

SPECIFICATIONS

Bridge Repairs

Gros Morne National Park, NL

Project No. 324331

(For Review)

PREPARED FOR:

Public Works and Government Services Canada

ON BEHALF OF:

Parks Canada

CONSULTANT:

Rutter Hinz Inc.
Clareville, NL

DATE

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This document is the document referred to as "Plans and Specifications" and marked "A" in the Articles of Agreement and includes the following:

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
SPECIFICATION FOR GROS MORNE NATIONAL PARK BRIDGE REPAIRS
NEWFOUNDLAND AND LABRADOR

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C6 of 7	Deer Brook Bridge Sections & Details.
C7 of 7	Shoal Cove Brook Bridge Sections & Details.

- 1.1 Scope .1 The work covered under this project consists of the furnishing of all plant, labour, equipment, hardware and materials, complete and in strict accordance with specifications and accompanying drawings and subject to all terms and conditions of contract.
- 1.2 Description .1 The work for each bridge structure will consist of but will not necessarily be limited to the following:
- .1 Dicks Brook Bridge
 - .1 Replace North Expansion Joint.
 - .2 Repair concrete in beams, columns, pier caps, abutment and creep block.
 - .3 Replace damaged railing posts
 - .4 Remove and replace approach asphalt.
 - .2 Shoal Cove Bridge
 - .1 Repair concrete in beams and abutments.
 - .3 Dear Arm Bridge
 - .1 Replace two Expansion Joints.
 - .2 Repair concrete in beams, pier, abutment, curb, curb soffit and creep block.
 - .3 Replace damaged aluminum railing and posts.
 - .4 Extend deck drains.
 - .5 Remove and replace approach asphalt.
- 1.3 Fish Habitat/
Domestic Usage .1 Contractors are advised that this project is being carried out in an area where fish habitat may be affected. The contractor will perform the work to conform with all rules and regulations governing fish habitat and in accordance with authorization for work or under takings affecting fish habitat.
- 1.4 Site of Work .1 Work will be carried out at Gros Morne National Park, Newfoundland and Labrador in the locations as shown on the accompanying drawings.

- 1.5 Datum .1 Datum used for this project is bench mark geodetic elevations as shown on the drawings.
- 1.6 Examination of Site .1 Parties intending to tender for this work are advised to visit the sites and make their own estimates of facilities and difficulties attending execution of work, actual site, soil and rock conditions, severity, exposure and uncertainty of weather and all other contingencies.
- 1.7 Work Schedule .1 Immediately upon award of contract, contractor will submit a schedule of work to Departmental Representative. All entries contained in unit price schedule will be entered on form. Each entry will show an intended start and completion date using a horizontal barograph method.
- .2 Should contractor find that he cannot maintain schedule as originally intended, he will immediately submit a revised schedule without being requested to do so by Departmental Representative.
- .3 All work on the project will be completed within the time indicated as shown on the Tender and Acceptance/Construction Tender Form.
- 1.8 Abbreviations .1 The following abbreviations of standard specifications and acronyms have been used in this specification and on the drawings:
- .1 NBC - National Building Code of Canada
 - .2 CGSB - Canadian Government Specifications Board
 - .3 CSA - Canadian Standards Association
 - .4 ASTM - American Society for Testing and Materials
 - .5 NFC - National Fire Code of Canada
 - .6 CCME - Canadian Council of Ministers of the Environment
 - .7 DR - Departmental Representative
 - .8 PWGSC - Public Works and Government

- responsibility for recording minutes of
(Cont'n)
- 1.12 Project Meetings
(Cont'n)
- .4 Contractor will have a responsible member of his firm present at all project meetings.
- 1.13 Protection
- .1 Store all materials and equipment to be incorporated into work to prevent damage by any means.
- .2 Repair or replace all materials or equipment damaged in transit or storage to the satisfaction of, and at no cost to, the DR.
- 1.14 Existing Services
- .1 Before commencing work, establish locations and extent of any service lines in area of work and notify DR of findings.
- .2 Submit schedule to, and obtain approval from, DR for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .3 Where unknown services are encountered, immediately advise DR and confirm findings in writing.
- .4 Record locations of maintained, re-routed and abandoned service lines.
- 1.15 Documents Required
- .1 Maintain at job site, one (1) copy each of following:
- .1 Contract drawings
 - .2 Specifications
 - .3 Addenda
 - .4 Reviewed shop drawings
 - .5 Change orders
 - .6 Other modifications to contract

- 1.15 Documents Required (Cont'n)
 - .7 Field test reports
 - .8 Copy of approved work schedule (Cont'n)
 - .9 Health and safety plan
 - .10 Environmental protection plan
 - .11 MSDS sheets
 - .12 Permits and licenses from regulatory authorities.

- 1.16 Taxes and Permits
 - .1 Pay applicable federal, provincial and municipal taxes.
 - .2 Obtain all environmental permits required for the work.

- 1.17 Existing Sub-surface Conditions
 - .1 No geotechnical investigation was carried out at the site. Bidders are responsible for making their own assessment of geotechnical conditions that could impact on the work.

- 1.18 Contractor's Use of Site
 - .1 The contractor will be solely responsible for arranging the storage of materials on or off the site, and any materials stored at the site which interfere with any of the day to day activities at or near the site will be moved promptly at the contractor's expense upon request by the DR.
 - .2 Exercise care so as not to obstruct or damage public or private property in the area.

- 1.19 Work Commencement
 - .1 Contractors are advised that mobilization is to commence immediately after award.
 - .2 The weather conditions, short construction season and remoteness of the work site may require the use of longer working days and additional work force to complete the project within the specified completion time.
 - .3 The contractor is to make every effort to ensure that sufficient material and equipment is delivered to site at the

- Municipal Statutes and authorities.
- .18 Any other Local, Municipal,
Provincial and Federal Code,
- (Cont'n)
- 1.20 Requirements & Guidelines
(Cont'n)
- .2 In case of conflict or discrepancy the more stringent requirements shall apply.
- .3 Insure the requirements of the contract documents and all specified codes, standards and referenced documents are met or exceeded.
- .4 These standards shall be considered an integral part of the specifications and shall be read in conjunction with the drawings and specifications. The Contractor shall be fully familiar with their contents and requirements as related to the work and materials specified.
- 1.21 Site Access
- .1 Provide and maintain adequate access to project site.
- 1.22 Relics and Antiques
- .1 Protect relics, antiques, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work.
- .2 Give immediate written notice to the DR and await DR written instructions before proceeding with work in the area.
- .3 Relics, antiques and items of historical or scientific interest remains Canada's property.
- 1.23 Salvage Value
- .1 Canada assumes no responsibility for the quality or quantity of any material removed under this project.
- .2 Any assumptions made regarding the salvage value of any and all materials under this contact are by the Contractor only. All estimates of quality and

quality of salvaged materials are to be made by the Contractor.

- (Cont'n)
- 1.23 Salvage Value .3
(Cont'n) No consideration for payment will be made by Canada to the Contractor as a result of the Contractor receiving less than assumed salvage value of any materials.
- 1.24 Special .1
Considerations All information and data gathered as part of the contractor's Bid submission and/or execution of this project shall be "strictly confidential". This information will be submitted in writing to the DR if requested.
- 1.25 Conflict of .1
Interest The Contractor, its employees, agents and subcontractors, as part of its consideration under this contract, declares that it is not in conflict of interest with respect to any and all work performed under this contract. Furthermore, if during the period of this contract the Contractor becomes aware of the potential for any real or perceived conflict of interest with respect to its performance of work under the contract, the Contractor is to immediately advise the DR. The Contractor will take immediate steps to rectify any conflict of interest situation to Canada.
- 1.26 Certification .1
of Good Standing For the purpose of this clause, a Letter of Recognition is written confirmation from a Construction Safety Association or similar organization that the Bidder has successfully completed a Certificate of Recognition or equivalent Program offered by such organizations. The content of the Program referred to herein shall address construction safety specifically.
- .2 In the event that a Confirmation of Enrollment was submitted prior to contract award, the Contractor shall complete the Certificate of Recognition or equivalent Program and provide a copy

- of a valid Letter of Good Standing to the Contracting Authority.
- .1 Within 45 days immediately
- (Cont'n)
- 1.26 Certification of Good Standing (Cont'n)
- .2 following the Acceptance of BID, or by the date of issuance of the Certificate of Substantial Completion, or
 - .3 Within 5 days immediately following the Bidder's successful completion of the Program, whichever occurs first.
- .3 Notwithstanding the provision described in The Terms of Payment, no payments will be made until the Contractor has delivered a copy of the Letter of Good Standing to the Contracting Authority. No interest payments will be made as a result of this action by Canada.
 - .4 Remain in good standing in the Program referred to above at least until the date set for the end of the warranty period established in accordance with Clause GC3.13, Execution and Control of the Work and provide evidence, acceptable to the Contracting Authority, of good standing when requested in writing to do so.
 - .5 Ensure that a similar provision forms par of all other contracts issued as a result of this contract.
- 1.27 Measurement for Payment
- .1 No separate measurement for payment shall be made for items under this section. Include costs for General Instructions in the lump sum portion of the work on the Bid and Acceptance Form.

- 1.1 Related Requirements .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by DR are specified under various sections.
- 1.2 Appointments and Payment .1 DR will appoint and pay for services of testing laboratory except for the following:
- .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 the supervision of DR.
 - .4 Tests requested by DR to confirm material specifications when the applicable manufacturer's documentation of test results are unavailable.
 - .5 Additional tests specified in paragraph 1.2.2.
- .2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, contractor shall pay costs for additional tests or inspections as DR may require to verify acceptability of corrected work.
- 1.3 Contractor's Responsibilities .1 Furnish labour and facilities to:
- .1 Provide access to work to be inspected and tested.
 - .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 DR sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of tests.

- 1.3 Contractor's Responsibilities
(Cont'n) .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 DR.
- 1.4 Measurement For Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Testing Laboratory Services in the lump sum portion of the work on the Bid and Acceptance Form.

- 1.1 General .1 Submit to DR, for review, shop drawings, product data and samples specified.
- 1.2 Shop Drawings .1 Drawings to be originals prepared by contractor, subcontractor, supplier or distributor, which illustrates appropriate portion of work, showing fabrication, layout, setting or erection details as specified in the appropriate sections.
- .2 Identify details by reference to sheet and detail numbers shown on contract drawings.
- .3 Maximum sheet size: 850 mm x 1120 mm.
- .4 Reproductions for submission: opaque diazo print.
- 1.3 Product Data .1 Certain specification sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.
- .2 Above will only be accepted if they conform to the following:
- .1 Supplement standard information to provide additional information applicable to project.
- .2 Show dimensions and clearances required.
- .3 Delete information which is not applicable to this project.
- 1.4 Samples and Mock-ups .1 Submit samples in sizes and quantities specified.
- .2 Where colour, pattern or texture is criterion, submit full range of samples.

- 1.4 Samples and Mock-ups
(Cont'd)
- .3 Construct each sample or mock-up complete, including work of all trades required to finish work.
 - .4 Construct field samples and mock-ups at locations acceptable to DR.
 - .5 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on project.
- 1.5 Co-ordination of Submissions
- .1 Review shop drawings and product data prior to submission.
 - .2 Verify:
 - .1 Field measurements.
 - .2 Field construction criteria.
 - .3 Catalogue numbers and similar data.
 - .3 Co-ordinate each submission with requirements of work and contract documents.
 - .4 Contractor's responsibility for errors and omissions in submission is not relieved by DR's review of submittals.
 - .5 Contractor's responsibility for deviations in submission from requirements of contract document is not relieved by DR's review of submission unless DR has given written acceptance of specified deviations.
 - .6 Notify DR, in writing, at time of submission of deviations from requirements of contract documents.
 - .7 After DR's review, distribute copies.
- 1.6 Submission Requirements
- .1 Schedule submissions at least seven (7) days before dates reviewed submissions will be needed.

- 1.6 Submission Requirements (cont'n)
- .2 Submit number of opaque diazo copies of shop drawings and product data which contractor requires for distribution plus four (4) copies which will be retained by DR.
 - .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date
 - .2 Project title and number
 - .3 Contractor's name and address
 - .4 Number of each shop drawing, product data, and samples submitted.
 - .5 Other pertinent data
 - .4 Submissions shall include:
 - .1 Original and/or revision dates.
 - .2 Project title and number.
 - .3 Name of:
 - .1 Contractor
 - .2 Subcontractor
 - .3 Supplier
 - .4 Manufacturer
 - .5 Separate detailer
 - .4 Identification of product or material.
 - .5 Relation to adjacent structure or materials.
 - .6 Field dimensions, clearly identified as such.
 - .7 Specification section number.
 - .8 Applicable standards, such as CSA or CGSB numbers.
 - .9 Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with contract documents.
- 1.7 Shop Drawing Review
- .1 Review of shop drawings by Public Works and Government Services Canada or its authorized consultant is for the sole purpose of ascertaining confirmation with the general concept. This review shall not mean that Public Works and Government Services Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with contractor submitting same, and such

- 1.7 Shop Drawing .1 (cont'd)
Review
(cont'd) review shall not relieve contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication process or to techniques of construction and installation and for coordination of work of all sub-trades.
- 1.8 Measurement .1
For Payment No separate measurement for payment shall be made for items under this section. Include costs for Submittals in the lump sum portion of the work on the Bid and Acceptance Forms.

PART 1 - GENERAL

- 1.1 Section Includes .1 Informational and Warning Devices.
.2 Protection and Control of Public Traffic.
.3 Operational Requirements.
- 1.2 Related Sections .1 Section 31 24 13 - Reshaping Roadway Subgrade.
.2 Section 32 11 23 - Aggregate Base Course.
.3 Section 32 11 19 - Granular Sub-base.
.4 Section 32 12 16 - Asphalt Paving.
.5 Section 03 30 00 - Cast-in-Place Concrete.
.6 Section 05 50 00 - Metal Fabrications.
- 1.3 References .1 Uniform Traffic Control Devices for Canada, (UTCD) January 1976 (distributed by Transportation Association of Canada).
.2 Manual of Uniform Traffic Control Devices for Streets and Highways, US FHWA, Part IV, - 1988.
.3 Traffic control manual for roadway work operations, Government of Newfoundland and Labrador, Department of Transportation and Works.
- 1.4 Protection of Public Traffic .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
.2 When working on travelled way:
.1 Place equipment in position to present minimum of interference and hazard to traveling public.

1.4 Protection of
Public Traffic
(Cont'n)

- .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
- .3 Do not leave equipment on travelled way overnight.
- .3 Do not close any lanes of road without approval of DR Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of UTCD.
- .4 Keep travelled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.
 - .1 Provide minimum 7 m wide temporary roadway for traffic in two-way sections through Work and on detours.
 - .2 Provide no less than half the width of the existing driving surface as a temporary roadway for traffic in one-way sections through the structures.
- .5 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of DR.

1.5 Informational
and Warning
Devices

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of UTCD manual.
- .3 Place signs and other devices in locations recommended in UTCD manual.
- .4 Meet with DR prior to commencement of Work

- 1.5 Informational and Warning Devices (Cont'd)
- .5 Continually maintain traffic control devices in use by:
- .1 Checking signs daily for legibility, (Cont'n) damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Removing or covering signs which do not apply to conditions existing from day to day.
- 1.6 Control of Public Traffic
- .1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD manual in following situations:
 - .1 When public traffic is required to pass working vehicles or equipment which block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .7 Delays to public traffic due to contractor's operators: maximum 15 min.

- 1.6 Control of Public Traffic (Cont'd) .2 Where roadway, carrying two-way traffic, to be restricted to one lane, for 24 h each day, provide portable traffic signal system. Adjust, as necessary, and regularly maintain system during period of restriction. Signal system to meet requirements of Part IV of Manual of Uniform Traffic Control Devices to Street and Highways, US FHWA. In addition to these requirements the portable traffic signal system shall include a time countdown that advises motorist of when the signals are going to change.
- 1.7 Operational Requirements .1 Maintain existing conditions for traffic crossing right-of-way.
- 1.8 Measurement For Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Special Procedures Traffic Control in the Lump Sum portion of the work on the Bid and Acceptance Form.

- 1.1 Section Includes
 - .1 Fire Safety Requirements.
 - .2 Hot Work Permit.
 - .3 Existing Fire Protection and Alarm Systems.

- 1.2 Related Work
 - .1 Section 01 35 30: Health and Safety Requirements

- 1.3 References
 - .1 FCC No. 301-June 1982 Standard for Construction Operations.
 - .2 FCC No. 302-June 1982 Standard for Welding and Cutting.

- 1.4 Definitions
 - .1 Hot Work defined as:
 - .1 Welding work
 - .2 Cutting of materials by use of torch or other open flame devices
 - .3 Grinding with equipment which produces sparks.

