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1343-03-008	DECK JOINT REPLACEMENT 2
1343-03-009	NEW ANCHORAGES FOR EXISTING CIP BARRIER
1343-03-010	BICYCLE RAILING

REFERENCE DRAWINGS:

1957 ORIGINAL DESIGN, VERMILION RIVER BRIDGE, BANFF-WINDERMERE
HIGHWAY MILE 25.9 KOOTENAY NATIONAL PARK, DEPARTMENT OF PUBLIC
WORKS CANADA

1 OF 9	PLAN AND ELEVATION
2 OF 9	WEST ABUTMENT
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8 OF 9	STANDARD HANDRAIL DETAIL
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1958 PRESTRESSED ALTERNATIVE, VERMILION RIVER BRIDGE, BANFF-
WINDERMERE HIGHWAY MILE 25.9, PRECAST CONCRETE LTD

- PRESTRESSED ALTERNATIVE
- STRINGER DETAIL
- PRETENSIONED ALTERNATIVE DESIGN INFORMATION
- MISCELLANEOUS DETAILS

1990 RENOVATION, VERMILION RIVER BRIDGE, KM 41.23 HIGHWAY NO. 93A,
KOOTENAY NATIONAL PARK BRITISH COLUMBIA, PUBLIC WORKS CANADA

-	COVER SHEET
1 OF 6	GENERAL LAYOUT - EXISTING
2 OF 6	NEW GENERAL LAYOUT
3 OF 6	TRAFFIC CONTROL AND DECK RECONSTRUCTION DETAILS
4 OF 6	JOINT AND BEARING DETAILS
5 OF 6	PRECAST CONCRETE APPROACH BARRIER
6 OF 6	TRAFFIC BARRIER AND REINFORCEMENT SCHEDULE

REFERENCE MATERIAL:

Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related
Infrastructure, May 2015

Direction for *Permitted Users* conducting water-related activities in LLYK

Standard CMS Translations (July 2018)

Construction Signage Translation (July 2018)

Temporary Swallow Nesting Structure Details – *SwallowStructureAlternateBase_2019Mar15*.

Project: 1343-03

Parks Canada

Bridge Rehabilitation
Vermilion River Bridge
Kootenay National Park

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END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Sections.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises rehabilitation of the Vermilion River Bridge, located at km 40.6 of Highway 93S in Kootenay National Park, British Columbia as nominally measured from the Trans Canada Highway.
- .2 Preparation of an Environmental Protection Plan for the Work.
 - .1 An "Environmental Protection Plan" (EPP) is to be prepared and followed by the successful Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures, to ensure that any adverse effects are minimal. The Contractor's EPP must be approved by the Departmental Representative on behalf of Parks Canada Agency (PCA) prior to the commencement of construction. The Departmental Representative and Parks Canada's Environmental Surveillance Officer (ESO) will refer to the approved EPP and these specifications in determining compliance with the plan and contract specifications. The EPP will form part of this contract.
- .3 Without limiting the scope of work, the work of this Contract generally comprises the following:
 - .1 Mobilization and site preparation.
 - .2 Project management and coordination.
 - .3 Traffic management during construction.
 - .4 Quality control and quality assurance of all construction activities.
 - .5 Environmental management during construction.
 - .6 Health and Safety management during construction.
 - .7 Protection of utilities and coordination of utility relocations.
 - .8 Construction to be completed in three Stages.
 - .9 Source appropriate site(s) outside of the Park for disposal of waste materials.
 - .10 Removal and disposal of concrete overlay and existing deck joints.
 - .11 Cold milling of concrete deck.
 - .12 Partial depth concrete deck patch repairs as directed by Departmental Representative.
 - .13 Abutment and pier concrete patch repairs as directed by Departmental Representative.
 - .14 Surface preparation and application of coating system to existing steel components at bearings.
 - .15 Pier West upstand repair as indicated.
 - .16 Supply, fabrication and installation of external stirrups at jump span beams.
 - .17 Supply and installation of lengthened drain downspouts at existing deck drains.

- .18 Supply and placement of new fibre reinforced concrete overlay.
- .19 Supply, fabrication and installation of new deck joints, including replacement of cast-in-place barriers at abutment deck joints.
- .20 Supply, fabrication and installation of new anchorages for the existing cast-in-place barriers.
- .21 Supply, fabrication and installation of new bicycle railing.
- .22 Application of lane markings on finished road surface.
- .23 Demobilization.

1.3 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.4 WORK BY OTHERS

- .1 Other contractors may be working in Kootenay National Park. The Contractor shall coordinate his operations with others. No claims for any delays or inconvenience will be entertained.
- .2 The Contractor is advised that the following work in the vicinity has been or will be contracted by Parks Canada:
 - .1 Wardle Creek Bridge Replacement at km 50.4 of Highway 93S. Anticipated construction through Spring/Summer/Fall of 2020.
 - .2 Pavement maintenance work km 0 - 103 of Highway 93S. Anticipated construction through Spring/Summer/Fall of 2020.
 - .3 Chip sealing of pavement km 70-81 and km 88-103 of Highway 93S. Anticipated construction through Spring/Summer/Fall of 2020.
 - .4 Culvert Replacement at km 95.5 of Highway 93S. Anticipated construction through Spring/Summer of 2020.
 - .5 Rock remediation, including scaling and blasting, at km 16 and at Sinclair Canyon (km 92 to 103) of Highway 93S. Anticipated construction Spring/Fall of 2020.
 - .6 Construction of new gate at km 100 of Highway 93S. Anticipated construction through Spring/Summer/Fall of 2020.
 - .7 Construction of expanded brake check area at km 6 of Highway 93S. Anticipated construction through Spring/Summer/Fall of 2020.
 - .8 Other projects and maintenance work may occur along highway 93S, 95 and the TCH in 2020.
- .3 The Contractor is advised that events may be planned during the anticipated construction season that could impact traffic patterns within Kootenay National Park (i.e. annual bike race events).
- .4 Where it is necessary that work is to proceed in areas of the project common to both the Contractor and other forces, the Contractor shall cooperate with the other forces and the Owner in reviewing their construction schedules, sharing his work space, and shall coordinate his operations with the other Contractors including traffic management and construction staging.

1.5 WORK SEQUENCE

- .1 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .2 Schedule work progress to allow Departmental Representative unrestricted access to inspect all phases of the Work.
- .3 Required stages:
 - .1 Completion of bird netting of existing structure and installation of alternative nesting habitat – 2020 April 10.
 - .2 The bridge shall be rehabilitated in three stages. Two lanes of traffic (one lane in each of northbound (NB) and southbound (SB) directions) must be provided at all times during construction.
 - .3 Final Completion – 2020 October 15.
- .4 Maintain fire access/control.
- .5 Work shall be carried out in accordance with Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.6 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Public usage.
- .2 Co-ordinate use of premises under direction of the Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 The Contractor and any Subcontractors shall obtain a business license from the Parks Canada Administration Office in Lake Louise Visitor Information Centre, prior to commencement of the contract.
- .5 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained at the Parks Canada Administration Office in Lake Louise Visitor Information Centre.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.7 OWNER FURNISHED ITEMS

- .1 There are no owner supplied materials for this project.
- .2 All materials required to complete the Work are to be supplied by the Contractor. Unless specifically noted otherwise in the specifications, supply of materials required to complete the Work will not be measured but considered incidental to the Work.

1.8 OWNER OCCUPANCY

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

1.9 CONSTRUCTION SIGNAGE

- .1 No sign or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages.
 - .1 Graphic symbols shall be diamond grade and shall conform to CAN3-Z321.
 - .2 Use approved translation list for signage.
- .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 the Departmental Representative.
- .4 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts installed in the shoulder areas at locations accepted by the Departmental Representative.
- .5 Signage shall be coordinated with other Contractors.
- .6 The Contractor will not be permitted to remove the temporary pavement marking until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.

1.10 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Environmental Protection Plan.
 - .2 Contract Drawings.
 - .3 Specifications.
 - .4 Addenda.
 - .5 Reviewed Shop Drawings.
 - .6 List of Outstanding Shop Drawings.
 - .7 Change Orders.
 - .8 Other Modifications to Contract.
 - .9 Copy of Traffic Management Plan.
 - .10 Safety Plan.
 - .11 WHMIS and associated SDS.
 - .12 Labour conditions and wage schedules.
 - .13 Applicable current editions of municipal regulations and bylaws.
 - .14 Field Test Reports.
 - .15 Copy of Approved Work Schedule.
 - .16 Health and Safety Plan and Other Safety Related Documents.

- .17 Restricted Activity Permits.
- .18 Other documents as specified.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 ACCESS AND EGRESS**

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

1.2 USE OF SITE AND FACILITIES

- .1 The Work Sites shall be specified by the Departmental Representative and shall only be used for the purposes of the Work. The Work Sites will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .2 While the Work Sites are under the Contractor's control, the Contractor shall be entirely responsible for the security of the Work Sites and of the Work, and for the security of the work of Other Contractors located on the Work Sites.
- .3 Keep the Work Sites clean and free from accumulation of waste materials and rubbish regardless of source. Remove snow as necessary for the performance and inspection of the work.
- .4 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .5 Provide for all traffic. Construct barriers in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
- .6 Construction camps inside any National Park are not permitted.
- .7 Office/tool trailer may be set up near the bridge sites at a location approved by the Departmental Representative.
- .8 Provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. Post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .9 Any damage to the Work Sites caused by the Contractor shall be repaired by the Contractor at its expense.
- .10 The work must be performed during daylight hours as follows, unless authorized in writing by the Departmental Representative.
 - .1 When Kootenay Park Lodge is open (2020 May 10 to 2020 Sep 28): from 8:00 to 19:00 hours, seven days per week (except for Statutory Holidays and Long Weekends), unless authorized in writing by the Departmental Representative.
 - .2 When Kootenay Park Lodge is closed (prior to 2020 May 10 and after 2020 Sep 28): from 7:00 to 22:00 hours, seven days per week (except for Statutory Holidays and Long Weekends), unless authorized in writing by the Departmental Representative.
 - .3 The Contractor will not be permitted to work during the following periods over Statutory Holidays or Long Weekends:

- .1 From 06:00 Thursday to 06:00 Tuesday of all Long Weekends (Statutory Holidays):
 - .1 From 06:00 2020 April 09 to 06:00 2020 April 14
 - .2 From 06:00 2020 May 14 to 06:00 2020 May 19
 - .3 From 06:00 2020 July 30 to 06:00 2020 August 04
 - .4 From 06:00 2020 September 03 to 06:00 2020 September 08
 - .5 From 06:00 2020 October 08 to 06:00 2020 October 13
- .2 From 06:00 to 22:00 Wednesday 2020 July 01.
- .4 Contractor will be permitted to work during these periods if and only when an exemption request has been approved by the Departmental Representative in writing.
- .5 Any exemption request shall be submitted in writing and be made at least one week in advance of traffic impact to be considered. Approval of exemption request is not guaranteed and shall not be relied upon. No claims for any delays or inconvenience due to denial of exemption request will be entertained.
- .6 Additional work restrictions, related to slowing or stopping of traffic, are provided in Section 01 55 26 – Traffic Control.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 - Environmental Procedures.
- .2 All components of the Work shall be conducted without equipment (including temporary works) entering into wetlands, water bodies, streams and rivers. Refer to Section 01 35 43 - Environmental Procedures for details.
- .3 All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the river valleys and waterways. All collected waste materials shall be disposed of in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan prepared for the project.

1.5 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 The locations of Utilities, if any, shown or not shown on the Drawings, are subject to verification by the Contractor.
- .3 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the work, using hand labour as required.
- .4 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.

- .1 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work.
 - .1 The Contractor shall advise Utilities of intended Works within fourteen days of Contract Award and obtain written approval for the intended methods of preserving the Utilities during Construction from all Utility Owners a minimum three (3) weeks prior to affecting any Utility.
 - .2 The Contractor shall be responsible for coordinating work and schedule to accommodate any blackout periods or other restrictions related to the Utilities. No claims for any delays or inconvenience will be entertained.
 - .3 The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities at the Construction Progress meetings.
- .2 The Contractor shall immediately report any damages to Utilities to the Departmental Representative and to the Utility owner or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.6 SURVEY OF EXISTING PROPERTY CONDITIONS

- .1 Submission of a tender is deemed to be confirmation that the contractor has inspected the site and is completely familiar with all conditions or restrictions affecting execution and completion of work.
- .2 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period, and shall immediately notify the Departmental Representative if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts, and landscaped areas.
- .3 The Departmental Representative may, but shall not be obligated to survey and record the condition of the Work Sites and of properties on or adjoining the Work Sites prior to the commencement of construction by the Contractor. If requested, the Departmental Representative will provide a copy of the survey records to the Contractor for reference.
- .4 Whenever supplied with survey records, the Contractor shall satisfy itself as to the accuracy and completeness of the survey records provided by the Departmental Representative for any area before commencing construction in that area. Commencement of construction in any area shall be interpreted to signify that the Contractor has accepted such survey records as being a true record of the existing conditions prior to construction.
- .5 The provision of the records of a survey of existing conditions by the Departmental Representative shall in no way limit or restrict the Contractor's responsibility to exercise proper care to prevent damage to all properties within or adjacent to the Work Sites, whether all such properties are covered by the survey or not.

1.7 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of the Workers' Compensation Board of British Columbia (WCB of BC), the Provincial OH&S Act and Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.

- .2 The Contractor shall comply with the Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .3 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or adjacent to the Work Site to the extent that may be affected by conduct of work.
- .4 The Contractor shall promptly take such measures as are required to repair, replace, or compensate for any loss or damage caused by the Contractor to any property, or if Parks Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage

1.8 USE OF PUBLIC AREAS

- .1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas.
- .2 Steel tracked equipment with cleats will not be allowed on pavement designated for future use. Asphalt, granular, embankment and excavation materials may be hauled on existing highway but this shall be by standard highway trucks not exceeding legal highway load limits.
- .3 All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle.
- .4 All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spill of materials in public areas shall be removed or cleaned immediately by the Contractor at its own expense.
- .5 All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.

1.9 SUPERVISORY PERSONNEL

- .1 Within five Days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 The following personnel shall be included in the list:
 - .1 Project Superintendent;
 - .2 Deputy Project Superintendent;
 - .3 Environmental Representative;
 - .4 Traffic Control Representative;
 - .5 Quality Control Representative;
 - .6 Health and Safety Coordinator.
- .3 The Project Superintendent shall be employed full time and shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work.
- .4 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.

- .5 Environmental Representative must:
 - .1 Be responsible for completing Environmental Protection Plan and ensuring personnel adhere to contract requirements as related to environmental activities.
- .6 Traffic Control Representative must:
 - .1 Be responsible for development, implementation and execution of the Traffic Management Plan.
- .7 Quality Control Representative must:
 - .1 Be responsible for development, implementation and execution of the Quality Management Plan.
- .8 Health and Safety Coordinator must:
 - .1 Have minimum 2 years site-related working experience specific to activities associated with roadway and bridge construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily, and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of the site supervisor.

1.10 MEETINGS

- .1 Hold meetings in accordance with Section 01 31 19 – Project Meetings.
- .2 The Work includes attending meetings between the Contractor and the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .3 The Departmental Representative will schedule an initial meeting to be held on site after award notification. Senior representatives of Parks Canada, the Departmental Representative, Contractor, major subcontractors, and field inspectors, shall attend this meeting.
- .4 Cost of attending the above meetings shall be considered incidental to the Contract items and no additional payment will be made.

1.11 WASTE DISPOSAL

- .1 Refer to Section 01 35 43 – Environmental Procedures.
- .2 All surplus, unsuitable, and waste materials shall be removed from the job site to approved sites outside Kootenay National Park unless specified otherwise in other sections of these Specifications.
- .3 Deposits of any construction debris into any waterway are strictly forbidden.

- .4 Cost for waste disposal described above shall be considered incidental to the Contract items and no additional payment will be made unless specified otherwise in other sections of these Specifications.

