SPECIFICATIONS

FOR

BROAD COVE BRIDGE (EASTPORT) - REHABILITATION
PARKS CANADA
TERRA NOVA NATIONAL PARK, NL

ISSUED FOR TENDER

PCA Project No.: RPA-675
Date: March 22, 2016

Specifications
Issued for Tender

PARKS CANADA
Broad Cove Bridge (Eastport) - Rehabilitation, Terra Nova National Park

Standing Offer Agreement: 5P301-14-0001/004
PCA Project No.: RPA-675

REGISTERED PROFESSIONAL ENGINEER
J.-M. CHEVARIE
SIGNATURE
Mar 22, 2016
DATE
NEWFOUNDLAND & LABRADOR

Jean-Maurice Chevarie

Jean-Maurice Chevarie, P. Eng.
Senior Structural Engineer
Valron Engineers Inc.

PROVINCE OF NEWFOUNDLAND
PERMIT HOLDER
This Permit Allows
Valron Engineers Inc.
To practice Professional Engineering in Newfoundland and Labrador.
Permit No. as issued by APEGN K0005
which is valid for the year 2016

PARKS CANADA

BROAD COVE BRIDGE (EASTPORT) REHABILITATION, TERRA NOVA NATIONAL PARK, NL

Crandall Engineering Ltd. & Valron Engineers Inc. **Issued for Tender – Technical Specifications**						
	Prepared by	**Init**	**Date**	**Checked by**	**Init**	**Date**
Structural	Reno Fortin	RF	22/03/2016	Bruce Baird (Front End)		21/03/2016
Project Manager	Lisa Grasse		22/03/2016	Jean-Maurice Chevarie (Technical)		22/03/2016

List of Appendices

PART 1 – GENERAL

1.1 Description of Work_ .1 The work will be carried out on the Broad Cove Bridge located on Route 310 in the Terra Nova National Park.

.2 In general, the work under this contract includes the provision of all materials, labour, equipment, and ancillaries, all as necessary for the completion of the work as indicated on the drawings and as described in the specifications. Work under this contract consists of, but is not limited to, the following:

.1 Site erosion and sediment control measures, including, silt fencing, floating silt curtain, and other measures as required, maintained for the duration of the project and removed following completion.

.2 Supply and installation of a containment enclosure below bridge to prevent any debris from falling into the water.

.3 Supply and operation of traffic control and signage for the duration of the project.

.4 Removal and off-site disposal of the existing asphalt surface on the bridge deck and on the approach roadway to extent indicated on plans.

.5 Excavation and disposal of existing roadway structure to limits indicated and as required for the installation of the work.

.6 Removal and replacement of guide rail system at bridge approaches.

.7 Foundation excavation at abutments, including removal, stockpiling and reinstatement of rock protection.

.8 Hauling, placement and compaction of fill materials behind and around existing abutments.

.9 Supply, hauling, placement and compaction of aggregates and granular materials for roadway structure and shoulder treatment.

.10 Supply and installation of new asphalt pavement, including keyed joints at existing pavement.

.11 Deconstruction, demolition, removal and disposal of the existing bridge superstructure.

.12 Selective demolition, preparation, repair and modification to the existing bridge abutments.

.13 Removal and off-site disposal of all

deconstructed material not designated for salvage.
.14 Supply and installation of new composite concrete bridge deck, new steel beams, bearings, railings, drains, expansion joints, decorative plaques, approach slabs, and guide rails.
.15 Supply and installation of waterproofing on new deck and approach slabs.
.16 All other labour, materials and work necessary to complete the project to the Departmental Representative's full satisfaction.

.3 All work to be carried out in accordance with applicable federal and provincial regulations for those agencies having jurisdiction for the work. The work is subject to the National Park Act and Regulations, Canadian Environmental Protection Act, Canada Labour Code and the NL Occupational Health and Safety Act and Regulations.

1.2 Traffic Maintenance

.1 The bridge is to remain in service and be capable of carrying one lane of alternating traffic throughout the construction period.

.2 A number of civil/marine projects will be underway on the Eastport end of the peninsula. Contractor to be aware that this will entail heavy construction traffic. In addition, the route is busy with tourist traffic during the summer period, from June to September, resulting in heavy traffic including recreation vehicles. A Fish plant also operates and transport trucks will be hauling fish product across the bridge during the construction period.

1.3 Wide Loads

.1 The Contractor to be aware and make allowance for accommodating wide loads that may have to pass across bridge structure during its rehabilitation.

.2 Temporary barrier for stage 1 deck reconstruction has been designed to be dismantled to accommodate the passage of wider loads.

.3 Contractor to allow for removal and re-erection of temporary barrier as required for the duration of the project.

.4 No claim for extra cost on delay will be

entertained for this work.

1.4 Familiarization With Site

.1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

.2 Obtain prior permission from the Parks Canada Asset Manager before carrying out such site inspection.

.3 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 – Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.

1.5 Interpretation of Documents

.1 Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual.

1.6 Term Engineer

.1 Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract.

1.7 Setting Out Work

.1 Contractor to carry out all layout.

.2 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.3 Supply such devices as straight edges and templates required to facilitate Departmental Representative’s inspection of work.

.4 Provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative.

1.8 Measurement For Payment

.1 Notify Departmental Representative sufficiently in advance of operations to permit required

measurements for payment.

1.9 Maintenance of Work During Construction

.1 Maintain work during construction. Undertake continuous and effective maintenance work day by day, with adequate equipment and forces so that the roadway or structures are continuously kept in a condition satisfactory to Departmental Representative.

1.10 Codes and Standards

.1 Perform work in accordance with National Parks Act, Code of Practice of the Department of Labour, as it pertains to the NL Traffic Control Manual (Department of Transportation & Works) and any other code of federal, provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

.2 Materials and workmanship must conform to or exceed applicable standards of Canadian General Standards Board (CGSB), Canadian Standards Association (CSA), American Society for Testing and Materials (ASTM) and other standards organizations.

.3 Conform to latest revision of any referenced standard as re-affirmed or revised to date of specification. Standards or codes not dated shall be deemed editions in force on date of tender advertisement.

1.11 Work Within Park Boundaries

.1 The project is within a national park and it is essential that lands remain as undisturbed as possible. The Contractor will be expected to use standards and methods beyond those for normal construction in order to protect the environment and ensure the aesthetics of the work. Contract limits shall be strictly adhered to and every precaution shall be taken to minimize environmental damage and disruption to vegetation, wildlife habitat, and structures or existing services, both on construction and storage sites.

.1 If any damage occurs during construction, the Contractor is responsible to bear the expense to immediately restore such damaged areas to the satisfaction of the Departmental Representative.

.2 If Contractor fails to repair damage to the satisfaction of the Departmental Representative,

the Departmental Representative may have repairs completed by others at the Contractor's expense.

.3 The Contractor shall ensure that contracted work meets the standards outlined in the contract specification and drawings.

.4 All sources of aggregate and asphalt cement must be submitted to the Departmental Representative for approval at least two weeks prior to the start of any work.

.5 The Contractor is responsible to follow the Provincial requirements regarding the following:

.1 Pit and Quarry Guidelines

.2 Environmental Construction Practice specifications

.6 The Contractor will make arrangements with authorities or owners of private properties for quarrying and transporting materials and machinery over their properties and be responsible for obtaining and paying of fees.

1.12 Documents Required_ .1 Maintain at job site, one copy each of following:

.1 Contract drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed drawings.
.5 Change orders.
.6 Other modifications to Contract.
.7 Copy of approved work schedule.
.8 Field test reports.
.9 Manufacturer’s installation and application instructions.
.10 Site specific Health and Safety Plan and other safety related documents.
.11 Other documents as stipulated elsewhere in the Contract Documents.

1.13 Site Conditions____ .1 The Contractor will be responsible to visit the roadway and review existing site conditions.

1.14 Departmental Representative_ ___ .1 Departmental Representative will be assigned after contract award.

1.15 Work Schedule ___ .1 Provide to the Departmental Representative in writing and within 5 working days after Contract award, a detailed construction schedule and traffic control plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work.

1.16 Sanitary Services

.1 The Contractor shall provide and maintain sanitary facilities for the use of workers at locations specified by the Departmental Representative. Provision of sanitary facilities shall meet requirements of provincial government and municipal statutes and authorities.

1.17 Contractor's Use of Site

.1 Use of site: for execution of work within roadway right of way and those areas specified by the Departmental Representative.

.2 The Departmental Representative will specify the areas for work and storage.

1.18 Project Meetings

.1 Meetings shall be called by PCA's project manager and shall be every two (2) weeks after construction commences.

.2 After receiving the Contractor's schedule, traffic control plan, health and safety hazard assessment, and environmental protection plan, and prior to start of construction, a meeting involving Contractor, Departmental Representative and Parks Canada will be held at a place and time to be determined by the Departmental Representative. This meeting will review implications of the contract, design, schedule of work health and safety, methods of construction, environment protection methods and traffic control.

.3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

.4 No work will begin until the pre-construction meeting is held, and all submittals have been approved.

.5 Following the pre-construction meeting and approval of submittals, the work will be carried out to meet the time restraints and have the project completed on time.

1.19 Cutting & Patching

.1 Cut and patch as required to make work fit.

.2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

1.20 Existing Services

.1 Carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian, vehicular traffic and marine traffic.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.3 Submit schedule to and obtain approval from Departmental Representative for any shut down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

.4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.5 Record locations of maintained, re-routed and abandoned service lines.

.6 Ensure that at least one (1) lane of alternating two-way traffic is maintained at construction site at all times.

.7 Ensure pedestrian and other traffic is not unduly impeded, interrupted or endangered by execution or existence of work or plant.

.8 Maintain existing signs at all times. When it is necessary to temporarily remove a sign, it shall be dismantled and re-established on a temporary post or stand set back from construction area. The work is considered to be incidental and no separate payment will be made for maintaining or moving signs.

.9 Verify locations of any underground utilities.

1.21 Additional Drawings

.1 Departmental Representative may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to

in Contract documents.

1.22 Relics, Antiques and Wildlife Habitat

.1 Protect relics, antiquities, wildlife habitat, items of historical or scientific interest such as cornerstones and contents, animal nesting sites, commemorative plaques, inscribed tablets, and similar objects found during course of work.

.2 Give immediate notice to Departmental Representative and await Departmental Representative's written instructions before proceeding with work in this area.

.3 Relics, antiquities and items of historical or scientific interest remain her Majesty's property.

1.23 National Park Act

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

1.24 Measurement of Quantities

.1 Linear: Items which are measured by metre or kilometer are to be measured along centreline of installation unless otherwise shown on plans.

.2 Area:
.1 Longitudinal and transverse measurements for areas to be measured horizontally.

.3 Mass:
.1 Term "tonne" shall mean 1000 kg.
.2 Materials which are specified for measurement by mass shall be weighed on scales approved by and at locations designated by Departmental Representative. Units used to haul material being paid for by mass shall bear legible identification numbers plainly visible to scale person as it approaches and leaves scale-house.

.4 Time:
.1 Unless otherwise provided for elsewhere or by written authority of Departmental Representative, hourly rental of equipment will be measured in actual working time and necessary travelling time of equipment within limits of project at an all-inclusive rate. Equip each unit of mobile equipment with an approved device to

register hours of operation. Devices which only measure hours of running of motor will not be accepted.

.5 Volume:

.1 For all cast-in-place concrete – measurement based on neat lines depicted within drawing set; breastwall repairs – Agreed amount between Contractor and Departmental Representative before placing.

1.25 Permits/Authorities

.1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. He shall also comply with all pertinent regulations of all authorities having jurisdiction over the work. The Contractor shall provide copies of all permits to the Departmental Representative prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all changes in connection therewith.

1.26 Equipment Rental Rates

.1 Upon written request, the Contractor will supply the Departmental Representative with a list of the rental equipment to be used on work beyond the scope of bid items. Equipment rental rates will be in accordance with current rates published by the Newfoundland and Labrador Department of Transportation and Works.

1.27 Protection

.1 Store all materials and equipment to be incorporated into work to prevent damage by any means.

.2 Repair and replace all materials or equipment damaged in transit or storage to the satisfaction of the Departmental Representative and at no cost to Crown.

.3 Contractor will take adequate precautions to protect existing structures when operating tracked equipment.

.4 Exercise care so as not to obstruct or damage public or private property in the area.

.5 At completion of work, restore area to its original condition. Damage to ground and property will be repaired by Contractor. Remove all

construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

END OF SECTION

PART 1 – GENERAL

1.1 Submittals

.1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
.1 Work Schedule as specified herein.
.2 Health and Safety Plan as specified in Section 01 35 29 – Health and Safety Requirements.
.3 Environmental Protection Plan as specified in Section 01 35 43 – Environmental Procedures.
.4 Traffic Control Plan as specified in Section 01 55 26 – Traffic Regulation.

1.2 Work Schedule

.1 Upon acceptance of bid submit:
.1 Preliminary work schedule within 5 calendar days of contract award.

.2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.

.3 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

.4 Work schedule content to include as a minimum the following:
.1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
.1 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
.2 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.

.5 Work schedule must take into consideration and reflect the work phasing.

.6 Schedule work in cooperation with the Departmental Representative.

.7 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.

.8 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.

.9 Schedule Updates:
.1 Submit when requested by Departmental Representative.
.2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
.3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.

.10 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.

.11 In every instance, any change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.3 Project Meetings

.1 Schedule and administer project meetings every two (2) weeks for entire duration of work.

.2 Prepare agenda for meetings.

.3 Notify participants by e-mail 4 days in advance of an unscheduled meeting date.
.1 Ensure attendance of all subcontractors.
.2 Departmental Representative will provide

list of other attendees to be notified.

.4 Hold meetings at project site or where approved by Departmental Representative.

.5 Preside at meetings and record minutes.
.1 Indicate significant proceedings and decisions. Identify action items by parties.
.2 Distribute to participants by e-mail or by facsimile within 3 calendar days after each meeting.
.3 Make revisions as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 General Requirements

.1 The Form of Tender includes one lump sum priced item and several unit priced items.

.2 The total tendered price shall be the sum of the lump sum item plus the amounts calculated from the unit priced items based on the approximate quantities identified for each of the unit priced items.

.3 The Contractor in submitting their Tender for the project understand that they will only be entitled to payment under the unit priced items when prior written authorization has been received from the Departmental Representative for utilization and then only to the extent of the work authorized by the Departmental Representative.

.4 Additional instructions for measurement and/or payment for items of the work may be contained in specific sections of the Technical Specifications. In the case of a conflict between the instructions for measurement and payment contained in this section with that of any other section, the requirement of this section shall apply.

.5 The submitted tender prices will be inclusive of all costs for the complete supply and installation of all materials, labour and equipment required to complete the work. No separate payment will be made for any testing, inspections and approvals required by Contractor.

.6 All measurement shall be along a horizontal plane unless otherwise indicated.

1.2 Lump Sum Item

.1 No separate measurement for payment shall be made for any work completed under this item.

.2 The work of the lump sum item shall include, but not necessarily limited to, the following:
.1 All mobilization and demobilization to the site, temporary utilities, construction facilities and temporary barriers/railings and

enclosures.

.2 Protection of all cultural resources.

.3 All environmental protection, including erosion controls, sedimentation controls, containment enclosure, de-watering and dust control. Dust prevention and erosion control measures shall be in effect until such works are restored to original condition or upon issuance of the “Certificate of Final Completion”. Dust control on any street or site where work have been or are being carried out.

.4 Cleaning of work site, including removal of waste, debris, and recyclable materials.

.5 Testing, inspections and permits from all regulatory agencies and groups required to complete the work.

.6 Traffic control devices and measures, including flag persons, signs, mobile traffic signals, lights, barriers, and temporary pavement markings to maintain traffic at all times.

.7 Design, construction, and maintenance of all temporary structures (shoring, bracing, underpinning, working platforms, scaffolding, stability bracing, supports, etc.) required to complete the work.

.8 Preparation and submission of all close-out submittals, maintenance manuals, and as-built drawings.

.9 Complete removal of the existing bridge railings. The railings and posts will be salvaged by the Owner. Transportation of the bridge railing systems to Big Brook Pit to be included in cost.

.10 Complete removal and disposal of the existing bridge superstructure, including all structural steel components, concrete deck, asphalt and other components as required in the contract documents.

.11 Demolition, removal and disposal of portion of the existing concrete abutments as outlined in the contract documents.

.12 Removal and disposal of the existing guide rails and guide posts as per the contract documents.

.13 All necessary excavation and backfill for construction of the new abutments as per the contract documents.

.14 All necessary removal and reinstatement of the existing rip rap and rock protection for construction of the new abutments.

.15 Disposal of all surplus materials from the site at completion of work.

.16 All other work within the Limits of Contract shown on the drawings and described in the specifications which are required for the completion of the rehabilitation of the Broad Cove Bridge exclusive of those covered by the unit priced items.

.3 All and any items not specifically included in the unit price items are considered incidental to the work and are to be included in the lump sum portion of the work.

1.3 Unit Price Items

.1 Cast-In-Place Reinforced Concrete for Abutments and Approach Slabs

.1 Unit of Measurement: metres cubed (m^3)

.2 Method of Measurement: Volume of consolidated concrete installed in completed structures, based on the neat lines called for in the plans. Waste materials are not included.

.3 This item includes: furnishing of all materials, aggregates, cement, supplementary cementing materials, concrete mixes, admixtures, reinforcing bars, tools, equipment, falsework, forms, bracing, chairs, bolsters, ties, labour, curing, surface finishing, concrete sealer, and all other items required to complete the work. Supply, installation and securing of reinforcing bars is incidental to this work and is included in this item.

.2 Cast In Place Reinforced Concrete for Bridge Deck

.1 Unit of Measurement: metres cubed (m^3)

.2 Method of Measurement: Volume of consolidated concrete installed in completed structures, based on the neat lines called for in the plans. Includes preparation, supply and placement of grout in the deck closure strip. Waste materials are not included.

.3 This item includes: furnishing of all materials, aggregates, cement, supplementary cementing materials, concrete mixes, admixtures, reinforcing bars, tools, equipment, falsework, forms, bracing, chairs, bolsters, ties, labour, curing, surface finishing, and all other items required to complete the work. Supply, installation and securing of reinforcing bars is

incidental to this work and is included in this item.

.3 Concrete Waterproofing

.1 Unit of Measurement: meters squared (m^2)

.2 Method of Measurement: Surface area of waterproofing and protection board installed in place and shall include supply, transportation, all labour, materials and equipment in accordance with the project requirements.

.4 Structural Steel Girders with Diaphragms

.1 Unit of measurement: Metric Tonne (1000 kg)

.2 Method of Measurement: Measurement computed on basis of CISC Code of Standard Practice including nuts, bolts and washers and shear studs.

.3 This item includes: supply and installation of all girder components including, but not limited to, girders, diaphragms, cross-bracings, field and shop splices, bearing plates, pintels, shear studs, stiffeners, bolts, washers and nuts and paint coating system.

.5 Bearings

.1 Unit of measurement: Each

.2 This item includes: supply and installation of the steel laminated bearings.

.6 Bridge Railings

.1 Unit of Measurement: linear metre (m)

.2 This item includes: Supply and installation of all bridge railing components as indicated in the contract documents, including galvanizing.

.7 Drains

.1 Unit of measurement: Each

.2 This item includes: supply and installation of the bridge deck drains as indicated in the contract documents, including HSS spout, steel reinforcing and galvanizing.

.8 Ballast Wall Angles

.1 Unit of measurement: Each

.2 Method of Measurement: Each unit installed on the full width of bridge.

.3 This item includes: supply and installation of the ballast wall angles including field splice, anchors and galvanizing.

.9 Expansion Joints
.1 Unit of measurement: Each
.2 Method of Measurement: Each unit installed on the full width of bridge.
.3 This item includes: supply and installation of the expansion joints including field splice, anchor plates, seal, and galvanizing.

.10 Decorative plaques
.1 Unit of measurement: Each
.2 This item includes: supply and installation of the stainless steel decorative plaques as indicated in the contract documents.

.11 Geotextile
.1 Unit of measurement: square meters (m^2)
.2 Method of Measurement: square meters measured horizontally in place.
.3 This item includes: supply and placement of geotextile where indicated in the contract documents.

.12 Granular Subbase
.1 Unit of measurement: Metric Tonne (t) (1000 kg)
.2 Method of measurement: slip showing the weight, type of material being delivered, and identifying the truck and driver. Include only one load on each slip. Any slips not received and signed by the Departmental Representative at the time of delivery will not be included in the weight for payment.
.3 This item includes: supply, sourcing, testing, loading, weighing, hauling, placing, spreading, shaping, compaction, adjustment of moisture content, traffic control, dust control, proof rolling, clean up and all work incidental thereto, all as specified or as shown on the Drawings or as directed by the Departmental Representative.

.13 Granular Base
.1 Unit of measurement: Metric Tonne (t) (1000 kg)
.2 Method of measurement: slip showing the weight, type of material being delivered, and identifying the truck and driver. Include only one load on each slip. Any slips not received and signed by the Departmental Representative at the

time of delivery will not be included in the weight for payment.

.3 This item includes: supply, sourcing, testing, loading, weighing, hauling, placing, spreading, shaping, compaction, adjustment of moisture content, traffic control, dust control, proof rolling, clean up and all work incidental thereto, all as specified or as shown on the Drawings or as directed by the Departmental Representative.

.14 Asphalt Pavement

.1 Unit of measurement: Metric Tonne (t) (1000 kg)

.2 Method of measurement: This work shall be measured in tonnes of asphalt concrete of the appropriate type, acceptably placed. Provide slips showing the weight, type of material being delivered, and identifying the truck and driver. Include only one load on each slip. Any slips not received and signed by the Departmental Representative at the time of delivery will not be included in the weight for payment.

.3 This item includes: supply and transportation of all equipment, labour and materials, signage and traffic control, fine grading, testing, tack coat, asphalt liquid, placement, compaction, construction joints, temporary markings, protection of structures, water for asphalt cooling when required, clean-up and all work incidental thereto, all as specified or as shown on the Drawings or as laid out by the Departmental Representative. The final pavement marking application will not be included in the scope of work.

.15 Guide Rail

.1 Unit of Measurement: linear metre (m)

.2 This item includes: Supply, transportation and installation of treated posts, blocks, metal rails, channels, washers, bolts, and all necessary appurtenances, augering of post holes, setting posts, offset blocks, installing reflectors, backfilling, compaction, disposal of surplus material and reinstatement of disturbed surfaces as measured from Contract Drawings.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 35 29 - Health and Safety Requirements.

.2 Section 01 35 43 - Environmental Procedures.

1.2 Administrative

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify that field measurements and affected adjacent Work are coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in

submission from requirements of Contract Documents is not relieved by Departmental Representative's review.

.10 Keep one reviewed copy of each submission on site.

1.3 Shop Drawings And Product Data

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 5 days for Departmental Representative to review each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, in duplicate, containing:
.1 Date.
.2 Project title and number.
.3 Contractor's name and address.

.4 Identification and quantity of each shop drawing, product data and sample.
.5 Other pertinent data.

.8 Submissions include:
.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
.5 Details of appropriate portions of Work as applicable:
.1 Fabrication.
.2 Layout, showing dimensions, including identified field dimensions, and clearances.
.3 Setting or erection details.
.4 Capacities.
.5 Performance characteristics.
.6 Standards.
.7 Operating weight.
.8 Wiring diagrams.
.9 Single line and schematic diagrams.
.10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Submit one (1) transparency on plastic film, six (6) prints and one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.17 Delete information not applicable to project.

.18 Supplement standard information to provide details applicable to project.

.19 If upon review by Departmental Representative,

no errors or omissions are discovered or if only minor corrections are made, transparency copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.4 Samples

.1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative business address.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental

Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 Certificates And Transcripts

.1 Immediately after award of Contract, submit Workplace NL status.

.2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

1.1 Definitions

.1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

.2 Competent Person: means a person who is:
.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
.3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.3 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.

.4 PPE: personal protective equipment

.5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.2 Submittals

.1 Make submittals in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan prior to commencement of Work.
.1 Submit within 10 work days of notification of Bid Acceptance. Provide 3 copies.
.2 Departmental Representative will review Health and Safety Plan and provide comments.
.3 Revise the Plan as appropriate and resubmit within 10 work days after receipt of comments.
.4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
.5 Submit revisions and updates made to the

Plan during the course of Work.

.3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.

.4 Submit building permit, compliance certificates and other permits obtained.

.5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
.1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

.6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.7 Submit copies of incident reports.

.8 Submit WHMIS MSDS - Material Safety Data Sheets.

1.3 Compliance Requirements

.1 Comply with Occupational Health and Safety Act for Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.
.1 The Canada Labour Code can be viewed at: www.http://laws.justice.gc.ca/en/L-2/
.2 COSH can be viewed at: www.http://laws.justice.gc.ca/eng/SOR-86-304/ n e .html
.3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: (819) 956-4800 (1-800-635-7943) Publication No. L31-85/2000 E or F)

.3 Observe construction safety measures of:
.1 Part 8 of National Building Code
.2 Provincial Worker’s Compensation Board.
.3 Municipal by-laws and ordinances.

.4 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.

.5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

.6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

.7 Comply with all works outlined in the Department of Transportation and Works, Traffic Control Manual, Revised April 2104.

1.4 Responsibility

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.5 Site Control and Access

.1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
.1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means.
.1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and

create a safe environment. See Section 01 56 00 – Temporary Barriers and Enclosures for minimum acceptable requirements.

.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

.3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

.6 Contractor to follow any recommendations from Navigable Waters for marine access.

1.6 Protection

.1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.

.2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.7 Filing of Notice

.1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.

.1 Departmental Representative will assist in locating address if needed.

1.8 Permits

.1 Post permits, licenses and compliance certificates, specified in section 01 11 00 – General Instructions, at Work Site.

.2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of

work.

1.9 Hazard Assessments

.1 Perform site specific health and safety hazard assessment of the Work and its site.

.2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.

.3 Record results and address in Health and Safety Plan.

.4 Keep documentation on site for entire duration of the Work.

1.10 Project/Site Conditions

.1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:
.1 Known latent site and environmental conditions:
.1 Steep slopes and rock faces.
.2 Streams, brooks and other water bodies.
.3 Wildlife.
.2 Facility on-going operations:
.1 Highway traffic.
.3 Work is above waterway. Contractor to provide rescue boat, floatation equipment and lifering in accordance with applicable health and safety regulations.

.2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.

.3 Include above items in the hazard assessment of the Work.

1.11 Meetings

.1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
.1 Superintendent of Work
.2 Designated Health & Safety Site Representative
.3 Subcontractors

.2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance

with Occupational Health and Safety regulations.

.3 Keep documents on site.

1.12 Health and Safety Plan

.1 Prior to commencement of Work, develop written Health and Safety Plan and Safety Control Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.

.2 Health and Safety Plan shall include the following components:
.1 List of health risks and safety hazards identified by hazard assessment.
.2 Control measures used to mitigate risks and hazards identified.
.3 On-site Contingency and Emergency Response Plan as specified below.
.4 On-site Communication Plan as specified below.
.5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
.6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.

.3 On-site Contingency and Emergency Response Plan shall include:
.1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
.2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire fighting equipment and other related data.
.3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
.4 Emergency Contacts: name and telephone number of officials from:
.1 General Contractor and subcontractors.
.2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
.3 Local emergency resource organizations.
.5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data

including name of PCA and Facility Management contacts.

.4 On-site Communication Plan:
.1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
.2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

.5 Address all activities of the Work including those of subcontractors.

.6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.

.7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.

.8 Post copy of the Plan, and updates, prominently on Work Site.

1.13 Safety Supervision

.1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work. Representative to be trained in occupational health and safety procedures and practices.

.2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
.1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work.
.2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
.3 Conduct site safety orientation session to persons granted access to Work Site.
.4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
.5 Stop the Work as deemed necessary for

reasons of health and safety.

.3 Health & Safety Site Representative must:
.1 Be qualified and competent person in occupational health and safety.
.2 Have site-related working experience specific to activities of the Work.
.3 Be on Work Site at all times during execution of the Work.

.4 All supervisory personnel assigned to the Work shall also be competent persons.

.5 Inspections:
.1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken.
.2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.
.3 Follow-up and ensure corrective measures are taken.

.6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.

.7 Keep inspection reports and supervision related documentation on site.

1.14 Training

.1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.

.2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

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

1.15 Minimum Site Safety Rules

.1 Notwithstanding requirement to abide by federal and provincial health and safety

regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
.1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses, hearing protection and high-visibility workwear.
.2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
.3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
.4 Obey warning signs and safety tags.

.2 Brief persons of disciplinary protocols to be taken for non compliance. Post rules on site.

1.16 Correction of Non-Compliance

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

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

.3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.17 Incident Reporting

.1 Investigate and report the following incidents to Departmental Representative:
.1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
.2 Medical aid injuries.
.3 Property damage in excess of $10,000.00,
.4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of $5000.00.

.2 Submit report in writing.

1.18 Hazardous Products

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site.
.1 Post on site.
.2 Submit copy to Departmental Representative.
.3 For interior work in an occupied Facility, post additional copy in one or more publically accessible locations.

1.19 Blasting

.1 Blasting or other use of explosives is not permitted on site without prior receipt of written permission and instructions from Departmental Representative.

1.20 Powder Actuated Devices

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

1.21 Confined Spaces

.1 Abide by occupational health and safety regulations regarding work in confined spaces.

.2 Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work.
.1 Obtain permit from Facility Manager
.2 Keep copy of permit issued.

.3 Safety for Inspectors:
.1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections.
.2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space.

1.22 Site Records

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Departmental

Representative or authorized Safety Officer for inspection.

1.23 Posting of Documents

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

.2 Post other documents as specified herein, including:
- .1 Site specific Health and Safety Plan
- .2 WHMIS data sheets
- .3 Incident reports
- .4 Tool box and safety meeting minutes

1.24 Navigable Waters

.1 To meet all requirements as provided by Transport Canada in the Basic Impact Assessment (BIA) included in Appendix A.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Sections

.1 Section 01 35 45 – Environmental Protection Refueling Vehicles.

.2 Section 01 74 21 – Constructional Demolition Management and Disposal.

1.3 Fires

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

1.4 Disposal of Wastes

.1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

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

.3 Dispose of uncontaminated construction/demolition material which cannot be recycled or reused, at an approved construction and debris disposal site.

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 local authority requirements.

1.5 Site Clearing and Plant Protection

.1 Protect trees and plants on site and adjacent properties as required. Departmental Representative to be notified prior to removal of trees and plants.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict vegetation removal to areas indicated or designated by Departmental Representative.

.6 Vegetation and topsoil should not be removed to obtain fill for road construction purposes.

.7 Whenever possible, organic debris removed during grading operations should be stored for use during site restoration. Such stockpiles should be located well away from any stream or water body and should be covered with coarse material or tarps to minimize wind and water erosion.

