



Fisheries and Oceans
Canada

**C&P Lower Terra Nova Warehouse Boat Launch
Angle Brook Road, Glovertown, NL**

File No. FP802-180056

SPECIFICATIONS

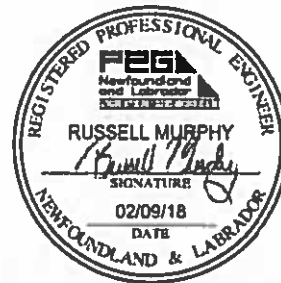
June 2018

SPECIFICATION

C&P LOWER TERRA NOVA WAREHOUSE BOAT LAUNCH

ANGLE BROOK ROAD, GLOVERTOWN, NL

P/N: F6879-179016

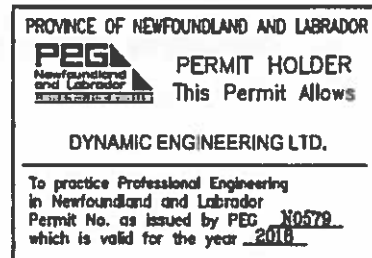


PREPARED FOR:

FISHERIES AND OCEANS CANADA

DATE:

NOVEMBER 2017



**BOAT LAUNCH
C & P WAREHOUSE
GLOVERTOWN, NL
P/N: F6879-179014**

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C1 Rev A	SITE PLAN AND BOAT LAUNCH DETAILS
C2 Rev A	BOAT LAUNCH SECTIONS AND DETAILS

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1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The work consists of the furnishing of all plant, labour, equipment and material in strict accordance with specifications and accompanying drawings and subject to the terms and conditions of the Contract.
- .2 Work of this Contract comprises general construction of a boat launch, to accommodate the launching of a DFO Conservation and Protection boat. The launch is required for the launching of one 18 ft. aluminum open boat at a time on a trailer. The boat and trailer measure 8ft. wide and 22 ft. in length. The site is located at the Lower Terra Nova River Warehouse DFRP# 58731 facility located on Angle Brook Road in Glovertown, NL; and further identified as site coordinates:48 39 31 N, 54 01 12 W.
- .3 In general, work under this contract consists of but will not be necessarily be limited to the following:
 1. Removal of all organic material from the boat launch footprint.
 2. Supply and install non-woven geotextile material.
 3. Supply, place and compact 100mm minus blast rock material.
 4. Supply, place and compact "Class B" material
 5. Supply and install precast concrete panels.
 6. Supply and install cast-in-place reinforced concrete.
 7. Supply and place riprap material.

1.02 CONTRACT METHOD

- .1 Construct Work under stipulated price contract.

1.03 WORK BY OTHERS

- .1 Not Used.

1.04 FUTURE WORK

- .1 Not Used.

1.05 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .2 Maintain fire access/control.

1.06 CONTRACTOR USE OF PREMISES

- .1 Co-ordinate use of premises under direction of Department.
- .2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .4 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Department.
- .5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.07 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.08 PARTIAL OWNER OCCUPANCY

- .1 Not Used.

1.09 PRE-ORDERED PRODUCTS

- .1 Not Used.

1.10 PRE-PURCHASED EQUIPMENT

- .1 Not used.

1.11 OWNER FURNISHED ITEMS

- .1 Not used.

1.12 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations and normal use of premises. Arrange with Department to facilitate execution of work.

1.13 EXISTING SERVICES

- .1 Notify, Department and utility companies of intended interruption of services and obtain required permission.
- .8 Where unknown services are encountered, immediately advise the Department and confirm findings in writing.

1.14 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

2 PRODUCTS

2.01 NOT USED

- .1 Not used.

3 EXECUTION

3.01 NOT USED

- .1 Not used.

END OF SECTION

1 GENERAL

1.01 ACCESS AND EGRESS

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

1.02 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.

1.03 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.

1.04 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

1.02 APPOINTMENT AND PAYMENT

- .1 Departmental Representative will appoint and pay for services of testing laboratory except follows:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Tests specified to be carried out by Contractor under supervision of Departmental Representative.
 - .4 Additional tests specified in the following paragraph.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.03 CONTRACTOR'S RESPONSIBILITIES

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

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PAYMENT PROCEDURES FOR
TESTING LABORATORY SERVICES

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2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Not Used.

1.02 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.03 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.

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

1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

1.05 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule. Identify and submit to Departmental Representative.

1.06 MASTER PLAN

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

1.07 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Excavation.
 - .6 Placement of Geotextile and Aggregate.
 - .7 Concrete Forming.
 - .8 Installation of Steel Reinforcement.
 - .9 Concrete Pouring.
 - .10 Form Stripping.
 - .11 Precast Panel Placement.
 - .12 Rip-Rap Placement.
 - .13 Driveway Rehabilitation.
 - .14 Site Clean-up and Site Restoration.
 - .15 Close-out Documentation.

.16 Demobilize.

1.08 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.09 PROJECT MEETINGS

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

2 PRODUCTS

2.01 NOT USED

- .1 Not used.

3 EXECUTION

3.01 NOT USED

- .1 Not used.

END OF SECTION

1 GENERAL

1.01 SECTION INCLUDES

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Certificates.

1.02 SUBMITTAL GENERAL REQUIREMENTS

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.03 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or

licensed in the province of Newfoundland and Labrador, 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 (10) 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.
- .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 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 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 6 prints in electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may

reasonably request.

- .11 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .12 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PSPC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.04 SAMPLES

1.04 NOT USED

- .1 Not Used.

1.05 MOCK-UPS

1.05 NOT USED

- .1 Not Used.

1.06 PHOTOGRAPHIC DOCUMENTATION

1.06 NOT USED

- .1 Not Used.

1.07 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Letter of Good Standing from Workers' Compensation Board.
- .2 Submit transcription of insurance immediately after award of Contract.

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SUBMITTAL PROCEDURES

SECTION 01 33 00

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2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCE STANDARDS

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .6 Province of Newfoundland and Labrador
 - .1 Occupational Health and Safety Act, R.S.N. - Updated 2013.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within five 5 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 operations.
- .3 Submit copies of reports or directions issued by Provincial health and safety inspectors.
- .4 Submit copies of incident and accident reports.
- .5 Submit WHMIS MSDS - Material Safety Data Sheets.
- .6 Name of Contractor's Representative(s) designated to perform full time health and safety supervision on site.
- .7 Letter of Good Standing/Certificate of Clearance from the Provincial Worker's Compensation Board.
- .8 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments.
- .9 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.
- .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

1.03 FILING OF NOTICE

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

1.04 SAFETY ASSESSMENT

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

1.05 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work. Ensure attendance of:
 - .1 Superintendent of Work.
 - .2 Contractor's designated Health and Safety Site Representative
 - .3 Health and Safety Site Coordinator.
- .2 Conduct regularly scheduled tool box and safety meetings during the work in conformance with Occupational Health and Safety Regulations.
- .3 Keep documents on site.

1.06 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Close proximity to water.
 - .2 Wet and slippery conditions.
 - .3 Heavy equipment activity in the area.
 - .4 Cutting tools and other construction/power tools.