1.12 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.13 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Prime Cost Sum.
- .2 Measurement Procedures.

1.2 PRIME COST SUM

- .1 Include in Contract Price a Prime Cost Sum of \$150,000.
- .2 Do not include in Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .3 The Contract Price, and not the Prime Cost Sum, includes Contractor's head office overhead and profit in connection with such prime cost sum.
- .4 Prime Cost Sum provided for in the lump sum arrangement table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of the Contract.
- .5 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
- .6 Expenditures must be substantiated with verified invoices and/or approved daily extra work reports, if requested by the Departmental Representative.
- .7 Prime Cost sum items may include but are not limited to:
 - .1 Additional partial depth concrete patch repairs as directed by the Departmental Representative beyond the quantity provided in the unit price table.
 - .2 Full depth deck repairs as directed by the Departmental Representative.
 - .3 Supply and placement of additional reinforcing due to corrosion.
 - .4 Miscellaneous work as directed by the Departmental Representative.
- .8 Once a Prime Cost Sum item has been agreed upon with Parks Canada, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project Schedule.

1.3 MEASUREMENT PROCEDURES

- .1 Payment for work under the Prime Cost Sum will be made using negotiated rates or by material, labour, and equipment rates as per the following:
 - .1 Rental rates will be in accordance with current British Columbia Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.
- .2 Transportation time to and from site to be reimbursed only if equipment is exclusively used for additional work.
- .3 Equipment paid on standby will be paid on 50% of the relevant rate less operator rates to a maximum of 10hrs per day.

- .4 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
- .5 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as approved by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
- .6 A claim for additional payment will not be considered submitted until all required documentation has been received by the Departmental Representative.
- .7 The Departmental Representative's, or their delegate's, signature on extra work reports is only a record of the equipment, materials and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.
- .8 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
 - .1 Extra work reports not submitted within the specified timelines may be denied payment at the Departmental Representative's sole discretion.
- .9 The Departmental Representative's, or their delegate's, signature on any of the Contractor's Daily Extra Work Reports shall not be an agreement to waive any portion of the Contract regardless of any wording to the contrary.
- .10 Unless otherwise provided for in the Contract, payment on a time and materials basis represents complete payment (exclusive of GST) and reimbursement for all impacts, related costs and expenses, including, without limitation: time; labour; materials; equipment; mobilization; subcontracting; overhead; profit; general supervision; occupational tax and any other Federal or Provincial revenue legislation exclusive of GST; premiums for public liability and property damage insurance policies; bonding; for the use of all tools and equipment for which no specific rental payment provision exists; and for all costs incurred by the Contractor in supplying materials.
- .11 Reimbursement for Living Out Allowance (LOA), as agreed upon by the Departmental Representative, shall be pro-rated based on the portion of the standard 10-hour work day spent on extra work items up to a maximum of 10 hours. LOA reimbursement will only be considered for extra works completed under Force Account rates and payment for LOA will not exceed the agreed upon daily rate.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

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Parks Canada

Bridge Rehabilitation
Vermilion River Bridge
Kootenay National Park

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ALLOWANCES
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Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from the project sites.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

1.2 MEASUREMENT PROCESS

- .1 Mobilization and Demobilization:
 - .1 Payment will be made under "Lump Sum Price Item – Mobilization / Demobilization"
 - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
- .2 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
- .3 Payment of only 5% of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than 5% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance, and Departmental Representative.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors, and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.19 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Site security in accordance with Section 01 14 00 – Work Restrictions, 01 52 00 Construction Facilities, 01 56 00 - Temporary Barriers and Enclosures and 01 35 43 – Environmental Procedures.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

- .8 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Monthly progress claims, administrative procedures, photographs, hold backs.
- .10 Close out procedures and submittals in accordance with Sections 01 77 00 – Closeout Procedures and 01 78 00 – Closeout Submittals.
- .11 Appointment of inspection and testing agencies or firms.
- .12 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and until project completion, schedule progress meetings weekly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 5 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Review Environmental issues.
 - .4 Review Traffic Control and Emergency Response Protocol issues.
 - .5 Review site safety and security issues.
 - .6 Field observations, problems, conflicts.
 - .7 Problems which impede construction schedule.
 - .8 Review of off-site fabrication delivery schedules.
 - .9 Corrective measures and procedures to regain projected schedule.
 - .10 Revision to construction schedule.
 - .11 Progress schedule, during succeeding work period.
 - .12 Review submittal schedules: expedite as required.
 - .13 Maintenance of quality standards.
 - .14 Review proposed changes for effect on construction schedule and on completion date.
 - .15 Other business.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Project: 1343-03

Parks Canada

Bridge Rehabilitation
Vermilion River Bridge
Kootenay National Park

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PROJECT MEETINGS
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Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 DEFINITIONS**

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

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Ensure all of the Work required for the Contract is identified in the Project Schedule. Refer to Section 01 11 00 – Summary of Work for a potential list of activities.
- .3 Plan to complete Work in accordance with prescribed milestones and time frame.
- .4 Limit activity durations to maximum of approximately 5 working days, to allow for progress reporting.
- .5 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Completion of each Stage of construction.
 - .2 Final Completion.

1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 10 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings.
 - .3 Permits.
 - .4 Submittals:
 - .1 Project Schedule
 - .2 Contractor Chain of Command including Sub-Contractors and Departmental Representatives
 - .3 List of subcontractors, suppliers and Departmental Representative
 - .4 Work Plan
 - .5 Construction Staging
 - .6 Survey Plan
 - .7 Environmental Protection Plan, review and implementation
 - .8 Site Access
 - .9 Traffic Management Plan, review and implementation
 - .10 Quality Management Plan, review and implementation

- .11 Quality Control Plan
- .12 Emergency Response Protocol
- .13 Site Specific Health and Safety Plan, incl. SDS sheets
- .14 On site Contingency and Emergency Response Plan, review and implementation.
- .15 Shop Drawings
- .16 Concrete / asphalt mix Designs
- .5 Mobilization.
- .6 Installation of bird netting.
- .7 Each stage of Removal and disposal of existing overlay and deck joints.
- .8 Each stage of Cold milling of concrete deck.
- .9 Each stage of Partial depth concrete deck patch repairs as directed by Departmental Representative.
- .10 Abutment and pier concrete patch repairs as directed by Departmental Representative.
- .11 Surface preparation and application of coating system to existing steel components at bearings.
- .12 Pier West upstand repair as indicated.
- .13 Each stage of supply, fabrication and installation of external stirrups at jump span beams.
- .14 Supply and installation of lengthened drain downspouts at existing deck drains.
- .15 Each stage of supply and placement of new fibre reinforced concrete overlay.
- .16 Each stage of supply, fabrication and installation of new deck joints, including replacement of cast-in-place barrier at abutment deck joints.
- .17 Each stage of supply, fabrication and installation of new anchorages for the existing cast-in-place barriers.
- .18 Supply, fabrication and installation of new bicycle railing.
- .19 Application of lane markings on new finished road surface.
- .20 Interim Inspection.
- .21 Demobilization.
- .22 Completion.

1.7 PROJECT SCHEDULE REPORTING

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

1.8 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule

are those with projected start or completion dates later than current approved dates shown on baseline schedule.

- .2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

1.1 ADMINISTRATIVE

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
- .3 The term "asphalt mix design" means engineering design for proportioning materials in asphalt concrete pavement including all supporting test results and materials properties. Asphalt mix design to be performed by a qualified test laboratory licensed to practice in British Columbia.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow fourteen (14) days for Departmental Representative's review of each submission.

- .6 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.
- .7 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.
- .8 Submit letter of certification with all mix designs.
- .9 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .10 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.
- .11 After Departmental Representative's review, distribute copies.
- .12 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

- .13 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.
- .14 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 accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .15 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.
- .16 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 Safety Data Sheets concerning impedances, hazards and safety precautions.
- .17 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .19 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .20 Delete information not applicable to project.
- .21 Supplement standard information to provide details applicable to project.
- .22 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

- .1 Not used.

1.4 MOCK-UPS

- .1 Not used.

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

1.6 REQUIRED CONTRACT SUBMITTALS

- .1 General

- .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.

- .2 Pre-Mobilization Submittals

- .1 Submit the following plans and programs to the Departmental Representative for review a minimum of fourteen (14) days prior to mobilization to the project site. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing. The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorizations of the programs shall not relieve the contractor for the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
 - .1 Project Schedule, detailing the schedule of the workdays and manpower required to complete each phase of the project in accordance with Section 01 32 16.19 Construction Progress Schedules – Bar (GANTT) Chart.
 - .2 Contractor Chain of Command, listing key Contractor personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers. The list shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.
 - .3 List of Sub-Contractors and Suppliers
 - .4 Work Plan, describing the Contractor's intended methods of construction including but not limited to the environmental mitigation strategies and projected number of personnel on site.
 - .1 Include work staging plan, including any temporary works required to permit staging of work.
 - .5 Environmental Protection Plan (EPP) which shall meet the requirements of Section 01 35 43 – Environmental Procedures.
 - .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
 - .7 Traffic Management Plan, in accordance with the requirements of Section 01 55 26 –Traffic Control.
 - .8 Site Access Plan which shall include but not be limited to, engineering Drawings and procedures for accessing all areas of the Work. This shall

- include access scaffolding, fixed and suspended work platforms, temporary railings, etc.
- .9 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada.
 - .10 Health and Safety Plan – The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work.
 - .11 Health and Safety Plan must include:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 Site specific hazard assessment.
 - .5 General safety rules for project.
 - .6 Job specific safe work procedures.
 - .7 Inspection policy and procedures.
 - .8 Incident reporting and investigation policy and procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .11 Results of safety and health risk or hazard analysis for site tasks and operation.
 - .12 Submit copies of Safety Data Sheets (SDS).
 - .13 Medical Surveillance: where prescribed by legislation, regulation, or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Departmental Representative.
 - .14 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
 - .2 Submit a copy of the filed Notice of Project with Provincial authorities.
 - .3 The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
- .3 Construction Phase Submittals

- .1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day-to-day basis.
 - .2 Quality Control Inspection Reports – The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.
 - .3 Traffic Accommodation logs.
 - .4 Shop drawings – The Contractor shall submit all shop drawings required to fabricate and conduct the work a minimum twenty-one days (three weeks) prior to fabrication.
 - .5 Concrete Mix Designs and supporting data.
 - .6 Product Data Sheets.
 - .7 Mill certificates.
 - .8 Deck surveys.
 - .9 Progress Photographs:
 - .1 Formats:
 - .1 Electronic: .jpg files
 - .2 Quality: minimum five (5) mega pixels, full-colour, and not scanned.
 - .2 Identification: spreadsheet listing name and number of project, description of each photograph with the corresponding file name and date taken.
 - .3 Viewpoints: four (4) viewpoints determined by the Departmental Representative.
 - .4 Detail Documentation: photographs documenting key details of the construction and as requested by the Departmental Representative.
 - .5 Submission Frequency: prior to commencement of work and weekly thereafter with progress statement, or as directed by the Departmental Representative.
 - .6 Submit two (2) copies of CD with all electronic pictures and the associated identification as part of the closeout package.
 - .10 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction weekly.
 - .11 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .12 Submit copies of incident and accident reports.
- .4 Project Completion Submittals
- .1 Record Drawings – The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.

- .2 Quality Control/Quality Assurance Records – The Contractor shall submit a bound and itemized set of project quality control and quality assurance records.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Safety Data Sheets (SDS).
- .2 Province of British Columbia
 - .1 Workers Compensation Act, RSBC 1996 - Updated 2012.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job specific safe work procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety meetings.
 - .9 Occupational Health and Safety communications and record keeping procedures.
 - .10 Results of site specific safety hazard assessment.
 - .11 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS SDS - Safety Data Sheets.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.

- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

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

1.6 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with National Parks Act.

1.7 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with Workers Compensation Act, B.C. Reg.

- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

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

1.11 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum 2 years site-related working experience specific to activities associated with bridge and roadway construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.12 POSTING OF DOCUMENTS

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

1.13 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.15 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Project: 1343-03

Bridge Rehabilitation
Vermilion River Bridge

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HEALTH AND SAFETY
REQUIREMENTS
Page 4

Parks Canada

Kootenay National Park

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Sections.

1.2 MEASUREMENT PROCEDURES

- .1 The cost to the Contractor to meet the environmental and aesthetic protection requirements described in this section unless specifically stated otherwise shall be considered incidental to the Work and no additional payment will be made.
- .2 Payment for bird netting as described in this Section, shall be made under “Lump Sum Price Item – Bird Netting” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
 - .1 Items considered incidental to the Work include, but are not limited to:
 - .1 Costs for supply and installation of bird netting.
 - .2 Costs for handling, modification, monitoring, maintenance, and repair of bird netting during the completion of the Work.
 - .3 Costs for removal of bird netting at project completion.

1.3 GENERAL

- .1 All Contractor operations shall be performed in such a manner that no detritus from his operations shall enter any waterway, ditches, or wetlands within Kootenay National Park.
- .2 If, in the opinion of the Departmental Representative or Parks Canada, full containment of Contractor's detritus is not being achieved, operations may be ordered halted until the situation is rectified.
- .3 In addition to the requirements outlined in the project specifications, the Contractor shall adhere to the *Parks Canada National Management Practices for Roadway, Highway, Parkway and Related Infrastructure* (BMP's), and the *Direction for Permitted Users Conducting Water-Related activities in LLYK* (LLYK Decontamination Procedure), which are provided as reference documents.
 - .1 Where there is a discrepancy or inconsistency between the project specifications, and the BMP's, the LLYK Decontamination Procedure, the most rigorous with regard to environmental stewardship shall be followed.
- .4 The following key mitigations are highlighted. This list does not replace the comprehensive mitigation requirements and details provided elsewhere in these project specifications, the BMP's, or the decontamination procedure:
 - .1 The Environmental Protection Plan (EPP) certified by a Qualified Environmental Professional (QEP) is to be submitted at least 14 days prior to the start of construction. EPP to be approved by the ESO prior to start of construction.

- .2 All contractor personnel working on site are required to attend an on-site environmental briefing conducted by the ESO prior to commencement of works.
 - .3 Bird nesting on existing bridge to be prevented. Active nests cannot be relocated and species specific setback distances will be required and work activities will be stopped and site shut down at the discretion of the ESO until nestlings have fledged. No claims for any delays or inconvenience related to the discovery of bird nest(s) will be entertained.
 - .4 Work will be conducted outside areas of known historical or cultural significance and there will be no trespass over such areas. The *Accidental Finds Protocol* shall be followed in the event that items are found when archaeologists or cultural resource managers are not present on site during construction activities.
 - .1 *Accidental Finds Protocol*: There may be cultural resources present in the project area that have not yet been discovered (even after an archaeological assessment has been carried out or no assessment was deemed necessary for the project). **If staff observe any significant cultural resources while working, they should stop work in the immediate area, and contact the Departmental Representative, or a Parks Canada archaeologist or cultural resource advisor, to discuss any protective measures that might be needed.**
 - .5 To minimize fire risk, a single location on site for smoking shall be designated and a plan developed for proper disposal of cigarette butts.
 - .6 No vehicle fueling or servicing permitted within 100 m of waterway.
 - .7 Equipment, propane storage, and fuel lines to be inspected daily for leaks. All equipment stored overnight in staging areas with appropriate containment and with drip trays and/or pans under fuel tanks.
 - .8 Prior to coming on site, all equipment that came into contact with soil at previous site (i.e. clearing, grading, etc.) must be cleaned (blow down/scrape down) and approved by the ESO.
 - .9 To prevent spread of whirling disease, all gear and equipment arriving on site which may be used instream/touching water must be cleaned and decontaminated in accordance with the protocol outlined in the LLYK Decontamination Procedure for whirling disease prevention. Proof of decontamination to be provided to Departmental Representative and ESO prior to commencement of works.
 - .10 Restricted Activity Permits (RAP) are required for some portions of the work, including but not limited to, use of on-site water as a water source for construction purposes.
 - .11 Materials laydown shall be on the construction right-of-way. Laydown area on the shoulders, or grassy areas adjacent to the structure, are not permitted to be used by the contractor. The Verdant Trailhead access road approximate 200 m north of the existing bridge, adjacent to the northbound lane, may be closed to the public and used for laydown/storage for the duration of the project contingent on two weeks advance notice from the contractor requesting its use.
- .5 LLYK Field Unit (FU) to be kept apprised of timelines, work periods, and construction activities so that their staff can provide information to the public to prevent additional

safety risks for recreational users in the vicinity of the Project site during construction. Communication to the FU shall be through the Departmental Representative.

