



**St. Joseph Bowmanville Site Development**  
**90 Parkway Crescent, Bowmanville, Ontario L1C 1C3**  
**“Issued For Tender”**

**Project 25196**

**March 31, 2026**



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End of Section

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Dwg. No.	Title	Issue No.	Rev. No.	Issue Date
A000	Cover, Location Map and List of Drawings	3	-	March 31, 2026
<b>CIVIL</b>				
C001	Grading Plan	3	-	March 30, 2026
C002	General Notes and Details	3	-	March 30, 2026
<b>ARCHITECTURAL</b>				
A101	Overall Site Plan	2	-	March 31, 2026
A102	Part Site Demolition Plan	3	-	March 31, 2026
A103	Part Site Plan	3	-	March 31, 2026
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A601	Sections	3	-	March 31, 2026
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<b>STRUCTURAL</b>				
S201	General Notes, Location Plan, Part Plan, Sections & Details	3	-	March 31, 2026
<b>RETAINING WALLS</b>				
RW1	Wall Plan		-	March 30, 2026
RW2	Wall Layouts		-	March 30, 2026
RW3	Typical Wall Sections		-	March 30, 2026
RW4	Typ. Wall Details		-	March 30, 2026

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Work covered by contract documents
- .2 Owner
- .3 Place of the Work
- .4 Site access
- .5 Work sequence
- .6 Contractor use of premises
- .7 Engineer design
- .8 Designated substances: ACM and others
- .9 Building smoking environment
- .10 Special conditions
- .11 Site security
- .12 "By Others"
- .13 Protection of Drawings

### 1.2 Work Covered by Contract Documents

- .1 Work of this Contract comprises the construction of the St. Joseph Bowmanville Site Development as indicated on the Contract Drawings and Specifications.

### 1.3 Owner

- .1 Peterborough Victoria Northumberland and Clarington Catholic District School Board.

### 1.4 Place of the Work

- .1 The Work of this Contract is located at 90 Parkway Crescent, Bowmanville, Ontario L1C 1C3

### 1.5 Metric Project

- .1 This project is to be based on The International System of Units (SI). Measurements are expressed in metric (SI) units.
- .2 All dimensions are to be shown in meters and millimeters.

### 1.6 Site Access

- .1 Access to the site to be arranged by the Owner.
- .2 Provide secure construction fencing as specified and where directed.

### 1.7 Work Sequence

- .1 Construct Work continuously.

### 1.8 Contractors Use of Premises

- .1 Contractor has unrestricted use of site until Substantial Performance.

1.9 Engineer Design

- .1 Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Ontario to design such work. Refer to Section 01 78 00.

1.10 Designated Substances: ACM and Others

- .1 No asbestos-containing materials, as defined by O. Reg. 278/05, may be specified or used in any project.

1.11 Verification

- .1 All dimensions shall be verified on site, and all necessary modifications and adjustments shall be made as necessary to suit.

1.12 Building Smoking Environment

- .1 Smoking and vaping are prohibited in all work places within the Owner's buildings and on the Owner's property.

1.13 Special Conditions

- .1 The following general and special conditions apply:
  - .1 All existing surfaces and finishes are to be repaired wherever damaged during the course of the Work.

1.14 Site Security

- .1 Daily Inspection: Provide inspection of the work areas daily while the work is in progress and take whatever measures are necessary to secure the construction zones from theft, vandalism and unauthorized entry.

1.15 "By Others"

- .1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope of work but will be required to be done within the General Contractor's contract.

1.16 Use of Drawings

- .1 Drawings are not to be scaled.
- .2 Copies of architectural and structural "issued for construction" drawings in digital format will be made available for the contractors use under the following conditions.
  - .1 Copyright remains with BBA.
  - .2 The drawings will only be used for shop drawings for this project and not be put to any other use.
  - .3 BBA assumes no liability for errors or omissions in the drawings. The Contractor assumes all risk and expenses associated with the use of drawings in the production of his work.
  - .4 References to BBA and other Consultants must be deleted from the title block.
  - .5 The Contractor signs a release available from BBA that addresses the above items in more detail.

- .3 Arrangements for use of Sub-Consultant drawings must be made with the Appropriate Sub-Consultant.

1.17 Protection of Drawings

- .1 Copyright of electronic document belongs to the Consultant. Electronic documents may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.
- .2 Drawings, specifications and other contract related documents which are posted on Contractor controlled websites for access by sub-trades and suppliers, shall be posted only on password protected platforms with access only to those parties with an expressed interest in the Project.
- .3 Provide Consultant and Owner with access to such websites as noted above.

PART 2 PRODUCTS

3.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.2 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Consultants

- .1 ARCHITECT:  
Barry Bryan Associates  
201 - 250 Water Street  
Whitby, Ontario L1N 0G5  
Tel: (905) 666-5252  
Attention: Amanda Nguyen M.Arch, B.Des, MRAIC
  
- .2 STRUCTURAL ENGINEER:  
Barry Bryan Associates  
201 - 250 Water Street  
Whitby, Ontario L1N 0G5  
Tel: (905) 666-5252  
Attention: Mr. Doug McLaughlin, P. Eng.
  
- .3 CIVIL ENGINEER:  
Monument Civil Engineers  
335 Hwy 49,  
Deseronto, Ontario  
Tel: (613) 800-1579  
Attention: Josh Hoekstra, P.Eng.

PART 2 PRODUCTS

3.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.2 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Requests for Substitution (RFS) prior to execution of Contract.
- .2 Requests for Substitution (RFS) after execution of Contract.

### 1.2 Definitions

- .1 Products Not Available: When all listed manufacturers products in the specification section are no longer manufactured.
- .2 Proprietary Specification: a specification which includes one or more proprietary names of products or manufacturers, or both, and may also include descriptive, reference standard, or performance requirements, or any combination thereof.
- .3 Non-proprietary Specification: a specification which includes descriptive, reference standard or performance requirements, or any combination thereof, but does not include proprietary names of products or manufacturers.
- .4 Substitution: a product or manufacturer not specified by proprietary name, which may be acceptable in place of a product or manufacturer which, is specified by proprietary name.

### 1.3 Procedures

- .1 Product Options:
  - .1 For products specified by non-proprietary specification:
    - .1 Select any product by any manufacturer, which meets requirements of Contract Documents.
    - .2 Substitute an unnamed product or manufacturer in accordance with Substitutions – Manufacturers article of this Section.
  - .2 For products specified by proprietary specification:
    - .1 Select any product or manufacturer named, or
    - .2 Substitute an unnamed product or manufacturer in accordance with Substitutions – Manufacturers article of this Section.
  - .3 For products specified by proprietary specification and accompanied by words indicating that substitutions will not be accepted:
    - .1 Select any product or manufacturer named; substitutions are not permitted.
- .2 Substitution Requests Prior to Execution of Contract: Submit substitutions requests to Consultant no later than the time stated in the Instructions to Bidders.

### 1.4 Substitutions – Products

- .1 Substitute Products: Where substitute products are permitted, unnamed products may be accepted by the Consultant, subject to the following:
  - .1 Substitute products shall be the same type as, be capable of performing the same functions as, and meet or exceed the standards of quality and performance of the specified products.
  - .2 Substitutions for Cause: Changes proposed by Subcontractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - .3 Substitutions for Convenience: Changes proposed by Subcontractor or Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor or Subcontractor.

1.5 Substitutions – Manufacturers

- .1 Substitute Manufacturers: Where substitute manufacturers are permitted, unnamed manufacturers may be accepted by the Consultant, subject to the following:
  - .1 Substitute manufacturers shall have capabilities comparable to those of the named manufacturers.
  - .2 In making a substitution Contractor and the Subcontractor represents that they have:
    - .1 Investigated substitute product or manufacturer, or both, and determined it meets or exceeds the criteria of the specified product, and;
    - .2 Will provide the same warranty for the Substitution as for the specified product.
    - .3 Will make any changes to the Work necessitated by substitution as required for Work to be complete in all respects, and;
    - .4 Waives claims for additional costs and time caused by substitution which may subsequently become apparent.
    - .5 Will reimburse Consultant's services for review or redesign, additional studies, investigations, review of submittals, and associated contract administration.
    - .6 Received necessary approvals of authorities having jurisdiction.
    - .7 Investigated the proposed substitute to determine if license fees and royalties are pending.
    - .8 If accepted, the substitution will not adversely affect the Construction Schedule.
  - .3 Do not install requested Substitutions without Consultant's acceptance.
  - .4 If, in the Consultant's opinion, a substitution does not meet requirements of Contract Documents, Contractor shall, at no extra cost to Owner, provide a product which, in the Consultant's opinion, does meet requirements of Contract Documents.

1.6 Proprietary Specifications

- .1 Notwithstanding specified proprietary names of either or both products or manufacturers, products provided shall meet other applicable requirements of Contract Documents. Modify products if necessary, to ensure compliance with all requirements of Contract Documents.

1.7 Changes to Accepted Products and Manufacturers

- .1 Products and manufacturers accepted by the Consultant for use in performance of Work of Contract shall not be changed without Consultant's written consent. .
- .2 Submit requests to change accepted products and manufacturers to Consultant in writing, including product data indicated in Product Data article.

1.8 Product Data

- .1 When requested by the Consultant, submit complete data substantiating compliance of a product with requirements of Contract Documents. Include the following:
  - .1 Product identification, including manufacturer's name and address.
  - .2 Manufacturer's literature providing product descriptions, applicable reference standards, performance and test data, in form consistent with the Contract Documents and readily comparable with product being substituted and can provide the specified and indicated requirements.
  - .3 Samples, as applicable.
  - .4 Name and address of projects on which product has been used and date of each installation.
  - .5 Itemized comparison of substitution with named product(s). List significant variations.
  - .6 Designation of availability of maintenance services and sources of replacement materials
  - .7 Completed Substitutions Request Form. Incomplete forms will be rejected.

1.9 Consultant Procedure

- .1 In reviewing the supporting data submitted for substitutions, Consultant will use, for purposes of comparison, all the characteristics of the specified material or equipment as they appear in the manufacturer's published data even though all the characteristics may not have been particularly mentioned in the Specifications.
- .2 Consultant will review supporting data and will determine that the substitution in the Consultant's opinion is or is not able to meet or exceed the standards of quality, appearance and performance to the material specified.
- .3 Consultant will sign, date and issue the RFS indicating acceptance or refusal, with applicable pre-contract or contract documentation, to affected participants.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Requests for Information
- .2 Submittal Procedures
- .3 Screening of RFI's
- .4 Response to RFI's
- .5 Response Timing

### 1.2 Request for Information (RFI)

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

### 1.3 Submittal Procedures

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Number RFI's consecutively in one sequence in order submitted, in numbering system as established by the Contractor.
- .3 Submit one distinct subject per RFI form. Do not combine unrelated items on one form.
- .4 RFI Form:
  - .1 Submit a draft "Request for Information" form to be approved by the Owner and Consultant.
  - .2 Submit RFI's to the Consultant on approved "Request for Information" form. The Consultant shall not respond to an RFI except as submitted on this form.
  - .3 Where RFI form does not have sufficient space to provide complete information thereon, attach additional sheets as required.
  - .4 Submit with RFI form all necessary supporting documentation.
- .5 RFI Log:
  - .1 Maintain log of RFI's sent to and responses received from the Consultant, complete with corresponding dates.
  - .2 Submit updated log of RFI's at each construction meeting.
- .6 Submit RFI's sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do so will not be paid by the Owner.
- .7 Only the Contractor shall submit RFI's to the Consultant.
- .8 RFI's submitted by Subcontractors or Suppliers directly to the Consultant will not be accepted.

### 1.4 Screening of RFI's

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

description, or where the detail provided is, in the opinion of the Consultant, insufficient, shall not be reviewed by the Consultant and shall be rejected.

1.5 Response to RFI's

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

1.6 Response Timing

- .1 Allow 5 Working Days for review of each RFI by the Consultant.
- .2 Consultant's review of RFI commences on date of receipt of RFI submission by the Consultant from Contractor and extends to date RFI returned by Consultant.
- .3 When the RFI submission is received by Consultant before noon, review period commences that day. When RFI submittal is received by Consultant after noon, review period begins on the next Working Day.
- .4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 5 Working Days, the Consultant will confer with the Contractor within 3 Working Days of receipt of such RFI's, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority among the RFI's submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Preconstruction Conference
- .2 Project Meetings
- .3 On Site Documents
- .4 Cost Breakdown

### 1.2 Preconstruction Conference

- .1 The Consultant will call for and administer a Preconstruction Conference at time and place to be announced.
- .2 Contractor, all major Subcontractors, and major suppliers shall attend the Preconstruction Conference.
- .3 Agenda will include, but not be limited to, the following items.
  - .1 Permits
  - .2 Lines of communication and contact information
  - .3 Submittal and RFI procedures
  - .4 Schedules
  - .5 Personnel and vehicle permit procedures
  - .6 Use of premises
  - .7 Location of any Contractor on-site facilities
  - .8 Security
  - .9 Housekeeping
  - .10 Inspection and testing procedures, on-Site and off-Site
  - .11 Control and reference point survey procedures
  - .12 Health and safety
  - .13 Contractor's Schedule of Values
  - .14 Contractor's Schedule of Submittals
- .4 The Consultant will distribute copies of minutes to attendees. Attendees shall have seven days to submit comments or additions to minutes. Minutes will constitute final documentation of results of Preconstruction Conference.

### 1.3 Project Meetings

- .1 The Contractor will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
- .2 Meetings will be held minimum bi-weekly.

### 1.4 On-Site Documents

- .1 Maintain at job site, one copy each of the following:
  - .1 Contract drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed shop drawings, product data, and samples.
  - .5 Requests for Information (RFI's)
  - .6 Change Orders and other modifications to Contract.
  - .7 Field test reports.

- .8 Inspection certificates.
  - .9 Manufacturer's certificates.
  - .10 Geotechnical reports
  - .11 DSS reports
  - .12 Approved Work schedule.
  - .13 Manufacturers' installation and application instructions.
  - .14 Safety Data Sheets (SDS).
  - .15 Health and Safety Plan and other safety related documents.
  - .16 Other documents as specified.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
  - .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
  - .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
  - .5 Keep record documents and samples available for inspection by Consultant.
- 1.5 Cost Breakdown
- .1 Submit a detailed cost breakdown to Consultant at least ten working days prior to the submission of the first progress claim. After approval by Consultant the cost breakdown will be used as basis for progress payment.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

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

### 1.2 Submittals

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

### 1.3 Schedules Required

- .1 Submit schedules as follows:
  - .1 Construction Progress Schedule.
  - .2 Submittal Schedule for Shop Drawings and Product Data.
  - .3 Submittal Schedule for Samples.
  - .4 Product Delivery Schedule.
  - .5 Cash Allowance Schedule for purchasing Products or Services.
  - .6 Shutdown or Closure Activity.

### 1.4 Format

- .1 Prepare schedule in form of a horizontal bar chart using Microsoft Project 2016 or later.
- .2 Provide a separate bar for each major item of work, trade or operation.
- .3 Split horizontally for projected and actual performance.
- .4 Provide horizontal time scale identifying first work day of each week.
- .5 Format for listings: chronological order of start of each item of work.
- .6 Identification of listings: By Systems description.

### 1.5 Submission

- .1 Submit initial format of schedules within 10 working days after award of Contract.
- .2 Submit schedules in electronic format, by email as PDF files.
- .3 Consultant will review schedule and return reviewed copy within 10 days after receipt.
- .4 Resubmit finalized schedule within 7 days after return of reviewed copy.
- .5 During progress of Work revise and resubmit schedule as directed by Consultant.
- .6 Submit revised progress schedule with each application for payment.

- .7 Distribute copies of revised schedule to:
  - .1 Job site office.
  - .2 Subcontractors.
  - .3 Other concerned parties.
  - .4 Instruct recipients to report to Contractor within 10 days, any problems anticipated by timetable shown in schedule.
  
- .8 Table current and up to date schedule at each regular site meeting.

#### 1.6 Critical Path Scheduling

- .1 Include complete sequence of construction activities.
- .2 Schedules shall represent a practical plan to complete the work within the Contract period, and shall convey the plan to execute the work. Schedules as developed shall show the sequence and interdependencies of activities required for complete performance of the work.
- .3 The submittal of schedules shall be understood to be the Contractor's representation that the schedule meets the requirements of the Contract Documents and that the work will be executed in the sequence and duration indicated in the schedule.
- .4 Failure to include any element of work required for performance of the Contract or failure to properly sequence the work shall not excuse the Contractor from completing all work within the Contract Time.
- .5 All schedules shall be developed utilizing industry standard 'best practices' including, but not limited to:
  - .1 No open-ended activities.
  - .2 No use of constraints other than those defined in the Contract Documents without the prior approval of the Consultant.
  - .3 No negative leads or lags.
  - .4 No excessive leads or lags without prior justification and approval from the Consultant.
  - .5 For individual schedule construction activities, do not exceed 14 days in duration without prior approval of the Consultant. Subdivide activities exceeding 14 days in duration to an appropriate level.
  - .6 Sufficiently describe schedule activities to include what is to be accomplished in each work area. Express activity durations in whole days. Clearly define work that is to be performed by subcontract.
  - .7 Create the schedule in conformance with the work-hours and constraints set forth in these Contract Documents.
- .6 Include dates for commencement and completion of each major element of construction.
- .7 Show projected percentage of completion of each item as of first day of month.
- .8 Indicate progress of each activity to date of submission schedule.
- .9 Show changes occurring since previous submission of schedule:
  - .1 Major changes in scope.
  - .2 Activities modified since previous submission.
  - .3 Revised projections of progress and completion.
  - .4 Other identifiable changes.

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

1.7 Submittals Schedule

- .1 Include schedule for submitting shop drawings, product data, and samples. Indicate manufacture and delivery lead times into the shop drawing submittal schedule.
- .2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Administrative
- .2 Requests for Information
- .3 Shop Drawings and Product Data
- .4 Interference Drawings
- .5 Progress Photographs
- .6 Samples
- .7 Mock-Ups
- .8 Certificates and Transcripts

### 1.2 Administrative

- .1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in metric units.
- .4 Where items or information is not produced in metric units converted values are acceptable.
- .5 Verify field measurements and affected adjacent work are coordinated.
- .6 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review.
- .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's review.
- .8 Keep one reviewed copy of each submission on site.

### 1.3 Requests for Information (RFI's)

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

### 1.4 Shop Drawings and Product Data

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, product data and other data which the Contractor provides to illustrate details of a portion of Work.
- .2 Coordinate each submission with requirements of Work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in the Province of Ontario where required by the individual specification sections. Each submittal and each resubmittal must bear the stamp of the Engineer
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where

articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

- .5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.
- .6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.
- .7 Allow ten days for Consultant's review of each submission.
- .8 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .9 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
- .10 Accompany submissions with transmittal letter containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .11 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.
- .12 After Consultant's review, distribute copies.

- .13 Submit one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
  - .14 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
  - .15 Delete information not applicable to project.
  - .16 Supplement standard information to provide details applicable to project.
  - .17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
  - .18 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
    - .1 This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
    - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.
- 1.5 Interference Drawings
- .1 Prepare interference drawings to coordinate the installation of the work of all sections, within available space. Conflicts between trades which could be determined beforehand, by the careful coordination and preparation of interference drawings, shall be corrected at no expense to the Owner.
  - .2 Prepare interference drawings of all buried services as necessary to avoid conflicts with new or existing structures, foundations or services.
  - .3 Submit interference and equipment placing drawings as specified in Section 01 71 00, when requested by the Consultant.
- 1.6 Progress Photographs
- .1 Progress photograph to be electronically formatted and labelled as to location and view.
- 1.7 Samples
- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin, manufacturer, product information, applicable specification section, and intended use.
  - .2 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
  - .3 Where colour, pattern or texture is criterion, submit full range of manufacturer's samples.

- .4 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .5 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.8 Mock-Ups

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

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Administrative
- .2 Fires
- .3 Disposal of Wastes
- .4 Drainage
- .5 Excess Soil Management
- .6 Pollution Control
- .7 Unanticipated Soil Contamination

### 1.2 References

- .1 Statutes of Canada 1999 Chapter 33.
  - .1 Canadian Environmental Protection Act 1999.
  - .2 SOR/2003-289. Federal Halocarbon Regulations, 2003.
  - .3 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
- .2 OPSS 805 "Construction Specification for Temporary Erosion and Sediment Control Measures".
- .3 Province of Ontario Environmental Protection Act, R.S.O. 1990, c. E.19
- .4 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

### 1.3 Administrative

- .1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation, including those referenced above.
- .2 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.
- .3 It is the Contractor's responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.
- .4 It is the Contractor's responsibility to obtain and abide by permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction.
- .5 All hazardous materials are to be stored with secondary containment

### 1.4 Fires

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

### 1.5 Disposal of Wastes

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

### 1.6 Drainage

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing deleterious substances into waterways, sewer or drainage systems.
- .3 Protect storm drains against entry by sediment, debris, oil, or chemicals.

- .4 Control disposal or runoff of water containing deleterious substances or other harmful substances in accordance with local authority requirements.

#### 1.7 Excess Soil Management

- .1 Comply with the requirements of Ontario Regulation O. REG 406/19, "On-Site and Excess Soil Management", for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

#### 1.8 Pollution Control

- .1 Maintain, inspect, and repair temporary erosion and pollution control features installed under this contract on a weekly basis. Submit inspection logs to the Owner when requested.
- .2 Control emissions from equipment and plant to conform to federal, provincial, and municipal requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .4 Take all measures necessary to prevent material and mud tracking on adjacent roads and streets.
- .5 Use mechanical sweepers as often as necessary to keep adjacent roads and streets clean of material and mud that is deposited from this project.
- .6 On site disposal or clean out of concrete trucks is not permitted. Any spillage of concrete onto asphalt or other surfaces must be cleaned up before spillage sets.