- 1.5 Submittals
 - .1 Submit copy of Hot Work Procedures, to DR for review, within seven (7) calendar days after contract award.
 - .2 Include sample of Hot Work Permit.

- 1.6 Fire Safety and Hot Work Requirement
 - .1 Implement and follow fire safety measures during work. Comply with following:
 - .1 National Fire Code
 - .2 Fire Protection Standards FCC 301, Standard for Construction Operations and FCC 302, Standard for Welding and Cutting as issued by the Fire Protection Services of Human Resources Development Canada
 - .3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 30.

- 1.6 Fire Safety and Hot Work Requirement (cont'd)
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, DR will advise on the course of action to be followed.
- .3 FCC standards, noted above, may be viewed at the Regional Fire Protection Services' office (previously known as the Fire Commissioner of Canada) located at 99 Wyse Road, 8th floor, Dartmouth, NS; Tel: (902)-426-6053.
- .4 Hot Work Requirements:
- .1 Obtain DR's written Authorization to Proceed for the performance of Hot Work on site as may be required in the course of Work.
- .2 To obtain authorization submit to DR for review:
- .1 Contractor's Hot Work Procedures to be followed on site in accordance with clause 8 below.
- .2 Type of work and frequency of situations which will require Hot Work.
- .3 Upon confirmation that effective fire safety measures will be implemented for hot work, DR will grant authorization to proceed.
- .4 In most cases, DR will issue only one (1) written authorization covering the entire construction project and duration of work. However in some cases, depending on the nature or phasing of work, the quantity of various trades needing to perform welding and cutting on site, or other deemed situation, DR might designate certain portions of the work as separate entities, each entity requiring individual written authorization to proceed.

- 1.6 Fire Safety and Hot Work Requirement (cont'd)
- .4 (cont'd)
Follow DR's directives in this regard.
 - .5 Do not perform any Hot Work until receipt of DR's written Authorization to Proceed.
 - .6 In tenant occupied facilities, coordinate performance of Hot Work with Facility Manager through the DR. When directed perform Hot Work during non-operative hours when Facility is vacant of employees. Follow DR's directives in this regard.
- 1.7 Conformance
- .1 Ensure that Hot Work Procedures, as established for project and agreed upon with DR, are stringently followed. Enforce use and compliance by all workers.
 - .2 Brief all workers and subcontractors on Hot Work Procedures and Permit system.
 - .3 Failure to comply with the established hot work procedures may result in the issuance of a Non-Compliance Notification at DR's discretion with possible disciplinary measures imposed as specified in Section 01 35 30.
- 1.8 Hot Work Procedures
- .1 Develop Hot Work Procedures, to be followed when Hot Work is required as part of the work.
 - .2 Describe safe work practices and sequence of activities to be followed on site by Contractor and workers to minimize the potential occurrence of a fire resulting from Hot Work.
 - .3 Hot Work Procedures to include:
 - .1 Requirement to perform hazard assessment of the site or immediate work area, based on type and extent of Hot Work required, in accordance with Hazard Assessment and Safety

- 1.8 Hot Work Procedures
(cont'd)
- (cont'd)
- Plan requirements of Section 01 35 30. Carry out hazard assessment for each hot work event.
- .2 Use of a Hot Work Permit system, issued by an authorized person in Contractor's employ, for each event when Hot Work is required, granting permission to carry out Hot Work.
 - .3 Provision of a designated person(s) to carry out a Fire Safety Watch for a minimum of 30 minutes immediately upon completion of the hot work.
 - .4 Procedures to comply with fire safety codes and standards specified herein and occupational health and safety regulations specified in Section 01 35 30.
 - .5 Generic procedures, if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.
 - .6 Include within procedures the step by step process on how to prepare and issue the Hot Work Permit.
 - .7 Hot Work Procedures to be in typewritten format, listing step by step procedures and worker instructions, clearly establishing and allocating responsibilities of:
 - .1 Worker(s)
 - .2 Designated person authorized to issue the Hot Work Permit
 - .3 Fire Safety Watcher
 - .4 Subcontractors and Contractor.
- 1.9 Hot Work Permit
- .1 Develop "Hot Work Permit" form in typewritten format.
 - .2 Hot Work Permit form to include, as a minimum, the following data:
 - .1 Project name and project number;
 - .2 Building name, address and specific floor, room or area where hot work will be performed;
 - .3 Date when permit issued;

- 1.9 Hot Work Permit
(cont'd)
- .4 Description on type of hot work to be carried out;
 - .5 Special precautions required, including type of fire extinguisher needed;
 - .6 Name and signature of authorized person, designated by Contractor, to issue the permit;
 - .7 Name of worker(s) (clearly printed) to whom the permit is being issued;
 - .8 Time duration of permit (not to exceed 8 hours) indicating "Start" time & date and "Completion" time & date when Hot Work permit will be in effect;
 - .9 Worker signature with date and time when hot work terminated;
 - .10 Specified period of time requiring Safety Watch;
 - .11 Name and signature of person designated as Fire Safety Watcher, complete with time and date when safety watch terminated, certifying that the surrounding area was under his continual watch and inspection for the minimum time period specified in permit and commenced immediately upon the completion of Hot Work.
- .3 Industry Standard forms shall only be used if all data specified above is included on form.
- .4 Each Hot Work Permit to be completed in full and signed as follows:
- .1 Authorized person issuing Permit before hot work commences;
 - .2 Worker(s) upon completion of Hot Work;
 - .3 Fire Safety Watcher upon termination of safety watch and;
 - .4 Returned to Contractor's Site Superintendent for safe keeping.

- 1.10 Fire
Extinguishers .1 Supply adequate fire extinguishers necessary to protect the work in progress, contractors physical plant and equipment on site.
- NOTE: Due to the sites remote location the contractor shall have additional fire fighting equipment on hand to protect plant, equipment and surrounding environment.
- 1.11 Documents
on Site .1 Keep Hot Work Permits and hazard assessment on site documentation on site for duration of work.
- .2 Upon request, make available to DR or to authorized safety representative for inspection.
- 1.12 Measurement
For Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Special Procedures on Fire Safety Requirements in the Lump Sum portion of the work on the Bid and Acceptance Form.

- 1.1 Related Work .1 Section 01 35 24: Special Procedures on Fire Safety Requirements.
- 1.2 Submittals .1 Submit to DR copies of the following documents, including updates issued:
- .1 Site Specific Health and Safety Plan.
 - .2 Building Permit, compliance certificates and other permits obtained.
 - .3 Reports or directions issued by Federal, Provincial inspectors or other Authority having jurisdiction.
 - .4 Formal Safety Inspection Reports.
 - .5 Accident or Incident Reports.
 - .6 MSDS data sheets.
 - .7 Name of person(s) designated to perform full time health and safety site supervision.
- .2 Medical Surveillance: Where prescribed by federal or provincial legislation and regulations, and upon request by DR, obtain and submit certification of medical surveillance for site personnel prior to commencement of work.
- .3 Submit other data, information and documentation upon request as stipulated elsewhere in this section.
- 1.3 Compliance Requirements .1 Comply with the Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health & 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.
- .3 Observe and enforce construction safety measures required by:

- 1.3 Compliance Requirements (cont'd) .3 (cont'd)
- .1 1995 National Building Code of Canada, Part 8;
 - .2 Provincial Worker's Compensation Board;
 - .3 Municipal statutes and ordinances.
- .4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, DR will advise on the course of action to be followed.
- .5 A copy of the Canada Labour Code Part II may be obtained by contacting:
Canadian Government Publishing
Public Works & Government Services Canada
Ottawa, Ontario, K1A 0S9
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Publication No. L31-85/2000 E or F)
- .6 Maintain Workers Compensation Coverage for duration of Contract. Submit Letter of Good Standing to DR upon request.
- 1.4 Responsibility .1 Be responsible for safety of persons and property on work site and for protection of building employees and general public circulating adjacent to work operations to extent that they may be affected by conduct of Work.
- .2 Enforce compliance by workers and other persons granted access to work site with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.5 Site Control and Access .1 Control work site and entry points. Grant and allow entry to only workers and other persons so authorized. Immediately stop non-authorized persons from circulating within construction areas and remove from site.

- 1.5 Site Control and Access
(cont'd)
- .2 Implement procedures for granting permission to enter onto work site to all persons who require access. Procedures to include the provision of a site safety orientation session.
 - .3 Delineate and isolate construction areas from other areas of site by use of appropriate means. Erect barricades, fences, hoarding and temporary lighting as required.
 - .4 Erect signage at entry points and at other strategic locations around site, clearly identifying construction area(s) as being "off-limits" to non-authorized persons. Signage must be professionally made in both official languages or by use of well understood graphic symbols.
 - .5 Secure site at night time or provide security guard as deemed necessary to protect site against entry.
 - .6 Ensure persons granted access are fitted and wear appropriate personnel protective equipment (PPE). Be responsible for the provision of such PPE to persons who require access to conduct work or perform inspections.
- 1.6 Protection
- .1 Provide temporary facilities for protection and safe passage of building occupants, public pedestrians and vehicular traffic around and adjacent to work site.
 - .2 Provide safety barricades, lights and signage on work site as required to provide a safe working environment for workers.
 - .3 Carry out work placing emphasis on health and safety of public, building employees, site personnel and protection of the environment.

- 1.6 Protection .4 Should unforeseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advise DR verbally and in writing.
- (cont'd)
- 1.7 Filing of Notice .1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.
- .2 Upon request, DR will provide name and mailing address of provincial department to whom the Notice of Project must be sent.
- 1.8 Permits .1 Obtain building permit related to project prior to commencement of Work.
- .2 Obtain permits, licenses and compliance certificates, at appropriate times and frequency as stipulated by authorities having jurisdiction.
- .3 Where particular permit or compliance certificate cannot be obtained at the required stage of work, notify DR in writing and obtain DR's approval to proceed prior to carrying out that portion of work.
- .4 Post all permits on site. Submit copies to DR.
- 1.9 Hazard Assessments .1 Implement and carry out a health and safety hazard assessment program as part of the work. Program to include:
- .1 Initial hazard assessment carried out immediately upon notification of contract award and prior to commencement of work.
- .2 On-going hazard assessments performed during the progress of work identifying new or potential health risks and safety hazards not previously known. As a minimum hazard assessments shall be carried out when:

- 1.9 Hazard Assessments (cont'd)
- .2 (cont'd)
 - .1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of the work.
 - .2 The scope of work has been changed by Change Order.
 - .3 Potential hazard or weakness in current health and safety practices are identified by DR or by an authorized safety representative.
 - .3 Hazard assessments to be project and site specific, based on review of contract documents, site and weather conditions.
 - .4 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of work. Upon request, make available to DR for inspection.
- 1.10 Project/Site Conditions
- .1 The following are known or potential project related safety hazards at site:
 - .1 Working in close proximity of water.
 - .2 Use of water craft.
 - .3 Working from heights.
 - .4 Wet and slippery conditions.
 - .5 Inclement weather.
 - .6 Heavy equipment activity in the area.
 - .7 Heavy lifting.
 - .8 Cutting tools.
 - .9 High speed highway traffic
 - .2 Obtain from DR, copy of MSDS Data sheets of existing hazardous materials stored on site or being used by Facility and Tenant personnel in the course of their operations.
 - .3 Above lists shall not be construed as being complete and inclusive of safety and health hazards encountered as a result of Contractor's operations during the course of work. Include above items into the hazard assessment program specified herein.

- 1.11 Safety Meetings .1 Prior to commencement of work attend health and safety meeting conducted by DR. Have Contractor's Site Superintendent in attendance. DR will advise of time and location.
- .2 Provide site safety orientation session to all workers and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the minimum site safety rules in force at site.
- .3 Conduct site specific occupational health and safety meetings during the entire work as follows:
- .1 Formal meetings on a minimum monthly basis
- .2 Informal tool box meetings on a regular basis from a predetermined schedule.
- .4 Keep workers informed of anticipated hazards, on safety practices and procedures to be followed and of other pertinent safety information related to:
- .1 Progress of Work;
- .2 New sub-trades arriving on site and;
- .3 Changes in site and project conditions.
- .5 Record and post minutes of meetings. Make copies available to DR upon request.
- 1.12 Health and Safety Plan .1 Develop written site-specific Project Health Safety Plan and Safety Plan, based on hazard assessments, prior to commencement of work. Submit plan to DR within fourteen (14) calendar days of Contract Award date.
- .2 Health and Safety Plan shall contain the following three (3) parts:
- .1 Part 1: List of individual health risks and safety hazards identified by hazard assessment(s).

- 1.12 Health and Safety Plan (cont'd)
- .2 (cont'd)
 - .2 Part 2: List of specific measures to control or mitigate each hazard and risk identified in part one of Plan. Describe the DRing controls, personnel protective equipment and safe work practices to be implemented and followed when performing work related to each identified hazard or risk.
 - .3 Part 3: Emergency Measures and Communications Procedures as follows:
 - .1 Emergency Measures: on-site operating procedures, evacuation measures and emergency response to be implemented in the occurrence of an accident or incident. Procedures to be specific and relevant to identified hazards. Measures to complement and be integrated with the Facility Emergency Response Plans in place at site. Obtain information on existing emergency and evacuation plans from DR and incorporate appropriate data.
 - .2 Communication Procedures:
 - .1 List of names and telephone numbers of designated official(s), to be contacted should an incident or emergency situation occur, including the following:
 - .1 General Contractor and all Subcontractors.
 - .2 Federal and Provincial Departments and local emergency resources organizations, as applicable to the hazards identified and type of accident or incident which might occur, in accordance with applicable laws and regulations.

1.12 Health and
Safety Plan
(cont'd)

- .3 Officials from PWGSC where work is carried out. Engineer will provide list of names to be included.
- .2 Procedures implemented at site to communicate and share information between workers, subcontractors, and General Contractor on work activities, and in particular those which might endanger workers and Facility employees.
- .3 List of critical construction activities to be communicated with the Facility Manager and designated tenant representative(s) which could affect facility and tenant operations, or pose a risk to the health and safety of their employees and to the general public. Develop list in consultation with the DR.
- .3 Prepare Health and Safety Plan in a three column format, addressing the three parts specified above, as follows:

Column 1	Column 2	Column 3
Identified	Control	Emergency Measures
Hazard	Measures	& Communications
Implemented	Procedures	

- .4 Develop Health and Safety Plan in collaboration with all subcontractors. Address all work and activities of subcontractors as they arrive on site. Immediately update Plan and submit to DR.
- .5 Implement, maintain and enforce compliance with requirements of the Health and Safety Plan until final completion of work and demobilization from site.

- 1.12 Health and Safety Plan
(cont'd)
- .6 As work progresses, review and update Plan addressing additional health risks and safety hazards identified by on-going hazard assessments.
 - .7 Submit revised versions of Plan to DR.
 - .8 Post a typewritten copy, including all updates, of the Health and Safety Plan in a common visible location at work site.
 - .9 Submission of the Health and Safety Plan, and updates, to the DR is for review and information purposes only. Its submission shall not be construed to imply approval by DR, be interpreted as a warranty of being complete, accurate and legislative compliant and shall not relieve Contractor of his legal obligations for the provision Health and Safety on the construction project.
- 1.13 Safety Supervision & Inspections
- .1 Designate competent person or persons to be present on site at all times during work, responsible for supervising health and safety and conducting safety inspections of work site.
 - .2 Assign responsibility, obligation and authority to such designated person(s) to stop and start work as deemed necessary for reasons of health and safety.
 - .3 Provide names of designated individuals to DR.
 - .4 Conduct regularly scheduled safety inspections of work site as follows:
 - .1 Informal Inspections: carry out on a minimum bi-weekly basis. Note deficiencies and remedial action taken in a log book or diary.

- 1.13 Safety Supervision & Inspections (cont'd)
- .2 Formal Inspections: carry out on a minimum monthly basis. Use standardized safety checklist forms. Prepare written report for each formal inspection. Document deficiencies, remedial action needed and assign responsibility for rectification to appropriate subcontractor or worker.
 - .5 Distribute monthly reports to subcontractors for their pursuance. Follow-up and ensure appropriate action and corrective measures are taken.
 - .6 Maintain safety inspection documentation on site. Submit copies of formal inspection reports to DR.
 - .7 All persons in Contractor's employ responsible for health and safety requirements specified in the Contract Documents to be competent in Occupational Health and Construction Safety as defined in the Provincial Occupational Health And Safety Act.
- 1.14 Training
- .1 Ensure that workers, subcontractors and other authorized persons granted access to site are trained and have been fully instructed, by a competent instructor, on:
 - .1 Safe operation of tools and equipment.
 - .2 Proper wearing and use of personnel protective equipment (PPE) as applicable to the purpose and activities to be conducted on site.
 - .3 Safe work practices and procedures to be followed during the performance of their given work tasks or function on site.
 - .4 Site Conditions and minimum site safety rules provided through site orientation sessions.
 - .2 Make training records readily available for review by DR upon request.