1.4 NATIONAL PARK REGULATIONS

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules, and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and any sub-Contractors shall obtain a business license from Parks Canada Administration Office in the Lake Louise Visitor Information Centre, prior to commencement of the contract.
- .3 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge at Parks Administration Office in the Lake Louise Visitor Information Centre.

1.5 IMPACT ASSESSMENT ACT (IAA) 2019

- .1 Execution of the work is subject to the provisions within the Impact Assessment Act (IAA) 2019 and subsequent amendments.
- .2 The Contractor is required to prepare an Environmental Protection Plan (EPP) before commencing construction activities or delivery of materials to site, which will include the topics in the following sub sections. The EPP shall be prepared and certified by a Qualified Environmental Professional (QEP) (such as Professional Biologist or Professional Agrologist) and in accordance with Parks Canada Environmental Procedures. The EPP shall be submitted at least 14 days prior to start of construction. The EPP to include, but not be limited to:
 - .1 Wildlife and Human Conflict Management Plan: Detail strategies to be implemented to prevent unnecessary interactions with wildlife. Parks Dispatch and the Departmental Representative to be notified immediately at non-emergency numbers 1-403-762-1470 or 1-403-762-4506 if a human-wildlife encounter occurs with a bear, wolf, cougar, or wolverine. All SARA-listed species and species of management concern will be documented and reported to the ESO.
 - .2 Bird Nesting Prevention and Netting Monitoring Plan (Nesting Prevention Plan): Detail prevention and monitoring program for any evidence of nesting activity or entrapment on site, as well as for inspection and maintenance of bird nesting prevention netting. Program to include frequency of inspections and checklists to prevent bird nesting. Barn swallows and cliff swallows (including nests) have been previously observed on the Vermilion River Bridge structure.
 - .3 Waste Management Plan: Outline the procedures for handling and disposing of waste materials generated as a result of construction or uncovered by chance.
 - .4 Air Quality and Dust Control Plan: Provide technical guidance to reduce the emission of fine particulate matter and green house gases into the surrounding environment.
 - .5 Debris/spoil Containment Plan: Include plan for debris/spoil control during work to prevent deleterious substances from entering the creek.

- .6 Noise and Vibration Management Plan: Indicate practices to minimize noise and vibration generated by construction activities.
 - .7 Spill Response Plan (SRP): In accordance with details provided later in this specification and the BMP's.
 - .8 Fire Prevention Plan: Describe the fire prevention equipment (e.g. fire extinguishers) and procedures on-site in the event of a fire. Should a fire occur, the Departmental Representative, Parks Dispatch and the LLYK Fire Duty Officer to be notified immediately.
 - .9 Visitor Experience Mitigation Plan: Provide measures to maintain visitor experience during active construction and upon completion of the Project.
 - .10 Develop and submit in the EPP a Standard Operation Procedure for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants, which includes procedures for storage, application, and disposal.
- .3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the Work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.
 - .4 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonable timely manner of any actual or potential environmental incidents or failure of protection measures, and immediately of any violations of environmental approvals, permits, authorizations, or EPP measures.

1.6 RELICS AND ANTIQUITIES

- .1 Give immediate notice to Parks Canada if evidence of archaeological finds are encountered during construction, and wait for written instructions before proceeding with Work in this area.
- .2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tables, and similar objects found on the site shall remain the property of Parks Canada. Protect such articles and request directives from Parks Canada.
- .3 Provide 48 hours' notice to Parks Canada prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Parks Canada.

1.7 WILDLIFE

- .1 Avoid or terminate activities on site that attract or disturb wildlife. Feeding, harassment, or destruction of wildlife is strictly prohibited.
- .2 Allow any wildlife encountered within or near the Project area to passively disperse. Construction vehicles to yield to wildlife.
- .3 Pets are not allowed on the work site, or in any administrative or laydown areas.

- .4 The EPP will be developed to include protocols for addressing wildlife encounters. Contractor is required to carry satellite phones or cell phones for use in reporting large carnivore sightings or incidents and other emergencies to Parks Dispatch.
- .5 The EPP will include a plan to minimize wildlife disturbance, including the time of work, and potentially stopping activities while potentially dangerous and/or sensitive wildlife is in the immediate vicinity.
- .6 All personnel will be instructed by Parks Canada's ESO in procedures to follow in the event of wildlife appearance near or intrusion onto the construction site. Personnel are not to attract or approach any wildlife seen near the site and are to vacate their location in the event of aggressive behaviour or persistent intrusion by bears, cougars, wolves, elk, or moose. The ESO and the Departmental Representative are to be notified about the circumstance immediately. The general presence of wildlife observed near the construction site, any carcasses, or unusual wildlife observations shall be reported in writing to the ESO and the Departmental Representative within 24 hours of the sighting.
- .7 If active nests, roosts, or dens of species protected by SARA or the Migratory Birds Convention Act are identified, immediately notify the Departmental Representative to determine appropriate mitigation measures. Active nests cannot be relocated and species-specific setback distances will be required until nestlings have fledged.
- .8 Species-specific mitigation requirements:
 - .1 Birds (migratory or non-migratory), including Barn Swallows and Cliff Swallows:
 - .1 Bird nesting season defined as starting April 10.
 - .2 A mandatory meeting must be held between the ESO and Departmental Representative, contractor, subcontractors and on-site personnel. It must be held prior to construction commencing to review the mitigation measures and any special considerations.
 - .3 Limit construction activities to the time between dawn and dusk to avoid the illumination of adjacent habitat.
 - .4 Install bird netting on existing bridge to prevent bird nesting. Netting must be installed prior to April 10 (i.e. prior to nesting season).
 - .1 No traps, chemical products, electrified shock, or sound deterrents are allowed in order to exclude or deter birds from an area.
 - .2 Debris netting with maximum 13 mm opening size to be secured to existing structure as taught as possible. Netting may be installed with a cable system or timber nailer boards. Intermediate anchors spaced no further than 600 mm apart. Ensure that the transverse ends of the net at the pier and abutments are securely fastened to prevent nesting.
 - .3 Contractor to maintain, repair, replace netting as necessary to prevent nesting on existing bridge. Establish monitoring program (minimum daily) for maintenance and inspection of installed netting.

- .4 Sequentially remove the least amount of netting that can feasibly be removed to facilitate construction activity in progress.
- .5 Once netting is in place, perform inspections of all exposed areas as outlined in the EPP (minimum daily) for any evidence of nesting activity or entrapment. If partially constructed nests, not active yet, are evident, obtain approval from Departmental Representative to immediately remove them prior to them becoming active.
- .6 Contractor to remove bird netting once work is completed or at the end of the nesting season, as determined by the ESO.
- .5 In addition to bird netting, visual deterrents such as windsocks, flags, mobile owl decoys, mylar or aluminum foil strips, may be used as part of the prevention measures in the Nesting Prevention Plan.
- .6 If breeding activity or active nests establish on the existing bridge during the construction phase, stop work immediately and consult with Departmental Representative and ESO to determine appropriate course of action, which will include establishment of a buffer zone until nestlings have fledged.
 - .1 Buffer zone limits to be determined by Departmental Representative and ESO.
 - .1 Buffer zone limits may be such that all work activities must be stopped and site shut down.
 - .2 Contractor shall flag the limits of the buffer zone to clearly identify the area. Never mark individual nests as it causes disturbance and may increase risk of predation.
 - .3 Contractor is responsible to ensure all personnel including any sub-contractors are aware of the buffer zone; conduct activities as directed to minimise disturbance; and remain outside of the buffer zone.
 - .4 If there is evidence that a buffer zone is ineffective (e.g., continued agitation/guarding behaviour, frequently leaving the nest) work must stop immediately and communicate with the Departmental Representative and ESO and the buffer zone will be adjusted.
 - .5 Any likely or confirmed incidental take (e.g., inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs) must be reported immediately to the Departmental Representative and ESO. Mitigations will be adjusted as directed by the Departmental Representative and ESO to avoid any additional occurrences.
 - .6 The buffer zone can only be removed upon confirmation from the Departmental Representative and ESO that all young have left the vicinity of nest.
 - .7 No claims for any delays or inconvenience related to the discovery of bird nest(s) will be entertained.

- .7 Supply and install alternative nesting habitat consisting of nesting structure in a close location to the existing bridge to allow bird nesting during the nesting season. Installation to occur prior to bird nesting season.
 - .1 Location of nesting structure to be approved by Departmental Representative and ESO.
 - .2 Contractor responsible to supply, fabricate, install and maintain nesting structure on temporary base in conformance with details provided in *SwallowStructureAlternateBase_2019Mar15* which is included as a reference document.
 - .3 Contractor responsible to remove nesting structure and deliver to Settlers Pit, after confirmation from the Departmental Representative and ESO once the work is completed and there is no sign on active nests or breeding activity on the nesting structure. Nesting structure to become property of Parks Canada upon delivery to Settlers Pit.
- .2 American badger, grizzly bear, wolverine:
 - .1 Encounters with wildlife during construction will be managed as per the contractor's EPP and will be consistent with direction from Parks Canada.

1.8 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 dispersal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .4 The Contractor's EPP will detail how the dewatering will be undertaken, with special attention to the environmental sensitivity of the discharge area, freezing conditions operation, overflow avoidance, decanting, and settlement pond reclamation.

1.9 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic fire-fighting equipment – e.g. three shovels, two pulaskis, and two 20 litre backpack pumps shall be maintained at the construction site at a location known and easily accessible to all the Contractor's staff..
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.
- .3 Care shall be taken while smoking on the construction site to ensure that accidental ignition of any flammable material is prevented.

- .1 Designate a single location on site for smoking and develop a plan for proper disposal of cigarette butts.
- .4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contacting the Parks Fire Duty Officer. Fire prevention care is to be commensurate with the fire Index.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.
- .6 Fires or burning of waste materials is not permitted.

1.10 SITE ACCESS AND PARKING

- .1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access off/on Highway 93S in the vicinity of the project – see specifications and drawings; access within the work limits, including day-to-day entry/egress, and plans for delivery and approach for large dimension materials will be anticipated and described. The access plan shall describe worker transportation to and from the construction site, and parking of worker's private vehicles.
- .2 Restrict vehicle movements to work limits.
- .3 Do not park vehicles in areas beyond work limits, unless specifically authorized by the ESO and the Departmental Representative.
- .4 A construction office is anticipated for the bridge contract. The construction office may be located on the construction right-of-way, actual location subject to the approval of the Departmental Representative and ESO. It is anticipated the construction office may comprise the Contractor's main office, a materials testing trailer, the Departmental Representative, and ESO trailer and toilets. Special measures are required to ensure that conflict with bears that are known to frequent the whole construction area does not arise. These include, but may not be limited to:
 - .1 Food, products, lunches, waste food products, or any other materials attractive to bears brought to this office location or to the bridge sites shall be secured within the trailers or by other specified means. Waste shall be secured in the trailers and removed daily from the office location.
 - .1 Food to be eaten inside vehicles and/or site trailers to minimize wildlife attractants.
 - .2 In the event of quick or persistent attraction of bears to the office location, the site may require electric fencing, or removal to an alternate location, at the direction of the Departmental Representative.
- .5 As an alternative to the above mentioned locations, a Contractor's office and work headquarters may be established at another location at the discretion of Parks Canada. The Contractor shall prepare a plan regarding structures, equipment, waste materials management, water, power and sewage services, materials laydown area, fuel storage, operations, etc. required at this location. The plan will be subject to review and approval by the Departmental Representative. This site may be shared with other Contractors.

- .6 A workers accommodation camp will not be permitted.
- .7 Materials laydown shall be on the construction right-of-way, or in unusual circumstances – e.g. over-size components, at an alternate location to be determined by the Departmental Representative in consultation with ESO.
 - .1 Laydown area on the shoulders, or grassy areas adjacent to the structure, are not permitted to be used by the contractor.
 - .2 The day use area immediately southwest of the bridge (adjacent to the SB lane at the south end of the existing structure) is not permitted to be used by the contractor.
 - .3 The Verdant Trailhead access road approximately 200 m north of the existing bridge (adjacent to the NB lane) may be closed to the public and used for laydown/storage for the duration of the project contingent on two weeks advance notice from the contractor requesting its use.
 - .4 At no time is the Kootenay Park Lodge accesses or parking area to be used for any activities related to the project (i.e. parking, turning, deliveries, etc.)

1.11 CONTRACTOR'S OPERATIONS

- .1 Confine all operations to the work limits as staked or designated by the Departmental Representative. No activities of any kind may be carried out beyond those work limits without the written permission of the Departmental Representative.
- .2 Do not store or stockpile construction materials in the trees bordering or being preserved on site. Do not unreasonably encumber the site with products.
- .3 Provide sufficient sanitary facilities and maintain in a clean condition.
- .4 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes shall not be permitted to slough or roll into surrounding tree cover or to bury any plant material designated to be retained.
- .5 When in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic facilities beyond the staked or designated work area, the Contractor shall be responsible at his expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of Parks Canada.

1.12 WATER (SURFACE AND GROUND)

- .1 ESC Management plan (included with the EPP) to be implemented and all components to be regularly maintained to guarantee effectiveness. The condition of all active components must be provided in an inspection report for review to the ESO on a weekly basis.
- .2 Plan project activities for dry weather to allow easier containment of contaminated runoff and sediment.

- .1 If scheduled activity requires working in wet conditions, isolate the area of work and use/install appropriate sediment controls to prevent the release of sediment-laden water or other deleterious substances into surface waters.
- .3 If on-site water will be used as a water source for construction purposes, obtain a Restricted Activity Permit (RAP) for water withdrawal and put in place proper intake screening procedures to prevent fish impingement and entrainment.
- .4 If accidental spills or leaks occur from equipment, follow procedure in the SRP (submitted as part of the EPP) and notify the ESO immediately.
- .5 Fuel management and Spill Containment requirements are explained in the Equipment Fueling, and Spill Containment sub sections respectively.
- .6 Locate concrete wash stations away from water sources and identify their locations in the EPP in consultation with the ESO.

1.13 WORK AROUND AND OVER WATER

- .1 The construction project shall take place outside of the wetted perimeter of any waterways. Some of the construction may require working over waterways. In these instances, the Contractor is to describe the measures in the EPP, to be employed to ensure fugitive materials, and especially deleterious substances do not enter any waterway – e.g. material produced by concrete curing.
- .2 The construction project shall take place above the high water mark of Vermilion River.
 - .1 Bridge rehabilitation work shall be executed from the bridge deck or from temporary works attached to bridge above high water mark. Vehicles, machinery, and heavy equipment are prohibited from entering the Vermilion river banks.
- .3 Avoid or mitigate impacts to fisheries resources through application of BMPs for working in close proximity to water. Work within 30 m from a water body will adhere to avoidance and mitigation measures as identified by the Department of Fisheries and Oceans and specific Fishers Act criteria so that activities near water do not interfere with fish habitat.
 - .1 Sensitive fish spawning and early development periods for the following fish species, identified as known or to have potential to occur with in the Project location, are provided following:
 - .1 Westslope cutthroat trout: May 16 to August 15.
 - .2 Rainbow trout: May 01 to July 15.
 - .3 Mountain whitefish: September 16 to April 15.
 - .4 Bull trout: September 01 to April 30.
 - .5 Brook trout: October 01 to April 15.
- .4 To prevent the spread of whirling disease, all gear and equipment arriving on site which may be used instream/touching water must be cleaned and decontaminated according to the protocol outlined in the LLYK Decontamination Procedure. Proof of decontamination will be required prior to commencement of works. Decontamination will include all Personal Protective Equipment (boots, gloves, etc.), nets, and heavy

equipment. Proof may be supplied in the form of photos or other means which provide documentation.