#### 1.9 Unanticipated Soil Contamination

- .1 Should unanticipated soil contamination be discovered:
  - .1 Stop work and assess the situation for safety.
  - .2 If situation does not appear to be safe, evacuate workers from area.
  - .3 If safe to do so, take immediate steps to control any spread of contamination, in accordance with Contractor's spill prevention and response plan.
  - .4 Immediately contact the Consultant.
- .2 Removal and disposal off site of contaminated materials shall comply with the requirements of Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management.

### PART 2 PRODUCTS

#### 2.1 Not Used

- .1 Not used

### PART 3 EXECUTION

#### 3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

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

### 1.2 References

- .1 Perform Work in accordance with Ontario Building Code (OBC), National Fire Code of Canada (NFC), the Canadian Electrical Code CSA C22.1:21, including all Supplements and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Where a material is designated in the Contract Documents for a certain application, unless otherwise specified, that material shall conform to standards designated in the Code. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned Code.
- .3 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.
  - .3 Manufacturer's instructions.
- .4 Where requirements of Contract Documents exceed Code requirements provide such additional requirements.
- .5 Where the Contract Documents or the Building Code do not provide all information necessary for complete installation of an item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

### 1.3 Owner's Regulations

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

### 1.4 Standards and Definitions

- .1 Where a reference is made to specification standards produced by various organizations and agencies, conform to latest edition of standards, as amended and revised to date of Contract.
- .2 Have a copy of each specified standard which relates to the work available on the site to be produced immediately on Consultant's request.

### 1.5 Hazardous Materials

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

handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.

- .2 Provide SDS for all materials brought to the Place of Work.
- .3 Hazardous Materials will not be introduced for experimental or any other use prior to being evaluated for hazards.
- .4 Make known to the Consultant those hazardous materials or designated substances intended to be used in the workplace and receive permission to use before introducing to the Owner's property.
- .5 Many common construction materials such as asbestos pipe and various insulations are designated substances and shall not be used under any circumstances.

#### 1.6 Spills Reporting

- .1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Consultant. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1999.
- .2 All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.
- .3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

#### 1.7 Protection of Water Quality

- .1 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geo-textile coverage will be required.
- .2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the watercourses.
- .3 Provide all de-watering and sedimentation control required to properly complete the work of this contract.
- .4 Supply, install and maintain silt/sediment control fencing along the edge of the site or where indicated to intercept construction runoff silt, to the satisfaction of the Owner.

#### 1.8 Potable Water Systems

- .1 Potable water systems in completed buildings must meet criteria and guidelines established by Provincial and Municipal authorities, prior to occupancy by the Owner.
- .2 Upon completion, submit testing certificates verifying water quality and water systems meets all applicable Provincial and Legislated Standards

1.9 Soils Management

- .1 Comply with the requirements of Ontario Regulation O. REG 406/19, "On-Site and Excess Soil Management", for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.10 Access for Inspection and Testing

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

1.11 Other Regulatory Requirements

- .1 Conform to the requirements of the Ontario Ministry of Transportation, Regional and Local authorities regarding transportation of materials.
- .2 Obtain required road occupancy permits.
- .3 Pay any required roadway damage deposits required by the local municipality.
- .4 Conform to the requirements of the Ontario Ministry of the Environment.
- .5 Conform to the requirements of the Ontario Ministry of Labour.
- .6 Conform to the requirements of the local Conservation Authority.
- .7 Conform to all applicable local by-laws, regulations and ordinances.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Inspection
- .2 Independent Inspection Agencies.
- .3 Access to Work
- .4 Procedures
- .5 Rejected Work
- .6 Reports
- .7 Contractors Responsibilities
- .8 Tests and Mix Designs

### 1.2 Inspection

- .1 Contractor is responsible for Quality Control (QC).
- .2 Allow Owner and Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .5 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

### 1.3 Independent Inspection Agencies

- .1 Independent Inspection and Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor and paid from the cash allowances specified in Section 01 21 13. Refer to Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re-inspection.

### 1.4 Access to Work

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

1.5 Procedures

- .1 Notify Owner and Consultant 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples

1.6 Rejected Work

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other work damaged by such removals or replacements promptly.
- .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Consultant will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.7 Reports

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

1.8 Contractors Responsibilities

- .1 Be responsible for the execution of the Construction Quality Plan and is to pay all costs for the execution of the Construction Quality Plan. Designate an experienced site representative for carrying out the Construction Quality Plan.
- .2 Provide the Owner with a completed quality product for the Work. Contractor shall be responsible for any costs associated with re-testing and reperforming the Work as a result of the Contractor's poor performance or workmanship or other failure to comply with the Contract Documents.
- .3 All Work shall be done by persons qualified in their respective trades, and the workmanship shall be first-class in every respect. Contractor is responsible for ensuring employees are appropriately trained. All materials and equipment furnished shall be the best of their respective kinds for the intended use and unless otherwise specified, same shall be new and of the latest design.
- .4 The Consultant will have the authority to reject Work that does not conform to the Contract Documents or may require special inspection or testing, whether or not such Work is to be then fabricated, installed or completed.
- .5 Failure by a Contractor to conduct its operations, means and methods and coordinate proper sequencing of the Work may cause the Owner to withhold payment or any other means deemed necessary to correct non-conforming Work.

- .6 The Owner shall engage a testing firm to perform such engineering laboratory services and on-site inspection as deemed necessary by the Owner. The testing firm will determine compliance with the requirements of the Contract Documents. This Work will not be a service to the Contractors for the performing of tests and checking of materials required of the Contractors.
  - .7 Copies of test and inspection reports will be furnished to the Contractor. The laboratory and its representatives will be instructed to promptly call to the attention of the Contractor, any instance of non-compliance with the requirements of the Contract Documents. Failure to so notify the Contractor shall not relieve the Contractor of any of its responsibilities for compliance or making good workmanship or materials which are not in compliance with the requirements of the Contract Documents. The agency shall notify the Consultant and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services
  - .8 Contractor's construction materials, procedures and work shall be subject to specified testing procedures and shall be in conformance with the Contract Documents as verified by Testing Agency.
  - .9 Cooperate with the testing firm and provide labor to assist with sample preparations where applicable.
  - .10 Except where specifically indicated to be provided by another entity as identified, inspections, tests, and similar quality control services including those specified to be performed by independent agency are the Contractor's responsibility, and costs thereof are not to be included in contract sum.
  - .11 Cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to Work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at Project site.
  - .12 Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of Work and without the need of removal/replacement of work to accommodate inspections and tests. Scheduling of times for inspections, tests, taking of samples, and similar activities is Contractor's responsibility.
  - .13 Where sampling and testing is required for Sections of Work listed in the Contract Documents, the tests shall be performed by an independent testing lab and paid for by the Contractor.
  - .14 Test procedures to be used shall be submitted for approval of the Consultant where other than those specified are recommended by the testing agency.
  - .15 Testing Agency Duties: The independent Testing Agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner, the Consultant and Contractors in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
  - .16 Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.
- 1.9 Tests and Mix Designs
- .1 Furnish test results and mix designs as requested.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Temporary utilities

### 1.2 Installation and Removal

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

### 1.3 Dewatering

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

### 1.4 Water Supply

- .1 Existing sources of water can be made available to the Contractor at no charge, subject to operational requirements. Arrange for connection and pay all costs for installation, maintenance and removal. Conversions or alterations to existing sources of water to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

### 1.5 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 flameless type. Solid fuel salamanders are not permitted, unless prior approval is given by the Consultant.
- .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:
  - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4 Ventilate storage spaces containing hazardous or volatile materials.
  - .5 Ventilate temporary sanitary facilities.
  - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

- .6 Permanent heating system of building may not be used when available, unless there are savings to the Contract Price and Consultant's written permission is obtained stating conditions of use, provisions relating to guarantees on equipment and operation and maintenance of system. Be responsible for damage to heating system if use is permitted.
- .7 On completion of Work for which permanent heating system is used, replace filters.
- .8 Ensure Date of Substantial Performance and warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .9 Pay costs for maintaining temporary heat, when using permanent heating system. Owner will pay utility charges when temporary heat source is existing building equipment.
- .10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform to applicable codes and standards.
  - .2 Enforce safe practices.
  - .3 Prevent abuse of services.
  - .4 Prevent damage to finishes.
  - .5 Vent direct fired combustion units to outside.
- .11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

#### 1.6 Temporary Power and Light

- .1 Existing sources of electric power can be made available to the Contractor. Conversions or alterations to existing sources of electric power to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected.
- .4 Provide and maintain temporary lighting throughout project. Lighting levels shall be sufficient to complete work including inspections. Provide minimum lighting levels of 400 lux at work areas. Lighting levels at floors and stairs not within work areas shall be not less than 160 lux at all times during construction activity.
- .5 All equipment used shall be CSA approved.
- .6 Wiring and method of installation shall conform to local power requirements and shall be reviewed by a licensed inspector prior to use.

#### 1.7 Temporary Communication Facilities

- .1 Provide and pay for temporary telephone, fax, cellular data, lines and all equipment necessary for Contractor's own use.

### PART 2 PRODUCTS

#### 2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Construction aids
- .2 Site storage
- .3 Construction parking
- .4 Offices
- .5 Equipment, tool and material storage
- .6 Sanitary facilities
- .7 Signage
- .8 Shoring

### 1.2 References

- .1 CSA Group (CSA)
  - .1 CAN/CSA Z321-96 (R2006) Signs and Symbols for the Workplace
  - .2 CSA Z797:18 (R2023) Code of Practice for Access Scaffold

### 1.3 Installation and Removal

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

### 1.4 Scaffolding

- .1 Scaffolding in accordance with CSA Z797.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs.
- .3 Enclose and heat scaffolding during cold weather.

### 1.5 Hoisting

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment.
- .2 Hoists and cranes shall be operated by qualified operator.

### 1.6 Site Storage/Loading

- .1 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.

### 1.7 Construction Parking

- .1 Parking will be permitted on site at areas designated by the Owner provided it does not disrupt performance of Work or ongoing Owners operations.
- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of

Contract and make good damage resulting from Contractors' use of roads.

1.8 Offices

- .1 General Contractor and Subcontractors may provide their own offices as necessary and subject to site constraints. Direct location of these offices.

1.9 Equipment, Tool and Material Storage

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

1.10 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.

1.11 Construction Signage

- .1 Direct requests for approval to erect a Contractor signboard to Consultant.
- .2 Signs and notices for safety and instruction shall be in English. Graphic symbols shall conform to CAN/CSA Z321.
- .3 Post "Construction Zone" signage outside barrier and entrance to all work areas.
- .4 Maintain approved signs and notices in good condition for duration of project and dispose of off-site on completion of project.
- .5 Install signage to direct site traffic and deliveries to the Construction work areas.

1.12 Shoring

- .1 Examine the site to determine the conditions under which work will be performed.
- .2 Contractor shall formulate his own conclusions as to the extent of the existing conditions and shoring required.
- .3 The method of shoring shall be according to the Contractor's and his Engineer's directions.
- .4 All existing loads must be shored prior to commencement of demolition and removal of load bearing elements.
- .5 All shoring and frame braces must be supplied with a safe load rating which must not be exceeded. Install in accordance with manufacturer's recommended procedures and safety guidelines. Ensure that the safe load conditions of the shoring are not exceeded by dead, live or construction loads.
- .6 All shoring shall be subject to the Consultant's review and approval prior to commencing demolition work.

- .7 Completely remove all shoring after new structure is installed and all concrete is set.
- .8 Submit shoring drawings and a proposed installation procedure stamped by a professional engineer registered in the Province of Ontario. Procedures shall follow the information provided on these drawings. The shoring design engineer shall be retained and paid for by the Contractor. The shoring engineer shall review all existing conditions on site prior to completing shoring design.
- .9 Removal of existing materials without proper engineered shoring is a safety hazard and will not be permitted.
- .10 Make good all damage to the existing structure and adjoining structures and bear full responsibility for failure to provide adequate shoring.
- .11 The failure or refusal of the Consultant to suggest the use of shoring, shall not in any way or to any extent relieve the Contractor of any responsibility concerning the condition of the work or of any of their obligations under the Contract, nor impose any liability on the Owner or their agents; nor shall any delay, whether caused by any action or want of action on the part of the Contractor, or by any act of the Owner, or their agents, or employees, relieve the Contractor from necessity of properly and adequately protecting the existing structure from collapse or damage, nor from and of his obligations under the Contract relating to injury to persons or property, nor entitle him to any claims for extra compensation or an extension in schedule.

## PART 2 PRODUCTS

### 2.1 Not Used

- .1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

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

### 1.2 Installation and Removal

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

### 1.3 Site Fencing

- .1 Contractor's lay-down area designated by the Owner must be secure and there must be no access by unauthorized persons. Provide temporary fencing around whole work site. Use modular free-standing fencing: galvanized, minimum 1.8m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed. Equip all gates with locks and keys. Maintain fence in good repair.

### 1.4 Guard Rails and Barricades

- .1 Provide secure, rigid guard rails and barricades around deep excavations and wherever else necessary to prevent accidental falls.
- .2 Provide as required by governing authorities.

### 1.5 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.

### 1.6 Protection of Building Finishes

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

### 1.7 Protection of Surrounding Work

- .1 Provide protection for finished and partially finished Work from damage.
- .2 Provide necessary cover and protection.
- .3 Be responsible for damage incurred due to lack of or improper or inappropriate protection.

1.8 Public Traffic Flow

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

1.9 Fire Routes

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

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Tolerances for Execution of Work.
- .5 Protection of Work in progress.
- .6 Existing Utilities

### 1.2 Quality

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

### 1.3 Availability

- .1 Review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

### 1.4 Storage, Handling and Protection

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store 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 and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.5 Transportation

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor shall be responsible for the unloading, handling and storage of such products.

1.6 Manufacturer's Instructions

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

1.7 Quality of Work

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.8 Coordination

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

1.9 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.

1.10 Tolerances for Execution of Work

- .1 Unless specifically indicated otherwise, Work shall be installed plumb, level, square and straight.
- .2 Unless acceptable tolerances are otherwise specified in specification sections, or are otherwise required for proper functioning of equipment, site services and mechanical and electrical systems:

- .1 "Plumb and level" shall mean plumb or level within 1 mm in 1m.
- .2 "Square" shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
- .3 "Straight" shall mean within 1 mm under a 1 m long straight edge.
- .4 "Flush" shall mean within:
  - .1 6 mm for exterior concrete and paving materials.

.3 Allowable tolerances shall not be cumulative

#### 1.11 Protection of Work in Progress

- .1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by Consultant, at no increase in Contract Price or Contract Time.
- .2 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of the Consultant.

#### 1.12 Existing Utilities

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

#### 1.13 Hazardous Materials

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

### PART 2 PRODUCTS

#### 2.1 Not Used

- .1 Not used

### PART 3 EXECUTION

#### 3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

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

### 1.2 References

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Fire Commissioners of Canada, FC 301, Standard for Construction Operations
- .3 National Fire Protection Agency (NFPA)
  - .1 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 Occupational Health and Safety Act
  - .1 R.R.O. 1990, Reg. 860: Workplace Hazardous Materials Information System (WHMIS)
  - .2 O. Reg. 632/05: Confined Spaces
- .5 Ontario Building Code

### 1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit to Owner and Consultant copies of the following documents, including updates issued:
  - .1 Notice of Project filed with Provincial Ministry of Labour or equivalent for Place of Work
  - .2 Site-specific Health and Safety Plan prior to commencement of work on the work site. Plan shall include but not be limited to the following:
    - .1 Name and contact info of Contractor's Health and Safety Representative for Work Site; including twenty-four (24) hour emergency contact phone numbers.
    - .2 Phone numbers of local fire, police, and ambulance outside of 911 services.
    - .3 Location of nearest medical facility and level of injury that each can service.
  - .3 Submit to the Owner, Consultant and Municipal Fire Department, for review, a "Fire Safety Plan" conforming to Section 2.14 of the National Fire Code of Canada. Maintain a copy of the "Fire Safety Plan" on site.
  - .4 Copies of certification for all employees on site of applicable safety training including, but not limited to:
    - .1 WHMIS.
    - .2 Fall arrest and protection.
    - .3 Suspended Access Equipment.
    - .4 Erection of Scaffolding.
    - .5 License for powder actuated devices.
  - .5 On-site Contingency and Emergency Response Plan addressing:
    - .1 Standard procedures to be implemented during emergency situations.
    - .2 Preventative planning and protocols to address possible emergency situations.
- .3 Guidelines for handling, storing, and disposing of hazardous materials that maybe encountered on site, including measures to prevent damage or injury in case of an accidental spill.
- .4 Incident and accident reports, promptly if and upon occurrence
  - .1 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
  - .2 Accident or Incident Reports, within 24 hours of occurrence.

- .5 Submit other data, information and documentation upon request by the Consultant as stipulated elsewhere in this section.

#### 1.4 Compliance Requirements

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

#### 1.5 Constructor

- .1 Notify all regulatory bodies required for construction activities, (i.e., Notice of Project, employer notification, etc.). Notifications shall include, but not be limited to, the notification requirements laid out in OHS Act Sec 51-53 and the requirements of Ontario Regulation 213/91 for Construction Projects, Sections 5, 6 and 7. For the purpose of this contract the Contractor shall be the "Constructor".
- .2 The "Constructor" will be solely responsible for the safety of all persons on the Site.

#### 1.6 Safety Requirements

- .1 Observe and enforce all construction safety measures and comply with the latest edition and amending regulations of the following documents and in the event of any differences among those provisions, the most stringent shall apply:
  - .1 Occupational Health and Safety Act and Regulations for Construction Projects, August 1997, Ontario Regulation 213/91 including amendments.
  - .2 Hazardous Products Act and Canada Labour Code.
  - .3 The Workplace Safety and Insurance Board, O. Reg 454.
  - .4 Ontario Building Code Act, Ontario Regulation 332/12 including amendments.
  - .5 National Building Code of Canada, Part 8: Safety Measures on Construction and Demolition Sites.
  - .6 National Fire Code of Canada.
  - .7 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition
  - .8 Environmental Protection Act.
  - .9 The Power Commission Act.
  - .10 The Boiler and Pressure Vessels Act.
  - .11 The Elevators and Lifts Act.
  - .12 The Operating Engineer's Act.
  - .13 Municipal statutes.
- .2 Obey all Federal, Provincial and Municipal Laws, Acts, Statutes, Regulations, Ordinances and By-laws which could in any way, pertain to the work outlined in the Contract, or to any employees of the Contractor. Satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a Contractor, and Constructor and/or Employer with respect to or arising out of the performance of the Contractors obligations under this Contract.
- .3 Working at Heights: The supervisor of the project, will be responsible to ensure that his employees and subcontractors/suppliers have current Working at Heights and Fall Protection certification.
- .4 The supervisor of the project will be responsible for his employees and subcontractors/suppliers maintaining standard safety practices, as well as the specific safety rules listed below, while working on the Owner's property.
- .5 The Owner reserves the right to order individuals to leave the site if the individual is in violation of

- any safety requirement or any Act. Any expense incurred will be the responsibility of the Contractor.
- .6 Notify the Owner should any hazardous condition become apparent.
  - .7 Enforce the use of CSA approved hard hats, reflective vests and safety boots for all persons entering or working at the construction site. Refuse admission to those refusing to conform to this requirement.
  - .8 Provide safeguard and protection against accident, injury or damage to any person on the site, adjacent work areas and adjacent property.

#### 1.7 Confined Space

- .1 Confined Space: Where applicable, provide the Consultant and all Regulatory Authorities with a copy of the Contractors' Confined Space Entry Procedure. In the event that defined procedures are not available, abide by the applicable requirements of the Occupational Health and Safety Act and all regulations made thereunder.
- .2 Persons intended to work in confined spaces, as defined by the Owner, must have formal training in performing work in confined spaces.
- .3 Provide proof of valid certificates of such training for all workers prior to entry of such workers into confined spaces.
- .4 Provide all necessary safety equipment for entry into confined spaces.
- .5 Where workers are required to enter a confined space, as defined by the OHSA, O. Reg. 632/05 Section 221.2, ensure that workers of the Contractor and all Subcontractors follow the requirements of the above legislation, including but not limited to:
  - .1 Having a method for recognizing each confined space to which the program applies
  - .2 Having a method for assessing the hazards to which workers may be exposed
  - .3 Having a method for the development of confined space entry plans (which include on-site rescue procedures)
  - .4 Having a method for training workers
  - .5 Having an entry-permit system.
  - .6 Supply the necessary tools and equipment to perform the confined space entry. These items include, but are not limited to, required documentation, gas detectors, breathing equipment, fall protection and rescue equipment.

#### 1.8 Safety Meetings

- .1 Site toolbox safety meetings will be held weekly for all Contractor employees and all sub trade contractors.
- .2 Where a Joint Health and Safety Committee is required on a project, workers and supervisors, selected, as members of the committee must attend.

#### 1.9 Workplace Hazardous Materials Information System (WHMIS)

- .1 Be familiar with WHMIS regulations and be responsible for compliance.
- .2 Provide to the Consultant a list of Designated Substances that will be brought to the site prior to commencing work. Safety Data Sheets (SDS) and the hazardous material inventory for each substance listed must be kept on the Project.

- .3 Be responsible for all other requirements of regulations as applicable to Employers.
- .4 All controlled products to be properly labelled and stored.
- .5 Immediately inform Owner and Consultant if any unforeseen or peculiar safety-related factor, hazard, or condition becomes evident during performance of Work.