1.07 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.

1.08 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 all workers, subcontractors and other persons granted access to the work site with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.09 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health and Safety

Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code Part II, and the Canada Occupational Safety and Health Regulations made under Part II of the Canada Labour Code.

1.10 UNFORSEEN HAZARDS

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

1.11 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

- .1 Have site-related working experience specific to activities of the Work.
- .2 Have working knowledge of occupational safety and health regulations.
- .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.12 POSTING OF DOCUMENTS

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

1.13 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.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

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HEALTH AND SAFETY
REQUIREMENTS

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3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 Environmental protection plan: include:
 - .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.
 - .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan which identifies 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.
- .7 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .9 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements

1.04 FIRES

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

1.06 DRAINAGE

- .1 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.07 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .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 dripline 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 or designated by Departmental Representative.

1.08 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 and debris.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Blasting is allowed only above water and 100 m minimum from indicated spawning beds.

1.09 REFUELING

- .1 Refueling of equipment to be performed in locations as directed by Departmental Representative.
- .2 Do not refuel equipment within 100 metres of any watercourse or storm water catch basin unless protection against spills is in place and location is approved by Departmental Representative.
- .3 Use petroleum containers approved for products with no spill fill spouts for dispensing fuels. The sure pour nozzle to have self closing valve, prevent any flow of fuel until the nozzle is inserted into the receiving container. On removal from the receiving container the slide valve closes to eliminate any fuel spill. Nozzle to be equipped with its own automatic vent eliminating the need for the user to open or close air inlets on the pouring container.
- .4 Nozzle to support the weight of the pouring container. Nozzles to automatically stop the flow when the receiving container becomes full. The nozzle to be such that it reduces evaporative losses of volatile organic compounds during the fuel transfer.
- .5 All spills of hydrocarbon based products such as gasoline, kerosene, naphtha, lubricating oils, engine oils, greases and de-icing fluids or antifreeze no matter how large or small to be reported to Departmental Representative.
- .6 Oil changes or equipment repairs in the field are not permitted.
- .7 Refueling to be performed on level surfaces, PCC Portland cement concrete or HMA surfaces when approved by the Departmental Representative unless otherwise directed.
- .8 Contractor to have drip pans sized for amounts of product to be recovered and customized to fit under pieces of equipment to perform routine maintenance to equipment while maintaining equipment on property. Drip Pans to be used whenever leaving equipment on site or parking overnight when not in use.
- .9 Parking of equipment on site to be on level ground in locations away from watercourses and as approved by Departmental Representative. Equipment with leaks or poor mechanical repair to be removed from site when so ordered by Departmental Representative.

1.10 SPILL CONTROL KIT

- .1 Contractor to have at the work site a spill control kit consisting of the following minimum types of equipment:
 - .1 a spaded shovel;
 - .2 a stable broom;
 - .3 a broad nosed shovel;
 - .4 a container(s) suitable, compatible to and of sufficient size to contain petroleum products being used with equipment;
 - .5 Absorbents;
 - .6 rags;

- .7 metal container for soiled rags;
- .8 Booms when working next to a watercourse that will traverse the width of the watercourse by two times; and
- .9 Spill control kit to be inspected and approved by Wing Environment Office prior to Work commencing. Spill control kits to be available to Contractor employees at all areas where Work of the Contract is being performed and at all times during the course of the Contract.
- .10 Contractor employees to be trained in the use of the spill control kit and the equipment they contain.

1.11 SPILLS

- .1 Disposal of spilled materials to be off the work site/property and at approved locations for materials to be disposed of.
- .2 When parking of equipment on site, the equipment is to be secured from entry, inspected for leaks and the ground protected from leaks.
- .3 Contractor to protect all wells, catch basins, drywells, drains and watercourses from contamination in event of a spill.
- .4 All equipment to be used for the Work of the Contract to be inspected by the Departmental Representative for leaks. Equipment not in good repair to be removed/repaired when directed by Departmental Representative.
- .5 Spills in excess of 74 litres to be reported immediately to Departmental Representative and the Newfoundland and Labrador Department of Environment and Conservation.
- .6 For spills occurring the Contractor to immediately remove as much or all of the contaminated soils created by the spill from Work of the Contractor as possible.
- .7 Contaminated soils/materials to be placed in containers compatible to the contaminants.
- .8 Any remaining clean-up to be performed at no extra cost to Canada. Clean-ups to be to the Departmental Representative's satisfaction.

1.12 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 Cover or wet down dry materials and rubbish to prevent blowing dust and debris
- .4 Have emergency spill response equipment and rapid clean-up kit, appropriate to work, at site. Locate adjacent to work and where hazardous materials are stored. Provide personal protective equipment as required for clean-up.

1.10 NOTIFICATION

- .1 Report to Federal and provincial Department of the Environment, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment. Also notify Departmental Representative within 24 hours of occurrence.
- .2 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.
- .3 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.
- .4 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .5 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

3 EXECUTION

3.01 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.

1.02 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative, or by inspection authorities having jurisdiction.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if work is expected to be not in accordance with Contract Documents.

1.03 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative except for the following which remain part of the Contractor's responsibilities:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Mill tests and certificates of compliance.
 - .4 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.
 - .5 Additional tests specified in Clause 1.3.2.
- .2 Where tests or inspections by approved Testing Agency reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Departmental Representative may require to verify acceptability of corrected work.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

- .5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

1.04 ACCESS TO WORK

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

1.05 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative sufficiently 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.

1.06 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative] as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.

1.07 REPORTS

- .1 Submit 2 copies of inspection and test reports to Departmental Representative.

1.08 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents, or beyond those required by inspection authorities having jurisdiction, will be appraised by Departmental Representative and may be authorized as recoverable.

1.09 MILL TESTS

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

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QUALITY CONTROL

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2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Not Used.

1.02 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 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 disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

1.03 AVAILABILITY

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

1.04 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store

sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.-
- .8 Immediately remove from site and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces. Use touch-up materials to match original. Do not paint over name plates.

1.05 TRANSPORTATION

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

1.06 MANUFACTURER'S INSTRUCTIONS

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

1.07 QUALITY OF WORK

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

1.08 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

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COMMON PRODUCT REQUIREMENTS

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1.09 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .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.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 77 00 - Closeout Procedures.

1.02 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site waste containers for collection of waste materials and debris.
- .5 Dispose of waste materials and debris off site.
- .6 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .7 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .8 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .9 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.03 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 Remove waste products and debris other than that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials

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on site.

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

2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill and includes the following:
 - .1 Preparation of a Construction Waste Management Plan (CWM Plan) that provides guidance on a logical progression of tasks and procedures to be followed in a pollution prevention program to reduce or eliminate the generation of waste, the loss of natural resources, and process emissions through source reduction, reuse, recycling, and reclamation.
 - .2 Owner has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors be employed by the Contractor.

1.02 RELATED REQUIREMENTS

- .1 Section 01 35 43 - Environmental Procedures

1.03 REFERENCE STANDARDS

- .1 Not Used.