- .5 Sediment control measures shall be to the satisfaction of the ESO.
- .6 Store hazardous or toxic products (i.e. fuels, lubricants, etc.) secured within secondary containment, and no closer than 100 m from drainage, wetland, watercourse, and water bodies.
- .7 Fuel management requirements are explained in the Equipment Fuelling and Maintenance, and Spill Containment Plan sub sections.
- .8 Do not operate construction equipment in waterways.
- .9 Waterways to be kept free of excavated fill, waste material and debris.
- .10 Do not skid logs or construction materials across waterways.
- .11 Install debris netting system as required to prevent debris from falling into the waterway during demolition and construction. Waterways to be kept free of waste material and debris at all times.
- .12 Install containment system as required to prevent spoil from drilling into existing barrier from falling into the waterway. Waste spoil from drilling to be collected and disposed of outside of Park.
- .13 Provide adequate containment for all deleterious substances and waste material during metallizing of existing bearing plates.
 - .1 Collect and dispose of outside of Park.

1.14 POLLUTION CONTROL

- .1 Maintain all temporary erosion and pollution control features for this project.
- .2 Control emissions from equipment and plant in accordance with local authorities emission requirements.
- .3 Only use stationary emission sources such as portable diesel generators, compressors, etc. when necessary.
- .4 No equipment (motor vehicle or construction equipment) motor to run idle when not in used, unless required under extenuating circumstances, and carpooling is encouraged to reduce air emissions and noise pollution.
- .5 Maintain all equipment, vehicles, and stationary emission sources and use at optimal loads for minimal noise and air emissions.
- .6 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide suitable, temporary enclosures or mats to the satisfaction of the Departmental Representative and the ESO.
- .7 Control dust generated by Project activities, both on Project footprint and Highway 93S in general, by watering down surfaces and ongoing cleanup/maintenance. Dust generating activities will be minimized as much as possible during windy periods.

- .8 No oils, rubber, or tires to be burned on site. Haul all such material off site and dispose of appropriately.

1.15 START-UP AND ENVIRONMENTAL BRIEFING

- .1 All staff employed at the construction site shall attend a briefing regarding their individual and collective responsibilities lasting approximately 1 hour, to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Employees of other service and materials providers who attend the site – e.g. concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.
- .2 Parks Canada will have an ESO (Environmental Surveillance Officer) attending the site to monitor the construction activity for conformance with these specifications and the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

1.16 HAZARDOUS PRODUCTS AND MATERIALS

- .1 A list of products and materials to be used or brought to the construction site that are considered or defined as hazardous to the environment shall be presented in the EPP. Such products include, but are not limited to fuels, lubricants, waterproofing agents, grout, concrete finishing agents, hot poured rubber membrane materials, blasting agents, etc. A plan in accordance with all applicable federal and provincial legislation detailing the containment and storage, security, handling, use, unique spill response requirements, and disposal of empty containers, surplus product or waste generated in the application of these products shall be presented in the EPP. Have the Safety Data Sheets (SDS) for all chemicals used available on site. Hazardous products shall be stored no closer than 100 m from any drainage, wetland, watercourse, and water body or stored offsite.
- .2 Fuels, gases, or other deleterious substances to be contained within appropriate containers.
- .3 Equipment stored overnight in staging areas to be stored with appropriate containment and with drip trays and/or pans under fuel tanks.
- .4 Transport fuels, gases, or other deleterious substances according to the federal Transportation of Dangerous Goods Regulations.
- .5 Special care to be taken in storage and application of patching and sealing compounds, tar, asphalt, traffic paint, and chemical surface sealants. Dispose of these items outside of the Park.

1.17 SPILL CONTAINMENT PLAN

- .1 A spill response plan (SRP) shall be presented in the EPP. Elements to be addressed shall include, but not necessarily limited to:
 - .1 Detail containment and storage, handling, use and disposal of empty containers, surplus fuels, or other hydrocarbon products in accordance with applicable federal and provincial legislation.
 - .2 Include a list of products and materials to be used or brought on site that are considered or defined as hazardous or toxic to the environment (i.e. fuels and lubricants).
 - .3 Safety Data Sheets (SDS) to be made available on site.
 - .4 Spill response kit capable of dealing with the 110 % of the largest potential spill shall be maintained in good working order on the construction site. Staff shall be informed of the location of the response kit and be trained in its use.
 - .5 Hazardous materials are to be stored and used in minimal required quantities in accordance with all applicable federal and provincial legislation.
 - .6 The SRP will identify and implement special care procedures for the storage and application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.
 - .7 All spills are to be immediately contained with the source of spill arrested, reported to the Departmental Representative and ESO and cleanup initiated. In the event of a major spill, all other work shall be stopped, and all personnel devoted to spill containment.
 - .1 In the event of fluid spills or leaks exceeding 5 L or any spill quantity in or near water, the SRP will be followed, including immediate containment, cleanup/mitigation, and immediate reporting to the Departmental Representative and the ESO.
- .2 Dispose of any absorbent materials used in the clean-up or soils contaminated by the spill in appropriate facilities and transport in accordance with the federal Transportation of Dangerous Goods Regulations.

1.18 EQUIPMENT FUELING AND MAINTENANCE

- .1 Equipment used on the project shall be fuelled with E10 gasoline and low sulphur diesel fuels.
- .2 A fuel delivery, storage, and distribution plan shall be submitted. Topics to be addressed in the EPP will include, but not necessarily be limited to:
 - .1 Diesel and gasoline supply vehicles, including bulk tankers shall be parked more than 100 metres from any watercourse, waterbody, wetland, or drainage ditch which connects to fish habitat.
 - .2 Fuel tanks with manual or electric pump delivery systems shall be used, gravity feed is not allowed.
 - .3 Fueling personnel shall maintain immediate attention to and presence at the fueling operation.

- .4 Fueling sites will be identified by the Departmental Representative and the ESO. Any fueling closer than 100 m to any watercourse will require the authorization and oversight of the ESO or the Departmental Representative.
- .5 Equipment fueling to take place at impermeable roadside areas or at staging areas with spill catchment counter measures in place.
- .6 Lubricant changes and minor repairs shall be conducted at a location identified by the Departmental Representative in consultation with the ESO. Waste lubricants, used filters and other waste maintenance products shall be removed from Kootenay National Park to recycling or certified disposal sites.
- .7 Equipment, propane storage, and fuel lines shall be inspected daily for fluid/fuel leaks and maintained in good working order.
 - .1 Record Inspections.
 - .2 Immediately address detected leaks.
 - .3 Inspect tanks, hoses and connections prior to use.
 - .4 Wrap hose connections and secure with absorbent pads during fuel/oil transfers.
 - .5 Keep hose, valves, and equipment in a containment area whenever possible.
 - .6 Hose length and this number of connections shall be minimized and use dripless connections if possible.
 - .7 Drain hoses when finished.
- .8 Fuels, gases, or other deleterious substances to be contained within the appropriate and approved containers and are not to be stored at the Project area where leaks and spills have the potential to seep into groundwater or enter surface watercourses or waterbodies. Secondary containment large enough to hold 110% of the volume of the containers will be used and will not be stored on-site. Fuels, gases, or other deleterious substances will be transported according to the federal Transportation of Dangerous Goods Regulations. Obtain a Restricted Activity Permit (RAP) for the possession and transport of fuel volumes over 250 litres.
- .9 All equipment stored overnight in staging areas to be stored with appropriate containment and with drip trays and/or pans under fuel tanks.
- .10 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.

1.19 WASTE MATERIAL STORAGE AND REMOVAL

- .1 The Contractor shall prepare a Waste Management plan as part of the EPP. The Plan shall include the following basic principle:
 - .1 Waste reduction which follows the 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

- .2 Wastes generated at the construction site are to be contained and removed in a timely and approved manner. The EPP shall detail the waste management procedures, including the following:
 - .1 Describe the management of waste.
 - .2 Construction wastes shall be stored in containers at an approved location and removed promptly when the containers are 90% full.
 - .3 A concerted effort to reduce, reuse and recycle materials is expected.
 - .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
 - .5 Provide containers to deposit recyclable materials.
 - .6 Transport all recyclable materials to an approved recycling facility off site.
 - .7 Waste materials are to be disposed of at a certified construction waste landfill outside Kootenay National Park. No burying, burning or discarding of waste materials will be permitted at the construction site, or elsewhere in Kootenay National Park.
 - .8 No materials attractive to wildlife are to be stored at the site overnight – daily removal is mandatory. Human food products are to be contained in a manner so as not to attract animals and waste food stuffs are to be removed from the construction site every day.
 - .9 Portable container toilets are to be provided in sufficient numbers and locations to ensure convenient usage including frequency of pump out.
- .3 All garbage must be stored and handled in conformance with the National Parks' Garbage Regulations.
- .4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site.
- .5 Dispose of all hazardous wastes in conformance with the Environmental Contaminates Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .6 Provide bear proof garbage containers on-site for domestic garbage and/or food attractants generated on-site by Contractor's personnel and make arrangement for collection of food waste daily.
- .7 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter.
- .8 Do not dispose of or allow to disperse waste or volatile materials such as mineral spirits, oil and paint thinners or other hazardous wastes into waterways. Provide clean-up equipment and adequate supply of absorbent material on-site.
- .9 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

1.20 VEGETATION

- .1 The EPP shall detail how the work limits will be marked and what procedures will be employed to ensure trespass outside these limits does not occur. No vegetation or tree

removal is required in the bridge contract for permanent works. Any vegetation wilfully or negligently removed shall be replaced in size and kind two fold. Top soil shall be supplied and placed as approved by the ESO, including the provision of biodegradable erosion control blankets.

- .2 Store all equipment either on the road or on previously disturbed or hardened surfaces to minimize vegetation disturbance.
- .3 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.
- .4 Minimize migration of invasive species from the Project site:
 - .1 Prior to entry onto new segments of the Project area, clean (blow down/scrape down) all equipment that came into contact with soil at previous segments (i.e. clearing, grading, decompaction, or restoration equipment) to approval of the ESO.
 - .2 Construction staff and others to scrape mud off their boots and brush seeds and dirt from their clothing before leaving the Project site.

1.21 SENSITIVE AND NO-GO ZONES

- .1 The ESO may identify sensitive areas and no-go zones in proximity to the work site. Even though these areas may lie outside the construction limit they must not be intruded into by personnel. The Contractor shall describe measures to be employed to achieve that goal.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CONCRETE MANAGEMENT

- .1 Wet and uncured concrete is an acutely toxic substance for an aquatic environment. Extra care not to introduce these materials into the environment is required. The Contractor is to prepare an EPP which address concrete plant location, operation, and reclamation where required, to the satisfaction of the Departmental Representative. This plan shall include the following concrete management elements:
 - .1 During drilling and saw-cutting, cooling fluids shall be contained, collected, and disposed of at an approved disposal facility.
 - .2 Concrete mixer truck washout shall be contained in a buried or above ground tank, with wash products moved back to the concrete batching yard or an approved facility for disposal.

- .3 Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.
- .2 If a concrete batching plant is used it shall be operated pursuant to applicable dust, air emission, and water quality control regulations.

3.2 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 Removal and storage of snow shall be described, and a plan shall be approved by the ESO and the Departmental Representative.
- .2 Within the EPP a contingency plan for control of dust generated from the construction site shall be prepared, with materials availability arranged in the event of their need.
- .3 It may be desirable or necessary to maintain security services at the construction site during quiet times. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals.
- .4 Develop a response plan for, and be suitable equipped for, fires on and immediately adjacent to the work area.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 This Work shall be incidental to contract and will not be measured for payment.

1.2 DEFINITIONS

- .1 Quality Control (QC): The process of checking specific products or services to determine if they comply with relevant quality standards and identify ways to eliminate causes of unsatisfactory product or service performed.
- .2 Quality Assurance (QA): The process of ensuring that the Contractor's Quality Management Plan (QMP) (QC, non-conformances, etc.) is being followed. The results of the QA are provided as feedback to both the Contractor and the Departmental Representative. Where required, the Contractor shall implement changes to the project based on the feedback received from the QA process.

1.3 QUALITY MANAGEMENT PROGRAM

- .1 The Contractor shall prepare a Quality Management Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Management Program shall be described in a Quality Management Plan. The Contractor shall submit the Quality Management Plan to the Departmental Representative for acceptance in accordance with Section 01 33 00 – Submittal Procedures. The Plan shall develop a logical system for tracking and documenting the Quality Control of the Work as well as the Contractor's internal Quality Assurance procedures to verify the compliance of the Quality Control process. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .3 The Quality Management Plan shall at a minimum include the following information:
 - .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
 - .2 Title page, identifying the Contract, Contractor and copy number;
 - .3 Revision page, identifying the revision number and date of the Manual;
 - .4 Table of contents;
 - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;
 - .6 Details of measuring and test equipment including methods and frequency of calibration,
 - .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;
 - .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
 - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;

- .10 Procedures for shipping, packaging and storage of materials;
 - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
 - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
 - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Quality Assurance Manager, if the Quality Assurance Manager witnesses the test;
 - .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance; and
 - .15 Details of the Quality Assurance Program including the Contractor's procedures to verify the compliance to the Quality Control process of on-site work and off-site work by fabricators.
- .4 The Contractor shall appoint qualified and experienced Quality Control and Quality Assurance Personnel, who are dedicated to quality matters and who will report regularly to the Quality Control Manager and Quality Assurance Manager as well as Contractor's management at a level which shall ensure that Quality Control and Quality Assurance requirements are not being subordinated to manufacturing, construction or delivery. The Quality Control and Quality Assurance Personnel shall be empowered by the Contractor to resolve quality matters. Personnel involved in Quality Assurance shall be independent of the Quality Control Process.
- .5 The Quality Management Plan shall include samples of all forms to be filled in by the Quality Control and Assurance Personnel. All forms shall be signed by the Quality Control Manager and Quality Assurance Manager and submitted promptly to the Departmental Representative.
- .6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. Quality Assurance Inspectors, will periodically (shall be a minimum of 10% of the Quality Control checks) perform a second independent check to assess if the Quality Control process is being followed. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .1 A testing agency independent from the Contractor must be engaged by the Contractor to perform either Quality Control or Quality Assurance for a given task as part of the Quality Program.
- .7 At completion of the Work a bound and itemized copy of all Quality Control and Quality Assurance documents and reports shall be prepared by the Contractor's Quality Control Manager and Quality Assurance Manager and submitted to the Departmental Representative.

1.4 TESTING

- .1 All Quality Control technicians are to be certified by Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.
- .2 Testing required to provide Quality Control and Quality Assurance to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - .1 Testing of all structural concrete, reinforcing steel, granular material, aggregates, asphalt, miscellaneous structural elements and metals, utilities installed, and all source acceptance testing;
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .3 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:
 - .1 Wherever these standards refer to standards (e.g. CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.
 - .2 If no testing standard is identified in the specifications, testing proposed shall be in accordance with BC MoTI Standard Specifications for Highway Construction.
 - .3 The Contractor and its independent Quality Assurance testing agency that will carry out the testing must satisfy themselves that the test frequencies being completed are sufficient to ensure the quality requirements of the QMP.
- .4 These are the minimum frequencies and the Contractor is responsible to assess the need to increase testing frequency. QC frequencies may be reduced below this level, subject to the Departmental Representative's authorization, should the Contractor's QC plan be proven very effective.
- .5 Passing the minimum quantity of QC tests does not relieve the Contractor from the obligation of meeting the Contract requirements and any identified non-compliant works or products shall be rectified by the Contractor at their cost.
- .6 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
 - .1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 Notify the Departmental Representative when sampling will be conducted;
 - .3 Within one day after completion of testing, submit test results to the Departmental Representative; and
 - .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .7 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.