1.10 Fire Protection

- .1 Provide and maintain safeguard and protection against fire in accordance with current fire codes and regulations.
- .2 Provide temporary fire protection throughout the course of construction. Particular attention shall be paid to the elimination of fire hazards.
- .3 Comply with the requirements of FCC No. 301 Standards for Construction Operations issued by the Fire Commissioner of Canada and the National Building Code.
- .4 Provide and maintain portable fire extinguishers during construction, in accordance with Part 6 of the National Fire Code of Canada 2015 and NFPA 241.
- .5 Maintain unobstructed access for firefighting at all areas in accordance with the National Building Code of Canada.

1.11 First Aid

- .1 Provide such equipment and medical facility as required by WSI Act to supply first aid services to anyone who may be injured at the place of Work. Report all accidents or injuries to the proper authorities and to the Owner and Consultant.

1.12 Accident Reporting

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

1.13 Records on Site

- .1 Maintain on site a copy of the safety documentation as specified in this Section and any other safety related reports and documents issued to or received from the authorities having jurisdiction.
- .2 Upon request, make copies available to the Consultant.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Field Engineering survey services.
- .2 Survey services to establish and confirm inverts for Work.
- .3 Recording of subsurface conditions found.

### 1.2 References

- .1 Owner's identification of existing survey control points and property limits.

### 1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit name and address of Surveyor to Consultant.
- .3 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .4 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

### 1.4 Examination of Work and Site

- .1 Examine the site and existing building to be fully informed of their particulars as related to the Work.
- .2 Verify dimensions of completed Work in place before fabrication of Work to be incorporated with it. Ensure that all necessary job dimensions are taken for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions.
- .3 No claims for extra payment will be paid for extra work made necessary or for difficulties encountered due to conditions of the site which were visible or reasonably inferable from an examination of the site at the time prior to tender closing date and furthermore, failure of the Contractor to visit and examine the site shall be deemed a waiver of all claims for extra payment due to any condition of the site existing prior to tender closing date.
- .4 As-found damage: Record by photography and submit evidence to Consultant before commencing work, any found damaged surfaces or materials adjacent to new work, and not included under scope of this new work. Remedial work to any damage, not so recorded, shall be the responsibility of the Contractor.

### 1.5 Qualifications of Surveyor

- .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

### 1.6 Survey Reference Points

- .1 Existing control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Consultant.

- .4 Report to Consultant when reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.7 Survey Requirements

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

1.8 Existing Services

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings. The Contractor is responsible for coordination of all utility locates.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut off points as directed by Consultant.
- .3 Where Work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to building occupants, pedestrian and vehicular traffic.
- .4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .5 Install temporary drain plugs to prevent construction debris from blocking pipes downstream of the work.

1.9 Location of Services, Equipment and Fixtures

- .1 Location of site services where required, is approximate and is based on information provided by the Owner. Undertake all locates to determine exact locations of existing services and lay out new services to avoid any conflicts with new building elements, including site improvements, building foundations and other new or existing services.
- .2 Submit field drawings and interference drawings to indicate relative position of various services and equipment. Refer to requirements for interference drawings specified elsewhere.
- .3 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance and access are indicated and maintained.

1.10 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.

1.11 Subsurface Conditions

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

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

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

### 1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit written request and obtain Consultant's approval in advance of cutting or alteration which affects:
  - .1 Structural integrity of any element of Project.
  - .2 Efficiency, maintenance, or safety of any operational element.
  - .3 Visual qualities of sight exposed elements
- .3 Include in request:
  - .1 Location and description of affected Work.
  - .2 Statement on necessity for cutting or alteration.
  - .3 Description of proposed Work, and products to be used.
  - .4 Alternatives to cutting and patching.
  - .5 Date and time work will be executed.

### 1.3 Materials

- .1 As specified and required for original installation.

### 1.4 Definitions

- .1 Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- .2 Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

## PART 2 PRODUCTS

### 2.1 Materials

- .1 General: Comply with requirements specified in other Sections.
- .2 In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
- .3 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

## PART 3 EXECUTION

### 3.1 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.

### 3.2 General

- .1 Carry out all cutting, fitting and patching required for the work of the Contract.
- .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 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

### 3.3 Cutting and Patching

- .1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- .2 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- .3 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - .2 Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - .3 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - .4 Proceed with patching after construction operations requiring cutting are complete.
- .4 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
- .5 Clean areas where cutting and patching are performed.

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

- .1 Progressive Cleaning
- .2 Final Cleaning

### 1.2 References

- .1 National Fire Protection Association (NFPA)
  - .1 NFPA 241-22 Standard for Safeguarding Construction, Alteration, and Demolition Operations

### 1.3 Project Cleanliness

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use clearly marked separate bins for recycling.
- .7 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

## PART 2 PRODUCTS

### 2.1 Products

- .1 All cleaning materials and products shall be low VOC type. Submit list of cleaning products including SDS for approval prior to commencement of cleaning operations.
- .2 Use only cleaning materials recommended by manufacturer of surface to be cleaned and recommended by cleaning material manufacturer.

## PART 3 EXECUTION

### 3.1 Final Cleaning

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.

- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Broom clean and wash exterior paved areas, walks, steps and surfaces; rake clean other surfaces of grounds.
- .5 Remove dirt and other disfiguration from exterior surfaces.
- .6 Remove snow and ice from access to building.

3.2 Waste Management and Disposal

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

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

### 1.2 References

- .1 O. Reg. 102/94 Waste Audits and Waste Reduction Work Plans.
- .2 O. Reg. 278/05 Occupational Health and Safety Act

### 1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit a completed Waste Management Plan (WMP) prior to project start-up.

### 1.4 Definitions

- .1 Waste Management Plan (WMP): Contractor's approved overall strategy for waste management including waste reduction workplan and materials source separation program.
- .2 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .3 Separate Condition: Refers to waste sorted into individual types.

### 1.5 Waste Management Goals for the Project

- .1 The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing over packaging and poor quantity estimating.
- .2 Of the waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling. Waste disposal in landfills or incinerators shall be minimized.

1.6 Waste Management Plan

- .1 Waste Management Plan: Submit a Waste Management Plan within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner. The Plan shall contain the following:
  - .1 Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight). In the case of demolition, a list of each item proposed to be salvaged during the course of the project should also be prepared
  - .2 Alternatives to Land Filling: Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.
- .2 Post WMP or summary where workers at site are able to review its content.

1.7 Materials Source Separation Program

- .1 The Waste Management Plan shall include a Source Separation Program for recyclable waste and shall be in accordance with the established policies currently in place at the local Municipality, and the requirements of O. Reg. 102/94.
- .2 Prepare MSSP and have ready for use prior to project start-up.
- .3 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.
- .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.
- .5 Provide containers to deposit reusable and/or recyclable materials.
- .6 Locate containers to facilitate deposit of materials without hindering daily operations.
- .7 Locate separated materials in areas which minimize material damage.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

1.8 Disposal of Wastes

- .1 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .2 Provide appropriate on-site containers for collection of waste materials and debris. Containers for volatile wastes shall be closed containers and shall be removed from site daily.
- .3 Provide and use clearly marked separate bins for recycling.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.
- .5 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .6 Do not permit waste to accumulate onsite.

- .7 Burying of rubbish and waste materials is prohibited.
- .8 Disposal of waste into waterways, storm or sanitary sewers is prohibited.

1.9 Scheduling

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

1.10 Storage, Handling and Protection

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Owner.
- .2 Materials from building demolition to be salvaged or re-used are to be removed and salvaged.
- .3 Unless specified otherwise, materials for removal become Contractor's property.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Application

- .1 Do work in compliance with Waste Management Plan.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.2 Diversion of Materials

- .1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Owner, and consistent with applicable fire regulations. Mark containers or stockpile areas.
- .2 On-site sale of materials is not permitted.

End of Section

## PART 1 GENERAL

### 1.1 Section Includes

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

### 1.2 References

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

### 1.3 Review and Takeover Procedures

- .1 In accordance with OAA/OGCA Document 100, latest edition, except where specified otherwise.
- .2 In OAA/OGCA Document 100, where the term "Architect" is used, substitute the term "Consultant", and where the term "inspection" is used in relation to the Consultant's assessment of the Work, substitute the term "review".
- .3 Arrange and pay for review by local authorities to obtain permission to occupy/occupancy permit (where applicable) prior to applying for Ready-for-Takeover.

### 1.4 Inspection and Declaration

- .1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
  - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .2 Request Consultant's review.
- .2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
  - .1 Work has been completed and inspected for compliance with Contract Documents.
  - .2 Defects have been corrected and deficiencies have been completed.
  - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
  - .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA, ESA and other regulatory agencies have been submitted.
  - .5 Operation of systems have been demonstrated to Owner's personnel.
  - .6 Work is complete and ready for Final Review by the Consultant.
- .4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.
- .5 Declaration of Substantial Performance: when Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and Payment of Holdback for specifics to

application.

- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.5 – Final Payment for specifics to application.
- .8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2, General Conditions Article 5.4 - Substantial Performance of Work and Payment of Holdback.

## PART 2 PRODUCTS

### 2.1 Not Used

- .1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 Submittals

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

### 1.2 Operating and Maintenance Manuals

- .1 Collect reviewed submittals and assemble documents executed by Subcontractors, suppliers, and manufacturers including red-lined as-builts.
- .2 Minimum two weeks prior to commencement of scheduled commissioning activities, submit 2 copies of the draft Operating and Maintenance Manuals, for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor 1 draft copy, with review comments, for revision. Submit 1 copy of the revised Operating and Maintenance for approval prior to the production of final copies. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final Operating and Maintenance Manuals.
- .3 Bind contents in a three ring, hard covered, black plastic jacketed binder, with labelling pocket on spine and with 'D' type rings. Size for 8-1/2" x 11" size paper, enclose title sheet labelled "Operating and Maintenance Data Manual", project name, date and list of contents. Organize contents into applicable sections of work to parallel project specification breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .4 Include following information as applicable, plus data specified elsewhere:
  - .1 Copy of certificates issued by other utilities.
  - .2 Copies of field tests.
  - .3 Copies of all inspection and testing reports.
  - .4 Maintenance instructions for finished surface and materials.
  - .5 Names, addresses and phone numbers of Contractor, Subcontractors and Suppliers, including local source of supplies and replacement parts.
  - .6 Manufacturer's product guarantees and warranties, executed in the name of the Owner, showing name and address of project and guaranty/warranty commencement date and duration of guaranty/warranty, and clear indication of what is being guaranteed and what remedial action will be taken under guaranty/warranty.
    - .1 Separate each warranty or guarantee with index keyed to Table of Contents listing.
    - .2 List subcontractor, supplier, and manufacturer with name, address, and telephone number of responsible principal.
    - .3 Co-execute submittals when required.
  - .7 Additional material used in project listed under various sections showing name of manufacturer and source of supply.
  - .8 A letter on company letterhead clearly stating and verifying that no materials or products containing more than 0.1 per cent asbestos by dry weight has been applied or installed on the project.
- .5 Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.
- .6 Manuals shall include complete set of reviewed shop drawings and product data sheets, indicating corrections and changes made during fabrication and installation.
- .7 Create electronic copies of manuals, in their entirety in a searchable PDF file format saved to USB flash-drive.
- .8 Building will not be deemed ready for use unless the draft copies of the Operating and Maintenance

Manuals and the "As-built" Record Documents have been submitted and reviewed by the Consultant.

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

### 1.3 Project Record Documents

- .1 After award of Contract, the Contractor will be provided with electronic copies of the Contract Documents. Contractor will use these to maintain current as-built drawings and specifications by recording deviations caused by site conditions and changes ordered by the Consultant and/or the Owner.
- .2 Record locations of:
  - .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 Field changes of dimension and detail.
  - .4 Changes made by Change Order, Change Directive or Site Instruction.
  - .5 Details not on original Contract Drawings.
  - .6 References to related shop drawings and modifications.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Record information on set of drawings, provided by Consultant. Record changes using a different colour of felt tip pen markers for each major system.
- .5 Specifications: legibly mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda, Change Order, Change Directive or Site Instruction.
- .6 Identify all copies of the drawings and specifications as "Project As-built Copy". Maintain in new condition and make available for review on site by Consultant/Owner. At construction completion, neatly and accurately transfer notations to a second set of hard-copy drawings and specifications. Once completed, create electronic copies of both. As-built drawings to be generated in AutoCAD and PDF file formats. As-built specifications to be generated in PDF file format.
- .7 Submit following drawings:
  - .1 Record changes in red. Mark on one set of prints and at completion of project prior to final inspection, produce electronic "as-built" records on disk using latest version of AutoCad. Annotate "AS-BUILT RECORD" in each drawing title block.
  - .2 All changes shall be shown on a separate drawing layer named "as-built".
- .8 Minimum 2 weeks prior to application for final payment, submit one (1) electronic copy of the Project Record Documents to Owner via the Consultant.

### 1.4 Maintenance Materials and Spare Parts

- .1 Where supply of maintenance materials and spare parts are specified, deliver to Owner as follows:
  - .1 Use unbroken cartons, or if not supplied in cartons, they shall be strongly packaged. Supply maintenance materials and spare parts in quantities specified in individual specification sections.

- .2 Provide only new materials as maintenance materials and spare parts, of the same manufacture, type and quality as incorporated into the Work.
- .3 Ensure maintenance materials and spare parts provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work

1.5 Storage, Handling and Protection

- .1 Store spare parts, maintenance materials in manner to prevent damage or deterioration and as follows:
  - .1 Store in original and undamaged condition with manufacturer's seal and labels intact.
  - .2 Store components subject to damage from weather in weatherproof enclosures.
  - .3 Store paints and freezable materials in a heated and ventilated room.
  - .4 Remove and replace damaged products at own expense and to satisfaction of Consultant.
  - .5 Clearly mark containers as to content.
  - .6 Obtain receipt from Owner upon delivery of materials.

1.6 Final Site Survey Certificate

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

1.7 Independent Specialty Engineers Sign-Off

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

1.8 Electronic Documents

- .1 Any electronic documentation submitted must be in the formats described above.
- .2 Any electronic documentation submitted must be compatible with Consultant's computers or the documentation will be returned for re-submission.
- .3 To ensure that the documents are able to be read on a computer different than the Contractor's, enable the "close the disc upon completion" option in the disc authorizing application.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 03 20 00 Concrete Reinforcing
- .2 Section 03 30 00 Cast-in-Place Concrete
- .3 Section 31 23 10 Excavating, Trenching and Backfilling

### 1.3 References

- .1 American Concrete Institute (ACI)
  - .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
  - .2 ACI 347R-14 Guide to Formwork for Concrete
  - .3 ACI SP-4-14 Formwork for Concrete
- .2 CSA Group (CSA)
  - .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  - .2 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples
  - .3 CSA O86:19 Engineering Design in Wood
  - .4 CSA O121-2017 (R2022) Douglas Fir Plywood
  - .5 CSA O141:23 Canadian Standard Lumber
  - .6 CSA S269.1-16 (R2021) Falsework and Formwork

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
  - .1 Submit shop drawings showing type, extent and locations of items to be built into concrete.
  - .2 Sleeving Drawings: Submit drawings showing sleeves required through floors, roof and other structural members.
  - .3 Submit drawings showing size and spacing of conduits and piping.
  - .4 Coordinate with other Divisions prior to submittal.
  - .5 Do not commence placing sleeves, conduits, or piping before drawings have been reviewed and Consultant's comments incorporated on drawings issued to site.
  - .6 Assume responsibility for accuracy of Work. Review of submitted shop drawings does not relieve Contractor from compliance with requirements of Contract Documents.
- .3 Required by Regulatory Agencies: Submit shop drawings bearing signature and seal of Professional Engineer responsible for formwork design, as may be required by regulatory Agencies. Proceed with construction of formwork only with their approval.

### 1.5 Quality Assurance

- .1 Obtain a copy of CSA A23.1/A23.2 and maintain on site
- .2 Design of Formwork: Assume full responsibility for complete structural design and construction of formwork in accordance with CSA S269.1 and CSA O86, as applicable.

- .1 The design and engineering of the formwork, as well as its' construction, shall be the responsibility of the Contractor.
  - .3 Formwork shall be designed for the loads and lateral pressures outlined in the ACI publication "SP-4 Formwork for Concrete" and wind pressures and allowable stresses as set down in the National Building Code and in accordance with CSA A23.1 and A23.2. Formwork shall be of sufficient strength and rigidity to support all concrete and construction loads, taking into account proposed rate and method of pouring concrete so that the resultant finished concrete shall conform to the shapes, lines and dimensions of the members shown on the drawings.
- 1.6 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 – Common Product Requirements.
  - .2 Protect formwork to prevent functional damage and damage to faces affecting appearance of concrete surfaces exposed to view.
- 1.7 Waste Management and Disposal
- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

## PART 2 PRODUCTS

### 2.1 Materials

- .1 All materials shall be new, in accordance with referenced standards.
- .2 Plywood: Douglas Fir, conforming to CSA O121. Sound undamaged sheets finished one side, fabricated especially for use as concrete form panels, with sealed edges. Minimum 17mm thickness.
- .3 Lumber: Conforming to CSA O141, with grade stamp clearly visible.
- .4 Chamfers: Cut from 19mm x 19mm wood, smooth with no open defects.
- .5 Form Ties: snap ties, with spreader washer and 25mm break back.
- .6 Joint Tape: non-staining, water impermeable, self-release.
- .7 Nails, Spikes and Staples: Galvanized, conforming to CSA B111.
- .8 Form Release Agent: Colourless mineral oil which will not stain concrete.
- .9 For concrete surfaces exposed to view, provide panels smooth and free of defects which would be reproduced as concrete blemishes.

## PART 3 EXECUTION

### 3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Notify the Consultant of any conditions which would prevent proper completion of this work.

- .3 Commencement of work implies acceptance of existing conditions.

### 3.2 Erection

- .1 Verify lines, levels and centres before proceeding with formwork. Ensure dimensions agree with drawings.
- .2 Align joints and make watertight, to prevent leakage of cement paste and disfiguration of concrete.
- .3 Construct formwork to produce concrete with dimensions, lines and levels within tolerances specified in ACI 347R-14.
- .4 Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in and passing through concrete members.
- .5 Install chamfers at all external corners exposed to view.
- .6 Adequately brace and shore formwork to sustain loads (both concrete and working loads) applied during construction.
- .7 Be responsible for safety of the structure both before and after the removal of forms, until the concrete has reached its specified 28 day strength.

### 3.3 Built-In Work

- .1 Form openings and build in anchors, inserts, sub-frames, key-ways, sleeves, miscellaneous metal items, reglets and similar items furnished under Work of other Sections, which are indicated on Drawings and on shop drawings of other trades, and as required for proper completion of Work.
- .2 Do not embed wood in concrete.
- .3 Anchor Bolts: Tie anchor bolts securely in position to prevent movement during concrete placing. Use template to locate bolts. Verify that bolts have specified projection above concrete.
- .4 Openings or Sleeves Not Shown on Structural Drawings:
  - .1 Obtain Consultant's written approval before forming openings of sleeves through columns and beams, or through slabs within 1800 mm of their supports.
  - .2 Obtain Consultant's written approval before forming openings or sleeves larger than 200 mm square in any location.
- .5 Embedded Pipe or Conduit Not Shown or Detailed on Structural Drawings:
  - .1 Obtain Consultant's written approval before placing conduit or pipe which would be embedded in finished structure.
- .6 Confirm that built-in items that penetrate surface waterproofing are installed to meet requirements of waterproofing trade.

### 3.4 Construction Joints

- .1 Form construction and expansion joints with bulkheads to ensure straight lines. Immediately before subsequent pour at construction joint, remove bulkhead and tighten forms so that concrete surfaces will be on same plane with no overlapping of concrete.

- .2 Review with Consultant proposed location and details of construction joints in walls, columns, beams and slabs.
  - .1 Construction joints shall present appearance of normal form panel joint.
  - .2 Install continuous shear key in construction joints in walls and framed floors which are 152mm or more thick.
  - .3 Provide vertical construction joints in walls at not more than 20 metres centre to centre.
  - .4 Provide waterstops in accordance with manufacturer's instructions at construction joints in walls which retain earth. Waterstops shall be continuous.

### 3.5 Treatment of Formwork Surfaces

- .1 Form Release Agent:
  - .1 Coat formwork with form release agent before reinforcement, anchors, accessories, and other built in items are installed.
  - .2 Do not coat plywood forms pre-treated with release agent.
  - .3 On surfaces to receive finish materials, adhesives, sealers, paint or other coatings or materials, use a compatible release agent.

### 3.6 Stripping of Formwork

- .1 Strip formwork on vertical surfaces when concrete has hardened sufficiently that no damage will result from stripping operations.
- .2 Do not remove plywood formwork by jerking loose or by metal pinch bars. Use wood wedges and gradually force panels loose. Leave plywood forms in place as long as possible to permit maximum shrinkage away from concrete.
- .3 Take particular care not to damage external corners when stripping formwork.
- .4 When forms are stripped during curing period, cure and protect exposed concrete in accordance with Section 03 30 00 - Cast-in-Place Concrete.

### 3.7 Defective Work

- .1 Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective work.
- .2 Replace defective work, as directed by Consultant.
- .3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if work has proven to be deficient.
- .4 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost.

