

PWGSC Ontario	SPECIFICATION	Section 00 00 00
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PROJECT TITLE Kenora, Ontario

PROJECT NUMBER R.083652.002

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PART 1 - GENERAL

1.1 MINIMUM
STANDARDS

- .1 Execute work to meet or exceed:
 - .1 National Building Code of Canada 2015, National Fire Code of Canada 2015, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply as directed by the Departmental Representative.
 - .2 Rules and regulations of authorities having jurisdiction.
 - .3 Treasury Board of Canada Secretariat, Fire Protection Standard, April 1, 2010.
 - .4 Observe and enforce construction safety measures required by National Building Code 2010, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
 - .5 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.
 - .6 Ontario Regulation 634/86 for Diving Operations.

1.2 TAXES

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

1.3 FEES, PERMITS
AND CERTIFICATES

- .1 Provide authorities having jurisdiction with information requested.
 - .2 Pay fees and obtain certificates and permits required.
 - .3 Furnish certificates and permits when requested.
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| <u>1.4 EXAMINATION</u> | .1 | Before submitting tender, examine existing conditions and determine conditions affecting work. |
| | .2 | Obtain all information which may be necessary for proper execution of Contract. |
| <u>1.5 SITE</u> | .1 | Confine work, including temporary structures, plant, equipment and materials to established limits of site. |
| | .2 | Locate temporary buildings, roads, walks, drainage facilities, services as directed and maintain in clean and orderly manner. |
| | .3 | Be responsible for snow clearing and removal for storage areas and area utilized for construction for the duration of the work. |
| <u>1.6 CONSTRUCTION & STORAGE AREA</u> | .1 | The limits of the Construction and Storage Area will be designated by the Departmental Representative prior to commencement of work unless otherwise shown on the Drawings. |
| <u>1.7 DOCUMENTS</u> | .1 | Keep on site one copy of contract documents and reviewed shop drawings. |
| <u>1.8 MEASUREMENT PROCEDURES</u> | .1 | Items measured for payment are in metric (SI) units. |
| | .2 | Submit requests for payment in metric units corresponding with items on the Unit Price Table. |
| | .3 | Submit supporting documents in metric units. Perform all necessary conversions required. |
| <u>1.9 COST BREAKDOWN</u> | .1 | Within one week of notification of acceptance of tender furnish a cost breakdown aggregating the Lump Sum Arrangement. |
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1.9 COST BREAKDOWN (Cont'd) .2 Submit breakdown in metric (SI) units.

1.10 AS-BUILT RECORD DRAWINGS

.1 As work progresses, neatly record significant deviations from the Contract drawings using fine, red marker on full size white prints.

.2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT RECORD".

.3 Record following significant deviations:

.1 Depths of various elements and foundations.

.2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.

.3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.

.4 Field changes of dimension.

.5 Other significant deviations which are concealed in construction and can not be identified by visual inspection.

.4 Turn one set of As-Built Record Drawings over to Departmental Representative on completion of work.

.5 If project is completed without significant deviations from contract drawings declare this in writing and submit to Departmental Representative in lieu of As-Built Record Drawings.

1.11 ADDITIONAL DRAWINGS

.1 Departmental Representative may furnish additional drawings to clarify work.

.2 Such drawings become part of Contract Documents.

- 1.12 LAYOUT OF WORK
- .1 Immediately upon entering site for purpose of beginning work on this project, locate all general reference points and take proper action necessary to prevent their disturbance. Include marine access points.
 - .2 Supply stakes and other survey markers required for this work. Employ competent personnel to lay out work in accordance with lines and grades provided.
 - .3 Maintain all reference points and markers for duration of contract.
- 1.13 CO-OPERATION & PROTECTION
- .1 Execute work with minimum disturbance to occupants and normal use of site work area. Make arrangements with Departmental Representative to facilitate execution of work.
 - .2 Maintain access and exits.
 - .3 Provide necessary barriers, warning lights and signs. Protect work from damage. Replace damaged existing work with material and finish to match original.
 - .4 Use equipment and procedures that prevent damage to the existing structures.
- 1.14 EXISTING UTILITIES
- .1 Establish location, protect and maintain existing utility lines.
 - .2 Connect to existing utilities with minimum disturbance to pedestrian and vehicular traffic.
- 1.15 MATERIAL AND EQUIPMENT
- .1 Use new products unless otherwise specified.
 - .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.
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1.15 MATERIAL AND
EQUIPMENT
(Cont'd)

- .3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.16 INSPECTION AND
TESTING

- .1 The Departmental Representative may employ an Inspection and Testing company to ensure work conforms with Contract Documents.
- .2 When initial tests and inspections reveal work not to contract requirements, pay for tests and inspections required by Departmental Representative on corrected work.

1.17 SCHEDULING OF
WORK

- .1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion.
- .2 When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.

1.18 FIRES AND
TEMPORARY HEATERS

- .1 Burning of rubbish on site not permitted.
- .2 Only fires for temporary heaters are permitted on site.
- .3 Maintain temperature required to prevent frost damage to work.

1.19 PROGRESS
PHOTOGRAPHS

- .1 As soon as work commences, take weekly digital progress photographs from multiple location(s).
- .2 View points, which will best illustrate progress of work, will be selected by Departmental Representative.
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<u>1.19 PROGRESS PHOTOGRAPHS (Cont'd)</u>	.3	Forward digital photographs by email or file transfer protocol to Departmental Representative each week. Provide a written description and date for each photograph forwarded.
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<u>1.20 DATUM</u>	.1	Elevations and soundings shown on Drawings are expressed in metres to Lake of the Woods Datum based on water levels taken from Lake of the Woods at Keewatin Station 05PE14.
	.2	Real time water levels may be obtained from http://wateroffice.ec.gc/report/real_time_e.html?stn=05PE014 .

<u>1.21 CONSTRUCTION PARKING</u>	.1	Parking will be permitted on site provided it does not disrupt performance of Work.
	.2	Provide and maintain adequate access to project site.