- .8 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work.
- .9 Quality Assurance testing will be undertaken by the Contractor through an independent CSA certified testing firm. The independent testing firm will complete random sampling, inspection, and testing for the purposes of determining the compliance with specifications and other contract documents. The frequency, location of the inspection, sampling, and tests shall be a minimum of 10% of the Quality Control testing frequency.
- .10 The Contractor shall be responsible for third party testing of materials incorporated into the works.
- .11 The Departmental Representative may perform quality audits as desired. Such audits will not relax the responsibility of the contractor to perform work in accordance with Specifications. To facilitate this work the contractor shall:
 - .1 Notify appropriate agency and Departmental Representative in advance of work which the Departmental Representative may want to test.
 - .2 Submit samples and/or materials required for testing, as specifically requested in the Specifications or as requested by the Departmental Representative. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site.

1.5 INSPECTION

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

1.6 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies may be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Employment of inspection/testing agencies does not relax responsibility of the Contractor to perform Work in accordance with Contract Documents.

- .3 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. The Contractor shall correct the defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative.

1.7 ACCESS TO WORK

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

1.8 REJECTED WORK

- .1 Any instances of unacceptable work discovered by either the Quality Control or Quality Assurance personnel will require the preparation of a non-conformance report (NCR).
- .2 If instances of unacceptable work are discovered by the Departmental Representative, the Departmental Representative may issue a non-conformance report (NCR).
- .3 The Contractor shall expediently correct any non-conformances, whether the result of poor workmanship, use of defective products or damage; and whether incorporated in the Work or not, the Contractor shall replace or re-execute in accordance with the Contract Documents.
- .4 Payment for the work itself may be withheld until the NCR issue has been resolved to the satisfaction of the Departmental Representative.
- .5 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative may deduct from Total Bid Amount the difference in value between Work performed and that called for by the Contract Documents, amount of which shall be determined by the Departmental Representative.

1.9 REPORTS

- .1 Submit one (1) electronic copy of all inspection and test reports to Departmental Representative in accordance with Section 01 33 00 Submittals Procedures.
- .2 Submit to the Departmental Representative one paper copy and one electronic copy of all Non-Conformance Reports.

1.10 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.

1.11 MILL TESTS

- .1 Submit mill test certificates as required in specification sections.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Project: 1343-03

Parks Canada

Bridge Rehabilitation
Vermilion River Bridge
Kootenay National Park

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QUALITY CONTROL
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Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
 - .1 CAN/CSA-S269.2, Access Scaffolding for Construction Purposes.
 - .2 CAN/CSA-Z321, Signs and Symbols for the Occupational Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, and platforms.

1.5 HOISTING

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

1.6 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 weight or force that will endanger Work.

1.7 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

1.8 SECURITY

- .1 The Contractor shall be entirely responsible for the security of the Work site and of the Work at all times while the Work Sites are under the Contractor's control (including after working hours and during holidays). Provision of security personnel, as determined necessary by the Contractor to maintain a secure site, will not be measured but considered incidental to the work.

1.9 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .1 Departmental Representative's Site office.
 - .1 Provide temporary office for Departmental Representative with sufficient working space for minimum of two persons and to include.
 - .1 Minimum (2) desks, (2) office chairs, printer.
 - .2 Provided office to be at minimum a separate room with a lockable door separate from the Contractor's working area. A separate trailer may be provided.
 - .3 Provide uninterrupted power supply and heat for office.
 - .4 Provide air-conditioning for office.
 - .5 Provide reliable satellite Internet connection with sufficient bandwidth to support phone calls for Departmental Representative usage.
 - .6 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 2 50% opening windows and one lockable door.
 - .7 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
 - .8 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
 - .9 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
 - .10 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
 - .11 Maintain in clean condition.
 - .12 The contractor shall remove from site all such work after use.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.11 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.12 CONSTRUCTION SIGNAGE

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

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.14 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.

- .4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 British Columbia Ministry of Transportation
 - .1 Traffic Control Manual for Work on Roadways.
 - .2 Standard Specifications for Highway Construction – Traffic Management for Work Zones.
- .2 U.S. Department of Transportation
 - .1 Manual of Uniform Traffic Control Devices for Streets and Highways (MUTCD).

1.1 MEASUREMENT AND PAYMENT

- .1 Traffic Control for all work will be paid under Lump Sum Price Item – Traffic Control – prorated by the portion of overall Contract Work completed.
 - .1 The cost of snow removal and provision of salt or sand required by the Contractor to maintain safe driving conditions within the work zone and complete the work identified in the Contract shall be considered incidental to the lump sum and no additional payment will be made.
- .2 Additional hours of Traffic Control Personnel requested by the Departmental Representative beyond those specified will be paid for separately.

1.2 GENERAL

- .1 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs, temporary pavement marking, other safety measures, and provide staff to ensure safe passage of all traffic from commencement of site work to date of acceptance by the Departmental Representative.
- .2 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.
- .3 At all work sites, the Contractor shall mark **accurately**, at regular intervals, the location and type of existing painted lines prior to their removal or covering, including start and ends of passing lanes and intersections, with a stake at the side of the roadway and make a written record of markings in a book, in order that painted lines can be accurately re-established after work is completed. If no lines are present the Contractor shall mark **accurately (+ or – 20 mm)** and at regular intervals in accordance with the Section 2.2.1 of the BC MoTI - Traffic Control Manual for Work on Roadways, 1999.
- .4 The Contractor shall develop and implement a Traffic Management Plan (TMP) in accordance with BC MoTI - Traffic Control Manual for Work on Roadways (1999), except where specified otherwise in the Contract Documents. The TMP shall take into account all hazards associated with construction operations on a busy highway and minimize risks to motorists prior to beginning Work. The TMP shall be updated regularly

in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.

- .5 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.

1.3 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 Carry out traffic regulation in accordance with BC MoTI – Standard Specifications for Highway Construction – Traffic Management for Work Zones except where specified otherwise.
- .3 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .4 Close lanes of road only after receipt of written approval from Departmental Representative.
 - .1 Before re-routing traffic erect suitable signs and devices to Traffic Control Manual for Work on Roadways.
- .5 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
- .5 A minimum of one lane in each of the northbound and southbound directions shall be maintained on Highway 93S at all times. The minimum clear Roadway for each lane of normal traffic shall be 4.0 m when the lanes are separated by the construction work zone, and 3.9 m when lanes are adjacent, unless otherwise approved in writing from the Departmental Representative.
- .6 Clear roadway shall be measured by extending straight lines parallel to the roadway at the narrowest constriction point in the work zone from inside the faces of construction barriers, or from the faces of other constrictions, on each side of the clear roadway and measuring the perpendicular distance between the lines.
- .7 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.
 - .1 Manage traffic to maintain full public access and use of the Kootenay Park Lodge and the day use area parking at the south end of the bridge adjacent to the southbound lane throughout the construction project.
- .8 Clear snow and ice from the roadway within the work zone.

1.4 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to BC MoTI - Traffic Control Manual for Work on Roadways (1999).
- .3 Place signs and other devices in locations recommended in BC MoTI - Traffic Control Manual for Work on Roadways (1999).
- .4 All construction signs shall be installed to prevent incidental blow down or displacement and must remain in service throughout the construction period. Construction signage heights to be minimum 1.5 m from ground to the bottom of the sign, or as per BC MoTI - Traffic Control Manual for Work on Roadways (1999), whichever is higher.
- .5 Supply, install and maintain two (2) flashing arrow boards (FAB), as required for the Works, in accordance with the accepted TMP. All FAB shall be as per MUTCD (latest edition).
 - .1 Location of the FABs will be agreed with the Departmental Representative.
 - .2 Removal of FABs will only be permitted upon completion of work.
 - .3 Payment for FABs will be incidental to the Lump Sum Price for Traffic Control – All other Work.
- .6 Supply, install, maintain two (2) changeable message signs (CMS) to inform the traffic of construction delays. All CMS shall be as per MUTCD (latest edition).
 - .1 Location of the CMS will be agreed with the Departmental Representative.
 - .2 Text for CMS will be directed by the Departmental Representative.
 - .3 Removal of CMS will only be permitted upon completion of work.
 - .4 Payment for CMS will be incidental to the Lump Sum Price for Traffic Control – All other Work.
- .7 Supply, install and maintain two (2) speed reader boards (SRB), as required for the Works, in accordance with the accepted TMP.
 - .1 Location of the SRBs will be agreed with the Departmental Representative.
 - .2 Removal of SRBs will only be permitted upon completion of work.
 - .3 Payment for SRBs will be incidental to the Lump Sum Price for Traffic Control – All other Work.
- .8 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.
- .9 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.5 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to BC MoTI - Traffic Control Manual for Work on Roadways (1999) for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When vehicles are entering or exiting Worksite access points.
 - .3 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.
 - .4 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .5 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .6 For emergency protection when other traffic control devices are not readily available.
 - .7 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .8 At each end of restricted sections where pilot cars are required.
- .2 Delays to public traffic due to contractor's operators: 15 minutes maximum when approved by the Departmental Representative. Emergency vehicles (i.e. ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic. Delay is defined as the total additional time required to pass through a work zone minus the time that would be required at the posted speed. Delay time shall be the maximum time elapsed as measured from the back of the approach queue to the resume speed sign.
- .3 The Departmental Representative will monitor the traffic control measures, and may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts. The Contractor shall bear the costs of implementing these requirements so as to ensure the traffic control specifications and associated performance standards are met.
- .4 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.
- .5 During hours of darkness, if permitted under these specifications, Contractor shall determine the specific traffic control equipment and signage requirements. As a minimum, flag persons shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with flashers.
- .6 Work restrictions related to slowing or stopping of traffic:

- .1 As specified in Section 01 14 00 Work Restrictions, **no work** will be permitted by the Contractor on Statutory Holidays or for specified periods over Long Weekends without exemption request.
- .2 Outside Statutory Holidays or Long Weekends, no work is permitted that will slow traffic to slower than 30 km/hr from 06:00 Friday to 22:00 Sunday through full construction period.
 - .1 Traffic may be slowed to slower than 30 km/hr during if and only when an exemption request has been approved by the Departmental Representative in writing.
- .3 Any exemption request shall be submitted in writing and be made at least one week in advance of traffic impact to be considered. Approval of exemption request is not guaranteed and shall not be relied upon. No claims for any delays or inconvenience due to denial of exemption request will be entertained.
- .4 At all other times, traffic may be stopped when approved by Departmental Representative and provided maximum delays to public traffic do not exceed allowable as specified in this section.

1.6 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 and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted to a reduced speed limit of 30 km/hr.
- .2 Maintain existing conditions for traffic crossing right of way except when required for construction.
- .3 Access to the Verdant Trailhead area (adjacent to the northbound lane approximately 200 m north of the structure):
 - .1 May be closed for public use and used for laydown/storage for the duration of the project contingent on two weeks advance notice from the contractor requesting its use.
 - .2 Access for Parks Canada use to be provided.
- .4 Manage traffic to maintain full public access and use of the Kootenay Park Lodge throughout the full construction period.
 - .1 At no time is the Kootenay Park Lodge accesses or parking area to be used for any activities related to the project (parking, turning, deliveries, etc.).
- .5 Manage traffic to maintain full public access and use of the existing day use area (DUA) adjacent to the southbound lane, immediately south of the structure.
 - .1 At no time is the DUA to be used for any activities related to the project (parking, turning, deliveries, etc.).
- .6 Provide the Departmental Representative with construction advisories for posting to the DriveBC website (<http://www.drivebc.ca>) and update advisories regularly to reflect the current and planned construction activities and highway closures.
- .7 Provide the Departmental Representative with construction advisories for posting to the Official Alberta Traffic Advisor website (<http://511.alberta.ca/>) and update advisories regularly to reflect the current and planned construction activities and highway closures.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
 - .1 CSA-O121, Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

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

1.3 HOARDING

- .1 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.4 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, and
- .2 Provide as required by governing authorities.

1.5 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.6 PUBLIC TRAFFIC FLOW

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

1.7 FIRE ROUTES

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

1.8 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.

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TEMPORARY BARRIERS
AND ENCLOSURES
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Parks Canada

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Technical Sections.

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 products or systems are 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 borne 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 incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 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.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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 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 the 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 and fabricated metals 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 will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 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 co-operation 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. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use stainless steel fasteners and anchors for securing exterior work, unless non-corrosive hot dip galvanized steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.12 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of structure. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.13 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 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.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Technical Sections.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Efficiency, maintenance, or safety of operational elements.
 - .3 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.

- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .7 Restore work with new products in accordance with requirements of Contract Documents.
- .8 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from work areas.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.2 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 and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean paved areas.
- .11 Clean downspouts, and drainage systems.

.12 Remove snow and ice.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection:
 - .1 Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .2 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .3 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
 - .2 When Work is deemed incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

1.2 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

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CLOSEOUT PROCEDURES
Page 2

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 As-built drawings.
- .2 Warranties and bonds.

1.2 AS -BUILT DOCUMENTS AND SAMPLES

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

1.3 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Specifications.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.

- .4 Details not on original Contract Drawings.
- .5 Referenced Standards to related shop drawings and modifications.
- .4 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Other Documents: maintain manufacturer's certifications, field test records, inspection certifications, required by individual specifications sections.
- .6 Provide digital photos, if requested, for site records.

1.4 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .4 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .5 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .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 applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .7 Respond in timely manner to oral or written notification of required construction warranty repair work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

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CLOSEOUT SUBMITTALS
Page 3

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This Section includes requirements for the following:
 - .1 Preparation/Removals for new concrete overlay and partial depth deck concrete patch repairs as directed by Departmental representative.
 - .2 Preparation/Removals for pier upstand repair as indicated.
 - .3 Preparation/Removals for installation of deck joints as indicated.
 - .4 Preparation/Removals of existing barrier at abutment deck joints as indicated.
 - .5 Removals to create blockouts for the installation of new anchorages in the existing cast-in-place barrier at jump spans and main spans.
 - .6 Removal of waste outside of Park.
- .2 This section does not include work for partial depth concrete patch repairs at pier and abutments. Complete partial depth concrete patch repairs at pier and abutments in accordance with Section 03 01 37 – Concrete Restoration.

1.2 RELATED REQUIREMENTS

- .1 Section 03 01 37 – Concrete Restoration.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 03 30 00 – Cast-in-Place Concrete.
- .4 Section 03 31 23.13 - High Performance Structural Concrete for Bridge Decks.
- .5 Section 05 12 33 – Structural Steel for Bridges.

1.3 MEASUREMENT AND PAYMENT

- .1 Measurement Procedures.
 - .1 Measure preparation/removals for new concrete overlay in square metres of existing concrete overlay removed. Payment will be made under "**Unit Price Item - Structure Demolition - Concrete Overlay**".
 - .2 Measure preparation/removals for installation of deck joints as indicated, in cubic meters of concrete removed. Payment will be made under "**Unit Price Item - Structure Demolition - Deck Joints**".
 - .1 Measure volume of removals for installation of deck joints as indicated from inside face to inside face of existing barriers.
 - .2 Removals beyond neat dimensions indicated will not be measured for payment.
 - .3 Removal of existing deck joints will not be measured but considered incidental to the work.
 - .3 No measurement for payment will be made under this Section for removals to create blockouts for the installation of new anchorages in the existing cast-in-place barrier at jump spans. Include costs in Section 03 20 00 - Concrete Reinforcing.