### 3.8 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 30 00 Cast-in-Place Concrete

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM A143/A143M-07(2020) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
  - .2 ASTM A1064/A1064M-22 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- .2 American Concrete Institute (ACI)
  - .1 ACI SP-66 (04) ACI Detailing Manual
- .3 CSA Group (CSA)
  - .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  - .2 CSA A23.3:19 Design of Concrete Structures
  - .3 CSA G30.18:21 Carbon Steel Bars for Concrete Reinforcement
  - .4 CSA G40.20-13/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  - .5 CSA W186:21 Welding of Reinforcing Bars in Reinforced Concrete Construction
- .4 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC Reinforcing Steel Manual of Standard Practice

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
  - .1 Submit shop drawings, including placing drawings and bar lists.
  - .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice and the typical details included with Contract Documents.
  - .3 Prepare placing drawings to minimum scale of 1:50.
  - .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  - .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
  - .6 Show concrete cover to reinforcement.
  - .7 Show location of construction joints.
- .3 Inspection Reports: Inspection and Testing Company shall:
  - .1 Submit written reports of inspection and tests.
  - .2 Distribute reports as follows:
    - .1 Consultant.
    - .2 Contractor.
- .4 Quality Assurance Submittals:

- .1 Mill Test Report: provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Submit in writing proposed source of reinforcement material to be supplied.

#### 1.5 Quality Assurance

- .1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.
- .2 Qualifications: Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186.
- .3 Source Quality Control: Source Quality Control may be performed by an Inspection and Testing Company appointed by Consultant.
- .4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .5 Identify and correlate reinforcing steel from Canadian mills with test reports for compliance with requirements specified.
- .6 Test unidentified reinforcing steel at expense of Contractor. Perform testing for each 1 tonne or part thereof supplied for incorporation in Work.

#### 1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

#### 1.7 Waste Management and Disposal

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

### PART 2 PRODUCTS

#### 2.1 Materials

- .1 In accordance with reference standards.
- .2 Substitute different size bars only if permitted in writing by Consultant.
- .3 Bar Reinforcing Steel:
  - .1 Bars which are to be welded by arc-welding process: to CSA G30.18, Grade 400W.
  - .2 Other bars: to CSA G30.18, Grade 400R.
- .4 Plain round bars: to CSA G40.20-04/G40.21.
- .5 Cold-drawn annealed steel wire ties: to ASTM A497.
- .6 Chairs, bolsters, bar supports, spacers: to CSA A23.1.
- .7 Mechanical splices: subject to approval of Consultant.

## 2.2 Fabrication

- .1 Fabricate reinforcing steel only in permanent fabricating shop.
- .2 Fabricate reinforcing steel in accordance with shop drawings.
- .3 Tag reinforcing bars to indicate placement as designated on shop drawings.
- .4 Splices:
  - .1 Provide splices only where specifically indicated on Drawings.
  - .2 Stagger alternate mechanical splices 750 mm apart.
  - .3 Stagger alternate end bearing splices 750 mm apart.
  - .4 Install on threaded splices, plastic internal coupler thread protector and plastic bar end thread protector.

## PART 3 EXECUTION

### 3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Examine formwork to verify that it has been completed, and adequately braced in place.
- .3 Notify the Consultant of any conditions which would prejudice proper completion of this work.
- .4 Commencement of work implies acceptance of existing conditions.

### 3.2 Installation

- .1 Place reinforcing steel in accordance with reviewed placing drawings, typical details, and CSA A23.3.
- .2 Adequately support reinforcing and secure against displacement within tolerances permitted.
- .3 Place reinforcing steel to provide minimum spacing and proper concrete cover as noted on drawings.
- .4 Do not cut reinforcement to incorporate other Work.
- .5 Relocate or rebend bars only on written instructions of Consultant.
- .6 Tie reinforcement in place. Do not weld.

### 3.3 Adjusting

- .1 Adjust and secure reinforcement in correct position immediately before concrete is placed.
- .2 Remove contaminants which lessen bond between concrete and reinforcement.

### 3.4 Field Quality Control

- .1 Provide competent supervisor, with at least three years of experience in reinforcement placement, to direct placement of reinforcement.
- .2 Inspect placement of reinforcement for conformance with Drawings and Specifications, before

each concrete placement, and correct as necessary.

- .3 Consultant's periodic review of selected areas of reinforcement are for verification of conformity to design concept and general arrangement only and shall not relieve Contractor of responsibility for quality control, errors, or omissions, or conformance with requirements of Contract Documents.

### 3.5 Defective Work

- .1 Incorrectly fabricated, misplaced or omitted reinforcement will be considered defective Work.
- .2 Replace or adjust defective reinforcement before concrete is placed as directed by Consultant.
- .3 Replace or strengthen concrete work which is deficient as a result of incorrectly fabricated, misplaced, or omitted reinforcement, which was not corrected before concrete was placed.
- .4 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if Work has proven to be deficient.

### 3.6 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 20 00 Concrete Reinforcing
- .3 Section 32 31 13 Chain Link Fencing
- .4 Section 33 44 16 Trench Drains

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM C260/C260M-24 Standard Specification for Air-Entraining Admixtures for Concrete
  - .2 ASTM C295/C295M-19 Standard Guide for Petrographic Examination of Aggregates for Concrete
  - .3 ASTM C309-25 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
  - .4 ASTM C330/C330M-23 Standard Specification for Lightweight Aggregates for Structural Concrete
  - .5 ASTM C494/C494M-24 Standard Specification for Chemical Admixtures for Concrete
  - .6 ASTM C881/C881M-20a Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
  - .7 ASTM C1017/C1017M-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  - .8 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  - .9 ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
  - .10 ASTM D570-22 Standard Test Method for Water Absorption of Plastics
  - .11 ASTM D624-00(2020) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
  - .12 ASTM D638-22 Standard Test Method for Tensile Properties of Plastics
  - .13 ASTM D1259-06(2025) Standard Test Methods for Nonvolatile Content of Resin Solutions
  - .14 ASTM D1751-23 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
  - .15 ASTM D2240-15(2021) Standard Test Method for Rubber Property—Durometer Hardness
  - .16 ASTM D5329-20 Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements
- .2 American Concrete Institute (ACI)
  - .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
  - .2 ACI 232.1R-12 Report on the Use of Raw or Processed Natural Pozzolans in Concrete
- .3 CSA Group (CSA)
  - .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
  - .2 CSA A283:19 Qualification Code for Concrete Testing Laboratories.
  - .3 CSA A3000-18 Cementitious Materials Compendium
- .4 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 1010 Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material.

- .2 OPSS 1212 Material Specification for Hot-Poured Rubberized Asphalt Joint Sealing Compound.
- .5 Government of Canada Treasury Board Secretariat (TBS)
  - .1 Standard on Embodied Carbon in Construction

#### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Samples: Submit for inspection, material samples of specified mix designs.
- .3 Concrete Mix Designs:
  - .1 Submit concrete mix designs for review. Specify intended use for each mix design.
  - .2 Review of mix design does not relieve Contractor from responsibility for compliance with Contract Documents.
  - .3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1. Mix design shall be adjusted to prevent alkali aggregate reactivity problems.
  - .4 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CSA A23.1.
  - .5 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
  - .6 Submit in writing, proposed method of in-situ strength testing.
- .4 Inspection Reports: Inspection and Testing Company shall:
  - .1 Submit written reports of inspection and tests.
  - .2 Distribute reports as follows:
    - .1 Consultant;
    - .2 Contractor.
  - .3 On concrete cylinder test reports, include:
    - .1 Specific location of concrete represented by sample
    - .2 Design strength.
    - .3 Unit weight of sample
    - .4 Class of exposure
    - .5 Aggregate size and mixtures incorporated
    - .6 Date, hour and temperature at time sample taken
    - .7 Percentage air content
    - .8 Test strength of cylinder
    - .9 Type of failure if test fails to meet specification.

#### 1.5 Quality Assurance

- .1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.
- .2 Pre-Construction Conference:
  - .1 Conduct a meeting to review proposed mix designs and to discuss detailed requirements of the proposed concrete operations. Review requirements for submittals, coordination, and availability of materials. Establish work progress and sequencing schedules and procedures for material testing, inspection and certifications.
- .3 Source Quality Control:
  - .1 Both source quality control, and field quality control specified in Article 1.5.4, may be performed by an Inspection and Testing Company appointed by Consultant.

- .2 Review provided by Inspection and Testing Company does not relieve the Contractor of his sole responsibility for quality control over Work. Performance or non- performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
  - .3 Inspection and Testing Company shall be certified under CSA A283, Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
  - .4 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
  - .5 Payment for additional tests (including testing of structure and its performance and load testing) required by changes of materials or mix design requested by Contractor, and failure of completed Work to meet specified requirements, shall be made at Contractor's expense.
  - .6 Perform Work of source quality control in accordance with CSA A23.2 and to include:
    - .1 Verification that ready-mix supplier is qualified to supply concrete in accordance with Specification.
    - .2 Review of proposed concrete mix designs.
    - .3 Sampling, inspection, and testing of materials as may be required.
- .4 Field Quality Control:
- .1 Inspection and Testing Company, when appointed as specified for Source Quality Control, shall perform sampling, inspection and testing of concrete work at site.
  - .2 Perform sampling, inspection and testing in accordance with CSA A23.2, and to include:
    - .1 Making of standard slump tests.
    - .2 Obtaining of three standard specimens for strength tests from each 100 m of concrete, or fraction thereof, of each mix design of concrete placed in any one day. In addition, for slabs-on-grade, obtain beam specimens for determination of modulus of rupture.
    - .3 Verification that test specimens are stored within an enclosure, maintained at specified temperatures.
    - .4 Making compression tests of each set of three specimens, one at 7 days and two at 28 days; modulus of rupture tests at 90 days.
    - .5 Verification of air content of air-entrained concrete.
      - .1 For Class of exposure F-1, and C-2, test at frequency in accordance with CSA A23.1.
      - .2 Make first test before placing any concrete.
      - .3 After stable air content has been established, frequency of tests will be determined by Consultant.
      - .4 For other Classes of exposure, test at time of obtaining strength test specimens.
  - .3 Inspection for Tolerances:
    - .1 Confirm that concrete work meets specified tolerance requirements.
    - .2 Use the elevation survey records of elevations of finished concrete surfaces specified in Section 03 10 00 and this section as basis for judging compliance.
    - .3 Use approved aluminum straightedge to judge compliance with specified slab tolerances, except use dipstick equipment where F-number tolerance is specified.
- 1.6 Tolerances
- .1 In accordance with ACI 117 and CSA A23.1.
- 1.7 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 – Common Product Requirements.

### 1.8 Job Conditions

- .1 Protect concrete surfaces exposed to view from grease, oil, and other soil which will affect the appearance of the concrete, or impair the bond of finish material.
- .2 Environmental Conditions: In addition to Cold Weather and Hot Weather Requirements of CSA A23.1, the following shall apply to Work of this Section:
  - .1 Provide protection or heat, or both, so that temperature of concrete at surfaces is maintained at not less than 21 ° C for three days after placing, not less than 10 ° C for the next two days and above freezing for the next two days.
  - .2 Do not permit alternate freezing and thawing for fourteen days after placing.
  - .3 Vent exhaust gases from combustion type heaters to atmosphere outside protection enclosures.
  - .4 Provide protection to maintain concrete continuously moist during curing period.
  - .5 For field cured cylinders representing strength development of in-situ concrete, provide same specified hot and cold weather protection for storage of each concrete compression specimen as for concrete from which it was taken, until it is sent to testing laboratory.
  - .6 Do not place concrete during rain. Should rain commence during placing, cover freshly placed concrete.
  - .7 Do not grout at ambient air temperatures or concrete surface temperatures less than 5 ° C, or when temperature is forecast to fall to less than 5 ° C within 24 hours of grouting.
  - .8 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5 ° C.

### 1.9 Project Records

- .1 Maintain record of all concrete pour related to time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep records on site until project is completed.
- .2 Delivery Records: File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, contractor, Project, Class of exposure, cementing materials content, air content, volume in load, and time of first mixing of aggregate, cementing materials and water.
- .3 Record Drawings:
  - .1 Record on a set of Drawings:
    - .1 founding elevations of all footings
    - .2 variations of foundation Work from that indicated on Drawings.
  - .2 Make record drawings available for Consultant's inspection at all times.

### 1.10 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

- .1 To meet specified requirements of referenced Standards.
- .2 Cement:
  - .1 Portland Cement: to CSA A3000.
  - .2 Cementitious Hydraulic Slag: to ACI 232.1R

- .3 Fine Aggregate: For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.
- .4 Coarse Aggregates:
  - .1 20 mm to 5 mm (No. 4 sieve) except as specified below.
- .5 Saw Cut Filler: Semi-rigid epoxy or polyurea in accordance with ACI 302.1R for joint fillers used in control and construction joints.
  - .1 Basis of Design Euco 700 or Euco QWIKjoint UVR by Euclid Chemical.
- .6 Premoulded Joint Fillers: Bituminous impregnated fiber board: to ASTM D1751.
- .7 Sealant: Refer to Section 07 92 00 – Joint Sealants
- .8 Weep hole tubes: plastic.

## 2.2 Concrete Mixes

- .1 Ready Mix, with 28 day compressive strength as indicated on Drawings.
- .2 Design concrete mix in conformance with CSA A23.1, Tables 1, 2, 5 (Alternative 1) and 17, and as follows. Provide concrete meeting water/cementing materials ratio and air content of Table 14 in accordance with Class of exposure specified in following sub-paragraphs, and minimum strength specified on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Table 14 may yield strength exceeding minimum strength specified on Drawings.
  - .1 Class of exposure C-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for pavements, sidewalks, curbs and gutters.
  - .2 Class of exposure F-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for grade beams, and for exposed exterior beams, columns, walls and slabs.
- .3 Submit evidence, and material samples, if requested, acceptable to the Inspection and Testing Company, to verify that the proposed concrete mix design will produce specified quality of concrete.
- .4 List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Consultants approval.
- .5 Concrete Weight: Air dry unit weight: minimum 2,300 kg/m<sup>3</sup>; adjusted proportionally for maximum air content listed in CSA A23.1, Clause 15, Table 10.
- .6 Concrete supplier to provide documentation indicating the requirements of TBS Standard on Embodied Carbon in Construction have been met.

## 2.3 Admixtures

- .1 Chemical Admixture: To ASTM C494. Incorporate water-reducing admixture, type WN, in all concrete.
- .2 Air Entraining Agent: To ASTM C260. Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1, Clause 15, Table 10.
- .3 Chloride: Do not use calcium chloride or admixtures containing chloride in concrete.

## 2.4 Premixed Grout

- .1 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107. Compressive strength at 28 days: 59 MPa.
- .2 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM C1107. Compressive strength at 28 days: 59 MPa.

## PART 3 EXECUTION

### 3.1 Examination

- .1 Before starting this work, examine work done by others which effects this work.
- .2 Notify Consultant of any condition which would prejudice proper completion of this work.
- .3 Confirm that surfaces on which concrete is to be placed are free of frost and water before placing.
- .4 Confirm that reinforcement, dowels, control joints, inserts and all other built in work are in place and secured.
- .5 Commencement of work implies acceptance of existing conditions.

### 3.2 Treatment of Formed Surfaces

- .1 Conform to the requirements of CSA A23.1, and as additionally specified herein.
- .2 Treat concrete surfaces which will be exposed or painted in the completed building to provide a "Smooth Rubbed Finish" in accordance with CSA A23.1, uniform in colour and texture.
- .3 Plugs at Recessed Ties:
  - .1 Clean tie holes to remove all foreign matter.
  - .2 Coat plugs by dipping in adhesive and insert in hole.
  - .3 Remove excess adhesive immediately with thinner which will not stain concrete, as recommended by manufacturer.
- .4 Obtain Consultant's approval of finished exposed concrete and grind or otherwise correct to the satisfaction of the Consultant.

### 3.3 Placing Concrete

- .1 Place concrete in accordance with requirements CSA A23.1/A23.2.
- .2 Notify Consultant and inspection and testing firm at least 24 hours prior to commencement of concrete placing operation and 24 hours before wall forms are closed in.
- .3 Obtain Geotechnical Engineer's confirmation that thickness, elevation and compaction of sub-grade meets specifications before placing concrete.
- .4 Do not place concrete in water or open frozen surfaces.
- .5 Remove contaminants which lessen concrete bond to reinforcement before concrete is placed.

- .6 Maintain accurate records of cast in place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.
- .7 Ensure that reinforcement, inserts, embedded items, formed expansion joints and the like, are not disturbed during concrete placement.
- .8 Joint fillers:
  - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant.
  - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
  - .3 Locate and form isolation, construction and expansion joints as indicated.
  - .4 Install joint filler.
  - .5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.
- .9 Provide construction joint as indicated on the drawings. Ensure dowels are adequately anchored and placed at right angles to the joint before placing concrete.
- .10 Sloping Surfaces and Slabs: commence concrete placement at bottom of sloping surfaces.

### 3.4 Finishing Concrete

- .1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1, and as specified herein.
- .2 Non-slip Surfaces: Provide swirl trowel or broom finish of texture acceptable to Consultant.
- .3 Curb Edging: Finish external corners of curbs rounded and smooth.

### 3.5 Curing

- .1 Cure concrete in accordance with CSA A23.1 and as specified herein.
- .2 Curing Compound Method:
  - .1 Use curing and sealing compound specified except:
    - .1 On surfaces to receive epoxy or similar paint finish.
    - .2 On surfaces to which architectural finishes will be adhered, the adhesives for which are incompatible with the curing compound.
    - .3 Air-entrained concrete for exterior slabs and sidewalks placed between October 1<sup>st</sup> and March 31<sup>st</sup>.
- .3 Select acrylic water compound except that if ambient conditions extend drying time unduly and if area is well ventilated and unoccupied by other workers, solvent based compound may be used.
- .4 Apply curing compound in accordance with manufacturer's instructions, increasing application rate as necessary to cover surface completely.
- .5 Curing Blanket or Wet Burlap Method: For exterior sidewalks and other finished concrete surfaces that will be exposed to freezing and thawing or deicing chemicals:
  - .1 Cover with curing blanket or wet burlap overlaid with 0.102 mm thick polyethylene and maintain in place for the additional curing for durability period in accordance with CSA A23.1 but in no case for less than 7 days.

- .2 Wet blanket or burlap regularly to maintain in moist condition. Do not allow to dry out.
- .6 Cure finished concrete surface with an approved curing and sealing compound which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that the curing compound will be compatible with the architectural finishes or adhesives for finishes to be applied later. Apply the compound in strict accordance with the manufacturer's instructions.
- .7 Protect surface which will be exposed to direct sunlight during the curing period, with a light coloured, laminated waterproof paper immediately after the curing and sealing compound has hardened sufficiently for the paper to be placed without damage to the sealed surface. Lap the paper a minimum of 100 mm and seal the laps. Leave the paper in place for at least seven days.

### 3.6 Grouting

- .1 Mix prepackaged grout with water in accordance with manufacturer's printed instructions.
- .2 Dampen concrete surfaces immediately before installing grout.
- .3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration.
- .4 Slope grout beyond edge of plate at 45 degrees.
- .5 Provide same environmental protection and curing as specified for concrete.

### 3.7 Joint Sealant

- .1 Apply sealant specified in Section 07 92 00 to thoroughly dry surfaces only, at ambient air temperatures above 5 ° C.
- .2 Provide sealant on top of joint filler with a polyethylene bond breaker between joint filler and joint sealant applied in accordance with manufacturer's direction.
- .3 Confirm that preformed joint filler and backer rod are compatible with sealant.
- .4 Caulk joints in accordance with the following:
  - .1 Do not commence joint preparation until concrete is at least 28 days old.
  - .2 Thoroughly clean sides of joints with mason's router, or power saw, equipped with double blade where necessary to suit joint width.
  - .3 Blow clean with compressed air with oil trap on line, or vacuum clean.
  - .4 Install backer rod of diameter 25 percent greater than joint width, and type recommended by sealant manufacturer to be compatible with sealant. Locate backer rod to provide for sealant depth of one-half joint width, but not less than 12 mm.
  - .5 Prime joint if required, as recommended by sealant manufacturer.

### 3.8 Defective Work

- .1 Variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by approved methods will be considered defective work.
- .2 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.

- .3 Replace or repair defectively placed or finished concrete as directed by the Consultant.
- .4 Testing and Replacement of Deficient Concrete in Place:
  - .1 Pay for additional testing and related expenses if concrete has proven to be deficient.
  - .2 Replace or strengthen deficient concrete work as directed by the Consultant, and pay for all testing and related expenses for replaced work until approved by the Consultant.

3.9 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clear away from the building site excess and waste materials and debris resulting from Work of this Section.

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 32 32 16 Precast Concrete Retaining Walls

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM A53/A53M-22 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
  - .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
  - .3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  - .4 ASTM A307-21 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  - .5 ASTM A385/A385M-22 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
  - .6 ASTM A1008/A1008M-23e1 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
  - .7 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  - .8 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
  - .9 ASTM F3125/F3125M-23 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- .2 CSA Group (CSA)
  - .1 CSA G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CSA-S16.1-M Limit States Design of Steel Structures.
  - .4 CSA S136-12 Cold Formed Steel Structural Members.
  - .5 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding of Steel Structures.
  - .6 CSA W59-18 Welded Steel Construction
  - .7 CSA W178.1-18 Certification of Welding Inspection Organizations
  - .8 CSA W178.2-18 Certification of Welding Inspectors
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.40-97 Anticorrosive Structural Steel Alkyd Primer
- .4 Canadian Sheet Steel Building Institute (CSSBI)

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
  - .1 Verify site dimensions before proceeding with shop fabrication and to suit field conditions and field openings.

- .2 Show and describe in detail all the work of this Section including large scale detail of members and materials, of connection and jointing details, and of anchorage devices, dimensions, thicknesses, description of materials, metal finishing, as well as all other pertinent data and information, including type, size and description of all fasteners and anchors.
- .3 Indicate connections to building structure.
- .4 Shop drawings for all metal fabrications shall be stamped and signed by a Professional Engineer registered in the Province of Ontario. Each submission of the shop drawings shall bear the seal of the Engineer.