1.6 Work Adjacent to Waterways

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material without Departmental Representative's approval.

.3 Do not dump excavated fill, waste material 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 indicated spawning beds when constructing temporary crossings of waterways.

.7 Do not blast under water or within 100 m of indicated spawning beds.

.8 Temporary diversion ditches, approved by the

Departmental Representative, are to be plastic lined.

.9 Temporary storage sites for debris generated from clearing operations should be deposited away from watercourses and should be surrounded by a natural vegetative buffer.

.10 Do not pump or drain water containing suspended materials into waterways. Water containing suspended materials shall be pumped into vegetation a minimum of 30 m away from watercourses.

1.7 Pollution Control

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. Chemicals used in dust control must have prior approval of the Departmental Representative.

1.8 General Requirements

.1 Work under this contract is to be carried out in a National Park, and environmental protection must be given a high priority by all staff involved with the work. Perform work in accordance with Canada National Parks Act and Regulations.

.2 An Environmental Briefing will be held prior to work commencing at the site, which will outline environmental factors to be considered during the work. It is mandatory that all current staff of the Contractor attend this meeting with the Departmental Representative and Environmental Protection Officer (EPO).

.3 The Contractor shall meet all requirements as detailed in Appendix A – Basic Impact Analysis

(BIA) Broad Cove Bridge Rehabilitation, Terra Nova National Park. This document is not all-inclusive, and site adjustment of the mitigation methods for the work may be required. The Departmental Representative will advise the Contractor of any additional requirements as they arise.

1.9 Site Set-up and Use

.1 All site activities related to construction are to be confined within the defined project boundaries.

.2 Work sites will be equipped with appropriate and properly maintained sanitary facilities.

.3 Garbage must be collected and removed daily from the work site. All material must be removed, transported and disposed of in accordance with existing provincial – municipal and Park solid waste disposal guidelines and/or regulations.

.4 Littering is prohibited.

.5 Temporary storage, parking areas, and turn-a-round facilities for contractor-related equipment and vehicles will be limited to those areas agreed to and designated by the Departmental Representative.

1.10 Environmental Protection Plan

.1 The Contractor is required to submit a plan showing all pollution control measures that will be used to fulfill the requirements of the Environmental Protection Section. This plan will be reviewed by the Departmental Representative and the Environmental Protection Officer prior to commencement of any work. Any deviation from this plan will require further approval by the Departmental Representative. The protection plan shall be submitted prior to the pre-construction meeting.

.2 The Environmental Plan will outline how the Contractor will address the environmental protection requirements, including removal and installation of bridge, and ensure pollution created by the construction is controlled. It will show sufficient detail on products to be used and

physical placement on site to determine effectiveness of these items.

.3 The plan must cover all activities within the limits of all construction, laydown and traffic diversion areas.

1.11 Environmental Performance

.1 The Contractor is required to follow the Canadian Environmental Protection Act and Canadian National Parks Act.

.2 The Contractor is held responsible to ensure that all necessary permits related to Environmental Protection have been obtained and that necessary documentation is available on-site.

1.12 Vehicular Movements

.1 Restrict movement of vehicles and equipment to existing disturbed areas (access roads, borrow pits, disposal areas and right-of-ways).

1.13 Storage and Handling of Fuels and Dangerous Fluids

.1 Locate fuel storage facility a minimum of 100 m from any water body in an area approved by Departmental Representative and construct impermeable dykes so that any spillage is contained. Fueling of vehicles or equipment will not be permitted within 100 m of any water body. Maintenance of vehicles and equipment will be permitted only in designated areas as directed by the Departmental Representative.

.2 Exercise care in handling of fuels or dangerous materials to minimize potential for spills. Report immediately any spills to Departmental Representative. Contractor is responsible for responding immediately to any spill to minimize environmental damage and for clean-up, repair or rehabilitation resulting from any spills to the satisfaction of the Departmental Representative.

.3 Supply and maintain on site emergency response material to contain spills and minimize environmental damage, i.e. absorbent material, to the approval of Departmental Representative. Disposal of all contaminated material shall be off-site at an approved facility.

.4 Dangerous goods, whose release into the environment could cause adverse effect, should be stored and handled in a manner which gives due regard for workers and public safety, and for the protection of the environment.

.5 No material toxic to fish or any aquatic life shall be permitted to enter any stream, river, or lake. This shall include, but not be limited to lubricants, fuels, testing fluids, insecticides, detergents, herbicides, cement, lime or concrete.

.6 The management of fuels, lubricants and chemicals must meet with the requirements of the Newfoundland & Labrador Department of Environment & Conservation and all other appropriate provincial and federal regulations.

.7 Fuel storage containers must be accompanied by impermeable structures that would provide containment of 125% of the container capacity in the event of a leak or spill.

.8 All refueling and lubricating operations should employ protection measures such as drip pans, to reduce the potential for escape of petroleum products to the environment.

.9 The Departmental Representative and the Park's Environmental Protection Officer (EPO) must be immediately contacted after a spill of fuel or lubricant, and after any amount of other chemical products has escaped.

.10 Storage of any fuel has to occur only in previously approved locations, and with Park consent. The Contractor must submit plans for fuel management and a Spill Contingency Plan seven days prior to the start of the Work. The Contractor is expected to be prepared to effect the containment and cleanup of all spills related to the Work.

.11 Storage of hazardous material, including explosives, shall not be permitted, except for quantities which shall normally be expected to be utilized in a day of Work, and which are not permitted to stockpile.

.12 Emulsion storage tanker and transfer of emulsion from tanker to spray vehicle are not permitted.

1.14 Erosion and Sediment Control

.1 Appropriate preventative controls should be in place at all times during construction to prevent undue erosion and sedimentation. The Contractor is required to provide to the Departmental Representative for approval ten (10) working days before start-up an erosion and sedimentation control plan, as part of the Environmental Protection Plan. The plan shall incorporate all necessary silt fences, silt traps, plastic lined trenches and ditches as approved by the Departmental Representative.

.2 The Contractor shall install and maintain all sedimentation and erosion control features for the duration of the project, in accordance with the approved plan. The Contractor shall remove all sedimentation and erosion control upon completion of the work and when requested by the Departmental Representative.

.3 Sediment fences and erosion control structures shall be constructed in roadside ditches or at culvert inlets prior to any excavation as directed by Departmental Representative.

.4 To minimize run-off, work on slopes which may affect water body will be curtained during periods of heavy rainfall, as directed by the Departmental Representative.

.5 Prior to carrying out work, check long range weather forecast to ensure that there is adequate time before forecast of heavy rain storms to stabilize the work. Provide details of stabilization plan to Departmental Representative for review.

.6 Maintain a stockpile of appropriate erosion and environmental protection materials (e.g. silt fences, straw bales, wood chips, clean rock fill and aggregate base course) on site at all times.

.7 Install additional erosion control measures as required by site conditions to prevent

sediment from entering drainage courses.

.8 Inspect erosion and sediment control measures on a daily basis and maintain as necessary.

1.15 Fisheries Regulations

.1 Obtain proper permits or authorization from Federal Department of Fisheries and Oceans and maintain a copy of said permit on site. Regulations stipulated in the Permit will be strictly enforced.

1.16 Relics and Antiquities

.1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on site or in structures to be demolished, shall remain property of Canada. Protect such articles and request direction from Departmental Representative.

.2 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction and await his written instructions before proceeding with work in this area.

1.17 Treated Wood

.1 Workers shall be made aware of the possible health risks associated with exposure to CCA or creosote treated timber as well as the recommended safe practices for handling such materials.

.2 Disposal of treated wood wastes including saw-dust must be outside of the site, and in accordance with all applicable Provincial and Municipal regulations. Similar attention must be given to disposal of any replaced guiderail posts which have been treated with creosote, which must also be removed from the park for disposal.

1.18 Environmental Incident or Emergency

.1 In the event of an environmental incident or emergency such as:

.1 Chemical spill or petroleum spill;
.2 Poisonous or caustic gas emission;
.3 Hazardous material spill;
.4 Sewage spill;
.5 Contaminated water into waterways.
.6 The Contractor or his employees shall immediately:

.1 Notify the Contractor's job superintendent.
.2 Call the local emergency services and give type of emergency.
.3 Notify the Departmental Representative and the Park's Environmental Protection Officer (EPO).

.2 The Contractor is to submit to Departmental Representative a copy of its Environmental/Spill Response Plan for approval.

1.19 Site Decommissioning

.1 Unless prior permission from the Departmental Representative is obtained, all contractor equipment, facilities and materials must be removed from the Park at the finish of each work phase, or if work is suspended due to weather or other circumstances, upon the suspension of work activities.

.2 All work sites must be returned to a neat and tidy condition upon site abandonment.

END OF SECTION

PART 1 - GENERAL

1.1 Refueling

.1 Refueling of equipment to be performed in locations as directed by Departmental Representative.

.2 Do not refuel equipment within 100 metres of any watercourse or storm water catch basin unless protection against spills is in place and location is approved by Departmental Representative.

.3 Use petroleum containers approved for products with no spill fill spouts for dispensing fuels. The sure pour nozzle to have self closing valve, prevent any flow of fuel until the nozzle is inserted into the receiving container. On removal from the receiving container the slide valve closes to eliminate any fuel spill. Nozzle to be equipped with its own automatic vent eliminating the need for the user to open or close air inlets on the pouring container.

.4 Nozzle to support the weight of the pouring container. Nozzles to automatically stop the flow when the receiving container becomes full. The nozzle to be such that it reduces evaporative losses of volatile organic compounds during the fuel transfer.

.5 All spills of hydrocarbon based products such as gasoline, kerosene, naphtha, lubricating oils, engine oils, greases and de-icing fluids or antifreeze no matter how large or small to be reported to Departmental Representative and the Park’s Environmental Protection Officer (EPO).

.6 Oil changes or equipment repairs in the field or on Parks Canada land are not permitted.

.7 Refueling to be performed on level surfaces, PCC Portland cement concrete or HMAC surfaces when approved by the Departmental Representative unless otherwise directed.

.8 Contractor to have drip pans sized for amounts of product to be recovered and customized to fit under pieces of equipment to perform routine maintenance to equipment while maintaining

equipment on property. Drip Pans to be used whenever leaving equipment on site or parking overnight when not in use.

.9 Parking of equipment on site to be on level ground in locations away from watercourses and as approved by Departmental Representative. Equipment with leaks or poor mechanical repair to be removed from site when so ordered by Departmental Representative.

1.2 Spill Control Kit

.1 Contractor to have at the work site a spill control kit consisting of the following minimum types of equipment:
.1 a spaded shovel;
.2 a stable broom;
.3 a broad nosed shovel;
.4 a container(s) suitable, compatible to and of sufficient size to contain petroleum products being used with equipment;
.5 Absorbents;
.6 rags;
.7 metal container for soiled rags;
.8 Booms when working next to a watercourse that will traverse the width of the watercourse by two times; and
.9 Spill control kit to be inspected and approved by both the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative prior to Work commencing. Spill control kits to be available to Contractor employees at all areas where Work of the Contract is being performed and at all times during the course of the Contract.
.10 Contractor employees to be trained in the use of the spill control kit and the equipment they contain.

1.3 Spills

.1 Disposal of spilled materials to be off Parks Canada property and at approved locations for materials to be disposed of.

.2 When parking of equipment on site, the equipment is to be secured from entry, inspected for leaks and the ground protected from leaks.

.3 Contractor to protect all wells, catch basins, drywells, drains and watercourses from

contamination in event of a spill.

.4 All equipment to be used for the Work of the Contract to be inspected by the Departmental Representative for leaks. Equipment not in good repair to be removed/repaired when directed by Departmental Representative.

.5 Spills to be reported immediately to Departmental Representative, the Park’s Environmental Protection Officer (EPO) and the Newfoundland and Labrador Department of Environment and Conservation.

.6 Contractor to immediately remove as much or all of the contaminated soils as possible, from any spills created from Work of the Contractor.

.7 Contaminated soils/materials to be placed in containers compatible to the contaminants.

.8 Any remaining clean-up to be performed at no extra cost to Parks Canada. Clean-up to be to the Departmental Representative's satisfaction.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures

1.2 Inspection

.1 Give minimum 24 hours notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.

.2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

.3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.

.4 Pay costs to uncover and make good work disturbed by inspections and tests.

1.3 Testing

.1 Tests on materials, as specified in various sections of the Specifications are the responsibility of the Department except where stipulated otherwise.

.2 Departmental Representative will engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor’s responsibilities:
.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
.2 Inspection and testing performed exclusively for Contractor’s convenience.
.3 Mill tests and certificates of compliance.
.4 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.

.5 Additional tests specified in Clause 1.3.2.

1.5 Access to Work

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Furnish labour and facility to provide access to the work being inspected and tested.

.3 Co-operate to facilitate such inspections and tests.

1.6 Rejected Work

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to new construction and finishes resulting from removal or replacement of defective work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

.4 Project identification.

1.2 Precedence

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

1.3 Related Sections

.1 Section 01 56 00 - Temporary Barriers and Enclosures.

1.4 References

.1 Canadian General Standards Board (CGSB)
.1 CGSB 1-GP-189M-84, Primer, Alkyd, Wood, Exterior.
.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)
.1 CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete.
.2 CSA-0121-M1978, Douglas Fir Plywood.
.3 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.

1.5 Installation and Removal

.1 Provide construction facilities in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.6 Scaffolding

.1 Provide and maintain scaffolding, ladders and temporary stairs.

1.7 Hoisting

.1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists cranes shall be operated by qualified operator. A qualified operator shall meet all requirements stated within the NL OHS Act.

.3 Operator must be certified by a professional engineer eligible to practice within the province of NL as stated within the Newfoundland and Labrador OHS Act.

1.8 Site Storage/Loading

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.9 Construction Parking

.1 Parking will be limited to Contractor vehicles and equipment required to carry out work only, provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.

.4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.10 Security

.1 Contractor shall provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays (24 hours per day, 7 days per week).

1.11 Departmental Representative’s

.1 Contractor to provide Departmental Representative’s office trailer/space. Minimum

Site Offices

office trailer/space size is 40 m^2.

.2 Contractor to arrange and pay for phone, fax machine, internet connection and photocopier in Departmental Representative's office for its exclusive use. Long distance calls placed on this phone and fax to be paid for by Departmental Representative. Replacement cartridges for printer and photocopier to be supplied by contractor.

.3 Contractor to equip office with washroom, kitchen and one separate office, two 1 m x 2 m tables, one 1 m x 2 m drafting table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.

.4 Upon completion of the Contract; all equipment and furniture provided by the Contractor shall be returned to contractor.

.5 Supply of the Departmental Representative's office, supplies and services will be incidental to the work. Payment to be included in the lump sum portion of the work.

.6 Contractor to ensure site office is supplied and operational within 14 days after contract award.

.7 Provide garbage and cleaning services bi-weekly.

.8 Maintain inside air temperature at 20 degrees.

1.12 Testing Labratory

.1 Provide testing laboratory at aggregate production site and at asphalt concrete plant for exclusive use of Departmental Representative.
.1 Provide water, electrical power and propane to testing laboratory at aggregate production site, and at asphalt concrete plant.
.2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of Laboratory personnel and scheduling of tests.
.3 No separate payment to be made for Testing Laboratory. Cost shall be deemed incidental to Contract, and deemed to be included in the lump sum portion of the work.
.4 If testing laboratory at aggregate production

site is required at the same time as testing laboratory at asphalt concrete production site, provide additional laboratory as required.

.5 Maintain inside air temperature at 20 degrees.

.6 Refer to the DTW Specifications Book, standard drawing 1203, for minimum size and equipment requirements.

1.13 Equipment, Tool and Materials Storage

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.14 Sanitary Facilities

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.15 Construction Signage

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

.2 Signs and notices for safety and instruction shall be in both official languages Graphic symbols shall conform to CAN3-Z321.

.3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Description

.1 This section is to provide traffic control as stipulated in the Department of Transportation and Works Traffic Control Manual (TCM).

.2 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work. Traffic Control Plan to be submitted prior to the pre-construction meeting.

1.2 Related Work

.1 Section 01 11 00 - General Instructions.

.2 Section 01 35 29 - Health and Safety Requirements.

.3 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 Reference Standard

.1 Government of Newfoundland and Labrador Department of Transportation and works, Highway Design Division.
.1 Traffic Control Manual (TCM), latest edition.

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 travelling public.
.2 Keep equipment units as close together as working conditions will 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 roadway without approval of Departmental Representative. Before re routing traffic, erect suitable signs and devices in accordance with instructions contained in the TCM.

.4 Keep travelled way well graded, free of pot holes and of sufficient width that required number of lanes of traffic may pass.

.5 Ensure at least one (1) lane of alternating two-way traffic at all times. Provide traffic signals for one-way bridge operation during construction, and at night and on weekends.

.6 When directed by Departmental Representative, provide well graded, detours or temporary roads to facilitate passage of traffic around restricted construction area. Provide and maintain signs and lights and maintain roadway.

.7 Provide and maintain reasonable road access and egress to property fronting along or in vicinity of work under Contract unless approved otherwise by Departmental Representative.

.8 All flag persons and traffic control personnel shall have successfully completed a traffic control training course approved by the Workplace Health, Safety and Compensation Commission of Newfoundland and Labrador. Proof of training for all persons shall be available on site at all times.

1.5 Informational and Warning Devices

.1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work which may require road user response.

.2 All traffic signs are to be bilingual or symbolic and shall be Level 1 reflectivity.

.3 Supply and erect signs, declinators, barricades and miscellaneous warning devices as specified in TCM.

.4 Place signs and other devices in locations recommended in the TCM. A message board must be placed on the Eastport Road (Hwy 310) at the TCH intersection advising of narrow structure under construction at Broad Cove crossing.

.5 The contractor shall provide an Accredited Sign

Supervisor to be on site at all times when active construction is taking place. The Accredited Traffic Control Sign Supervisor will be responsible to supervise the placement and dismantling of all temporary condition signs and devices that indicate to the road user that highway construction activity exist and also to ensure that proper traffic control procedures are carried out in accordance with the TCM. The Accredited Sign Supervisor is considered part of the contractor's supervision and administration staff and compensation for the provision this individual is considered incidental to the work.

.6 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work.

.7 Continually maintain traffic control devices in use by:
.1 Checking signs daily for legibility, 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 Portable Variable Message Signs

.1 General

.1 It is a requirement that electronic signage (trailer mounted) be employed at both ends of the work area, notifying the general public of construction, along with anticipated delay times, etc. Notification signage is critical for this project, given the traffic volumes and potential for accidents to occur.

.2 Operating Characteristics

.1 The Portable Variable Message Signs (PVMS)shall exhibit the following operating characteristics while in use:
.1 Light emitting diode (LED) technology or hybrid LED/Flip Disk Technology.
.2 Antiglare polycarbonate sheeting.
.3 Solar powered.
.4 Capable of operating for 7 consecutive days on battery power supply with solar panels disconnected.
.5 Shall include all hardware and software necessary to facilitate reliable local and

remote sign control.
.6 Programmable (25 message sequence for one week duration).
.7 Capable of displaying a multiphase message with variable dwell times for each phase.
.8 Text of message shall not scroll or travel horizontally or vertically across the face of the sign.
.9 Capable of displaying 3 lines of 8 characters, each character being approximately 457 mm high.
.10 Each character matrix comprised of 35 pixels, 5 wide by 7 high.
.11 Message visible from 500 metres away in all ambient light conditions.
.12 Message legible from 50 m to 300 m away in all ambient light conditions.
.13 Ability to raise the bottom of the display board a minimum of 1.5 metres above ground level.
.14 Flat black background on the display area when the pixels are in the off position.
.15 Trailer painted orange or yellow.
.16 Capability to accurately level the sign and aim it towards oncoming traffic.
.17 Photo sensor array to enable the luminance of the sign to be controlled both automatically and manually in relation to ambient light levels.
.18 Locking device to prevent rotation of the sign in winds up to 10-km/hour, while the sign is in display mode.

.3 Trailer Mounting
.1 The maximum dimensions of the Portable Variable Message Sign and trailer assembly while in display mode shall be as follows:
.1 Maximum overall height = 4.5 metres.
.2 Maximum overall width = 3.75 metres.
.3 Maximum overall length = 5.5 metres.
.4 Maximum gross unit weight = 2500 kilograms.

.4 Conspicuity Markings
.1 PVMS trailer assemblies shall require high reflectivity micro-prismatic fluorescent sheeting tape (or equivalent) (e.g. diamond grade or Type VII) (meeting ATSM standard E991 and ASTM

E1247 for fluorescent materials). The reflectorized tape shall be of alternating, uniform white and orange or white and yellow sections. Sections of reflectorized tape shall be placed around the trailer frame, tongue or other outermost dimension, at uniform height and width such to reflect the light from the headlights of a vehicle approaching from any direction.

.2 PVSM sign assemblies shall require high reflectivity micro-prismatic fluorescent sheeting tape (or equivalent) (e.g. diamond grade or Type VII) ((meeting ATSM standard E991 and ASTM E1247 for fluorescent materials). The reflectorized tape shall be construction orange in colour, and 13 mm in width. The tape shall surround the outside of the sign assembly on all sides and be uniform distance from the outmost pixels.

1.7 Control of Public Traffic

.1 Provide traffic control personnel who have valid provincial certification and are trained in accordance with and properly equipped as specified in the TCM, in following situations:

.1 When public traffic is required to pass working vehicles or equipment which may 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 workers 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.

.2 All Traffic Control Personnel shall be equipped with portable radios of sufficient range to ensure continuous communication within the traffic

control zone.

.3 All construction vehicles shall operate in accordance with and are subject to traffic control restrictions and operations in place on the project.

.4 In addition to traffic control during the normal hours of work, the contractor shall have a responsible person on site at all times to monitor that the traffic signage is working properly (including nights, weekends and holidays).

.5 Flagpersons are to be equipped with portable radios only, not cellular devices. Any flagperson using cellular devices, except for emergency use only, shall be deemed incompetent and shall be removed from site immediately. PCA shall not be held responsible for lost time incurred due to the removal of such an individual.

1.8 Traffic Management Plan Requirement

.1 Contractor to provide a Traffic Control plan, prior to construction, for approval by the Departmental Representative.

1.9 Operational Requirements

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified herein and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic may be restricted as follows:
.1 In accordance with TCM.
.2 Individual traffic control zone delay shall not exceed **10 minutes**.

.2 Maintain existing conditions for traffic crossing right-of-way containing work except that, when required for construction under this Contract and when measures have been taken as specified herein and approved by Departmental Representative, to protect and control public traffic.

1.10 Navigable Waters	.1	To meet all requirements as provided by Transport Canada in the Basic Impact Assessment (BIA) included in Appendix A.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Sections

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 55 26 – Traffic Regulation.

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 International)
.1 CSA-O121-M1978, Douglas Fir Plywood.

.3 Government of Newfoundland and Labrador, Department of Transportation and Works, Highway Design Division.
.1 Traffic Control Manual (TCM), latest edition.

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 Guard Rails and Barricades

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

.3 Provide Traffic Control guard rails, barricades and delineators in accordance with Section 01 55 26 – Traffic Regulation.

1.6 Access to Site	.1	Provide and maintain access roads, as may be required for access to Work.
1.7 Public Traffic Flow	.1	Provide Traffic Control in accordance with Section 01 55 26 – Traffic Regulation.
1.8 Fire Routes	.1	Maintain access to properties for use by emergency response vehicles.
1.9 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.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Reference Standards

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 Quality

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 Availability

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber, fencing on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 Transportation

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

1.7 Manufacturer’s Instructions

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 Quality of Work

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 Co-Ordination

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 Remedial Work

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

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 Existing Utilities

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

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

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 78 00 - Closeout Submittals.

1.2 Precedence

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

1.3 References

.1 Owner's identification of existing survey control points and property limits. Departmental Representative is responsible for surveys and layout of work.

1.4 Survey Reference Points

.1 Contractor is to locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.2 Make no changes or relocations without prior written notice to Departmental Representative.

.3 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.4 The contractor is responsible to hire surveyor to replace control points in accordance with original survey control, if disturbed unnecessarily during construction activities.

1.5 Survey Requirements

Departmental Representative will:

.1 Establish permanent bench marks on site, as required, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement.

.4 Stake slopes.

.5 Establish pipe invert elevations and location of any exposed pipe not being removed under this contract.

.6 Record elevation and location of all existing and installed end caps of abandoned underground services.

.7 Provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative.

1.6 Existing Services

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

1.7 Records

Departmental Representative will:

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 On completion of site works, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

.3 Record locations of maintained, re-routed and abandoned service lines.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Section

.1 Section 01 77 00 - Closeout Procedures.

1.3 Project Cleanliness

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

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

.4 Provide on-site containers for collection of waste materials and debris.

.5 Provide and use clearly marked separate bins for recycling.

.6 Remove waste material and debris from site and deposit in waste container at end of each working day.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Dispose of waste materials, and debris off site at approved facilities.

1.4 Final Cleaning

.1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review, remove surplus products, tools, construction machinery and equipment.

.4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

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

.6 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.7 Remove dirt and other disfiguration from exterior surfaces.

.8 Sweep and wash clean paved areas.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

1.2 Precedence

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

1.3 Definitions

.1 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.2 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.

.3 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.4 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.5 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
.2 Returning reusable items including pallets or unused products to vendors.

.6 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.7 Separate Condition: Refers to waste sorted into individual types.

.8 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

1.4 Documents

.1 Maintain at job site, one copy of following documents:
.1 Material Source Separation Plan.

1.5 Submittals

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

.2 Prepare and submit following prior to project start-up:
.1 Submit 2 copies of Materials Source Separation Program (MSSP) description.

1.6 Waste Reduction Workplan (WRW)

.1 Prepare, Waste Reduction Workplan.

.2 Structure WRW to prioritize actions and follow as first priority Reuse, then followed by Recycle.

.3 Describe management of waste.

.4 Post workplan or summary where workers at site are able to review its content.

1.7 Materials Source Separation Program (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up. The Demolition Waste Audit (DWA), with related weight bills and/or receipt must be submitted on a monthly basis with the Contractor's monthly Progress claim.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate

deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separated condition.
.1 Transport to approved and authorized recycling facility.

1.8 Storage, Handling and Protection

.1 Store, materials to be reused, recycled and salvaged in locations as specified in MSSP.

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

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

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

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

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

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

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

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
.1 On-site source separation is recommended.
.2 Remove co-mingled materials to off-site processing facility for separation.
.3 Provide waybills for separated materials.

1.9 Disposal of Wastes

.1 Do not bury rubbish or waste materials.

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

.3 Keep records of construction waste including:
- .1 Number and size of bins.
- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.

.4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.10 Use of Site and Facilities

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by PCA.

1.11 Scheduling

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

PART 2 - PRODUCTS

.1 Not Applicable

PART 3 – EXECUTION

3.1 Application

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 Cleaning

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Sections

.1 Section 01 78 00 - Closeout Submittals.

.2 Section 01 74 11 - Cleaning.

1.3 Inspection and Declaration

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
.2 Request Departmental Representative's Inspection.

.2 Departmental Representative's Inspection: Departmental Representative 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 Work has been completed and in compliance with Workplace Health, Safety and Compliance Commission of Newfoundland and Labrador (WHSCC).
.4 Operation of systems have been demonstrated to Departmental Representative's personnel.
.5 Work is complete and ready for Final Inspection.

.4 Final Inspection: when items noted above are

completed, request final inspection of Work by Departmental Representative, in conjunction with Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 – Testing and Quality Control.

.3 Section 01 71 00 - Examination and Preparation.

.4 Section 01 77 00 - Closeout Procedures.

1.3 Submission

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Departmental Representative's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged, free of defects, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.4 Format

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: Manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in dxf or dwg format on diskettes or CD.

1.5 Contents - Each Volume

.1 Table of Contents: provide title of project;
.1 date of submission; names,
.2 addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
.3 schedule of products and systems, indexed to content of volume.

.2 For each product or system:
.1 list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – Testing and Quality Control.

1.6 As-Builts and Samples

.1 Maintain at the site for Departmental Representative one record copy of:
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders and other modifications to the Contract.
.5 Reviewed shop drawings, product data, and samples.
.6 Field test records.
.7 Inspection certificates.
.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.7 Recording Actual Site Conditions

.1 Record information on set of opaque drawings, provided by Departmental Representative.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
.1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.2 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.3 Field changes of dimension and detail.
.4 Changes made by change orders.
.5 Details not on original Contract Drawings.
.6 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:
.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 Final Survey

.1 Contractor is to submit final site survey certificate, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 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.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until the Date of 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.

1.10 Materials and Finishes

.1 Building Products, Applied Materials, and Finishes: include produce data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 55 26 – Traffic Regulations.

.2 Section 01 35 43 – Environmental Procedures.

.3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.2 Description

.1 This section specifies requirements for deconstruction, 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 Deconstruction/demolition, removal and disposal of the bridge superstructure in its entirety. This includes, but is not limited to asphalt, concrete deck and curbs, aluminum rail system, deck drains, structural steel beams, bracing, diaphragms, tension rod system, and bearing assemblies.

.2 Removal of bearing blocks, barrier walls and wing walls of both abutments.

.3 Partial removals of concrete at abutments to prepare for modifications as detailed to suit new work.

.4 Approach guide rails and posts to limits and extent as detailed to suit new work.

.5 Approach roadway to limits and extent required to install new work.

.3 The aluminum traffic rail system will be salvaged by the Owner. Contractor to include, in his price, costs to deconstruct transport and unload traffic rail system with minimum damage to components, at Big Brook Pit.

1.3 References

.1 Definitions:

.1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly.

.2 Reference Standards:

.1 CSA International
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 Federal Legislation
.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
.4 Motor Vehicle Safety Act 1993, c.16.

1.4 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, Departmental Representative.

1.5 Administrative Requirements

.1 Pre-Demolition Meeting:
.1 Convene pre-demolition meeting 1 week prior to beginning work on-site, with Contractor's Representative and Departmental Representative in accordance with Section 01 31 19 –Project Meetings to:
.1 Verify project requirements.
.2 Verify existing site conditions adjacent to demolition work.
.3 Co-ordination with other construction subtrades.

1.6 Quality Assurance

.1 Qualifications: provide adequate workforce training through meetings and demonstrations. Have someone on site with deconstruction experience throughout project for consultation and supervision purposes.

.2 Regulatory Requirements:
.1 Ensure Work is performed in compliance with CEPA, CEAA, TDGA, MVSA and applicable Provincial/Territorial regulations.

1.7 Environmental Requirements

.1 Do Work in accordance with Section 01 35 43 – Environmental Procedures.

.2 Ensure deconstruction work does not adversely affect adjacent watercourses, groundwater and

wildlife, or contribute to excess air noise pollution.