- 1.15 Minimum Site Safety Rules .1 Notwithstanding the requirement to abide by federal and provincial health and safety regulations, the following safety rules shall be considered minimum requirements at the work site and obeyed by all persons granted access:
- .1 Wear personnel protective equipment (PPE) appropriate to function and task on site; the minimum requirements being hard hat, safety footwear and eye protection.
 - .2 Immediately report unsafe activities, conditions, near-miss accidents, injuries and damages.
 - .3 Maintain site in tidy condition.
 - .4 Obey warning signs and safety tags.
- .2 The following actions or conduct by Contractor, workers and sub-contractors will be considered as non conformance with the health and safety requirements of the contract for which a Non-Compliance Notification will be issued to the General Contractor by the DR:
- .1 Failure to follow the minimum site safety rules specified above.
 - .2 Negligence resulting in serious injury or major property damage.
 - .3 Deliberate non-compliance with Federal and Provincial Acts and Regulations.
 - .4 Falsification of information in Workers Compensation Reports, safety reports and other health and safety related documents submitted to DR or to Authority having jurisdiction.
 - .5 Possession of firearms on site.
 - .6 Possession of non-prescriptive illegal drugs or alcohol.
 - .7 Action, or lack thereof, resulting in the issuance of Warnings, Fines or Stop Work Orders from a Provincial Authority having jurisdiction.
 - .8 Violation of other specified health and safety rules and requirements as determined by DR.

- 1.15 Minimum Site Safety Rules (cont'd)
- .3 The final decision as to what constitutes a safety violation or non-compliance issue will be made by DR.
 - .4 Non-Compliance Notifications may result in disciplinary measures taken as specified under the Non-Compliance Disciplinary Measures specified elsewhere in this section.
 - .5 Brief workers on site safety rules, and on the disciplinary measures to be taken for violation or non compliance of such rules. Post such information on site.
- 1.16 Accident Reporting
- .1 Investigate and report incidents and accidents as outlined in Provincial Occupational Safety and Health Act and Regulations.
 - .2 Investigate and immediately report to DR incidents and accidents which result, or have the potential of resulting in:
 - .1 Injuries requiring medical aid,
 - .2 Property damage in excess of \$5000.00,
 - .3 Interruption to building operations with potential loss to owner or client in excess of \$5000.00,
 - .4 Required notification to Workers Compensation Board or other regulatory agencies as stipulated by applicable regulations.
 - .3 Medical aid in above clause shall have the same meaning as the term "medical aid injury" as defined in the Canadian Dictionary of Safety Terms - 1987 issue, from the Canadian Society of Safety DRs (C.S.S.E) as follows:
 - .1 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

- 1.17 Tools and Equipment Safety
- .1 Implement and follow a scheduled tool and equipment inspection/maintenance program at work site. Regularly check tools, equipment and machinery for safe operation and perform maintenance at pre-established time and frequency intervals as recommended by manufacturer. Include subcontractors equipment as part of the inspection process.
 - .2 Use standardized checklists to ensure established safety checks are stringently followed.
 - .3 Immediately tag and remove items found faulty or defective off site.
 - .4 Maintain written documentation on each inspection. Make available to DR upon request.
- 1.18 Hazardous Products
- .1 Comply with requirements of Workplace Products Hazardous Materials Information System (WHMIS).
 - .2 Keep MSDS data sheets on site. Provide copies of all data sheets to DR upon receipt of materials on site.
 - .3 Post all MSDS data sheets on site, in a common area, visible to workers.
- 1.19 Blasting
- .1 Blasting or other use of explosives is not permitted without prior written instructions from DR and permits from Authorities having jurisdiction.
- 1.20 Powder Actuated Devices
- .1 Use powder actuated fastening devices only after receipt of written permission from DR.
- 1.21 Confined Spaces
- .1 Carry out work in confined spaces in compliance with:
 - .1 Provincial Occupational Safety and Health Regulations and;
 - .2 Part XI of the Regulations Respecting Occupational Safety and Health made under Part II of the Canada Labour Code.

- 1.21 Confined Spaces.2 Include hazard assessment of confined space(s) as part of the hazard assessment program.
- (cont'd)
- .3 Provide and maintain all equipment as required for the safety and emergency evacuation of persons entering and/or performing work in confined space.
- .4 Provide training to all persons entering and working in confined spaces.
- .5 Safety for Inspectors:
- .1 Upon DR's request, provide protective equipment and training to DR or to other person designated by DR for the purpose of entering the confined space(s) to conduct inspections.
- .2 Training to be specialized instructions (beyond basic confined space entry training) to suit the specific nature and type of confined space conditions at site.
- .3 Be responsible for the efficacy of the equipment and for the safety of such persons during their entry and occupancy in the confined space.
- .6 Develop and use "Entry Permits" for each and every entry into the confined space in accordance with Section 11.3 of Part XI of the Regulations Respecting Occupational Safety and Health made under Part II of the Canada Labour Code. Keep all entry permits on site for duration of work. Make permits available for inspection when requested by DR.
- 1.22 Posting of Documents .1 Post documents indicated herein and Documents as required by Authority having jurisdiction.
- 1.23 Records on Site .1 Maintain on site copy of safety documentation as specified in this section and other safety related reports and documents issued to or received from authorities having jurisdiction.

- 1.23 Records on Site (cont'd) .2 Make available to DR, or authorized safety representative, for inspection upon request.
- 1.24 Non Compliance Notifications & Disciplinary Measures Measures .1 Immediately address and correct health and safety violations and non-compliance issues.
- .2 In an effort to communicate the importance placed by Public Works and Government Services Canada (PWGSC) of stringently maintaining health and safety on the construction site, DR will institute on project a system of "Non-Compliance Notifications" issued to the General Contractor. The non-compliance notifications could lead to disciplinary measures imposed on the offending party and on the General Contractor depending on the frequency or severity of infractions.
- .3 The system consists in the issuance of a "Non-Compliance Notification" by DR to the General Contractor whenever a worker, subcontractor or other person, granted access to the work site violates a site safety rule, or a health and safety requirement of the Contract or is non-compliant with applicable occupational health and safety laws and regulations.
- .1 Each non-compliance notification issued is given a rating based on a three level classification system.
- .2 Levels are graduated and progressive to reflect:
- .1 The seriousness of the infraction(s) as viewed by PWGSC and by the DR and;
- .2 The degree of disciplinary measures which will be taken by PWGSC.
- .4 The following describes the situations and disciplinary actions to be taken by DR dependent on the rating level given to a particular Non-Compliance Notification issued:

- 1.24 Non-Compliance .4 (cont'd)
- Notifications & Disciplinary Measures
(cont'd)
- .1 Non-Compliance Notification-Level 1 rating:
 - .1 Situation: occurrence of a first time infraction by a person or party on site.
 - .2 Action: verbal warning to General Contractor, documented in PWGSC project files and copy sent to the General Contractor.
 - .2 Non-Compliance Notification-Level 2 rating:
 - .1 Situation:
 - .1 The second occurrence of a previous infraction by the same person or party on site or;
 - .2 Accumulation of several level one notifications for different infractions by the same person or party on site or;
 - .3 Non-action on the part of the Contractor or subcontractor to rectify non-compliance infractions previously identified in one or several level one notifications or;
 - .4 Violation or non observance of a Federal or Provincial safety Law or Regulation by subcontractor or Contractor or;
 - .5 Negligence by a person or party resulting in injury or major property damage.
 - .2 Action: written notice to General Contractor complete with an Order for immediate remedial action to be taken. Depending on the severity of the offence, Order may include the immediate removal of the offending person or party from site.
 - .3 Non-Compliance Notification-Level 3 rating:

- 1.24 Non-Compliance .3 (cont'd)
 Notifications .1 Situation:
 & Disciplinary .1 Continued and repeated
 Measures non-compliance with
 (cont'd) health and safety
 requirements by the
 General Contractor or by
 subcontractor(s) or;
 .2 The occurrence of a
 "serious accident" on
 site resulting in serious
 bodily injury or death.
- .2 Action:
 .1 Formal letter issued to
 General Contractor with
 an Order to
 "Immediately Stop Work"
 until so notified to
 proceed.
 .2 Review and possible
 investigation by DR and
 other PWGSC officials of
 all the non compliance
 incidences which have
 occurred or of the
 serious accident.
 .3 Based on outcome of the
 review/investigation, DR
 may proceed with "Taking
 the Work out of the
 Contractor's Hands" in
 accordance with article
 no. GC 38 of the General
 Conditions Document "C".
- .3 The term "serious accident", as used
 herein, shall have the same meaning
 as defined in the Canadian
 Dictionary of Safety Terms - 1987
 issue from the Canadian Society of
 Safety DRs (C.S.S.E).
- .5 Non-Compliance Notifications issued by DR
 shall not be construed as to overrule or
 disregard warnings, orders and fines
 levied against Contractor by a Regulatory
 Agency having jurisdiction.
- .6 An explanation of the disciplinary
 system, how it will function and be
 administered will be provided to the

- 1.24 Non-Compliance .6 (cont'd)
 Notifications & Disciplinary Measures
(cont'd)
- .6 successful Tenderer at the pre-construction Health and Safety meeting. Upon award of contract, be responsible to fully brief workers and subcontractors on the operation and importance of this system.
- .7 Decision on which "rating level" to be placed on any given Non-Compliance Notification will be determined solely by DR.
- .8 DR will make final decision as to when a Non-Compliance Notification will be issued, based on nature of violation noted or brought to his/her attention by an authorized safety representative.
- .9 Denied future tendering opportunities: Beware that Contractors to whom a charge or charges are laid by a Regulator for violations of safety laws and/or regulations and which result in a conviction, may have their bidding privileges suspended indefinitely on future PWGSC construction projects. This decision will be solely at the discretion of PWGSC and be dependent on the severity of the offense.
- 1.25 Diving .1 All diving work to comply fully with the requirements of CSA Standard Z275.2 "Occupational Safety Code for Diving Operations", the Canada Occupational Safety and Health Regulations of the Canada Labour Code - Part II, Part XVII Diving Operations, CSA Z275.4, Competency Standards for Diving Operations, and CSA Z180.1, Compressed Breathing Air and System.
- Operation
- .2 Diving personnel must meet the minimum competency requirements of CSA Z275.4 and all divers must possess a valid Category I Diving Certificate.
- .3 Diving in free swim mode is not permitted at the work site.

- 1.25 Diving Operation
(cont'd) .4 Divers must have a current (less than one year) validated medical examination certificate from a licensed diving physician in Newfoundland and Labrador, who is knowledgeable and competent in diving and hyper baric medicine, for all dives.
- 1.26 Measurement
For Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Health and Safety Requirements in the Lump Sum portion of the work on the Bid and Acceptance Form.

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- 1.1 General .1 This section outlines the requirements for the environmental protection associated with the work.
- 1.2 Fires .1 Fires and burning of rubbish and waste materials on site are not permitted.
- 1.3 Disposal of Wastes .1 Burying of rubbish and waste materials on site is not permitted.
- .2 All waste material is to be disposed of at an approved waste disposal site in a manner in accordance with appropriate environmental guidelines.
- .3 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .4 It shall be the responsibility of the Contractor to obtain the necessary permits from governing authorities for the disposal of demolished material and debris. Any sampling and laboratory testing not previously conducted will be the responsibility of the Contractor, if required by the governing authorities.
- 1.4 Drainage .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with these specifications and provincial rules and regulations.
- 1.5 Site Cleaning & Plant Protection .1 Protect trees and plants on site and adjacent properties where indicated or designated by DR.

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- 1.6 Work Adjacent to Waterways
- .1 Do not operate construction equipment in waterways.
 - .2 Do not use waterway beds for borrow material.
 - .3 Do not dump excavated fill, waste materials or debris in waterways.
 - .4 Design and construct temporary crossings to minimize erosion to waterways.
 - .5 Do not skid logs or construction materials across waterways.
 - .6 Avoid spawning beds when constructing temporary crossings of waterways.
 - .7 Do not blast under water or within 100 m of indicated spawning beds.
 - .8 Blasting near fish bearing waterways to be carried out in strict accordance with regulatory permits.
- 1.7 Pollution Control
- .1 Maintain temporary pollution control features installed under this contract.
 - .2 Air Pollution:
 - .1 Control emissions from equipment and plant to local authorities emission requirements.
 - .2 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
 - .3 Cover or wet down dry materials and rubbish to prevent blowing dust or debris.
 - .3 Refueling Areas:
 - .1 Review in detail proposed route of construction to plan Areas, access routes and fueling areas.
 - .2 Establish suitable fueling and maintenance areas and obtain approval from the DR.
 - .3 Do not refuel or maintain equipment adjacent to or in watercourses.

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- 1.7 Pollution Control (cont'd) .3 (cont'd)
- .4 Do not fuel equipment within 30 metres of any watercourses unless non-spill facilities are used.
 - .4 Cleaning Equipment:
 - .1 Do not clean equipment in streams or lakes.
 - .2 Clean construction equipment prior to driving on roadways.
 - .3 Do not clean equipment in locations where debris can gain access to watercourses.
 - .5 Spills:
 - .1 Submit procedures for interception, rapid clean-up and disposal of spillages that may occur, for the DR's review, prior to commencing work.
 - .2 Intercept, clean-up and dispose of any spillage that may occur whether on land or water.
 - .3 Keep all materials required for clean-up of spillages readily accessible on site.
 - .4 Report immediately any spills causing damage to environment to the Newfoundland Department of Environment and Labour.
 - .6 Use of Pesticides:
 - .1 Shall not be permitted.
- 1.8 Noise Control .1 Establish and maintain site procedures such that noise level from construction areas are minimized.
- .2 Control noise level in accordance with local by-laws and policies/procedures established by Department of National Defence for 5 Wing, Goose Bay, Labrador.
 - .3 Use vehicles and equipment equipped with efficient muffling devices.
 - .4 Provide and use devices that will minimize noise level in construction area.

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- 1.9 Dust Control
- .1 Prevent dust nuisances resulting from construction operations at all locations on site.
 - .2 Use water, brine or calcium chloride to control dust.
 - .3 Minimize use of calcium and brine, particularly in close proximity to water courses or agricultural lands.
 - .4 Transport dusty materials in covered haulage vehicles.
 - .5 Public roadways and existing site road shall be kept clean, free of mud and dust controlled.
- 1.10 Water Control
- .1 Direct pumped water or run-off to settling ponds or sediment basins prior to discharge to adjacent watercourses.
 - .2 Provide settling basins and sediment traps where needed or as directed by the DR.
 - .1 Control overflow rates from settling ponds or sediment basins to ensure minimum solids transportation.
 - .2 Provide straw bales, filter berms, siltation fencing or sand bags as required to retard and filter run-off prior to discharge to watercourses.
 - .3 Clean out sediment basins periodically or as directed by the DR so that sediment discharge is prevented.
 - .3 Intercept and divert concentrated run-off from unstabilized areas under sheet flow conditions.
 - .4 Provide splash pads where water is discharged to watercourse.
 - .5 Dispose of water so as not to be injurious to public health or safety, to property or to any part of work completed or under construction.

- 1.10 Water Control (cont'd)
- .6 It is emphasized that control of water and prevention of siltation is the responsibility of the Contractor. All work is to be carried out in accordance with the Newfoundland Department of Environment and Labour.
 - .7 Regularly inspect to ensure that ponds or sediment traps function and are not full of sediment. Clean out as required by the DR. Make any necessary repairs promptly.
 - .8 Remove all sediment and installed materials at regular disposal intervals as required in a fashion so as not to cause downstream siltation, and dispose in an acceptable location.
- 1.11 Erosion Control
- .1 The Contractor shall be responsible for control of erosion during Works.
 - .2 Removal of vegetation from sloped approaches to watercourses to be kept to a minimum.
 - .3 Excavate and stabilize temporary channel beds prior to any diversion of flow.
 - .4 Provide splash pads where water is discharged into watercourses.
 - .5 Removal of vegetation from slopes to be kept to a minimum.
- 1.12 Waste Management Plan
- .1 Submit for approval by the DR within ten (10) working days after contract award, a Waste Management Plan identifying:
 - .1 contractor's representative responsible for implementing the plan and what are the expected results.
 - .2 resources required, staff and equipment.
 - .3 waste separation and recyclable materials, quantities and types.
 - .4 waste materials to be disposed, quantities and types.