#### 1.5 Qualifications

- .1 Work of this Section shall be executed by a firm thoroughly conversant with laws and regulations which govern and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work and having a minimum ten (10) years proven experience in the fabrication of high quality metal fabrications. Use workmen skilled in work of this Section.
- .2 Welding shall be performed by trades persons certified by The Canadian Welding Bureau under CSA Standard W47.1.

#### 1.6 Design Requirements

- .1 Design metal handrail and guardrail construction and connections to OBC vertical and horizontal live load requirements.

#### 1.7 Examination

- .1 All dimensions shall be taken from the drawings and checked against the building. Be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

#### 1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.
- .3 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.
- .4 Protect architecturally exposed materials during fabrication, delivery, handling, storage and erection to prevent marring of surfaces exposed to view, by marking, bending, denting or coarse grinding.

#### 1.9 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Structural Steel Sections and Steel Plate: CSA G40.20-13/G40.21-13, Grade 350W.
- .2 Architectural and Miscellaneous Mild Steel: CSA G40.20-13/G40.21-13, Grade 300W.
- .3 High Strength Bolts and Nuts: ASTM F3125. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.
- .4 Steel Pipe: ASTM A53 Schedule 40, Grade B.
- .5 Welding Materials: CSA W59.
- .6 Welding Electrodes: CSA W48 Series.
- .7 Sulphur: Commercial Grade for setting of steel posts.
- .8 Grout: non-shrink, non-metallic, non-stain, flowable, to ASTM C1107, 15 MPa at 24 hours.

### 2.2 Finishes

- .1 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A385.
  - .1 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
  - .2 Galvanized coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips: Galvanized after all welding and grinding complete. No welding or grinding of galvanized products allowed.
- .2 Zinc Rich Primer: zinc rich, organic, ready mix to CAN/CGSB 1.181. Low VOC type.

## PART 3 EXECUTION

### 3.1 Fabrication

- .1 Fabricate to reviewed shop drawings and in general to details, sizes and materials indicated on drawings and specified herein.
- .2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .3 Fabricate work complete with all components required for anchoring; bolting or welding to structural frame; standing free or resting in frames or sockets; in a safe and sure manner.
- .4 Where possible fit and shop assemble various sections of the work and deliver to site in largest practicable sections. Where shop fabricating is not possible, make trial assembly in shop.
- .5 Ensure exposed welds are continuous for length of each joint.
- .6 Fill all open joints, depressions, seams with metallic paste filler or by continuous brazing or welding and grind smooth to true sharp arises and profiles.

- .7 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings.
- .8 Supply all fastenings, anchors, accessories required for fabrication and erection of work of this Section. Make thread dimensions such that nuts and bolts will fit without re-threading or chasing threads.
- .9 Welding shall be done by the shielded metal-arc method in accordance with the requirements CSA W59. The welding operators shall be currently certified under CSA W47.1 for the work they are performing.
- .10 Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless otherwise indicated.
- .11 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, each layer shall be cleaned before the next layer is deposited. Care shall be taken to minimize stresses due to heat expansion, contraction and distortion by using proper sequence in welding and by approved methods.
- .12 Appearance, quality of welds made, methods of correcting defective work shall be in accordance with CSA W59.

### 3.2 Galvanizing

- .1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.
- .2 Galvanizing of architecturally exposed steel shall be completed by a company recognized in the application of High Quality galvanized finishes and in accordance with ASTM A385.
- .3 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
- .4 Coating Requirements:
  - .1 Weight: the weight of the galvanized coating shall conform to Table 1 of CSA G164, ASTM A123 or ASTM A153 (as appropriate).
  - .2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article. The integrity of the coating shall be determined by visual inspection and coating thickness measurements.
  - .3 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

### 3.3 Railings

- .1 Definition: the term railing shall be taken to mean balustrades, guards, rails and handrails.
- .2 Design and fabricate railings to conform to all applicable Ontario Building Code requirements.
- .3 Unless otherwise indicated, fabricate railings as follows:
  - .1 Fabricate guardrails as detailed.
  - .2 Pipe rails shall have an outside diameter of not more than 40 mm. Close open ends of tubular members with welded steel plugs.
  - .3 Support railings at each end, and at maximum 1070 mm centres unless indicated otherwise or

- required to meet loading requirements of the Ontario Building Code.
- .4 Minimum wall thicknesses of tubular railings: 2.5 mm.
- .5 At corners, angles and intersections, cope or mitre railings, weld and grind smooth.
- .6 Pickets shall be minimum 10 mm square solid steel bars at 100 mm centres.

- .4 Exterior railings as detailed, galvanized.

### 3.4 Installation

- .1 Supervise the setting of bases, anchor bolts, and other steel to concrete connections. Cutting of base plates to accommodate anchor bolts is cause for rejection of base plates.
- .2 Provide all bracing and shoring required to support the work of this Section during installation.
- .3 Work shall be fabricated and erected square, plumb and true, straight, level and accurately fitted to size detailed on reviewed Shop Drawings. All joints shall be welded unless otherwise indicated. Exposed welds shall be ground smooth and/or flush. Exposed work shall be finished smooth and even, close joints and neat connections. Exposed welds continuous for full length of joints.
- .4 Where anchors or fastenings, sleeves, have to be built in by other trades, supply all necessary templates, instructions and supervision to ensure satisfactory installation.
- .5 Do all drilling, cutting and fitting necessary to attach this work to adjoining work and make it complete.
- .6 Provide all components required for anchoring. Make anchoring in concealed manner where possible. Exposed anchors shall be approved by the Consultant, shall be neat, and of the same material, colour, texture and finish of base metal on which they occur. Exposed fastenings shall be evenly spaced.
- .7 Grind all field welds smooth.

### 3.5 Fasteners and Anchors

- .1 Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
- .2 Securely anchor components in place. Unless otherwise indicated, anchor components as follows:
  - .1 To concrete and solid masonry with expansion or epoxy adhesive type anchors.
  - .2 To hollow construction with toggle bolts.
  - .3 To thin metal with screws or bolts.
  - .4 To thick metal with bolts or by welding.
  - .5 Fill space between railing members and sleeves with non-shrink grout.
- .3 Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
- .4 Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
- .5 Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.

- .6 Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

### 3.6 Schedule

#### .1 General:

- .1 Supply and install all metal fabrications indicated on Drawings, and not included in the work of other Sections.
- .2 Coordinate and sequence the work to ensure timely delivery to the site, of all items to be built in.
- .3 Where items are required to be built into masonry, concrete or other work supply such items to respective Sections with all anchors and accessories for building in.
- .4 All items shall be of sizes and as detailed on drawings.
- .5 Coordinate with Section 09 91 13 for preparation of exposed metal items required to have finish coatings applied in the field.
- .6 Review all coordination drawings prior to installation of materials, to ensure that no interferences with the work of other Sections will occur.

### 3.7 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 03 30 00 Cast-In-Place Concrete
- .2 Section 32 12 16 Asphalt Paving
- .3 Section 32 32 16 Precast Concrete Retaining Walls
- .4 Section 32 92 23 Sodding
- .5 Section 33 05 14 Manholes
- .6 Section 33 11 00 Storm Sewers
- .7 Section 33 46 13 Foundation Drainage
- .8 Section 32 91 13.13 Mulching

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM D698-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))
  - .2 ASTM D1557-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))
- .2 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 805 Construction Specification for Temporary Erosion and Sediment Control Measures
  - .2 OPSS 180 General Specification for the Management of Excess Materials
  - .3 OPSS 206 Construction Specification for Grading
  - .4 OPSS 1010 Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
- .3 Ontario Provincial Standard Details (OPSD)
  - .1 OPSD 219.130 Heavy Duty Silt Fence Barrier
  - .2 OPSD 805 Temporary Erosion and Sediment Control Measures
- .4 The Occupational Health and Safety Act.
- .5 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings of shoring and bracing required in connection with excavation. Drawings to show clearly procedural sequence to be followed.

### 1.5 Definitions

- .1 Earth: Site excavated material, including shale, rubble rock, building debris, shrub and tree roots and soil.
- .2 Soil: Site excavated material, free from shale, rubble rock, building debris, shrub and tree roots.
- .3 Fill: Approved materials, other than earth, clay and unapproved soil. Approved soil may be used only with approval of the Consultant in writing.

- .4 Rock: All solid rock in ledges, stratified deposits, unstratified masses, and all conglomerate deposits or any other material so firmly cemented by process of nature as to present all the characteristics of solid rock, being so hard or firmly cemented that it cannot be excavated and removed with a power shovel except after thorough and continuous drilling and blasting.
- .5 Backfilling: The operation of supplying and installing fill and approved soil materials.
- .6 Engineered Fill: Approved material used to build-up to design elevations.

1.6 Examination

- .1 Examine the site and determine the nature and extent of the materials to be removed or the additional fill required to provide depths and levels indicated on drawings. Verify locations of all existing utilities and services that will affect the work.

1.7 Setting Out Work

- .1 The drawings indicate the building components location and proposed and final grades. Be responsible to construct the work according to levels and locations shown on the drawings. Report any errors or discrepancies to the Consultant before commencing work.
- .2 Commencement of any part of the work shall constitute acceptance of drawings as being correct.
- .3 Employ a competent instrument man and provide all lines and levels, limit lines and boundary stakes for the execution of the work as required. All benchmarks shall be carefully protected.
- .4 Provide and be responsible for, all lines, levels and dimensions which trades require to relate their work to the work of other trades. All trades shall be notified that all such levels and dimensions must be obtained from the Contractor.

1.8 Existing Underground Utilities

- .1 Arrange underground locates of all utility assets prior to excavating. Do not commence excavation in a location prior to utility members marking the location of their utilities or indicating that none exist within the outlined excavation limits. Where necessary, employ the services of a private utility locator to ensure that all utilities are located in a timely manner.
- .2 Verify the location and elevation of all existing utilities within the limits of the Work. Observe the locations of the stake outs, prior to commencing the Work. In the event there is a discrepancy between the locations of the stake outs and the locations shown on the Contract Documents, that may affect the Work, immediately notify the Consultant and the affected utility companies, in order to resolve the conflict.
- .3 All existing buried utilities located within the excavation zone and any other facilities adjacent to the excavation shall be carefully supported and protected from damage as a result of the Contractor's operations. Be responsible for repairing any damaged underground utilities, as a result of actions during the course of the work at no extra cost to the Owner.
- .4 All costs associated with this work shall be considered incidental to all related items of work in the Contract. No separate payment will be made for costs incurred in obtaining utility locates.

1.9 Protection of Existing Services

- .1 Notify the Owner, Public Utility or Municipal authorities in advance of planned excavations adjacent to their services.
- .2 Take care not to damage or displace encountered known and unknown services.
- .3 When such services are encountered during the execution of work, immediately notify the Consultant and protect, brace and support active services. Where repairs to these services become necessary use the following procedure:
  - .1 Known services, repair at no expense to the Owner.
  - .2 Unknown services, forward to the Consultant a complete breakdown of the estimated cost of such work. Proceed only upon written authorization.
- .4 In the case of damage to, or cutting off of an essential service, notify Consultant, the Owner, and Public Utility or Municipal authorities immediately and repair the service under the Consultant's direction.

1.10 Inspection and Testing

- .1 Provide proper and sufficient samples, ample opportunity and access at all times for the Consultant or Testing Agency to inspect materials, operations and completed works carried out under this Section.
- .2 Sample and test excavated material prior to shipping to landfill off the site in accordance with the requirements of O. Reg. 406/19. Samples shall be tested for compliance of acceptable material for landfill. Furnish to the Owner the results of all testing and location of landfill site used. This testing will not be undertaken by the Owner's Inspection and Testing Agency.
- .3 Provide 24 hours notice to inspection laboratory and request tests as follows:
  - .1 Sieve Analysis: Proposed fill materials will be tested to confirm stability for intended use and conformity with specifications.
  - .2 Density Test: Tests will be conducted on compacted fill, to ASTM D698.
  - .3 Frequency Test: Excavated Surfaces: When existing compacted fill surface is being prepared, make a series of three tests of surface for each 500 m<sup>2</sup> area.
  - .4 Fills under Pavement or Slabs on Grade: Make three tests for every two lifts of compacted fill for each 500 m<sup>2</sup> area.
  - .5 Backfill Structural Walls: Test each different material for approximately each 30 metres of wall being backfilled at depth increments of 610 mm.

1.11 Standards

- .1 Carry out all work in accordance with the applicable OPSS, OPSD and site drawings. The applicable Ontario Provincial Standard Specifications are listed hereafter.
- .2 The following shall apply:
  - .1 OPS 180 Management and Disposal of Excess Material
  - .2 OPS 206 Grading, Nov. 2005
  - .3 OPS 314 Untreated Granular Subbase, Base, Surface, Shoulder and Stockpiling
  - .4 OPS 805 Temporary Erosion and Sediment Control Measures

1.12 Shoring and Bracing

- .1 Shoring and trench timbering, in addition to requirements of local authorities, shall be carried out in accordance with the requirements of The Occupational Health and Safety Act, "November 1992 Ontario Regulation 213/91" and Regulations for Construction Projects by Ontario Ministry of Labour and to Construction Safety Association brochure "Trenching Safety April 1994".
- .2 Erect necessary shoring for excavations in such a manner that:
  - .1 Whenever a trench or excavated face is necessary, shore and brace to prevent failure. Engage a registered Professional Engineer fully qualified in this line of work to design, stamp shop drawings and assume responsibility for the shoring and bracing. Submit shop drawings to the Consultant.
  - .2 It will properly retain the banks of the excavations and prevent caving-in or displacement or damage to surrounding or adjacent buildings or other property.
  - .3 All other work in connection with this Contract, including the Mechanical and Electrical Trades, may be carried out while it is still in place if necessary.
  - .4 It will be entirely free of footings, foundation walls or other such work so that it may be removed entirely or in sections when it is no longer required or when directed, without causing any damage or injury to the structural work that has been completed.

1.13 Sedimentation Control

- .1 Maintain and/or repair sedimentation control at all watercourses and catch basins to prevent contamination by excavated fill.
- .2 Sedimentation control shall be in accordance with the Ontario Provincial Standard Specifications, OPSS 805 and local authorities.
- .3 Refer to details and notes on site development drawings.
- .4 Install additional sedimentation control as required and obtain Consultant's approval prior to commencement of site works.

1.14 Dewatering

- .1 Keep excavations and backfill dry at all times.
- .2 Obtain letter of conditional approval from Authorities Having Jurisdiction to dispose of ground water into the storm sewer drainage system. Apply for and pay for water disposal permit.
- .3 Dispose of water in conformance with applicable by-laws and in a manner not detrimental to public and private property, or portion of site work completed or under construction.
- .4 Should the method of dewatering/groundwater control fail to achieve the conditions specified above, the Consultant reserves the right to revise methods and procedures at no cost to the Owner.

PART 2 PRODUCTS

2.1 Materials

- .1 Type A Fill: Granular "A" material conforming to OPSS1010, latest edition.
- .2 Type B Fill: Granular "B" material conforming to OPSS 1010, latest edition.

- .3 Crushed Stone: Crushed stone shall be composed of clean, hard, durable course gravel, or crushed rock fragments such that 100% of the particles pass the 18 mm sieve and not more than 10% of the particles pass the No. 4 sieve. No clay or other objectionable materials shall be present.
- .4 Engineered Fill: fill placed below Type A and Type B fill to bring excavation to the design elevations. To be Type B fill or approved fill, approved in writing by the Consultant.
- .5 Topsoil: As specified in Section 32 92 23.
- .6 Silt fence: heavy duty geotextile, Mirafi Envirofence or equivalent.

### PART 3 EXECUTION

#### 3.1 Preparation

- .1 Clearing: Refer to Section 31 10 00 - Site Clearing.
- .2 Lines and Levels: Refer to Section 01 71 00 - Examination and Preparation.
- .3 Stock Piles: Materials shall not be stockpiled on the site except with the prior approval of the Consultant. Where permitted, stockpile materials in a manner to prevent segregation and contamination. Piles not to exceed 2000 mm in height. Stockpile materials in a location and manner not interfering with ongoing operation and use of the site and building by the Owner.
- .4 Install silt fencing in accordance with reference standards.

#### 3.2 Excavation Work

- .1 Excavate to elevations and dimensions indicated or required by the work, plus sufficient space to permit erection of forms, shoring and inspection. Excavation shall be made to clean lines to minimize quantity of fill material required.
- .2 Remove large rocks, stumps and other obstructions of whatever nature encountered in the course of excavation and haul away off the site. Remove all concrete, masonry, rubble or other construction debris encountered during the work.
- .3 Unauthorized Excavation - Excavation to greater than required depth shall be corrected by the Contractor at his own expense in a manner as directed by the Consultant. Fill over-excavated areas under structure bearing surfaces and footings with concrete as specified for foundations.
- .4 Keep excavation free of water by bailing, pumping or a system of drainage as required and provide pumps, suction and discharge lines or well points of sufficient capacity and maintain until such time as the permanent drainage system is installed or until the Consultant's approval of removal of equipment is obtained. Take all necessary measures to prevent flow of water into the excavation.
- .5 Protect the bottom and sides of excavated pits and trenches from freezing. Protect also from exposure to the sun and wet weather to prevent cave-ins and softening of the bed upon which concrete or drains rest.
- .6 Excavations must not interfere with the normal 45 degree plane of bearing from the bottom of any footing.

- .7 Keep bottoms of excavations clean and clear of loose materials levelled and stepped at changes of levels with exception of excavations made for drainage purposes and those to slope as required.
- .8 If the excavations reveal seepage zones, springs or other unexpected sub-surface conditions which may necessitate revisions or additions to any drainage system, inform the Consultant immediately so that remedial action can be taken.
- .9 If removal of earth causes displacement of adjacent earth, the earth so disturbed shall be removed at no additional cost to the Owner.
- .10 Excavations in excess of 1200mm in depth shall conform to the requirements of the Occupational Health and Safety Act, and Regulations for Construction Projects.
- .11 Conditions of Excavated Surfaces
  - .1 Excavate to a depth sufficient to expose firm undisturbed subsoil, free of organic matter and to the Testing Agency's approval.
  - .2 Remove soft, wet or unconsolidated ground and organic material encountered in excavating.
  - .3 Should the nature of the sub-soil at the depths shown prove to be unsatisfactory to the Consultant for the placing of the concrete work, then upon the Consultant's written order, the Contractor shall excavate to greater depth until a satisfactory bottom is reached.
- .12 Tolerances: General excavation shall be to the elevations shown on the drawings, plus or minus 25 mm.

### 3.3 Backfilling

- .1 Proceed promptly with backfilling as the building progresses, and as work to be backfilled has been inspected and approved by the Consultant. The backfill in areas where settlement cannot be tolerated, e.g. service and footing trenches under the floor slab, should be compacted to at least 100 per cent of its Standard Proctor Maximum Dry Density. The backfill should be placed in lifts not greater than 200 mm thick in the loose state, each lift being compacted with a suitable compactor to the specified density.
- .2 Do not commence backfilling operations until site drainage systems, have been inspected and approved by Consultant and authorities having jurisdiction.
- .3 Withdraw shoring material during backfill. Lumber left in place without the Consultant's approval will not be paid for by the Owner.
- .4 Backfill evenly on both sides of retaining walls to avoid unequal fill pressures on walls.
- .5 Place fill around foundation walls and footings so that footings will have a minimum of 1200 mm coverage, measured at an angle of 45 degrees from bottom of footing to protect against frost until final grading is complete.
- .6 Where fill is placed adjacent to structures or vulnerable building components or in restricted areas, the fill shall be compacted to the same degree as specified by suitable equipment approved by the Consultant. Avoid damage to or displacement of walls, columns, piers, underground services, and process/ production equipment.
- .7 Add water in amounts required only to achieve the optimum moisture content, in accordance with ASTM D1557.

- .8 Backfill shall be free of snow and ice, topsoil, construction debris and oversized boulders greater than 150 mm.

### 3.4 Rough Grading

- .1 Preparation and Layout
  - .1 Establish extent of grading by area and elevation.
  - .2 Prior to commencement of grading work, establish location and extent of all underground utilities occurring in work areas. Maintain, reroute or extend as required. Pay all costs for this work, except costs borne by utilities companies.
  - .3 Slope grade away from building as indicated on drawings.
  - .4 Cut temporary drainage swales and create containment ponds and structures for temporary surface run-offs, until storm sewer system is installed.
  - .5 Regrade all areas that retain or pond water.
  - .6 Rough grade all areas to tolerance of plus or minus 50 mm.

### 3.5 Fills Under Concrete and Asphalt Paving

- .1 The fill shall be deposited in layers of such thickness that the equipment being used for compacting can produce the specified density but in no cases, more than 200 mm thickness. If lumps are present in the material each layer shall be continuously disced in order to ensure proper compaction.
- .2 The exposed subgrade shall be proof rolled to ensure its integrity. If the subgrade consists of engineered fill, the fill shall be compacted to at least 98% of its maximum Standard Proctor Dry Density for native materials or 100% compaction for Granular "A" and "B" materials, using equipment approved by the Consultant. Any loose, wet or deleterious material shall be sub-excavated and replaced by the Contractor with Type B Engineered fill which must be compacted to 98% Standard Proctor Maximum Density.
- .3 Immediately after levelling, each layer of fill shall be thoroughly compacted by the use of approved mechanical equipment.