.3 Fires and burning of waste or materials is not permitted on site.

.4 Do not bury waste or materials on site unless approved in writing by Departmental Representative.

.5 Do not dispose of waste or volatile materials into watercourses, storm or sanitary sewers.
.1 Ensure proper disposal procedures in accordance with applicable Provincial/ Territorial regulations.

.6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties in accordance with authorities having jurisdiction.

.7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction as directed by Departmental Representative.

.8 Protect trees, plants and foliage on site and adjacent properties where indicated.

.9 Prevent extraneous materials from contaminating air beyond deconstruction area, by providing temporary enclosures during Work.

.10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on temporary roads.

1.8 Site Conditions

.1 Structures to be demolished to be based on their condition at time of examination prior to tendering.

.2 Support affected structures and, if safety of structure being deconstructed or adjacent services appears to be endangered, take

preventative measures. Cease operations and immediately notify Departmental Representative.

.3 Prevent debris from blocking surface drainage system.

PART 2 – PRODUCTS

2.1 Equipment

.1 Leave equipment and machinery running only while in use. Except where extreme temperatures prohibit shutting down.

.2 Where possible, use water efficient wetting equipment/trucks/attachments when minimizing dust.

PART 3 - EXECUTION

3.1 Execution

.1 Inspect site and verify with Departmental Representative objects designated for removal.

3.2 Preparation

.1 Obtain necessary permits and approvals.

.2 Locate and protect utility lines. Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.

3.3 Removal

.1 Remove in their entirety all materials and objects specified for removal.

.2 Do not disturb adjacent work designated to remain in place.

3.4 Safety Code

.1 Do demolition work in safe manner and according to provincial regulations.

.2 Blasting is not permitted.

3.5 Disposal of Materials

.1 The Owner will have the first right of refusal (at no cost) to all deconstructed 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 the satisfaction of Departmental Representative and in accordance with all applicable permits.

3.6 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.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Management and Disposal.

.3 Section 03 20 00 - Concrete Reinforcing.

.4 Section 03 30 00 – Cast-in-Place Concrete.

1.2 Description

.1 This section specifies the materials for forms as well as their fabrication, erection and removal.

1.3 References

.1 American Concrete Institute (ACI)
.1 ACI 301-10, Specifications for Structural Concrete.

.2 Canadian Standards Association (CSA International)
.1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction.
.2 CSA-O86-14, Engineering Design in Wood (Limit States Design).
.3 CSA O121-08(R2013), Douglas Fir Plywood.
.4 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
.5 CAN/CSA-S269.3-M92(R2013), Concrete Formwork, National Standard of Canada.

.3 Council of Forest Industries of British Columbia (COFI)

1.4 Shop Drawings

.1 Submit shop drawings for formwork and falsework in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangements of joints, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3 for formwork drawings.

.3 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.

.4 Indicate sequence of erection and removal of

formwork/falsework as directed by Departmental Representative.

.5 Each shop drawing submission shall bear the stamp and signature of qualified professional Engineer registered or licensed in the Province of Newfoundland and Labrador.

1.5 Responsibility

.1 Design for method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, ties, liners, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.

1.6 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.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.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.7 Delivery, Storage and Handling

.1 Deliver, handle and store formwork materials to prevent weathering, warping or damage detrimental to the strength of the materials or to the surface to be formed.

.2 Ensure that formwork surfaces which will be in contact with concrete are not contaminated by foreign matter. Handle and erect the fabricated formwork so as to prevent damage.

PART 2 - PRODUCTS

2.1 Materials

.1 Formwork materials:
.1 Use high density overlaid plywood to CSA O121.
Alternatively, use heavy-gauge steel forms.

.2 The form facing material shall be free from surface defects and meet deflection requirements

in accordance with CAN/CSA S269.3.

.2 Falsework materials: to CSA S269.1.

.3 Form ties:
.1 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface. Holes are to be filled with non-shrink grout.
.2 Adjustable in lengths to permit tightening and alignment of forms.
.3 Form tie colour shall be grey.

.4 Form release agent: compatible with repair materials, non-toxic, biodegradable, low VOC, chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.

.5 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 15 and 24 mm^2/sat 40°C, flashpoint minimum 150°C, open cup.

PART 3 - EXECUTION

3.1 Fabrication and Erection

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings. Review all drawings and check dimensions prior to construction for proper fit and report any discrepancies before proceeding with the work.

.2 Assemble formwork so that concrete is not damaged during its removal.

.3 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.

.4 Do not place shores and mud sills on frozen ground.

.5 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and

levels indicated within tolerances required by CSA-A23.1/A23.2.

.7 Align form joints and make watertight. Keep form joints to minimum.

.8 Make the form mortar tight by sealing with building tape or sealants along all joints.

.9 Where concrete is to remain exposed, use 20 mm chamfer strips on external corners and 20 mm fillets at interior corners, joints, unless specified otherwise.

.10 Form chases, slots, openings, drips, recesses and expansion joints as indicated.

.11 Prior to placing concrete, the elevations of forms shall be checked to verify drainage slopes.

.12 Provide 48 hour notice to Departmental Representative for inspection prior to concrete placement.

.13 Clean formwork to remove foreign matter. Remove cuttings, shavings and debris from within forms. Flush completely with water to remove remaining foreign matters. Ensure that water and debris drain to exterior through clean-out ports.

.14 During cold weather, remove ice and snow from within forms, do not use de-icing salts. Do not use water to clean out completed forms, unless formwork and concrete construction proceed within a heated enclosure.

.15 Repair concrete will be placed within the working time of bonding coats.

.16 Patch all form tie holes and finish surface to remove all evidence of tie holes and/or patching.

.17 Construction Joints:
.1 Form construction joints where required and as approved.

.18 Build in anchors, sleeves, and other inserts required to accommodate work specified in other sections.

.19 Clean formwork in accordance with CSA A23.1/A23.2 before placing concrete.

3.2 Removal and Reshoring

.1 Notify Departmental Representative prior to form removal.

.2 Form removal times are dependent on proper curing in accordance with CAN/CSA-A23.1, CSA S269.1 and CAN/CSA-S269.3. Provide written evidence of concrete strength to the Departmental Representative 24 hours prior to form removal to show that suitable strength has been achieved. Contractor shall pay for the concrete cylinder strength tests to demonstrate concrete strength prior to form removal.

.3 Remove formwork progressively and in accordance with the reference code requirements, and so that no shock loads or imbalanced loads are imposed on the structure.

.4 Leave formwork in place for following minimum periods of time after placing concrete.
.1 3 days or at achievement of 80% of 28-day design strength for walls and vertical surfaces.
.2 28 days for deck soffits or 7 days when replaced immediately with adequate shoring and concrete has achieved at least 70% of its 28 day design strength.

.5 Remove forms not directly supporting the weight of concrete as soon as stripping operations will not damage concrete.

.6 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

.7 Loosen forms carefully. Do not wedge pry bars, hammers or tools against concrete surfaces.

.8 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.9 Remove all forms. Do not leave any forms in place after completion of project.

3.3 Form Finishes

.1 Form finishes: to CSA A23.1 and ACI 301 as follows:
.1 Exposed soffit "Smooth Form Finish".

.2 Sides of walls and formed surfaces buried below earth: Rough form finish.
.3 Sides of walls and formed surfaces exposed to view: Rubbed finish as per ACI 301.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 03 10 00 - Concrete Forming and Accessories.

.4 Section 03 30 00 – Cast-in-Place Concrete.

1.2 Description

.1 This section specifies concrete reinforcing materials, their fabrication and placing.

1.3 References

.1 American Concrete Institute (ACI)
.1 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.

.2 American Society for Testing and Materials International (ASTM)
.1 ASTM A108-13, Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.

.3 Canadian Standards Association (CSA)
.1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction.
.2 CSA-A23.3-14, Design of Concrete Structures.
.3 CSA-G30.3-M83 (R1998), Cold Drawn Steel Wire for Concrete Reinforcement.
.4 CSA-G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
.4 CSA-S806-12, Design and Construction of Building Structures with Fibre-Reinforced Polymers.

.4 Reinforcing Steel Institute of Canada (RSIC)
.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.4 Shop Drawings

.1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, and locations of reinforcement with

identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

.3 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated. Provide Class B tension lap splices unless otherwise indicated.

.4 Each shop drawing submitted to bear the stamp and signature of a qualified Professional Engineer registered in the Province of Newfoundland and Labrador.

1.5 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 Materials

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

.2 Reinforcing bars:
.1 Black steel reinforcing: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
.2 GFRP (glass fiber reinforced polymer) reinforcing: sand coated bars, ultimate tensile strength (f_{FRPu}) for straight bars of 1184 MPa in accordance with CSA S806 and specified modulus of elasticity (E_{FRP}) of 62.6 GPa.
Acceptable supplier: Pulltrall V-ROD Grade III (HM).

.3 Tie wires:
.1 Black steel reinforcing: cold-drawn annealed steel wire ties: minimum 1.5 mm diameter to CAN/CSA G30.3.
.2 GFRP reinforcing: type 316LN or type 316L stainless steel wire, 1.2 or 1.6 mm in diameter.

.4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2, adequate for strength and support of reinforcing during construction

conditions, all of which to be non-staining. Do not use metal chairs. Colour to be grey where all or portions of the chair may remain exposed.

.5 All black steel reinforcing are designed using Metric (SI) reinforcing steel bar sizes and the Contractor shall supply accordingly.

.6 All GFRP reinforcing are designed using imperial bar sizes and the Contractor shall supply accordingly.

2.2 Fabrication

.1 Fabricate reinforcing bars in accordance with CSA-A23.1/A23.2, ANSI/ACI 315 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada. Shop fabricate and bend all reinforcing bars.

.2 Fabricate to the following tolerances:
.1 Sheared length + 25 mm.
.2 Stirrups + 10 mm.
.3 Other bends + 25 mm.

.3 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 Source Quality Control

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to beginning reinforcing work. Mill certificates shall be in accordance with CAN/CSA G30.18.

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

.3 Prior to fabrication of GFRP reinforcement, submit GFRP bar supplier to Departmental Representative for approval.

2.4 Cleaning

.1 Clean reinforcing to CSA-A23.1/A23.2. All reinforcing bars are to be free of scale rust and contamination at time of placing in forms.

PART 3 - EXECUTION

3.1 Examination

.1 Examine work related to this section and report discrepancies to Departmental Representative.

.2 Commencement of work shall imply acceptance of conditions.

3.2 Field Bending

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 No field bending of GFRP reinforcing bars will be allowed under any circumstances.

.4 Replace bars, which develop cracks or splits.

3.3 Placing Reinforcement

.1 Place reinforcing bars as indicated on reviewed placing drawings and in accordance with CSA-A23.1/A23.2.

.2 Provide all chairs, braces, lateral support, headers, ties, etc. to secure reinforcing in place during construction.

.3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

.4 Ensure cover to reinforcement is maintained during concrete pour.

.5 Under no circumstances will concrete trucks or highway traffic be permitted to travel over the reinforcing during concrete placing operations.

.6 After reinforcing is placed and prior to closing of forms, notify the Departmental Representative for inspection of the Work.

.7 Reinforcement shall be adequately supported by chairs, spacers or hangers and secured against displacement within the tolerance permitted and in accordance with the latest ACI Standard 315.

3.4 Storage

.1 Store reinforcing bars to prevent deterioration,

contamination or disfigurement.

.2 Store reinforcing bars off the ground.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 29 – Health and Safety Requirements.

.3 Section 01 45 00 – Testing and Quality Control.

.4 Section 03 10 00 - Concrete Forming and Accessories.

.5 Section 03 20 00 - Concrete Reinforcing.

.6 Section 03 35 00 – Concrete Sealer.

.7 Section 03 40 00 – Concrete Waterproofing.

.8 Section 31 23 10 – Excavating, Trenching and Backfilling.

1.2 Description

.1 This section specifies requirements for the supply and installation of all cast-in-place concrete work for the bridge deck, curbs, abutments and approach slabs.

1.3 References

.1 American Concrete Institute (ACI)
.1 ACI 117-10, Standard Tolerances for Concrete Construction and Materials.

.2 American Society for Testing and Materials International (ASTM)
.1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
.2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
.3 ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.
.4 ASTM C881/C881M-10, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
.5 ASTM C1107/C11107M-14a, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
.6 ASTM D1622/D1622M-14, Standard Test Method for Apparent Density of Rigid Cellular Plastics.
.7 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint

Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.3 Canadian Standards Association (CSA)
.1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
.2 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.
.3 CSA-A3000-08, Cementitious Materials Compendium.

.4 Government of Newfoundland and Labrador, Department of Transportation and Works, Highway Design Division, Specifications Book, 2011 edtion.

.5 Technical Guidelines No. 03732 published by the International Concrete Repair Institute (ICRI).

.6 COE CRD-C621 – US Army Corps of Engineers Specification for Nonshrink Grout.

1.4 Certificates

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

.2 Provide certification indicating the concrete supplier is certified in accordance with the Atlantic Provinces Ready Mix Concrete Association Program or equivalent.
.1 Only concrete supplied from such certified plants shall be acceptable to the Departmental Representative.
.2 Plant certification shall be maintained for the duration of the fabrication and erection until the warranty period expires.

.3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.

.4 Provide mix design in compliance with CSA-A23.1 to provide concrete of quality, yield and strength as specified under 2.2 Mix Design. Mix design to be prepared by and stamped by an engineer licensed to practice in the Province of Newfoundland and Labrador.

.5 Prior to starting concrete work, submit to Departmental Representative 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 Admixtures.
- .5 Aggregates.
- .6 Water.

1.5 Waste Management and Disposal

.1 Designate a cleaning area for concrete trucks off site, at a company owned site for such a purpose meeting all federal and provincial requirements.

.2 Use trigger operated spray nozzles for water hoses.

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

.4 Carefully coordinate the specified concrete work with weather conditions.

.5 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or waterways. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal.

.6 Choose least harmful, appropriate cleaning method which will perform adequately.

1.6 Quality Assurance

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

.2 Submit to Departmental Representative, minimum four weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
- .1 When plant does not hold valid certification, provide test data and certification by qualified independent inspection and testing laboratory that materials used in concrete mixture will meet specified requirements.

.3 Minimum 4 weeks prior to starting concrete work,

submit proposed quality assurance procedures for review by Departmental Representative on following items:
.1 Falsework erection.
.2 Hot weather concrete.
.3 Cold weather concrete.
.4 Curing.
.5 Finishes.
.6 Formwork removal.
.7 Joints.

.4 At least fifteen (15) days prior to the start of the concrete construction schedule, a pre-concrete conference must be held. The mix designs shall be reviewed, and the required methods and procedures to achieve the required concrete shall be discussed. Send a pre-concrete conference agenda to all the attendees ten (10) days prior to the scheduled date of the conference.

.5 Arrange for representatives of parties concerned with the concrete work to attend the conference, including but not limited to the following:
.1 The Contractor.
.2 The concrete sub-contractor.
.3 The Departmental Representative.
.4 The Owner’s Representative.

.6 Record minutes of meeting and distribute to all parties concerned within five (5) days of meeting. Submit minutes to Departmental Representative.

.7 Quality Control Plan: submit written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

.8 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.7 Delivery, Storage and Handling

.1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
.1 Modifications to maximum time limit must

be agreed to by Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
.2 Deviations to be submitted for review by Departmental Representative.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

PART 2 - PRODUCTS

2.1 Materials

.1 All materials for concrete structure to be in accordance with the Newfoundland and Labrador Department of Transportation and Works, 2011 Edition, Section 904 – Concrete Structures, article 904.02 – Materials.

.2 Curing compound: to CSA-A23.1/A23.2.

.3 Non-shrinkage grout: premixed compound consisting of non-metallic aggregate, Portland Cement, water-reducing and plasticizing agents to CAN/CSA A23.1/A23.2.
.1 Product shall conform to:
.1 CRD C621, US Army Corps of Engineers Specification for Non-Shrink Grout.
.2 ASTM C1107, Standard Specification for Packaged, Dry, Hydraulic-Cement Grout (Non-Shrink).
.2 Compressive strength at flowable consistency: 50 MPa (7250psi) at 28 days.
.3 Expansion at flowable consistency: 0.03% at 28 days.
.4 Deck Closure strip shall have a flowable consistency.
.5 Add aggregates to mix as per the manufacturers recommendations.
.6 Acceptable products:
.1 NS Grout by Euclid Chemical Company.
.2 MasterFlow 713 by BASF.
.3 Alternate Materials: Approved by addendum in accordance with instructions to Tenderers.

.4 Bar couplers: to meet or exceed capacity of coupled bars in tension. To be BPI standard barsplicer system, or approved alternate, with protective plug.

.5 Joint filler board: bituminous impregnated fibre board: to ASTM D1751.

.6 Polyethylene film under approach slabs: 2 sheets each 6 mils thick, to CAN/CGSB-51.34.

2.2 Mixes

.1 The contractor shall be responsible for the concrete mix design.

.2 It shall be the responsibility of the Contractor to ensure that the mixture proportions shall be properly batched, mixed, placed and cured such that the concrete conforms to the specifications.

.3 Mix designs to be in accordance with the Newfoundland and Labrador Department of Transportation and Works Specifications Book, 2011 Edition. Mix designs to produce the specified properties and meet the parameters listed in the table given in article 904.04.02 - Concrete Quality of 45 MPa for all concrete.

.4 Where admixtures are used, do not allow end-of-truck slump with admixtures to exceed 150mm.

.5 In sufficient time before placement, submit all concrete mix designs to Departmental Representative for approval. No concrete shall be placed before mix designs are approved.

.6 Obtain authorization from Departmental Representative for use of super plasticizing admixture, water reducer and all other admixtures. Add plasticizer, water reducer and/or other admixtures as approved by Departmental Representative to achieve desired concrete properties. Pay for all admixtures required.

.7 Provide quality management plan to ensure verification of concrete quality to specified performance.

.8 Use of Calcium Chloride not permitted.

PART 3 - EXECUTION

3.1 Preparation

.1 Obtain Departmental Representative’s approval before placing concrete. Provide 24 hours’ notice

prior to placing of concrete.

.2 Place, consolidate, finish, cure and protect concrete to CAN/CSA-A23.1 except where specified otherwise.

.3 Pumping of concrete is permitted only after approval of equipment and mix.

.4 Secure in position reinforcing steel, embedded parts, anchor bolts and dowels etc. prior to placing concrete and ensure these are not disturbed during concrete placement in accordance with CAN/CSA A23.1.

.5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.7 Do not place load upon new concrete until authorized by Departmental Representative.

.8 During concreting operations:
.1 Development of cold joints not allowed.
.2 Ensure concrete delivery and handling facilities placing with minimum of rehandling, and without damage to existing structure or work.

.9 Ensure that reinforcement and formwork are thoroughly clean before placing.

.10 Place concrete in dry conditions.

.11 Ensure reinforcement and inserts are not disturbed during concrete placement.

.12 Protect previous work from staining.

.13 Bond fresh concrete to hardened concrete to CAN/CSA A23.1.

.14 Do not permit vertical free fall of concrete mix to exceed 1500 mm.

3.2 Construction

.1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.

.2 Construction Joints
.1 Construction joint locations shall be approved by Departmental Representative wherever they are not specifically designated on drawings.
.2 Surface of concrete construction joints shall be cleaned and laitance removed.
.3 Immediately before concrete is placed, all construction joints shall be wetted and standing water removed.

.3 Joint fillers.
.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
.2 Locate and form isolation, construction, expansion joints as indicated and as per CAN/CSA A23.1. Supply and install joint filler in strict accordance with manufacturer’s written instructions.

.4 Concrete shall not be placed on or against any surface (including rebar) that is at a temperature below 5°C (40°F).

.5 Concrete at time of deposit shall be between 10°C (50°F) and 30°C (85°F).

.6 Pour concrete continuously between predetermined construction and control joints.

.7 Carry out winter concreting in strict accordance with. CSA-A23.1/A23.2.

.8 Carry out hot weather concreting in accordance with CAN/CSA A23.1.

.9 Top surface of vertically formed lifts shall be generally level.

.10 Fill all construction joints in the completed concrete work minimum 28 days after casting employing an epoxy injection technique approved

by Departmental Representative to completely seal cracks.

3.3 Field Quality Control

.1 Quality Control Inspection and testing of concrete and concrete materials will be carried out by an independent testing agency in accordance with CAN/CSA A23.1/A23.2.

.2 For compressive strength testing of concrete a minimum of 3 cylinders and 2 field cured cylinders are required for:
.1 Each day's pour.
.2 Each type of grade of concrete.
.3 Each change of supplier.
.4 Each 40 cubic meters or fraction thereof.
.5 Test cylinders are required for testing at 7, 14 and 28 days as per requirements of CAN/CSA A23.1.
.6 Test cylinders are required for testing at 56 days, in addition to requirements of CAN/CSA A23.1.
.7 Conduct at least one slump and one air entrainment test with each compressive strength test.
.8 In addition, each truck to be tested for air and slump.
.9 Additional test specimen shall be taken whenever requested by Departmental Representative to verify concrete quality.
.10 Additional test specimen shall be taken during cold weather concreting.

.3 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 CSA-A23.1/A23.2.

.5 Inspection and testing by testing laboratory will not augment or replace contractor quality assurance nor relieve contractor of contractor responsibility.

3.4 Concrete Cover Over Reinforcement

.1 Ensure reinforcing bars are placed to specified tolerances.

.2 Concrete cover around reinforcing bars shall be as detailed on the Contract Documents.

.3 The preceding clear covers to be maintained within tolerances as per CAN/CSA S6.

.4 Provide continuous supervision during placement of concrete to ensure that reinforcing bars is maintained in its correct position.

3.5 Finishing

.1 Only ACI (American Concrete Institute) certified or other pre-approved concrete finishers are to be utilized in finishing all concrete works.

.2 Finish concrete in accordance with CSA-A23.1.
.1 Float surfaces with wood or metal floats or power finishing machines and bring surfaces to true grade or dimensions.
.2 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

.3 Deck and curb finish to be in accordance with class 6 finish of the Newfoundland and Labrador Department of Transportation and Public Works Specifications Book, 2011 edition, Section 904.08 Surface Finishing.

3.6 Curing

.1 Cure concrete in accordance with CAN/CSA A23.1.

.2 Ensure that freshly placed concrete is protected from freezing, dehydration, mechanical shock and contact with injurious substances.

.3 Use curing compounds compatible with applied finish on concrete. Do not use curing compounds that would have a detrimental effect on bonding, adhesion, curing, appearance, or similar qualities of materials applied to concrete surfaces. Use only moisture curing where finishes are incompatible with curing compound.

.4 Slab concrete to be moist cured in accordance with the Newfoundland and Labrador Department of Transportation and Public Works Specifications Book, 2011 edition, Section 904.05.02 Moist Curing.

.5 Protect the concrete from premature drying and extremes of temperature.

.6 Cure, protect and finish concrete to CAN/CSA A23.1, CSA S269.1 and S269.3. Curing type in accordance with specified exposure classification unless more stringent requirements are noted otherwise. Special curing and finishing requirements are as follows:
.1 Bridge deck and approach slabs: curing "TYPE 3". A wet-curing period of Seven (7) days at ≥ 10°C and for the time necessary to attain 70% of the specified concrete strength.

.7 Do not remove forms or shoring during curing period.

.8 Wet cure shall be done in accordance with CSA-A23.1/A23.2 and shall be done by:
.1 Non-staining absorptive mat fabric kept continuously wet.
.2 Additionally, curing mats shall be thoroughly wet when applied and kept continuously wet and in intimate contact with the concrete surface for the duration of the moist curing period. Mats shall be long enough to cover the entire width and edges of the concrete and lapped at joint to prevent drying between adjacent sheets. Mats shall be applied to concrete immediately after disappearance of surface water sheen after the final finishing pass.
.3 End laps shall be at least 75 mm and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during period using cover material and waterproof tape.
.4 Remove curing cover and allow concrete to air dry for at least twelve (12) hours prior to applying liquid densifier/sealer.

.9 Foot traffic shall be kept off curing concrete for 1 day.

.10 Vehicles shall be kept off concrete for 7 days.

3.7 Defective Work

.1 Repairs and classification of unacceptable concrete to be in accordance with CSA-A23.1/A23.2.

.2 Remove defective concrete and embedded debris and repair as directed by Departmental Representative.

.3 A cold joint, honeycombing or embedded debris in any concrete shall deem it defective. Remove and replace defective concrete as directed by Departmental Representative.

.4 Remove to bare concrete curing compounds detrimental to application of specified finishes.

.5 Concrete to be supplied at the minimum strength requirement at 28 days. Tests indicating strengths lower than specified will necessitate further testing as required by Departmental Representative. Cost for such testing to be at the Contractor's expense. Should further tests confirm low values, Departmental Representative has the right to require strengthening of the affected area or removal and replacement of weak concrete all to the Contractor's expense.

.6 Repair all shrinkage cracks in the completed concrete work minimum 28 days after casting employing an epoxy injection technique acceptable to Departmental Representative to completely seal all such cracks.

3.8 Surface Removal

.1 Surface removal shall apply at the full side and top surfaces of the existing breastwall as shown on plans.

.3 Surface removal work is intended to remove any unsound concrete and to obtain a rough surface for the new concrete.

.2 The surface removal and the removal of unsound and delaminated areas of concrete shall extend to the top of the footing.

.1 Concrete shall be removed to a minimum depth of 10 mm.

.2 Any additional unsound concrete, beyond the minimum specified, shall also be removed from these areas.

.1 Removal of concrete beyond the specified limit shall only be carried out when directed by the Departmental Representative.

.3 Concrete shall be removed in such a manner as to prevent damage to adjacent concrete, other components and utilities that are to remain in place.

.4 Reinforcing steel exposed during removal of unsound concrete shall not be damaged or loosened.

.5 Concrete removal shall not be permitted within 1 m of newly placed concrete for a period of 72 hours and to a minimum compressive strength of 20 MPa.

.6 For sound concrete, the surface must be roughened on a depth of 10 mm minimum.
.1 Roughening must produce a sufficiently rough surface corresponding to a CSP 7 roughness as specified in the guideline 03732 published by ICRI.

.7 For unsound concrete, concrete removal must be limited to the concrete which is removed by a high pressure water jet (15 MPa pressure, output 20 L/min, concentrated circular jet nozzle with nozzle to concrete surface distance of 150 to 200 mm).
.1 Concrete that can withstand the high pressure water jet can remain even if it’s considered low resistance concrete.

.8 Surface removal must also include the removal of all delaminated concrete.

.9 All of the exposed reinforcing steel within these repair areas shall be cleaned by sandblasting or high pressure water jet (or Departmental Representative approved alternate method) such that it is free of scale, rust and concrete.

.10 Once the bars are cleaned, clean the concrete surface with a high pressure water jet (15 MPa pressure, output 20 L/min, concentrated circular jet nozzle with nozzle to concrete surface distance of 150 to 200 mm).

.11 The exposed reinforcing bars shall be retied at each intersection point.

3.9 Partial Depth Removal .1 Partial depth removal shall apply at the full front surface of the existing breastwall as shown on plans.

.2 The partial depth removal and the removal of

unsound and delaminated areas of concrete shall extend to the top of the footing.

.1 Concrete shall be removed to a minimum depth of 125 mm or to a minimum of 25 mm behind the exposed reinforcing steel.

.2 Any additional unsound concrete, beyond the minimum specified, shall also be removed from these areas.

.1 Removal of concrete beyond the specified limit shall only be carried out when directed by the Departmental Representative.

.3 Concrete shall be removed in such a manner as to prevent damage to adjacent concrete, other components and utilities that are to remain in place.

.4 Reinforcing steel to remain in place shall not be damaged or loosened.

.5 For removal of concrete in front of the first layer of reinforcing steel: Chipping hammers shall weigh less than 30 kg.

.1 A jackhammer with an impact force of less than 60 J is also acceptable.

.6 For removal of concrete next to and behind the first layer of reinforcing steel: Chipping hammers shall weigh less than 7 kg.

.7 Hammer shall not come in contact with reinforcing bars in a manner which will cause debonding of bars in adjacent concrete areas not being repaired.

.8 Concrete removal shall not be permitted within 1 m of newly placed concrete for a period of 72 hours and to a minimum compressive strength of 20 MPa.

.9 All of the exposed reinforcing steel within these repair areas shall be cleaned by sandblasting or high pressure water jet (or Departmental Representative approved alternate method) such that it is free of scale, rust and concrete.

.10 Once the bars are cleaned, clean the concrete surface with a high pressure water jet (15 MPa

pressure, output 20 L/min, concentrated circular jet nozzle with nozzle to concrete surface distance of 150 to 200 mm).

.11 The exposed reinforcing bars shall be retied at each intersection point.

.12 if necessary, add reinforcement the same diameter as the existing bars to compensate for the section loss of more than 30%, either due to corrosion or demolition.

.1 In general, the loss of section of the reinforcing bars can be compensated globally. Thus, in the case where several bars have a section loss of the order of 30%, only a single additional bar would be needed for three bars deteriorated.

.2 To establish continuity, the necessary splice length each side of the damaged section shall be 600 mm minimum.

END OF SECTION

END

PART 1 – GENERAL

1.1 Related Sections

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

1.2 Description

.1 This section specifies the requirements for the supply, surface preparation, and application of the concrete sealer. To be applied to all surfaces of the deck, curbs and abutments to be exposed in the finished work.

1.3 References

.1 Canadian Standards Association (CSA)
.1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 NCHRP Standard 244-82 (R2013), "Concrete Sealers for Protection of Bridge Structures".

.3 Government of Newfoundland and Labrador, Department of Transportation and Works, Highway Design Division, Specifications Book 2011 (2013 Erratas).

1.4 Performance Requirements

.1 Product quality and quality of work in accordance with Section 01 61 00 – Common Product Requirements.

.2 Materials, surface preparation and application of surface sealer to be in accordance with Section 924, Application of Concrete Sealers, of the Newfoundland and Labrador Department of Transportation and Works, Highway Design Division Specifications Book 2011 (2013 Erratas).

1.5 Product Data

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

.2 Submit WHMIS MSDS - Material Safety Data Sheets - Hazardous Materials. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content.

1.6 Environmental Requirements

.1 Moisture:
.1 Ensure concrete substrate is within moisture limits prescribed by sealer manufacturer.

.2 Safety:
.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

PART 2 - PRODUCTS

2.1 Sealing Compounds

.1 Materials to be in accordance with the Newfoundland and Labrador Department of Transportation and Works, Highway Design Division Specifications Book 2011 Edition (2013 Erratas), Section 924 – Application of Concrete Sealers.

PART 3 - EXECUTION

3.1 Examination

.1 Verify that surfaces are ready to receive work.

3.2 Execution

.1 Rub exposed sharp edges of concrete with carborundum to produce 1/8" (3 mm) radius edges unless otherwise noted.