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- 1.12 Waste Management Plan (cont'd)
- .1 (cont'd)
 - .5 collection, handling and/or demolition methods.
 - .6 transportation, storage and/or disposal methods and locations.
 - .7 waste audit sampling records.
 - .8 records of all hazardous and non hazardous waste materials.
 - .9 list of licensed waste management/recycling facilities and capabilities.
 - .10 waste audit summary report.
- 1.13 Environmental Protection Plan
- .1 The Contractor is required to develop and submit an Environmental Protection Plan (EPP) that demonstrates the Contractors commitment to avoidance of adverse environmental impacts through implementation of best practices in pollution prevent and the promotion of sound environmental practices for the project and specifically address plans to control surface water and off site discharges during remedial activity.
 - .2 Contractor shall submit the EPP within two (2) weeks after award.
- 1.14 Approvals and Permitting
- .1 The Contractor is required to obtain and abide by all environmental permits required to carry out the necessary construction work.
 - .2 Part G of a CEAA screening report carried out by the Owner is attached under Appendix "A" for information purposes, and identifies some of the environmental issues and requirements that the Contractor will need to comply with in conducting operations at the site. Inclusion of this information does not relieve the Contractor of the responsibility obtaining all applicable approvals and permits for construction of the work.

1.15 Measurement
For Payment

.1 No separate measurement for payment shall be made for items under this section. Include costs for Environmental Procedures in the Lump Sum portion of the work on the Bid and Acceptance Form.

- 1.1 Section Includes .1 Inspection and testing, administrative and enforcement requirements.
- 1.2 Inspection .1 Allow DR 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 DR, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 DR may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, DR shall pay cost of examination and replacement.
- 1.3 Access to Work .1 Co-operate to provide reasonable facilities for such access.
- 1.4 Procedures .1 Notify appropriate agency DR in advance of requirement for test, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

- 1.4 Procedures .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
(cont'd)
- 1.5 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 DR as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of DR it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by DR.
- 1.6 Measurement .1 No separate measurement for payment shall be made for items under this section. Include cost for Quality Control in the Lump Sum portion of the work on the Bid and Acceptance Form.
For Payment

- 1.1 Related Sections .1 Section 01 35 43 - Environmental Procedures.
 - .2 Section 02 41 16 - Demolition and Removal
- 1.2 References .1 National Building Code of Canada
- 1.3 Installation and Removal .1 Provide construction facilities in order to execute work expeditiously.
 - .2 Remove from site all such work after use.
- 1.4 Site Loading .1 Do not load or permit to load any part of work with a weight or force that will endanger the work.
- 1.5 Security .1 Secure site at night and other times outside of working hours as deemed necessary to protect the site against entry.
- 1.6 Equipment, Tools and Materials Storage .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
 - .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause interference with work activities.
- 1.7 Site Facilities .1 The Contractor will provide all facilities necessary for the performance of all work and direct personnel requirements. This includes, but is not limited to, the following:
 - .1 Site office
 - .2 Sanitary facilities
 - .3 Electricity/Lighting
 - .4 Fresh water
 - .5 Eye wash stations
 - .6 First aid stations c/w stretcher
 - .2 The Contractor will provide and maintain separate drinking (commercially bottled) water for the duration of the contract at their expense for all site offices.
 - .3 The Contractor will make the necessary arrangements for utilities and they

1.7 Site Facilities
(Cont'n)

(Cont'n)
will be provided and maintained
at the Contractor's expense. The request
for utilities shall be initiated within
24 hours after award of contract.

- .4 All temporary facilities shall be
anchored to resist extreme wind loading
minimum 160 km/h.

NOTE: Contractors are advised that there
are no municipal sewer or water
facilities available on site. All septic
disposal facilities shall be approved by
the Newfoundland and Labrador Department
of Government Services.

1.8 Contractor's
Site Office

- .1 The Contractor will provide a
construction site office with adequate
space to accommodate site meetings of six
(6) persons.
- .2 The office must be furnished with a
drawing laydown table.
- .3 The heating system must be able to
maintain an inside temperature of 22
degrees C when the outside temperature is
-20 degrees C.
- .4 The electrical lighting system is to
provide a minimum 750 lux using surface
mounted, shielded commercial fixtures
with 10% upward light component.

1.9 Sanitary
Facilities

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

Note: Contractors are advised that there
are no municipal water, sewer or power
facilities available at the site.

- 1.10 Site Signs and Notices .1 Only Project Identification signboard, notices of safety or instruction are permitted on site.
- .2 Safety and Instruction Signs and Notices:
.1 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN3-Z321-77.
- .3 Maintain signboard signs and notices for the duration of the project. Remove and dispose of signs off site on completion of project.
- 1.11 Power .1 Provide, pay for and maintain temporary electrical power in accordance with governing regulations and ordinances as follows:
.1 All work shall be done under supervision or to the approval of Newfoundland Light and Power Ltd.
.2 All temporary transformers, power lines, poles, etc., required for the Contractor's performance of the work shall be removed after all work has been completed and accepted by the DR.
- 1.12 Fresh Water Supply .1 Provide, pay for and maintain temporary fresh water supply for all site offices in accordance with governing regulations and ordinances.
- 1.13 Removal of Temporary Facilities .1 Remove temporary facilities from site when directed by DR.
- 1.14 Measurement For Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Temporary Facilities in the Lump Sum portion of the work on the Bid and Acceptance Form.

PART 1 - GENERAL

- 1.1 Section Includes .1 Barriers.
.2 Environmental Controls.
.3 Traffic Controls.
.4 Fire Routes.
- 1.2 Related Sections .1 Section 01 51 00 - Temporary Facilities.
- 1.3 References .1 Canadian General Standards Board (CGSB)
.1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.
.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
.2 Canadian Standards Association (CSA)
.1 CSA-0121-M1978, Douglas Fir Plywood.
- 1.4 Installation and Removal .1 Provide temporary controls in order to execute Work expeditiously.
.2 Remove from site all such work after use.
- 1.5 Hoarding .1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- 1.6 Guard Rails and Barricades .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts and steep embankments.
.2 Provide as required by governing authorities.

- 1.7 Access to Site .1 Provide and maintain access roads, sidewalk crossings and construction runways as may be required for access to Work.
- 1.8 Public Traffic Flow .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.
- 1.9 Fire Routes .1 Maintain access to property including overhead clearances for use by emergency response vehicles.
- 1.10 Protection for Off-Site and Public Property .1 Protect surrounding private and public property from damage during performance of Work.
.2 Be responsible for damage incurred.
- 1.11 Measurement For Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Temporary Barriers and Enclosures in the Lump Sum portion of the work on the Bid and Acceptance Form.

- 1.1 General
- .1 Use new material and equipment unless otherwise specified.
 - .2 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
 - .3 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- 1.2 Manufacturer's Instructions
- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
 - .2 Notify DR in writing of any conflict between these specifications and manufacturer's instructions. DR will designate which document is to be followed.
- 1.3 Measurement For Payment
- .1 No separate measurement for payment shall be made for items under this section. Include costs for Common Product Requirements in the Lump Sum portion of the work on the Bid and Acceptance Form.

- 1.1 General
 - .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - .2 Store volatile wastes in covered metal containers, and remove from premises daily.
 - .3 Prevent accumulation of wastes which create hazardous conditions.
 - .4 Provide adequate ventilation during use of volatile or noxious substances.

- 1.2 Materials
 - .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.
 - .2 Provide on site garbage containers for collection of waste materials and rubbish.
 - .3 Remove waste materials and rubbish from the site or building each day.

- 1.3 Final Cleaning
 - .1 In preparation for substantial completion, conduct inspection of sight-exposed interior and exterior surface.

- 1.4 Measurement For Payment
 - .1 No separate measurement for payment shall be made for items under this section. Include costs for Cleaning in the Lump Sum portion of the work on the Bid and Acceptance Form.

- 1.1 Section Includes .1 Administrative procedures preceding preliminary and final inspection of work.
- 1.2 Related Sections .1 Section 01 78 00 - Closeout Submittals.
- 1.3 Inspection & Declaration .1 Contractors Inspection:
 - .1 Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .2 Notify DR in writing of satisfactory completion of Contractor's inspection and that corrections have been made.
 - .3 Request DR's Inspection..2 DR's Inspection:
 - .1 DR and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly..3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Operation of systems have been demonstrated to Owner's personnel.
 - .4 Work is complete and ready for Final Inspection..4 Final Inspection: when items noted above are completed, request final inspection of Work by DR and Contractor. If Work is deemed incomplete by Owner and DR, complete outstanding items and request reinspection.
- 1.4 Measurement For Payment 1. No separate measurement for payment shall be made for items under this section. Include costs for Close-out Procedures in the Lump Sum portion of the work on the Bid and Acceptance Form.

- 1.1 Section Includes
 - .1 As-built and specifications.
 - .2 Finishes and related information.
 - .3 Warranties and bonds.

- 1.2 Related Sections
 - .1 Section 01 45 00 - Quality Control.
 - .2 Section 01 77 00 - Closeout Procedures.

- 1.3 As-Built and Samples
 - .1 In addition to requirements in the General Conditions, maintain at the site for DR, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Field Test Records.
 - .6 Inspection Certificates.
 - .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
 - .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "Project Record" in neat, large, printed letters.
 - .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purpose.
 - .5 Keep record documents and samples available for inspection by DR.

- 1.4 Recording Actual Site Conditions
- .1 Record information on set of blue line or black line opaque drawings and in copy of Project Manual, provided by DR.
 - .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
 - .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
 - .4 Contract Drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements in relation to finish datum.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract Drawings.
 - .5 References to related modifications.
 - .6 Include on site plan, the general location and layout of all changes from original contract drawings.
 - .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Changes made by Addenda and Change Orders.
- 1.5 Finishes
- .1 Additional Requirements: as specified in individual specifications sections.
- 1.6 Warranties and Bonds
- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

- 1.6 Warranties and Bonds
(cont'd)
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item of work.
 - .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
 - .5 Verify that documents are in proper form, contain full information, and are notarized.
 - .6 Co-execute submittals when required.
 - .7 Retain warranties and bonds until time specified for submittal.
- 1.7 Measurement For Payment
- .1 No separate measurement for payment shall be made for items under this section. Include costs for Close-out Submittals in the Lump Sum portion of the work on the Bid and Acceptance Form.

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for demolishing and removing wholly or in part various items designated to be removed or partially removed.
- .2 Demolition and removal will consist of, but not necessarily be limited to, the following:
- .1 Dicks Brook Bridge
 - .1 Expansion joint.
 - .2 Deteriorated concrete.
 - .3 Damaged Bridge Railing
 - .4 Approach Asphalt
 - .2 Shoal Cove Bridge
 - .1 Deteriorated concrete.
 - .3 Dear Arm Bridge
 - .1 Expansion joints
 - .2 Deteriorated concrete.
 - .3 Damaged bridge railing and posts.
 - .4 Approach Asphalt.
 - .5 Guide Rail
- 1.2 Protection .1 Protect existing objects designated to remain. In event of damage, immediately replace or make repairs to approval of, and at no additional cost to, DR.
- 1.3 Measurement for Payment .1 No separate measurement for payment shall be made for items under this section. Include all costs incidental to the following unit price items:
- .1 Demolition and removal of concrete including surface preparation and cleaning of reinforcing steel to be measured incidental to the unit price for cast-in place concrete as specified in section 03 30 00 Cast-in place concrete.
 - .2 Demolition and removal of asphalt including water proof membrane and surface preparation to be measured incidental to the unit price for asphalt paving as specified in Section 32 12 16 - Asphalt Paving.

- 1.3 Measurement for
Payment
(Cont'n)
- .3 Demolition and Removal of expansion joints including surface preparation to be measured incidental to the unit price for expansion joints as specified in Section 05 50 00 - Metal Fabrications.
 - .4 Demolition and removal of bridge railing including preparation to install new railing to be measured incidental to the unit price for aluminum bridge railing as specified in Section 05 50 00 - Metal Fabrications.
 - .5 Demolition and removal of bridge posts including preparation to install new posts to be measured incidental to the unit price for aluminum bridge railing as specified in Section 05 50 00 - Metal Fabrications.
 - .6 Demolition and Removal of existing guide rails and posts to be measured incidental to the unit price for new guide rail as specified in Section 34 17 39 - Vehicular W-Beam Guide Rail.
 - .7 Demolition and Removal of bearing pads including surface preparation to be measured incidental to the unit price for neoprene bearing pads as specified in Section 03 10 00 - Concrete Formwork and Accessories.

PART 2 - PRODUCTS

- 2.1 Equipment
- .1 Equipment to approval of DR and to comply with following requirements:
 - .1 Sandblasting equipment to be capable of removing all direct, oil and other foreign material as well as laitance from surface of concrete, and removing rust from exposed reinforcement.

- 2.1 Equipment
(Cont'n)
- .2 Vacuum or compressed air equipment to be capable of removing all dust of loose material from concrete surface after sandblasting. In case of compressed air it is to be free from oil.
 - .3 Power-Driven hand tools to be permitted for removal of concrete with following restrictions:
 - .1 Use scabblers machine, to prepare deck surface, capable of removing old "Gem-crete" or "Force 10,000" surface and any unsound concrete material on bridge deck.
 - .2 Use "Jack Hammers" not heavier than nominal 13.6 kg class.
 - .3 "Jack Hammers" or mechanical chipping tools to be operated at an angle less than 45 degrees measured from the vertical.
 - .4 Use "chipping Hammers" not heavier than nominal 6.8 kg class to remove concrete from beneath any reinforcing steel.
 - .5 Use other hand tools such as hammers and chisels for removal of final particles of unsound concrete or to achieve required depth.

PART 3 - EXECUTION

- 3.1 Execution
 - .1 Inspect site and verify with DR objects designated for removal.
- 3.2 Removal
 - .1 Remove in their entirety all materials and objects specified for removal.
 - .2 Do not disturb adjacent work designated to remain in place.
 - .3 Deck repairs are to be done in two stages such that one complete lane of bridge is available to traffic at all times.

- 3.2 Removal
(Cont'n)
- .4 Remove materials and asphalt to limits indicated on drawings for placement of new concrete and asphalt as indicated on plans.
- .5 No concrete or asphalt shall be placed until the prepared surface to be restored is inspected and approved in writing by the DR.
- 3.3 Surface
Preparation
- .1 Sandblast and clean thoroughly, by vacuum or air blast, exposed concrete and steel contact surfaces against which fresh concrete, overlay or grout is to be placed. Remove all foreign matter, laitance and loose concrete so as to present a clean sound surface with coarse aggregate exposed. Sandblast to commercial blast clean condition all exposed reinforcing to Steel Structures painting Council Standard SSPC-SP-6 (commercial clean)
- 3.4 Damaged or
Deteriorated
Reinforcing
Steel
- .1 Sandblast to a commercial clean (SSPC SP6). All existing steel.
- .2 All reinforcing steel bars which are damaged by Jack Hammering or have deteriorated and cannot be reused shall be replaced with an equivalent area or steel. This shall be in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 The extent and exact nature of the work shall be determined in the field.
- 3.5 Abutment and
Pier - Concrete
Removal
- .1 This includes abutments, piers, creep blocks, and wing walls having deterioration as noted on the drawings.
- .2 This work shall entail the removal of deteriorated concrete and surface preparation. All loose, deteriorated and chloride contaminated concrete shall be removed to a minimum depth identified on drawings beyond original lines or further until sound concrete as determined by the DR is encountered. If any re-bar corroded, presently exposed or exposed by

3.5 Abutment and
Pier - Concrete
Removal
(Cont'n)

concrete removal, then the concrete surrounding the re-bar shall be removed to a clear distance of 25mm beyond the steel. Concrete removal shall be as detailed on the drawings and as directed by the DR.

- .3 Prior to restoration of the deteriorated areas, all exposed reinforcing steel shall be satisfactorily sand-blasted until the steel is free from all rust. Fine particles of cement or sand shall be removed by vacuum or with jets of oil-free compressed air.
- .4 Where fresh concrete will meet hardened concrete, a 25 mm deep sawcut shall be used to obtain clean lines and to preclude feather-edging.

3.6 Curb and
Soffit Removal

- .1 The areas to be repaired are designated on the drawings.
- .2 The perimeter of the designated areas shall be saw cut to depth of 25 mm or to the level of the re-bar if less than 25 mm or as shown on the Contract Drawings. Deteriorated concrete shall be removed.
- .3 Concrete shall be removed to a minimum depth identified on drawings below original lines or further until sound concrete is encountered. If concrete is to be removed by jackhammer, the maximum hammer mass permitted is 13kg. All tools used in concrete removal shall be pointed. If any reinforcing steel is found to be exposed, the concrete shall be removed to a clear distance of 25mm below the underside of the reinforcement. If any concrete is required to be removed around reinforcing steel, then the maximum hammer size permitted shall be 7 kg. The Contractor shall take care not to damage any existing steel. The DR shall be the sole judge of the extent of removal required.