### 3.6 Compaction Density

- .1 Use approved equipment for compaction. Maintain materials at optimum moisture content to obtain required compaction. Special care shall be taken to prevent disturbance of the existing subgrade and adjacent structures and equipment.
- .2 Be responsible for damage to the subgrade and installed materials due to improper compaction methods. Make good to approval of the Consultant.
- .3 The minimum density of fill in place shall be the following values of Standard proctor densities for corresponding locations in accordance with ASTM D698.
  - .1 Type A Fill: To 98% Standard Proctor Maximum Density.
  - .2 Type B Fill: To 98% Standard Proctor Maximum Density.
  - .3 Engineered Fill: To 98% Standard Proctor Maximum Density.
- .4 If during progress of work, tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest at own expense.

- .5 Ensure compacted fills are tested and approved before proceeding with placement of surface materials.

### 3.7 Fill Locations

- .1 Type A Fill:
  - .1 Under all exterior concrete slabs 150 mm minimum thickness.
  - .2 At all areas on the site indicated to be paved with asphalt, 150 mm thickness.
- .2 Type B Fill:
  - .1 Around all footings, foundations and walls up to the underside of Type A fill.
  - .2 From top of approved compacted subgrade to underside of concrete slabs but not less than 200 mm thickness.
  - .3 At all areas on the site indicated to be paved with asphalt, 300 mm thickness.
- .3 Crushed Stone: around all foundation drainage piping, minimum 200 mm thick.
- .4 Engineered Fill: All fill locations up to the underside of Type B fill and where required to fill up to design elevations.
- .5 Site excavated material: as backfill to exterior side of foundation walls only when permitted and approved by the Consultant and below all sodded or seeded areas up to underside of topsoil, but not within 600 mm of foundation walls or structures.

### 3.8 Water on Prepared Surfaces

- .1 Promptly remove, by approved methods, water rising from seeping of the soil or resulting from rainfall wherever such water is on the surface of sub-grade soil and compacted fill.
- .2 Where proper drainage and pumping is not carried out as specified herein, and any prepared sub-grade soil for under structural work, and any compacted fill for under concrete slabs, is softened or disturbed by water due to improper drainage and pumping, the Contractor shall remove the unsatisfactory soil and fill, and bear all incidental costs in connection with additional excavation and placing and compacting of granular fill under floor slabs.

### 3.9 Surplus Soil Disposal

- .1 Comply with the requirements of Ontario Regulation O. REG 406/19, "On-Site and Excess Soil Management", for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.
- .2 Contractor shall assume for the purpose of this contract, that soils may be contaminated with excess chlorides or salts. The costs associated with disposal at an approved site shall be assumed within the base contract.

### 3.10 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 As excavation proceeds, keep roads and aisles clean of dirt and excavated material.

- .3 Clean up and wash down to remove all dirt and excavated materials caused by the work of this Section daily.

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling

### 1.3 References

- .1 Ontario Provincial Standard Specification (OPSS)
  - .1 OPSS 1003 (2013) Material Specification for Aggregates - Hot Mix Asphalt
  - .2 OPSS 1010 (2013) Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
  - .3 OPSS 1101 (2014) Material Specification for Performance Graded Asphalt Cement
  - .4 OPSS 1150 (2008) Material Specification for Hot Mix Asphalt
- .2 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

### 1.4 Submittals

- .1 Provide submittals in accordance with Section 01 33 00 Submittals.
- .2 Submit asphalt mix designs.

### 1.5 Protection

- .1 Protect work of all trades and adjacent properties from damage from the work of this section.
- .2 Barricade paved areas to prevent vehicle traffic for at least 24 hours after completion.

### 1.6 Quality Assurance

- .1 All work of this Section shall be completed by a bona fide road building contractor engaged in paving work for a minimum of 5 years and having all equipment necessary to complete the work as specified.

### 1.7 Inspection and Testing

- .1 The Owner will engage an independent inspection and testing company.
- .2 The inspection and testing company shall perform the following services:
  - .1 Sample proposed sources of fill materials and advise as to acceptability, maximum densities obtainable and compaction procedures.
  - .2 Carry out density tests to ensure that the required density is achieved and report the results of such tests in writing.

## PART 2 PRODUCTS

### 2.1 Engineered Fill

- .1 Compacted Granular 'B' fill or other suitable fill as approved by the Consultant to thickness required to bring subgrade to level of underside of Granular 'B' base course.

## 2.2 Granular Base Materials

- .1 Granular 'B' Base Course: Crushed or uncrushed bank or pit gravel or stone obtained from an approved source, conforming to requirements for Granular 'B' aggregate, Ontario Provincial Standard Specifications Form No. 1010.
- .2 Granular 'A' Base Course: Crushed gravel or stone, obtained from an approved source conforming to requirements for Granular 'A' aggregate, Ontario Provincial Standard Specifications Form No. 1010.

## 2.3 Asphalt Materials

- .1 Asphalt Cement: OPSS 1101
- .2 Aggregates: OPSS 1003 and OPSS 1010
- .3 Filler: OPSS 1003
- .4 Asphalt (H.L.3) conforming to OPSS Form 1150
  - .1 Asphalt surface course shall be hot mixed, hot laid.

## PART 3 EXECUTION

### 3.1 Surface Conditions

- .1 Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- .2 Verify that asphalt pavement may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
- .3 Check rough grading, re-grade, re-level and re-compact as required. Soft spots, wet holes, shall be dug out and filled with granular fill placed in not over 150 mm layers and compacted. Remove surplus material from the site.
- .4 Sub-grade shall be fully stabilized, compacted to 100% of standard Proctor Density and levelled to a tolerance of not more than 13 mm measured on a 3.0 m straight edge.
- .5 In the event of discrepancy, immediately notify the Consultant.

### 3.2 Placement of Granular Base

- .1 Granular material shall be placed in layers of such thickness that the equipment being used can produce the specified density. Maximum 300 mm lifts.
- .2 Immediately after leveling the material shall be compacted to the specified density.
- .3 Compaction: All granular material shall be compacted to a minimum of 100% Standard Proctor Maximum Density.
- .4 Finished elevation tolerance will be to within 13 mm of the required elevation.

### 3.3 Placement of Asphaltic Surfacing

- .1 Asphalt surfacing shall be placed in accordance with Ontario Provincial Standard Specification for Hot Mix Hot Laid Asphaltic Concrete. Materials, equipment and construction methods shall be in accordance with the current edition of OPSS 1010 including all amendments thereto.
- .2 Place asphalt paving where indicated on the drawings.
- .3 Pavement structures including asphalt course and fill shall be as noted on the drawings.
- .4 Finished surface shall be smooth of uniform density and texture and true to established finished elevations. Paving shall be of thickness specified and when checked with a 3 m straight edge shall show no irregularity exceeding 6 mm in depth. Surface shall be sloped in order that all surface water will be drained to perimeter of asphalt.
- .5 Paint contact edges of abutting concrete paving with a tack coat of hot asphalt cement before paving mixture is placed against them.
- .6 Joints in asphalt shall be kept to a minimum. Joints in base and top asphalt shall be staggered.
- .7 Where asphalt does not adjoin concrete paving, edges shall be trimmed and hand tamped to a clean straight line.

### 3.4 Asphalt Prime

- .1 Paint contact of curbs and like structures with thin, uniform coat of asphalt prime material.
- .2 Do not apply prime when air temperature is less than 5 ° C or when rain is forecast within 2 hours.
- .3 Where traffic is to be maintained, treat no more than one-half width of surface in one application.
- .4 Prevent overlap at junction of spreads.
- .5 Do not prime surfaces that will be visible when paving is complete.
- .6 Apply additional material to areas not sufficiently covered.
- .7 Keep traffic off primed areas until asphalt prime has cured.
- .8 Permit prime to cure before placing asphalt paving.

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 32 12 16 Asphalt Paving

### 1.3 References

- .1 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 710 Construction Specification for Pavement Marking
  - .2 OPSS 1716 Water-Borne Traffic Paint
- .2 United States Federal Standards
  - .1 Federal Standard 595B, Colors Used in Government Procurement

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit manufacturer's product data.
- .3 Submit following material sample at least 4 weeks prior to commencing work.
  - .1 Paint colour selection.
  - .2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, reference specification number and formulation number and batch number.

### 1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.6 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Paint:
  - .1 To OPSS 1716.
  - .2 Colour: Federal Standard FS Federal 595B, Yellow 33538.
  - .3 Paint shall be non-slip.

### PART 3 EXECUTION

#### 3.1 Equipment

- .1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.
- .2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

#### 3.2 Condition of Surfaces

- .1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

#### 3.3 Application

- .1 Lay out pavement markings.
- .2 Unless otherwise approved by Consultant, apply paint only when air temperature is above 10° C, wind speed is less than 60km/h and no rain is forecast within next 4 hours.
- .3 Apply paint evenly at rate of 3m<sup>2</sup> /L.
- .4 Do not thin paint unless approved by Consultant.
- .5 Paint lines to be of uniform colour and density with sharp edges.
- .6 Thoroughly clean distributor tank before refilling with paint of different colour.

#### 3.4 Tolerance

- .1 Paint markings to be within plus or minus 12 mm of dimensions indicated.
- .2 Remove and replace incorrect markings.

#### 3.5 Protection

- .1 Protect pavement markings until dry.

#### 3.6 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling
- .2 Section 32 18 22 Synthetic Playground Turf
- .3 Section 32 91 13 Playground Mulch
- .4 Section 32 91 13.13 Mulching

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
  - .2 ASTM F1292-22 Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment
- .2 CSA Group (CSA)
  - .1 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
  - .2 CSA Z614-2020: Children's Playground Equipment
- .3 National Lumber Grading Authority (NGLA)
  - .1 Standard Grading Rules for Canadian Lumber, Latest Edition.

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Test Reports:
  - .1 Toxicology Testing Report performed by a Certified Canadian Laboratory
  - .2 Test results confirming product has been tested and in compliance with ASTM F1292 and CAN/CSA Z614-14.
- .3 Product Data:
  - .1 Manufacturers description of product, installation methods and maintenance instructions.
  - .2 Colour chart of available colours.
  - .3 MSDS sheets for materials used to construct the same.
- .4 Shop Drawings:
  - .1 Detailed shop drawings of safety surfacing edging details and material thickness.
- .5 Samples:
  - .1 Minimum 200 x 200 mm sample of the surface system.
- .6 Manufacturer Submittals:
  - .1 Statement from the Manufacturer that the system to be installed shall only be performed by authorized and trained personnel.
  - .2 Statement from Manufacturer that the binders used in the system has been specifically designed for water play surfacing.
- .7 Submit maintenance instructions for resilient surfacing for inclusion in the Operation and

Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 Performance Requirements

- .1 Resilient safety surfaces shall exceed the performance requirements for impact attenuation and Head Injury Criteria as per CSA Z614 Standards confirming a maximum deceleration of no more than 200 gMax and a HIC value of no more than 1000 as per ASTM F1292 and CSA Z614 method of testing.
- .2 The impact attenuation performance shall be documented by a certificate of compliance and shall be performed using Triax 2000 non-destructive testing apparatus within 30 days of installation.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Project Conditions

- .1 Temperatures: minimum 10° C during the day and evening hours throughout installation period for the rubber surfacing to be installed. Note: With cooler temperatures rubber finish will be noticeably more rough than a typical in-season installation.
- .2 UTS Binder is moisture cured with the presence of water. Sub-base cannot have any puddling or standing water when applying rubber. Once base rubber is applied, the rubber must be free of wetness from dew and/or frost or rain prior to applying top wear course.
- .3 When applying multi-colour rubber patterns, the bonding edges must be dry or foaming will occur. This includes bonding to all perimeter materials such as brick, concrete, wood. etc.
- .4 Rubber should be protected at all times against frost during the curing of both base and top wear course to prevent freezing of the uncured binder which can cause premature wear and or failure of the performance of the rubber.
- .5 If temperatures are below 10° C tenting and heating is permissible. Tent must be constructed in such a way to withstand weather conditions of fall and or winter weather.

1.8 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Manufacturer

- .1 Ure-Tech Surfaces: 905.623.0600 fax: 905.248.3180 [info@ure-techsurfaces.com](mailto:info@ure-techsurfaces.com)

2.2 Material

- .1 PlaySoft TPV/EPDM shall meet the following gradations granulated rubber: 1 - 3.5 mm. Or 1-4 mm depending on desired surface texture.

- .2 TPV/EPDM rubber shall meet ASTM D412 for tensile strength.
- .3 Polyurethane binders shall be specially formulated for playground surfacing, shall contain no TDI, filler minerals such as plasticizers, catalysts, extenders or heavy metals. Weight of polyurethane shall be no less than 1.02 Kg/l.
  - .1 Primer: Single component moisture cured UTS- 136.01 polyurethane primer.
  - .2 Binder: An elastic polyurethane pre-polymer with minimal odour, excellent weathering and binding characteristics. UTS- 136.01 Urethane. Supplier must receive written authorization prior to installing the product which verifies use supply of urethane specified for this project. No urethane substitutions are permitted.
- .4 Colour: As selected by the Consultant from full range of manufacturer's standards. Two colours will be selected.

### 2.3 Accessories

- .1 Timber Edging
  - .1 Select Grade Western Red Cedar, NLGA Clear or better, Rough sawn.
  - .2 Size: As indicated.
  - .3 Spikes: To CSA B111, galvanized
- .2 Geotextile:
  - .1 Terratex SD geotextile filter fabric.

## PART 3 EXECUTION

### 3.1 Base Preparation

- .1 Bases must be constructed to ensure a firm, stable and draining foundation for the surface. Any and all contaminated materials, wood fibre systems or materials that are subject to decomposition or expansion shall be removed and disposed of.
- .2 Ensure drainage of the base material is existing or install drainage system under the safety surfacing system.
- .3 Construct new base or recycle existing materials in accordance with manufacturer's written specifications to provide a stable firm base on which to install safety surface system.
- .4 Construct bases as per manufacturer's specifications for various site conditions as listed below.
  - .1 Asphalt, concrete or compacted stone bases. Stone bases shall be minimum 76 mm depth wet compacted to a 95% proctor density.
- .5 Install timber edging at perimeter of playground surface.
  - .1 Drill edging and anchor in place with 10M reinforcing bars minimum 600 mm long at 200 mm centres. Set anchors minimum 13 mm below top of wood edging.
  - .2 Edging shall be installed in multiple layers as indicated and each layer fastened with galvanized spikes at 600 mm centres.

### 3.2 Surface Installation

- .1 After the stone base has been constructed to manufacturer's specifications, graded and compacted to proper slope and elevations, install geotextile filter fabric over base, overlapping all joints by 152

mm. Provide protection to curbs, sidewalks and play equipment to eliminate polyurethane residue on the same.

- .2 Polyurethane and buffings SBR rubber for base mat must be minimum 50% new buffings from recycled tires mixed with binder produced in North America and clearly labeled with a minimum 8% urethane per by weight of rubber. Rubber shall be thoroughly mixed on site to ensure 100% coverage of all particles and poured in place to required thickness to meet critical height criteria of play equipment. Allow 24 hours to cure.
- .3 Prior to installing wearing course, the edging shall be primed with diluted polyurethane binder.
- .4 Surface layer of TPV/EPDM rubber shall be thoroughly mixed on site to ensure 100% coverage of all particles and poured in place by means of rakes and screed bars and compacted to required density by use of hand trowels and rollers.
- .5 TPV/EPDM rubber shall be peroxide cured.
- .6 Install two colours in patterns indicated.

### 3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove any spills or residue that may make contact with structure or surrounding curbs or sidewalks. On completion of work and the 24 hr. cure time, remove all protection provided for the same.

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling
- .2 Section 32 18 16 Resilient Playground Surfacing
- .3 Section 32 91 13 Playground Mulch
- .4 Section 32 91 13.13 Mulching

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM D418-93 Standard Methods of Testing Pile Yarn Floor Covering Construction
  - .2 ASTM D1338-99(2021) Standard Practice for Working Life of Liquid or Paste Adhesives by Consistency and Bond Strength
  - .3 ASTM D1557-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))
  - .4 ASTM D1577-07(2018) Standard Test Methods for Linear Density of Textile Fibers
  - .5 ASTM D2859-16(2021) Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
  - .6 ASTM D5034-21 Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
  - .7 ASTM D5848-20 Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Coverings
  - .8 ASTM F355-16e1 Standard Test Method for Impact Attenuation of Playing Surface Systems, Other Protective Sport Systems, and Materials Used for Athletics, Recreation and Play
  - .9 ASTM F1551-09(2017) Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials
  - .10 ASTM D1557-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))
- .2 CSA Group (CSA)
  - .1 CSA Z614-2020: Children's Playground Equipment
- .3 Synthetic Turf Council (STC)
  - .1 STC Suggested Guidelines for the Essential Elements of Synthetic Turf Systems (2021)

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit the product name/description as well as the name and location of the manufacturers and suppliers of each component.
- .3 Submit two samples, 300 x 300 mm minimum size, illustrating details of finished product as bid, including full cross section of subbase, turf, and infill material.
- .4 Product Literature: Submit two copies of manufacturer's recommended installation and maintenance information, including any technical criteria for evaluation of the installed product. Descriptions of all equipment recommended for the maintenance and repair of turf product, as well as a list of any activities not recommended relative to the warranty.
- .5 Submit a .454 kg sample of the infill materials.

- .6 Certified copies of independent (third-party) laboratory reports on ASTM tests as follows:
  - .1 Pile Height, Face Width & Total Fabric Weight, ASTM D418 or D5848
  - .2 Primary & Secondary Backing Weights, ASTM D418 or D5848
  - .3 Tuft Bind, ASTM D1335
  - .4 Grab Tear Strength, ASTM D5034
- .7 ASTM test submittals may vary by no more than ¼” and 6 oz. of the specified product.
- .8 Submit maintenance instructions for synthetic turf, for inclusion in the Operation and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 Quality Assurance

- .1 Manufacturer Qualifications: Company specializing in manufacturing products specified in this section. The Turf Manufacturer:
  - .1 Must be experienced in the manufacturing of tall pile synthetic infill grass systems with the same fiber as specified.
  - .2 Manufacturer must be a member in good standing with the Synthetic Turf Council (STC).
  - .3 Manufacturer must utilize best practices as certified by ISO-9001 and ISO-14001.
- .2 Installer Qualifications: Company specializing in performing the work of this section.
  - .1 The Synthetic Turf Installer must provide competent workmen skilled in this type of synthetic grass installation. All technicians must have installed similar synthetic turf.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver products to site in original containers and wrappers as agreed between the Engineer and Contractor. Inspect products upon delivery for damage.
- .3 Store products in a location and in a position that protects them from crush damage or any other defects.
- .4 Handle and store (on and off site) all materials safely to ensure their physical properties are not adversely affected and that they are not subject to vandalism or damage.
- .5 Rubber and sand infill shall arrive dry and loose.
- .6 Adhesives shall arrive in dry, sealed containers.

1.7 Project Conditions

- .1 Coordinate all work with the work of other sections to avoid delay and interference with other work.
- .2 Protect excavations by shoring, bracing sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.
- .3 Install synthetic turf surfacing only when ambient air temperature is 2° C or above and the relative humidity is below 35% or as specified by the product manufacturer. Installation will not proceed if rain is imminent.
- .4 Install product only when prepared base is suitably free of dirt, dust, and petroleum products, is

moisture free and sufficiently secured to prevent unwanted pedestrian and vehicular access.

- .5 Maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
- .6 Adjacent streets, sidewalks, and property shall be kept free of mud, dirt, or similar nuisances resulting from earthwork operation.

1.8 Waste Management and Disposal

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

1.9 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

- .1 Basis of design shall be “Softlawn EZ Play by synthetic turf system as provided by Synthetic Turf International. [www.synthetic-turf.com](http://www.synthetic-turf.com)

2.2 Turf System

- .1 Turf Fiber:
  - .1 The turf fiber must be tufted to the backing with a minimum tuft bind of 10 pounds.
  - .2 The tufted fiber weight shall be a minimum of 60 ounces per square yard.
  - .3 The turf fiber shall be non-abrasive and a minimum of 100 microns thick.
  - .4 The turf fiber must contain less than 100 ppm of lead chromate in all colors.
  - .5 The turf fibers must be from the same dye lots.
  - .6 The turf fibers must be guaranteed for a period of Eight Years not to fade or fail (as distinguished from a change in texture) or have a pile height decrease to 50% of pile height as result of UV degradation.
  - .7 The turf fiber must retain a minimum of 75% of its original fibril width after 10,000 cycles on the Lisport Studded Roll Test Machine.
  - .8 The pile fiber shall possess the following characteristics:

Characteristic	Value	Test
Linear Density (Denier)	13600	ASTM D1577
Yarn Thickness	100 Microns (PE Mono); 100 Microns (PP)	ASTM D3218
Tensile Strength	71 N (PE Mono); 16.5N (PP)	ASTM D2256
Pile Weight *	60 oz./yd <sup>2</sup>	ASTM D5848
Fiber manufacturer must be from the same source		
The above specifications are nominal. *Values are +/- 5%.		