1.04 DEFINITIONS

- .1 **Clean Waste:** Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 **Construction Waste:** Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, operations.
- .3 **Hazardous:** Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 **Non hazardous:** Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 **Non toxic:** Not poisonous to humans either immediately or after a long period of exposure.
- .6 **Recyclable:** The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 **Recycle:** To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
 - .1 Solvents in paints and other coatings;
 - .2 Wood preservatives; strippers and household cleaners;
 - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
 - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.05 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.

1.06 SUBMITTALS

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

1.07 PROJECT CLOSEOUT SUBMISSIONS

- .1 Not Used.

1.08 QUALITY ASSURANCE

- .1 Not Used.

1.09 DELIVERY, STORAGE AND HANDLING

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:
 - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
 - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

3 EXECUTION

3.01 (CWM PLAN) IMPLEMENTATION

- .1 Manager: Contractor is responsible for designating an on site party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Owner, the Representative and other site personnel as required to maintain CWM Plan.
- .3 Instruction: Provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractor's at appropriate stages of the project.
- .4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
 - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
 - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.
- .5 Progressive Documentation: Submit a monthly summary of waste generated by

the project to ensure that waste diversion goals are on track with project requirements:

- .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Owner, Contractor and Representative.
- .2 Monthly waste summary shall contain the following information:
 - .1 The amount in tonnes or m3 and location of material landfilled,
 - .2 The amount in tonnes or m3 and location of materials diverted from landfill, and
 - .3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

3.02 SUBCONTRACTOR'S RESPONSIBILITY

- .1 Subcontractor's shall cooperate fully with the Contractor to implement the CWM Plan.
- .2 Failure to cooperate may result in the Owner not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor's.

3.03 SAMPLE CONSTRUCTION WASTE MANAGEMENT FORMS

- .1 Not Used.

END OF SECTION

1 GENERAL

1.01 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of white print sets of contract drawings and two copies of specifications provided by Departmental Representative.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
- .4 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Other Documents: maintain inspection certifications, field test records, required by individual specifications sections.
- .6 Provide digital photos, if requested, for site records.

1.02 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-In-Place Concrete.

1.02 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA-A23.1-[14]/A23.2-[14], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA O121-[08(R2013)], Douglas Fir Plywood.
 - .3 CSA O151-[09(2014)], Canadian Softwood Plywood.
 - .4 CSA O153-[13], Poplar Plywood.
 - .5 CAN/CSA-O325.0-[16], Construction Sheathing.
 - .6 CSA O437 Series-[93(R2011)], Standards for OSB and Waferboard.
 - .7 CSA S269.1-[16], Falsework and Formwork.
 - .8 CAN/CSA-S269.3-[M92(R2003)], Concrete Formwork.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel, site supervisor, and Departmental Representative attend.
 - .1 Verify project requirements.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements, 01 35 43 - Environmental Procedures.
- .3 Sustainable Design Submittals:
 - .1 Not used.

1.05 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 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 formwork from damages.

- .3 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 MATERIALS

- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-086.
 - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.
- .2 Form ties:
 - .1 For concrete not designated 'Architectural': removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes minimum 25 mm diameter in concrete surface.
- .3 Form liner:
 - .1 Not used.
- .4 Form release agent: Proprietary, non volatile material not to stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non petroleum containing, non-toxic, biodegradable, low VOC.

3 EXECUTION

3.01 FABRICATION AND ERECTION

- .1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .6 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .7 Use 25 mm chamfer strips on external corners and [25] mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .10 Line forms for following surfaces:
 - .1 Not used.
- .11 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.02 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 2 days for walls and sides of beams.
 - .2 5 days for beam soffits, slabs, decks and other structural members, or 3 days when replaced immediately with adequate shoring to standard specified for falsework.
 - .3 2 days for footings and abutments.
- .2 Remove formwork when concrete has reached 70 % of its 28 day design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: separate waste materials for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-In-Place Concrete.

1.02 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement made under this Section.

1.03 REFERENCE STANDARDS

- .1 Do concrete reinforcement work to CSA-A23.1.

1.04 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel, site supervisor, and Departmental Representative attend.
 - .1 Verify project requirements.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Not used.
- .4 Sustainable Design Submittals:
 - .1 Not used.
- .5 Quality Assurance Submittals:
 - .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .2 Mill Test Report: upon request, submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 1 weeks prior to beginning reinforcing work].
 - .3 Upon request submit in writing to Departmental Representative proposed source of reinforcement material.
 - .4 Upon request submit to Departmental Representative epoxy coating applicator certificates identified in Quality Assurance.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 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 Handle, transport, store and install epoxy coated reinforcing steel bars to prevent damage to coating. Prevent bar-to-bar abrasion and excessive sagging. Do not drop or drag bars. Store on suitable non-metallic supports. For lifting use nylon lifting slings, padded slings, separators or other means recommended by epoxy coated reinforcing steel supplier.

2 PRODUCTS

2.01 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Consultant.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable or non-weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM 1064/A 1064M.
- .5 Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A 775M.
- .6 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .7 Tie wire: 1.5 mm diameter annealed wire, epoxy coated.
- .8 Mechanical splices: subject to approval of Consultant.

2.02 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 SP-66 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
 - .1 SP-66 unless indicated otherwise.
- .2 Obtain Consultant's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

- .1 Ship epoxy coated bars in accordance with ASTM A 775A/A 775M.

2.03 SOURCE QUALITY CONTROL

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

3 EXECUTION

3.01 PREPARATION

- .1 Not used.

3.02 FIELD BENDING

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

3.03 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Maintain cover to reinforcement during concrete pour.
- .4 Protect epoxy coated portions of bars with covering during transportation and handling.

3.04 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.05 FIELD QUALITY CONTROL

- .1 Site tests: Not used.

3.06 CLEANING

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

**BOAT LAUNCH
C & P WAREHOUSE
GLOVETOWN, NL
P/N: F6879-179014**

CONCRETE REINFORCING

SECTION 03 20 00

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- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 20 00 - Concrete Reinforcing.
steel, structural steel, or piles.

1.02 REFERENCE STANDARDS

- .1 Do structural concrete work to CSA-A23.1 and CSA A23.3.

1.03 ABBREVIATIONS AND ACRONYMS

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:
 - .1 GU, GUb and GUL - General use cement.
 - .2 MS and MSb - Moderate sulphate-resistant cement.
 - .3 MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 HE, HEb and HEL - High early-strength cement.
 - .5 LH, LHb and LHL - Low heat of hydration cement.
 - .6 HS and Hsb - High sulphate-resistant cement.
- .2 Fly ash types:
 - .1 F - with CaO content maximum 8%.
 - .2 CI - with CaO content 15 to 20%.
 - .3 CH - with CaO minimum 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

1.04 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure Departmental Representative attend.
 - .1 Verify project requirements.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

- .3 Site Quality Control Submittals:
 - .1 Provide testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters found.
 - .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
 - .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.
- .4 Samples:
 - .1 Minimum 2 weeks prior to beginning Work, submit samples for review and acceptance of materials proposed for use as follows:
 - .1 Curing compound.
 - .2 Joint filler.
 - .3 Joint sealant.
 - .4 Portland cement.
 - .5 Supplementary cementing material.
 - .6 Blended hydraulic cement.
 - .7 Admixtures.
 - .8 Fine and coarse aggregate.
 - .2 Samples returned for inclusion into work.