3.3 Application

.1 After concrete has cured and surface of concrete is dry, apply minimum one application of silane concrete sealer uniformly to all exposed surfaces of deck, curbs and abutments. Do not apply on deck surfaces with waterproofing membrane.

.2 Application to be as per Newfoundland and Labrador Department of Transportation and Works, Highway Design Division Specifications Book 2011 Edition (2013 Erratas), Section 924 – Application of Concrete Sealers.

.3 Do not apply silane concrete sealer to damp surfaces.

3.4 Protection

.1 Protect finished installation in accordance with manufacturer's instructions. Clean overspray from adjacent surfaces.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 43 – Environmental Procedures.

.3 Section 03 30 00 – Cast-in-Place Concrete.

1.2 Description

.1 This section specifies requirements for the supply and installation of the concrete waterproofing system for the bridge deck and approach slabs.

1.3 Sampling and Testing

.1 The Departmental Representative may require that sufficient quantities of the asphalt membrane, rubber membrane, and protection board be supplied from the materials being used on the project for immediate analysis, flow tests, water absorption, or for other future testing purposes.

PART 2 - PRODUCTS

2.1 Materials

.1 All materials for this application will be reviewed for acceptance by the Departmental Representative.

.1 Tack Coat: The tack coat used in conjunction with the asphalt membrane shall be primer, cut back with an equal volume of gasoline type solvent, or an acceptable alternative cut-back asphalt product and be compatible with the asphalt membrane.

.2 Asphalt Membrane: Asphalt membrane shall be hot applied rubberized asphalt and shall be supplied in cakes ready for melting and application.

.1 Acceptable materials:

.1 “Bakor” 790-11

.2 “Temproof” 150

.3 “Permaquick 6100” W.I. 250

.4 “Hydrotech 6125”

.5 “Beamalastic 1213 BDM”

.3 Rubber Membrane: The rubber membrane shall be 1.2 mm thick butyl rubber.

.1 Acceptable materials:

.1 “Elastosheet 6147”

.2 “BP47 Elastomeric Reinforcement”

.3 “Bakor 990-25”

.4 Waterproofing Protection Board: The

protection board shall be a durable panel of 3 mm thickness specifically designed to provide a protective cushion between the hot mix asphaltic concrete pavement and the asphalt waterproofing membrane. It shall have a water absorption property of 5% or less and shall meet the Ontario Ministry of Transportation and Communications Material Specification for Protection Board. Protection Board shall consist of spun glass fibres and not cellulose reinforcing fibres.

.1 Acceptable materials:

.1 "Vibraflex MTO Protection Board"

.2 "Bakor Asphalt Protection Board"

.3 "IKO Protectboard"

2.2 Equipment

.1 An approved heating and mixing kettle shall be used to heat the hot-applied rubberized asphalt membrane. The kettle shall be of the double boiler oil transfer type with a built-in agitator and equipped with permanently installed dial type thermometers to measure the temperature of the melted compound and the oil.

PART 3 - EXECUTION

3.1 Procedure

.1 The Contractor shall perform all of the operations involved in waterproofing in sequential order, such that there are no delays between individual operations except those necessary to meet the requirements of these specifications.

.2 The Contractor shall give the Departmental Representative 48 hours' notice prior to commencing any waterproofing operations.

.3 The bridge deck and approach slabs must be completely dry and cured at least 14 days before application of tack or membrane can proceed.

.4 The existing surface of the concrete shall be completely shotblasted to expose sound, laitance-free concrete. All dirt and debris shall be removed and disposed of, leading a prepared surface satisfactory for tack coating. Tack coating and waterproofing shall not commence until the Departmental Representative has accepted all preparation work.

.5 Immediately prior to the application of the tack

coat, the concrete surface shall be air blasted to remove all dust and any other foreign material.

.6 The tack coat shall be cut back 50% with gasoline solvent.

.7 The application rate shall be such that the tack material will be absorbed into the concrete, resulting in a surface that is dull and black in appearance.

.8 The application of an excessive amount of tack as indicated by a shiny black surface shall be avoided.

.9 Tack coat material shall be applied with approved equipment which will provide uniform application at the required rate.

.10 The tack coat shall be applied only when the concrete is dry and clean, and when the air and concrete surface temperatures are above 5°C.

.11 Waterproofing equipment or material shall not be permitted on the tack coat until it has fully cured and is completely tack-free.

.12 The following reinforcement shall be applied over all construction joints, and over any cracks designated by the Departmental Representative.
.1 Prior to the application of the asphalt membrane to the deck, a coat of hot asphalt membrane at least 4 mm thick and wide enough to extend 200 mm on either side of the joint or crack shall be applied in accordance with Section 3.2 below, to the tack-coated concrete surface.

.13 A strip of butyl rubber membrane material wide enough to extend 150 mm on either side of the joint or crack shall be applied while the asphalt membrane is still hot.

.14 Along all curbs, the hot asphalt membrane shall be applied to the height indicated.

.15 The rubber membrane shall extend up the vertical faces as indicated.

3.2 Application of

.1 Cakes of asphalt membrane shall be melted in the

Asphalt Membrane

mechanically agitated heating and mixing unit specified. This unit shall keep the contents continuously agitated until the material can be drawn free flowing and lump-free from the mixing unit at a temperature not exceeding that recommended by the manufacturer.

.2 Membrane shall not be applied until the tack coat has cured completely.

.3 The asphalt membrane shall be applied within the temperature range recommended by the manufacturer, to the clean, tack-coated concrete deck, to form a uniform film having a minimum thickness of 4 mm and a maximum thickness of 6 mm.

.4 The laying operation shall be such that discontinuities in the membrane are avoided and any joints lapped 150 mm.

.5 The membrane shall be applied over all waterproofed joints and cracks, and shall extend up the face of the curbs, to the height of the top of the hot mix surface course.

3.3 Application of Protection Board

.1 The Contractor shall check and ensure that the asphalt membrane thickness conforms to the specified requirement, prior to placing the protection board.

.2 Protection boards shall be laid on the asphalt membrane, while the membrane is still hot, with the length of the board running transversely, on the deck. It shall be rolled by means of a linoleum or lawn type roller in order to ensure good contact with the membrane.

.3 The protection boards shall be placed with edges overlapping 25 mm both longitudinally and transversely.

.4 The protection board edge shall be within 5 mm of all curbs.

.5 Protection boards shall be placed such that the longitudinal (direction of traffic flow) joints are staggered at least 150 mm.

.6 In instances where edges of the protection board curl up, the edges shall be cemented down using hot membrane material to the satisfaction of the Departmental Representative.

.7 Protection boards that are warped, distorted or damaged in any way, by manufacture, storage, handling or exposure to weather, shall be rejected.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 02 41 16 – Deconstruction of Structure.

.2 Section 03 30 00 – Cast-In-Place Concrete.

.3 Section 05 50 00 – Metal Fabrications.

.4 Section 09 97 19 – Paint Coating System.

1.2 Description

.1 This section specifies the requirements for the materials, fabrication, supply and erection of the replacement superstructure steel including beams, bracing, diaphragms, studs, bearings, temporary works, and quality control testing and inspection.

1.2 References

.1 American Association for State Highway and Transportation Officials (AASHTO)
.1 AASHTO Standard Specifications for Highway Bridges – 17th Edition 2002.

.2 American Society for Testing and Materials International (ASTM International)
.1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.2 ASTM A325M-14, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.
.3 ASTM A490M-14a, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints Metric.

.3 Canadian Standards Association International (CSA International)
.1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.2 CAN/CSA S6-14, Canadian Highway Bridge Design Code (CHBDC).
.3 CSA S16-14, Design of Steel Structures.
.4 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
.5 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
.6 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

1.4 Administrative

.1 Pre-Installation Meeting:

Requirements

.1 Convene pre-installation meeting four weeks prior to beginning on-site delivery/installation of superstructure steel between Departmental Representative, General Contractor, Site Superintendent, Steel Fabricator and Steel Erector to:

.1 Verify project requirements.

.2 Review erection and substrate conditions.

.3 Review engineered erection plan, traffic control/closure requirements, erection schedule, and emergency measures planning.

.2 Site Meetings: as part of manufacturer's Services described in PART 3 – Field Quality Control, schedule site visits, to review work.

1.5 Action and Informational Submittals

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador, Canada.

.2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, studs, braces, diaphragms and welds. Indicate welds by CSA W59, welding symbols.

.3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

.4 Submit description of methods, temporary bracing and strengthening, sequence and phasing of erection and type of equipment proposed for use in erecting structural steel.

.5 Shop drawing submittal to be complete package including all erection drawings and all

piece details and related camber diagrams.

.6 The Contractor shall schedule 3 weeks (15 business days) for the Departmental Representative's detailed single review of the bridge superstructure steel shop drawings. This review time will start the following business day after the Contractor has submitted the shop drawings to the Departmental Representative. If additional reviews of shop drawings are required, the additional time beyond that scheduled for the initial review will be required and the time required for subsequent shop drawing reviews shall not be constituted in any way by the Contractor as a delay.

1.6 Delivery, Storage and Handling

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Provide protective blocking for lifting, transportation and storing.

.1 Exercise care during fabrication, transportation and erection so as not to damage beams and superstructure steel components.

.2 Do not notch edges of members.

.3 Do not cause excessive stresses.

.3 Mark mass on members weighing more than 3 tonnes.

.4 Ensure that no portion of steel comes into contact with ground.

.5 Provide Departmental Representative with delivery schedules minimum 7 days prior to shipping.

.6 Replace defective or damaged materials with new.

1.7 Quality Assurance

.1 Preconstruction Testing:

.1 Provide suitable facilities and cooperate with Departmental Representative in carrying out inspection and tests required.

.2 Adequate time shall be allotted for in both the construction and fabrication schedules to allow inspectors to complete all inspections and tests

required. The construction and fabrication schedules provided for review to the Departmental Representative at the start of construction shall designate inspection task items that clearly show the time allotted for inspections and tests.

PART 2 – PRODUCTS

2.1 Materials

.1 Structural steel: to CSA G40.20/G40.21—
.1 Grade 350 AT, category 3 for all structural steel with the exception of secondary members comprised of rolled shapes.
.1 This material shall possess a minimum Charp V Notch impact energy of 27 Joules when tested at minus 30ºC as evidenced by rolling mill certificates.
.2 Grade 350A, for all rolled beams, angles and pintles.

.2 High strength bolts, nuts and washers: bolts to ASTM A325M galvanized type 1 with grade A563 DH nuts.

.3 Anchor bolts: to ASTM A307.

.4 Bearings: All materials shall conform to the requirements of CAN/CSA S6. Elastomer bearing pads shall have 100% virgin natural polyisoprene of nominal 55 ± 5 durameter hardness to CAN/CSA S6.

.5 Shear studs: Headed stud type in accordance with the requirements of CAN/CSA W59.

.6 Welding electrodes: to CSA W48 series.

.7 Hot dip galvanizing: to ASTM A123/123M, minimum zinc coating of 600 g/m^2.

2.2 Fabrication

.1 Fabrication shall not commence prior to the review of shop drawings by the Departmental Representative. Any fabrication done without the reviewed shop drawings may be rejected. All steel fabrication shall be done in accordance with CSA S6, CSA W59 and in accordance with the reviewed shop drawings.

.2 Workmanship and finish shall be of the best modern general practice in the bridge fabrication and construction industry, Stressing, flame cutting and planning shall be done carefully and accurately. Particular attention shall be paid to the neatness and uniformity of finish of all parts of the work exposed to view.

.3 Steel coatings: All structural steel to be painted see Section 09 97 19 – Paint Coating System.

2.3 Source Quality Control

.1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.

.2 Provide Departmental Representative, prior to fabrication, with two (2) copies of steel producer certificates, in accordance with CSA G40.20/G40.21.

.3 Provide Departmental Representative with two (2) copies of mill certificates for all steel and certified test reports for Charpy V-notch tests and NDT testing.

.4 Provide suitable facilities and cooperate with inspection organization and Departmental Representative in carrying out inspection and tests required.

.5 The acceptance criteria for all welding inspections shall be based on CSA W59, Section 12, Cyclically Loaded Structures.

.1 All welds shall be visually inspected. All full penetration welds, except those specified in webs, shall be 100% inspected by Radiographic or Ultrasonic methods. When welds are tested by Ultrasonic method, spot Radiography shall be performed on 10% of those welds tested.

.2 All full penetration welds in webs shall be inspected by Radiographic or Ultrasonic methods for at least 25% of the weld length. The inspection shall be performed nearest the tension flange. If defects are identified, additional inspections shall be done to determine the extent of these defects.

.3 Web-to-flange fillet welds shall be subject to magnetic particle inspection in accordance with the following:

.1 Submerged arc welds: 25 percent of

length.
.2 Semi-automatic welds: 50 percent of length.
.3 Manual welds: 100 percent of length.

.4 Fillet welds for attaching gusset plates, diaphragms and stiffeners shall have 25 percent of the total weld length tested by magnetic particle inspection.
.5 All gusset plates and stiffeners for attaching diaphragms and/or bracing shall be tested for 100 percent of the weld length.
.6 The cost of additional inspection and testing made necessary by the Contractor’s work not meeting these specifications shall be the responsibility of the Contractor.

PART 3 – EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrates previously installed under other Sections are acceptable for structural steel installation in accordance with manufacturer's written instructions.
.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Preparation

.1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.

.2 Verify location of substructure units, elevations of bearing seats and location of pintels before erection of structural steel. Report discrepancies to Departmental Representative.

.3 Do not disturb embankments without prior written permission from Departmental Representative.

.4 Restrict drifting during assembly to minimum required to bring parts into position without

enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
.1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
.2 Ensure reamed holes are 2 mm maximum larger than bolt size used.

.5 Fabricate and install bearings as indicated.

.6 Place pintels at elevations and locations indicated.
.1 Protect holes against entry of water and foreign material.
.2 Provide heating and protection as directed by Departmental Representative and completely fill space around pintels with grout.

3.3 Installation

.1 Do falsework in accordance to CSA S269.1, except where specified otherwise.

.2 Do fabrication and erection of structural steel in accordance with CAN/CSA S6, Design of Highway Bridges and AASHTO Standard Specifications for Highway Bridges.

.3 Do welding in accordance with CSA W59, except where specified otherwise.
.1 For CSA G40.20/G40.21, grade 350AT steel, deposited weld metal to have Charpy V-Notch value not lower than that of the steel.
.2 Do welding in shop unless otherwise permitted by Departmental Representative.
.3 Weld only at locations indicated.

.4 High strength bolting: in accordance with CAN/CSA S6 and CSA S16. Use 'turn-of-nut' tightening method.

.5 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.

.6 Allowable tolerance for bolt holes:
.1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely

through assembled members at right angles to such members.

.2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.

.3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.

.4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:

Centre-to-Centre distance in metres	Tolerance in plus or minus mm
less than 10	1
10 to 20	2
20 to 30	3

.5 Correct mispunched or misdrilled members only as directed by Departmental Representative.

.7 Span length tolerances:

.1 Beams: plus or minus 6 mm

.2 Centre-to-centre of bearing stiffeners and bearing plates: plus or minus 3 mm.

.8 Beam support requirements:

.1 Support top and bottom flanges of ends of beams.

.2 Install beams flat and smooth except as otherwise indicated.

.3 Install bearing stiffeners after beam support requirements have been met.

.9 Shop splices:

.1 Use complete joint penetration groove welds finished flush.

.2 Details of butt joints to CSA W59.

.3 Use only as approved by Departmental Representative.

.10 Camber:

.1 Camber tolerances for beams to be to CSA W59.

.2 Record measurements of camber of each beam, at points indicated.

.3 Fabricate field splices to conform to required camber.

.4 Submit diagram to Departmental Representative showing camber for each beam

fabricated.
.5 Advise Departmental Representative immediately when camber of fabricated beam is greater than specified tolerances.
.6 Submit proposal for corrective measures.
.7 Undertake remedial measures as approved by Departmental Representative.

.11 Shop erection:
.1 Support each beam on its bearing points and measure and record deflection at same points indicated for measurement of camber.
.2 Measure deflections in plane of beam web.
.3 Submit diagram to Departmental Representative showing deflection measurements for each beam before delivery.
.4 Shop erection is not required for single span beams with no field splices.

.12 Field splices: to approval of Departmental Representative.

.13 Mark members in accordance with CSA G40.20/G40.21.
.1 Do not use die stamping.

.14 Match marking: shop mark bearing assemblies and splices.

3.4 Field Quality Control

.1 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of work, in handling, installing, protecting and cleaning of steel.
.2 Submit manufacturer's field services and periodic site visits for inspection of erection in accordance with manufacturer's instructions.
.3 Ensure manufacturer's representative is present before installation, during critical periods of installation and during construction of field joints and bolting of splices.

.4 Schedule site visits:
.1 After delivery and storage of products, and when preparatory work, or other work, on which the work of this Section depends, is complete but before

installation begins.
.2 Twice during progress of work at 25% and 60% complete.
.3 Upon completion of the work, after cleaning is carried out.

3.5 Cleaning

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

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

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

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

1.2 Description

.1 The work under this section covers the supply and installation of all the following miscellaneous metal items, but not limited to:

.1 Ballast wall angles, expansion joints, deck drains, bridge railings, decorative plaques, temporary bridge railing and bracing.

1.3 References

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM A53/A53M-12, Standard specification for Pipe, Steel, Black, and Hot-Dipped, Zinc-Coated, Welded and Seamless.

.2 ASTM A108-13, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.

.3 ASTM A123/A123M-12, Standard Specification for Zinc, (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.4 ASTM A240/A240M-15b, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.5 ASTM A307-12 Standard Specification for Carbon Steel Bolts and Studs, 410 MPa (60 000 PSI) Tensile Strength.

.6 ASTM A325-10, Standard Specification for Structural Bolts, Steel, Heat Treated, 825/720 MPa (120/105 ksi) Minimum Tensile Strength.

.7 ASTM F593-13a, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

.2 Canadian Standards Association (CSA)

.1 CSA-G40.20/G40.21-04 (R2009), General Requirements for Rolled or

Welded Structural Quality Steels.

.2 CSA-S16-09, Design of Steel Structures.

.3 CSA-W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.

.4 CSA-W48-06 (R2011), Filler Metals and Allied Metals for Metal Arc Welding.

.5 CSA-W55.3-08, Certification of companies for resistance welding of steel and aluminum.

.6 CSA-W59-03 (R2008), Welded Steel Construction (Metal Arc Welding).

1.4 Source Quality Control

.1 The Contractor is to provide written documentation from the Canadian Welding Bureau certifying that all welders used for this work are qualified to the requirements of CSA-W47.1, Division 1 or 2.1 or CSA-W47.2.

.2 Provide written procedures to Departmental Representative for review and approval indicating methods to be used for all welding on this project.

.3 Provide evidence to the Department Representative of current qualifications of welders.

1.5 Shop Drawings

.1 Submit fabrication and erection documents and material lists in accordance with Section 01 33 00 Submittal Procedures.

.2 It is the responsibility of this Contractor to field confirm the exact locations and construction of related work to which work under this section connects to, or is supported on.

.3 Each drawing submission shall bear signature and stamp of qualified Professional Engineer registered or licensed to practice in the Province of Newfoundland and Labrador, for all assemblies, components, details and connections not shown on the drawings.

.4 Review of procedure and erection drawings will extend to general design concept only. This review does not relieve the Contractor of the responsibility for accuracy of the detail dimensions, general fit-up of parts to be assembled, adequacy of proposed methods and procedures or for errors or defects contained in the details.

1.6 Quality Assurance

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Provide manufacturer’s product specifications and written instructions for cleaning, surface preparation and application for field touch-up of all galvanized steel supplied under this section.

1.7 Waste Management and Disposal

.1 Divert unused metal materials from landfill to an approved metal recycling facility approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel angles and plates to CSA G40.20/G40.21, Grade 300W.

.2 H piles and W sections to CSA G40.20/G40.21, Grade 350W.

.3 Welding Electrodes: to CSA W48 Series.

.4 Welding materials: to CSA W59.

.5 Structural Bolts: to ASTM A325.

.6 Anchor bolts to ASTM A307.

.7 Deck Drains: materials as noted on plans.

.8 Railings: materials as noted on plans.

.9 Expansion joints: As specified under the Newfoundland Labrador Department of Transportation and Public Works Highway Design Division Specifications Book, 2011 Edition, Section 913.02.

.10 Studs for ballast wall angles: to ASTM A108 Grade 1015.

.11 Pipe: to ASTM A53, grade 240.

.12 Wire rope for temporary railing: cable to be round strand general purpose wire rope, 10.8 ton minimum breaking load, as supplied by Wire Rope Industries, or approved alternate.

.13 Stainless steel threaded rods: to ASTM F593, Type 316L.

.14 Stainless steel for plaque: to ASTM A240, Type 316L.

.15 Galvanizing: Hot Dip to ASTM A123/A123M. (610g/m^2).

.16 Galvanizing Touch-Up/Repair:

.1 Touch-up galvanizing for repair to damaged galvanized surfaces shall be with a purpose-made cold-applied film galvanizing system consisting of zinc powder, aromatic hydrocarbon and binder. Coating system to meet the following minimum requirements:

.1 Dry film content 96% by weight with zinc purity of 99.995% to ISO 3549.

.2 Recognized for use as repair coating for hot-dip galvanizing.

.3 Dry film non-toxic to AS/NSZ 4020.

.4 UV resistant.

.17 Anchorage Adhesive: to ASTM C881/C881M, Type IV, Grade 3, Class A, B, and C.

.1 Acceptable Products:
.1 Epcon S7 by ITW Red Head.
.2 HIT HY200 Injection Adhesive System by HILTI.
.3 SET-XP Acrylic-Tie Anchoring System by Simpson Strong-Tie.
.4 Alternate Materials: Approved by addendum in accordance with Instructions to Tenderers.

2.2 Fabrication - General

.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.

.4 Provide adequate drainage at low points of all closed sections. Indicate drain hole locations on shop drawings.

PART 3 - EXECUTION

3.1 General

.1 Do steel work in accordance with CSA-S16.

.2 Do welding work in accordance with CSA W47.1 or CSA W47.2 unless specified otherwise.

.3 Erect metal work square, plumb, square, and true, accurately fitted, with tight joints and intersections.

.4 Take necessary care in the handling of all galvanized steel parts to prevent damage to the galvanized coating. Evidence of damage shall be cause for rejection. Damage may be touched-up if approved by Departmental Representative.

.5 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 Touch-up of Galvanized Surface

.1 Touch up all damaged, scratched or exposed steel at welds of galvanized components

in field with cold applied film galvanizing system.

.2 Prepare all surfaces to be touched-up by de-greasing and cleaning to SSPC-SP12.

.3 Refer to manufacturers written instructions for additional cleaning, surface preparation and application requirements.

3.3 Welding Inspection

.1 The Contractor is responsible to assure that materials, fabrication, and examination procedures for all welding conforms to CSA W59 or W59.2.

.2 Quality assurance inspection and testing of welds will be carried out by a Testing Agency designated by Departmental Representative.

.3 Provide safe access and working areas for inspection and testing on site, as required by Testing Agency and as authorized by Departmental Representative.

.4 Inspection or testing by Departmental Representative will not augment or replace Contractor's quality control nor relieve him of his contractual responsibility.

3.4 Ballast Wall Angles

.1 The Contractor shall carry the work as indicated on the plans.

.2 Steel ballast wall angle assemblies shall be fabricated in two equal pieces in the fabricating shop and field welded together as noted on plans.

.3 Portions of inorganic zinc coating, damaged by field welding, shall be mechanically cleaned and recoated in the field.

.4 Inorganic zinc shall have all curing solution and residue removed by water and bristle brush, prior to installation of assemblies.

.5 Welding of stud anchors on steel ballast wall assemblies shall conform to the requirements of CAN/CSA W59.

3.5 Expansion Joints

.1 Expansion joint fabrication and installation shall be as specified under the Newfoundland Labrador Department of Transportation and Public Works Highway Design Division Specifications Book, 2011 Edition, Section 913 and as per the plans.

3.6 Deck Drains

.1 Drains are to be installed in the locations shown on plans.

.2 Deck drains shall be put in place before the deck concrete is cast.

.3 Care shall be taken that the top of the drain is slightly below the surrounding finished surface.

.4 Care shall also be taken that the bottom of the downspout extends below the adjacent structure.

.5 Incorrectly placed drains shall be cause for rejection and shall be replaced in accordance with Departmental Representative’s instructions.

3.7 Bridge Railings

.1 The Contractor shall carry the work as indicated on the plans.

.2 The Contractor shall be responsible for the placing and alignment of the anchor bolts in the formwork and concrete at the stage of work when this placement must occur.

.3 The Contractor shall install all posts and railings and these shall be secured firmly in place.

.4 All contacting steel and concrete surfaces shall be separated by a Fabreeka pad.

.5 Rail post bases bearing unevenly on concrete surfaces shall be brought to bear in alignment as specified by grouting under

the base plate of the rail post with an approved epoxy grout.

.1 The grout shall provide a smooth bearing surface under the full base plate area and shall form a waterproof seal.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 05 12 33 – Structural Steel for Bridges.

1.2 Description

.1 This section specifies the requirements for the cleaning, preparation, supply and application of the protective coating paint system for all new steel for the bridge superstructure.

1.3 References

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM D269-97(2015), Standard Test Method for Insoluble Matter in Rosin and Rosin Derivatives.
.2 ASTM D4541-09e1, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

.2 The Society for Protective Coatings (SSPC)
.1 SSPC-SP 1-15, Solvent Cleaning.
.2 SSPC-SP 10/NACE No. 2-07, Near White Blast Cleaning.
.3 SSPC-PA 2-15, Procedure for Determining Conformance to Dry Coating Thickness Requirements.
.4 SSPC-Vis-1-02, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning.
.5 SSPC Good Painting Practices, Volume 1, 4th Edition.

1.4 Submittals

.1 Submit product data and manufacturer’s installation/application instructions for paints and coating products to be used in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for protective coating system and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 30 - Health and Safety Requirements.

.3 Submit three (3) copies of the following in

accordance with Section 01 33 00 – Submittal Procedures prior to the start of coating operations.
.1 Abrasive to be utilized along with manufacturer's specifications.
.2 Coating(s) to be utilized along with manufacturer's specifications.

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Test Reports:
.1 Submit test reports showing compliance with specified performance characteristics and physical properties.

.6 Upon completion, submit records of products used. List products in relation to finish system and include the following:
.1 Product name, type and use.
.2 Manufacturer's product number.
.3 Colour numbers.
.4 Manufacturer's Material Safety Data Sheets (MSDS).

1.5 Scheduling

.1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule minimum 48 hours in advance of proposed operations.

.2 Obtain written authorization from Departmental Representative for changes in work schedule.

.3 Schedule painting operations to prevent disruption of other trades.

1.6 Quality Assurance

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Standard of Acceptance:
.1 Surfaces: No defects visible from a distance

of 1000 mm at 90 degrees to surface.
.2 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

.3 Manufacturer's Obligations:
.1 The manufacturer shall play an active role in the application of their product during the period of this contract.
.2 The manufacturer shall be represented at all relevant meetings by a qualified technical representative, trained as a paint inspector.
.3 The technical representative shall be approved by the Departmental Representative.
.4 A minimum of five (5) in-shop inspections from the manufacturer's representative must be made prior to and during application of this work to ensure proper application.
.5 Scheduling of shop inspections to be to the approval of the Departmental Representative.
.6 After each visit, provide a written report to the Departmental Representative and General Contractor within five (5) working days.

.4 Pre-installation Meeting: conduct pre-installation meeting to verify project requirements, coating manufacturer's installation instructions, and manufacturer's warranty requirements. Representative from paint manufacturer shall be present at meeting.

.5 Coating system application shall be subject to inspection by the Departmental Representative. An appointed inspector may be on-site at the shop during all operations. Such inspection shall not relieve any of the responsibility for furnishing the qualified labour, equipment, staging, etc., necessary to meet the requirements of this specification.

.6 Keep accurate records containing details such as weather, temperatures, dew points and times for the various coating applications and shall make these records available to the Departmental Representative upon request.

.7 Coating inspection shall be performed in accordance with the procedures outlined in SSPC Manual, Volume 1, Chapter 5, "Inspection".

.8 Profile measurements shall be made on a random basis by use of replica tape and spring micrometer or by micrometer depth gauge.

.9 Dry film coating thickness readings shall be performed in accordance with SSPC-PA 2, “Measurement of Dry Paint Thickness with Magnetic Gages”.

.10 All coated steel shall have the dry film thickness verified by inspection with a Positector or similar dry film thickness testing device.

.11 When necessary, the testing of ambient and surface temperature and humidity shall be done by thermometer, surface thermometer and psychrometer with recognized psychometric tables.

.12 Destructive testing may be required where inadequate adhesion of the coating(s) is suspected. Adhesion testing shall be done in accordance with ASTM D4541. The minimum adhesion of the coating under evaluation shall be 1.7 MPa (250 psi). Coatings damaged as the result of destructive testing shall be repaired at no extra cost to the Contract. Repair procedures and materials shall be approved by the Departmental Representative prior to application.

1.7 Inspection Requirements

.1 Coating system application shall be inspected by the manufacturer’s trained technical representative (Inspector) acceptable to the specifying authority and Departmental Representative. Painting contractor shall notify the Inspector a minimum of one week prior to commencement of work and provide a copy of project painting specifications (including pertinent details).

.2 All steel surfaces receiving coating system shall be inspected by the Inspector who shall notify Departmental Representative and General Contractor in writing of defects or problems,

prior to commencing painting work, or after prime coat shows defects in substrate.

1.8 Quality Control

.1 Provide mock-up in accordance with Section 01 45 00 – Testing and Quality Control.

.2 When requested by Departmental Representative, prepare and paint designated surface to requirements specified herein, with specified paint showing selected colour, gloss/sheen, texture and workmanship for review and approval. When approved, surface, and/or items shall become acceptable standard of finish quality and workmanship.

1.9 Extra Materials

.1 Submit maintenance materials in accordance with Section 01 78 00 – Closeout Submittals.

.2 Submit two – four litre cans of each type and colour of coating. Identify colour and paint type in relation to established colour schedule and finish system.

1.10 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Paint and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.3 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

1.11 Delivery, Storage and Handling

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Deliver and store materials in original containers, sealed, with labels intact.

.3 Labels shall clearly indicate:
.1 Manufacturer’s name and address.

.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.4 Observe manufacturer's recommendations for storage and handling.

.5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.6 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.7 All coating materials shall be supplied in new condition. Two component coatings shall be packaged separately.

PART 2 - PRODUCTS

2.1 Materials

.1 Protective Coating Paint System:
.1 All steel surfaces to receive a protective coating system complete with a UV resistant tintable top coat.
.2 Coating system applied to structural steel shall consist of:
.1 Inorganic zinc primer plus high build modified aluminum epoxy mastic mid-coat plus high build aliphatic polyurethane top coat in a selected colour.