- 3.6 Curb and Soffit Removal
(Cont'n)
- .4 The concrete substrate and all exposed reinforcing steel shall be satisfactorily sandblasted until the steel is free from all rust and all loose concrete particles have been dislodged. Fine particles of concrete and sand shall be removed using jets of oil-free compressed air or water producing a minimum pressure of 6 Mpa. If the substrate is wet at the time of cleaning, then high pressure water jets shall be used to remove these particles. Air compressors must be equipped with a functional oil trap.
- .5 The curbs shall be restored as per the drawings. However, no concrete shall be placed until the prepared surface to be restored is inspected and approval in writing is given by the DR.
- .6 Concrete shall be kept damp for a minimum of 24 hours prior to placement of new material. Excess water shall be removed with compressed air. This shall be followed by a rich mixture of cement and water. The bonding mixture shall be cement with only sufficient water added to give a consistency such that the imprint remains when indented by the finger. The maximum thickness of bond grout is limited to 3mm. It is important that the mixture not be permitted to set before placing the new concrete. If the mixture has set before the concrete has been placed, it shall be mechanically removed and a fresh coat applied under the direction of the DR.
- 3.7 Expansion Joint Removal
- .1 Where expansion joints on the structures are to be replaced by new sealant system, the expansion joint shall be in accordance with Section 05 50 00 - Metal Fabrication. Areas of deck adjacent to the expansion joints may have an undetermined degree of deterioration. It is also necessary to remove sections of the deck and back wall to accommodate the new joint system. All concrete to asphalt joints must be sawcut, a space provided and filled with an approved sealant, as

described on the drawings.

- 3.7 Expansion Joint Removal (Cont'n)
- .2 It will be the Contractors responsibility to ensure that exact dimensions of the replacement joint are correct.
 - .3 All deck repairs adjacent to joints and overlays must be complete prior to the installation of concrete in expansion joint dams and asphaltic plug joints.
 - .4 The work shall entail the removal of concrete, existing sealants and joints fillers and water stops. The work shall be performed as detailed on the drawings. All existing formwork remaining from the original construction along with any accumulated debris on the beam seats shall be removed and disposed of to the DR's satisfaction.
 - .5 Concrete shall be removed to 300mm each side of the joint centerline in plan view and removed in the deck and in the backwall to the dimensions indicated on the drawings. If concrete is to be removed by jackhammer, the maximum hammer mass permitted is 13 kg. All tools used in concrete removal should be pointed.
 - .6 If any reinforcing steel is found to be exposed, the concrete shall be removed to a clear distance of 25mm below the underside of the reinforcement.
 - .7 If any concrete is required to be removed around reinforcing steel, then the maximum hammer size permitted shall be 7kg. The Contractor shall take care not to damage any existing steel.
 - .8 At the edge of areas to be repaired, a neat line shall be sawcut, a minimum of 30mm, to preclude featheredged. Prior to restoration of these areas, the concrete substrate and all exposed reinforcing steel shall be satisfactorily sandblasted until the steel is free of all rust and all loose particles of concrete and sand shall be removed with oil-free jets of compressed air or water producing a

- 3.7 Expansion Joint Removal (Cont'n)
- minimum pressure of 6 Mpa. If the substrate is wet at the time of the cleaning, then it shall be cleaned with (Cont'n)
- high pressure jets of water. A pressure gauge shall be installed in the water or air lines in order to verify the specified pressure.
- .9 The deck and backwall shall then be restored as per the drawings. However, no concrete shall be placed until the prepared surface to be restored, inspected and approval in writing is given by the DR.
- .10 Concrete substrate shall be kept damp for a minimum of 24 hours prior to placement of concrete.
- .11 Any excess water shall be removed with compressed air. This should be followed by a rich mixture of cement and water. The bonding mixture shall be cement with only sufficient water added to give a consistency such that the imprint remains when indented by the finger. The maximum thickness of bond grout is limited to 3m. It is important that the mixture not be permitted to set before placing the new concrete. If the mixture has set before the concrete has been placed, it shall be mechanically removed and a fresh coat applied under the direction of the DR.
- 3.8 Girder Concrete Removal
- .1 Remove deteriorated concrete as shown on the drawings at indicated girders as marked by the DR. Do not damage reinforcement or prestressed steel strands or ducts.
- 3.9 Safety Code
- .1 Do demolition work in safe manner and according to provincial regulations.
- .2 Blasting not permitted.

- 3.10 Disposal of Material .1 The Owner will have the first right of refusal (at no cost) to all demolished materials except those designated for reuse. If the Owner does not want any of the materials, such materials will become the property of the contractor to be removed from the site and disposed of to satisfaction of DR and in accordance with all applicable permits.
- 3.11 Restoration .1 Upon completion of work, remove debris, trim surfaces and leave work site in clean condition.
- .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for supply and installation of concrete formwork and accessories.
- 1.2 Reference Standards .1 Do concrete formwork to CSA A23.1, except where indicated otherwise.
- 1.3 Shop Drawings .1 Submit shop drawings.
- .2 Clearly indicate method and schedule of construction, materials, arrangement of joints, ties, shores, liners and location of temporary embedded parts. Comply with Clause 3 of CSA S269.1 for falsework drawings.
- 1.4 Measurement For Payment .1 Bearing Pad: As specified including all plant, material, and labor will constitute a unit price for each neoprene bearing pad installed in the work as accepted by the DR. The unit price shall include the Demolition and Removal of the existing bearing pads and all required preparation for new bearing pad installation.
- .2 No separate measurement for payment shall be made for any other items indicated under this section. Include costs incidental to unit price for cast-in-place concrete as specified in Section 03 30 00, Cast-in-place Concrete.

PART 2 - PRODUCTS

- 2.1 Materials .1 Formwork lumber: plywood and wood formwork materials to CSA A23.1.
- .2 Falsework materials: to CSA S269.1
- .1 Materials shall bear grade marks, or be accompanied with certificates, test reports or other proof of conformity.

- 2.1 Materials (Cont'n)
- .3 Form release agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing set of film of concrete in contact with form.
- .4 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia in concrete surface.
- .5 Neoprene Bearing Pad: Neoprene bearing pad to the size and thickness to match existing. Submit product data to DR for approval in accordance with Section 01 33 00 - Submittals.

PART 3 - EXECUTION

- 3.1 Formwork
- .1 Verify lines and levels before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Construct forms to produce finished concrete conforming to the shape, dimensions, locations and elevations shown on drawings within tolerances required by CSA A23.1.
- .3 Construct falsework to CSA S269.1.
- .4 Align form joints and make watertight. Keep form joints to minimum.
- .5 Expansion and control joints as specified in Sections 03 30 00.
- .6 Leave formwork in place for minimum of seven (7) days after placing concrete.
- .7 All exposed formwork to be stripped after concrete cured.
- .8 Reuse of formwork subject to requirements of CSA A23.1 Clause 11.9.

-
- 3.2 Workmanship .1 Place concrete in accordance with CAN3-A23.1-M90, Section 03 30 00.
- .2 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .3 Obtain DR's approval of proposed method for protection of concrete during placing and curing in adverse weather, prior to placing of concrete.
- 3.3 Inserts .1 Set sleeves, ties and other inserts in concrete as required.
- 3.4 Defective Concrete .1 Remove defective concrete, blemishes and embedded debris and repair as directed by DR, and at no cost to the Owner.

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for supplying and placing reinforcing steel for concrete work.
- 1.2 Reference Standards .1 Do concrete reinforcement work to CSA A23.1.
- 1.3 Source Sampling .1 Provide DR with certified copy of mill test of steel supplied, showing physical and chemical analysis, minimum four (4) weeks prior to commencing work.
- 1.4 Shop Drawings .1 Submit shop drawings and bar list of rebar.
- 1.5 Delivery and Storage .1 To CSA A23.1
- 1.6 Measurement For Payment .1 Reinforcing steel including dowels to be measured in kg if steel incorporated in to work, computed from theoretical unit mass specified in CAN/CAS-G30.18 for lengths and sizes of bars as indicated or authorized in writing by the DR. Include incidental to this unit cost the cost of installing and grouting all dowels.

PART 2 - PRODUCTS

- 2.1 Materials .1 Reinforcing Steel - to CSA G30.12 billet steel, deformed bars having yield stress of 400 Mpa.
- .2 Wire Ties - to CSA G30.3, plain, cold drawn annealed steel wire.
- .3 Supports - to CSA A23.1.
- 2.2 Fabrication .1 Ship bundles of bar reinforcement, clearly identified in accordance with bar list to be supplied upon request.

PART 3 - EXECUTION

- 3.1 Field Bending .1 Do not field bend reinforcement except where indicated or authorized by DR.
- .2 When authorized, bend without heat, applying a slow and steady pressure.
- 3.2 Placing .1 Accurately place the reinforcing steel as indicated on the drawings and hold firmly during placing, compacting and setting of the concrete.
- .2 Use approved type chairs to locate the reinforcing at the proper grade.
- .3 Tie reinforcement where spacing in each direction is:
- .1 Less than 300 mm: - tie at alternate intersections.
- .2 300 mm or more: - tie at each intersection.
- 3.3 Cleaning .1 Clean reinforcing before placing concrete to CSA A23.1.
- 3.4 Inspection .1 Do not place concrete until DR has inspected and approved reinforcement work in place.

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for supplying, placing, finishing, protecting and curing structural concrete for rehabilitation of abutments, piers, creep blocks, wing wall, girders, curbs, soffits and expansion joints.
- 1.2 Related Sections .1 Section 03 10 00 - Concrete Forms and Accessories.
.2 Section 03 20 00 - Concrete Reinforcement.
- 1.3 Measurement Procedures .1 Cast-in-place concrete: As specified including all plant, material, labour and equipment will be measured in cubic metres (m³) calculated from dimensions indicated or authorized in writing by DR.
.1 Include incidental to the work for cast-in-place concrete all cost for demolition and removal of existing concrete including surface preparation, clean reinforcing steel, bonding agent concrete finishing, formwork and accessories.
.2 No separate measurement will be made for any other ingredient or feature of the concrete work including scheduling, cold weather placement, additives, cement, aggregates, finishing, plant or labour. All such items will be considered incidental to the work, and costs included in the unit price bid for structural concrete.

- 1.4 References
 - .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A5-93, Portland Cement.
 - .2 CAN/CSA-A23.1-94, Concrete Materials and Methods of Concrete Construction.
 - .3 CAN/CSA-A23.2-94, Methods of Test for Concrete.
 - .4 CAN/CSA-A23.5-M86(R1992), Supplementary Cementing Materials.
 - .5 CAN/CSA A363-M88(R1996), Cementitious Hydraulic Slag.

- 1.5 Samples
 - .1 Submit samples in accordance with Section 01 33 00 - Submittals.

- 1.6 Certificates
 - .1 Submit certificates in accordance with Section 01 33 00 - Submittals.
 - .2 Minimum 2 weeks prior to starting concrete work submit to DR manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Blended hydraulic cement.
 - .3 Supplementary cementing materials.
 - .4 Grout.
 - .5 Admixtures.
 - .6 Aggregates.
 - .7 Water.
 - .8 Waterstops.
 - .9 Waterstop joints.
 - .10 Joint filler.
 - .11 Bonding Agent
 - .3 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.

- 1.8 Waste Management and Disposal (Cont'n) .8 Choose least harmful, appropriate cleaning method which will perform adequately.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Portland cement to CAN/CSA-A5.
 - .2 Supplementary cementing materials: to CAN/CSA-A23.5.
 - .3 Cementitious hydraulic slag: to CAN/CSA-A363.
 - .4 Water: to CAN/CSA-A23.1.
 - .5 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.
 - .6 Air entraining admixture: to ASTM C 260.
 - .7 Chemical admixtures: to ASTM C 494. DR to approve accelerating or set retarding admixtures during cold and hot weather placing.
 - .8 Curing compound: to CAN/CSA-A23.1.
 - .9 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D 1751.
 - .10 Bonding Agent
 - .1 Bonding agent to be weld-crete or approved equal.
- 2.2 Concrete Mixes
- .1 Concrete shall be mixed and proportioned in accordance to CSA A231, Clause 14.
 - .2 Proportion normal density concrete for rehabilitation of expansion joints in accordance with CSA A231 and the following requirements.

2.2 Concrete Mixes
(Cont'n)

- .1 Cement - Type 10 normal Portland Cement meeting CSA standard CAN/CSA-A5-M
 - .2 Minimum compressive strength at 28 days: 40 Mpa.
 - .3 Maximum water/cement ratio: 0.39.
 - .4 Class of exposure: C1
 - .5 Aggregate: Maximum aggregate size shall be 20 mm and the aggregate must be sound with a petrographic number not greater than 135 and an abrasion loss not greater than 35%.
 - .6 Slump at time and point of discharge: As per approved mix design.
 - .7 Air Content: $6 \pm 1\%$
 - .8 Concrete strength shall be minimum 20 Mpa in 48 hrs.
 - .9 If super plasticizers are used, the maximum slump permitted will be 90mm.
 - .10 High range water reducing agents (super plasticizers) maybe used at the contractors request if so indicated when the mix design is submitted. The contractor must demonstrate competence and experience in their use and specified approval must be obtained.
- .3 Proportion latex modified concrete for rehabilitation of abutments, curbs, soffits, piers, creep blocks, wing walls and girders in accordance with CSA A23.1 and the following requirements.
- .1 Cement: Type 10 normal Portland Cement meeting CSA Standards CAN/CSA-AS-M.
 - .2 Minimum Compressive Strength at 28 days 35 Mpa.

2.2 Concrete Mixes
(Cont'n)

- .3 Maximum water/cement ratio 0:37
 - .4 Class of exposure: C1.
 - .5 Aggregate: Maximum aggregate size shall be 10 mm, or an approved equal repair mortar.
 - .6 Slump at time and point of discharge: 125 mm ± 30mm.
 - .7 Air Content: 3% to 6%.
 - .8 Latex Emulsion: Shall have 46%-49% solids content and the latex content (solids) in the concrete shall be 15% by weight of cement.
 - .9 The use of super plasticizers to ensure the proper consolidation of concrete will be permitted subject to the DR's approval of the concrete mix design, however, the contractor must demonstrate competence and experience in their use.
 - .10 Latex modified concrete shall be mixed by mechanical mixer and placed within twenty minutes of batching.
- .4 For concrete rehabilitation at the abutments, curbs, soffits, piers, creep blocks, wing walls and girders where the thickness of repair is equal to or less than 50 mm, a one-component high performance repair mortar can be used as an alternative to latex modified concrete.

PART 3 - EXECUTION

3.1 Preparation

- .1 Obtain DR's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

3.1 Preparation
(Cont'n)

- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain DR's approval of proposed method for protection

(Cont'n)
of concrete during placing and curing in adverse weather.
- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .7 Do not place load upon new concrete until authorized by DR.
- .8 In areas of repairs no concrete shall be placed until the prepared surface to be restored is inspected and approved in writing by DR.
- .9 Apply bonding agent to all existing concrete surfaces in accordance with manufacturers instructions prior to placement of new concrete. No bonding agent is required for latex modified concrete.

- 3.2 Construction .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Sleeves and inserts.
.1 Where approved by DR, set sleeves, ties and other inserts and openings as indicated or specified elsewhere.
- 3.2 Construction .2 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from DR before placing of concrete.
.3 Check locations and sizes of sleeves and openings shown on drawings.
.4 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts.
.1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
- .4 Finishing.
.1 Finish concrete in accordance with CAN/CSA-A23.1 and as specified.
.2 Use procedures acceptable to DR or those noted in CAN/CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.
.3 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.
- 3.3 Abutment, Pier, Creep Block And Girder Rehabilitation .1 Removal and surface preparation as per Section 02 41 16 - Demolition and Removal.
.2 Concrete mix design to be in accordance with Part 2.2.3 of this specification section.

- 3.3 Abutment, Pier, Creep Block And Girder Rehabilitation (Cont'n) (Cont'n)
- .3 Latex modified concrete shall be vibrated and well consolidated to ensure all voids are removed. Finish surface for a uniform appearance and to the satisfaction of the DR.
- 3.5 Curb and Soffit Resurfacing
- .1 Removal and surface preparation as per Section 02 41 16 - Demolition and Removal.
- .2 Concrete mix design to be in accordance with Part 2.2.3 of the Specification.
- .3 The concrete shall be finished immediately after strike off before the appearance of bleed water using a magnesium float.
- .4 The surface shall not be overworked or sealed. All concrete shall be broom finished. The Contractor shall supply a 3m straight edge and the surface shall not deviate from the design grade by more than 8mm.
- .5 Two qualified concrete finisher approved by the DR shall be supplied to perform float and broom finishing.
- .6 Immediately after finishing, the Contractor shall apply an evaporation retardant and finishing aid called "Confilm" manufactured by Master Builders Company Ltd. or equivalent. The product shall be applied as per manufacturer's instructions and recommendations.
- 3.6 Expansion Joint Replacement
- .1 Removal and surface preparation as per section 02 41 16 - Demolition and Removal.
- .2 Concrete mix design to be in accordance with Part 2.2.2 of the specification.