<u>1.22 SECURITY</u>	.1	Pay for responsible security personnel to guard site and contents of site after working hours and during holidays.
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<u>1.23 DEMOBILIZATION</u>	.1	Complete demobilization of equipment no later than one week after receiving departmental Representative's written release from work. Do not leave equipment on job site.
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PART 1 - GENERAL

- 1.1 ADMINISTRATIVE
- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .2 Do not proceed with Work affected by submittal until review is complete.
 - .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
 - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
 - .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
 - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Verify field measurements and affected adjacent Work are co-ordinated.
 - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
 - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
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| 1.1 ADMINISTRATIVE
(Cont'd) | .10 | Keep one reviewed copy of each submission on site. |
| | .11 | Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative. |
| 1.2 SHOP DRAWINGS
AND PRODUCT DATA | .1 | The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work. |
| | .2 | When requested submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of Canada. |
| | .3 | Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications. |
| | .4 | Allow 5 working days for Departmental Representative's review of each submission. |
| | .5 | Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work. |
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1.2 SHOP DRAWINGS
AND PRODUCT DATA
(Cont'd)

- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

1.2 SHOP DRAWINGS
AND PRODUCT DATA
(Cont'd)

- .11 Submit one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

1.2 SHOP DRAWINGS
AND PRODUCT DATA
(Cont'd)

- .17 Submit one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, electronic copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted electronic 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.
- .21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PWGSC 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.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address.

1.3 SAMPLES
(Cont'd)

- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Amount Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 FEES, PERMITS
AND CERTIFICATES

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and permits required.
- .3 Furnish certificates and permits.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA): Canada
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2015 (NBC):
 - .1 NBC 2015, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2015 (NFC):
 - .1 NFC 2015, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Province of Ontario:
 - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities.
- .5 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316§ion=text.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
 - .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
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1.2 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .3 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.
 - .4 Contractor's and Sub-contractor's Safety Communication Plan.
 - .5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.
 - .6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.
 - .7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
 - .8 Submit names of personnel and alternates responsible for site safety and health.
 - .9 Submit records of Contractor's Health and Safety meetings when requested.
 - .10 Submit 1 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
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1.2 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .11 Submit 1 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, daily weekly.
- .12 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .13 Submit copies of incident and accident reports.
- .14 Submit Material Safety Data Sheets (MSDS).
- .15 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

1.3 FILING OF
NOTICE

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

1.4 WORK PERMIT

- .1 Obtain building permits related to project prior to commencement of Work.

1.5 SAFETY
ASSESSMENT

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

1.6 MEETINGS

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

1.7 REGULATORY
REQUIREMENTS

- .1 Comply with the Acts and regulations of the Province of Ontario.
- .2 Comply with specified standards and regulations to ensure safe operations at site.

1.8 PROJECT/SITE
CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Silica in concrete.
 - .2 Guano in on wharf deck surfaces.
 - .3 Work at or near water.
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1.8 PROJECT/SITE
CONDITIONS
(Cont'd)

- .1 (Cont'd)
.4 Mould on timber crib.

1.9 GENERAL
REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.10 COMPLIANCE
REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter O.1, as amended.

1.11 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.12 UNFORESEEN HAZARDS

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

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.13 POSTING OF DOCUMENTS

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

.1 Contractor's Safety Policy.

.2 Constructor's Name.

.3 Notice of Project.

.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).

.5 Ministry of Labour Orders and reports.

.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.

.7 Address and phone number of nearest Ministry of Labour office.

.8 Material Safety Data Sheets.

.9 Written Emergency Response Plan.

.10 Site Specific Safety Plan.

.11 Valid certificate of first aider on duty.

.12 WSIB "In Case of Injury At Work" poster.

.13 Location of toilet and cleanup facilities.

1.14 CORRECTION OF NON-COMPLIANCE

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

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

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

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| <u>1.15 BLASTING</u> | .1 | Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative. |
| <u>1.16 POWDER
ACTUATED DEVICES</u> | .1 | Use powder actuated devices only after receipt of written permission from Departmental Representative. |
| <u>1.17 WORK STOPPAGE</u> | .1 | Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work. |
| | .2 | Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations. |

PART 2 - PRODUCTS

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| <u>2.1 NOT USED</u> | .1 | Not used. |
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PART 3 - EXECUTION

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| <u>3.1 NOT USED</u> | .1 | Not used. |
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PART 1 - GENERAL

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| <u>1.1 DEFINITIONS</u> | .1 | Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically. |
| | .2 | Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. |
| <u>1.2 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Submit in accordance with Section 01 33 00. |
| | .2 | Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets upon request and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit 1 digital copy of WHMIS MSDS. |
| | .3 | Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative. |
| | .4 | Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction. |
| | .5 | Address topics at level of detail commensurate with environmental issue and required construction tasks. |
| | .6 | Include in Environmental Protection Plan:
.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
.3 Names and qualifications of persons responsible for training site personnel. |
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1.2 ACTION AND
INFORMATIONAL
SUBMITTALS

(Cont'd)

- .6 (Cont'd)
- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations
- .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
- .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
- .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)	.6	(Cont'd) .13 Waste Water Management Plan identifying methods and procedures for management and or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
1.3 FIRES	.1	Fires and burning of rubbish on site is not permitted.
1.4 SITE CLEARING AND PLANT PROTECTION	.1	Protect trees and plants on site.
	.2	Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
	.3	Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage. .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
	.4	Minimize stripping of topsoil and vegetation.
	.5	Restrict tree removal to areas indicated.
1.5 WORK ADJACENT TO WATERWAYS	.1	Construction equipment to be operated on land only.
	.2	Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.
	.3	Waterways to be kept free of excavated fill, waste material, debris and other deleterious substances.
1.6 IN WATER WORK	.1	No in water work is permitted between April 1 and July 15.

1.7 POLLUTION
CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 Abide by local noise by-laws.
- .6 Spills of deleterious substances:
 - .1 Immediately contain, limit the spread and clean up in accordance with provincial regulatory requirements.
 - .2 Report immediately to the Ontario Spill
 - .3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing
- .7 Re-fuelling of machinery must take place at a safe distance from the waterway as designated by the Departmental Representative.
- .8 Machinery to arrive on site in a clean, washed condition and maintained free of leaks.
- .9 Wash, refuel, service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- .10 Keep an emergency spill kit on site in the case of fluid leaks or spills from machinery.