.2 Acceptable products: the Contractor is responsible for ensuring that the latest formulation of the proposed coating products to be utilized in the work satisfy the requirements of this specification. The primer and top coats must be compatible with

each other and must be manufactured by the same company. All coating work and systems for the purpose of this specification shall be considered a fully cured system prior to being accepted by the Departmental Representative. No accelerators for the purpose of force curing the coating system will be accepted without prior written approval.

.3 Qualified products: paint materials from the following manufacturers are acceptable for use on this project:

.1 Armorcoat
.2 Pittsburgh
.3 Carboline
.4 Alternate manufacturer as approved by addendum in accordance with Instructions to Tenderers.

.4 Paint materials for paint systems shall be products of single manufacturer.

.2 Colours:

.1 Departmental Representative will provide Colour Schedule after contract award.
.2 Selection of colours will be from manufacturer’s full range of colours.
.3 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
.4 Finished product will be one colour.

.3 Ethyl Silicate/Potassium Zinc-Rich Primer:

.1 Inorganic zinc primer shall be a two-component self-curing type which, when mixed and applied in accordance with the manufacturer’s instructions, cures without the use of a separate curing solution, and shall have the properties described herein. The inorganic zinc primer shall meet or exceed the requirements of Steel Structures Painting Council Specifications PS 20.00 (Type 1).

.2 Pigment: the zinc portion of the pigment shall be a finely divided zinc powder containing, by weight, a minimum of 94% metallic zinc. All other fillers contained in the pigment shall be inert substances with an average particle size of 6 microns.
.3 Vehicle: the vehicle components shall

consist primarily of a partially hydrolyzed ethyl and/or potassium silicate, in an appropriate hydrocarbon solvent. The storage life of the vehicle shall be nine (9) months minimum at 25°C.

.4 Mixed coating: the total zinc portion shall be at least 84% by dry weight of the total solids of the dried coating. The coating shall tolerate up to 1% water contamination by weight without gelation, within five (5) minutes. The usable pot life of the mixed coating shall be not less than four (4) hours at 25°C. There shall be no hard settling which cannot be easily re-dispersed during this period.

.5 Colour: the inorganic zinc coating shall be formulated so as to produce a distinct contrast in colour with the blast cleaned metal surfaces.

.6 Primer coating shall be certified as a Class B coating for slip coefficient and creep resistance as per Appendix A of the ASTM A325 or A490 Bolt Specification. All faying surfaces shall be coated with Class B primer coating as outlined in the ASTM A325 or A490 Bolt Specification.

.7 Unless otherwise recommended by the manufacturer or the Steel Structures Painting Council Specification, the dry film thickness shall be in the range of 1.5 mils to 2.0 mils.

.4 High Build Modified Aluminum Epoxy Mastic:

.1 Coating shall be a self-priming, two-component, high build, aluminum filled epoxy mastic. The coating shall be compatible with inorganic zinc primers, catalyzed epoxies, catalyzed phenols or other coatings as recommended by the coating manufacturer. The coating shall also be compatible to be used over most generic types of coatings which are tightly adhering and properly prepared.

.2 Solids by volume of the coating, when mixed, shall be 90.2%, when tested in accordance with ASTM D269, total pigment by weight.

.3 Pigment: the primary pigment shall be aluminum and shall represent a minimum of 17% of the total pigment by weight.

.4 Mixed coating: the mixed coating must be capable of being top coated with most generic types of coatings after curing a minimum of 24 hours at 24°C. Final curing shall be attained after five days minimum at 24°C. The pot life of the

mixed coating shall be a minimum of four (4) hours when the material and ambient temperature are 24°C and the material has been thinned according to manufacturer's recommendations. The coating shall be capable of being applied when the material is at a temperature as low as 10°C.

.5 Unless otherwise recommended by the manufacturer or the Steel Structures Painting Council Specification, the dry film thickness shall be in the range of 5.0 mils to 7.0 mils.

.5 High Build Aliphatic Polyurethane Finish Coat:

.1 High build aliphatic polyurethane finish coat shall be two component, high solids, high build, spray applied coating with a satin or semi-gloss finish that is highly resistant to UV, weather, abrasion, corrosive fumes, splash and spillage of acids, alkalies, solvents, salts and water. It shall provide adequate hiding when applied in a single coat directly over aluminum mastic and shall provide long term colour and gloss retention. The coating shall be compatible with inorganic zinc primers, catalyzed epoxies, catalyzed phenols or other overcoats, as recommended by the coating manufacturer. The coating shall also be compatible to be applied over most generic types of coatings which are tightly adhering and properly prepared.

.2 Mixed coating: the two components of the system shall have a shelf life of twelve (12) months minimum. The pot life for the mixed material shall be four (4) hours at 24°C.

.3 Finish coat colour to be light grey. Provide colour chip to Departmental Representative prior to executing work.

.4 All field touch-up shall be completed within an appropriate containment system to ensure that no materials fall or spill into the river or land area surrounding the structure.

.5 Unless otherwise recommended by the manufacturer or the Steel Structures Painting Council Specification, the dry film thickness shall be in the range of 3.0 mils to 4.0 mils.

.6 Blast Media:

.1 Abrasive blast media shall be clean and sharp silica sand, washed industrial sand, steel grit, or a slag material of suitable size, weight

and angular shape to produce the degree of cleaning specified and anchor pattern/profile required. The blast media shall contain no more than 1% by weight of water soluble solids. There shall be less than 10 ppm oil in the abrasive and no trace of salts or toxic material. When cleaning by air blasting with sand abrasives, adequate separators and traps shall be provided to remove detrimental amounts of water and oil from the compressed air before it reaches the nozzle.

.2 Materials unsuitable for sure in the work shall be disposed of in an approved manner at no additional cost to the Contract. Re-claimed abrasive material will not be acceptable with the exception of steel grit.

.7 Solvent:

.1 Solvents shall be compatible with the primer and paint being utilized.

.8 Touch-up:

.1 All damaged areas shall be power tool cleaned in accordance with SSPC.SP 11, primed with 4-5 mils of primer surface tolerant epoxy and top coated in accordance with the original specification.

PART 3 - EXECUTION

3.1 General

.1 Apply paint materials in accordance with paint manufacturer’s written application instructions.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Coating system shall be as detailed in these specifications. The manufacturer’s data sheets are part of this specification. Should there be any conflict between these two specifications, the decision of the Departmental Representative shall prevail.

.4 All surfaces to be coated shall be free from contamination prior to any application. No coating work shall be done when the surface is

less than 3°C above the dew point, nor when it is likely that there will be a change in conditions within four (4) hours of application that would be detrimental to the coating system. All coatings shall be uniformly applied without sags, foreign material, dust, contamination, cracks or other blemishes. Defects shall be removed and repaired to the satisfaction of the Departmental Representative.

.5 Equipment: abrasive blast cleaning equipment shall be of a quality and size sufficient to perform the work within the time available in the contract. Blast equipment must have adequate in-line “driers” to ensure moisture is completely removed during blasting operations. All spray and blasting equipment must be adequately grounded to avoid build-up of static electricity. Detrimental amounts of water and oil shall be removed from any compressed air supply used for blast cleaning by means of appropriate functional traps, separators and heaters before the airstream reaches the nozzles.

3.2 Preparation

.1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following:

.1 Solvent cleaning: to SSPC-SP 1.

.2 Near White Blast Cleaning: to SSPC-SP 10/NACE No. 2.

.3 Prepare all surfaces to a 2-3 mil anchor profile or as otherwise recommended by coating manufacturer to achieve good coating adhesion and coverage.

.2 Compressed air to be free of water and oil before reaching nozzle.

.3 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.

.4 Apply paint after prepared surfaces have been tested and accepted by Departmental Representative’s authorized testing personnel.

.5 Prior to starting paint application ensure degree of cleanliness of surfaces is to SSPC-VIS 1.

.1 Apply primer, paint, or pretreatment after surface has been cleaned and before deterioration of surface occurs.
.2 Clean surfaces again if rusting occurs after completion of surface preparation.

.6 Mixing paint:
.1 Do not dilute or thin paint for brush application.
.2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
.3 Do not mix or keep paint in suspension by means of air bubbling through paint.
.4 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.7 Number of paint coats: 3.

3.3 Application

.1 Protective coating paint system to be applied in shop.

.2 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.3 Manufacturer’s representative to be present at start of painting.

.4 Apply paint by spraying, brushing, or combination of both. Use sheepskins or daubers when no other method is practical in places of difficult access.

.5 Use dipping or roller coating method of application only when specifically authorized by Departmental Representative in writing.

.6 All edges, corners, crevices, bolts, welds and sharp edges shall be stripe coated with the aluminum polyamide epoxy mastic prior to the steel receiving the final coat in accordance with the

coating manufacturer's recommendations. Such striping shall be done with brushes, daubers, or mitts and extend a minimum 2.5 cm from the edge being coated. Brushes and daubers shall be provided and used to work coatings into cracks, crevices and locations which cannot be adequately coated by spray application.

.7 Caulk open seams at contact surfaces of built up members with material approved by Manufacturer, before intermediate coat is applied.

.8 For field touch-up:

.1 Where surface to be painted is not under cover, do not apply paint when:

.1 Air temperature is below 5 degrees C or when temperature is expected to drop to 0 degrees C before paint has dried.

.2 Temperature of surface is over 50 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.

.4 Surface to be painted is wet, damp or frosted.

.5 Previous coat is not dry.

.2 Supply cover when paint must be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.

.3 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.9 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.10 Spray application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and

equipped with suitable pressure regulators and gauges.

.2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.

.3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.4 Brush apply primer to all sharp edges, corners, projection welds and seams.

.5 Apply paint in uniform layer, with overlapping at edges of spray pattern.

.6 Brush out immediately runs and sags.

.7 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.

.8 Remove runs, sags and brush marks from finished work and repaint.

.11 Shop painting:

.1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.

.2 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.

.3 Do not paint metal within 50 mm of edge to be welded. Give unprotected steel one coat of approved protective coating after shop fabrication is completed.

.4 Remove weld spatter before painting. Remove weld slag and flux.

.5 Protect machine finished or similar surfaces that are not to be painted but that do require protection, with coating of rust inhibitive petroleum, molybdenum disulphide, or other coating approved by Departmental Representative.

.12 Field touch-up:

.1 Touch-up steel structures as soon as practical after erection.

.2 Touch-up metal which has been shop coated with same type of paint and to same thickness as

shop coat. This touch-up to include cleaning and painting of field connections, welds, nuts, washers, bolts, and damaged or defective paint and rusted areas.

.3 Field paint surfaces (other than joint contact surfaces) which are accessible before erection but which are not to be accessible after erection.

.4 If concreting or other operations damage paint, clean and repaint damaged area. Remove concrete spatter and droppings before paint is applied.

.5 Where painting does not meet with the requirements of specifications, and when so directed by Departmental Representative, remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.

.13 Handling painted metal:

.1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.

.2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

3.4 Repair of Defects

.1 Before application of any further coats of material, all damage and/or contamination to previous coats shall be repaired to the approval of the Departmental Representative. In the case of repair, the procedures shall be in an acceptable manner as approved by the Departmental Representative. In the case of removal, the work shall be replaced by work and materials which shall conform to the specification. This clause shall have full effect regardless of the fact that the defective work may not have been previously identified by the Departmental Representative.

3.5 Quality Control

.1 Inspection of painting operations to be carried out by manufacturer’s trained technical

representative.

.2 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC-PA 2.

.3 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.4 Co-operate with Inspector and provide access to areas of work.

3.6 Protection

.1 Protect painted surfaces from damage during construction.

.2 Protection of surfaces:
.1 Protect surfaces not to receive paint.
.2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
.3 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.

.3 Repair damage to adjacent materials caused by touch-up painting.

3.7 Extended Warranty

.1 The Contractor shall warrant the coating system applied under the terms of this Contract for new construction to be free of defects in materials and workmanship for a period of 60 months from the date the work is accepted by the Departmental Representative.

.2 During the warranty period, the Departmental Representative will inspect the coating system, and will advise the Contractor and Manufacturer, in writing, of any repairs that are required. Intermediate inspections may be made and warranty repairs claimed and repaired by the Contractor and Manufacturer each year of the 60 months warranty period.

.3 Failure of the protective coating system may include but not be limited to:

END

.1 Any debonding or failure of adhesion of the coating either to the structural steel or other coatings.

.2 The appearance of any rust stains on the coated structure due to loss of coating or leaking from joints between structural members (staining from leaking expansion joints or from structural components not coated under the contract will be exempt from the provision of the warranty).

.3 Failure of the coating to resist chipping and abrasion from normal site conditions.

.4 Any loss of normal gloss or rapid colour change.

.4 Warranty repair will be completed within 45 days of notification, or if this would place repair in unsuitable weather conditions, by June 15 of the following year.

END OF SECTION

PART 1 – GENERAL

1.1 References

.1 Transportation Association of Canada:
  .1 Manual of Uniform Traffic Control Devices for Canada.

.2 American Association of State Highway and Transportation Officials (AASHTO)
  .1 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, (5th Edition).

.3 Newfoundland and Labrador Department of Transportation and Works.
  .1 Specifications Book

1.2 Submittals

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

1.3 Delivery, Storage and Handling

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.4 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.5 Replace defective or damaged materials with new.

1.4 Design Requirements

.1 Sign supports to be capable of withstanding the summation of the following loads:
  .1 Wind load in any direction of 0.60 kPa on signboards and 0.60 kPa on sign supports and appurtenances.

.2 Dead load of signboards, sign supports and appurtenances.

.3 Ice load of 0.25 kPa on one face of signboards and around surface of all structural members and appurtenances.

.4 Structural deflections and vibration in

accordance with American Association of State Highway and Transportation Officials (AASHTO), "Specifications for the Design and Construction of Structural Supports for Highway Signs".

PART 2 – PRODUCTS

2.1 Traffic Sign Posts

.1 Wood:

.1 Wood posts must be dry no. 1 grade Douglas fir, Eastern Hemlock, or Red pine, conforming to AASHTO M 168.

.2 Posts shall be sound and rot-free and shall conform with the requirements for No. 1 Structural Posts and Timbers, graded in accordance with the National Lumber Grading authority (NLGA) Standard Grading Rules for Canadian lumber.

.3 Prior to pressure-treating, posts and blocks shall be incised on all four sides and dried to their fibre saturation point of 25 to 30% at 25 mm depth.

.4 For pressure treating, preservative treatment of posts and blocks shall be chromated copper arsenate (CCA). For field cut surfaces, preservative shall be 2% copper napthenate wood preservative, applied in two coats.

.5 Treatment shall be completed in accordance with requirements of CSA-080. The penetration and retention of preservatives shall conform to the requirements of CSA Standard O80.14, Table 1, Minimum Retention of Preservatives in Pressure Treated Wood for Highway Construction, under the headings “Post-Guide Rail, Guide, Sign and Sight” for posts, and “Bridge Hand Rails, Guide Rails and Posts” (not in contact with ground or water). The Engineer may verify the penetration and retention of the preservative by the assay method.

.2 Fasteners:

.1 Bolts, nuts, washers and other hardware for roadside signs to be cast aluminum alloy, or galvanized steel.

.2 All steel bolts, nuts and washers shall conform to ASTM A 307 and shall be hot dip

galvanized conforming to CSA-G164-M.

.3 Flat Aluminum Sign Panels:

.1 Aluminum sign panels must conform to ASTM B209M ASTM B209, alloy-temper 6061-T6 or 5052-H38. The blanks must be free from laminations, blisters, open seams, pits, holes, other defects that may affect their appearance or use. The thickness must be uniform and the blank commercially flat.

.4 Traffic Sign Retroreflective Sheeting and Lettering:

.1 All background sheeting applied to flat sheet and extruded panel signs must be in accordance with ASTM D4956, Type III, IV, VII, VIII, IX or XI retroreflective sheeting and must have Class 1, 3, or 4 adhesive backing. Retroreflective sheeting must be high intensity that is an unmetallized micro prismatic reflective material.

.2 Retroreflective sheeting must have sufficient adhesion, strength and flexibility such that the sheeting can be handled, processed and applied according to the manufacturer's recommendations without appreciable stretching, tearing, cracking or other damage.

.5 Non-reflective Lettering and Symbols:

.1 Non-reflective lettering and symbols: cut from vinyl film as specified in CGSB 62-GP-9M, or paint using required colour of finish paint or silk screen transparent ink.

.6 Sign identification:

.1 Apply sign number and date of installation with 25mm high stencil painted black letters on lower left back face of each signboard.

PART 3 – EXECUTION

3.1 Sign Posts

.1 Wood:

.1 Erect supports as indicated. Permissible tolerance: 50 mm maximum departure from vertical for direct buried supports. Where separate concrete footings have been placed, erect posts with base plates resting on levelling nuts and restrained with nuts and washers. Permissible tolerance: 12 mm maximum departure from vertical.

.2 Drill holes in the post as indicated.

3.3 Protection

.1 Place temporary covering on signboards where indicated. Covering to be capable of withstanding rain, snow and wind and be non-injurious to signboard. Replace deteriorated covering and remove covers as directed by Owner’s Representative.

3.4 Cleaning

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

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

APPENDIX 1 - COMBINED PRICE FORM

1) The prices per unit shall govern in establishing the Total Extended Amount. Any arithmetical errors in this Appendix will be corrected by Canada.

2) Canada may reject the bid if any of the prices submitted do not reasonably reflect the cost of performing the part of the work to which that price applies.

LUMP SUM

The Lump Sum Amount designates Work to which a Lump Sum Arrangement applies.

(a) Work included in the Lump Sum Amount represents all work not included in the unit price table.

LUMP SUM AMOUNT (LSA) Excluding GST / HST	

UNIT PRICE TABLE

1) The unit price table designates the Work to which a Unit Price Arrangement applies
   (a) The Price per Unit and the Price must be entered for each Item Listed
   (b) Work included in each item is as described in the referenced specification section

Item	Specification Reference	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity	Price per Unit GST/HST Extra	Estimated Total Price GST/HST Extra
1	03 30 00	Cast-in-Place Concrete for Abutments and Approach Slabs	m^3	61		
2	03 30 00	Cast-in-Place Concrete for Bridge Deck	m^3	70		
3	03 40 00	Concrete Waterproofing	m^2	362		
4	05 12 33	Structural Steel Girders with Diaphragms	t	33.6		
5	05 12 33	Bearings	Each	8		
6	05 50 00	Bridge Railings	m	58		
7	05 50 00	Drains	Each	4		
8	05 50 00	Ballastwall Angles	Each	2		
9	05 50 00	Expansion Joints	Each	2		
10	05 50 00	Decorative Plaques	Each	4		
11	31 32 19.01	Geotextile	m^2	130		
12	32 11 19	Granular Subbase	t	200		
13	32 11 23	Granular Base	t	180		
14	32 12 16	Asphalt Pavement	t	106		
15	34 71 13.25	Guide Rail	m	46		
				TOTAL EXTENDED AMOUNT (TEA) Excluding GST/HST		

TOTAL BID AMOUNT

TOTAL BID AMOUNT (LSA + TEA) Excluding GST/HST	

Please note: All fixed price items of the specification NOT designated in the unit price table above, are subject to a lump sum arrangement and should be included in the amount in subparagraph 1(a) of BA03

PART 1 - GENERAL

1.1 Related Work

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

.2 Section 32 11 19 - Granular Subbase.

.3 Section 32 11 23 - Granular Base.

1.2 References

.1 American Society for Testing and Materials (ASTM)
.1 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles or Flat and Elongated Particles in Coarse Aggregate.

1.3 Source Approval

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling

.2 If, in opinion of Departmental Representative, aggregate from the proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from source in question can be processed to meet specified requirements.

.3 Should a change of aggregate source be proposed during work, advise Departmental Representative 1 week in advance of proposed change to allow sampling and testing.

.4 Acceptance of an aggregate at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.

1.4 Sampling

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

.2 Allow continual sampling by Departmental Representative during production.

.3 Provide Departmental Representative with access to source and processed material for sampling.

.4 Install sampling facilities at discharge end of

production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.

.5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

PART 2 - PRODUCTS

2.1 Materials

.1 Aggregate quality: sound, hard, durable aggregate free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in a deleterious manner for the use intended.

.2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
.1 Greatest dimension to exceed three times least dimension.

.3 Fine aggregate satisfying requirements of applicable section to be one, or a 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.

PART 3 - EXECUTION

3.1 Development of Aggregate Source

.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Departmental Representative.

.2 Where clearing is required, leave a screen of trees between cleared area and roadways as per

the Guidelines.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.

.5 Trim off and dress slopes of waste material piles and leave site in neat condition.

3.2 Stripping of Topsoil

.1 Commence topsoil stripping of areas as indicated by the Guidelines and as directed by the Departmental Representative.

.2 Avoid mixing topsoil with subsoil.

.3 Stockpile in locations as indicated by the Guidelines. Stockpile height not to exceed 2 m.

3.3 Processing

.1 Park owned pit location to be determined near the Work Zone. Contractor to provide Pit Development Plan.

.2 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.3 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.

.4 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.

.5 When operating in stratified deposits use excavation equipment and methods that will produce uniform, homogeneous aggregate.

3.4 Handling

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.5 Stockpiling

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:
.1 Maximum 1.5 m for coarse aggregate and base coarse aggregate.
.2 Maximum 1.5 m for fine aggregate and sub-base aggregate.
.3 Maximum 1.5 m for other aggregate.

.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.

3.6 Aggregate Stockpile Cleanup

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.

3.7 Source Abandonment

.1 For temporary or permanent abandonment of aggregate source, rehabilitate source to condition meeting requirements of the Guidelines.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 35 43 - Environmental Procedures.

.2 Section 31 05 17 – Aggregates: General.

.3 Section 32 11 19 – Granular Subbase.

.4 Section 32 11 23 – Granular Base.

1.2 References

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM C117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
- .4 ASTM D698-07, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbs/ft^3) (600 kN-m/m^3).
- .5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.3 Definitions

.1 Excavation classes: one class of excavation will be recognized; common.
- .1 Common excavation: excavation of materials of whatever nature.

.2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.4 Unsuitable materials:
.1 Weak and compressible materials under excavated areas.
.2 Frost susceptible materials under excavated areas.
.3 Frost susceptible materials:
.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1.

.2 Table

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 – 45

.3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

.5 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 Quality Assurance

.1 For design of any temporary structures submit design and supporting data at least 2 weeks prior to installation or construction.

.2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.3 Keep design and supporting data on site.

.4 Engage services of qualified professional Engineer who is registered or licensed in Province of Newfoundland and Labrador, Canada in which Work is to be carried out to design and inspect shoring, bracing and underpinning required for Work.

1.5 Shoring, Bracing, and Underpinning

.1 Shoring, Bracing or underpinning may be required to prevent undermining of adjacent structures, underground utilities and/or traffic

areas.

.2 Comply with safety requirements and applicable local legislation to protect existing features.

.3 Engage services of qualified Professional Engineer who is registered in the Province of Newfoundland and Labrador to design and inspect cofferdams, shoring, bracing and underpinning required for work.

.4 At least 2 weeks prior to commencing work, submit design and supporting data.

.5 Design and supporting data submitted to bear the stamp and signature of qualified Professional Engineer licensed in the Province of Newfoundland and Labrador.

PART 2 - PRODUCTS

2.1 Materials

.1 Rock Borrow – maximum 250 mm diameter, angular, well graded. Use approved common excavation material from existing granular shoulders in fill areas.

.2 Granular Fill:
.1 Blasted or crushed rock, as approved by the Departmental Representative.
.2 Gradation to be within the limits specified

Sieve Designation	% Passing
112 mm	100
40 mm	60 - 85
5 mm	25 - 50
0.315 mm	5 – 15
0.080 mm	2 – 7

.3 Other properties as follows:
.1 Los Angeles Abrasion: Max. 45
.2 Plasticity Index: Max. 6 (sand portion)

.3 Granular Subbase in accordance with Section 32 11 19 – Granular Subbase.

.4 Granular base in accordance with Section 32 11 23 – Granular Base.

PART 3 - EXECUTION

3.1 Site Preparation

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Sawcut pavement neatly along limits of proposed removal in order that surface may break evenly and cleanly

3.2 Dewatering

.1 Keep excavations free of water while Work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved runoff areas and in manner not detrimental to public and private property, existing facilities, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.4 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.3 Excavation

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Excavation must not interfere with bearing capacity of adjacent foundations.

.3 Dispose of surplus and unsuitable excavated material in approved location off site.

.4 Do not obstruct flow of surface drainage.

.5 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.6 Notify Departmental Representative when bottom of excavation is reached.

.7 Obtain Departmental Representative's approval of completed excavation.

.8 If encountered, remove unsuitable material from excavation bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

3.4 Fill Types & Compaction

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698.
.1 Granular Fill: compact to 95% of maximum dry density.

.2 Minimum roller size: 9t

3.5 Backfilling

.1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations.
.1 Place bedding and surround material as specified elsewhere.
.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
.3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 1.0 m.

3.6 Restoration

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.3 Restore site to its normal state prior to excavation.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures

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

1.2 References

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D 4491-99a(2011), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D 4595-09, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.3 ASTM D 4716-08(2013), Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

.4 ASTM D 4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2 No. 11.2-M89(2004), Textile Test Methods – Bursting Strength - Ball Burst Test (Reaffirmation of September 1989).

.2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.

.1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.

.2 Field surveys for layout of the construction work items and for collection of as-built condition information.

.3 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.

.4 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.

.5 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

.6 No. 10-94, Methods of Testing

Geosynthetics - Geotextiles - Filtration Opening Size.

.3 Canadian Standards Association (CSA International)
- .1 CAN/CSA-G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 Newfoundland and Labrador Department of Transportation and Works
- .1 Specifications Book (latest edition).

1.3 Submittals

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

.2 Submit to Departmental Representative following samples at least 4 weeks prior to beginning Work.
- .1 Minimum length of 2 m of roll width of geotextile.

.3 Submit to Departmental Representative copies of mill test data and certificate at least 4 weeks prior to start of Work, and in accordance with Section 01 33 00 - Submittal Procedures.

1.4 Delivery, Storage and Handling

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.5 Waste Management and Disposal

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 – PRODUCTS

2.1 Material

.1 Filter Fabric to be synthetic fiber and be rot proof, unaffected by action of oil or salt water and not subject to attack by marine life, insects, or rodents. Filter fabric to be of non-woven construction supplied in rolls of minimum 3.0 metres width.

.1 Filter fabric for the Floating Debris Containment Curtain to following properties:

- .1 Mass(g/m²) 250 to 270
- .2 Tear (N) 500
- .3 Tensile Strength (N) 950
- .4 Elongation at Break(%) 70-100
- .5 Mullen Burst Strength (kPa) 2500
- .6 Opening Size (um) 50 to 150
- .7 Permeability (K cm s-1) 2.7x10-1.

.2 Filter fabric buried below the approaches to have the following properties:

- .1 Mass(g/m²) 380
- .2 Tear (N) 500
- .3 Tensile Strength (N) 1,200
- .4 Elongation at Break(%) 50
- .5 Opening Size (um) 50 to 250
- .6 Permeability (K cm s-1) 1.0 to 2.5x10-1.

.3 Contractor shall note that the material may become buoyant.

.4 Seams: to be in accordance with manufacturer's recommendations.

.5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

PART 3 – EXECUTION

3.1 Debris and Sediment Containment Curtain Installation

.1 The debris and sediment containment curtain will be installed before the excavation or removal work begins and it will remain in place for the duration of the work.

.2 Remove and replace fabric damaged or deteriorated as directed by Departmental Representative.

.3 Any fabric damaged to be replaced at no additional cost.

.4 The floating debris containment curtain will not

be removed until approved by the Departmental Representative.

3.2 Filter Fabric Installation

.1 Place geotextile material by unrolling in orientation, manner and locations indicated and retain in position with securing pins and washers, weights or other method as approved by Departmental representative.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.3 Overlap each successive strip of geotextile minimum of 600 mm over previously laid strip.

.4 Pin successive strips of geotextile with securing pins or fasteners as recommended by manufacturer.

.5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material.

.6 After installation, cover with overlying layer within 4 hours of placement.

.7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

3.3 Protection

.1 Vehicular traffic not permitted directly on geotextile or geogrid.

END OF SECTION

PART 1 – GENERAL

1.1 Description

.1 The work under this section covers the removal of existing asphalt including cutting, excavation, removal from site and disposal of material outside the park.

PART 2 – PRODUCTS

Not Applicable

PART 3 – EXECUTION

3.1 Preparation

.1 Prior to commencing removal operation, inspect and verify with Department Representative areas, depths and lines of asphalt concrete pavement to be removed.

.2 Removal of existing asphalt shall be accomplished by either excavation or by cold-milling.

3.2 Equipment

.1 Cutting of the transverse butt joint shall be done by either cutting with a saw or cold-milling machine to achieve a straight line.

3.3 Removal

.1 Remove existing asphalt pavement to lines and grades as indicated.

.2 Prior to paving operations commencing a transverse butt joint must be constructed. If a transverse vertical cut is milled in the existing pavement at the limit of the work area the contractor shall immediately construct with hot mix asphalt concrete a temporary smooth 1.5 meter long taper. The temporary taper must be removed prior to paving of the milled area.

.3 Use equipment and methods of removal and hauling which do not tear, gouge, break or otherwise damage or disturb underlying pavement.

.4 Prevent contamination of removed asphalt

concrete pavement and granular base by topsoil, underlying gravel or other materials.

.5 Provide for suppression of dust generated by removal process.

.6 In areas where localized pavement removal is carried out within the traffic lane ensure traffic is restricted from area until the surface is restored.

3.4 Traffic Control

.1 Maintain at least one lane of alternating two-way traffic at construction sites at all times as specified in Section 01 55 26 – Traffic Regulations.

3.5 Disposal

.1 The Contractor shall be responsible for the disposal of all removed asphalt to an approved disposal site outside the park.

END OF SECTION

PART 1 - GENERAL

1.1 Related Work

.1 Section 31 05 17 - Aggregates: General.

.2 Section 31 23 10 – Excavating Trenching and Backfilling.

1.2 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C 117-13, Standard Test Methods for Material Finer Than 75-micro m (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM D6928-10, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

.3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D 422-63 (2007), Standard Test Method for Particle-Size Analysis of Soils.

.5 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ftn) (600kN-m/mn).

.6 ASTM D 1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.7 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

PART 2 - PRODUCTS

2.1 Materials

.1 Granular “B” Sub-base Material: in accordance with Section 31 05 17 – Aggregates: General and following requirements:

.1 Crushed blasted rock.

.2 Gradations to be within limits specified when tested To ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 AND CAN/CGSB-8.2.