- .4 No measurement for payment will be made under this Section for removals to create blockouts for the installation of new anchorages in the existing cast-in-place barrier at main spans. Include costs in Section 05 12 33 - Structural Steel for Bridges.
- .5 No measurement for payment will be made under this Section for preparation/removals for partial depth deck concrete patch repairs. Include costs in Section 03 30 00 – Cast-in-Place Concrete.
- .6 No measurement for payment will be made under this Section for barrier removals at abutment deck joints or for pier upstand repair removals. Include costs in Section 03 30 00 – Cast-in-Place Concrete.
 - .1 Barrier removals at abutment deck joints includes removal of volume of deck overhang concrete below the barrier at the abutment deck joints.
- .7 Costs of any temporary works required to complete the work will not be measured but considered incidental to work.
- .8 Unit prices to include all costs associated with environmental mitigations for work in accordance with Section 01 35 43 – Environmental Procedures.
- .9 Payment for stockpiling, loading, hauling, and offsite disposal of all demolished materials outside of National Park will be included in above removal items.

1.4 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA S350, Code of Practice for Safety in Demolition of Structures.
- .2 Department of Justice Canada (Jus)
 - .1 Impact Assessment Act (IAA), 2019.
 - .2 Canadian Environmental Protection Act (CEPA), 1999.
 - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
 - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
 - .4 Motor Vehicle Safety Act (MVSA), 1995
 - .5 Hazardous Substances Information Review Act, 1985
- .3 National Fire Protection Association (NFPA)
 - .1 NFPA 241-13, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 U.S. Environmental Protection Agency (EPA)
 - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
 - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
 - .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 DEFINITIONS

- .1 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB s, CFC s, HCFC s poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Departmental Representative for the material ownership as follows:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Departmental Representative's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- .2 Pre-Demolition Meetings:
 - .1 Convene pre-installation meeting prior to beginning work of this Section, as requested by 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.
 - .2 Hold project meetings every week.
 - .3 Ensure key personnel attend.
 - .4 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Demolition Plan: submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority having Jurisdiction.
- .3 Submit copies of certified receipts from authorized disposal sites and recycling facilities for material removed from site upon request of Departmental Representative.
- .4 Shop Drawings:
 - .1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures.
- .5 Deck Surveys:

- .1 Submit deck surveys completed 7 days prior to scarification/milling.
- .2 Submit deck surveys completed after deck scarification/milling.

1.8 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, IAA and applicable Provincial/Territorial and Municipal regulations.
 - .1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
 - .2 Standards: Comply with ANSI A10.6 and NFPA 241
- .2 Regulatory Requirements: Perform work of this Section in accordance with the following:
 - .1 Workers' Compensation Board of British Columbia (WorkSafeBC).
 - .2 Occupational Health and Safety Standards and Programs (WorkSafeBC).

1.9 SITE CONDITIONS

- .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Fires and burning of waste or materials is not permitted on site.
- .4 Do not bury rubbish waste materials.
- .5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout project.
- .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and 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 application area, by providing temporary enclosures during demolition work.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

Part 2 Products

2.1 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

2.2 TEMPORARY SUPPORT STRUCTURES

- .1 Design temporary support structures required for demolition work and underpinning and other foundation supports necessary for the project using a qualified professional engineer registered or licensed in Province of the Work.
 - .1 Including any temporary support structures required to permit staging of the work in accordance with the Contract Documents.

Part 3 Execution**3.1 EXAMINATION**

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.
- .2 Review Project Reference Drawings and existing conditions of as-built structure.
 - .1 Departmental Representative does not guarantee that existing conditions are the same as those indicated in Project Reference Drawings.
- .3 Inventory and record the condition of items being removed.
- .4 Measure and record existing bridge pavement marking prior to overlay removals. Use existing layout for pavement marking on finished road surface.
- .5 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.
- .6 Promptly submit a written report to Departmental Representative.

3.2 PREPARATION

- .1 Protect demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .3 Protection of in-place conditions:
 - .1 Work in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Prevent movement, settlement or damage of adjacent structures, services, paving, trees, adjacent grades, and parts of existing structure to remain.
 - .1 Provide bracing, and shoring as required.
 - .2 Repair damage caused by demolition as directed by Departmental Representative at no additional cost to Owner.

- .3 Support affected structures and, if safety of structure being demolished, adjacent structures or services, appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
- .4 Prevent debris from blocking surface drainage system.
- .4 Surface Preparation:
 - .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
 - .2 Do not disrupt active or energized utilities traversing premises.
- .5 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as Work progresses.
- .6 At end of each day's work, leave Work in safe and stable condition.
- .7 Minimize dusting during demolition. Keep materials wetted as directed by Departmental Representative.
- .8 Use natural lighting to do Work where possible.
 - .1 Shut off lighting except those required for security purposes at end of each day.

3.3 **PREPARATION/REMOVALS FOR NEW CONCRETE OVERLAY AND PARTIAL DEPTH DECK PATCH REPAIRS**

- .1 Survey and reference profile the existing deck prior to removals:
 - .1 Maximum 2m stations.
 - .2 Include 25m of approach roadways on either end of bridge.
 - .3 Additional shots at joint locations.
 - .4 Profiles to include at minimum:
 - .1 500 mm from curb or barrier faces
 - .2 300 mm from construction/staging joints
 - .3 Hinge point of crown
 - .5 Elevations are to be taken perpendicular to centreline.
 - .6 Layout points such that they can be re-established within 25mm of their original locations.
- .2 Remove the existing concrete surface by use of scarification (roto-milling), hydro-demolition or alternate methods acceptable to the Departmental Representative, over the full length and width of the bridge deck.
 - .1 Submit proposed alternate methods to Departmental Representative at least two weeks prior to Work.
 - .2 Prior to removing concrete surface, measure and record existing bridge pavement marking prior to overlay removals. Use existing layout for pavement marking on finished road surface.
- .3 Scarification equipment to be capable of concrete removal to an accuracy of +/- 5 mm with a milled surface that does not exceed 10 mm in amplitude for roughness.
 - .1 Mill 65mm of existing overlay or to within 10 mm of the reinforcing steel, whichever is less.

- .4 Monitor the total depth of concrete cover to the top mat of reinforcing using a pachometer or alternate methods acceptable to the Departmental Representative.
 - .1 Readings shall be taken at regular intervals ahead of the scarification.
 - .2 Adjust the rate and depth of concrete removal to ensure that the reinforcing steel is not damaged and the desired scarified profile is achieved.
- .5 Following scarification/milling of the existing deck, survey deck:
 - .1 Maximum 2 m stations
 - .2 Additional shots at joint locations
 - .3 Profiles to include at minimum:
 - .1 500 mm from curb or barrier faces
 - .2 300 mm from construction/staging joints
 - .3 Hinge point of crown
 - .4 Elevations are to be taken perpendicular to centreline
 - .5 Layout points such that they can be re-established within 25mm of their original locations
- .6 Following scarification/milling of the existing deck, carry out a detailed visual inspection of the scarified deck surface.
- .7 Perform a chain drag delamination survey of the entire deck surface in the presence of the Departmental Representative to jointly
 - .1 Mark all areas of delamination or deterioration requiring further concrete removal with paint.
 - .2 Supply necessary materials to mark out repair areas.
- .8 Keep partial depth patch repair boundaries square or rectangular and avoid abrupt changes in width of a given repair area.
- .9 Saw cut edges of repair areas to a minimum depth of 25 mm.
- .10 Edge of the repair area to be vertical.
- .11 Remove deteriorated, delaminated and all patch concrete to sound concrete.
 - .1 Remove all concrete to allow a 25 mm minimum space around all exposed reinforcing bar with partial depth patch repair.
 - .2 Expose all corroded reinforcement with section loss at edges of partial and full depth repair area.
- .12 Pneumatic hammers heavier than nominal 14 kg class and chipping hammers heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Maximum jackhammer weight used on the deck shall be 18 kg.
- .13 Do not damage existing reinforcing steel during the removal process.
 - .1 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
- .14 Existing Exposed Reinforcement to be retained:

- .1 High pressure clean all reinforcement to be retained, as identified on the drawings, to remove all loose and laitance materials.
- .2 Remove and replace any existing reinforcement with damage resulting in net section loss of 20% or greater at any location with a new bar of matching diameter.
 - .1 Use mechanical couplers acceptable to the Departmental Representative or lap spliced in accordance with CAN/CSA-S6-14 Clause 8.15.9.
 - .2 Mechanical couplers shall develop at least 125% of the specified yield strength of the bar.
- .15 Full depth repairs will only apply when soffit concrete is removed, as instructed by the Departmental Representative.
 - .1 Finished soffit repair concrete to be flush with surrounding soffit concrete.
 - .2 Patch areas for full depth repair exceeding 1 m² prior to overlay placement.
- .16 Abrasive blast (minimum 35 MPa/5000 psi) or high-pressure water blast (minimum 35 MPa/5000 psi) clean the surfaces of sub deck prior to the placement of the partial depth to remove all bruised and fractured concrete and foreign materials such as dirt, dust laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.
- .17 High pressure water blast the surface of the entire concrete sub-deck no earlier than 2 days before placing the overlay concrete.
 - .1 Minimum 110 MPa/15000 psi using a rotating head.
 - .2 Roughness amplitude shall be at least 6 mm.
- .18 Thoroughly clean the roughened surface of existing concrete prior to placing new concrete with oil-free compressed air.
- .19 Saturate existing concrete with water, with free standing water removed.
- .20 Prevent detritus from falling onto the adjacent travel lane or falling into the river below during roughening and cleaning process.
- .21 Contain all water, blast material and concrete debris during all stages of construction in accordance with Section 01 35 43 – Environmental Procedures.
- .22 Perform a final inspection of the prepared deck with the Departmental Representative immediately prior to placement of new concrete overlay.
 - .1 Supply and placement of deck overlay concrete, including for partial and full depth repairs, shall be in accordance with Section 03 30 00 – Cast-in-Place Concrete and Section 03 31 23.13 - High Performance Structural Concrete for Bridge Decks.

3.4 PREPARATION/REMOVALS (OTHER)

- .1 Preparation/removals of concrete for pier upstand repair, preparation/removals for installation of deck joints, preparation/removals of existing barriers at abutment deck joints, and removal of concrete to create blockouts for the installation of new anchorages in the existing cast-in-place barrier at jump spans and main spans. Removals as indicated on drawings.

- .1 Blasting operations not permitted during demolition.
 - .2 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place.
 - .3 Limits of concrete removal shall be outlined by 25 mm deep sawcuts.
 - .4 All saw cuts shall be made straight and in accordance with the drawings or as directed by the Departmental Representative.
 - .5 Leave existing reinforcement intact as indicated.
 - .6 Do not damage existing reinforcing steel during the removal process.
 - .7 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
 - .8 Trim reinforcement as indicated to satisfy cover requirements.
 - .9 Partially exposed rebar shall be entirely exposed by removal of concrete to a depth of 25 mm behind the bar.
- .2 Existing reinforcement to be retained as identified on the drawings shall be high pressure cleaned to remove all loose concrete and laitance materials.
 - .3 Supply and place additional rebar where greater than 20% section loss has occurred to the existing reinforcement.
 - .4 Abrasive blast (minimum 35 MPa/5000 psi) or high-pressure water blast (minimum 35 MPa/5000 psi) to clean the surfaces prior to the placement of new concrete to remove all bruised and fractured concrete and foreign materials such as dirt, dust, laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.

3.5 WASTE DISPOSAL

- .1 Remove and dispose of demolished materials, except where noted otherwise, and in accordance with authorities having jurisdiction.
 - .1 All demolished materials are considered waste and to be disposed of outside Kootenay National Park at a certified construction waste landfill.
- .2 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal. Refer to Existing Conditions in PART 1.

3.6 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling:
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .3 Designate appropriate security resources / measures to prevent vandalism, damage and theft.
- .4 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.

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END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 – Concrete Forming and Accessories.

1.2 SECTION INCLUDES

- .1 Work requirements for concrete restoration in accordance with Section 01 11 00 – Summary of Work including the following:
 - .1 Partial depth concrete patch repairs at pier and abutments.

1.3 MEASUREMENTS AND PAYMENTS

- .1 Partial depth concrete patch repairs at pier and abutments will be measured in square metres. Payment will be under "**Unit Price Item – Pier and Abutments – Partial Depth Concrete Patch Repairs**".
 - .1 Unit price to include all work required to complete repair in accordance with this section, including but not limited to surface preparation, concrete removals, and supply and placement of the patch material.
 - .2 Costs of any temporary works required to complete the work will not be measured but considered incidental to work.
 - .3 Unit price to include all costs associated with environmental mitigations for work in accordance with Section 01 35 43 – Environmental Procedures.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Site Visit: Schedule a site visit with Departmental Representative to examine existing site conditions prior to commencement of works.

1.5 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM C1611 / C1611M Standard Test Method for Slump Flow of Self-Consolidating Concrete
 - .2 ASTM C230 / C230M - 14 Standard Specification for Flow Table for Use in Tests of Hydraulic Cement
 - .3 ASTM C1202 Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.
 - .4 ASTM C457 / C457M - 16 Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete
 - .5 ASTM C39 / C39M - 18 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - .6 ASTM C882 / C882M - 13a Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear
 - .7 ASTM C666 / C666M - 15 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing

.8 ASTM C157 / C157M - 17 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

.2 Canadian General Standards Board (CGSB):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for compounds and include product characteristics, performance criteria, physical properties, finish and limitations.

.3 Submit 2 copies of WHMIS Safety Data Sheet (SDS).

.4 Submit a proposed work plan for review by Departmental Representative at least two weeks prior to beginning concrete restoration works. Work plan to include a list of materials and proposed plan to be implemented to perform the work.

1.7 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 – Closeout Submittals.

1.8 QUALITY ASSURANCE

.1 Manufacturer's Instructions: submit manufacturer's application instructions and special handling criteria and cleaning procedures.

.2 Submit in accordance with Section 01 45 00 – Quality Control.

1.9 EXISTING CONDITIONS

.1 Examine Site conditions and existing surfaces to be restored.

Part 2 Products

2.1 MATERIALS

.1 Patch material: High strength shrinkage compensating cementitious repair material suitable for vertical and overhead applications, such as Sikacrete-08 SCC or Master Emaco S440 MC, or approved equivalent.

Part 3 Execution

3.1 SURFACE PREPARATION/APPLICATION

.1 Provide access scaffolding or other means suitable for close proximity inspection of all above ground/water substructure elements and arrange for inspection with the Departmental Representative to mark out all areas for repair.

- .2 Thoroughly clean all substructure surfaces above ground/water prior to close proximity inspection with Departmental Representative.
 - .1 Surfaces to be free of all debris, dirt and laitance material.
- .3 Remove concrete in partial depth patch areas identified by the Departmental Representative.
- .4 Do not damage existing reinforcing during the removal process.
 - .1 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
- .5 Remove, contain, collect, and dispose of all concrete and other materials identified for removal to prevent debris from falling into any waterway.
- .6 Prepare and submit written procedure for the pier and abutment repairs prior to commencement of work to the Departmental Representative for review.
 - .1 Procedure to include descriptions of removal sequences, methods, equipment, tools and containment measures.
- .7 Pneumatic hammers heavier than nominal 14 kg class and chipping hammers heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place.
- .8 All saw cuts shall be in accordance with the drawings or as directed by the Departmental Representative.
 - .1 All patch areas to have straight edges only, preferably rectangular in shape.
- .9 Cut into existing concrete to a minimum depth of 25 mm.
- .10 Remove concrete a minimum of one bar diameter behind existing reinforcement.
- .11 Repair areas shall be thoroughly cleaned and free of foreign material to provide a sound bonding surface and to remove corrosion products.
 - .1 Use compressed air to remove all dust, grit, and concrete debris, or as recommended by the patch repair product manufacturer.
- .12 Repair areas shall be "saturated-surface-dry" or as recommended by the patch repair product manufacturer.
- .13 Mix patch compound components in accordance with manufacturer's written instructions.
 - .1 Apply mix immediately.
 - .2 Dispose of not used mix immediately, do not retemper.
- .14 Protect other trades work and/or other prepared surfaces from patching material spills.
- .15 Patch material to be placed by forming and pouring, not trowel applied.
- .16 Curing to meet manufacturer requirements.
- .17 Finish: Smooth form finish.