- .9 The pile fabric shall possess the following physical characteristics:

Characteristic	Value	Test
Finished Pile Height*	1.25" (31.75 mm)	ASTM D5823
Product Weight (total)*	87 oz. /yd <sup>2</sup>	ASTM D3218

Characteristic	Value	Test
Primary Backing Weight*	7.4 oz. /yd <sup>2</sup>	ASTM D2256
Secondary Coating Weight**	20 oz. /yd <sup>2</sup>	ASTM D5848
Fabric Width	15' (4.57 m)	ASTM D5793
Tuft Gauge	3/8"	ASTM D5793
Grab Tear Strength	200-lb-F	ASTM D5034
Tuft Bind	>10-lb-F	ASTM D1335
Infill sand)	2 lbs silica sand	None
Infill (rubber)	N/A	None
Except where noted as a minimum, the above specifications are nominal.		
*Values are +/- 5%. ** All values are +/- 3 oz/yd <sup>2</sup>		

- .2 Backing Material
  - .1 Primary Backing:
    - .1 Primary backing must be a dual layered woven polypropylene material, ArmorLoc 3L.
    - .2 Primary backing system weight must be a minimum of 7.0 ounces/square yard.
  - .2 Secondary Backing
    - .1 Secondary backing system weight must be a minimum of 20 ounces/ square yard.
    - .2 Secondary backing SilverBack shall saturate the primary backing and effectively lock the fiber tufts in place to the primary backing.
    - .3 Secondary backing must be a heat activated polyurethane coating with no vegetable based polyols.
    - .4 Secondary backing system shall have minimum tuft bind strength of 10 pounds.
    - .5 Secondary backing must have Drainage Perforations: 3/16" to 1/4" diameter at 4 inches or less on center each way. Non-perforated backing is not acceptable.
- .3 Turf roll seams: to be sewn or glued on site so that no openings larger than the porous backing mat openings are created. All turf fabric edges to be securely bound as per the perimeter detail design. Adhesives for joining seams of turf together shall be Nordot 34G Glue, Mapei 2K, Turf Claw, hot melt technology or equivalent.
- .4 Fabric surface: shall be constructed and installed in minimum widths of 15 feet with no longitudinal or transverse seams.
- .5 The entire system shall be resistant to weather, including ultra-violet light and heat degradation; insects, rot, mildew and fungus growth and be non-allergenic and non-toxic.
- .6 The turf material shall be non-combustible and pass the DIN standard Pill Burn test or ASTM D2859.

2.3 Synthetic Glue Material

- .1 Adhesive products shall be Nordot 34G, Mapei 2K, Turf Claw, hot melt technology or equivalent as approved by the Consultant.
- .2 Any adhesive products required for the installation of a proposed turf system shall be purpose-suited to the system. The material and application methods shall be as recommended by the adhesive manufacturer.

2.4 Infill Material

- .1 The synthetic infill material shall consist of a blend of graded, silica sand and treated and mixed ground rubber.
  - .1 Sand: specially-graded, dust-free silica sand shall be placed on the turf in a minimum quantity

of 1 pound/ square foot and shall include test results that demonstrate the following minimum properties:

- .1 Colour – tan
- .2 Sand shall be round non-angular in shape
- .3 Roundness – 0.6+
- .4 Hardness - 0.6-0.8 on the Mohs Scale
- .5 Size – 1.00 mm ± 0.15 mm
- .6 Density – 90 – 95 lbs/ cu ft.
- .7 Dust - < 0.001 %
- .8 Angle of Repose - < 30°
- .9 Sand shall be heavy metal safe
- .2 Rubber: Rubber is SBR ambient (styrene butadiene rubber) rubber, colour black, 10-18 mesh, that is 99% fiber free and is heavy metal safe. Rubber shall be placed on the turf in a minimum quantity as referenced the table in Section 2.02 in this document and shall be of the following Mesh Size Distribution:

Mesh Size	% Retained
10	0-15%
12	5-30%
16	40-70%
20	15-35%
30	0-10%
40	0-1%
Pan	0-1%

### PART 3 EXECUTION

#### 3.1 General

- .1 Installation of the synthetic turf system is to comply with the manufacturer's recommendations, requirements and the reviewed and approved shop drawings.
- .2 Perform all work in strict accordance with the Contract Documents and the manufacturer's specifications and instructions. Only those skilled technicians proposed in the bid phase are to be assigned to this project by the Contractor.
- .3 The designated Supervisor for the Synthetic Turf Installer must be present during any and all construction activity associated with the field installation, including testing, cleanup and training.
- .4 All products and equipment are to be from sources approved by the authorized turf manufacturer and conform to the specifications.

#### 3.2 Examination

- .1 The inspection shall include a check for planarity. The finished surface shall not vary from a true plane more than 6 mm in 3.0 m when measured in any direction. The Contractor shall provide all required tools and materials needed for the planarity check, which may include but not be limited to, a laser level, string line, straight edge and/or other assessment materials. The Contractor shall mark in the field any deviations from grade in excess of those specified above, as well as provide a marked up plan locating the deviations.
- .2 The compaction of aggregate base shall be 95% to Standard Proctor and surface tolerances shall not exceed 6 mm over 3 m.

- .3 The Contractor shall have a registered surveyor conduct an elevation survey of the area in a 7.0 m grid to determine and verify that subgrade elevations and slopes are within previously specified tolerances. This elevation survey may require further verification of smaller areas within the 7.0 m grid if determined necessary by the Consultant.
- .4 When any or all corrective procedures have been completed, the finished sub-base surface must be re-inspected, with the same representatives attending as the initial inspection. If required, additional repair and inspections are to be conducted until the subbase surface is deemed acceptable by the Consultant and Synthetic Turf Installer
- .5 Once the sub-base surface has been deemed acceptable, the Contractor shall submit a written certificate indicating the acceptance of:
  - .1 The sub-base construction finished surface as totally suitable for the application of the selected synthetic turf system, and
  - .2 The sub-base construction as totally suitable for work under this section to proceed with the final installation and fully warrant the athletic surface installation for the period and conditions specified herein.
- .6 Commencement of work under this Section shall constitute acceptance of the work completed under other sections by the Contractor, acceptance of dimensions of the subbase, and hence, no claims for extra work based upon these conditions will be permitted.

### 3.3 Installation

- .1 Install synthetic turf system in accordance with the manufacturer's written installation instructions.
- .2 Turf shall be attached to the perimeter edge as shown in the construction plans and as per the manufacturer.
- .3 All seams shall be brushed thoroughly before infill materials are installed.
- .4 All terminations shall be as detailed and approved in the shop drawings.

### 3.4 Infill Installation

- .1 The synthetic turf shall be thoroughly brushed prior to installation of infill materials to remove wrinkles.
- .2 Turf shall remain free draining at all times before, during and after the infill materials are installed.

### 3.5 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Protect all installed work from other construction activities as installation progresses.
- .3 Keep the area clean throughout the construction period and free from the installation process, including track surfaces.
- .4 Upon completion of the installation, thoroughly clean surfaces and site of all refuse resulting from the installation process.
- .5 Any damage to existing fixtures or facilities resulting from the installation of the synthetic turf system shall be repaired to original condition at the Contractor's expense prior to Substantial

Performance.

- .6 Provide a written acceptance by the turf manufacturer that the turf and base system is installed in accordance with their recommendations prior to final completion.

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

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

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM A53/A53M-22 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
  - .2 ASTM A90/A90M-21 Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
  - .3 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - .4 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  - .5 ASTM A392-11a(2022) Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
  - .6 ASTM A817-12(2025) Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcellled Tension Wire

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings
  - .1 Show and describe in detail all the work of this Section including large scale detail of members and materials, of connection and jointing details, and of anchorage devices, dimensions, thicknesses, description of materials, metal finishing, as well as all other pertinent data and information, including type, size and description of all fasteners and anchors.
  - .2 Indicate connections to retaining walls.
  - .3 Shop drawings shall be stamped and signed by a Professional Engineer licensed in the Province of Ontario. Include structural analysis data signed and sealed by the professional engineer who was responsible for their preparation, demonstrating compliance with the referenced codes and standards.

### 1.5 Design Requirements

- .1 Posts and base plates for chain link fencing mounted on concrete retaining walls shall be designed by a professional engineer to withstand loading requirements for guardrail assemblies as required by the Ontario Building Code.

### 1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 16 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.7 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Posts:
  - .1 Line Posts: Tubular steel pipe, 60 mm outside diameter, 4.46 kg/m galvanized.
  - .2 Corner Posts: Tubular steel pipe, 89 mm outside diameter, 11.3 kg/m galvanized.
  - .3 Posts for chain link fencing mounted on concrete retaining walls shall be fitted with base plates.
- .2 Top Rail Braces and Centre Rail: Tubular steel pipe, 42 mm outside diameter., 1.86 kg/m galvanized.
- .3 Connection Sleeves: Malleable iron, galvanized
- .4 Fabric: Chain link, 50 mm mesh of 3.0 mm diameter steel wire, hot dipped galvanized after fabrication or electrically galvanized before weaving. Fabric shall conform to the requirements of ASTM A392 and shall have a Class 2 zinc coating.
- .5 Galvanized Steel Finish: ASTM A392, Class 2, with not less than 610 g/m<sup>2</sup> zinc of uncoated wire surface on wire coated before weaving or not less than 610 g/m<sup>2</sup> zinc of uncoated wire surface on wire of fabric coated after weaving as determined from the average of two or more samples and not less than 549 g/m<sup>2</sup> zinc per sq. ft. of uncoated wire surface for any individual sample.
- .6 Reinforcing Wire: 4.0 mm diameter steel wire, hot dipped galvanized.
- .7 Tie Wire: 3.0 mm diameter steel, hot dipped galvanized or aluminum alloy wire.
- .8 Fittings and accessories including base plates, nuts, bolts, etc. steel or malleable iron, hot dipped galvanized.
- .9 Turnbuckles to be drop forged.
- .10 Concrete for post foundations, 25 MPa, air entrained, as specified in Section 03 30 00.

## PART 3 EXECUTION

### 3.1 Fencing

- .1 Erect fencing accurately located with posts vertical, fencing and post tops parallel to contour of finished grade, with space between bottom of bottom rail and ground not less than 38 mm and no more than 76 mm.
- .2 Posts mounted on concrete retaining walls: Provide minimum 9.5 mm thick base plate welded to fence posts. Anchor to top of foundation wall in accordance with engineered shop drawings.
- .3 Excavate for posts using 254 mm diameter auger for line post and 305 mm diameter auger for corner posts as required. Set posts 1080 mm into 1200 mm deep concrete footings, rough cast in the ground and domed above grade to shed water.

- .4 Remove boulders or other subsurface obstructions as required. In such cases, where the size of hole exceeds the minimum dimensions of the footings either place the footing against undisturbed soil or backfill the hole with suitable earth material compacted to a density of 95% of maximum dry density and then bore a hole to the required minimum dimensions.
- .5 Install line posts spaced between corner posts (maximum 3.0 m on centre).
- .6 Install top rail continuous, passing through line post caps, secured to each corner post. Use pipe coupling sleeves to provide for expansion at intermediate joints.
- .7 Install bottom rail continuous around enclosure secured to corner and line posts.
- .8 Fasten post caps securely to corner and line posts.
- .9 Stretch bottom tension wire tight and securely fasten to corner posts with turnbuckles and tension bar bands.
- .10 Fence fabric shall not be installed until the concrete footings have cured for a period of at least 5 days.
- .11 Place fence fabric on the outside of the posts.
- .12 Securely fasten fabric to corner posts using tension (stretcher) bars with bar bands spaced 300 mm on centre.
- .13 Securely fasten fabric to the top, brace and bottom rails with tie wires at 460 mm on centre and to line posts with tie wires at 300 mm on centre.
- .14 All abraded and damaged galvanized surfaces shall be cleaned and painted. Damaged areas shall be thoroughly wire brushed and all loose and spelter coating removed, after which the cleaned area shall be painted with two coats of zinc rich paint.

### 3.2 Cleaning

- .1 Proceed in accordance with Section 01 74 10 – Cleaning.
- .2 Thoroughly clean all areas where work has occurred. Remove from the site excess material, debris and rubbish.
- .3 Take all precautions to protect completed work. Immediately repair or replace all damaged areas due to tire ruts, erosion, compaction failure, etc. Keep all erosion control measures intact.

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 31 23 10 Excavating, Trenching and Backfilling
- .3 Section 33 46 13 Foundation Drainage

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM D698-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))
  - .2 ASTM D751-19 Standard Test Methods for Coated Fabrics
  - .3 ASTM D5034-21(2025) Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
- .2 CSA Group (CSA)
  - .1 CSA A231.1-14/A231.2-14 Precast Concrete Paving Slabs/Precast Concrete Pavers
- .3 Canadian General Standards Board (CGSB)
  - .1 CGSB 41-GP-29Ma-83 Tubing, Plastic, Corrugated, Drainage.
- .4 OPSS 1010, April 2004 Ontario Provincial Standard Specification, Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit full size sample of each type of retaining wall unit.
- .3 Submit shop drawings stamped by a Professional Engineer registered in the Province of Ontario.
  - .1 Indicate layout, pattern and relationship of joints to fixtures and project formed details.
- .4 Include manufacturer's test data.

### 1.5 Protection

- .1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property. Make good any damage.

### 1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.7 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Precast concrete retaining unit: to CSA A231.1/A231.2.
- .2 Brampton Brick Proterra Split Series.
  - .1 Standard Unit:
    - .1 Width 1000 mm.
    - .2 Height 185 mm.
    - .3 Depth 375 mm.
  - .2 Provide coping and corner units, manufacturer's standard, as required.
    - .1 Coping Units minimum 430 mm wide.
  - .3 Colour as selected from standard range.
- .3 Granular Material: to OPSS 1010, for:
  - .1 Granular A, maximum size 13.2 mm.
- .4 Clear Stone:
  - .1 Crushed stone shall be composed of clean, hard, durable coarse gravel, or crushed rock fragments such that 100% of the particles pass the 18 mm sieve and not more than 10% of the particles pass the No. 4 sieve. No clay or other objectionable materials shall be present.
- .5 Filter fabric:
  - .1 Synthetic fibre: rot-proof, unaffected by action of oil or salt water and not subject to attack by insects or rodents.
  - .2 Fabric: woven construction supplied in rolls of minimum 3.8 m width, 130 m length, minimum thickness of 0.5 mm and minimum weight of 160 g/m<sup>2</sup>.
  - .3 Seams: sewn or overlapped in accordance with manufacturer's recommendations.
  - .4 Physical properties:
    - .1 Breaking load and elongation: to ASTM D5034 Grab Test Method 25 mm square jaws, constant rate of travel 300 mm per minute.
      - .1 Stronger principal direction, 800 N.
      - .2 Elongation minimum 22 percent.
    - .2 Bursting strength: To ASTM D751, using Diaphragm Bursting Tester 1500 N.
    - .3 Permeability: 2.2 x 10.
- .6 Flexible plastic tubing and fittings: to CGSB 41-GP-29Ma. Type 3 perforated with polyester sock filter and Type 1 non-perforated, corrugated, nominal inside diameter 100 mm.
- .7 Butyl tape: type recommended by stone manufacturer.

## PART 3 EXECUTION

### 3.1 Subgrade

- .1 Ensure that subgrade preparation conforms to levels and compaction required to allow for installation of granular base and required depth of granular base behind wall.

### 3.2 Excavation

- .1 Excavate for footing to depth indicated on engineered shop drawings or until firm original soil is reached.
- .2 Excavate for compacted granular backfill behind the wall.

- .3 Where poor soils or running water is encountered, consult a soils engineer for recommendations on modifying the design to account for these problems.

### 3.3 Geotextile Filter

- .1 Install geotextile filter to separate native soil from the backfill material.
- .2 Ensure the geotextile covers the top of the backfill and separates it from the topsoil.

### 3.4 Granular Base

- .1 Sub-base minimum thickness: as indicated.
- .2 Spread and compact crushed stone or gravel in uniform layers not exceeding 150 mm compacted thickness.
- .3 Compact to a density of not less than 100% Standard Proctor Density in accordance with ASTM D698.
- .4 Apply water as necessary during compaction to obtain specified density. If subgrade is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

### 3.5 Installation

- .1 Ensure granular laying course is dry (4-8% moisture content) prior to placement of units.
- .2 Level the first course and place the top of the unit flush with the desired finished grade in front of the wall.
- .3 Install units true to grade, in location, layout and pattern as indicated.
- .4 .Where required, cut units accurately without damaging edges.
- .5 Tubing laying:
  - .1 Ensure tubing interior and coupling surfaces are clean before laying.
  - .2 Lay perforated tubing to minimum slope of 1:100. Face perforations and coupling slots downward.
  - .3 Lay non-perforated tubing to slope of 1:100, from perforated tubing to disposal source. Make joints watertight.
  - .4 Do not use shims to establish tubing slope.
  - .5 Use fittings recommended by manufacturer.
  - .6 Install end plugs at ends of collector drains.
  - .7 Protect tubing ends from damage and ingress of foreign material.
  - .8 Connect non-perforated tubing to sewer by appropriate adapters manufactured for this purpose.
- .6 Filter bed backfill:
  - .1 Place coarse filter material after tubing installation is approved by Consultant.
  - .2 Avoid crushing flexible tubing during backfill operations. Consolidate by hand tamping lightly. Prevent displacement of tubing. Do not use a vibratory plate compactor. Place the backfill in maximum 100 mm lifts and compact with a hand tamper.

- .7 Backfill the wall with crushed granular fill as the height increases every two courses. Ensure compaction of the backfill as specified above. Do not use a vibratory plate compactor. Place the backfill in maximum 100 mm lifts and compact with a hand tamper.
- .8 Landscape the exposed excavation to promote surface water runoff over the top of the wall. Do not allow unusual surcharge loading in the tributary area served by the wall.
- .9 Step back each layer of the wall.
- .10 Use stones without top ribs for coping.
- .11 Use unsplit combination stone for step systems.

3.6 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling
- .2 Section 32 18 22 Synthetic Playground Turf
- .3 Section 32 18 16 Resilient Playground Surfacing
- .4 Section 32 91 13.13 Mulching

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM F1951-14 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment
  - .2 ASTM F1292-18e1 Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment
  - .3 ASTM F2075-15 Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment
- .2 CSA Group (CSA)
  - .1 CSA Z614-2020: Children's Playground Equipment

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit manufacturer's product information and test data for all products specified.
- .3 Submit samples of mulch.

### 1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.6 Waste Management and Disposal

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

### 1.7 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Mulch: Engineered mulch manufactured of a ground wood fiber comprised of softwoods and/or

hardwoods, consisting of uniform particle sized wood fibers.

- .1 Material shall be IPEMA certified to ASTM F2075 and ASTM F1292 and in compliance with CSA Z614.
- .2 Product to have minimal bark and to be free of twigs, leaf debris and other organic material.
- .3 Typical Analysis:
  - .1 Size Gradation: average size of 25mm – 50mm
  - .2 Maximum of 15% fine particles
  - .3 Meets specifications regarding chip size, shape, consistency, drainage qualities and impact attenuation
- .4 Certification:
  - .1 Basis of Design Product: Hermanns PlaySafe EWF

- .2 Product depth, after installation, must be in accordance with the procedure described in ASTM F1292 and meet guidelines for critical height as set forth by the Consumer Product Safety Commission for use of wood products for protective surfacing.

## 2.2 Accessories

- .1 Filter Cloth: Non-woven Geotextile as recommended by manufacturer.
  - .1 Basis of Design: Fibertop Filter Cloth.
- .2 Playground Borders: Flextop Flex Timber borders or equivalent. Provide with stakes.
- .3 Drainage gravel: Minimum 200 mm Granular A to OPSS 1010.

## PART 3 EXECUTION

### 3.1 Preparation

- .1 For on grade installations, excavate area to proper depth.
- .2 Both in-ground and above-ground systems shall be properly graded. A (1) percent grade is recommended for proper drainage. Do not install on grades exceeding 10 percent. Substrate (for both in-ground and above-ground systems) shall be firmly compacted. The substrate shall be free of stones, roots and other vegetation.
- .3 Compact subgrade.

### 3.2 Installation

- .1 Install applicable drainage system.
- .2 If gravel drainage is used, place 76 mm of drainage gravel on a layer of geotextile fabric. Overlap all seams a minimum of 3 in. Slit fabric to fit around equipment uprights. Where possible, overlap all slits with next piece of fabric.
- .3 Cover drainage system with geotextile fabric. Overlap all seams a minimum of 76 mm. Slit fabric to fit around equipment uprights. Where possible, overlap at slits with next piece of fabric.
- .4 Install edging.
- .5 Install the engineered wood fiber to the proper depth (300 mm thick finished), mounding in the center of the play areas of the playground. Extra materials shall be provided to allow for compaction. Use a small front-end loader to spread surfacing. Do not travel on the fabric or turn

sharply on the engineered wood fiber. It will also be necessary to spread manually. Engineered wood fiber must be compacted with a mechanical compactor in order to be considered handicapped accessible.

.6 Hand rake to smooth finish.

3.3 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling
- .2 Section 32 18 22 Synthetic Playground Turf
- .3 Section 32 18 16 Resilient Playground Surfacing
- .4 Section 32 91 13 Playground Mulch

### 1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's instructions, printed product literature and data sheets for mulch and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit a two litre sample of wood mulch.

### 1.4 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.5 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Basis of Design Manufacturer

- .1 Hermanns Cedar Mulch [www.hermanns.ca](http://www.hermanns.ca)

### 2.2 Mulch

- .1 Hermanns Cedar Mulch mix of natural cedar bark and wood, with a soft fibrous texture that knits together to protect the soil from erosion and to improve moisture retention.
- .2 Cedar mulch Dark brown in colour that greys as it ages Fresh cedar aroma Enhances moisture retention Suppresses weed growth.
- .3 Typical Analysis:
  - .1 pH 5.5 – 7.0
  - .2 Moisture Content 45% to 55%
  - .3 Organic Matter Content 70 - 85% by weight (dry)
  - .4 Minimum Size Gradation 97% < 25mm Minimum 66% < 5/8"

### PART 3 EXECUTION

#### 3.1 Installation

- .1 Ensure soil settlement has been corrected before mulching.
- .2 Spread mulch as indicated on Drawings or directed by Consultant.
- .3 Apply 76 mm of mulch before settlement, covering the entire planting bed area. Install no more than 25 mm of mulch over the top of the root balls of all plants. Taper to 50 mm when abutting pavement.
- .4 For trees planted in lawn areas the mulch shall extend to a 1.5 m radius around the tree or to the extent indicated on the plans.
- .5 Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if covered.
- .6 There shall be no mulch applied within 50 mm of the crown of the plant or tree

#### 3.1 Maintenance

- .1 Replace or re-spread damaged, missing or disturbed mulch.
- .2 Cultivate non-mulched areas, as required to keep top layer of soil friable.