1.8 CONCRETE
OPERATIONS

- .1 The following clauses are applicable to all work under Section 35 51 16.
 - .2 Employ measures to prevent entry of concrete wash water or leachate from uncured concrete into the water.
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1.8 CONCRETE
OPERATIONS
(Cont'd)

- .3 Containment facilities shall be provided at the site for the wash-down water from concrete delivery trucks, concrete equipment, and other tools and equipment as required. Water used to wash concrete should not be allowed to enter directly into water bodies. The sediment should be allowed to settle out and reach neutral pH before the clarified water is released to the drain system or allowed to percolate into the ground.
- .4 Concrete trucks and concrete equipment should be washed out in a designated area where runoff to the marine environment, adjacent waterways and storm drains can be prevented.
- .5 Prior to placement of concrete, all forms shall be thoroughly inspected to ensure that formwork is fully secured and sealed to prevent the release of concrete or concrete contaminated water into the waterway.
- .6 If escape of concrete is observed or detected, pumping and or placement should be stopped and appropriate action taken to immediately rectify the situation.
- .7 Measure and record baseline pH levels in the project area prior to commencement of work.
- .8 Prior to the commencement of operations, demonstrate satisfactory knowledge and use of pH monitoring equipment to Departmental Representative.
- .9 Monitor the pH levels frequently in the waterway immediately downstream of isolated work site until completion of work. Emergency measures shall be taken if pH change more than 1.0 pH unit, measured to an accuracy of 0.2 pH units from the background level or is recorded to be below 6.0 or above 9.0 pH units.
- .10 The pH levels are to be maintained within the range of 6.5-8.5 as per Provincial Water Quality Objectives (PWQO).

1.8 CONCRETE
OPERATIONS
(Cont'd)

- .11 Keep a carbon dioxide (CO₂) tank with regulator, hose and gas diffuser readily available during concrete work. Use it to release carbon dioxide gas into the affected area to neutralize pH levels should a spill occur. Train workers to use the tank.

1.9 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .1 Leave Work area clean at end of each day.
- .2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.

3.1 CLEANING
(Cont'd)

- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20 01 35 21.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

1.1 CONSTRUCTION &
DEMOLITION WASTE

- .1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Target for this project is 50 % diversion from landfill. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.
- .2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
 - .1 Provide facilities for collection, handling and storage of source separated wastes.
 - .2 Source separate the following waste:
 - .1 Portland cement concrete.
 - .2 Corrugated cardboard.
 - .3 Wood, not including painted or treated wood or laminated wood.
 - .4 Steel.
- .3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
 - .1 Indicate how material being removed from the site will be reused, recycled, composted or anaerobically digested.
- .4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

1.2 WASTE
PROCESSING SITES

- .1 Province of: Ontario.
 - .1 Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
 - .2 Telephone: 800-565-4923 or 416-323-4321.
 - .3 Fax: 416-323-4682.
 - .2 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
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1.2 WASTE PROCESSING SITES (Cont'd)	.2 (Cont'd)	
	.1	Telephone: 416-657-2797 or 1-888-501-9637.
	.2	Fax: 416-960-8053.
	.3	Email: rco@rco.on.ca.
	.4	Internet: http://www.rco.on.ca/.

PART 2 - PRODUCTS

<u>2.1 NOT USED</u>	.1	Not Used.
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PART 3 - EXECUTION

3.1 CANADIAN GOVERNMENTAL	.1	Government Chief Responsibility for the Environment.	
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<u>Address</u>	<u>General</u>	<u>Fax</u>
	Inquiries	

<u>Province</u>			
Ontario	Ministry of Environment and Energy	(416) 323-4321	(416) 323-4682
	135 St Clair Avenue West	(800) 565-4923	
	Toronto, ON M4V 1P5		
	Environment Canada	(416) 734-4494	
	Toronto, ON		

PART 1 - GENERAL

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| <u>1.1 RELATED REQUIREMENTS</u> | .1 | Section 31 23 11 - Excavating and Backfilling. |
| <u>1.2 MEASUREMENT AND PAYMENT</u> | .1 | Demolition, removal and disposal of existing asphalt pavement and the existing concrete launching ramp will not be measured separately for payment. Includes all costs in Lump Sum Arrangement. |
| <u>1.3 ADMINISTRATIVE REQUIREMENTS</u> | .1 | <p>Site Meetings.</p> <p>.1 Convene pre-demolition meeting one week prior to beginning work of this Section to:</p> <p>.1 Verify project requirements.</p> <p>.2 Review installation and substrate conditions.</p> <p>.3 Co-ordination with other subtrades.</p> <p>.2 Arrange for site visit with Departmental Representative to examine existing site conditions and site conditions adjacent to demolition work, prior to start of Work.</p> |
| <u>1.4 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Submit in accordance with Section 01 33 00. |
| | .2 | <p>Waste Reduction Workplan:</p> <p>.1 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 74 20 and indicate:</p> <p>.1 Descriptions of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.</p> <p>.2 Name and address of waste receiving facilities.</p> |
| | .3 | Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction and Section 01 35 43. |
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<u>1.5 QUALITY ASSURANCE</u>	.1	Regulatory Requirements: ensure Work is performed in compliance with CEPA, and applicable Provincial/Territorial regulations.
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<u>1.6 DELIVERY, STORAGE AND HANDLING</u>	.1	Storage and Protection. .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative. .2 Remove and store materials to be salvaged, in manner to prevent damage. .3 Store and protect in accordance with requirements for maximum preservation of material. .4 Handle salvaged materials as new materials.
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<u>1.7 SITE CONDITIONS</u>	.1	Site Environmental Requirements. .1 Ensure that selective demolition work does not adversely affect adjacent watercourse, or contribute to excess air and noise pollution. .2 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses. .1 Ensure proper disposal procedures are maintained throughout the project. .3 Do not pump water containing suspended materials into watercourses, or onto adjacent properties. .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with as directed by Departmental Representative. .5 Protect trees, plants and foliage on site and adjacent properties where indicated.
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PART 2 - PRODUCTS

<u>2.1 EQUIPMENT</u>	.1	Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.
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PART 3 - EXECUTION