- 3.6 Expansion Joint Replacement (Cont'n) .3 Concrete must be finished immediately after strike off before the appearance of bleed water using a magnesium float. All concrete must be broom finished. The surface shall not be overworked. The Contractor shall supply a 3m straight edge and the surface shall not deviate from the design grade by more than 8mm.
- .4 Immediately after the concrete has been placed and finished, the Contractor shall apply an evaporation retardant and finishing aid called "Confilm" manufactured by Master Builders Company Ltd. or equivalent. The product shall be applied as per manufacturer's instructions and recommendations.
- 3.7 Site Tolerance .1 Concrete tolerance in accordance with CAN/CSA-A23.1
- 3.8 Field Quality Control .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by DR in accordance with CAN/CSA-A23.1.
- .2 DR will pay for costs of tests as specified in Section 01 29 83 - Testing Laboratory Services.
- .3 DR will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .4 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.
- .5 Inspection or testing by DR will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for fabrication, supply and installation of Bridge Deck expansion joints, deck drain extensions and aluminum bridge railing.
- 1.2 References .1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.
- .2 Canadian Standards Association (CSA)
.1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
- .2 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-S16.1-94, Limit States Design of Steel Structures.
- .4 CSA W59-M1998, Welded Steel Construction (Metal Arc Welding).
- 1.3 Shop Drawings .1 Submit shop drawings in accordance with Section 01 33 00 - Submittals.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- 1.4 Protection .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

- 1.4 Protection
(Cont'n)
- .3 The expansion joint assembly shall be shipped with the preset dimensions at 50mm for 10°C unless otherwise indicated on the drawings, care shall be taken in the shipping to prevent bending, warping and damage.
 - .4 The joint assembly shall be stored such that it is protected from rusting, dirt and distortion.
- 1.5 Measurement for
Pavement
- .1 Expansion Joint: As specified including all plant, material, fabrication and labor will constitute a unit price for each joint assembly installed in the work as accepted by the DR. The assembly shall include the demolition and removal of the existing expansion joint, surface preparation, expansion joint and all related components as described herein. All concrete placed within the boxes area and outside the boxed area shall be measured as Cast-in-place Concrete in accordance with Section 03 30 33 - Cast-in-place Concrete.
 - .2 Drain Extension: As specified including all plant, materials, fabrication and labour will constitute a unit price for each extension installed in the work as accepted by the DR.
 - .3 Aluminum Bridge Railing: As specified including all plant, materials, fabrication and labor will constitute a unit price per linear meter (Lm) of each individual rail section installed in the work as accepted by the DR. The unit price shall include the demolition and removal of the existing railing and all required preparation for new post installation.
 - .4 Aluminum Bridge Posts: As specified including all plant, material, fabrication and labor will constitute a unit price for each post installed in the work as accepted by the DR. The unit price shall include the demolition and removal of the existing posts and all required preparation for new post installation.

PART 2 - PRODUCTS

2.1 Materials

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Welding materials: to CSA W59. The company undertaking welding fabrication shall be (Cont'n)

2.1 Materials
(Cont'n)

- certified in Division 1 or Division 2.1 of CSA W47.1.
- .3 Welding electrodes: to CSA W48 Series.
- .4 Type A325 anchor bolts, nuts and washers shall be of hot dipped galvanized steel in accordance with CSA G164-M.

2.2 Fabrication

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

2.3 Expansion Joints

- .1 The steel extrusion shall be zinc metalized in accordance with CSA Standard G189M providing a minimum metalized coating of 200µm.
- .2 All cut edges shall be smooth, regular and free of slag.
- .3 All holes shall be drilled and bleed holes shall be 12mm diameter.
- .4 The neoprene seal shall be continuous.
- .5 The roadway part of the expansion joint shall be bent up 150 mm at a 45 degree angle into the curb, the neoprene seal shall extend 25mm.

2.3 Expansion Joints .6
(Cont'n)

Where the expansion joint being supplied contains snow plow deflection plates, the same shall be placed parallel to the centerline of the roadway.

.7 Seal for expansion joint shall be a neoprene seal conforming to OPSS1210.

.8 The Contractor shall supply a suitable lubricant to facilitate the installation of the seal into the expansion joint rail, the lubricant shall be compatible with the neoprene seal.

.9 The expansion joint assembly shall be a mechanically locked joint of the type shown on the contract drawings or an approved equivalent. It shall be capable of satisfactory operations between -36°C and 40°C.

2.4 Aluminum Bridge .1
Railings

The posts on the bridge railing shall be permanent-mould cast from Alcan Alloy A444-2-T4 or equal.

.2 The rails on the bridge shall be extruded from Alcan Alloy 6351-T6 or equal. The rail plugs shall be cast from Alcan Alloy 356.0F or equal.

.3 The set screws on the bridge railing shall be of stainless steel

.4 Miscellaneous materials on the bridge railing shall be as noted on the contract drawings.

.1 The railing shall be fabricated strictly to the requirements given in the latest edition of the brochure "Alcan Highway Railings" published by the Extrusion Division of the Aluminum Company of Canada Limited. The type of a general arrangement for railing shall be defined in the contract. Fabrication of the railing shall be to CAN/CSA-S6-88.

.2 Before starting any work on the railing,

2.4 Aluminum Bridge Railings
(Cont'n) the Contractor shall submit six copies of shop drawings including Bill of Materials to the Engineer for approval, showing full details of the fabrication and erection of the railing.

2.5 Finishes

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/mto CAN/CSA-G164, unless otherwise noted.
- .2 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .3 Bituminous paint: to CAN/CGSB-1.108.

2.4 Isolation Coating

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

PART 3 - EXECUTION

3.1 Erection

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to DR such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Make field connections with bolts to CAN/CSA-S16.1, or weld.

- 3.1 Erection
(Cont'n)
- .6 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .7 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
- 3.2 Expansion Joint
- .1 The Contractor shall provide a technician, approved by the DR, familiar with the expansion joint assembly being installed, to supervise all works involved with its installation.
- .2 Before the placement of the expansion joint assembly, all deck concrete shall have been placed and cured for a minimum period of three days with enough area for the proper placement of the expansion joint assembly "boxes out" as per detail on contract drawings.
- .3 The expansion joint installation sequence is outlines as follows:
- .1 Install steel expansion joint assembly. Adjust for the prevailing temperature shall be made and clamps re-tightened.
- .2 Erect form work, prepare concrete surfaces, place expansion joint and dam concrete; this concrete is to be cast separately from the deck concrete. Clamps shall be removed shortly after the concrete has set.
- .3 Remove form work, polystyrene and debris, request inspection and approval to install seal from DR. The use of heat, fire, gasoline or the application of corrosive chemicals is not an acceptable means of polystyrene removal.
- .4 Install the seal in the expansion joint.
- .4 Concrete the same as the specified for the deck in accordance with Section 03 30 00

3.2 Expansion Joint
(Cont'n)

Cast-in-place concrete, shall be placed around the expansion joint in the previously boxes-out area with great care being taken during consolidation that no voids are left under the steel components.

- .5 The joint assembly shall be placed precisely as called for in the drawings and such that it will remain true to elevation and grade and remain form after the concrete has hardened. Deviation from the grade or elevation shall be cause for rejection. Rejection would mean that complete removal of the expansion joint assembly and it subsequent replacement.
- .6 After the concrete has hardened the exposed face of the seal and structural steel shapes shall be cleaned of deleterious material. Bleeder holes and bolts holes shall be cleaned and filled with an approved epoxy grout and any scratches in the metalizing shall be touched up with zinc rich touch-up paint.

3.3 Aluminum
Bridge Railing

- .1 Rail and posts shall be erected true to line and levels as shown on the drawings or as directed by the DR. Rails are to be parallel to the top of the concrete, and the posts are to be perpendicular to the concrete.
- .2 Where shims are required for the alignment of the posts, they shall be made from fully annealed allow known commercial as Alcan AA1100 or equivalent.
- .3 Surfaces of aluminum in contact with concrete shall be given a heavy coat of alkali-resistant bituminous paint prior to the installation. The paint shall be applied as it is received from the manufacturer without the addition of any thinner.
- .4 A neoprene gasket shall be placed between the aluminum post and concrete. The 4mm thick gasket shall have pre-punched holes enabling

3.3 Aluminum
Bridge Railing
(Cont'n)

it to properly fit over the anchors.

- .5 A prefabricated anchor insert of the type shown on the drawings or an approved equal, shall be used to secure the bridge railing posts to the concrete.
- .6 Nylon bushings shall be used to prevent any electro-chemical reaction occurring between the aluminum posts and the bolts. For accurately positioning the insert with the form, a setting template shall be furnished with the inset.
- .7 Railing shall be installed as indicated on the contract and shop drawings. Snug-tight bolts for the slip joints shall be extra long and have double nuts which shall be torqued up against each other while still maintaining the slip joint.
- .8 The aluminum bridge railing shall be thoroughly cleaned of all discoloration by approved methods and all marks and scratches occurring during fabrication shall be removed. The Contractor may at his own expense, apply a thin coat of clear non-yellowing lacquer to the cleaned surfaces, but he shall in any case ensure that the railings, when erected, have a clear surface of uniform appearance and texture.

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for preservative treatment by pressure impregnation to CSA 080.
- 1.2 Related Work .1 Supply and installation of guide rails: Section 02282.
- 1.3 Reference Standards .1 CSA 080 - Wood Preservation.
.2 American Wood Preservers Association (AWPA)
.3 NLGA standard grading rules for Canadian Lumber.
- 1.4 Source Quality Control .1 Ordering of material is to follow the Requirements of the contract such that field cutting of treated material is essentially avoided and is used as a last resort and only authorized by engineer.
.2 All preservation treatments, unless otherwise specified, shall be applied through the use of approved pressure, impregnation processes by licensed operators as issued by the appropriate governing authorities.
.3 All operations associated with treatment (before, during, and after treatment) shall be carried out in complete accordance with the Canadian Standards Association (CSA), Standard 080-M89, Wood Preservation, and with the American Wood Preservers Association (AWPA) Standards. These standards are complimentary and as such, the CSA standard or the AWPA standard may be considered incomplete if read separately.
- 1.5 Measurement for Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Wood Treatment in the Lump Sum portion of the work on the Bid and Acceptance Form.

PART 2 - PRODUCTS

2.1 Materials

- .1 All materials to be pressure treated with chemical preservatives shall be sound, of good quality, and of satisfactory species and grade as required in the plans and Supplementary General Conditions.
- .2 All species shall be treated with specified chemical preservatives to the required tolerances or the minimum acceptable tolerances as outlined in the CSA Standard "080-M89 Wood Preservation" and the "AWPA Standards".
- .3 These standards cannot give complete instructions for all conditions and all users. The net retention's required shall be governed by the severity of the service conditions and by a number of other considerations, such as service life desired, cost of replacement, climate, ground contact, exposure to weather, exposure to insect attack, size of material and depth of sapwood. The specified net retention's therefore, may be greater than indicated in the applicable standards and the supplementary specifications shall take precedence.

2.2 Preparation
And Handling

- .1 All materials to be pressure treated with chemicals preservatives shall be prepared in a manner as required by the particular treatment process to be undertaken and shall be in accordance with appropriate sections of the CSA and AWPA standards.
- .2 All pressure preserved materials shall be transported, stored, stacked, and handled or otherwise used in a manner that will avoid damage or field fabrication causing alterations of the original pressure preserved surface.
- .3 In particular, the use of cant hooks, peavies, pickaroons, and end hooks shall not be permitted on the side surface of treated materials. The handling of pressure preserved piles, poles, ties, lumber or timber with such pointed tools shall be confined to end grain only.

- .4 Any pressure treated materials damaged through improper handling or misuse by the Contractor, shall be repaired or replaced at cost to the Contractor under the direction of the DR.
- .5 Insofar as practicable, all adzing, boring, chamfering, framing, graining, incising, surfacing, or trimming shall be undertaken prior to treatment.

PART 3 - EXECUTION

- 3.1 Field Treatment .1 The contractor shall adhere to the following:
 - .1 Handle pressure treated material in a manner that will avoid damage which may expose untreated material. Rejection of any damaged material may result and replacement will be required at the Contractors' expense.
 - .2 Fill all bored bolt holes with preservative immediately after boring. Use a pressurized container with hose to apply preservative, or some alternate method acceptable to the DR.
 - .3 Fill all unused bored holes and spike holes with tight fitting treated wooden plugs.
- 3.2 Cutting .1 Field cuts are to receive three (3) liberal coats of the applicable preservative applied to dry wood on each application.
- 3.3 Field Quality .1 Timbers which contain rot, splits exposing untreated wood, excessive wane, or timbers which cannot be fastened in the work so as to be structurally sound are unacceptable.
 - .2 The DR reserves the right to carry out field testing of treated timber for penetration and retention of preservative. Timber not meeting the requirements of the specification may be rejected for use under the contract.

PART 1 - GENERAL

- 1.1 References
- .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
 - .2 CGSB 37-GP-9Ma-83, Primer. Asphalt, Unfilled, for Asphalt Roofing, Damp proofing.
 - .3 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
 - .4 CAN/CGSB-37.50-M89, Hot Applied, Rubberized Asphalt for Roofing and Waterproofing.
 - .5 CAN/CGSB-37.51-M90, Application for Hot-Applied Rubberized Asphalt, for Roofing and Waterproofing.
 - .6 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for use in Building Construction.
 - .7 CRCA Canadian Roofing Contactors Association.
 - .8 ASTM D2178-89 Specification for Asphalt Glass (Felt) Used in Waterproofing.
- 1.2 Shop Drawings
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittals.
- 1.3 Mock-up
- .1 Construct mock-up in accordance with Section 01 33 00 - Submittals.

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 32 11 17 - Granular Sub-Base
 - .2 Section 32 11 23 - Aggregate Base Cover
 - .3 Section 31 26 13 - Reshaping Roadway Subgrades
 - .4 Section 03 30 00 - Cast-in-place Concrete
 - .5 Section 32 12 16 - Asphalt Paving
- 1.2 References
- .1 ASTM D 4791-[89], Test Method for Flat or Elongated Particles in Coarse Aggregate.
- 1.3 Samples
- .1 Submit samples in accordance with Section 01 33 00 - Submittals.
 - .2 Allow continual sampling by DR during production.
 - .3 Provide DR with access to source and processed material for sampling.
 - .4 Install sampling facilities at discharge end of production conveyor, to allow DR to obtain representative samples of items being produced. Stop conveyor belt when requested by DR to permit full cross section sampling.
 - .5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
- 1.4 Measurement For Payment
- .1 No separate measurement for payment shall be made for items under this section. Include costs for Aggregate Materials in the Lump Sum portion of the work on the Bid and Acceptance Form.

PART 2 - PRODUCTS

2.1 Materials

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D 4791.
 - .1 Greatest dimension to exceed five times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .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.

2.2 Source Quality Control

- .1 Inform DR of proposed source of aggregates and provide access for sampling at least 2 weeks prior to commencing production.
- .2 If, in opinion of DR, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .3 Advise DR 2 weeks in advance of proposed change of material source.

- 2.2 Source Quality Control (Cont'd) .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.

PART 3 - EXECUTION

- 3.1 Preparation .1 Processing
- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by DR.
 - .3 Wash aggregates, if required to meet specifications. Use only equipment approved by DR.
 - .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.
- .2 Handling
- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- .3 Stockpiling
- .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by DR. 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 300mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300mm of pile into work.
 - .5 Separate different aggregates by strong,

3.1 Preparation
(Cont'd)

(Cont'd)

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 DR within 48h of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:

.1 Max 1.5m for coarse aggregate and base course materials.

.2 Max 1.5m for fine aggregate and sub-base materials.

.3 Max 1.5m 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.

3.2 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 DR.

.3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

- 1.1 Description .1 This section specifies requirement for re-compacting and reshaping of existing granulars, to lines and grades established by DR.

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 35 14 - Special Procedures: Traffic Controls.

- 1.2 References .1 ASTM D 698-91(1998), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m).

- 1.3 Definitions .1 Reshaping subgrade: scarifying, pulverizing, blading, reshaping and recompacting existing subgrade surface.