3.2 CLEANING

- .1 Progress cleaning in accordance with Section 01 74 00 - Cleaning.

- .2 Leave work area clean at end of each working day.
- .3 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .5 Waste Management: separate waste materials for recycling.

3.3 PROTECTION OF COMPLETED WORK

- .1 Protect adjacent finished work against damage which may be caused by on-going work.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 01 37 – Concrete Restoration.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 03 30 00 – Cast-In-Place Concrete.
- .4 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks

1.2 PRICE AND PAYMENT PROCEDURES

- .1 No measurement will be made under this Section.
 - .1 Include formwork and falsework costs in items of concrete work in Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA O86-14, Engineering Design in Wood.
 - .3 CSA O121, Douglas Fir Plywood.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA O153, Poplar Plywood.
 - .6 CAN/CSA O325.0, Construction Sheathing.
 - .7 CSA S269.1, Falsework and Formwork.
 - .8 CAN/CSA S269.3, Concrete Formwork.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel, site supervisor and Departmental Representative attend.
 - .1 Verify project requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS SDS Safety Data Sheets.
- .3 Submit shop drawings for formwork and falsework.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of British Columbia, Canada.

- .2 Prepare Shop Drawings in accordance with CSA S269.1 for formwork and falsework.
- .3 Indicate formwork design data: 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 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.
- .6 Include the following information on falsework Shop Drawings:
 - .1 Longitudinal, lateral, vertical, dead, live and impact loads used in design.
 - .2 Safe bearing capacity of soil underneath mud sills.
 - .3 Maximum column, post and support loads.
 - .4 Deflection diagrams for beams with deflection of 10 mm or more.
 - .5 Deflection diagrams indicating initial and final elevation of deck surfaces, roofs and soffits.
 - .6 Grade of structural steel.
 - .7 Indicate steel posts, girders, beams, connections, bracing and welding, providing sufficient detail for safe performance of falsework.
 - .8 Fully detailed steel frame shoring.
 - .9 Species, grades and sizes of wood.
 - .10 Type and weight of equipment (moving or stationary) supported by falsework.
 - .11 Sequence, methods and rate of concrete placement.
 - .12 Proprietary equipment, adequately identified for checking purposes.
 - .13 Full details and locations of splices.

1.6 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Retain a professional engineer registered or licensed in British Columbia, Canada, with experience in formwork and falsework design of comparable complexity and scope, to perform following services as part of Work of this Section:
 - .1 Design of formwork and falsework.
 - .2 Review, stamp, and sign fabrication and erection Shop Drawings, design calculations and amendments.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:

- .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect formwork from damages.
- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.
 - .2 Forms for exposed surfaces, including the barriers and deck soffit, shall be new materials, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.
 - .3 All form material for exposed surfaces shall be full-sized sheets, as practical. The re-use of any forms must have the acceptance of the Departmental Representative.
- .2 The minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Strong-backs or walers placed perpendicularly to the supports shall be employed to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 50 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.
- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.
- .6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even, uniform in colour.
- .7 Form release agent shall be non-toxic, biodegradable, and low VOC.
- .8 Falsework material shall conform to CSA S269.1.

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.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.

- .3 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.
- .4 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .5 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.
- .6 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .7 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .8 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete. If formwork is removed prior to the end of the curing period required by CSA-A23.1/A23.2, the exposed concrete surfaces shall be protected by other accepted method of curing as provided in CSA-A23.1/A23.2.
 - .1 Seven (7) days for cast in place barriers at abutment deck joints.
 - .2 Three (3) days for pier upstand repair.
 - .3 Three (3) days for partial depth concrete patch repairs at pier and abutments.
- .2 Remove formwork when concrete has reached 50 % of its 28 day design strength or minimum period noted above, whichever comes later, subject to approval of Departmental Representative.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This item includes reinforcing steel for new anchorages for existing cast-in-place barrier at jump spans, reinforcing steel for new barriers at abutment deck joints, reinforcing steel for pier upstand repair, and reinforcement steel for new deck strip seal joint blockouts.
- .2 For new anchorages for cast-in-place barrier at main spans, see Section 05 12 33 – Structural Steel for Bridges.

1.2 RELATED REQUIREMENTS

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 30 00 – Cast-In-Place Concrete.
- .3 Section 05 12 33 – Structural Steel for Bridges.

1.3 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure new anchorages for existing cast-in-place barrier at jump spans in units of anchorages incorporated into Work. Payment will be made under "**Unit Price Item – Anchorages for existing CIP barrier at jump spans**".
 - .1 Unit price to include:
 - .1 Removal of concrete to create a blockout at each anchorage required to install new anchorage as indicated, in accordance with Section 02 41 16 – Structure Demolition.
 - .2 Hole drilling, and epoxy doweling of reinforcing steel as indicated in accordance with this Section.
 - .3 Surface preparation and grouting blockouts after anchor installation indicated, in accordance with Section 03 30 00 – Cast-in-Place Concrete.
 - .4 Surface preparation, supply and application of pigmented concrete sealer as indicated, in accordance with Manufacturer's Recommendations.
 - .2 Locating existing reinforcement in deck and barriers will not be measured but considered incidental to the work.
 - .3 Additional removals and/or drilling required after encountering reinforcement and filling of abandoned blockouts and holes will not be measured but considered incidental to the work.
 - .4 Unit price to include all costs associated with environmental mitigations for work in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 No measurement for payment will be made under this Section for reinforcing steel for new barriers at abutment deck joints, for reinforcing steel in pier upstand

repair, or for reinforcing steel for new deck strip seal joint blockouts. Include cost in Section 03 30 00 – Cast-in-Place Concrete.

1.4 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A970/A970M, Standard Specification for Headed Steel Bars for Concrete Reinforcement.
 - .4 ASTM A1064/A1064M, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .2 CSA Group (CSA)
 - .1 CSA A23.1 /A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA A23.3, Design of Concrete Structures.
 - .3 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .3 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC, Reinforcing Steel Manual of Standard Practice.
- .4 Alberta Infrastructure and Transportation Technical Standards Branch
 - .1 B388- Specification for Concrete Sealers.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure site supervisor, Departmental Representative, testing laboratories, concrete producer, speciality contractor – finishing and forming attend.
 - .1 Verify project requirements.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit 2 copies of WHMIS Safety Data Sheet (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
 - .1 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.

- .2 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
- .3 Detail lap lengths and bar development lengths to CAN/CSA A23.3, unless otherwise indicated.
 - .1 Provide type B unless otherwise indicated.
- .4 Quality Assurance Submittals:
 - .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .2 Mill Test Report: submit to Departmental Representative certified copy of mill test report of reinforcing steel.
 - .3 Submit in writing to Departmental Representative proposed source of reinforcement material.

1.7 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400W, deformed bars to CSA G30.18, unless indicated otherwise.
- .3 Headed bars to meet requirements of ACI 318 with heads to ASTM A970, HA heads.
- .4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.
- .5 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.
- .6 Tie wire: 1.5 mm diameter annealed wire.
- .7 Mechanical splices: subject to approval of Departmental Representative.

- .8 Epoxy: as indicated.
- .9 Concrete sealer: type 3 according to B388- Specification for Concrete Sealers.

2.2 FABRICATION

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

2.3 SOURCE QUALITY CONTROL

- .1 Provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, prior to beginning reinforcing work.
- .2 Inform Departmental Representative of proposed source of supplied material.
- .3 Provide Departmental Representative with copy of post-installed anchorages Manufacturer's Printed Installation Instructions.

Part 3 Execution

3.1 FIELD BENDING

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

3.2 PLACING REINFORCEMENT

- .1 Reinforcing steel for new anchorages for existing cast-in-place barrier at jump spans:
 - .1 Use pachometer, or alternate method acceptable to the Departmental Representative, to locate existing steel in deck and barriers.
 - .2 Locate barrier anchorages to avoid existing steel in deck and barriers. No steel permitted to be cut or damaged to place barrier anchorages except as noted following:
 - .1 Bottom layer of longitudinal deck steel may conflict with barrier anchorages location and may be required to be cut/drilled through when drilling hole for anchorage, subject to approval of Departmental Representative.
 - .3 Drill holes in existing concrete as indicated in accordance with Manufacturer's Printed Installation Instructions.
 - .1 Holes shall be hammer drilled or core drilled and roughened using a diamond cored hole roughening tool in accordance with Manufacturer's Printed Installation Instructions.

- .4 Protect holes from water accumulations, snow and ice build-ups. Clean holes before reinforcing installation in accordance with Manufacturer's Printed Installation Instructions.
 - .5 Place steel dowels for barrier anchorages of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor in accordance with Manufacturer's Printed Installation Instructions. Installation of barrier anchorages shall be performed by personnel trained to install adhesive anchors.
 - .6 All abandoned drilled holes shall be filled with epoxy.
 - .7 Prior to breakout grouting, provide Departmental Representative QC/QA reports for installation of anchorage reinforcement.
- .2 Reinforcing steel in locations where reinforcing is dowelled to existing work (new cast-in-place barrier at abutment deck joints and pier upstand repair):
- .1 Drill holes in existing concrete as indicated.
 - .1 Holes shall be hammer drilled.
 - .2 Protect holes from water accumulations, snow and ice build-ups. Clean holes before reinforcing installation in accordance with Manufacturer's Printed Installation Instructions.
 - .3 Place steel dowels of deformed steel reinforcing bars as indicated on placing drawings in accordance with CSA A23.1/A23.2, and pack solidly with epoxy grout to anchor in accordance with Manufacturer's Printed Installation Instructions. Installation shall be performed by personnel trained to install adhesive anchors.
 - .4 Maintain cover to reinforcement during concrete pour.
- .3 All other reinforcing steel:
- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA A23.1/A23.2.
 - .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
 - .3 Maintain cover to reinforcement during concrete pour.

3.3 FIELD QUALITY CONTROL

- .1 The field quality control for new anchorages for existing cast-in-place barrier at jump spans shall, as a minimum, include the following verifications for the adhesive anchor installation:
 - .1 Hole drilling method in accordance with the Manufacturer's Printed Installation Instructions.
 - .2 Anchor edge distance and spacing.
 - .3 Hole diameter and depth.
 - .4 Hole cleaning in accordance with the Manufacturer's Printed Installation Instructions.
 - .5 Anchor element type, material, diameter, and length.
 - .6 Adhesive identification and expiration date.

- .7 Adhesive installation in accordance with the Manufacturer's Printed Installation Instructions.
- .8 Additional inspection procedures to verify proper usage as specified by the manufacturer.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This section includes cast-in-place concrete for partial depth deck patch repairs, deck concrete overlay, deck joint blockouts, cast-in-place barriers at abutment deck joints and pier upstand repair, and grouting blockouts for new anchorages for existing cast-in-place barrier at jump spans and main spans.
- .2 This section does not include work for concrete patch repairs at abutments and piers. Complete concrete patch repairs at abutments and piers in accordance with Section 03 01 37 – Concrete Restoration.

1.2 RELATED REQUIREMENTS

- .1 Section 03 01 37 – Concrete Restoration.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks

1.3 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure cast-in-place concrete for partial depth deck patch repairs in square metres. Payment will be made under **"Unit Price Item – Concrete – Class C-XL Fibre Reinforced (Partial Depth Deck Patch Repairs)"**.
 - .1 Unit price to include cost of removals and surface preparation. Removals and surface preparation to be completed in accordance with Section 02 41 16 - Structure Demolition.
 - .2 Unit price to include supply and placement of deck patch repair concrete, to underside of new deck overlay. Supply and placement of deck patch concrete to be completed in accordance with Section 03 30 00 Cast-In-Place Concrete and Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.
 - .2 Measure cast-in-place concrete for deck overlay and deck joint blockouts in cubic metres. Payment will be made under **"Unit Price Item – Concrete - Class C-XL Fibre Reinforced (Deck Overlay and Deck Joint Blockouts)"**.
 - .1 Concrete placed beyond dimensions indicated will not be measured.
 - .2 Additional deck concrete overlay volumes caused by milling deeper than indicated will not be measured for payment.
 - .3 Measure volume for deck joint blockouts from inside face to inside face of existing barriers.
 - .4 Supply and installation of reinforcement steel for new deck strip seal joint blockouts as indicated, in accordance with Section 03 20 00 –

Concrete Reinforcing, will not be measured but be considered incidental to work.

- .3 Measure concrete for cast-in-place barriers at abutment deck joints under **"Lump Sum Item – Cast-in-Place Barriers at Abutment Deck Joints"**.
- .1 Lump sum to include all costs associated with the removal and replacement of the barriers at the abutment deck joints as indicated, including supply, fabrication and installation of reinforcement (including headed bars) as indicated.
 - .2 Include in this item removals and replacement of volume of deck overhang concrete below the barrier at the abutment deck joints.
 - .3 Doweling of reinforcement as indicated will not be measured but considered incidental to work.
 - .4 Supply and installation of barrier joint galvanized steel cover plates, complete with studs and structural inserts in accordance with Section 05 12 33 – Structural Steel for Bridges will not be measured but be considered incidental to work.
 - .5 Removals/preparation in accordance with Section 02 41 16 – Structure Demolition.
 - .6 Supply, fabricate, and install reinforcing in accordance with Section 03 20 00 – Concrete Reinforcing.
- .4 Measure concrete for pier upstand repair under **"Lump Sum Item – Pier Upstand Repair"**.
- .1 Lump sum to include all costs associated with the removal and replacement of the pier upstand, including supply, fabrication and installation of reinforcement as indicated.
 - .2 Doweling of reinforcement as indicated will not be measured but considered incidental to work.
 - .3 Removals/preparation in accordance with Section 02 41 16 – Structure Demolition.
 - .4 Supply, fabricate, and install reinforcing in accordance with Section 03 20 00 – Concrete Reinforcing.
- .5 No measurement for payment will be made under this Section for grouting blockouts for new anchorages for existing cast-in-place barrier at jump spans. Include costs in Section – 03 20 00 – Concrete Reinforcing.
- .6 No measurement for payment will be made under this Section for grouting blockouts for new anchorages for existing cast-in-place barrier at main spans. Include costs in Section – 05 12 33 – Structural Steel for Bridges.
- .7 No deductions made for volume of concrete displaced by reinforcing steel or structural steel.
- .8 No deductions made for volume of concrete less than 0.1 m³ in cross sectional area displaced by individual drainage openings.
- .9 Costs of any temporary works required to complete the work will not be measured but considered incidental to work.

- .10 Unit prices to include all costs associated with environmental mitigations for work in accordance with Section 01 35 43 – Environmental Procedures.

1.4 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
- .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
 - .2 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .3 ASTM A307M, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength
 - .4 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .5 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
 - .6 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .7 ASTM C C1059/C1059M, Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.
 - .8 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .9 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
 - .10 ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .11 ASTM D1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - .12 ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness.
 - .13 ASTM F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.
- .2 CSA Group (CSA)
- .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .4 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
 - .5 CSA S6, Canadian Highway Bridge Design Code.

1.5 ABBREVIATIONS AND ACRONYMS

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

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel, site supervisor, Departmental Representative, speciality contractor – finishing and forming, concrete producer and testing laboratories attend.
 - .1 Verify project requirements.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Site Quality Control Submittals:
 - .1 Provide testing, inspection results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters found.
 - .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.