1.06 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.
- .3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .4 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.07 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.
 - .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.
- .2 Deviations submitted for review by Departmental Representative.

1.08 SITE CONDITIONS

- .1 Placing concrete during rain or weather events that could damage concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold weather protection:
 - .1 Maintain protection equipment, in readiness on Site.
 - .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.
 - .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot weather protection:
 - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
 - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

2 PRODUCTS

2.01 MATERIALS

- .1 Portland Cement: Cement in accordance with CAN/CSA A3001, Type GUb Portland Cement (blended).
- .2 Hydraulic cement: Type GUb to CSA A3001.
- .3 Supplementary cementing materials: to CSA A3001.
- .5 Water: to CAN/CSA A23.1.
- .6 Aggregates: to CAN/CSA A23.1. Coarse aggregates to be normal density.
- .7 Admixtures:
 - .1 Air entraining admixture: to ASTM C 260.
 - .2 Chemical admixture: to ASTM C 494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
 - .3 Concrete retarders: to ASTM C494M. Do not allow moisture of any kind to come in contact with the retarded film.
 - .4 Curing compound: curing compounds are not to be used.

- .8 Premoulded joint fillers:
 - .1 Joint sealer: to CGSB 19-GP-24M and CSA A23.1, chemical curing, multi-component, Class 'B', Type 1 for horizontal joints.
 - .2 Sponge rubber: to ASTM D 1752, Type I, flexible grade.
- .9 Concrete Bonding Agents: to be weld-crete or approved equal.

2.02 MIXES

- .1 Concrete mixed and proportioned to CSA A23.1, Clause 4.3.
 - .1 Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1.
 - .2 Co-ordinate construction methods to suit Departmental Representative concrete mix proportions and parameters.
 - .3 Identify and report immediately to Departmental Representative when concrete mix design and parameters pose anticipated problems or deficiencies related to construction.
 - .4 Concrete shall be proportioned to comply with Alternative 1, Table 2 in CSA A23.1 and following requirements:
 - .1 Cement: Type GUb, Portland Cement (blended).
 - .2 Minimum compressive strength of all concrete to be 35 MPa at 28 days.
 - .3 Class "F1" exposure.
 - .4 Nominal size of course aggregate 20mm.
 - .5 Slump range at point of discharge 50 mm to 100 mm.
 - .6 Air content 5 - 8 percent.
 - .7 Density of air-dry concrete will be in range of 2240 to 2400 kg.m³.
 - .8 Minimum cement content: 385 kg/m³.
 - .9 Maximum w/c ratio : 0.40.
 - .10 High range water reducing agents (superplasticizers) may be used at the Contractor's request, if so indicated when the mix design is submitted. The Contractor must demonstrate competence and experience in their use and specific approval must be obtained. The Contractor shall state his method of concrete placement when submitting his concrete mix design.
 - .11 If superplasticizers are used, the maximum concrete slump in a superplasticized condition shall be limited to 230 mm. The mix design shall state the design slump before and after the addition of superplasticizers along with the appropriate tolerances. Note that the slump in the above may not be applicable when using superplasticizers.
 - .5 When the Contractor wishes to purchase concrete from a ready mix supplier, submit a letter from the supplier certifying the following:
 - .1 That his plant and equipment is certified and all materials to be used in the concrete comply with the requirements of CSA Standard CSA A23.1.
 - .2 That the mix proportions selected will produce concrete of the specified quality and yield. Indicate mix proportions and sources of all materials.
 - .3 That the strengths will comply with the strengths herein.
 - .6 When the Contractor wishes to mix concrete at site, he shall identify the source of aggregates and submit samples of fine and coarse aggregates to a testing laboratory for testing and trial mixes in order to determine a suitable mix design. The testing laboratory,

at Contractor's cost, will test the trial mix for slump, air content, density and strength. The results of these tests will be submitted to the Departmental Representative to be reviewed for compliance with the specification. This review must be completed before permission to place concrete is given.

- .1 The sand, gravel, water and air entraining agent should be mixed prior to the addition of cement and water reducer.
- .2 Weigh aggregates, cement, water and admixture when batching. No alternative methods of batching will be permitted.
- .3 Do not use calcium chloride.

2.03 MISCELLANEOUS METALS

- .1 Galvanized wire rope:
 - .1 Wire rope to ASTM A1023/A1023M-09.
 - .2 Diameter 19 mm, breaking strength 212 KN minimum.
 - .3 Galvanized wire rope to be free of broken strands and visual defects to the satisfaction of Departmental Representative.
- .2 Forged wire rope clips:
 - .1 Forged wire rope clips to be G-450 Crosby Red-U-Bolt or approved equivalent.
 - .2 Size clips to manufacturer's specifications for specified wire rope.

3 EXECUTION

3.01 PREPARATION

- .1 Obtain Departmental Representative's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitate placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete permitted only after approval of equipment and mix.
- .5 Disturbing reinforcement and inserts during concrete placement is prohibited.
- .6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.

- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, workability, air content, temperature and test samples taken.
- .10 Do not place load upon new concrete until authorized by Departmental Representative.

3.02 INSTALLATION/ APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
 - .1 Do not place concrete on or against frozen material.
 - .2 Place concrete continuously from joint to joint. Unless otherwise specified, consolidate concrete with high speed internal vibrators.
 - .3 Place concrete in a uniform heading, normal to the centreline. Limit rate of placing to that which can be finished before beginning of initial set.
 - .4 If proposed by the Contractor, alternate placement methods to those described herein (which yield, the desired results), can be reviewed by the Departmental Representative with necessary submittals from the Contractor.
- .2 Finishing and curing:
 - .1 Finish and cure concrete to CSA A23.1/A23.2.
 - .2 Concrete shall be cured by protecting it against loss of moisture, rapid temperature change and mechanical injury for at least seven days after placement. After finishing operations have been completed, the entire surface of the newly placed concrete shall be covered by whatever curing medium is applicable to local conditions and approved by the Departmental Representative. The Contractor shall have the equipment needed for adequate curing at hand and ready to install before actual concrete placement begins.
 - .3 When air temperature is at or below 5o C or when there is a probability of its falling to that limit within 24 hours of placing (as forecast by the nearest official meteorological office) cold weather protection as per CSA A23.1 will be provided and the following:
 - .1 Housing - Protect concrete by a windproof shelter of canvas or other material to allow free circulation of inside air around fresh touch formwork and provide sufficient space for removal of formwork for finishing. Supply approved heating equipment capable of keeping inside air at a constant temperature sufficiently height to maintain concrete at following curing temperatures.
 - .2 For initial three (3) days at a temperature of not less than 15 degrees C nor more than 27 degrees C at surface.
 - .3 Maintain concrete at 10 degrees C for an extra four (4) days plus the initial three (3) days.
 - .4 In addition to the protective housing, the concrete must be cured as outlined in Clause 3.10.2 above.
 - .4 Use procedures as reviewed by Departmental Representative to remove excess bleed water. Ensure surface not damaged.
- .3 Joint fillers:
 - .1 Apply filler for each joint for depth and width required for joint, unless otherwise authorized by Departmental Representative.