.3 Table:

Sieve Designation	% Passing
50.8 mm	100
25.4 mm	50 – 100
4.76 mm	20 – 55
1.20 mm	10 – 35
0.300 mm	5 – 20
0.075 mm	2 – 6 (Pit Source) 2 – 8 (Rock Source)

.4 Other Properties as follows:

.1 Liquid Limit: to ASTM D 4318, Maximum 25.

.2 Plasticity Index: to ASTM D 4318 Maximum 0.

.3 Los Angeles degradation: to ASTM C131. Max % loss by mass: 35.

.4 Crushed Particles: at least 100% of particles by mass retained on the 4.75 mm sieve to have at least one fractured face.

.5 Particles smaller than 0.02 mm: to ASTM D 422, Maximum 3%.

.6 Flat and elongated particles: maximum percent by mass: 15.

PART 3 - EXECUTION

3.1 Inspection of Underlying Sub-Base

.1 Place granular sub-base after surface is inspected and approved by Departmental Representative.

.2 Underlying material to be compacted to 100% of Standard Proctor Density to ASTM D698

3.2 Placing

.1 Place granular sub-base after subgrade is to the satisfaction of the Departmental Representative.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean, unfrozen surface, free from snow or ice.

.5 Place granular sub-base materials using methods

which do not lead to segregation or degradation.

.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace portion of layer in which material has become segregated during spreading.

.9 Place and compact shouldering to 2% cross slope in reconstruction areas. In overlay sections, feather new shoulder material from top of new asphalt to rounding of shoulder slope. RAP may be used in place of granular subbase.

.10 Compacted shouldering to be flush with asphalt concrete surface. RAP may be used in place of granular subbase.

.11 Hand work will be required to form base for asphalt concrete gutters/offtakes.

.12 Place, hand rake and compact new shoulder material under and behind guiderail.

3.3 Compaction

.1 Compaction equipment to be vibratory-type and capable of obtaining required material densities.

.2 Compact to density of not less than 100% of Maximum Dry Density in accordance with ASTM D 698.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers to the satisfaction of the Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is

within specified tolerance.

3.4 Site Tolerances

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

3.5 Protection

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

.2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.3 Shouldering to have 2% cross slope.

END OF SECTION

PART 1 - GENERAL

1.1 Related Work

.1 Section 31 05 17 - Aggregates: General.

.2 Section 31 23 10 – Excavating, Trenching and Backfilling.

1.2 References

.1 American Society for Testing and Materials (ASTM)
.1 ASTM C 117-13, Standard Test Methods for Materials Finer Than 75-mirco m Sieve in Mineral Aggregates by Washing.
.2 ASTM D 6928-10, Standard Test Method for Resistance of coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.
.3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.4 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ftn) (600kN-m/mn).
.5 ASTM D 1883-07e1, Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils.
.6 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB) .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series. .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

PART 2 - PRODUCTS

2.1 Materials

.1 Granular “A” base: material in accordance with Section 31 05 17 – Aggregates: General and following requirements:
.1 Crushed blasted rock.
.2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.

.1 Gradation to:

Sieve Designation	% Passing
19 mm	100
9.51 mm	50-80
4.76 mm	35-60
1.20 mm	15-35
0.300 mm	5-20
0.075 mm	2-6 (pit source) 2-8 (pit source)

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

.3 Plasticity index: to ASTM D 4318, maximum 0.

.4 Los Angeles degradation: to ASTM C 131. Maximum % loss by mass: 35.

.5 Crushed particles: at least 100% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C 136.

.6 Flat and elongated particles: maximum by mass: 15%.

PART 3 - EXECUTION

3.1 Placing

.1 Place granular base after sub-base surface is inspected and approved by the Departmental Representative.

.2 Construct granular base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow and ice.

.5 Place material using methods which do not lead to segregation or degradation of aggregate.

.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace that portion of layer in which material becomes segregated during spreading.

3.2 Compaction

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density not less than 100% of Maximum Dry Density in accordance with ASTM D 698.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.4 Apply water as necessary during compacting to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers to the satisfaction of the. Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 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.

.2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Protection

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

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 32 12 16 – Hot-Mix Asphalt Concrete Paving

1.2 References

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM D 140-2009, Standard Practice for Sampling Bituminous Materials.
.2 ASTM D 244-09, Standard Test Methods and Practices for Emulsified Asphalts.
.3 ASTM D 997-13, Standard Specification for Emulsified Asphalt.

1.3 Environmental Provisions

.1 Tack coat spills larger than 70 L shall be immediately reported to the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative.

.2 The Contractor shall take such steps as are necessary to abate the discharge, clean up the area affected, dispose of waste materials in an approved waste disposal site, and restore the environment to the satisfaction of the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative, all at the Contractor’s expense.

PART 2 – PRODUCTS

2.1 Materials

.1 Emulsified Asphalt: Type SS-1 or Type SS-1h emulsified asphalt, to ASTM D 997 as the tack coat material.
.1 The Departmental Representative shall be notified in advance as to which type the Contractor intends to use and the tack coat shall meet the following standards.

.2 Water: Water for forming the solution shall be clean water free from impurities.

PART 3 – EXECUTION

3.1 Equipment

.1 Tack coat shall be applied by means of an approved pressure distributor equipped with thermometer, pressure gauge, fifth wheel tachometer and suitable spray nozzles which shall all be of the same orifice and manufacturer and capable of producing a fog-

type spray. The slot of each nozzle shall be set at 30 degrees to the axis of the spray bar and the spray bar shall be set at a height above the existing pavement that will permit the fan from each nozzle to overlap its neighbouring fan by exactly half.

3.2 Application

.1 Obtain Departmental Representative's approval of existing surface before applying asphalt tack coat. Clean surface as required.

.2 Tack coat shall only be placed on surfaces that are clean and dry and then only when the atmospheric temperature is at least 10°C and when rain is not forecast within 2 hours of application.

.3 Should the surface to be treated be dirty, then the Contractor shall thoroughly clean the surface by means of a power broom, or equivalent.

.4 The Contractor shall plan his work so that no more tack coat than is necessary for the day's paving operation is applied at one time.

.5 Paint contact surfaces of existing abutting asphalt surface with thin, uniform coat of asphalt tack coat material.

.6 To avoid nuisance and possible property damage to the travelling public, the Contractor shall install portable traffic lights or other means of directing one-way traffic while working on the adjacent part of the road.

.7 Type SS-1 or Type SS-1h emulsion shall be diluted with an equal volume of water prior to the application. The diluted SS-1 or SS-1h emulsion shall be applied at a rate of 0.3 to 0.5 l/m^2 of diluted emulsion on old pavement. Both the mixing temperature and the application temperature shall be between 20°C and 50°C. Care must be exercised not to exceed the recommended application rate.

.8 Tack coat application shall be visually uniform. Areas of insufficient or non-uniform tack coat

coverage shall be corrected by the contractor at no cost to Canada.

.9 Where traffic is to be maintained, treat no more than one half of width of surface in one application.

.10 Keep traffic off tacked areas until asphalt tack coat has set.

.11 Re-tack contaminated or disturbed areas as directed by Departmental Representative.

.12 Permit asphalt tack coat to set before placing asphalt pavement.

3.3 Curing

.1 No hot mix shall be placed upon the tack coat until it has dried to a proper condition of tackiness, as determined by the Departmental Representative. The Contractor is advised that the period required for such drying will depend upon weather conditions.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 35 43 - Environmental Procedures.

.2 Section 31 05 17 - Aggregates: General.

.3 Section 32 11 23 - Granular Base.

.4 Section 32 12 13.16 – Asphalt Tack Coat.

.5 Section 32 17 23 – Pavement Marking.

1.2 References

.1 ASTM International

- .1 ASTM C 88-13, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
- .2 ASTM C 117-13, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.
- .3 ASTM C 123-12, Standard Test Method for Lightweight Particles in Aggregate.
- .4 ASTM C 127-12, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- .5 ASTM C 128-12, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
- .6 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .7 ASTM C 136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- .8 ASTM C 207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.
- .9 ASTM D 995--95b(2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- .10 ASTM D 2419-09, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- .11 ASTM D 3203-11, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.12 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
.13 ASTM D 6373-13, Standard Specification for Performance Graded Asphalt Binder
.14 ASTM D 6927-06, Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
.15 ASTM D 6928-10, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus
.16 ASTM C 1252-06, Standard Test Methods for Uncompacted Void Content of Fine Aggregate (as Influenced by Particle Shape, Surface Texture, and Grading)
.17 ASTM D 4867, Standard Test for Effect of Moisture on Asphalt Concrete Paving Mixtures (Lottman Test)

.2 Government of Newfoundland and Labrador, Department of Transportation and works, Highway Design Division.
.1 The Department of Transportation and Works (DTW) specifications Book, latest edition.

1.3 Supply of Materials

.1 Notify Departmental Representative of proposed date for use of materials; order and schedule shipments to coincide with construction schedule.

1.4 Source Sampling

.1 At least 4 weeks prior to commencing work inform Departmental Representative of proposed source of aggregates and provide access for sampling.
.1 A copy of the location letter shall be forwarded to the Superintendent, Terra Nova National Park.

.2 At least 4 weeks prior to commencing work submit samples of following materials proposed for use as requested by the Departmental Representative:
.1 One 5 L container of asphalt cement.

1.5 Material

.1 Submit manufacturer's test data and

Certification

certification that asphalt cement meets requirements of this section.

1.6 Submission of Mix Design

.1 Submit asphalt concrete mix design and trial mix test results to Departmental Representative for review at least 4 weeks prior to commencing work.

.2 All asphalt concrete mix supplied for the work shall conform to the requirements of the 'surface course' designation.

1.7 Delivery and Storage

.1 Deliver and stockpile aggregates in accordance with Section 31 05 17 - Aggregates: General. Stockpile minimum 50% of total amount of aggregate required before commencing asphalt mixing operation.

.2 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.

.3 Stockpile fine aggregate separately from coarse aggregate.

.4 Provide approved storage, heating tanks and pumping facilities for asphalt cement.

.5 Furnish copies of freight and weigh bills for asphalt cement as shipments are received. Departmental Representative reserves right to check weights as material is received.

PART 2 – PRODUCTS

2.1 Materials

.1 Asphalt cement: PG 58-28 in accordance with ASTM D6373.

.2 Aggregate material to following requirements:

.1 Crushed rock consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, and other deleterious materials.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on semi-log grading chart.

Sieve Designation		Surface Course % Passing
19.0	mm	100
12.5	mm	93 – 100
9.5	mm	75 – 92
4.75	mm	55 – 75
2.00	mm	32 – 55
0.425	mm	12 – 25
0.150	mm	5 – 12
0.075	mm	2 – 5

.3 Coarse aggregate is aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm when tested to ASTM C136.

.4 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.

.5 Coarse aggregate stockpile shall contain no more than 15% passing 4.75 mm sieve.

.6 Fine aggregate stockpile shall contain no more than 15% retained on 4.75 mm sieve.

.7 Petrographic Number: CSA A23.2 – 15A, Max: 135.

.8 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.9 Sand equivalent: ASTM D2419 Min: 50

.10 Magnesium Sulphate Soundness: ASTM C88. Max.% loss by mass: Coarse aggregate, surface course: 12. Fine aggregate, surface course: 16

.11 Los Angeles abrasion; Gradation B. to ASTM C131. Max. % loss by mass: Coarse aggregate, surface course: 35

.12 Absorption: ASTM C127, max. % by mass: Coarse aggregate, surface course: 1.75

.13 Loss by washing: to ASTM C117. Max. % passing 0.075 mm sieve: Coarse

aggregate, surface course: 1.75

.14 Flat and elongated particles with length to thickness ratio greater than 4: Max. % by mass: Coarse aggregate, surface course: 20

.15 Crushed fragments at least 100% of particles by mass within each of following sieve designation ranges to have at least 2 freshly fractured faces. Material to be divided into ranges using methods of ASTM C136.

Passing		Retained on
19.0 mm	to	12.5 mm
12.5 mm	to	4.75 mm

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

.17 Micro – Deval abrasion, to ASTM D6928, Coarse aggregate: Max. 20%.

.18 Micro – Deval abrasion, to CSA A23.2 – 23A, Fine aggregate: Max 20%.

.19 Fine aggregate angularity, to ASTM C1252, Min. 45%.

.3 Mineral filler:

.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 to improve mix properties.

.3 Mineral filler to be dry and free flowing when added to aggregate.

2.2 Mix Design

.1 Job mix formula to be provided by Contractor and designed and certified by a Professional Engineer licensed to practice in the Place of Work. Job mix formula to be approved by Departmental Representative.

.2 Design of mix: by Marshall method to requirements below and as directed by Departmental Representative.

.1 Compaction blows on each face of test

specimens: 75.

.2 Mix physical requirements: Marshall Stability at 60°C: 10000 N(minimum) Flow Value mm: 2 to 4.25 Air Voids in Mixture, %: 3-5
Voids in Mineral Aggregate, % min: 15
Index of Retained Stability % Minimum: 75

.3 Measure physical requirements as follows:
.1 Marshall load and flow value: to ASTM D6927.
.2 Air voids: to ASTM D3203.

.4 Do not change job-mix without prior approval of Departmental Representative. Should change in material source be proposed, new job-mix formula to be reviewed by Departmental Representative.

.5 Return plant dust collected during processing to mix in quantities acceptable to Departmental Representative.

.6 Asphalt content: 5.5-6.25% based on total weight.

.7 Asphalt mixtures containing RAP shall be designed in accordance with the latest edition of the Asphalt Institute Manual Series No. 2.

.8 The quality of the final pavement mixture shall meet all requirements set forth in this specification.

.9 Use liquid type anti-stripping agent. Ensure compatibility with cement being used. Tensile Strength Ration (TSR) required is 80% minimum.

PART 3 – EXECUTION

3.1 Plant and Mixing Requirements

.1 Batch and continuous mixing plants:
.1 To ASTM D995.
.2 Heat asphalt cement and aggregate to mixing temperature directed by Departmental Representative. Do not heat asphalt cement above 160°C.
.3 Before mixing, dry aggregates to a

moisture content not greater than 0.5% by mass or to a lesser moisture content if required to meet mix design requirements.

.4 Make available current asphalt cement viscosity data at plant. With information relative to viscosity of asphalt being used, Departmental Representative will direct temperature of completed mix at plant and at paver after considering hauling and placing conditions.

.5 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders.

.6 Feed cold aggregates to plant in proportions that will ensure continuous operations.

.7 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.

.8 Store hot screened aggregates in a manner to minimize segregation and temperature loss.

.9 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.

.10 Maintain temperature of materials within plus or minus 5°C of specified mix temperature during mixing.

.11 Mixing time:

.1 In batch plants, both dry and wet mixing times as directed by Departmental Representative. Continue wet mixing as long as necessary to obtain a thoroughly blended mix but not less than 30 s or more than 75 s.

.2 In continuous mixing plants, mixing time as directed by Departmental Representative but not less than 45 s.

.3 Do not alter mixing time unless directed by Departmental Representative.

.2 Dryer drum mixing plant:

.1 Feed aggregates to burner end of dryer drum by means of a multi-bin cold feed unit and blend to meet job-mix

requirements by adjustments of variable speed feed belts and gates on each bin.

.2 Meter total flow of aggregate by an electronic weigh belt system with an indicator that can be monitored by plant operator and which is interlocked with asphalt pump so that proportions of aggregate and asphalt entering mixer remain constant.

.3 Provide for easy calibration of weighing systems for aggregates without having material enter mixer.

.4 Calibrate individual feed bin conveyors to ensure mix proportions are achieved.

.5 Make provision for conveniently sampling the full flow of materials from the cold feed.

.6 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate from cold feed prior to entering drum.

.7 Provide a system interlock which will stop all feed components if either asphalt or aggregate from any bin stops flowing.

.8 Accomplish heating and mixing of asphalt mix in an approved parallel flow dryer-mixer in which aggregate and asphalt enter drum at burner end and travel parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt mixture at discharge, with a printing recorder that can be monitored by plant operator. Submit printed record of mix temperatures at end of each day.

.9 Mixing period and temperature to produce a uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves mixer to be less than 1%.

.3 Temporary storage of hot mix:

.1 Provide mix storage of sufficient capacity to permit continuous operation

and designed to prevent segregation.

.2 Do not store asphalt mix in storage bins in excess of 3 h.

.4 While producing asphalt mix for this project, do not produce mix for other users unless separate storage and pumping facilities are provided for materials supplied to this project.

.5 Mixing tolerances:

.1 Permissible variation in aggregate gradation from job mix (percent of total mass):

4.75 mm sieve and larger	5.0
2.00 mm sieve	4.0
0.425 mm sieve	2.5
0.075 mm sieve	1.0

.2 Permissible variation of asphalt cement from job mix, 0.30%.

.3 Permissible variation of mix temperature at discharge from plant, 10°C.

3.2 Equipment

.1 Pavers: mechanical (grade controlled) self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.2 Rollers, general: sufficient number of rollers of type and weight to obtain specified density of compacted mix.

.3 Haul trucks: 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.

.4 Trucks which cannot be weighed in a single operation on scales supplied will not be accepted.

.4 Hand tools:
- .1 Lutes or rakes with covered teeth for spreading operations.
- .2 Provide tamping irons having mass not less than 12 kg and a bearing area not exceeding 310 cm2 for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental Representative, may be used instead of tamping irons.
- .3 Straight edges, 4.5 m in length, to test finished surface.

3.3 Preparation

.1 Reshape granular roadbed to Departmental Representative's approval.

.2 Prior to laying mix, clean surfaces of loose and foreign material.

.3 Saw cut adjacent asphalt surfaces and prior to placing new asphaltic pavement.

.4 Construct key joint at locations where the new top lift of asphalt will meet existing asphalt as indicated on the drawings.

3.3 Transportation of Mix

.1 Transport mix to job site in vehicles cleaned of foreign material in good mechanical working order, tight gates and with tarps.

.2 Paint or spray truck beds with limewater, soap or detergent solution, or non-petroleum based commercial product at least once a day or as required. Elevate truck bed and thoroughly drain. No excess solution will be permitted.

.3 Schedule delivery of material for placing in daylight, unless Departmental Representative approves artificial light.

.4 Deposit mix from surge or storage silo into trucks in multiple drops and use methods necessary to prevent segregation.

.5 Deliver materials to paver at a uniform rate

and in an amount within capacity of paving and compacting equipment.

.6 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at a temperature within range directed, but not less than 130°C.

3.5 Placing

.1 Obtain Departmental Representative's approval of base prior to placing asphalt.

.2 Place asphalt concrete to thicknesses, grades and lines indicated or directed by Departmental Representative.

.3 Placing conditions:
- .1 Place asphalt mixtures only when air temperature is above 5°C.
- .2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
- .3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.

.4 Place asphalt concrete in compacted lifts of thickness as noted on the plans.

.5 Spread and strike off mixture with self-propelled mechanical finisher:
- .1 Construct longitudinal joints and edges true to line markings. Lines for paver to follow will be established by Departmental Representative parallel to centerline of proposed pavement. Position and operate paver to follow established line closely.
- .2 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
- .3 Correct irregularities in alignment left by paver by trimming directly behind machine.
- .4 Correct irregularities in surface of pavement course directly behind paver.

Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.

.5 Do not throw surplus material on freshly screeded surfaces.

.6 When hand spreading is used:

.1 Approved wood or steel forms, rigidly supported to assure correct grade and cross section, may be used. Use measuring blocks and intermediate strips to aid in obtaining required cross-section.

.2 Distribute material uniformly. Do not broadcast material.

.3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered rakes. Reject material that has formed into lumps and does not break down readily.

.4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.

.5 Provide heating equipment to keep hand tools free from asphalt. Avoid high temperatures which may burn material. Do not use tools at a higher temperature than temperature of mix being placed.

3.6 Compacting

.1 Roll asphalt continuously to a density not less than 93% of the mix maximum theoretical density.

.2 General:

.1 Start rolling operations as soon as placed mix can bear weight of roller without undue displacement of material or cracking of surface.

.2 Operate rollers slowly initially to avoid displacement of material. For subsequent rolling do not exceed 5 km/h for static steel- wheeled rollers and 8 km/h for pneumatic-tired rollers.

.3 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per metre of travel.

.4 Overlap successive passes of roller by

at least one half width of roller and vary pass lengths.

.5 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.

.6 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism.

.7 Do to permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.

.8 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.

.9 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.

.3 Rolling:

.1 Commence rolling immediately following rolling of transverse and longitudinal joint and edges.

.2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.

.3 Accomplish finish rolling with steel drum roller while material is still warm enough for removal of roller marks.

.4 Use only experienced roller operators for this work.

3.7 Joints

.1 General:

.1 Trim vertical face by saw-cutting to provide true surface and cross section against which new pavement may be laid. Remove loose particles.

.2 Paint joint face with thin coat of hot asphalt cement or cutback asphalt or preheat joint face with approved heater, prior to placing of fresh mix.

.3 Overlap previously laid strip with spreader by 100 mm.

.4 Remove surplus material from surface of previously laid strip. Do not dispose

on surface of freshly laid strip.

.5 Construct joints between asphalt concrete pavement and portland cement concrete pavement as directed by Departmental Representative.

.6 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.2 Transverse joints:

.1 Construct and thoroughly compact transverse joints to provide a smooth riding surface.

.2 Stagger joint locations 2 m.

.3 Offset transverse joint in succeeding lifts by at least 600 mm.

.3 Longitudinal Joints:

.1 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with a lute or rake.

.2 Roll longitudinal joints directly behind paving operation.

.3 When rolling with static roller, shift roller over onto previously placed lane in order that 100 to 150 mm of drum width rides on newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until thoroughly compacted neat joint is obtained.

.4 When rolling with static or vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.

.5 Offset longitudinal joints in succeeding lifts by at least 150 mm.

3.8 Finish Tolerances

.1 Finished asphalt surface to be within 5 mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 5mm when checked with a 4.5 m straight edge place in any direction.

3.9 Defective Work

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.

.2 Repair areas showing checking, rippling or segregation.

.3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.10 Hours of Work

.1 Unless specifically authorized otherwise by the Departmental Representative, all spreading of asphalt mix shall stop at least 1/2 hour before sunset and the paver shall be off the road by sunset.

3.11 Pollution Control/site Clean-up

.1 Control emissions from equipment and plant to Provincial emission requirements.

.2 Copies of the Contractor's current Provincial Asphalt Plant Approval Permit must be provided to PCA and the EPO.

.3 Excess asphaltic concrete material must be disposed of at approved locations. No material will be deposited outside the lines and grades indicated for asphalt paving, except as approved by the Departmental Representative.

.4 The EPO on behalf of Provincial Department of Environment and Conservation will be monitoring the Contractor's operation, including site cleanup.

END OF SECTION

1 GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

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

1.2 Description

.1 This section specifies the requirements for the supply, fabrication and erection of the guide rail system as indicated on the drawings and as specified herein.

1.3 References

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM C881/C881M-14, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

.2 Canadian Standards Association (CSA)
- .1 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA-S16-14, Design of Steel Structures. CSA-W59-13, Welded Steel Construction (Metal Arc Welding).

.3 American Association of State Highway and Transportation Officials (AASHTO)
- .1 AASHTO M180-2011, Corrugated Sheet Steel Beams for Highway Guide Rails.

.4 American Society for Testing and Materials (ASTM International)
- .1 ASTM A 307-10, Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

.5 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.6 Canadian Standards Association (CSA International)
- .1 CAN/CSA-O80 Series-97(February 2000), Wood Preservation.

.7 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of

Irregularly Shaped Articles.

.8 Newfoundland and Labrador Department of Transportation and Works
.1 Specifications Book (latest edition).

1.4 Samples

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

.2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed sources of guide rail and components.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel W-beam guide rail:
.1 Steel rail and terminal sections: to AASHTO M180, Class B(3.5mm thick), Type 2 zinc coated.
.2 Bolts, nuts and washers: to ASTM A307, hot dip galvanized to CSA G164.
.3 All steel rail to have a minimum thickness of 3.5mm.

.2 Timber post and offset block:
.1 Well seasoned, straight and sound, free from loose knots or other defects, dressed four sides.
.2 Acceptable species of wood: Jack Pine or Eastern Hemlock.

.3 Treat posts and blocks to CSA O80 commodity standard O80.14-M, pressure preserved wood for highway construction Table 1 and its references. Standard minimum retention of CCA preservative 6.4 kg/m3.

.4 Reflector strips shall be 100 mm x 75 mm on metal backing.

PART 3 - EXECUTION

3.1 Erection

.1 Install posts plumb at locations and to depths indicated or directed by Departmental Representative.

.2 When excavation is required, auger post holes and compact bottom to provide firm foundation. Set

post plumb and square in hole, backfill in 150 mm layers and compact each layer before placing succeeding layer.

.3 Cut off tops of posts to elevations indicated.

.4 Treat cut tops with two coats of same type of wood preservative used to pressure treat posts.

.5 Erect steel W-beam components to details indicated. Lap joints in direction of traffic. Tighten nuts to 100 N.m torque. Maximum protrusion of bolt 6 mm beyond nut.

.6 Once the W-beam rail is properly installed, new reflective strips shall be placed immediately on every third post on curves and on each end post, and every fifth post on tangent or straight run.

.1 White reflector shall be placed facing the approaching traffic in the immediately adjacent driving lane and yellow reflector on the opposite side of the same post facing traffic in the other direction.

.7 Worker protection: workers must wear appropriate breathing, eye, and clothing protection when handling, drilling, sawing, cutting or sanding preservative treated wood and applying preservative materials.

.8 Construct anchorages to details as indicated. Place and compact backfill for anchors as directed by Departmental Representative.

3.2 Painting Touch Up

.1 Galvanized steel-touch up:

.1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas. Pre-treat damaged surfaces according to manufacturer's instructions for zinc-rich paint.

.2 Major abrasions shall be repaired by re-galvanizing.

END OF SECTION

APPENDIX A

BASIC IMPACT ASSESSMENT

APPENDIX B

PAINT SAMPLING REPORT BY STRUM CONSULTING
AND
CONCRETE CONDITION SURVEY BY CONQUEST ENGINEERING

Project No.: 675 March 22, 2016

Strum CONSULTING

March 4, 2016

Ms. Lisa Grasse
Crandall Engineering Ltd.
1077 St. George Boulevard
Moncton, NB E1E 2C9

Dear Ms. Grasse,

Re: Paint Sampling
Terra Nova National Park - Newfoundland and Labrador

Thank you for retaining Strum Consulting to complete paint sampling at Terra Nova National Park in Newfoundland and Labrador.

In August 2015, six paint samples were collected from steel beams of the bridge located on Highway 310 near Broad Cove within Terra Nova National Park. The samples were submitted to Maxxam Analytics laboratory in Bedford, NS for analysis of extractable arsenic, lead, and mercury. As shown in Table 1 (attached), three of the six samples collected reported lead concentrations that exceed the maximum allowable concentration of lead (1000 mg/kg) for disposal purposes at the Robin Hood Bay Waste Management Facility in St. John's, NL.

As per the Robin Hood Bay Waste Management Facility Certificate of Approval, if the average of the extractable concentrations of lead exceeds 1000 mg/kg, the leachate characteristics of the material must be evaluated to determine leachable lead. If the leachate analysis indicates a leachate concentration of less than 5 mg/L of lead, the material may be disposed of at the facility.

Strum returned to the site in February 2016 to collect three additional paint samples from the bridge that were submitted to Maxxam Analytics for leachable lead analysis. As shown in Table 1, the three paint samples collected in February 2016 reported leachable lead concentrations ranging from 0.027 to 0.14 mg/L. As such, the leachable lead concentrations comply with the maximum allowable lead leachate concentration (5 mg/L) as per the Robin Hood Bay Waste Management Facility Certificate of Approval.

Thank you,

Shawn Duncan, BSc.
Vice President
sduncan@strum.com

Strum Project # 15-5456

TABLE 1: Extractable Arsenic, Lead, and Mercury Analytical Results, Terra Nova National Park, NL *Project # 15-5456*

Sample ID	Units	Lead	Mercury	Arsenic
Extractable Analysis				
P1(AU27)	mg/kg	1100	nd	170
P2(AU27)	mg/kg	730	nd	130
P2(AU27) Lab- Dup	mg/kg	610	nd	140
P3(AU27)	mg/kg	2600	nd	75
P4(AU27)	mg/kg	1000	nd	62
P5(AU27)	mg/kg	32	nd	100
P6(AU27)	mg/kg	27000	nd	nd
P6(AU27) Repeat	mg/kg	24000	-	-
Lead Leachate Analysis				
P1(FE16)	mg/L	0.027	-	-
P2(FE16)	mg/L	0.062	-	-
P3(FE16)	mg/L	0.14	-	-

Notes:

nd: non-detectable concentrations

Samples collected on dates indicated

RDL : Reportable Detection Limit

Analysis by Maxxam Analytics Inc., Bedford, NS

* Sample P6(AU27) underwent additional analysis to confirm elevated lead (Pb) concentrations.

Strum CONSULTING

Maxxam Job #: B5H3744
Report Date: 2015/10/16

Strum Environmental
Client Project #: 15-5456

ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT)

Maxxam ID		AWT849	AWT850	AWT850	AWT851	AWT852	AWT853	AWT854		
Sampling Date		2015/08/27	2015/08/27	2015/08/27	2015/08/27	2015/08/27	2015/08/27	2015/08/27		
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	P1(AU27)	P2(AU27)	P2(AU27) Lab-Dup	P3(AU27)	P4(AU27)	P5(AU27)	P6(AU27)	RDL	QC Batch
Metals										
Acid Extractable Arsenic (As)	mg/kg	170	130	140	75	62	100	ND	10	4174324
Acid Extractable Lead (Pb)	mg/kg	1100	730	610	2600	1000	32	27000	5.0	4174324
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	ND	ND	ND	ND	ND	1.0	4174324

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

Maxxam ID		AWT854		
Sampling Date		2015/08/27		
COC Number		N/A		
	UNITS	P6(AU27) REPEAT	RDL	QC Batch
Metals				
Acid Extractable Lead (Pb)	mg/kg	24000	5.0	4228541

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B633406
Report Date: 2016/02/25

Strum Environmental
Client Project #: 15-5456

ELEMENTS BY ICP/MS (PAINT)

Maxxam ID		BWL619	BWL620	BWL621		
Sampling Date		2016/02/16	2016/02/16	2016/02/16		
COC Number		N/A	N/A	N/A		
	UNITS	P1(FE16)	P2(FE16)	P3(FE16)	RDL	QC Batch
Metals						
Leachable Lead (Pb)	ug/L	27	62	140	5.0	4390859

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Strum
CONSULTING

September 4, 2015

Ms. Lisa Grasse
Crandall Engineering Ltd.
1077 St. George Blvd., Suite 400
Moncton, NB Canada, E1E 4C9

Dear Ms. Grasse,

Re: Paint Sampling, Bridge Structure, Terra Nova National Park, Newfoundland

Strum Consulting was commissioned by Crandall Engineering to complete sampling activities for a bridge structure in the Terra Nova National Park in Newfoundland. Samples were collected on August 27, 2015. The purpose of the sampling was to determine potential contaminants in paint associated with the bridge structure.