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| <u>3.1 PREPARATION</u> | .1 | Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain. |
| | .2 | Locate and protect utilities. Preserve active utilities traversing site in operating condition. |
| | .3 | Notify and obtain approval of utility companies before starting demolition. |
| <u>3.2 REMOVAL OPERATIONS</u> | .1 | Remove and dispose items as indicated. |
| | .2 | Do not disturb items designated to remain in place. |
| | .3 | Removal of pavements, and concrete:
.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
.2 Protect underlying and adjacent granular materials. |
| | .4 | Stockpile topsoil for final grading and landscaping:
.1 Provide erosion control and seeding if not immediately used. |
| | .5 | Disposal of Material:
.1 Dispose of materials not designated for salvage or reuse on site at authorized facilities approved in Waste Reduction Workplan. |
| | .6 | Backfill:
.1 Backfill in areas as indicated and in accordance with Section 31 23 11. |
| <u>3.3 RESTORATION</u> | .1 | Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work match condition of adjacent, undisturbed areas. |
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<u>3.3 RESTORATION</u> (Cont'd)	.2	Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
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<u>3.4 CLEANING</u>	.1	Progress Cleaning: .1 Leave Work area clean at end of each day. .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
	.2	Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
	.3	Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20. .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

<u>3.5 PROTECTION</u>	.1	Repair damage to adjacent materials or property caused by selective site demolition.
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PART 1 - GENERAL

<u>1.1 MEASUREMENT PROCEDURES</u>	.1	Cast in place concrete slab shall be measured by the square metre of plan area and shall include all labour, materials and equipment necessary to complete the work including quality control and cold weather protection.
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<u>1.2 REFERENCES</u>	.1	ASTM International <ul style="list-style-type: none"> .1 ASTM A1064/A1064M-17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete. .2 ASTM C260/C260M-10a(2016), Standard Specification for Air-Entraining Admixtures for Concrete. .3 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compound for Curing Concrete. .4 ASTM C494/C494M-17, Standard Specification for Chemical Admixtures for Concrete.
	.2	Canadian General Standards Board (CGSB) <ul style="list-style-type: none"> .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
	.3	CSA International <ul style="list-style-type: none"> .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete. .2 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005). .3 CSA G30.18-09(R2014), Carbon Steel Bars for Concrete Reinforcement.

<u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u>	.1	Provide submittals in accordance with Section 01 33 00.
	.2	At least 4 weeks prior to beginning Work, inform Departmental Representative of source of fly ash. <ul style="list-style-type: none"> .1 Do not change source of fly ash without written approval of Departmental Representative.

1.3 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .3 At least 4 weeks prior to beginning Work, submit to Departmental Representative samples of following materials proposed for use: curing compound.
- .4 Provide mix design for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .5 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 for concrete to be delivered to site of Work and discharged after batching.

1.4 QUALITY
ASSURANCE

- .1 Provide to Departmental Representative, 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
 - .1 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.
 - .2 Quality Control Plan: provide concrete testing by Canadian Standards Association certified testing facility independent of concrete supplier testing.
 - .1 Provide concrete compression test results at 7 day strength and 28 day strength. Tests cylinders are to be cast at the commencement of each individual pour and every 30 cubic metres thereafter if the pour is greater than 30 cubic metres.
 - .2 Slump tests and air entrainment tests are to be taken for each load of concrete delivered to the site and associated with each pour.
 - .3 Submit in accordance with Section 01 33 00 all test results, verifications and certifications.

1.5 DELIVERY,
STORAGE AND
HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

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| 1.5 DELIVERY,
STORAGE AND
HANDLING
(Cont'd) | .1 | (Cont'd) |
| | .1 | (Cont'd) |
| | .1 | Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2. |
| | .2 | Deviations to be submitted for review by the Departmental Representative. |
| | .2 | Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2. |
| | .3 | Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials in accordance with Section 01 74 20. |

PART 2 - PRODUCTS

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|---------------------------------|----|--|
| <u>2.1 DESIGN CRITERIA</u> | .1 | Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS. |
| <u>2.2 PERFORMANCE CRITERIA</u> | .1 | Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE. |
| <u>2.3 MATERIALS</u> | .1 | Cement: to CAN/CSA-A3001, Type GU. |
| | .2 | Supplementary cementing materials: with minimum 20% Type F fly ash replacement or GGBFS, by mass of total cementitious materials to CAN/CSA-A3001. |
| | .3 | Water: to CSA A23.1/A23.2. |
| | .4 | Reinforcing bars: to CSA G30.18, Grade 400W. |
| | .5 | Welded steel wire fabric: to ASTM A1064/A1064M, flat sheets only. |
| | .6 | Admixtures: |

2.3 MATERIALS

(Cont'd)

- .6 (Cont'd)
 - .1 Air entraining admixture: to ASTM C260/C260M.
 - .2 Chemical admixture: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Curing compound: to CSA A23.1/A23.2 white and ASTM C309, Type 1-chlorinated rubber Type 1-D with fugitive dye.

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
 - .2 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Compressive strength at 28 days: 35 MPa minimum.
 - .3 Intended application: cast in place slab on grade.
 - .4 Aggregate size 19 mm maximum.
 - .5 Surface texture: coarse broom finish.
 - .6 Pre-qualification: yes.
 - .3 Concrete supplier's certification.
 - .4 Provide quality management plan to ensure verification of concrete quality to specified performance.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Provide Departmental Representative 24 hours notice before each concrete pour.
- .2 Place concrete reinforcing as indicate.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.