- .2 Locate and form joints as indicated.
- .3 Install joint filler.

3.03 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 7 and 28 days.
 - .5 Air and concrete temperature.
- .2 Contractor will appoint a concrete testing company approved by the Departmental Representative to test all work under this section of specification as per CSA A23.1.
- .3 Cost of comprehensive strength tests shall be paid for by the Contractor.
- .4 Testing company shall issue reports to Departmental Representative on quality of test cylinders.
- .5 Contractor shall notify Departmental Representative at least seven (7) days prior to start of placing concrete. He shall provide for testing purposes an adequate quantity of approved test cylinders.
- .6 At least one (1) set of three (3) cylinders each shall be taken from 25 m³ or fraction thereof of each day's pour, whichever is less. One (1) cylinder shall be tested at seven (7) days and other two (2) tested at twenty-eight (28) days.
- .7 Cylinders will be crated and delivered to the testing laboratory within forty-eight (48) hours after casting in accordance with CSA A23.1. Contractor will pay for crating and delivery of cylinders to the laboratory.
- .8 If strength tests of test cylinder for any portion of the work falls below the specified compressive strength at 28 days, the Departmental Representative reserves the right to determine the acceptability of the concrete by performing additional field testing as outlined in CSA-A23.1.
- .9 If concrete does not conform to drawings or specifications, the Contractor will take measures as directed to correct the deficiency. All costs of correctional measures will be at the expense of the Contractor.
- .10 Inspection or testing enforced by the Departmental Representative will not replace contractor quality control or relieve him of his contractual responsibility.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-In-Place Concrete.

1.02 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction//Methods of Test for Concrete.

2 PRODUCTS

2.01 NOT USED

- .1 Not used.

3 EXECUTION

3.01 CONCRETE FINISH

- .1 Finish concrete in accordance with CAN3-A23.1-M90.
- .2 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise detailed.
- .3 All concrete surfaces, unless specified otherwise, that will be visible on completion of the work shall conform to surface finish Class 2. The surface shall be uniform in colour and texture when viewed from a distance of 15 m.
- .4 Class 2 - Rubbed Finish
 - .1 Immediately following the removal of forms, all fins and irregular projections shall be removed from all interior and exterior surfaces except from those which are not to be exposed. On all surfaces, the cavities produced by form ties and all other holes, honeycombs, spots, broken corners or edges and other defects shall be cut back to sound concrete and thoroughly cleaned. No feather edging is permissible.
 - .2 After having been kept saturated with water for a period of not less than three hours, the cavities shall be carefully pointed and trued with a 40 mPa non-shrink grout. The patches shall be placed and cured as specified by the manufacturer. The resulting surfaces shall be true and uniform. After removal of forms, the rubbing of concrete shall be started as soon as its condition will permit. However, before starting this work the concrete shall be kept thoroughly saturated with water for a minimum period of three hours but sufficient time shall have elapsed before the wetting down to allow the grout used in the pointing of rod holes and defects to thoroughly set. Surfaces

to be finished shall be rubbed with a medium coarse carborundum stone, using a small amount of mortar on its face. The mortar shall be composed of extra cement and fine and mixed in proportions such as to match existing concrete verified by a patch test. Rubbing shall be continued until all form marks, projections and irregularities have been removed, all voids filled, and a uniform surface has been obtained. The paste produced by this rubbing shall be left in place at this item. After all concrete above the surface being treated has been cast, the final finish shall be obtained by rubbing with a fine carborundum stone and water. This rubbing shall be continuous until the entire surface is of a smooth texture and uniform colour. After the final rubbing is completed and the surface has dried, it shall be rubbed with burlap to remove loose powder and shall be left free from all unsound patches, paste, powder, and objectionable marks.

- .3 Steel trowel concrete surfaces by means of hand trowel. Do not leave any hard, smooth, polished or burnished surface area.
- .4 Do not bring water and fines to the surface by over trowelling.
- .5 After slight interval necessary for concrete to further harden, repeat the trowelling operation.
- .6 The surface shall be true and accurate within a tolerance acceptable to the Departmental Representative. Refer to Section 03 30 00, for acceptable concrete placement tolerances.

END OF SECTION

1 GENERAL

1.01 NOT USED

- .1 Not Used.

1.02 NOT USED

- .1 Not Used.

1.03 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A 775/A 775M, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - .2 ASTM C 260/C 260M, Standard Specification for Air-Entraining Admixtures for Concrete.
- .2 CSA Group
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-A23.3, Design of Concrete Structures.
 - .3 CSA-A23.4, Precast Concrete - Materials and Construction.
 - .4 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .5 CAN/CSA-G30.18, Carbon steel bars for concrete reinforcement.
 - .6 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .7 CAN/CSA-S6-14[16], Canadian Highway Bridge Design Code.
- .3 The Master Painters Institute (MPI)
 - .1 MPI # 18, Organic Zinc Rich Primer.
 - .2 MPI # 23, Primer, Metal, Surface Tolerant.

1.04 NOT USED

- .1 Not Used.

1.05 PERFORMANCE REQUIREMENTS

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

1.06 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Precast Structural Concrete and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29.06 - Health and Safety Requirements.

- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Newfoundland and Labrador, Canada.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures and provide sample and sample number of each finish used on project to Departmental Representative.
- .5 Quality Assurance Submittals:
 - .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .2 Mill Test Report: upon request, submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
 - .3 Upon request submit in writing to Departmental Representative proposed source of reinforcement material.
 - .4 Upon request submit in writing to Departmental Representative epoxy coating applicator certificates identified in Quality Assurance.
 - .5 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .6 Submit concrete supplier's certification.

1.07 QUALITY ASSURANCE

- .1 Quality Control Plan: submit written report, to Departmental Representative verifying concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.08 QUALIFICATIONS

- .1 Fabricate and erect precast concrete elements by manufacturing plant certified in appropriate category according to CSA-A23.4
- .2 Precast concrete manufacturer certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting Bid and to verify as part of Bid that plant has current certification in appropriate category, Structural.
- .3 Only precast elements fabricated in certified plants acceptable and plant certification maintained for duration of fabrication, erection until warranty expires.
- .4 Welding companies certified to CSA-W47.1.

1.09 DELIVERY, STORAGE AND HANDLING

- .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 Deliver, store and handle all pre-cast concrete to avoid damage by any means. Damaged sections will not be accepted and are to be replaced at no cost to Canada.