Scope of Work

Based on the scope of work communicated to Crandall Engineering, Strum completed the following tasks:

- Traveled to Terra Nova National Park to collect paint samples from the existing bridge structure.
- Collected six (6) paint samples from various parts of the structure.
- Submitted samples to an accredited laboratory for analysis for lead, mercury, and arsenic (typical paint contaminants).
- Preparation of this report that includes appropriate remediation measures to direct contractor on proper material handling procedures and disposal requirements.

Analytical Results

All six samples collected for analysis reported detectable concentrations of lead. Reported concentrations in paint range from 32 – 27,000 mg/kg. Five of the paint samples also had detectable concentrations of Arsenic. Arsenic concentrations ranged from 62-170 mg/kg. None of the samples had detectable levels of Mercury. A summary of the paint samples collected is presented below in Table A.

Table A: Paint Sample Results

Sample ID	Units	Sample Location	Result Pb	Result Hg	Result As
P1(AU27)	mg/kg	south beam, west side of bridge	1100	nd	170
P2(AU27)	mg/kg	2nd from south beam, west side of bridge	730	nd	130
P2(AU27) Lab- Dup	mg/kg	-	610	nd	140
P3(AU27)	mg/kg	north beam, west side of bridge	2600	nd	75
P4(AU27)	mg/kg	south beam, east side of bridge	1000	nd	62
P5(AU27)	mg/kg	2nd from north beam, east side of bridge	32	nd	100
P6(AU27)	mg/kg	north beam, east side of bridge	27000	nd	nd
RDL	mg/kg	-	5	1	10

Notes:
nd: non-detectable concentrations
RDL : Reportable Detection Limit
Analysis by Maxxam Analytics Inc., Bedford, NS

Recommendations

Based on the results of the analysis, the following recommendations are provided:

1. All metal containing paints should be removed by an experienced lead abatement contractor or other suitably trained workers and disposed of at an approved disposal facility. Management of spent abrasive blasting medium generated during site work should be completed as per regulatory requirements.
2. Encapsulation of the work area where paint is being removed should be completed in accordance to standard practices to avoid lead contamination from spreading across the site and into the waterways. If sandblasting is undertaken, full enclosure should be installed prior to the commencement of paint removal and inspected by a qualified representative.
3. All workers handling metal containing paints should be outfitted with appropriate PPE. As a minimum, workers should wear a half-face air purifying respirator employing P100 HEPA filtration, Nitrile gloves, and a protective Tyvek® suit.

If you have any questions, please do not hesitate to contact us.

Thank you,

Shawn Duncan, BSc.
Vice President
sduncan@strum.com

Conquest Engineering
Experience commitment.
Geotechnical and Materials Engineers

Saint John
Moncton
Fredericton
Bedford
Corner Brook

Broad Cove Bridge – Concrete Condition Survey
Rte. 310 – Terra Nova National Park, NL

Report to:
Lisa Grasse, P.Eng., FEC
Moncton, NB
Crandall Engineering Ltd.
via email

Prepared by:
Conquest Engineering Ltd.
575 Crown Street
Saint John, NB E2L 5E9
ph: (506) 635-7565

Project No: 071-160
Date: November 10, 2015

PWGSC Project No.
R.046114.105

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Appendices

1.0 Introduction

The Broad Cove Bridge, on Route 310 in Terra Nova National Park, NL was constructed in 1964 and is a two-lane, single-span structure with steel girders and concrete deck. A 2012 report by SNS Lavalin identified numerous deficiencies within the structure that require attention. It is our understanding that the structure is scheduled for rehabilitation and that the current condition survey, which addresses the accessible concrete components, will be used to provide input to options and the extent of rehabilitation.

The condition survey tasks carried out by Conquest Engineering Ltd. addressed the following:

- The general condition of the concrete from visual inspection and compressive strength testing of core samples,
- Identify if delamination of the concrete within the bridge deck has occurred, which would likely be due to reinforcing steel corrosion,
- Determine the depth of penetration of water soluble chlorides within the bridge deck to establish if conditions exist at the reinforcing steel depth for chloride-induced corrosion,
- Identify if reaction products from alkali-aggregate reactivity exist within the concrete of the abutments.

2.0 Scope of Work

The scope of the condition survey performed by Conquest Engineering Ltd. (CEL) included:

- Ground penetrating radar (GPR) equipment was used to locate reinforcing steel embedded within the concrete structure at core sample locations.
- Eighteen (18) four-inch (4") diameter concrete cores were obtained from the bridge deck and abutments.
- The reinforcing steel of the deck was exposed at two (2) locations for observation of corrosion,
- Asphalt was removed over both expansion joints for observation of the conditions,
- A visual examination on the core samples was carried out, noting such features as aggregate size, delamination, etc.
- Test the core samples from the bridge deck for water soluble chlorides, in accordance with standard test method *ASTM C1218*.
- Test sections of core samples from each bridge abutment for evidence of alkali-aggregate reactivity (AAR), using the gel fluorescence test method.
- Carry out compressive strength tests on all concrete core specimens in accordance with standard test method *CSA A23.2-14C.*
- Reinstate all core holes in the concrete by patching with structural non-shrink repair mortar and patch the core holes in the pavement surface on the bridge deck with cold patch asphalt compacted in place.

3.0 Condition of Bridge Structure

3.1. Bridge Deck

The concrete bridge deck is overlain by a layer of asphalt concrete, ranging in thickness from 45 to 90 mm. A waterproofing membrane exists between the layer of asphalt concrete and the concrete bridge deck. The concrete bridge deck is approximately 200 mm thick. The reinforcing steel that is embedded in the concrete appears to be 20M bar.

A visual examination of all concrete cores did not reveal any evidence of delamination. Furthermore there was no evidence of corrosion of the upper layer of reinforcing steel where it was encountered. Figure 1 is an image showing the condition of the rebar where it was encountered in one of the core holes.

Figure 1 - Bridge Deck Reinforcement Condition

3.1.1. Concrete Compressive Strength

Six (6) drilled cores from the concrete bridge deck were trimmed, capped with a sulphur capping compound, and tested for compressive strength in accordance with CSA A23.2-14C. The results of the compressive strength testing are presented in Table No.1. Approximate locations from which core samples were taken are provided on SK-1 in Appendix A.

Table 1 – Compressive Strength of Concrete Cores – Bridge Deck

Core ID	Comp. Strength (MPa)	Core ID	Comp. Strength (MPa)
1	33.9	8	25.7
3	32.2	10	31.6
5	38.8	11	49.8

According to the current standards for reinforced concrete in Canada (CSA A23.1-14 – Concrete Materials and Methods of Concrete Construction), the concrete of bridge decks would be categorized as C-1 Exposure Class and with a minimum specified compressive strength of 35 MPa within 56 days.

3.1.2. Water Soluble Chloride Concentration

Eight core samples obtained from the bridge deck were tested for water soluble chloride concentrations, in accordance with standard test method *ASTM C1218*. The results of the water soluble chlorides testing are provided in Table No.2. A visual representation is presented in Figure No. 2. Approximate locations from which core samples were selected for water soluble chloride testing are provided in SK- 1 in Appendix A.

Table 2 – Water Soluble Chloride Concentrations in Deck Concrete Cores

Core ID:	Water Soluble Chloride Concentration (% by mass of concrete) Depth (mm)										
	0	10	20	30	40	50	60	70	80	90	100
2	0.080	0.124	0.038	0.031	0.021	0.011	-	-	0.005	-	0.005
4	0.081	0.061	0.041	0.028	0.023	0.021	0.021	0.020	0.020	0.021	0.005
6	0.033	0.100	0.071	0.048	0.035	0.043	0.031	0.029	0.021	0.021	0.025
7	0.023	0.037	0.092	0.054	0.032	0.008	0.009	0.008	0.007	0.007	0.007
9	0.023	0.050	0.032	0.021	0.020	0.018	0.011	0.011	0.011	0.009	0.005
12	0.102	0.097	0.089	0.080	0.042	0.026	-	-	-	-	0.024
13	0.117	-	-	-	0.113	0.078	0.075	0.053	0.043	-	0.016
14	0.112	0.101	0.092	0.085	0.043	0.023	0.021	0.021	0.010	0.005	0.007

The chloride threshold, by mass of concrete, which is required for corrosion of black steel is generally accepted as being a minimum of 0.025%. From our GPR data and observations from the core drilling, the depth to the top layer of reinforcing steel within the bridge deck is of the order of 100 mm. The test results indicate that the potential corrosion threshold of 0.025% has been achieved in 2 of the 8 test locations (Core No. 6 and Core No. 12).

The following Figure 2 graphically presents the results of the water soluble chloride concentrations within the bridge deck concrete.

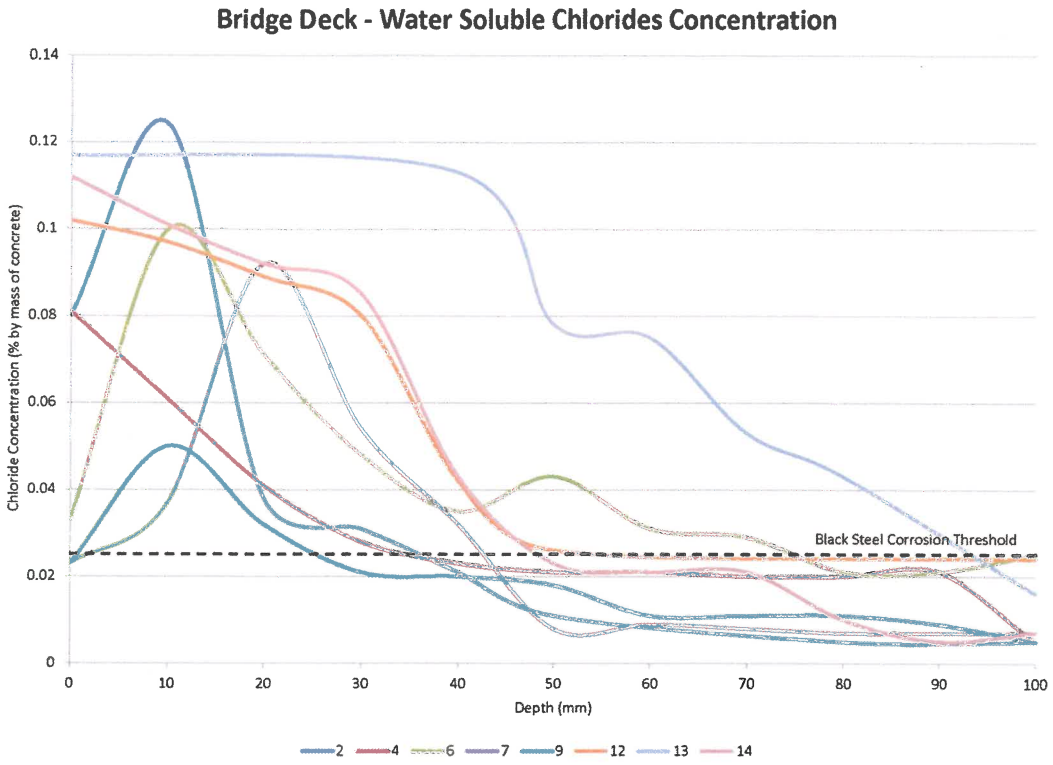


Figure 2

3.2. Expansion Joints

The asphalt was removed over the expansion joints at each end of the bridge deck and photographs taken for review by Valron Engineering. The following photos depict the general conditions of the expansion joints as observed below the asphalt.

Figure 3 – West Expansion Joint

Figure 4 – West Expansion Joint

Figure 5 – East Expansion Joint

3.3. Abutments

Four drilled core samples were obtained from the east and west abutments and tested for compressive strength in accordance with CSA A23.2-14C. The results of the compressive strength tests are presented in Table 3.

Table No. 3 - Compressive Strength of Concrete Cores - Abutments

Core ID	Location	Comp. Strength (MPa)	Core ID	Location	Comp. Strength (MPa)
15	East abutment	27.1	17	West abutment	24.0
16	East abutment	33.2	18	West abutment	28.5

According to the current standards for reinforced concrete in Canada (CSA A23.1-14 – Concrete Materials and Methods of Concrete Construction), the concrete of bridge abutments would also be categorized as C-1 Exposure Class and with a corresponding minimum compressive strength requirement of 35 MPa within 56 days.

The abutments and wing walls are exhibiting evidence of Alkali Aggregate Reactivity, as indicated by the pattern of map cracking and exudation. Figures 6 and 7 below are images of the east abutment wing wall. Figure 6 is from the SNC Lavalin report of 2012 and Figure 7 is from the 2015 condition survey. The pattern of map cracking is clearly evident and the degree of cracking appears to have increased since 2012. Corrosion deposits on the face, which are indicative of corrosion of embedded reinforcing steel, also appears to be more prevalent today than in 2012.

Figure 6 – East Abutment Wing Wall 2012

Figure 7 – East Abutment Wing Wall 2015

To confirm the presence of alkali-aggregate reactivity (AAR) within the concrete, samples from the east abutment were sent to W. S. Langley Concrete & Materials Technology. Gel Fluorescence tests were performed which confirmed the presence of reaction products due to AAR. Reaction rims around coarse aggregate particle and cracking of coarse aggregate particles were also noted, which are indicative of AAR. See Figure 8.

Figure 8 – Reaction rims around coarse aggregate particles

It should be expected that further expansion and cracking

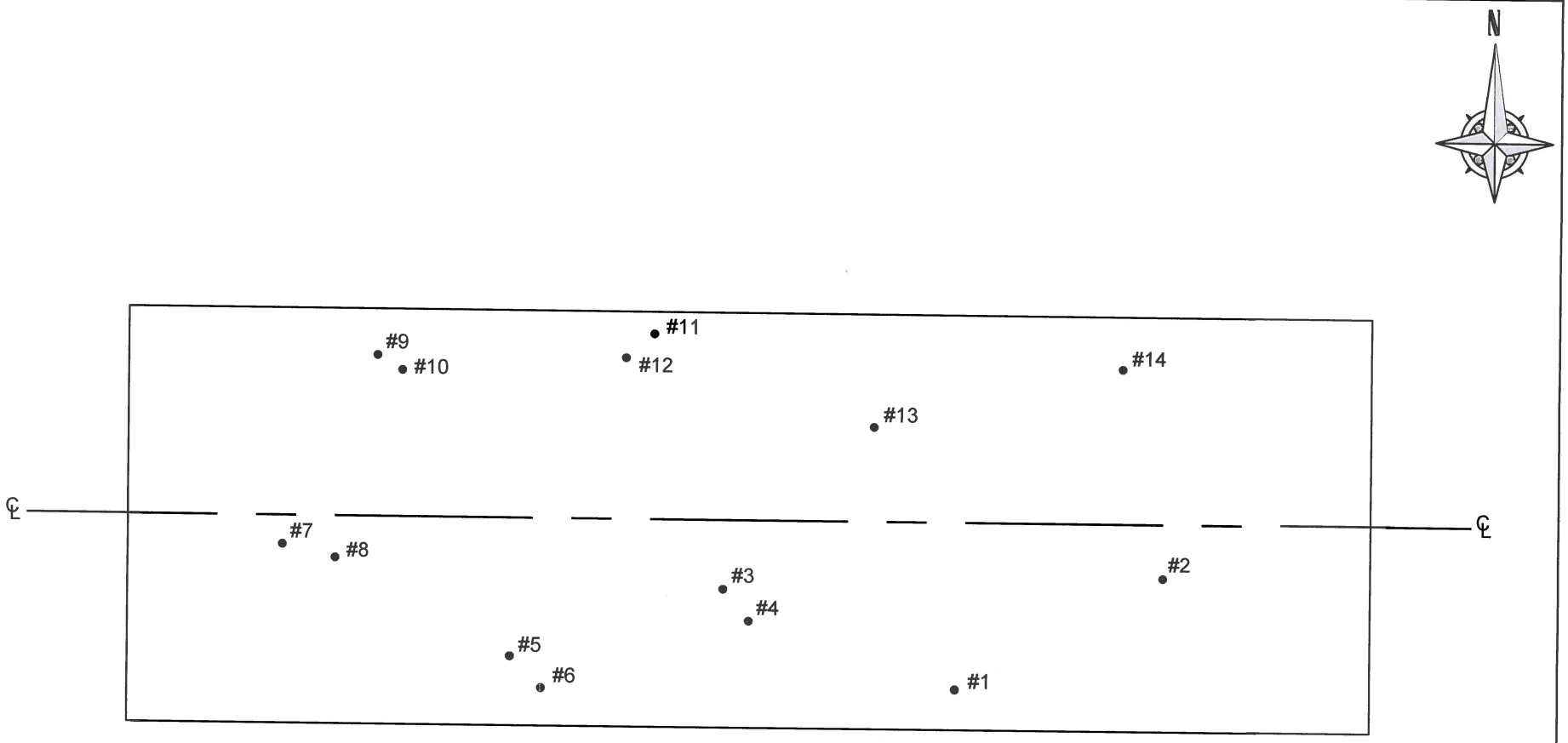
due to AAR will continue since the concrete is exposed to a moist environment.

4.0 Closing

We trust the findings in this report are sufficient for your present requirements and are in keeping with the scope of work as proposed. If you have any questions, or if we can be of any further assistance to you on this project, please feel free to contact us.

Respectfully submitted,
CONQUEST ENGINEERING LTD.

G. Ross Whitcomb, P. Eng.
Senior Engineer/Principal



BRIDGE DECK CONDITION SURVEY
BROAD COVE BRIDGE, NL
CORE LOCATIONS

Conquest Engineering
Experence commitment.
Geotechnical and Materials Engineers

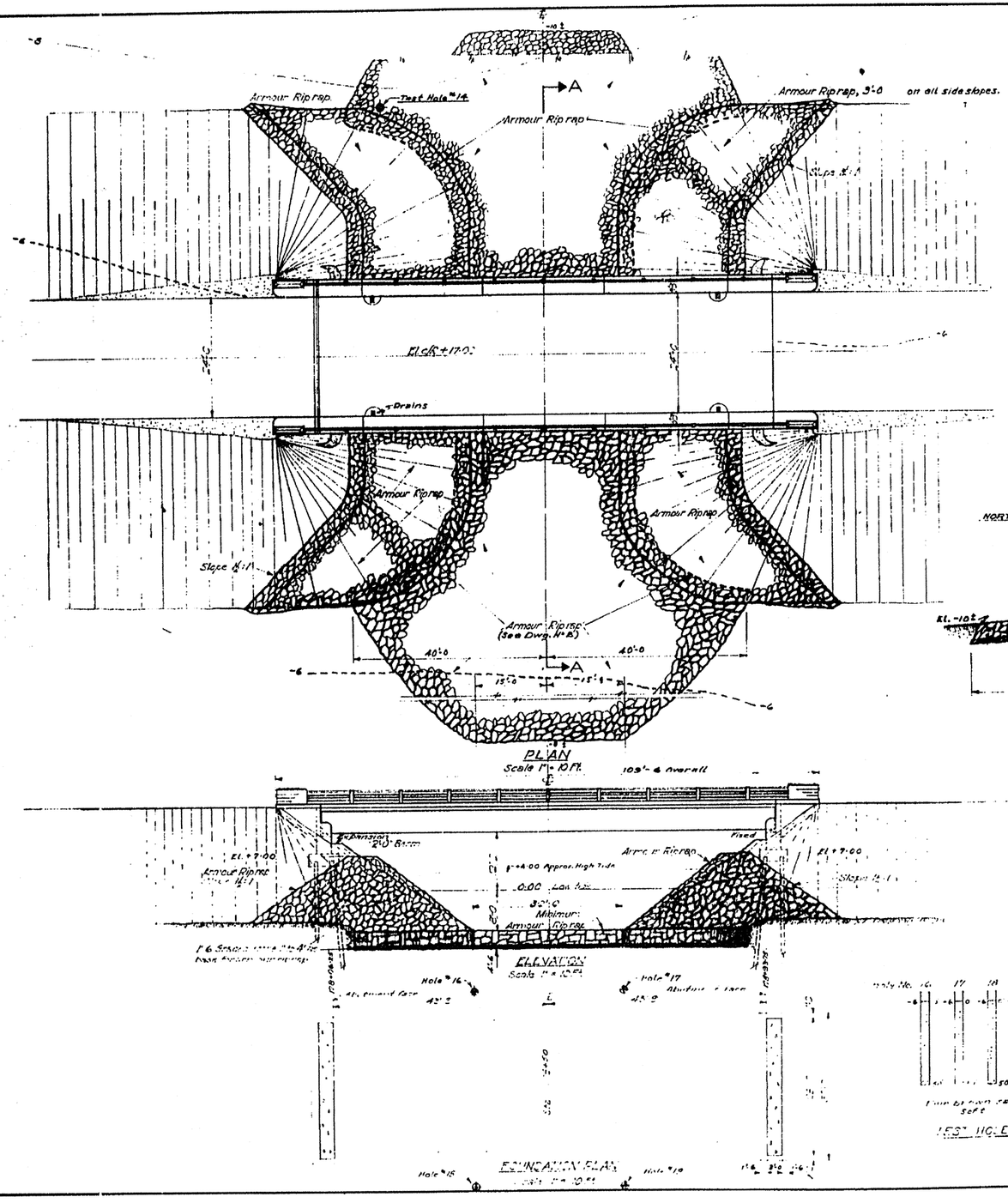
Saint John
Moncton
Fredericton
Bedford
Corner Brook

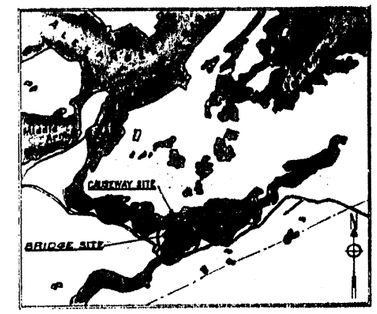
DATE:	SCALE:
September 29, 2015	NTS
PROJECT No.:	**FIGURE:**
071–160	1

APPENDIX C

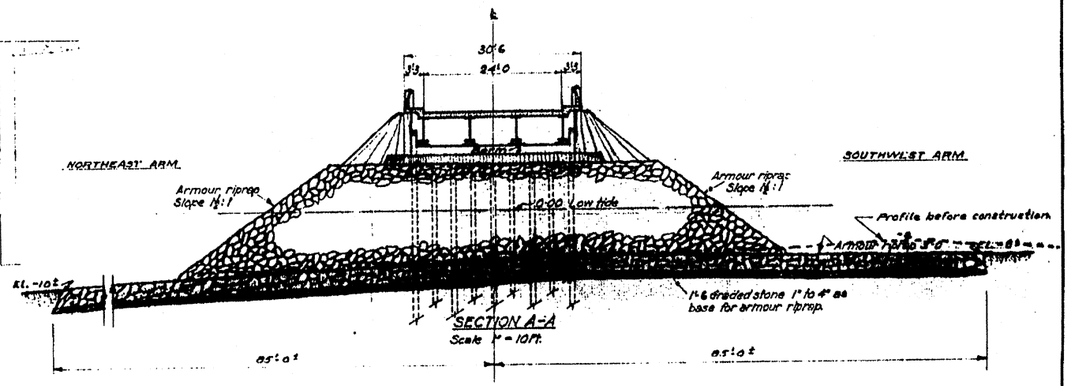
EXISTING DRAWINGS

DRAWING NO.	VERT. SCALE	HORIZ. SCALE	SHEET NO.	TOTAL SHEETS
A-A-61-1-ab-10	—	—	10	13





LOCATION PLAN
Scale 1:100,000



LIST OF DRAWINGS

1 — GENERAL LAYOUT
2 — ABUTMENTS AND REINFORCING STEEL SCHEDULE
3 — DECK AND BEARINGS
4 — STANDARD HANDRAIL

GENERAL NOTES.

1. Loading: H20-S16.
2. Concrete: Minimum compressive strength 3000 psi at 28 days.
3. Reinforcing steel: Hard grade or intermediate grade, rail or billet steel, deformed bars.
4. Structural steel: Shall conform to CSA G40.8 Design, fabrication and erection of structural steel shall be in accordance with the latest CSA specification for Steel Highway Bridges – S6.
5. All exposed edges of concrete to be chamfered 1" unless otherwise noted.
6. Concrete cover to reinforcing steel to be 2" except as noted.
7. Permanent bench marks to be established and checked by the Engineer before construction work begins.
8. Any construction joints, other than those indicated on the drawings, must be approved by the Engineer.

NO.	REVISIONS	NAME	DATE

DEPARTMENT OF PUBLIC WORKS
CANADA
DEVELOPMENT ENGINEERING BRANCH
STRUCTURES DIVISION

BROAD COVE BRIDGE
TERRA NOVA NATIONAL PARK – NFLD.

GENERAL LAYOUT

JOB SUPERVISOR H. Hewitt
APPROVED DATE 6/5/63

DESIGN N.K. CHECK
DRAWN H.V.P. CHECK
TRACED CHECK

PROJECT NO. SD-147

CHIEF, STRUCTURES DIVISION
APPROVED DATE 6/5/63

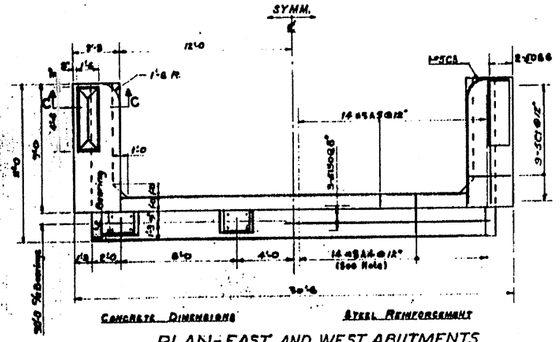
CHIEF ENGINEER

SHEET 1 OF 4

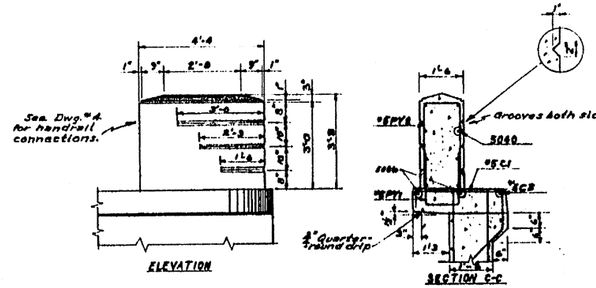
7/8/63 app'd

#274

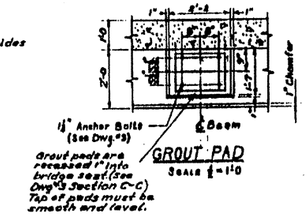
DRAWING NO.	VERT. SCALE	HORIZ. SCALE	SHEET NO.	TOTAL SHEETS
A-A-61-1-ab-11	—	—	11	13



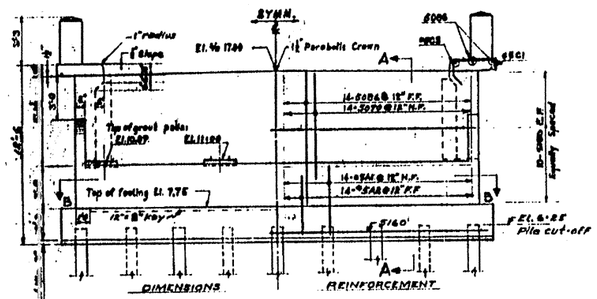
PLAN-EAST AND WEST ABUTMENTS
SCALE $\frac{1}{4}$"=1'-0



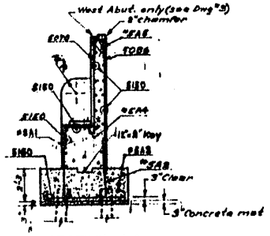
PYLON DETAILS
SCALE $\frac{1}{2}$"=1'-0



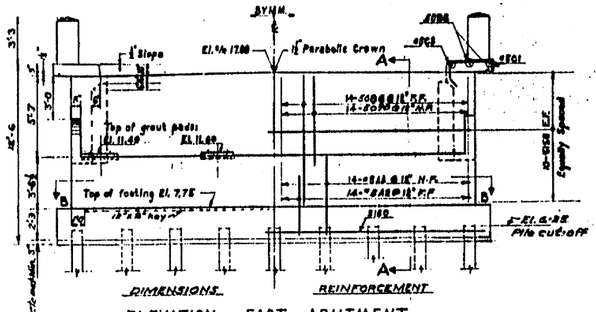
GROUT PAD
SCALE $\frac{1}{4}$"=1'-0



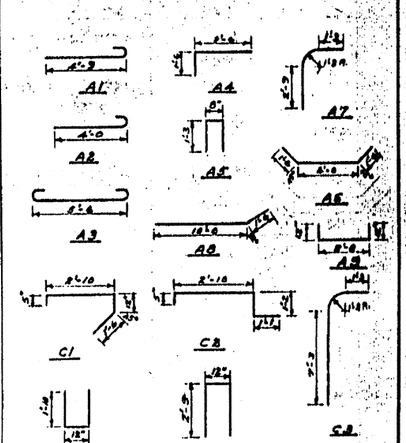
ELEVATION — WEST ABUTMENT
SCALE $\frac{1}{4}$"=1'-0



SECTION A-A
SCALE $\frac{1}{4}$"=1'-0

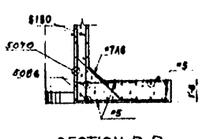


ELEVATION — EAST ABUTMENT
SCALE $\frac{1}{4}$"=1'-0

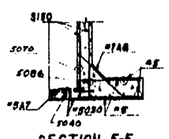


STEEL SCHEDULE

LOCATION	CU YDS. CONC.	LBS. REINF.	STRAIGHT BARS No.	SIZE	LENGTH	MARK	BENT BARS No.	SIZE	LENGTH	MARK
ABUTMENTS AND WINGS	80	~5940	80	5	16'-0	5160	90	5	4'-8	5A1
			92		15'-0	5150	56	5	4'-6	5A8
			72		8'-6	5086	60	5	6'-3	5A5
			6		8'-3	5083	56	5	4'-0	5A6
			56		9'-0	5070	56	5	5'-0	5A7
			8		6'-6	5066	28	5	6'-0	5A6
			8		8'-3	5059	8	5	7'-0	5A7
			16		3'-0	5050	8	5	11'-6	5A8
			8		4'-6	5046	16	5	4'-6	5A9
			48		3'-0	5040	36	5	5'-6	5C1
			48		3'-3	5033	4	5	10'-6	5C8
			16		3'-0	5030				
			8	5	3'-3	5026	20	5	4'-6	5PY1
			8	5	3'-0	5020	20	5	6'-3	5PY8
DECK	87	15,820	244	6	27'-6	6276	184	5	8'-3	5C2
			100	5	24'-0"	5240				
			136	4	24'-0	4240				
			12	4	8'-6	4086				



SECTION D-D
SCALE $\frac{1}{4}$"=1'-0



SECTION E-E
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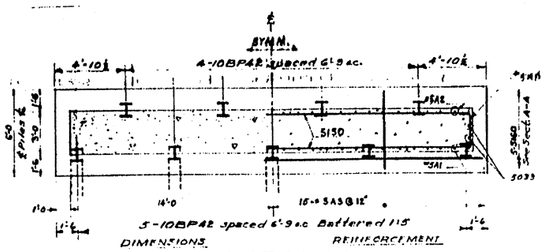
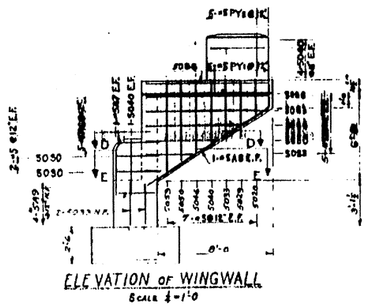
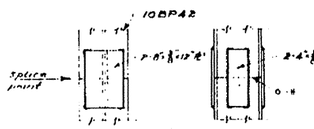


SECTION B-B
SCALE $\frac{1}{4}$"=1'-0



ELEVATION of WINGWALL
SCALE $\frac{1}{4}$"=1'-0

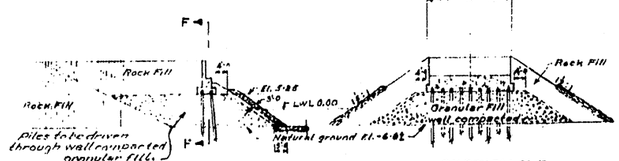
LEGEND
N.F. = Near Face
F.F. = Far Face
E.F. = Each Face



NOTE —
18 Piles 10BP42 x 70'-0 lg.