- 3.1 PREPARATION (Cont'd)
- .3 (Cont'd)
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
 - .4 Protect previous Work from staining.
 - .5 Clean and remove stains prior to application of concrete finishes.
- 3.2 COLD WEATHER PROTECTION
- .1 Do not cast concrete on frozen ground. Heat ground to remove frost and maintain ground temperature above 5 degrees centigrade during placement of concrete.
 - .2 Maintain temperature of concrete in accordance with CSA A23.1/A23.2 during placement and during the curing period.
- 3.2 INSTALLATION/ APPLICATION
- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
 - .2 Complete work to the following tolerances to CSA A23.1/A23.2:
 - .1 Straight to 1:500.
 - .2 Thickness to 6 mm.
 - .3 Sleeves and inserts:
 - .1 Cast in reinforcement and other inserts required to be built-in.
- 3.3 FINISHES
- .1 Cast in place concrete slab:
 - .1 Screed to plane surfaces and use magnesium floats.
 - .2 Provide round edges and joint spacings using standard tools.
 - .3 Trowel smooth to provide coarse brushed non-slip finish.
- 3.4 CONTROL JOINTS
- .1 Cut control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.
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3.5 EXPANSION AND ISOLATION JOINTS .1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

3.6 CURING .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

3.7 FIELD QUALITY CONTROL .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by the Contractor.

3.8 CLEANING .1 Clean in accordance with Section 01 74 11.

.2 Use trigger operated spray nozzles for water hoses.

.3 Designate cleaning area for tools to limit water use and runoff.

.4 Cleaning of concrete equipment to be done in accordance with Section 01 35 43.

.5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.1 Divert unused concrete materials from landfill to local quarry or facility after receipt of written approval from Departmental Representative.

.2 Provide appropriate area on job site where concrete trucks and be safely washed.

.3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.

.4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 03 30 00 - Cast-in-Place Concrete Short Form
<u>1.2 MEASUREMENT PROCEDURES</u>	.1	Precast concrete panels shall be measured by the unit and shall include all labour, materials and equipment necessary to cast, supply, deliver, store and install the panels including quality control.
<u>1.3 REFERENCES</u>	.1	American Society for Testing and Materials International (ASTM) .1 ASTM A1064/A1064M-17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete. .2 ASTM C260/C260M-10a(2016), Standard Specification for Air-Entraining Admixtures for Concrete. .3 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compound for Curing Concrete. .4 ASTM C494/C494M-17, Standard Specification for Chemical Admixtures for Concrete.
	.2	Canadian Standards Association (CSA International) .1 CSA A23.1-14/A23.2-14, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete. .2 CSA A23.3-14, Design of Concrete Structures. .3 CSA A23.4-16, Precast Concrete - Materials and Construction. .4 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005). .1 CSA A3001-13, Cementitious Materials for Use in Concrete. .5 CSA G30.18-09(R2014), Carbon Steel Bars for Concrete Reinforcement. .6 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

1.3 REFERENCES
(Cont'd)

- .2 (Cont'd)
- .7 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding for Steel.
- .8 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .9 CSA W59-13, Welded Steel Construction (Metal Arc Welding) (Metric version).
- .10 CSA W186-M1990(R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.4 DESIGN
REQUIREMENTS

- .1 Design precast elements to CSA A23.3 and CSA A23.4 to carry handling stresses.

1.5 PERFORMANCE
REQUIREMENTS

- .1 Length of precast elements not to vary from design length by more than plus or minus 6 mm.
- .2 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 6 mm.
- .3 Deviations from straight lines not to exceed 1 mm in 500 m.

1.6 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets.
- .3 Submit shop drawings in accordance with CSA A23.3 and CSA A23.4 and include following items:
 - .1 Design calculations for items designed by manufacturer.
 - .2 Methods of handling and installation.
 - .3 Openings, sleeves, inserts and related reinforcement.
- .4 Submit copies of detailed calculations and design drawings for typical precast elements and connections for review by Departmental Representative 2 weeks prior to manufacture.

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| <u>1.6 SUBMITTALS
(Cont'd)</u> | .5 | Shop Drawings: submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Ontario, Canada. |
| <u>1.7 QUALITY
ASSURANCE</u> | .1 | Quality Control Plan: submit written report, as described in PART 3 - VERIFICATION, to Departmental Representative verifying compliance that concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS. |
| | .2 | Provide quality control in accordance with Section 03 30 00. |
| <u>1.8 QUALIFICATIONS</u> | .1 | Fabricate and erect precast concrete elements by manufacturing plant certified in appropriate categories according to CSA A23.4 |
| | .2 | Only precast elements fabricated in such certified plants to be acceptable to Departmental Representative and plant certification to be maintained for duration of fabrication, erection until warranty expires. |
| | .3 | Welding companies certified to CSA W47.1. |
| <u>1.9 DELIVERY,
STORAGE AND
HANDLING</u> | .1 | Deliver, handle and store precast/prestressed units according to manufacturer's instructions. |
| | .2 | Protect unit corners from contacting earth to prevent from staining. |
| | .3 | Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20. |
| <u>1.10 WARRANTY</u> | .1 | Contractor warrants that precast elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with General Conditions, but for 12 months warranty period, which is extended to 24 months. |
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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Cement: to CAN/CSA-A3001, Type GU.
- .2 Supplementary cementing materials: with minimum 20% Type F fly ash replacement or GGBFS, by mass of total cementitious materials to CAN/CSA-A3001.
- .3 Water: to CSA A23.1/A23.2.
- .4 Reinforcing steel: to CSA G30.18, Grade 400W.
- .5 Welded wire fabric: to ASTM A1064/A1064M.
- .6 Hardware and miscellaneous materials: to CSA A23.1/A23.2.
- .7 Forms: to CSA A23.4.
- .8 Anchors and supports: to CSA G40.20/G40.21, Type 400W.
- .9 Welding materials: to CSA W48.
- .10 Welding electrodes: to CSA W48 certified by Canadian Welding Bureau.
- .11 Admixtures:
 - .1 Air entraining admixture: to ASTM C260/C260M.
 - .2 Chemical admixture: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .12 Curing compound: to CSA A23.1/A23.2 white and ASTM C309, Type 1-chlorinated rubber Type 1-D with fugitive dye.