2 PRODUCTS

2.01 MATERIALS

- .1 Cement to CAN/CSA-A3001, Type GU.
- .2 Blended hydraulic cement: type GUB CAN/CSA-A3001.
- .3 Water: to CSA-A23.1/A23.2.
- .4 Reinforcing steel: to CAN/CSA-G30.18, epoxy coated.
- .5 Hardware and miscellaneous materials: to CSA-A23.1/A23.2.
- .6 Forms: to CSA-A23.4.
- .7 Epoxy coating: to ASTM A 775/A 775M.
- .8 Air entrainment admixtures: to ASTM C 260.
- .9 Chemical admixtures: to ASTM C494.
- .10 Coarse aggregates to be normal density to A23.1/A23.2.

2.02 MIXES

- .1 Concrete:
 - .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria in accordance with CAN/CSA-A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance.
 - .2 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: F1.
 - .2 Minimum compressive strength at 28 days: 35 MPa.
 - .3 Minimum cement content: 300 kg/m³ of concrete.
 - .4 Nominal size of coarse aggregate: 20mm.
 - .5 Air content: 5 to 8%.
 - .6 Chemical admixtures: admixtures in accordance with ASTM C494.

2.03 FABRICATION

- .1 Manufacture units in accordance with CSA-A23.4.
- .2 Cast members in accurate rigid moulds designed to withstand high frequency vibration. Set reinforcing anchors and auxiliary items to indicated on shop drawings. Cast in anchors, blocking and inserts supplied by other Sections as required to accommodate their work. Vibrate concrete during casting for full thickness. Maintain even and uniform appearance.
- .3 Anchors, lifting hooks, shear bars, spacers and other inserts or fittings required for a complete and rigid installation. Each to conform to requirements of local codes. Lift hooks adequately sized to safely handle panels according to member dimension and weight. Conceal anchors and inserts

where practical.

- .4 Galvanize steel embedments after fabrication and touch up with zinc-rich primer after welding.

2.04 FINISHES

- .1 Finish units to CSA-A23.4.

2.05 SOURCE QUALITY CONTROL

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

2.06 MISCELLANEOUS METALS

- .1 Galvanized wire rope:
 - .1 Wire rope to ASTM A1023/A1023M-09.
 - .2 Diameter 19 mm, breaking strength 212 KN minimum.
 - .3 Galvanized wire rope to be free of broken strands and visual defects to the satisfaction of Departmental Representative.
- .2 Forged wire rope clips:
 - .1 Forged wire rope clips to be G-450 Crosby Red-U-Bolt or approved equivalent.
 - .2 Size clips to manufacturer's specifications for specified wire rope.

3 EXECUTION

3.01 PREPARATION

- .1 Precast concrete work in accordance with CSA-A23.4.
- .2 Obtain Departmental Representative approval before initiated pre-cast units or casting concrete in place on site.
- .3 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature, and test samples taken.
- .4 Do not place load upon new concrete until authorized by Departmental Representative.

3.02 CONSTRUCTION

- .1 Do all concrete work in accordance with CSA A23.1/A23.2.
- .2 Sleeves/bolts/inserts:
 - .1 Where approved by Departmental Representative (for such items as lifting hooks for pre-cast units), they must be approved by Departmental Representative under plans sealed by a professional engineer (sealed plans are the responsibility of the contractor).
- .3 Finish concrete in accordance with CSA-A23.1/A23.2.

3.03 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CSA-A23.1/A23.2.
- .2 Departmental Representative will pay for cost of concrete testing.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 22 13 - Rough Grading

1.02 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D 4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
 - .1 Allow continual sampling by Departmental Representative during production.
 - .2 Provide Departmental Representative with access to source and processed material for sampling.
 - .3 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.
 - .4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

2 PRODUCTS

2.01 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D 4791.
 - .1 Greatest dimension to exceed 5 times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
 - .2 Natural sand.
 - .3 Manufactured sand.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

- .1 Crushed rock.
- .2 Gravel and crushed gravel composed of naturally formed particles of stone.
- .3 Light weight aggregate, including slag and expanded shale.

2.02 SOURCE QUALITY CONTROL

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 2 weeks minimum before starting production.
- .2 If, in the opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .3 Advise Departmental Representative 2 weeks minimum in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

3 EXECUTION

3.01 PREPARATION

- .1 Aggregate source preparation:
 - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as [directed by Departmental Representative.
 - .2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
 - .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 - .4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
 - .5 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .2 Processing:
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, as required, that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
 - .1 Use methods and equipment approved in writing by Departmental Representative.

- .3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.

- .4 Stockpiling:
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 m for coarse aggregate and base course materials.
 - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
 - .3 Maximum 1.5 m for other materials.
 - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
 - .9 Do not cone piles or spill material over edges of piles.
 - .10 Do not use conveying stackers.
 - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.02 CLEANING

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 35 43 - Environmental Protection.

1.02 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
- .5 Grubbing consists of excavation and disposal of stumps and roots boulders and rock fragments of specified size (100mm) to not less than specified depth below existing ground surface.

1.03 QUALITY ASSURANCE

- .1 Safety Requirements: worker protection.
 - .1 Workers must wear gloves, dust masks, eye protection, protective clothing when applying herbicide materials.
 - .2 Workers must wear gloves, dust masks, eye protection, protective clothing, safety boots, safety vests when clearing and grubbing.

1.04 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses, root systems of trees which are to remain.
- .2 Repair damaged items to approval of Departmental Representative.

2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

3 EXECUTION

3.01 PREPARATION

- .1 Inspect site and verify with Departmental Representative, items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify Departmental Representative in ample time to minimize interruption of service.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and walks free of dirt and debris.

3.02 CLEARING

- .1 Clearing includes felling, trimming, and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within cleared areas.
- .2 Clear as directed by Departmental Representative, by cutting at height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.
- .3 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.
- .4 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

3.03 CLOSE CUT CLEARING

- .1 Close cut clearing to ground level.
- .2 Cut off branches and down trees overhanging area cleared as directed by Departmental Representative.
- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

3.04 ISOLATED TREES

- .1 Cut off isolated trees as indicated directed by Departmental Representative at height of not more than 300 mm above ground surface.
- .2 Grub out isolated tree stumps.
- .3 Prune individual trees as indicated.
- .4 Trim trees designated to be left standing within cleared areas of dead branches 4 cm or more in diameter; and trim branches to heights as indicated.
- .5 Cut limbs and branches to be trimmed close to bole of tree or main branches.

3.05 UNDERBRUSH CLEARING

- .1 Clear underbrush from areas as indicated at ground level.

3.06 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200 mm below ground surface.
- .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

3.07 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials off site.
- .2 Cut timber greater than 125 mm diameter to 300mm lengths and stockpile as indicated. Stockpiled timber becomes property of the Department.
- .3 Dispose of cleared and grubbed materials off site.
- .4 Remove diseased trees identified by Departmental Representative and dispose of this material to approval of Departmental Representative.

3.08 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for immediate grading operations, stripping of topsoil to approval of Departmental Representative.

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CLEARING AND GRUBBING

SECTION 31 11 00

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3.09 CLEANING

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 11 00 - Clearing and Grubbing.
- .3 Section 31 37 00 - Rip-Rap.