- 1.4 Measurement For Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Reshaping Roadway Subgrade in the Lump Sum portion of the work in the Bid and Acceptance Form.

PART 2 - PRODUCTS

- 2.1 Not Used .1 Not used.

PART 3 - EXECUTION

- 3.1 Scarifying and Reshaping .1 Scarify subgrade to full width as directed by DR and to minimum depth of 150 mm.
.2 Pulverize and break down scarified material except that stones larger than this size may be left intact as directed by DR.

- 3.1 Scarifying and Reshaping (Cont'n)
- .3 Blade and trim pulverized material to elevation and cross section dimensions as directed by DR.
 - .4 Where deficiency of material exists, add and blend additional subgrade material as directed by DR.
 - .5 Re-use excess material in areas of material deficiency. Blade excess material over shoulder and trim, as directed by DR.
- 3.2 Compacting
- .1 Compact to density not less than 100% corrected maximum dry density.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade surface.
 - .3 Apply water as necessary during compaction to obtain specified density.
 - .4 If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected to the optimum value for compaction in accordance with ASTM D 698.
- 3.3 Site Tolerances
- .1 Reshaped compacted surface to be within plus or minus 10 mm of elevation as indicated, or as directed by the DR.
- 3.4 Protection
- .1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until DR acceptance.

PART 1 - GENERAL

- 1.1 Related Work .1 Section 02 41 16 - Demolition and Removal
.2 Section 32 12 16 - Asphalt Paving
- 1.2 Measurement for Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for pavement cleaning and marking removal in the lump sum portion of the work on the Bid and Acceptance Form.

PART 2 - PRODUCTS

- 2.1 Materials .1 Abrasives and solvents used for removal of paint, oil, grease, rubber deposits: proprietary products specially designed for pavement cleaning, subject to approval by DR.

PART 3 - EXECUTION

- 3.1 Removing Pavement Markings .1 In areas designated by DR remove rubber tire deposits and paint markings by sand, water shot blasting, rotary grinding, heater planing or other method approved by DR.
.2 Exercise care to avoid dislodging of coarse aggregate particles, excessive removal of fines, damage to bituminous binder or damage to joint and crack sealers.
.3 When using heater planing equipment, do not heat pavement surfaces above 120 C.
- 3.2 Pavement Surface Cleaning .1 Where directed by DR remove sealing compound which has protruded excessively. Dispose of removed material as directed by DR.

- 3.2 Pavement Surface Cleaning
(Cont'n)
- .2 Remove dust, contaminants, loose and foreign materials, oil and grease, in areas designated and by method approved by DR.
 - .3 Use rotary power brooms and/or vacuum sweepers supplemented by hand brooming.

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 32 11 19 - Granular Sub-base
 - .2 Section 32 11 23 - Aggregate Base Course
- 1.2 Measure For Payment
- .1 No separate measurement for payment shall be made for granular base material. Include all costs in the lump sum portion of the work on the Bid and Acceptance Form.
 - .2 No separate measurement for payment shall be made for the excavation of base materials to correct deficiencies in grade. Include all costs in the lump sum portion of the work on the Bid and Acceptance Form.
- 1.3 References
- .1 ASTM C 117-90, Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131-89, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136-92, Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 698-91, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft) (600 kN-m/m).
 - .5 ASTM D 1557-91, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft) (2,700 kN-m/m).
 - .6 ASTM D 1883-92, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D 4318-84, Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.3 References
(Cont'n)

(Cont'n)

- .8 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire, Inch Series.
- .9 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.

1.4 Delivery, Storage, and Handling

- .1 Deliver and stockpile aggregates in accordance with Section [31 05 17 - Aggregates Materials]. Stockpile minimum 50% of total aggregate required prior to commencing operation.
- .2 Store cement in weather tight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment.

PART 2 - PRODUCTS

2.1 Materials

- .1 Granular base: material to Section 31 05 17 - 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.
- .2 Gradation to: Department of Transportation and Works Standards except that percentage finer than 0.075 mm not to exceed 8%.
- .3 Liquid limit: to ASTM D 4318, maximum 25
- .4 Plasticity index: to ASTM D 4318, maximum 6
- .5 Los Angeles degradation: to ASTM C 131. Max. % loss by weight: 35
- .6 Crushed particles: at least 60% of particles by mass within each of following sieve designation ranges to have at least

2.1 Materials
(Cont'd)

(Cont'n)

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

- .7 Soaked CBR: to ASTM D 1883, min 100, when compacted to 100% of ASTM D 1557.

PART 3 - EXECUTION

3.1 Sequence of Operation

- .1 Place granular base after sub-base surface is inspected and approved by DR.
- .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 Place material using methods which do not lead to segregation or degradation of aggregate.
- .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. DR may authorize thicker lifts (layers) if specified compaction can be achieved.
- .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.

-
- 3.1 Sequence of Operation (Cont'n)
- .3 Compaction Equipment
 - .1 Compaction equipment to be capable of obtaining required material densities.
 - .4 Compacting
 - .1 Compact to density not less than 100% corrected maximum dry density
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by DR.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- 3.2 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.
- 3.3 Protection
- .1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by DR.

PART 1 - GENERAL

- 1.1 Summary
- .1 This method covers measurement of loss of Marshall Stability resulting from action of water on compacted asphalt paving mixtures containing penetration grade asphalt cement.
 - .2 Numerical index of retained stability is obtained by comparing stability of specimens determined in accordance with usual Marshall procedures with stability of specimens that have been immersed in water for prescribed period.
- 1.2 References
- .1 ASTM D1559-89, Test Method for Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.
- 1.3 Measurement For Payment
- .1 No separate measurement for payment shall be made for items under this section. Include costs for Marshall Immersion Test in the Lump Sum portion of the work on the Bid and Acceptance Form.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Representative samples of each asphalt paving mixture proposed for use on project.
- 2.2 Equipment
- .1 One or more water baths with automatic controls for immersing specimens. Baths normally used for Marshall test are suitable for test.
 - .2 Scale and water bath with suitable accessory equipment for weighing test specimens in air and in water to determine their densities.
 - .3 Flat transfer plates of glass or metal. Keep one plate under each specimen during

2.2 Equipment
(Cont'n)

(Cont'n)
immersion period and during subsequent handling, except when weighing and testing, to prevent breakage or distortion of specimens.

- .4 Apparatus required to conduct Marshall test.

PART 3 - EXECUTION

3.1 Preparation of Test Specimens

- .1 Prepare at least 8 specimens for each test in accordance with ASTM D1559, except where specified otherwise.

3.2 Test Procedure

- .1 Do Marshall testing in accordance with ASTM D1559, except where specified otherwise.
- .2 Weigh each specimen in air and in water. Weigh in water as rapidly as possible to minimize absorption.
- .3 Calculate specific gravity of each specimen as follows:

$$\text{Specific Gravity} = \frac{A}{A-B}$$

Where A = weight of specimen in air in grams
B = weight of specimen in water in grams

- .4 Sort each set of 8 specimens into 2 groups of 4 specimens each so that average specific gravity of specimens in group 1 is essentially same as that of group 2.
- .5 Test group 1 specimens for Marshall stability. Calculate S1 = Marshall stability of group 1 (average).
- .6 Immerse group 2 specimens in water for 24 h at 60 C, then test immediately for Marshall stability. Calculate S2 = Marshall stability of group 2 (average).

3.3 Test Report

- .1 Report all test results to DR
- .2 Report numerical index of retained stability as resistance of asphaltic paving mixtures to detrimental effect of water, expressed as percentage of original stability retained after immersion period.
- .3 Calculate index as follows:

$$\text{Index of Retained Stability} = \frac{S_2}{S_1} \times 100$$

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 32 01 12 - Pavement Cleaning and Marking Removal.
 - .2 Section 32 12 16 - Asphalt Paving.
- 1.2 Measurement for Payment
- .1 No separate measurement for payment shall be made for items under this section. Include all costs for Asphalt Tack Coat, Incidental to the unit of measure for asphalt paving as per section 32 12 16 - Asphalt Paving.
- 1.3 References
- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM D 140-93, Practice for Sampling Bituminous Materials.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.
- 1.4 Quality Assurance
- .1 Upon request by DR, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this section.
- 1.5 Delivery, Storage and Handling
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- 1.6 Waste Management and Disposal
- .1 Separate and recycle waste materials.
 - .2 Place materials defined as hazardous or toxic waste in designated containers.
 - .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade SS-1h.
 - .2 Water: clean, potable, free from foreign matter.

PART 3 - EXECUTION

- 3.1 Equipment
- .1 Pressure distributor to be:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m.
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .2 Equipped with meter, registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
 - .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.

3.1 Equipment
(Cont'n)

- .4 Equipped with an easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
- .5 Equipped with accurate volume measuring device or calibrated tank.
- .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
- .7 Equipped with nozzle spray bar, with operational height adjustment.
- .8 Cleaned if previously used with incompatible asphalt material.

3.2 Application

- .1 Apply asphalt tack coat only on clean and dry surface. Obtain DR's approval of surface before applying asphalt tack coat.
- .2 Dilute asphalt emulsion with water at 1:1 ratio for application. Mix thoroughly by pumping or other method approved by DR.
- .3 Apply asphalt tack coat evenly to pavement surface at rate as directed by DR, but do not exceed 0.7 L/m.
- .4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.
- .5 Do not apply asphalt tack coat when air temperature is less than 10C or when rain is forecast within 2 hours of application.
- .6 Apply asphalt tack coat only to surfaces that are expected to be overlayed on same day.
- .7 Evenly distributes localized excessive deposits of tack coat by brooming as directed by DR.
- .8 Where traffic is to be maintained, treat no

3.2 Application
(Cont'n)

(cont'n)

more than one half of width of surface in one application.

- .9 Keep traffic off tacked areas until asphalt tack coat has set.
- .10 Re-tack contaminated or disturbed areas as directed by DR.
- .11 Permit asphalt tack coat to set before placing asphalt pavement.

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 32 11 23 - Aggregate Base Course
 - .2 Section 32 12 15 - Asphalt Tack Coat
 - .3 Section 32 17 23 - Painted Traffic Lines and Markings.
- 1.2 Reference Standards
- .1 Government of Newfoundland and Labrador, Department of Transportation and Works, specifications book.
- 1.3 Product Data
- .1 Submit product data in accordance with Section 01 33 00 - Submittals and consistent with Newfoundland and Labrador Department of Transportation and Works.
 - .2 Submit asphalt concrete mix design to DR for approval.
 - .3 Materials to be tested by accredited testing laboratory.
 - .4 Submit test certificate showing suitability of materials at least 1 week prior to commencing work.
- 1.4 Samples
- .1 Submit samples in accordance with Section 01330 - Submittal Procedures.
 - .2 Inform DR of proposed source of aggregates to provide access for sampling.
- 1.5 Measurement For Payment
- .1 Asphalt Paving: As specified including all plant, material, labour and equipment will be measured in tonnes of asphalt paving installed to the compacted thickness indicated on the drawings.
 - .1 Include incidental to the work for asphalt paving all costs for demolition and removal of existing asphalt including surface preparation, asphalt tack coat and joint sealing.

PART 2 - PRODUCTS

2.1 Materials

.1 Aggregate base course and sub-base material:
to Section 32 11 23 - Aggregate Base Course
Section 32 11 19, Granular Sub-base and
following requirements:

- .1 Crushed or screened stone, gravel or sand.
- .2 Gradations: with limits specified when tested to ASTM C 136 and ASTM C 117, Sieve sizes to CAN/CGSB-8.1.

.2 Asphalt concrete aggregates:

- .1 Coarse aggregate is aggregate retained on 4.75 mm sieve and fine aggregate passing 4.75 mm sieve when tested to ASTM C 117.
- .2 When dryer drum plant or plant without hot screening is used. Process fine aggregate through 4.75 mm sieve and stockpile separately from coarse aggregate.
- .3 Do not use aggregates having known polishing characteristics in mixes for surface courses.
- .4 Aggregate: material to Section 31 05 17 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 117. Sieve sizes to CAN/CGSB-8.1

Sieve <u>Designation</u>	%Passing Asphalt Concrete (Surface)
19.0mm	100
12.5mm	100

2.1 Materials
(Cont'n)

(Cont'n)

9.5mm

4.75mm

55-75

2.00mm

35-55

0.425mm

18-30

0.180mm

0.075mm

4-10

Asphalt Content 5.5-7.5

(% by weight of total mixture)

.3 Physical requirements for coarse aggregate:

.1 Magnesium Sulphate soundness: to ASTM C 88. Max % loss by weight: coarse aggregate 12, fine aggregate 16.

.2 Los Angeles Degradation: to ASTM C 131. Max % loss by weight: coarse aggregate, 35.

.3 Absorption: to ASTM C 127. Max % by weight: coarse aggregate, 1.75.

.4 Flat and elongated particles: to ASTM D 4791, (with length to thickness ratio greater than 5): Max % by weight: coarse aggregate, 10.

.5 Crushed particles: at least 90% of particles by mass within each of the 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>
19mm	to	9.5mm
9.5mm	to	4.75mm

.6 Petrographic number: to CSA A23.2-15A. Maximum 135.

.7 Freeze-thaw test: to CSA A23.2-24A.

.8 Loss by washing: to ASTM C117: maximum % passing 1.75.

.9 Micro Deval: to MTD LS-618, % max, 2.

2.1 Materials
(Cont'n)

(Cont'n)

- .10 Regardless of compliance with specified physical requirements, aggregates may be accepted or rejected on basis of past field performance.

- .4 Mineral filler for asphalt concrete:
 - .1 Finely ground particles of limestone, hydrated lime, Portland cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.
 - .2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed by Engineer to improve mix properties.

- .5 Asphalt cement: to CAN/CGSB-16.3, grade PG 58-28.

- .6 Physical requirements of fine aggregate:
 - .1 Micro-Deval test for fine aggregate: to CSA A23.2-23A, % maximum, 20.
 - .2 Plasticity Index: to ASTM D4318: 0

- .7 Blending Sand:
 - .1 Blending sand shall consist of clean, tough, rough, surfaced grains, free from clay, loam or any other foreign matter.
 - .2 The gradation of the blending sand shall be such that when used in the asphalt mix, the resulting mix shall meet the requirements of this specification. In any case, the blending sand shall have 100% (by dry weight) passing the 12.5 mm sieve and at least 50% (by dry weight) passing 0.425 mm sieve.

2.1 Materials
(Cont'n)

.8 Joint Sealant:

- .1 The sealant shall be hot-poured, rubberized joint and crack sealant conforming to ASTM Specification D-3405 such as Hydrotech 6165 and Bakelite 590-13A, or approved equivalent.
- .2 Neat cement or agricultural lime will be required to sprinkle over sealed joints to prevent tacking.

2.2 Mix Design

- .1 Mix design to Asphalt Institute MS-2.
- .2 Job mix formula to be approved by Engineer.
- .3 Design of mix: by Marshall method to requirements below:

- .1 Compaction blows on each face of test specimens: 50.
- .2 Mix physical requirements:

<u>Property</u>	<u>Asphalt</u>	<u>Concrete</u>
Marshall	8000	
Stability at 60 EC.kN Minimum		
Flow Value	2.5-4.25 mm	
Air Voids in Mixture %	3-5	
Voids in Mineral Aggregate % Minimum	15	
Index of Retained Stability % Minimum	70	

- .3 Measure physical requirements as follows:
 - .1 Marshall load and flow value: to ASTM D 1559.
 - .2 Air voids: to ASTM D 3203.
 - .3 Voids in mineral aggregate: to Asphalt Institute, MS-2, Chapter 4.

- 2.2 Mix Design
(Cont'n)
- .4 Index of Retained Stability: measure in accordance with Section 02703 - Marshall Immersion Test.
- .4 Do not change job-mix without prior approval of Engineer. When change in material source proposed, new job-mix formula to be approved by Engineer.