#### 3.2 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling

### 1.3 References

- .1 Nursery Sod Growers Association of Ontario (NSGA)
- .2 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit grass seed mix.
- .3 Submit name and address of sod farm.

### 1.5 Quality Assurance

- .1 Topsoil from each source, native and imported, shall be tested for N.P.K., atrazine, minor elements, as well as clay and organic matter contents and acidity (pH) range. Topsoil shall be tested, written test report submitted and approved by Consultant, prior to delivery to site.

### 1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Protect sod during transportation, for delivery to the site in a fresh and healthy condition.
- .3 Install sod immediately, no later than 48 hours after arrival on site. Keep moist and fresh until installation.
- .4 Handle sod carefully to prevent breaking or tearing. Immediately remove damaged and dried-out sod from the site.

## PART 2 PRODUCTS

### 2.1 Topsoil

- .1 Clean topsoil imported material approved by the Consultant, and free from admixtures of subsoil, clay lumps, stones or roots over 25 mm diameter, free of toxic substances or any other foreign matter which would inhibit growth. Minimum 150 mm thickness.
- .2 Comply with the requirements of Ontario Regulation O. REG 406/19, “On-Site and Excess Soil Management”, for the importation of new soils. Complete testing of imported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

## 2.2 Sod

- .1 Sod shall be a Certified No. 1 sod, grown and sold in accordance with the latest specifications of the Nursery Sod Growers Association of Ontario (NSGA), composition of 50% Kentucky Blue Grass and 50% Merion Blue Grass.
- .2 At the time of delivery, sod shall have a strong, fibrous root system, be free of disease, stones, burned or bare spots, with a healthy green colour and containing not more than 1% twitch grass and other weeds.
- .3 Sod shall be cut and rolled in sections of max. 1.0 m<sup>2</sup> in area and approximately 30 mm thick as specified by the NSGA.

## 2.3 Wooden Pegs

- .1 Hardwood pegs, 25 x 25 mm square and at least 250 mm long, or longer as required for satisfactory anchorage of sod.

## 2.4 Fertilizer

- .1 Commercial type having a 10-10-10 ratio and shall be applied such that actual nitrogen is 9.0 kg/10 m<sup>2</sup>.

## PART 3 EXECUTION

### 3.1 Preparation

- .1 Adjust subgrade to allow the placing of topsoil to minimum depths specified.
- .2 Scarify subgrade to at least 75 mm deep and remove debris and all stones 50 mm in diameter and larger.
- .3 Arrange for inspection of finished subgrade by Consultant.
- .4 Spread and grade topsoil evenly over approved subgrade. Provide minimum 150 mm thick topsoil. No less will be accepted.
- .5 Finished sodded area top surface shall be uniform and evenly graded between elevations indicated, free of bumps, ridges and depressions. Remove all stones and lumps over 25 mm in diameter and foreign materials.
- .6 Unless recommended otherwise on soil analysis report, apply a 10-10-10 fertilizer at the rate of 9.0 kg/10 m<sup>2</sup>.
- .7 Work fertilizer well and uniformly into the topsoil within 48 hours before laying sod.
- .8 Fine grade, rake and roll surface until smooth and firm against foot prints, and free of depressions, lumps and irregularities.

### 3.2 Installation

- .1 Place sod closely knit together, so that no open joints are visible, and pieces are not overlapping.

- .2 Install sod to blend tightly and uniformly with adjoining grass areas and, unless otherwise detailed, to be flush with paving, top of curbs.
- .3 On slopes of 3:1 and steeper, place sod perpendicularly to the slope and stake every row with wooden pegs at maximum 600 mm intervals. Drive pegs flush with sod.
- .4 Immediately after installation, water with sufficient amount to saturate sod and underlying topsoil.
- .5 As soon as sod has dried sufficiently to prevent damage, roll with roller to ensure a good bond between sod and topsoil and to remove minor depressions and irregularities.

### 3.3 Maintenance

- .1 Maintain all sodded areas, from date of installation and until one full growing season is complete (minimum 6 months). Obtain Consultant's approval at end of maintenance.
- .2 Maintenance shall include all necessary measures to establish and maintain grass in a healthy, vigorous growing condition, for one full growing season.
- .3 Maintenance shall include, but not be limited to the following work:
  - .1 Mow grass areas at regular intervals as required to maintain grass height between 50 mm and 60 mm. Not more than  $\frac{1}{3}$  of grass blade shall be cut during one mowing. Hand clip where necessary and keep edges neatly trimmed. Remove heavy clippings immediately after mowing and trimming.
  - .2 Control weeds by cutting. Use of chemicals is strictly prohibited.
  - .3 Fertilize not less than once per season (Spring, Summer, Fall).
  - .4 Water when necessary, with sufficient quantities of water to prevent sod and underlying soil from drying out.
  - .5 Roll all sodded areas to remove minor depressions and irregularities.
  - .6 Repair all erosion damage resulting from faulty workmanship and/or maintenance.
  - .7 Replace all grass which has deteriorated, or which shows bare spots.
  - .8 Protect all grass areas against damage, including erosion and trespassing, by providing and maintaining proper safeguards. Remove safeguards at end of maintenance period.

### 3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clean up all areas and remove debris

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling
- .2 Section 33 11 00 Storm Sewers

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM A48/A48M-22 Standard Specification for Gray Iron Castings
  - .2 ASTM C139-25 Standard Specification for Dry-Cast Concrete Masonry Units for Construction of Catch Basins and Manholes
  - .3 ASTM C478/C478M-22 Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
- .2 CSA Group (CSA)
  - .1 CSA A3000:23 Cementitious Materials Compendium
  - .2 CSA A257 SERIES:19 Standards for Concrete Pipe and Manhole Sections
  - .3 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
  - .4 CSA A82.56-M1976 Aggregate for Masonry Mortar.
  - .5 CSA A165 Series-14 (R2019) CSA Standards on Concrete Masonry Units
  - .6 CSA G30.18:21 Carbon Steel Bars for Concrete Reinforcement
  - .7 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 407 Construction Specification for Installation of New Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers
  - .2 OPSS 408 Adjusting or Rebuilding Maintenance Holes, Catch Basins Ditch Inlets and Valve Chambers

### 1.4 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.5 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Precast manhole units: to ASTM C478M, circular or oval. Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation. Monolithic bases to be approved by Consultant and set on concrete slabs cast in place.
  - .1 1200 mm diameter manhole as per OPSD 701.010.
- .2 Joints: to be made watertight using rubber rings or cement mortar.

- .3 Mortar:
  - .1 Aggregate: to CSA A82.56.
  - .2 Portland Cement: to CSA A3000.
- .4 Ladder rungs: to CSA-G30.18, No. 25M billet steel deformed bars, hot dipped galvanized to CAN/CSA G164 Rungs to be safety pattern (drop step type).
- .5 Adjusting rings: to ASTM C478M.
- .6 Concrete Brick: to CSA A165.
- .7 Frames, gratings, covers to dimensions as indicated and following requirements:
  - .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
  - .2 Gray iron castings: to ASTM A48, strength class 30B.
  - .3 Castings: coated with two applications of asphalt varnish.
  - .4 Storm manhole frames and covers: heavy duty municipal type for road service. Cover cast without perforations and complete with two 25 mm square lifting holes, as per OPSD 401.010, unless otherwise specified.
- .8 Bedding material shall be 150mm Granular A. OPSS 402 & 1010.
- .9 Unshrinkable fill: to Section 31 23 10 – Excavating, Trenching and Backfilling.

### PART 3 EXECUTION

#### 3.1 Excavation and Backfill

- .1 Excavate and backfill in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
- .2 Obtain approval of Consultant before installing manholes.

#### 3.2 Installation

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.
- .3 Dewater excavation free of standing water or as directed by Consultant and remove soft and foreign material before placing concrete base
- .4 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% SPMDD.
- .5 Precast units.
  - .1 Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base. Make each successive joint watertight with rubber ring gaskets, cement mortar, or combination thereof.
  - .2 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
  - .3 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
- .6 For sewers:
  - .1 Place stub outlets and bulkheads at elevations and in positions indicated.

- .2 Provide 300 mm sump.
- .7 Compact granular backfill to 98% SPMDD.
- .8 Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.
- .9 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.

3.3 Adjustments

- .1 All manhole frames and covers, catch basin frames and covers, drains and valves including those existing scheduled to remain, shall be adjusted and set flush with finished elevation.
- .2 Adjustments to manholes and catch basins shall be done using concrete adjustment units as per OPSS 408.

3.4 Leakage Test

- .1 Visual inspection of leakage will be carried out. If any leakage is observed, correct leakage as directed by Consultant at no additional cost.

3.5 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling
- .2 Section 33 05 14 Manholes

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM C443-21 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
  - .2 ASTM C990/C990M-25 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
- .2 CSA Group (CSA)
  - .1 CSA A3000:23 Cementitious Materials Compendium
  - .2 CSA A257 SERIES:19 Standards for Concrete Pipe and Manhole Sections
- .3 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 407 Construction Specification for Installation of New Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers
  - .2 OPSS 410 Construction Specification for Pipe Sewer Installation in Open Cut

### 1.4 Material Certification

- .1 Certification to be marked on pipe.

### 1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.6 Scheduling of Work

- .1 Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.

### 1.7 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 PVC Pipe

- .1 Poly Vinyl Chloride pipe as specified in the Contract Drawings shall be in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.

2.2 Pipe Embedment, Surround and Cover Materials

- .1 Granular material to Section 31 23 10 - Excavating, Trenching and Backfilling
- .2 Pipe embedment shall be in accordance with OPSD 802.010

2.3 Backfill Material

- .1 Backfill shall be granular material as specified in Section 31 23 10 – Excavation, Trenching and Backfilling.

2.4 Joint Mortar

- .1 Portland cement: to CSA A3000, normal type 10.
- .2 Mortar: one part Portland cement to two parts clean sharp sand mixed with minimum amount of water to obtain optimum consistency for use intended. Do not use additives.

PART 3 EXECUTION

3.1 Preparation

- .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site.

3.2 Trenching

- .1 Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
- .2 Do not allow contents of any sewer or sewer connection to flow into trench.
- .3 Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.

3.3 Granular Bedding

- .1 Place granular bedding material to details indicated in bedding detail OPSD 802.010 to OPSD 802.054, depending on type of soil and pipe. Use Class B bedding and place bedding in unfrozen condition.
- .2 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness.
- .3 Compact each layer full width of bed to at least 95% corrected maximum dry density.
- .4 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
- .5 Shape transverse depressions as required to suit joints.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted granular backfill.

### 3.4 Installation of Storm Drainage Piping

- .1 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Consultant.
- .2 Handle pipe using methods approved by Consultant. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .3 Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .4 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .5 Do not allow water to flow through pipes during construction except as may be permitted by Consultant.
- .6 Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .7 Joints, Poly Vinyl Chloride Pipe
  - .1 PVC Pipe as specified in the Contract Drawings shall be installed in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.
- .8 When any stoppage of work occurs, restrain pipes as directed by Consultant, to prevent "creep" during down time.
- .9 Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .10 Make watertight connections to manholes and catch basins. Use shrinkage compensating grout when suitable gaskets are not available. Support connections as per OPSD 708.020.
- .11 Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
- .12 Temporarily plug open upstream ends of pipes with removable watertight steel or plastic bulkheads.

### 3.5 Pipe Surround

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated. Pipe surround material to extend 300 mm above crown of pipe.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 Compact each layer from pipe invert to mid height of pipe to at least 100% SPMDD

3.6 Backfill

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

3.7 Field Testing

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 When directed by Consultant, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .3 Remove foreign material from sewers and related appurtenances by flushing with water.

3.8 Cleaning

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

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 31 23 10 Excavating, Trenching and Backfilling
- .3 Section 33 11 00 Storm Drains

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM A536-24 Standard Specification for Ductile Iron Castings
- .2 American Association of State Highway and Transportation Officials (AASHTO)

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit detailed shop drawings, clearly indicating materials, layout, connections, accessories and slope.
  - .1 Indicate drain piping connection locations.
  - .2 Indicate load rating for gratings.

### 1.5 Quality Control

- .1 Source quality control: Manufacturer must have continuing in-house quality control system to assure highest standards of quality.
- .2 Installer qualifications: Use only persons thoroughly familiar with manufacturer's installation requirements.
- .3 Allowable tolerances: Setting; plus/minus 1.5 mm.

### 1.6 Design Criteria

- .1 Drain, gratings and covers to withstand Minimum Load Class A according to BS EN 1433:2002 and DIN 19580.

### 1.7 Project Conditions

- .1 Existing conditions: Verify that base to receive system, has been compacted to requirements of Section 31 23 10
- .2 Environmental requirements: Assure that all joints in systems are sealed to preclude leakage.
- .3 Protection: Assure installed system is protected from damage.
- .4 Sequencing: Assure that system is completed and tested prior to placing surrounding paving.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.
- .3 Perform in manner to preclude damage to components and surroundings.

1.9 Waste Management and Disposal

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

1.10 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

- .1 Acceptable Manufacturer:
  - .1 ACO Drain, manufactured by ACO Polymer Products Inc.
  - .2 Meadrain
  - .3 Polydrain, manufactured by ABT, Inc.

2.2 System

- .1 Description: System of pre-sloped 1.0 meter long sections of polymer concrete drainage channel, accessories and galvanized steel gratings, Load Class A.
- .2 Lockable Grates.
- .3 Basis of Design System: ACO KClassicdrain K100.

2.3 Materials

- .1 The channel system bodies shall be manufactured from polymer concrete with minimum properties as follows:
  - .1 Compressive strength: 96.5MPa (14000psi)
  - .2 Flexural strength: 27.5MPa (4000psi)
  - .3 Water absorption 0.05%
  - .4 Water penetration level 0 mm
  - .5 Density: 2.23 kg/dm<sup>3</sup>
  - .6 Material structure: capillary free
- .2 Drain Trench: The nominal clear opening shall be 100mm or 200mm, as called for on the Site Grading Plan. Each unit will feature a full radius in the trench bottom, step system slope and a male to female interconnecting end profile. Cast iron rail will have a KTL-coating (cataphoretic painting). The rail system will be cast in by the manufacturer to ensure maximum strength between polymer concrete body and edge rail. One half meter to be modified to be used for 2 locations to accommodate length required. End caps and all parts shall be polymer concrete.
  - .1 Lengths: 1000 mm and 500 mm

- .2 Bottoms: sloped to provide 0.6% slope
  - .3 Anchoring Ribs: full length
  - .4 Grate Locking Slots: blind, vibration damping, thermoplastic
  - .5 Interlocking Ends
- .3 Grates: Ductile iron gratings complying with ASTM A536. Load Classification A.
- .4 Grating to meet or exceed AASHTO load ratings.
- .1 Grates to have length of 500 mm with 123mm or 239mm width, as appropriate for the corresponding drain trench.
  - .2 The inlet sectional area to be 145.16cm<sup>2</sup>/half metre of grate for nominal 100mm grates, and 230.96cm<sup>2</sup>/half meter of grate for nominal 200mm grates.
  - .3 After removal of grates there shall be uninterrupted access in the trench to aid maintenance. One unit to be bolted and modified by contractor to fit locations due to odd size required for complete runs.
- .5 Catch Basin: deep system with saddles to height of trench entrance. System to be black coated steel.
- .6 Accessories: Manufacturer's standard as required to provide a complete installation as indicated on the drawings and including:
- .1 End plates
  - .2 Outlet plates
  - .3 Strainers
  - .4 Locking devices
  - .5 Sealant: two part epoxy
  - .6 Sidewall extenders
  - .7 Installation devices
- .7 Sealant: As recommended and supplied by the manufacturer.

### PART 3 EXECUTION

#### 3.1 Manufacturer's Instructions

- .1 Install trench drain and all accessories in accordance with manufacturer's written instructions.

#### 3.2 Preparation

- .1 Where sealant is required, roughen surfaces and acetone wash components to receive sealants.
- .2 Excavate to follow slope of trench and allow for concrete encasement of trench drains of thickness equivalent to surrounding floor slab thickness, but in no cases less than what is specified in the trench drain manufacturer's written instructions, installation details, and approved shop drawings.
- .3 Ensure that all underground plumbing is in place and has been inspected and approved. Coordinate with Division 22.

#### 3.3 Installation

- .1 Install all materials in accordance with manufacturer's printed instructions and approved shop drawings.

- .2 Seal all joints with manufacturers recommended sealant.
- .3 Utilize manufacturers approved installation devices to ensure proper joints, drawn tightly together at joints.
- .4 Make pipe connections.
- .5 Commence installation at outlet or discharge end of each run and work upstream.
- .6 Install components flush, level and in straight lines. Ensure drainage trench is securely in place to prevent displacement during concrete pour.
- .7 Install plywood covers or plastic wrapped gratings to prevent concrete from entering trench.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove and clean gratings.
- .3 Clean all debris or concrete spillage out of trench.
- .4 Insert grates and lock in place with locking devices.
- .5 Leave system and surrounding area broom clean.

End of Section

## PART 1 GENERAL

### 1.1 General

- .1 Conform to the requirements of Division 1.

### 1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 31 23 10 Excavating, Trenching and Backfilling
- .3 Section 32 32 16 Precast Concrete Retaining Walls

### 1.3 References

- .1 ASTM International (ASTM)
  - .1 ASTM D1248-25 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
- .2 CSA Group (CSA)
  - .1 CSA A23.1:19 Concrete Materials and Methods of Concrete Construction
  - .2 CSA B182.1 Plastic Drain and Sewer Pipe and Pipe Fittings
- .3 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 1840 Material Specification for Non-Pressure Polyethylene (PE) Plastic Pipe Products
- .4 Ontario Building Code 2012, Part 7 - Plumbing

### 1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit manufacturer's technical literature and installation instructions.

### 1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

### 1.6 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Perforated plastic pipe and fittings: to CSA 182.1. Nominal pipe size 100 mm diameter. Manufactured from high density polyethylene resin which meets or exceeds the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C as per ASTM D1248.
- .2 Joining System: snap, insert or split coupler
- .3 Filter Sock: Woven polyester.
- .4 Acceptable product: Big 'O' Perforated Corrugated with Polyester Sock Filter as manufactured by Armtec Ltd

- .5 Coarse filter aggregate: to CSA-A23.1, Table 2, Group 1, 20-5 mm.
- .6 Fine filter aggregate: to CSA-A23.1, Table 1.
- .7 Filter Mat: Non-Woven Polypropylene Geotextile
  - .1 Terrafix 200R by Terrafix Geosynthetics Inc.
  - .2 Mirafi 140N by TC Mirafi.

### PART 3 EXECUTION

#### 3.1 Layout

- .1 Establish grades and inverts from appropriate bench marks. Lay out lines as shown on Drawings.
- .2 Slope drainage pipes at least 1%. Pipe grade shall not vary more than 10% of internal diameter of pipe withing a given run. Such deviation shall be gradual and over a distance of not less than 9.0 m.
- .3 Lay pipe in straight lines; turn corners using 45° bends.

#### 3.2 Installation

- .1 Coordinate work of this Section with that of other related Sections.
- .2 Do not place pipe in direct contact with rigid materials such as rock, brick, or wood. Do not use grade stakes, stones, masonry or concrete fragments or any type of shim under pipe.
- .3 Join pipe sections by means of couplings. Provide end plugs on open ends of pipe runs at high points. Provide fittings such as elbows, bends, tees, adapters, reducers, as required to form a complete drainage system. Carefully tap tapered fittings into pipe; do not overdrive.
- .4 Install perforated pipe with holes and coupling slots facing down.
- .5 Aggregate materials shall be damp when placed. If necessary, spray with water using fog nozzle to assist hydraulic consolidation.
- .6 Place aggregate materials by hand around and above pipe in successive 150 mm lifts.
- .7 Consolidate each lift by tamping moderately; prevent damage to pipes.
- .8 Do not cover pipes until inspected and approved by Consultant.
- .9 Supply rigid non-corrosive sleeves for insertion into foundation walls and other building elements where pipe penetrates such elements. Sleeve diameter shall be 50 mm larger than pipe diameter. Pack joint between pipe and sleeve with moisture resistant compressible pre-moulded filler.

#### 3.3 Retaining Wall Drainage

- .1 Provide perimeter drainage where indicated at base of concrete and precast retaining walls.
- .2 Connect to existing subdrainage system.
- .3 Place filter fabric into prepared excavation. Size filter fabric to completely wrap drainage course, lapping at joints minimum 300 mm.

- .4 Place minimum 150 mm coarse filter aggregate on top of filter fabric and consolidate.
- .5 Lay drainage pipe to layout shown. Unless other size is indicated, provide 100 mm diameter perforated pipe. Connect to existing outfall as directed by Owner's Representative.
- .6 Provide minimum 150 mm thick coarse filter aggregate at sides and top of drainage pipe.
- .7 Close filter fabric over top of drainage course and secure lap in place.
- .8 Cover filter fabric with 300 mm fine filter aggregate.

3.4 Inspection

- .1 Arrange for inspection of foundation drainage systems by Municipal Inspectors and the Consultant prior to placing backfill.

3.5 Cleaning

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

End of Section