2.2 MIXES

- .1 Concrete:
 - .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria in accordance with CSA A23.1/A23.2.
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| 2.2 MIXES
(Cont'd) | .1 | (Cont'd) |
| | .1 | (Cont'd) |
| | .1 | Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION. |
| | .2 | Provide concrete mix to meet following plastic state requirements: |
| | .1 | Durability and class of exposure: C-1. |
| | .2 | Compressive strength at 28 days: 35 MPa minimum. |
| | .3 | Intended application: cast in place slab on grade. |
| | .4 | Aggregate size 19 mm maximum. |
| | .5 | Surface texture: coarse broom finish, non-slip surface. |
| | .6 | Pre-Qualification: yes. |
| | .3 | Provide quality management plan to ensure verification of concrete quality to specified performance. |
| | .4 | Concrete supplier's certification. |

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| 2.3 MANUFACTURED
UNITS | .1 | Manufacture units in accordance with CSA A23.4. |
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| 2.4 SOURCE QUALITY
CONTROL | .1 | Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CSA 23.4. |
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PART 3 - EXECUTION

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| 3.1 ERECTION | .1 | Do precast concrete work in accordance with CSA A23.4, CSA A23.3. |
| | .2 | Do welding in accordance with CSA W59, for welding to steel structures and CSA W186, for welding of reinforcement. |
| | .3 | Erect precast elements within allowable tolerances as specified. |
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<u>3.1 ERECTION</u> (Cont'd)	.4	Non-cumulative erection tolerances in accordance with CSA A23.4.
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<u>3.2 VERIFICATION</u>	.1	Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established in Part 2 - Products, by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.
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<u>3.3 CLEANING</u>	.1	Use cleaning methods as reviewed by Departmental Representative before cleaning soiled precast concrete surfaces.
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PART 1 - GENERAL

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| <u>1.1 REFERENCES</u> | .1 | Canadian Standards Association (CSA International):
.1 CSA W47.1-R2014, Certification of Companies for Fusion Welding of Steel.
.2 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.
.3 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
.4 CSA W59.2-M1991 (R2013) - Welded Aluminum Construction. |
| <u>1.2 WELDER QUALIFICATIONS</u> | .1 | Use only welders qualified under CSA W47.1 and CSA W47.2. |
| | .2 | Make available to Departmental Representative currently valid Canadian Welding Bureau Qualification Certificate for each welder employed on the work. |
| <u>1.3 MEASUREMENT PROCEDURES</u> | .1 | Welding will not be measured separately for payment but is considered included in the paid items as specified and indicated. |

PART 2 - PRODUCTS

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| <u>2.1 MATERIALS</u> | .1 | Welding materials to CSA W59 and CSA W59.2. |
|----------------------|----|---|

PART 3 - EXECUTION

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|----------------------------|----|--|
| <u>3.1 WELDING GENERAL</u> | .1 | Welding: to CSA W59 and CSA W59.2. |
| | .2 | Do not deviate the size, length and location of welds from the design or from details shown on reviewed shop drawings without approval of Departmental Representative. |
| | .3 | Grind flush all butt welds. |
-

3.2 PREPARATION

- .1 Surfaces to be welded shall be smooth, uniform and free from fins, tears and other defects which would adversely affect the quality of the weld.
- .2 Ensure areas within 50 mm of the weld are free from loose scale, slag, rust, grease, moisture, paint or other matter which would impair the quality of the weld.
- .3 Remove slag before welding over previously deposited metal and brush clean weld and adjacent base. This requirement applies to successive layers, successive beads and to crater area when welding is resumed after any interruption.
- .4 Before welding is started from the second side remove to sound metal the root of the initial weld of all butt welds except when produced with the aid of backing. Thoroughly fuse the weld metal with the backing in all butt welds made with the use of backing of the same material as the base metal.

3.3 ASSEMBLY

- .1 Bring members to be welded into correct alignment and hold securely in position until the joint has been welded.
- .2 Carefully align abutting parts joined by butt welds.
- .3 Weld in a sequence that will balance the effects of applied heat of welding on various sides as the welding progresses.

3.4 WELD QUALITY

- .1 Weld metal to be sound throughout with no porosity or cracks on the surface of any weld or weld pass.
 - .2 Ensure complete fusion between the weld metal and the base metal and between successive passes throughout the joint.
 - .3 Welds shall be free from overlap and the base metal free from undercutting.
-

3.4 WELD QUALITY .4 Fill all craters to the full cross section of
(Cont'd)

.5 Fill and grind to profile any craters at the
extreme ends of fillet welds.

3.5 TESTING

.1 Give Departmental Representative 48 hours
notice of when work is ready for inspection.

.2 All welds will be subject to visual inspection
requirements of CSA W59 and CSA W59.2.

.3 Welds which fail the visual inspection will be
subject to further nondestructive testing. This
testing may be either radiographic or
ultrasonic. The full length of the weld will be
examined.

.4 If more than 50% of the welds fail the visual
inspection requirements all welds will be
tested by nondestructive testing methods.

.5 Pay all costs for nondestructive testing
resulting from visual inspection failure.

.6 Departmental Representative will not approve
any weld until all required inspection is
completed, found acceptable and marked as such.

3.6 ACCEPTANCE
REQUIREMENTS

.1 Welds subject to nondestructive testing
unacceptable if:

.1 There is any imperfection within 25 mm
from the beginning or end of a butt weld.

.2 There is any type of crack, tear, zone of
incomplete fusion or incomplete penetration
regardless of size and location.

.3 Inclusion:

.1 Occurs in any 25 mm of a welded joint
containing two or more inclusions where
the sum of the greatest dimensions of
those inclusions exceed 5 mm;

.2 Is greater than one-third the joint
thickness but in no case larger than
19 mm.

- 3.6 ACCEPTANCE
REQUIREMENTS
(Cont'd)
- .1 (Cont'd)
 - .3 (Cont'd)
 - .2 Repair defective welds by chipping, air-arc gouging or grinding out from one side or both sides. Remove all traces of defects before rewelding. Remove all traces of oxidation after air-arc gouging.
 - .3 Resubmit all repaired welds to nondestructive testing.

PART 1 - GENERAL

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|--|----|---|
| <u>1.1 MEASUREMENT
PROCEDURES</u> | .1 | Sleepers will not be measured separately for payment. Include all labour, materials and equipment necessary to fabricate and install the sleepers under Section 03 041 00, Clause 1.1. |
| <u>1.2 REFERENCES</u> | .1 | ASTM International
.1 ASTM A53/A53M-12, 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 A269/A269M-15a, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
.4 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
.5 ASTM F593-17, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs |
| | .2 | CSA International
.1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.2 CSA S16-14, Design of Steel Structures.
.3 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
.4 CSA W59-13, Welded Steel Construction (Metal Arc Welding). |
| | .3 | Health Canada / Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS). |
| <u>1.3 ACTION AND
INFORMATIONAL
SUBMITTALS</u> | .1 | Submit in accordance with Section 01 33 00. |
| | .2 | Submit connection detail shop drawing for aluminum safety grating. |
-

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan related to Work of this Section and in accordance with Section 01 74 20.