All welding $\frac{5}{16}$" continuous Fillets. Electric arc welding.

PILE SPLICE DETAIL



GRANULAR FILL DETAIL
Scale 1"=20'-0

No.	REVISIONS	NAME	DATE

DEPARTMENT OF PUBLIC WORKS
CANADA
DEVELOPMENT ENGINEERING BRANCH
STRUCTURES DIVISION

BROAD COVE BRIDGE
TERRA NOVA NATIONAL PARK — NFLD

ABUTMENTS
REINFORCING STEEL SCHEDULE

JOB SUPERVISOR H. Hogg	DESIGNED	N.K.	CHECKED
APPROVED DATE 12/1/60	DRAWN	N.K.	CHECKED
	TRACED		CHECKED

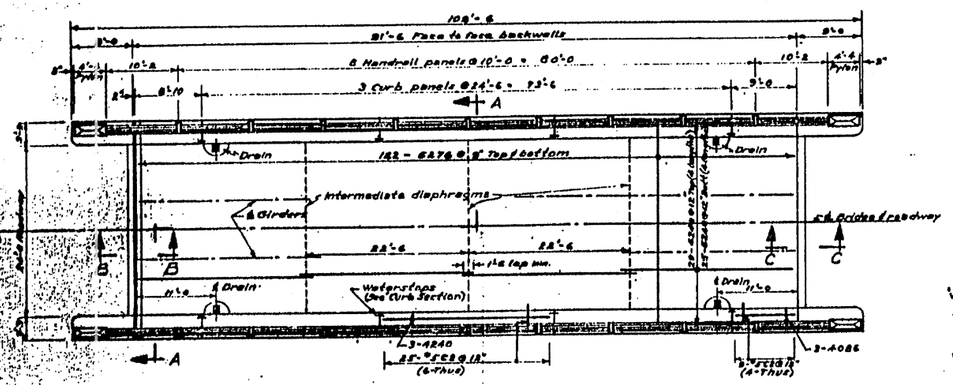
Geo. H. Crowe, CHIEF-STRUCTURES DIVISION
APPROVED DATE 5 Dec 60
CHIEF ENGINEER

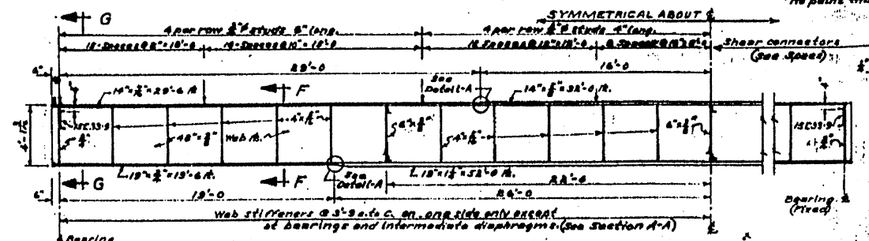
PROJECT NO. SD — 147

SHEET 2 OF 4

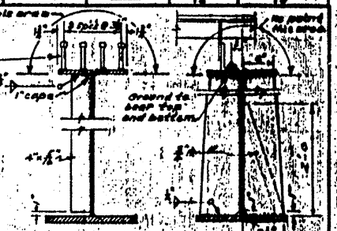
DRAWING NO.	VERT. SCALE	HORIZ. SCALE	SHEET NO.	TOTAL SHEETS
AA-611-02-12	—	—	12	13

No paint this area





BEAM DETAILS
Scale 1/4" = 1'-0



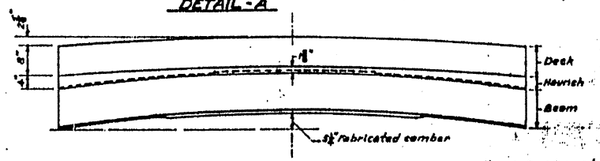
SECTION F-F

SECTION G-G

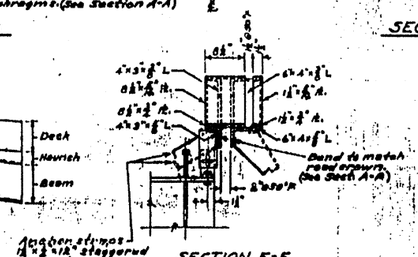
Scale : 1" = 1'-0

DETAIL - A

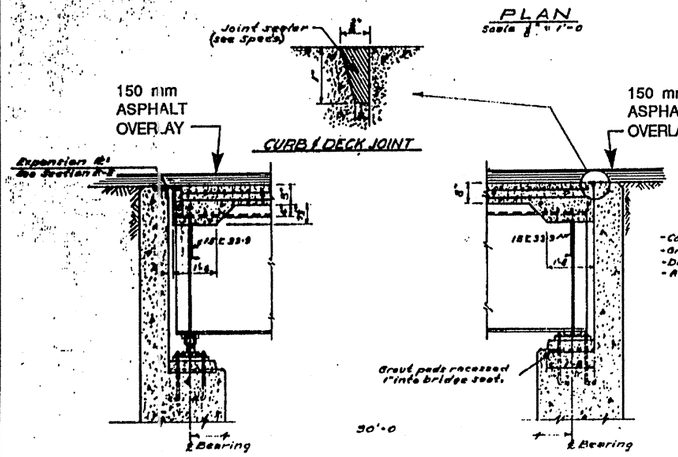
Butt weld.



HAUNCH & CAMBER DIAGRAM
(DECK NOT POURED)
NOT TO SCALE



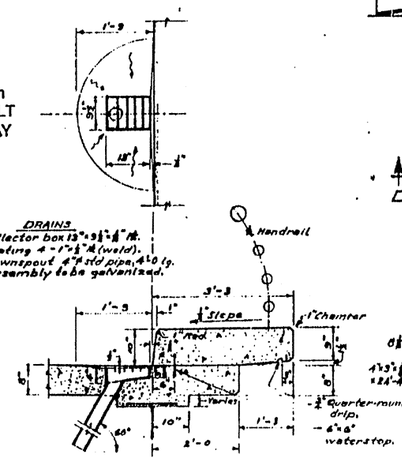
SECTION E-E



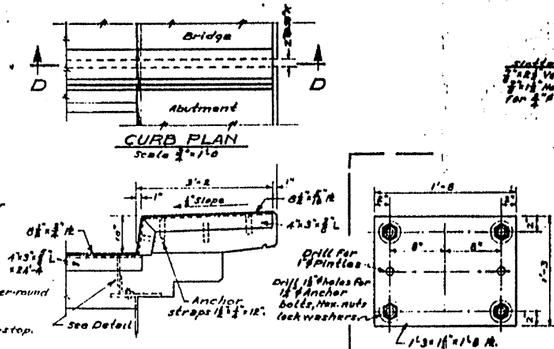
CURB & DECK JOINT

SECTION B-B
Scale 1/4" = 1'-0

SECTION C-C
Scale 1/4" = 1'-0



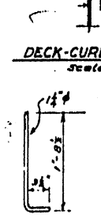
CURB SECTION
Scale 1/2" = 1'-0



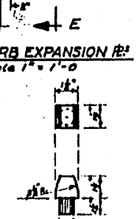
CURB PLAN
Scale 1/2" = 1'-0

SECTION D-D
Scale 1/2" = 1'-0

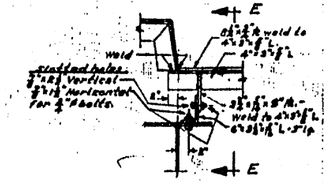
BASE PLATES
Scale 1/2" = 1'-0



ANCHOR BOLTS

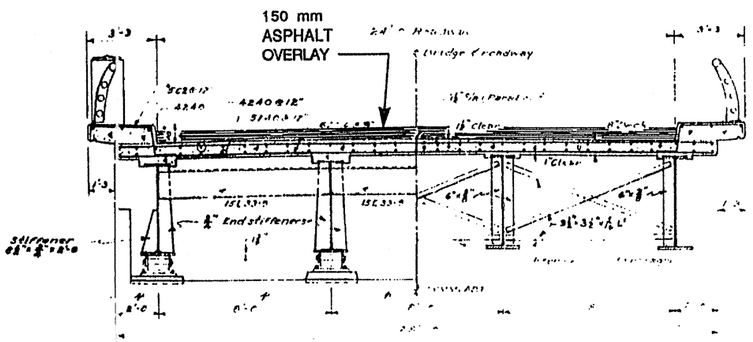


PINTLES
Scale 3"=1'-0

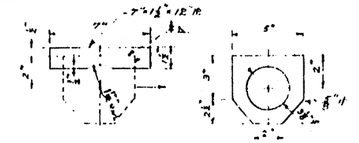


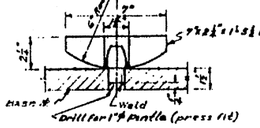
DECK-CURB EXPANSION ℄s
Scale 1" = 1'-0

NOTE
Expansion bearing rockers to be set for a vertical position at 50°F.

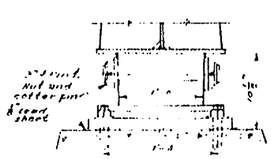


SECTION A-A
Scale 1/4" = 1'-0



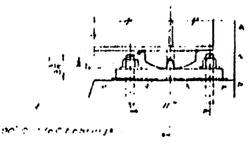


FIXED ROCKER & PINTLE

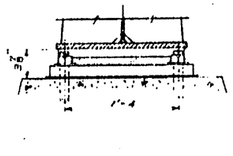


EXPANSION BEARINGS
Scale 1" = 1'-0

3" ø pin between trunnion and cotter pins



SIDE VIEW



ELEVATION

FIXED BEARINGS
Scale 1" = 1'-0

NO.	REVISIONS	NAME	DATE

DEPARTMENT OF PUBLIC WORKS
CANADA
DEVELOPMENT ENGINEERING BRANCH
STRUCTURES DIVISION

BROAD COVE BRIDGE
TERRA NOVA NATIONAL PARK - NFLD.

DECK & BEARINGS

JOB SUPERVISOR H. HEWITT
APPROVED DATE 8/5/62
CHIEF, STRUCTURES DIVISION
APPROVED DATE 8 Aug/62
CHIEF ENGINEER

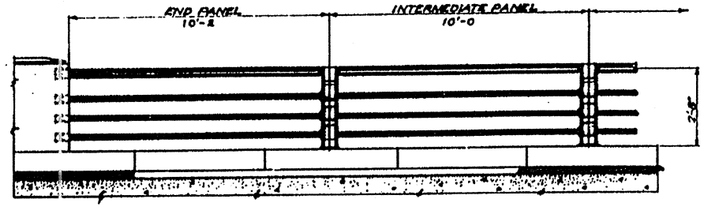
DESIGN N.K. CHECKED
DRAWN D.A.S CHECKED
TRACED CHECKED

PROJECT NO. 90-147

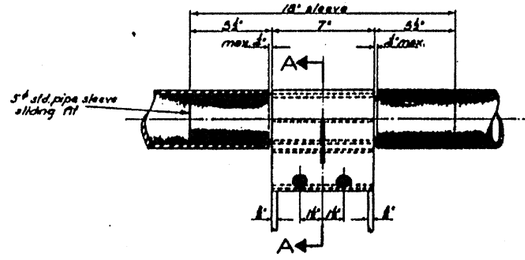
SHEET 3 OF 4

22

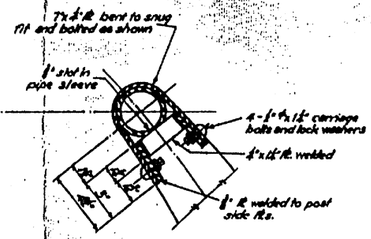
DRAWING NO.	VERT. SCALE	HORIZ SCALE	SHEET NO.	TOTAL SHEETS
A-A-81-1-ab-13	—	—	13	13



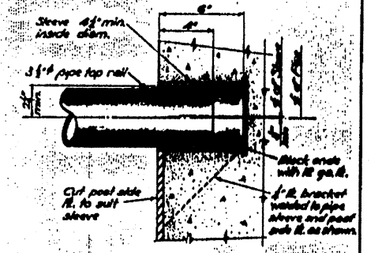
INTERIOR ELEVATION OF POSTS AND HANDRAILS
Scale ½"=1'-0



DETAIL AT POST

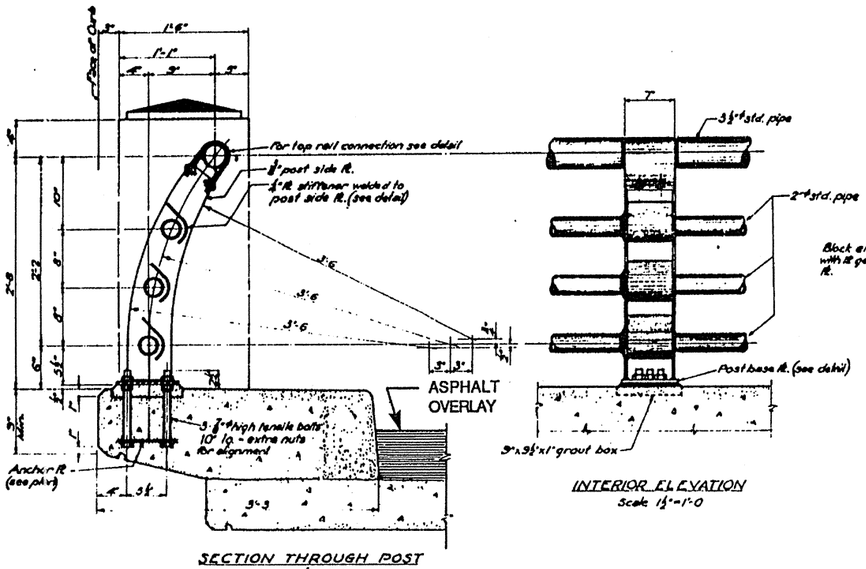


SECTION A-A



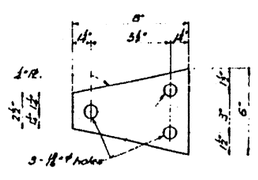
DETAIL AT PYLON

TYPICAL TOP RAIL CONNECTIONS
scale 3"=1'-0

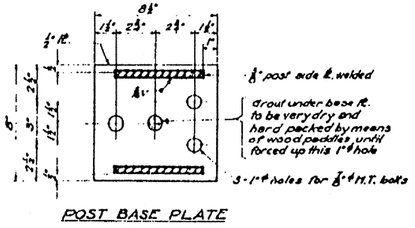


SECTION THROUGH POST
Scale 1½"=1'-0

INTERIOR ELEVATION
Scale 1½"=1'-0

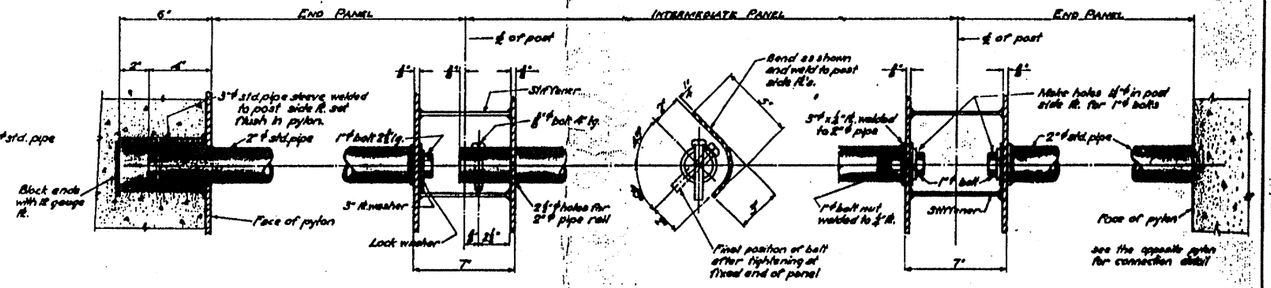


ANCHOR PLATE



POST BASE PLATE

Scale 3"=1'-0



PYLON — POST 'A' — STIFFENER — POST 'B' — PYLON

TYPICAL LOWER RAIL CONNECTIONS
PYLON TO PYLON
Scale 3"=1'-0

No.	REVISIONS	NAME	DATE

DEPARTMENT OF PUBLIC WORKS
CANADA
DEVELOPMENT ENGINEERING BRANCH
STRUCTURES DIVISION

BROAD COVE BRIDGE
TERRA NOVA NATIONAL PARK - NFLD.

STANDARD HANDRAIL FOR SAFETY CURB.

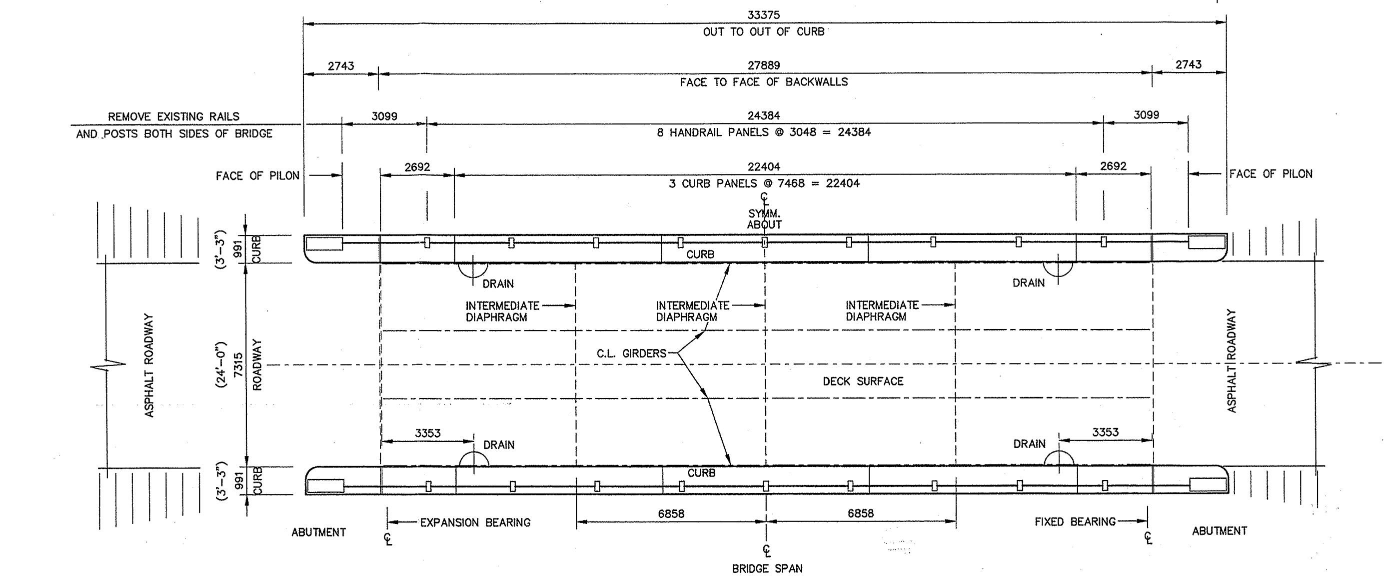
JOB SUPERVISOR H. Hewitt
APPROVED DATE 8, 5, 16
DESIGN V.B.T. CHECK
DRAWN H.V.E. CHECK
TRACED CHECK
CHIEF-STRUCTURES DIVISION
APPROVED DATE 5 Aug 16
CHIEF ENGINEER

PROJECT NO. SD-147

SHEET 4 OF 4

NATN 00/R24 3/4
Terra Nova National Park
Bridge Repairs 2000
Broad Cove Bridge General Layout

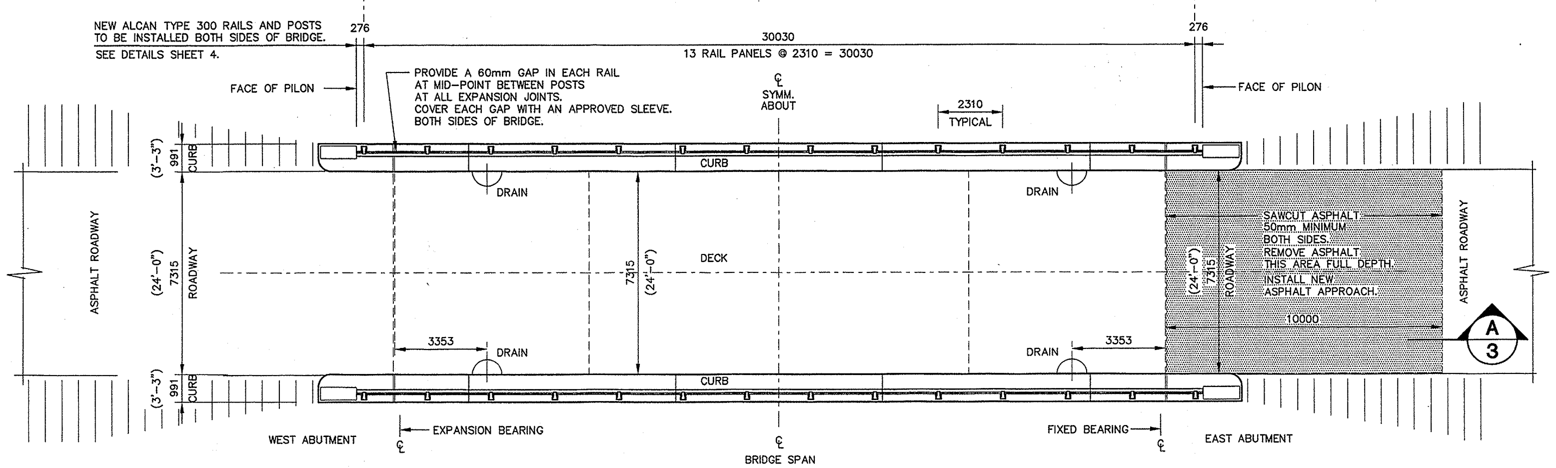
PLOT SCALE 1:1



EXISTING CONDITION

PLAN

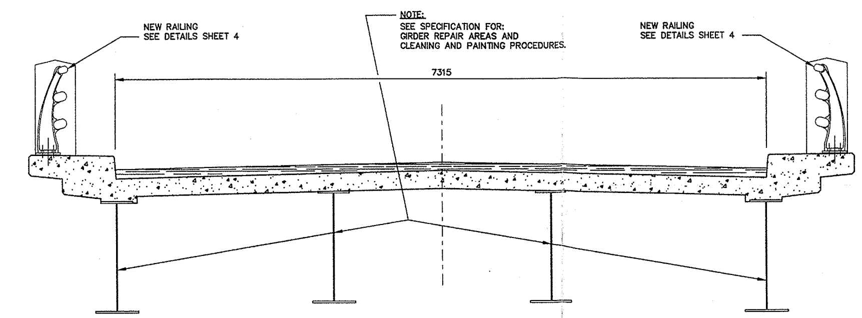
SCALE 1:100



NEW CONDITION

PLAN

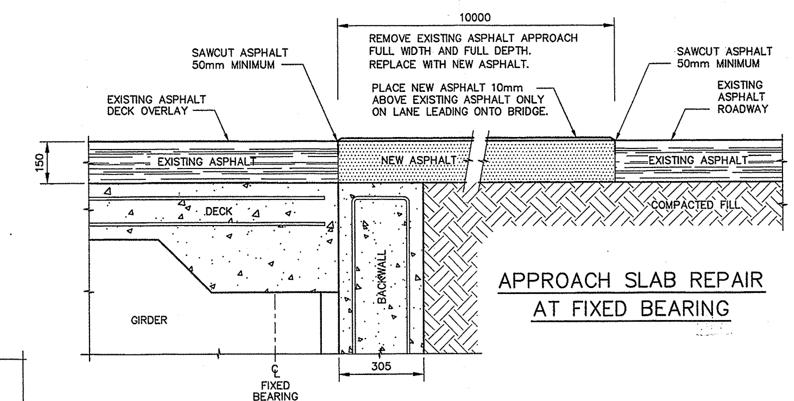
SCALE 1:100



SPOT PAINTING OF GIRDERS

SECTION

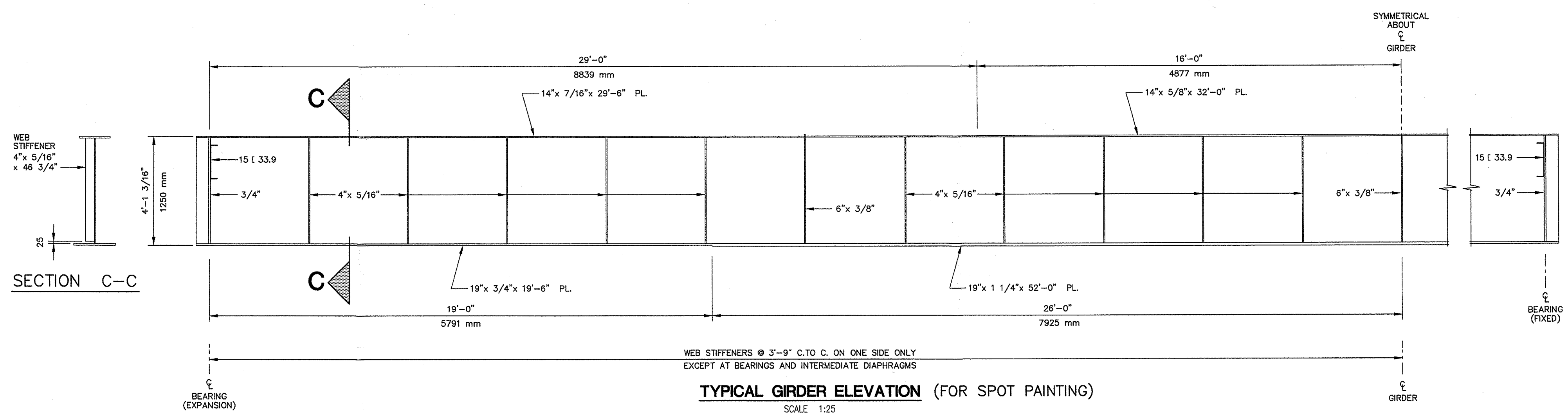
N T S



APPROACH SLAB REPAIR AT FIXED BEARING

SECTION A/3

SCALE 1:10



TYPICAL GIRDER ELEVATION (FOR SPOT PAINTING)

SCALE 1:25

GENERAL NOTES

1. SPECIFICATIONS: PROJECT SPECIFICATIONS (HEREINAFTER THESE WILL BE REFERRED TO AS SPEC'S) AASHTO SPECIFICATIONS, CSA STANDARDS AND AS NOTED.
2. DESIGN CODE: CAN/CSA S6, UNLESS NOTED OTHERWISE.
3. UNITS: 1. CHAINAGES AND ELEVATIONS IN m. 2. DIMENSIONS IN mm.
4. CONCRETE STRENGTH AT 28 DAYS: ABUTMENTS, DECKS 35MPa MIN. SEE SPEC'S.
5. REINFORCING STEEL: TO CSA G30.18 GRADE 400 DEFORMED BARS. SEE SPEC'S.
6. DO NOT DAMAGE OR CUT EXISTING REINFORCING.
7. CONCRETE COVER FOR REINFORCING BARS: 50mm, UNLESS NOTED OTHERWISE.
8. CHAMFER EXPOSED EDGES 20 mm, UNLESS NOTED OTHERWISE.
9. CONCRETE FINISH: SEE SPEC'S.
10. HOT DIP GALVANIZING: TO CSA G164, MINIMUM THICKNESS 90 µm AFTER FABRICATION.
11. DIMENSIONS OF EXISTING STRUCTURE TO BE VERIFIED BY CONTRACTOR IN FIELD, BEFORE COMMENCEMENT OF WORK.
12. ALL CONSTRUCTION JOINTS TO BE ROUGHENED AND THOROUGHLY CLEANED OF FOREIGN MATTER AND LAITANCE.
13. INFORMATION AND BENCH MARKS, EXISTING STRUCTURE, LOCATION AND ORIENTATION TO BE OBTAINED FROM:
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
UPPER WATER STREET
HALIFAX, NOVA SCOTIA
B3J 1S9

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

National Centre of Expertise
Centre d'expertise national

National Center of Expertise
Architectural and Engineering Services
Real Property Services Branch

Centre d'expertise national
Services d'architecture et génie
Direction générale des services immobiliers

Canadä
NATN 00/R24
15 Sept 00
15 Sept 2000

revisions | date

A detail no. / no. du detail
B location drawing no. / sur dessin no.
C drawing no. / dessin no.

project / projet

TERRA NOVA NATIONAL PARK

BRIDGE REPAIRS 2000

TERRA NOVA NATIONAL PARK
NEWFOUNDLAND

drawing / dessin

BROAD COVE BRIDGE GENERAL LAYOUT

(26)

designed / conçu	W.J. DANSON	
drawn / dessiné	G.E. ROBERTS	00–08–11
reviewed / examine	A. CHIANG	
approved / approuvé	G.S. HIBBERT	
Tender / Soumission — Project Manager / Administrateur de projets	D. TRIM	
project no. / no. du projet	107621	
drawing no. / no. du desin	NATN 00/R 24	3/4

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PWGSC B1