1.02 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D 698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

2 PRODUCTS

2.01 MATERIALS

- .1 Excavated or graded material existing on site suitable to use as fill for grading work if approved by Departmental Representative.

3 EXECUTION

3.01 STRIPPING OF TOPSOIL

- .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Departmental Representative.
- .2 Commence topsoil stripping of areas after area has been cleared of brush, weeds, grasses and removed from site.
- .3 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil.
- .4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.
- .5 Dispose of unused topsoil as directed by Departmental Representative.

3.02 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to depths as indicated on drawings.
- .3 Do not disturb soil within branch spread of trees or shrubs to remain.

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ROUGH GRADING

SECTION 31 22 13

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3.03 PROTECTION

- .1 Maintain access roads to prevent accumulation of construction related debris on roads.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 11 00 - Clearing and Grubbing.
- .3 Section 31 22 13 - Rough Grading.
- .4 Section 31 37 00 - Rip-Rap.

1.02 NOT USED

- .1 Not Used.

1.03 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D 4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .2 ASTM D 4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .3 ASTM D 4716, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .4 ASTM D 4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.6.1, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .4 No.7.3, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .5 No. 10, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Samples:
 - .1 Provide following samples 4 weeks prior to beginning Work.
 - .1 Minimum length of 2 m of roll width of geotextile.
 - .2 Methods of joining.
- .4 Test and Evaluation Reports:
 - .1 Submit copies of mill test data and certificate at least 4 weeks prior to start of Work.

1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground and 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.

2 PRODUCTS

2.01 MATERIAL

- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 4.5 m minimum.
 - .2 Length: 40.0 m minimum.
 - .3 Composed of: minimum 85% by mass of polypropylene with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure.
- .2 Physical properties:
 - .1 Thickness: to CAN/CGSB-148.1, No.3, minimum 3.3 mm.
 - .2 Mass per unit area: to CAN/CGSB-148.1, No.2, minimum 407 g/m².
 - .3 Tensile strength and elongation (in any principal direction): to ASTM D 4595.
 - .1 Seam strength: equal to or greater than tensile strength of fabric.
 - .2 Grab tensile strength and elongation: to CAN/CGSB-148.1, No.7.3.
 - .1 Breaking force: minimum 1424 N, wet condition.
 - .2 Elongation at future: minimum 50%.
 - .4 Trapezoidal tear strength: to minimum 556 N, wet condition.
 - .5 CBR puncture strength: minimum 4005 N, wet condition.
- .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D 4751, 0.15 mm.
 - .2 Permeability: to ASTM D 4491, 0.3 cm/s.
 - .3 Flow rate: to ASTM D 4491, minimum 2648 l/min/m².
 - .4 Permittivity: to ASTM D 4491, 0.9 sec⁻¹.

- .4 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to ASTM A 123/A 123M.
- .5 Factory seams: sewn in accordance with manufacturer's recommendations.
- .6 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts 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.

3.02 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 Join successive strips of geotextile by pinning.
- .6 Pin successive strips of geotextile with securing pins at 600 mm interval at mid point of lap.
- .7 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .8 After installation, cover with overlying layer within 4 hours of placement.
- .9 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

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GEOTEXTILE SOIL
STABILIZATION

SECT 31 32 19.16

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3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.04 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.
- .2 Do not overload soil or aggregate covering on geotextile.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 11 00 - Clearing and Grubbing.
- .3 Section 31 22 13 - Rough Grading.
- .4 Section 31 32 19.16 - Geotextile soil stabilization.

1.02 NOT USED

- .1 Not Used.

2 PRODUCTS

2.01 STONE

- .1 Hard, dense with relative density (formally specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:
 - .1 Type II rip-rap:
 - .1 Nominal 500 mm diameter or 200 kg mass.
 - .2 Allowable local velocity up to 4 m/s.
 - .3 Gradation specification:
 - .1 100% smaller than 800 mm or 700 kg.
 - .2 At least 20% larger than 600 mm or 300 kg.
 - .3 At least 50% larger than 500 mm or 200 kg.
 - .4 At least 80% larger than 300 mm or 40 kg.

2.02 GEOTEXTILE FILTER

- .1 Geotextile soil stabilization: in accordance with Section 31 32 19.16 - Geotextile soil stabilization.

3 EXECUTION

3.01 PLACING

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place geotextile on prepared surface in accordance with Section 31 32 19.16 - Geotextile soil stabilization and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.

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RIP-RAP

SECTION 31 37 00

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- .4 Place rip-rap to thickness and details as indicated.
- .5 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.

END OF SECTION

1 GENERAL

1.02 RELATED REQUIREMENTS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 11 00 - Clearing and Grubbing.
- .3 Section 31 22 13 - Rough Grading.

1.03 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 422, Standard Test Method for Particle-Size Analysis of Soils.
 - .5 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .6 ASTM D 1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .7 ASTM D 1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .8 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

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

1.06 NOT USED

- .1 Not Used.

2 PRODUCTS

2.01 MATERIALS

- .1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
- .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.
 - .3 Table
- | Sieve Designation | % Passing |
|-------------------|-----------|
| 100 mm | 100 |
| 75 mm | - |
| 50 mm | 75-100 |
| 37.5 mm | - |
| 25 mm | - |
| 19 mm | - |
| 12.5 mm | - |
| 9.5 mm | - |
| 4.75 mm | 20-55 |
| 2.00 mm | 10-35 |
| 0.425 mm | 5-20 |
| 0.180 mm | - |
| 0.075 mm | 0-12 |
- .4 Other properties as follows:
- .1 Liquid Limit: to ASTM D 4318, Maximum 25.
 - .2 Plasticity Index: to ASTM D 4318, Maximum 6.
 - .3 Los Angeles degradation: to ASTM C 131.
 - .1 Maximum loss by mass: 40 %.

3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base 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.

3.02 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 PLACING

- .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
- .2 Construct granular sub-base to depth and grade in areas indicated on drawings.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.
- .5 Begin spreading sub-base material on crown line or high side of one-way slope.
- .6 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace portion of layer in which material has become segregated during spreading.

3.04 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Equipped with device that records hours of actual work, not motor running hours.
- .3 Compact to density of not less than 98% maximum dry density in accordance with ASTM D 698.
- .4 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .5 Apply water as necessary during compaction to obtain specified density.
- .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

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GRANULAR SUB-BASE

SECT 32 11 16.01

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3.05 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.06 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 31 05 15 - Aggregate Materials.

1.02 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM C 117, Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136, Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³).
 - .5 ASTM D 4318, Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-8.1, Sieves Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves Testing, Woven Wire, Metric.

2 PRODUCTS

2.01 MATERIALS

- .1 Granular material: to Section 31 05 16 - Aggregate Materials and following requirements:
- .1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material and other deleterious materials.
 - .2 Graduations within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1.
 - .3 Gradation to:

Sieve Designation	% Passing
100 mm	-
75 mm	-
50 mm	-
38.1 mm	-
25 mm	-
19 mm	100
12.5 mm	70-100
9.5 mm	-
4.75 mm	40-70
2.00 mm	23-50
0.425 mm	7-25
0.180 mm	-
0.075 mm	3-8
 - .4 Gradation to: Department of Transportation and Works Newfoundland and Labrador, Granular "A".