PART 3 - EXECUTION

- 3.1 Surface Preparation and Inspection
- .1 Verify grades of subgrade drains and other items set in paving area for conformity with elevations and sections before placing granular base and sub-base material.
- .2 Obtain approval of subgrade by DR before placing granular base.
- 3.2 Granular Sub-Base & Base
- .1 Place granular sub-base and base material on clean surface.
- .2 Place in layers, not exceeding 150 mm compacted thickness. Place granular base and sub-base to compact thickness as indicated. Do not place frozen material. Compact to density not less than 100 & maximum dry density in accordance with ASTM D 698.
- .3 Finished base surface to be within 10 mm of specified grade, but no uniformly high or low.
- 3.3 Plant and Mixing Requirements
- .1 To ASTM D 995.
- 3.4 Equipment
- .1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

- 3.4 Equipment
(Cont'n)
- .2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
 - .3 Vibratory rollers for parking lots and driveways:
 - .1 Minimum drum diameter 750 mm.
 - .2 Maximum amplitude of vibration (machine setting): 0.5 mm for lefts less than 40 mm thick.
 - .4 Haul trucks: to sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
 - .5 Suitable hand tools.
 - .6 Router to be a Crafcro Router, or equivalent having a small, saw like cutter wheel head mounted between the wheels for high degree of maneuverability to follow joints, cutting the pavement aggregate without tearing, chipping or spalding pavement edges. Equipment must produce clean, neat, square cut with vertical sidewalls.
 - .1 Router to be capable of cutting a groove as shown in the drawings.
 - .2 Open "V" shaped grooves not permitted.
 - .3 Vertical bit routers not permitted.
 - .7 A compressor is required to clean joints. The compressor shall provide an oil free air jet of at least 2.1 m³/min at a pressure of at least 500 KPa.

- 3.4 Equipment (Cont'n)
- .8 A hot compressed air lance is required to clean, dry and pre-heat joints prior to applying sealant. The machine shall be capable of applying a blast of air of at least 900 m/s with a temperature of 1560°C.
- .9 The sealant applicator shall be portable rubber tired melting kettle of the double boiler, indirect heating type using a hot flash point oil (min. 315°C) as the heat transfer medium.
- .1 The melting equipment shall be portable, rubber tired melting kettle of the double boiler, indirect heating type using a hot flash point oil (min 315°C) as the heat transfer medium.
- .2 The kettle shall have a positive mechanically operated agitator to keep sealant material under constant movement in kettle during and throughout heating.
- .3 Kettle to be equipped with thermometers and controls to maintain the correct temperature for both the sealant compound and the heat transfer oil.
- .4 The application shall be by a pressure applicator nozzle, or nozzles, from standard pouring pots with 15 mm spout, or by means of a hose and application wand from a low pressure pump on the melter.
- 3.5 Asphalt Concrete Paving
- .1 Obtain approval from DR before placing asphalt mix.
- .2 Place asphalt mix only when base or previous course is dry and air temperature is above 5°C.
- .3 Place asphalt concrete in compacted layers not exceeding 50 mm.

3.5 Asphalt
Concrete Paving
(Cont'n)

- .4 Minimum 135°C mix temperature required when spreading.
- .5 Maximum 160°C mix temperature permitted at any time.
- .6 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .7 Compact asphalt concrete to density not less than 97% of density obtained with Marshall specimens prepared in accordance with ASTM D 1559 from samples of mix being used. Roll until roller marks are eliminated.
- .8 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .9 Moisten roller wheels with water to prevent pick up of material.
- .10 Compact mix with hot tempers or other equipments approved by DR, in areas inaccessible to roller.
- .11 Finish surface to be within 10 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.
- .12 Repair areas showing checking, rippling, or segregation as directed by DR.

3.6 Joint Sealing

- .1 The routed joints are to be thoroughly cleaned of residual dust and debris immediately prior to sealing using the compressor. The Contractor shall remove any dampness and dry the cleaned crack with hot compressed air lance as required to ensure good sealant bond.
- .2 The contractor shall fully comply with the sealant manufacturer's instructions for heating and preparing sealant compound for application using the specified equipment.

3.6 Joint Sealing
(Cont'n)

- .3 All joints shall be carefully inspected prior to sealing to ensure they are thoroughly dry, clean and free from dust and debris. Adjacent pavement surface must also be clean and dry.
- .4 The sealant compound shall not be applied when the ambient temperature is below 10°C.
- .5 The sealant compound shall not be applied with evidence of any dampness on or within the pavement or in the pavement pores.
- .6 No sealing shall proceed under unfavorable conditions having regard to the foregoing stipulations, until same have been rectified to the satisfaction of the Engineer.
- .7 The liquid sealing compound shall be poured into the prepared joints in a neat and workmanlike manner, taking care so that when dry the sealant fills the joints but does not extend above the existing asphalt. See details on drawings. Should the sealant extend above the pavement at any places, then the sealant shall be removed and replaced at the Contractors expense. Care shall be taken to avoid spillage of the sealant on the pavement. Should spillage occur, then the Contractor shall clean it up at his own expense.
- .8 To prevent tacking prior to curing, the Contractor shall sprinkle sealant with Portland Cement, neat cement or agricultural lime stone as traffic warrants.
- .9 Should the liquid sealing compound applied to the joints be below the desired cross section of the seal, a second application of joint sealant shall be carried out with the use of pour pots.

3.7 Joints

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
- .2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
- .3 For cold joints cut back to full depth vertical face and tack face with hot asphalt.
- .4 For longitudinal joints, overlap previously laid strip with spreader by 25 to 50 mm.

3.8 Testing

- .1 Inspection and testing of asphalt pavement will be carried out by designated testing laboratory.

3.9 Protection

- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled before 38°C. Do not permit stationary loads on pavement until 24 hours after placement.
- .2 Arrange paving schedule so as not to interfere with normal use of premises and vehicular and pedestrian traffic.

PART 1 - GENERAL

- 1.1 Related Work .1 Section 32 12 16 - Asphalt Paving
- 1.2 References .1 CAN/CGSB-1.5-M91, Low Flash Petroleum Spirits Thinner.
- .2 CGSB 1-GP-12c-68, Standard Paint Colours.
- .3 CGSB 1-GP-71-83, Method, of Testing Paints and Pigments.
- .4 CGSB 1-GP-74M-79, Paint, Traffic, Alkyd.
- 1.3 Samples .1 Submit samples in accordance with Section 01 33 00 - Submittals.
- .2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.
- 1.4 Measurement for Payment .1 No separate measurement for payment shall be made for items under this section. Include costs for Painted Traffic Lines and workings in the lump sum portion of the work on the Bid and Acceptance Form.

PART 2 - PRODUCTS

- 2.1 Materials .1 Paint:
- .1 To CGSB 1-GP-74M, alkyd traffic paint.
- .2 Colour: to CGSB 1-GP-12C, yellow 505-308. black 512-301, white 513-301.

2.1 Materials
(Cont'n)

.3 Upon request, DR will supply a qualified product list of paints applicable to work. Qualified paints may be used but DR reserves right to perform further tests.

.2 Thinner: to CAN/CGSB-1.5.

PART 3 - EXECUTION

3.1 Equipment
Requirements

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

3.2 Condition of
Surfaces

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

3.3 Traffic Control

.1 Traffic control to be in accordance with Section 01 35 14 - Special Procedures: Traffic Control.

3.4 Application

.1 Unless otherwise approved by DR, apply paint only when air temperature is above 10C, wind speed is less than 60km/h and no rain is forecast within next 4h.

.2 Apply traffic paint evenly at rate of 3m/L.

.4 Do not thin paint unless approved by DR.

.5 Symbols and letters to conform to dimensions indicated.

.6 Paint lines to be of uniform colour and density with sharp edges.

-
- 3.4 Application (Cont'n) .7 Thoroughly clean distributor tanks before refilling with paint of different colour.
- 3.5 Tolerance .1 Paint markings to be within plus or minus 12mm of dimensions indicated.
- .2 Remove incorrect markings in accordance with Section 32 01 12 - Pavement Cleaning and Marking Removal.
- 3.6 Protection of Completed Work .1 Protect pavement markings until dry.

PART 1 - GENERAL

- 1.1 Description .1 This section specifies the requirements for the supply and installation of guide rails.
- 1.2 Measurement For Payment .1 Guide Rail: Measurement for payment for the supply and installation of guide rail shall be the length of guide rail placed within the limits specified or designated by the DR, measured in metres, rounded to one decimal place, measured end to end along the face of the railing and terminal sections. Payment by the metre shall include the demolition and removal of existing guide rail and posts, excavation for new post holes, supply and install all posts, anchors, rail section, angled rail sections, rail terminal sections, buried ends, bolts, nuts, washers, spikes, and nails, the backfill of post holes, compaction of backfill, the disposal of waste material, the trimming of posts, the supply and application of wood preservative, the installation of reflectors, the cleaning, pre-treatment and coating of steel rail with col galvanizing compound where so required, all in accordance with this specification.
- .2 Guide Rail End Block Connection: Measurement for payment to be made for each guide rail end shoe securely attached to the concrete bridge end block. Payment by each shall include all fasteners, washers and chemical anchors.

PART 2 - PRODUCTS

- 2.1 Materials .1 Guide rail parts furnished under this section shall be interchangeable with similar parts regardless of their source of manufacture.

- 2.1 Materials (Cont'n)
- .1 The rail elements shall consist of a corrugated steel W-beam with corrugations symmetrical about the horizontal axis and such that the edges and centre of the rail element may contact each post.
 - .2 The individual rail elements shall be of the W-beam type consisting of 2.75 mm thick and 3.5 mm thick rail of length not less than 4125 mm, having post bolt slots 3810 mm apart centre to centre, unless indicated elsewhere in which case one additional post bolt plot will be placed at mid-span.
 - .3 The rail metal shall be open hearth oxygen furnace or electric furnace steel having an elongation of not less than 12 percent in 50 mm and shall withstand cold bend, without cracking, or 180° around a mandrel of a diameter equal to 2^{1/2} times the thickness of the plate.
 - .4 The rail elements shall be hot-dip galvanized before or after fabricating in accordance with ASTM A-525 (Class 2^{1/2} oz.) Or A123.
 - .5 Rail element joints shall be capable of withstanding a tensile load of not less than 350 kN without failure. The rail element shall not deflect more than 140 mm when tested as a simple beam with the traffic face up and with a 8.9 kN load applied at the centre of a 3650 mm span through a 76 mm wide flat bearing.
 - .6 Workmanship shall be equivalent to good commercial practice and all edges, bolt holes and surfaces shall be free of torn metal, burns, sharp edges and protrusions.
 - .7 Rail sections shall be supplied by the Contractor.

- 2.1 Materials (Cont'n)
- .8 Two (2) certified copies of mill test reports of each batch from which the rail element is formed, shall be furnished to the DR, if required.
- .2 Angled rail sections shall be manufactured to meet the dimensions as shown on drawings. The sections shall be shop fabricated from rail sections conforming to the requirements. No punching, cutting or welding will be permitted in the field.
- .1 The weld shall be cleaned, pre-treated and coated with cold galvanizing compound as outlined.
- .2 Where corrugated steel beam is cut with a saw, drilled or welded, the beam shall be thoroughly cleaned with a wire brush to remove scale, ruse, slag residue, weld splatter, etc. and wiped clean. The cleaned surface shall receive at least one (1) application of metal conditioner to de-oxidize, de-grease and phosphatize the metal surface to be treated if the surface is oily. Pre-mixed, ready to apply liquid zinc compound should be applied to the prepared, clean, dry metal surface. The cold galvanizing compound must be of a type that imports cathodic action against corrosion. The cold-galvanizing compound should have a minimum 50 mm overlap of the surrounding undamaged galvanized steel.
- .3 Both metal conditioner and cold-galvanizing compound must be approved by Underwriters Laboratories Inc. for component coatings-organic and meet or exceed in accordance with the manufacture instructions.
- .4 The Contractor shall supply the angled sections.

2.1 Materials
(Cont'n)

- .3 Rail terminal sections shall be illustrated on the drawings. The metal and galvanizing shall be of the same thickness and quality as is stipulated for the rail sections. The Contractor shall supply the terminal sections.
- .4 All bolts, nuts and washers shall conform to the specifications of ASTM A307 or A325, except the rail splice bolts shall be button headed.
 - .1 Post bolts and splice bolts shall have shoulders of such shape and size that they fit into the bolt slot in the rails and prevent the bolt from turning.
 - .2 Post bolts shall be 16 mm diameter and 500 mm long for use with 200 mm x 200 mm posts and 200 mm blocking.
 - .3 Post bolt washers for the back of posts shall be 45 mm in diameter and 4 mm thick.
 - .4 Bolts for anchors shall be 16 mm diameter and 350 mm long for use with 150 mm x 150 mm posts and anchors. Washers shall be 45 mm round and 4 mm thick.
 - .5 Splices for anchors shall be 125 mm galvanized spikes.
 - .6 Bolts, nuts, washers and other fittings shall be hot-dip galvanized in accordance with ASTM A-153.
 - .7 The Contractor shall supply the bolts, nuts, washers and spikes.
 - .8 Connection for Guide Rail end shoe shall consist of Hilti Hit C-100 chemical anchors and 19.05 mm galvanized A307 steel bolts with S.A.E A325 38.10 mm O.D.x 20.64 mm I.D. x 3.18 mm thick type 1 hardened round galvanized washers.

2.1 Materials
(Cont'n)

- .5 Silver signal reflectors and yellow signal reflectors shall be of size 75 mm x 100 mm. The Contractor shall supply both types of signal reflectors.
- .6 Nails for securing signal reflectors shall be supplied by the Contractor and shall consist of 30 mm galvanized flat head nails.
- .7 Timber for posts and anchors shall be sound, well-seasoned structural grade lumber.
 - .1 Posts shall have minimum dimensions of 200 mm x 200 mm x 2100 mm.
 - .2 Anchors shall consist of either one piece of guide rail post cut 450 mm long or two pieces of 38 mm x 140 mm x 450 mm lumber.
 - .3 After cutting to size, posts and anchors shall be pressure treated with wood preservative. The minimum weight of preservative retained per cubic metre of timber shall be 130 kg with empty cells.
 - .4 The Contractor shall supply all the required wood preservative treated posts and anchors.
- .8 Field treatment of wood preservative to be in accordance with CSA 080.

PART 3 - EXECUTION

3.1 Installation

- .1 Galvanize materials shall be loaded, hauled and handled in such a manner that galvanizing will not be damaged. All bare, abraded, and damaged surfaces shall be cleaned, pre-treated if required and coated with cold galvanizing compound as outlined above.
- .2 Guide rail shall be placed to lengths, lines and grades set by DR. Except where directed otherwise by the DR, the guide rail shall be installed in accordance with the requirements of the drawings.

- 3.1 Installation (Cont'n)
- .3 An angled rail section shall be placed on the approaching traffic end of a run of guide rail and terminal section shall be placed at the other end, unless directed otherwise by the DR.
 - .4 The end post at an angled rail section shall have an anchor secured to the bottom of the post.
 - .5 Where a 150 mm x 150 mm x 450 mm timber anchor is used it shall be secured to the post by means of a galvanized nut and 16 mm diameter bolt 3560 mm long together with two (2) 45 mm round, 4 mm thick galvanized washers.
 - .6 Where a double 38 mm x 140 mm x 450 mm timber anchor is used it shall be secured to the post by means of four (4) 125 mm galvanized spikes.
 - .7 Field boring and cutting to length of anchors will be permitted provided that the hole is treated with two (2) coats of wood preservative before driving the bolts and provided that the cut end is treated with two (2) coats of wood preservative before burying.
 - .8 The Contractor shall excavate the holes for the posts such that when placed in the holes the bottom of the posts are at least 1000 mm below the ground surface.
 - .9 Posts shall be set plumb and to the established lines and grades and shall be placed at 3810 mm intervals, unless directed otherwise by the DR.
 - .10 The posts shall be firmly backfilled with selected material, free of large rock, placed in layers of thickness and not greater than 100 mm. Each layer shall be thoroughly compacted before the next layer is placed. Should the backfill be dry then each later shall be moistened before tamping.
 - .11 All backfill shall be compacted to 95% of Standard Proctor Density (ASTM D698-78).

- 3.1 Installation
(Cont'n)
- .12 All excavated waste material shall be disposed of along the sides of fill, or in other locations as directed by DR.
 - .13 The rails shall be secured to even lines such that the centre of the rail is 500 mm above the edge of pavement.
 - .14 The Contractor shall bore holes in the posts for the post bolts and treat the holes with two (2) coats of wood preservative before driving the bolts.
 - .15 Rail elements and terminal sections shall be lapped so that the exposed ends will not face approaching traffic.
 - .16 The bolted connections of the rail element to the post shall be capable of withstanding a 22.5 kN pull at right angle to the lines of the railing.
 - .17 When the attachment of the rail elements to the posts has been completed, the tops of the posts shall be cut to a point 75 mm above the top of the rail as shown on drawings. The tops of the posts shall be treated with two (2) coats of wood preservative after cutting.
 - .18 Signal reflectors shall be attached to posts at terminal sections, posts at the welded angled sections and to every fourth post in a length of guide rail. Silver reflectors shall be placed facing oncoming traffic and yellow reflectors shall be placed on the opposite side.
 - .19 The Contractor shall drill nail holes in the reflectors, bend the reflectors to the required shape and secure the reflectors with 20 mm galvanized flat head nails as shown on drawings.
 - .20 The Guide Rail end shoe connection shall be completed as detailed on the drawings.