1.6 WELDER QUALIFICATIONS

- .1 To Section 05 12 35.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W, minimum 30% recycled content.
 - .2 Hollow structural steel: to CSA G40.20/G40.21, Grade 350W, Class H.
 - .3 Welding materials: to CSA W59.
 - .4 Welding electrodes: to CSA W48 Series.
-

- 2.2 FABRICATION
- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
 - .2 Where possible, fit and shop assemble work, ready for erection.
 - .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

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

- 3.3 FIELD METALWORK
- .1 Do welding work in accordance with Section 05 12 35
 - .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
 - .3 Field cutting or altering steel members: to approval of Departmental Representative.
-

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 32 19.

1.2 UTILITY LINES

- .1 Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify Departmental Representative of findings.
- .2 Advise Departmental Representative to re-route existing lines in area of excavation. Pay costs of such work.
- .3 Maintain existing lines in areas of excavation which must remain active. Pay costs for this work.
- .4 Record locations of maintained, re-routed and abandoned underground utility lines.
- .5 Make good damage to existing utility lines resulting from work.

1.3 PROTECTION

- .1 Protect excavated earth from freezing by approved method.
- .2 Grade around excavations to prevent surface water runoff into excavated area.
- .3 Protect bottoms of excavations from weather. Should softening in bottoms occur due to water or other causes, remove softened soil and replace with structural concrete at no additional cost.

1.4 MEASUREMENT PROCEDURES

- .1 Excavated material including disposal off site shall all be considered incidental and not measured separately for payment.

1.4 MEASUREMENT
PROCEDURES
(Cont'd)

- .2 Relocation of float anchor blocks to permit excavation and construction of the launching ramp shall be considered incidental and not measured separately for payment.
- .3 Clear stone fill will be measured in tonnes of material supplied and placed and shall include all labour, materials and equipment necessary to complete the work.
- .4 Rip-Rap will be measured in tonnes of material supplied and placed and shall include all labour, materials and equipment necessary to complete the work.
- .5 Granular A will be measured in tonnes of material supplied and placed and shall include all labour, materials and equipment necessary to complete the work.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Native fill: soil, free from roots and debris. Departmental Representative to approve excavated material before use as fill.
 - .2 Clear Stone: Ontario Provincial Standard Specification ,OPSS.PROV 1004, November 2012, Material Specification for Aggregates - Miscellaneous. Maximum size 19.0 mm, Type 2.
 - .3 Rip-Rap: to Ontario Provincial Standard Specification, OPSS.PROV 1004, November 2012, Material Specification for Aggregates - Miscellaneous, Rip-Rap R-50.
 - .4 Granular A: to OPSS 1010, April 2013, Ontario Provincial Standard Specification, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material. Maximum size 19.0 mm.
-

PART 3 - EXECUTION

- 3.1 STOCKPILING .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- 3.2 EXCAVATING GENERAL .1 Excavate to elevations and dimensions indicated or as required for construction of work.
- .2 Make excavation to clean lines to minimize quantity of fill material required.
- .3 Earth bottoms of excavations to be dry undisturbed soil, reasonably level, free from loose or organic matter.
- .4 Excavation exceeding that shown on drawings, if authorized in writing by Departmental Representative, will be paid as extra to Contract price in accordance with General Conditions. Quantities will be calculated in place, compaction included. Truck load measurements not acceptable.
- .5 Remove any obstructions encountered in the course of excavation upon approval of Departmental Representative.
- .6 Dispose off site excess excavated material not required as native backfill.
- 3.3 ANCHOR BLOCKS .1 To permit construction of the launching ramp, anchor blocks that interfere with the excavation shall be relocated as required to permit excavating and backfilling
- 3.4 EXCAVATION REQUIRED BY OTHER SECTIONS .1 Excavation for work of other sections is included in this Section and shall be carried out in accordance with provisions specified herein and indicated. This work to be laid out and supervised by trade concerned.
-

3.5 BACKFILLING GENERAL

- .1 Do not commence backfilling until area of work to be backfilled have been inspected and approved by Departmental Representative.
- .2 Backfill all spaces excavated and not occupied by parts of the structure, or other permanent works, with specified material placed as shown on the drawings.
- .3 Areas backfilled to be free from debris, snow, ice, water or frozen ground.
- .4 Prior to placing fill, compact existing sub grade above water to obtain same compaction as for specified fill. Cut out "soft" areas and fill with suitable material until specified compaction can be obtained.
- .5 Place and compact fill materials in continuous layers not exceeding 300 mm loose depth. Use methods to prevent disturbing or damaging any part of the work. Make good any damage.
- .6 Maintain optimum moisture content to enable compaction to attain specified density.
- .7 Compact each layer to 98% Standard Proctor Density. Where working space is limited, employ approved mechanical hand operated tamping devices. When such devices are employed, deposit backfill material in layers not exceeding 150 mm in thickness.

3.6 LAUNCHING RAMP

- .1 Excavate to neat lines and depth to achieve slope and elevations indicated.
- .2 Place geotextile to Section 31 21 19.01.
- .3 Backfill with clear stone to underside of steel sleepers. Provide continuous clear stone support along entire length the bottom flanges of the sleepers. Backfill to underside of the concrete panels after acceptance of Departmental Representative of the sleeper placement.
- .4 Place Granular A to elevations and thickness required and compact to 98% Standard Proctor prior to casting concrete slab.

- 3.7 RIP-RAP
- .1 Remove debris from shore and level to even surface.
 - .2 Place geotextile to Section 31 32 19.
 - .3 Place well knit 400 mm thick layer of Rip-Rap over geotextile.