- .5 Other properties as follows:
 - .1 Liquid limit: ASTM D 4318, maximum 25.
 - .2 Plasticity index: ASTM D 4318, maximum 6.
 - .3 Los Angeles Degradation: ASTM C 131, maximum % loss by weight 45.
 - .4 Crushed particles: at least 50 % of particles by mass within 19.0 mm to 4.75 mm sieve designation range to have at least 1 freshly fractured face. Material divided into ranges using methods of ASTM C 136.

3 EXECUTION

3.01 SEQUENCE OF OPERATION

- .1 Scarifying and reshaping:
 - .1 Scarify roadbed to width as indicated unless directed otherwise by Departmental Representative and to minimum depth of 150 mm.
 - .2 Pulverize and break down scarified material to 50 mm maximum particle size.
 - .3 Blade and trim pulverized material to elevation and cross section dimensions as indicated unless directed otherwise by Departmental Representative.
 - .4 Where deficiency of material exists, add and blend in new granular base material as directed by Departmental Representative. Ensure no frozen material is used.
- .2 Compacting:
 - .1 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .2 Use mechanical tampers, approved by Departmental Representative to compact areas not accessible to rolling equipment to specified density.
- .3 Repair of soft areas:
 - .1 Correct soft areas by removing defective material to depth and extent directed by Departmental Representative and compact to specified density.
 - .2 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative.

3.02 SITE TOLERANCES

- .1 Reshaped compacted surface within plus or minus 10 mm of elevation as indicated.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 11 00 - Clearing and Grubbing.
- .3 Section 31 22 13 - Rough Grading.

1.02 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 117, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D 1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.03 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 31 05 16 - Aggregate Materials
- .2 Storage and Handling Requirements:
 - .1 Stockpile minimum 50% of total aggregate required prior to beginning operation.

2 PRODUCTS

2.01 MATERIALS

- .1 Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed stone or gravel.
 - .2 Gradations to be within limits specified when tested to ASTM C 136

and [ASTM C 117] . Sieve sizes to CAN/CGSB-8.1.

.1 Gradation Method #1 to:

Sieve Designation % Passing

100 mm	-
75 mm	-
50 mm	100
37.5 mm	-
25 mm	50-100
19 mm	-
12.5 mm	-
9.5 mm	-
4.75 mm	20-55
2.00 mm	10-35
0.425 mm	5-20
0.180 mm	-
0.075 mm	2-8

.2 Gradation Method to Department of Transportation and Works Newfoundland and Labrador, Granular "B".

.3 Material to level surface depressions to meet gradation (2) limits in accordance with Method #1.

.4 Liquid limit: to ASTM D 4318, maximum 25

.5 Plasticity index: to ASTM D 4318, maximum 6.

.6 Los Angeles degradation: to ASTM C 131. Max. % loss by weight: 45

.7 Crushed particles: at least 60% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C 136.

<u>Passing</u>		<u>Retained on</u>
50 mm	to	25 mm
25 mm	to	19.0 mm
19.0 mm	to	4.75 mm

3 EXECUTION

3.01 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to [requirements of authorities having jurisdiction] [sediment and erosion control drawings] [sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent].

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.02 PLACEMENT AND INSTALLATION

- .1 Place granular base after subgrade surface is inspected and approved in writing by Departmental Representative.
- .2 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
 - .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
 - .1 Ensure compaction equipment is capable of obtaining required material densities.
- .4 Compacting:
 - .1 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .2 Apply water as necessary during compacting to obtain specified density.
 - .3 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
 - .4 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.03 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.05 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 31 11 00 - Clearing and Grubbing.
- .2 Section 31 22 13 - Rough Grading.
- .3 Section 31 32 19.16 - Geotextile Soil Stabilization.

1.02 ENVIRONMENTAL REQUIREMENTS

- .1 Ensure a dewatered condition for operation of equipment within watercourses.
- .2 Install stabilized entrances at equipment access points to dewatered watercourses.
- .3 Use rubber tracked machinery when working on watercourse bed material.
- .4 Use borrow material from watercourse beds only after receipt of written approval from Departmental Representative and authority having jurisdiction.
- .5 Dumping excavated fill, waste material, or debris in watercourse or wetland is prohibited.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Sustainable Design Submittals:
 - .1 Erosion and Sedimentation Control: Provide copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

2 PRODUCTS

2.01 MATERIALS

- .1 Silt Fencing:
 - .1 Consisting of non-woven geotextile with manufactured seams as resistant as the geotextile material itself. The geotextile shall be in one piece.
 - .2 Stakes to be natural wood, minimum 1.5 metres in length, sized to withstand peak flows.
- .2 Turbidity or Floating Silt Curtain:
 - .1 Consisting of a heavy duty woven fabric with top loops connected to floats and bottom loops woven through a 5 mm diameter heavy metal chain.

- .2 Length of silt curtain to be sufficient to fully contain the work area.
- .3 Height of silt curtain to be sufficient to adjust to variable water levels while maintaining continuous contact with the watercourse bed.
- .3 Pumps:
 - .1 The inlet and outlet of pumps and hoses for use in-water to be screened to prevent aquatic fauna from entering the equipment.

3 EXECUTION

3.01 EXISTING CONDITIONS

- .1 Maintain existing flow pattern in natural watercourse systems.
- .2 In natural systems maintain existing riffle pool and step pool patterns.
- .3 In wetland systems, maintain existing hydrological conditions.

3.02 SITE CLEARING AND PLANT PROTECTION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls once disturbed areas have been restored and stabilized.
- .2 Minimize disturbance to vegetated buffer zones and protect trees and plants on site and adjacent properties where indicated.
- .3 Wrap trees and shrubs adjacent to construction work, storage areas and trucking lanes in burlap.
- .4 Protect roots of designated trees to dripline or as instructed by Departmental Representative during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .5 Leave cuttings from trees and other vegetation on site as brush piles to allow for natural degradation.
 - .1 Secure large piles with degradable materials to prevent interference with watercourse.
- .6 Remove only trees that may offer future blockage problems as instructed by Departmental Representative.
- .7 Leave roots mass and stumps in place.

3.03 DRAINAGE

- .1 Pumping water containing suspended materials into watercourse is prohibited.
- .2 Establish rock chute spillways to accommodate safe surface water entry to watercourse as directed by Departmental Representative.

3.04 REMOVAL OF SEDIMENT CONTROL MEASURES

- .1 Sediment control measures to remain in place at all times during the work in order to catch and filter any run-off from the worksite before it reaches the watercourse.
- .2 Measures to remain in place until the growth of seed, sod or other surface cover is sufficient to retain sediments from being mobilized in runoff.
- .3 Method of removal of sediment control measures to be submitted for approval by Departmental Representative.
- .4 For in-water sediment control measures, allow minimum 1 day for settlement of suspended sediments before removal.

3.05 SITE RESTORATION

- .1 Restore the original watercourse bed grades and materials upon completion of in-water works.

END OF SECTION