PART 1 - GENERAL

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|--|----|---|
| <u>1.1 MEASUREMENT AND PAYMENT</u> | .1 | Measure geotextiles in square metres of surface area covered by material. No allowance will be made for seams and overlaps. |
| <u>1.2 REFERENCES</u> | .1 | ASTM International:
.1 ASTM D4632/D4632M-15a, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
.2 ASTM D4751-16, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
.3 ASTM D6241-14, Standard Test Method for Static Puncture Strength of Geotextile-Related Products Using a 50-mm Probe. |
| <u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Submit in accordance with Section 01 33 00. |
| | .2 | Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements. |
| <u>1.4 DELIVERY, STORAGE AND HANDLING</u> | .1 | Deliver, store and handle materials in accordance with and with manufacturer's written instructions. |
| | .2 | Storage and Handling Requirements:
.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect geotextiles from direct sunlight and UV rays.
.3 Replace defective or damaged materials with new. |
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PART 2 - PRODUCTS

- 2.1 MATERIAL
- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 4.5 m minimum.
 - .2 Composed of: polypropylene with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure.
 - .2 Physical properties:
 - .1 Tensile strength and elongation (in any principal direction): to ASTM D4632.
 - .1 Tensile strength: minimum 1000 N, condition.
 - .2 Elongation at break: minimum maximum 50%.
 - .2 CBR Puncture: to ASTM D6241.
 - .1 Breaking force: minimum 2700 N
 - .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D4751, 0.15 micrometres.
 - .4 Factory seams: sewn in accordance with manufacturer's recommendations.
 - .5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
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3.2 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 After installation, cover with overlying layer within 4 hours of placement.
- .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .8 Place and compact soil layers in accordance with Section 31 23 11.

3.3 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D751-06(2011), Standard Test Methods for Coated Fabrics.
 - .2 ASTM D2261-13, Standard Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of-Extension Tensile Testing Machine).
 - .3 ASTM D5034-09(2013), Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).
- 1.2 SUBMITTALS
- .1 Submit details of the temporary turbidity curtain system to the Departmental Representative prior to the start of the Work.
 - .2 Submit to Departmental Representative details of geotextile material and seam at least 2 weeks prior to commencing work.
- 1.3 DELIVERY AND STORAGE
- .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

PART 2 - PRODUCTS

- 2.1 MATERIAL
- .1 Turbidity Curtain:
 - .1 Flotation Properties:
 - .1 Size: 150 mm x 150 mm.
 - .2 Curtain Depth: 3 m.
 - .3 Buoyancy: 20 Kg/m.
 - .2 Curtain Body Properties:
 - .1 Nylon Vinyl Reinforced: 5492 g/m².
 - .2 Grab Tensile: to ASTM D5034, 1779 N.
 - .3 Tear: to ASTM D2261, 444 N..
 - .4 Hydrostatic Resistance: to ASTM D751, 4136 kPa.
 - .5 Seam strength: Heat Sealed.
 - .6 Fabric: Impermeable.
-

- 2.1 MATERIAL (Cont'd)
- .1 (Cont'd)
 - .2 (Cont'd)
 - .7 Ballast Chain: 6 mm.
 - .2 Seams: sewn in accordance with manufacturer's
 - .3 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

PART 3 - EXECUTION

- 3.1 GENERAL
- .1 Supply, install, maintain and remove silt curtains when instructed by the Departmental Representative.
 - .2 Monitoring of water turbidity outside the turbidity curtain will be done by the Departmental Representative. Turbidity shall not exceed 8 NTU above background conditions.
- 3.2 INSTALLATION
- .1 Turbidity curtains shall consist of turbidity curtain geosynthetic, load line, flotation, ballast, anchors, mooring buoys, mooring lines, adjustment lines, and tie-downs.
 - .2 Design to conform to US Army Corps of Engineers EP 1110-1-16 Appendix C, BMP 27 Type 1.
 - .3 Turbidity curtains shall be constructed as follows:
 - .1 The flotation shall provide support along the length of the turbidity curtain.
 - .2 A sleeve shall be formed and heat-sealed or sewn along the entire bottom edge of the turbidity curtain geosynthetic, to contain the ballast in the sleeve. Breaks may be made in the sleeve to facilitate pulling, provided they are a minimum 100 mm in size and spaced at minimum 3 m intervals.
 - .3 Where turbidity curtain geosynthetic is joined to provide a continuous run, the sections shall be connected to provide a continuous seal and prevent the escape of turbid water between the sections.
-

3.2 INSTALLATION
(Cont'd)

- .3 (Cont'd)
- .4 The turbidity curtain, as prepared for installation, shall be of sufficient width to account for water depth and wave action.
- .5 The turbidity curtain shall be of sufficient length to permit work inside the area enclosed by the curtain without restricting equipment operations, and personnel from working.
- .6 Seal the ends of the turbidity curtain where it is terminates at the existing structure face.
- .4 The turbidity curtain shall be maintained in place during removal of the existing launching ramp and construction of the new launching ramp.

3.3 OPERATION AND
MAINTENANCE

- .1 Turbidity curtains shall be installed to prevent sediment and debris passage, from the area enclosed by the curtain, to the remaining water body. Turbidity curtains shall be installed and maintained in a manner that avoids entry of equipment, other than hand-held equipment or boats, to the remaining water body.
- .2 Equipment is permitted in the work area enclosed by the turbidity curtain.
- .3 Turbidity curtains shall be operated and maintained in the specified location, with the entire top edge above the water surface.
- .4 The turbidity curtain shall be free of tears and gaps, and the bottom edge of the curtain is to be continuously in contact with the water course bed so that sediment passage from the area enclosed is prevented.
- .5 Any folds in the turbidity curtain which form next to the flotation collar shall be regularly monitored and freed of collected sediment.
- .6 Monitor and maintain the silt curtains booms both during and outside normal working shifts as required. Provide all personnel, materials and equipment necessary to maintain, repair or relocate the turbidity curtain system.

3.3 OPERATION AND
MAINTENANCE
(Cont'd)

- .7 Carry out construction operations to minimize impact on fish habitat from both disturbed sediments and fill materials.
- .8 Replace damaged or deteriorated fabric to approval of Departmental Representative.
- .9 Remove turbidity curtain when authorized by the Departmental representative after completion of the work.