- .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

1.8 QUALITY ASSURANCE

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

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.
 - .2 Deviations to be submitted for review by Departmental Representative.
- .3 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.10 SITE CONDITIONS

- .1 Placing concrete during rain or weather events that could damage concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold weather protection:

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

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Blended hydraulic cement: Type GUB to CSA A3001.
- .3 Supplementary cementing materials:
 - .1 Partial depth deck patch repairs, bridge deck overlay, deck joint blockouts, and new barrier at abutment deck joints: with maximum 15 % Type F fly ash replacement, by mass of total cementitious materials to CSA A3000.
 - .2 Pier upstand repair: with maximum 25% Type F fly ash replacement, by mass of total cementitious materials to CSA A3000.
- .4 Water: to CSA A23.1.
- .5 Aggregates: to CSA A23.1/A23.2.
- .6 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494.
 - .1 Departmental Representative to approve all admixtures, including accelerating or set retarding admixtures. Contractor to submit certified mix design that contains proposed admixture in proposed dosage. Submitted certification to include verification that the proportions selected will produce concrete of the performance specified.

- .7 Non premixed non-shrink dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 45 MPa at 28 days.
- .8 Evaporation Retarder: to CSA A23.1/A23.2.
 - .1 Departmental Representative to approve use of evaporation retarder. Evaporation retarder will not be permitted to be used as finishing aid or to be worked into the concrete surface.
- .9 Curing compound: to CSA A23.1/A23.2.

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity: as required by CSA A23.1/A23.2.
 - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
 - .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Compressive strength at 28 days age: 35 Mpa minimum.
 - .3 Intended application: Pier upstand repair.
 - .4 Aggregate size 28 mm maximum.
 - .4 See Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks for concrete mix for partial depth deck patch repairs, bridge deck concrete overlay, deck joint blockouts, and cast-in-place barriers at abutment deck joints.
 - .5 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .6 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Departmental Representative's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.

- .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete is permitted only after approval of equipment and mix.
- .5 Disturbing reinforcement and inserts during concrete placement is prohibited.
- .6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application of concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quantity of concrete placed, quality, workability, air content, temperature and test samples taken.
- .10 Do not place load upon new concrete until authorized by Departmental Representative.
- .11 Surface preparation for blockouts for new anchorages for existing cast-in-place barrier at jump spans and main spans:
 - .1 Roughen, clean and keep free of grease, oil, standing water, snow, epoxy, loose material or any other contaminant all surfaces that will be in contact with the grout.
 - .2 Saturate with water in accordance with manufacturer's recommendations.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings except where indicated or approved by Departmental Representative.
 - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated reviewed by Departmental Representative.
 - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.
 - .5 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Grouting for blockouts for new anchorages for existing cast-in-place barrier at jump spans and main spans:
 - .1 Fill barrier blockouts after anchorage installation with non premixed non-shrink dry pack grout as indicated.
 - .1 Include all blockouts at abandoned anchorages.
 - .2 Place and cure in accordance with manufacturer's recommendations.

- .4 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2 unless noted otherwise.
 - .1 Schedule:
 - .1 Deck – transverse tined.
 - .1 The tining shall create transverse grooves 3 mm wide by 1.5 mm to 3 mm deep at 20 mm centre-to-centre spacing.
 - .2 Deck shall have steel trowel finish at the gutter, within 300 mm of the inside face of the barrier.
 - .2 Underside of deck – smooth form finish
 - .3 Top and inner surface of barriers – sack rubbed finish.
 - .4 Outer surface of barriers – smooth form finish.
 - .5 Pier upstand repair – smooth form finish.
 - .2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .5 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
 - .2 When more than one piece required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form construction joints as indicated.
 - .4 Install joint filler.

3.3 PROTECTION

- .1 Protection and curing for concrete placed between October 1 and May 1 to comply with the following requirements in addition to cold weather requirements of CSA A23.1/A23.2.
 - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
 - .2 Do not let walls of shelter touch formwork.
 - .3 Provide sufficient space for removal of formwork for finishing.
 - .4 Use heating equipment approved by Departmental Representative.
 - .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at the following curing temperatures:
 - .1 For initial 3 days: minimum temperature of 15 degrees C, maximum temperature of 27 degrees C at concrete surfaces.
 - .2 Maintain concrete at 10 degrees C for additional 14 days.
 - .6 Keep concrete surfaces continually moist while protected.
 - .7 Provide fogging equipment to allow for mist spray curing before start of bridge deck pour.

- .2 Unformed surfaces: cure with burlap and water.
 - .1 Place two layers of damp burlap on surface of concrete.
 - .2 Overlap each strip by minimum 75 mm and secure against displacement by wind.
 - .3 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .3 Formed surfaces:
 - .1 No additional curing will be required if formwork is left in place for seven days or more.
 - .2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.
- .4 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

3.4 SURFACE TOLERANCE

- .1 Concrete tolerance to CSA A23.1 to tolerance schedule as indicated.
 - .1 Deck: less than 3mm gap under a 3m straightedge.

3.5 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 7 and 28 days.
 - .5 Air and concrete temperature.
 - .6 Other
- .2 Inspection and testing of concrete and concrete materials carried out by testing laboratory designated by Contractor for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory certified to CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Frequency of testing compressive strength:
 - .1 Not less than two (2) tests for every 35m³ concrete placed, with no fewer than two (2) tests for each class of concrete placed on any one day.
 - .2 A compressive strength test shall consist of a minimum of four standard test specimens, sampled, made, cured, and tested in accordance with CSA Standards.
 - .1 One cylinder shall be tested at 7 days.
 - .2 The 28 day test result shall be the average of the strengths of the remaining three specimens, except that if any specimen in a test showing

distinct evidence of improper sampling, moulding or testing, shall be discarded and the remaining strengths averaged.

- .5 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .6 Frequency of testing for slump, air content, and concrete temperature:
 - .1 Test every load unless approved otherwise by Departmental Representative.
- .7 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .8 Inspection or testing by Departmental Representative not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

3.6 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Waste Management: separate waste materials for recycling.

END OF SECTION

Part 1 General**1.1 HIGH-PERFORMANCE STRUCTURAL CONCRETE FOR BRIDGE DECKS INCLUDES**

- .1 Deck overlay, partial depth deck patch repairs, deck joint blockouts, and cast-in-place concrete for barriers at abutment deck joints.

1.2 RELATED REQUIREMENTS

- .1 Section 02 41 16 – Structure Demolition.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete

1.3 MEASUREMENT PROCEDURES

- .1 No measurement will be made under this section.
 - .1 Include costs of items in Section 03 30 00 - Cast-in-Place Concrete.

1.4 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C1116/C1116 – 10a, Standard Specification for Fibre-Reinforced Concrete.
 - .2 ASTM C1399/C1399M – 10, Standard Test Method for Obtaining Average Residual-Strength of Fibre Reinforced Concrete.
- .2 CSA Group (CSA)
 - .1 CSA A23.1-14 /A23.2-2014, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Fibres: provide test data in accordance with ASTM C1399 to show the fibre complies with the specification requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert unused plasticizers, water-reducing agents and air-entraining agents materials from landfill to official hazardous material collections site as reviewed by the Departmental Representative.

- .4 Unused plasticizers, water-reducing agents and air-entraining agents materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete and this Section.
- .2 Reinforcing steel: in accordance with Section 03 20 00 - Concrete Reinforcement.
- .3 Synthetic Fibres: 100% virgin polypropylene to ASTM C1116, Type III.
 - .1 Fibres shall have a minimum length of 50 mm.
 - .2 Fibres shall have a minimum tensile strength of 350 MPa and a minimum modulus of elasticity of 4.2 GPa.

2.2 MIXES

- .1 Alternative 1 – Performance Method of specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance in Quality Control Plan.
 - .2 Provide concrete mix to meet the following plastic state requirements:
 - .1 Uniformity: as required by CSA A23.1/A23.2.
 - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
 - .3 Provide concrete mix to meet the following hard state requirements:
 - .1 Durability and class of exposure: C-XL.
 - .2 Minimum Post-Cracking Residual Strength Index: 0.15.
 - .3 Compressive strength at 28 days: 45 MPa minimum.
 - .4 Intended application: Partial depth deck patch repairs, bridge deck concrete overlay, deck joint blockouts, and cast-in-place barriers at abutment deck joints.
 - .5 Aggregate size 10 mm maximum.
 - .6 Special requirements: Synthetic Fibres.

Part 3 Execution

3.1 PREPARATION

- .1 Deck Overlay Preparation:
 - .1 Removal of existing top of deck and preparation of subsurface in accordance with Section 02 41 16 Structure Demolition.

- .2 Partial depth deck patch repair preparation:
 - .1 Preparation/removals in accordance with Section 02 41 16 Structure Demolition.
- .3 Support rail elevation for mechanical bridge deck finisher:
 - .1 Submit for review by Departmental Representative survey of deck surface after removal in accordance with Section 01 33 00 – Submittal Procedures and 02 41 16 – Structure Demolition. Departmental Representative will provide input on setting elevations for rails or headers.

3.2 CONSTRUCTION

- .1 Do concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete and this Section.
- .2 Fibre reinforced concrete:
 - .1 Add fibres early in the mixing process following manufacturer's recommendations to ensure evenly distributed fibres.
 - .2 Steel fibres shall be free from balls and clumps at all times during their use in the work.
- .3 Place concrete at temperatures limits to CSA A23.1/A23.2.
- .4 Avoid concrete placement:
 - .1 When air temperature is above 22 degrees C.
 - .2 During rain or excessive wind or dust.
 - .3 When conditions, as reviewed by Departmental Representative seem detrimental to concrete.
- .5 When air temperature falls below 5 degrees C, comply with cold weather requirements
- .6 Place deck concrete between hours of 6:00 p.m. and 10:00 a.m. as reviewed by Departmental Representative.
 - .1 Provide proper lighting for night pours as reviewed by Departmental Representative.
- .7 Maintain temperature of concrete during discharge between 10 degrees C and 18 degrees C unless permitted otherwise by Departmental Representative.
 - .1 Maintain temperature of mix below maximum temperature of 18 degrees C by adding ice to mix which does not alter design water-cement ratio.
- .8 Immediately prior to placing concrete, thoroughly wet down substrates with clean water.
- .9 Consolidate deck concrete with mechanical vibration even when vibratory drum type finishing machines are used.
- .10 Cast and finish deck with mechanical bridge deck finisher, approved by Departmental Representative.
- .11 Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time.

- .12 Ensure that experienced finishing machine operators and concrete finishers are provided to finish deck.
- .13 Do not place concrete until rails for support and operation of finishing machines and headers for hand operated strike-off devices are in place and firmly secured.
 - .1 Rails or headers to be of type, and so installed, that no springing or deflection will occur due to weight of finishing equipment and so located that finishing equipment can operate without interruption over entire bridge roadway deck being finished.
 - .2 Extend rails for finishing machines beyond both ends of scheduled length of concrete placement sufficient distance to permit float of finishing machine to fully clear concrete to be placed.
 - .3 Set rails or headers to elevations, with allowance for anticipated settlement, camber, and deflection of falsework, as required to produce bridge roadway deck true to required grade and cross section.
- .14 Immediately prior to placing, check falsework and wedges and make necessary adjustments.
 - .1 Provide suitable means, such as telltales, to readily permit measurement by Departmental Representative of settlement and deflection.
- .15 Place concrete in uniform heading approximately normal to structure centreline, or in case of screed supported on transverse headers, parallel to centreline.
 - .1 Limit rate of placing to that which can be finished before beginning of initial set.
- .16 Immediately after concrete has been placed and consolidated, strike off surface.
 - .1 Correct immediately improper adjustment and operation which results in unsatisfactory consolidation and smoothness.
 - .2 Unsatisfactory performance may be cause for rejection of equipment and removal of concrete in place.
- .17 Following completion of strike off by hand methods, float roadway slab surface longitudinally to smooth uniform surface with hand-operated wood float boards 3.5 to 5 m long, minimum 25 mm thick, minimum 200 mm wide, ribbed and trussed as necessary to provide rigid float, and equipped with adjustable handles at each end.
 - .1 Provide adjusting screws spaced at maximum 600 mm centres between float board and rib.
 - .2 Maintain float board true to line and free of twist.
- .18 Use floats to remove roughness and minor irregularities left by strike board or finishing machine and to seal concrete surface to approval of Departmental Representative.
- .19 Adjust rails or headers as necessary to correct for settlement or deflection, which occurs during finishing operations.
 - .1 Operate finishing floats from transverse bridges that span area being floated: provide sufficient number and type of bridges, as reviewed by Departmental Representative, to permit operation of floats without undue delay.

- .2 Provide minimum of two bridges when hand operated float boards are used.
- .3 When finishing machine is used for longitudinal floating, supply one bridge for use by Departmental Representative.
- .20 Finishing bridge deck slab: when concrete has hardened sufficiently to prevent dislodgement of coarse aggregate particles, give surface transverse tined finish free from porous spots, irregularities, depressions, small pockets or rough spots.

3.3 PROTECTION

- .1 Protection and curing shall comply with CSA-A23.1/A23.2, including Annex I.
- .2 Unformed surfaces: cure with burlap and water.
 - .1 Burlap must be presoaked by immersing it in water for a period of at least 24 h immediately prior to placing.
 - .2 Place two layers of damp burlap on surface of concrete.
 - .3 Overlap each strip by minimum 150 mm and secure against displacement by wind.
 - .4 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .3 Formed surfaces:
 - .1 No additional curing will be required if formwork is left in place for seven days or more.
 - .2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.
- .4 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.
- .5 Protection and curing for concrete placed between October 01 and May 01 shall additionally comply with cold weather requirements of CSA-A23.1/A23.2 and the following requirements.
 - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
 - .2 Do not let walls of shelter touch formwork.
 - .3 Provide sufficient space for removal of formwork for finishing.
 - .4 Use heating equipment approved by Departmental Representative.
 - .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
 - .1 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
 - .2 For superstructure: maintain concrete at 10 degrees C for additional 14 days.
- .6 Keep concrete surfaces continually moist while protected.

Project: 1343-03

Bridge Rehabilitation
Vermilion River Bridge

Section 03 31 23.13
HIGH-PERFORMANCE
STRUCTURAL CONCRETE FOR
BRIDGE DECKS

Parks Canada

Kootenay National Park

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- .7 Provide fogging equipment to allow for mist spray curing before start of bridge deck pour.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This section includes:
 - .1 Bicycle railing, complete with connecting brackets and hardware.
 - .2 Drain downspouts.
 - .3 Strip Seal deck joints.
 - .4 New anchorages for existing cast-in-place barrier at main spans.
 - .5 Jump span external Stirrups.
 - .6 Bearing steel components recoating (metallizing).
 - .7 Barrier joint galvanized steel cover plates.
- .2 For asphaltic plug joint, see Section 32 12 17 – Asphaltic Plug Joints.
- .3 For barrier anchorages at jump spans, see Section 03 20 00 - Concrete Reinforcing.

1.2 RELATED REQUIREMENTS

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 30 00 – Cast-In-Place Concrete.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 32 12 17 – Asphaltic Plug Joints.

1.3 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure steel for bicycle railing in metres of rail fabricated, delivered and installed, including steel brackets, nuts, anchor rods, washers, posts, neoprene pads and sealant. Payment will be made under "**Unit Price Item – Structural Steel – Bicycle Railing**".
 - .1 Supply and installation of anchor rods as indicated will not be measured but be considered incidental to work.
 - .2 Locating existing reinforcement in barriers will not be measured but considered incidental to the work.
 - .3 Additional drilling required after encountering reinforcement and filling of abandoned holes as indicated will not be measured but considered incidental to the work.
 - .2 Measure new drain downspouts as individual units fabricated, delivered and installed. Payment will be made under "**Unit Price Item – Structural Steel – Drain Downspouts**".
 - .1 Supply and installation of the couplers as indicated will not be measured but considered incidental to work.

- .3 Measure fabrication, delivery and installation of new deck strip seal joints in linear meters measured from out to out of barriers. Payment will be made under **"Unit Price Item – Structural Steel – Deck Strip Seal Joint"**.
 - .1 Joint surface preparation and neoprene seal will not be measured but be considered incidental to work.
- .4 Measure new anchorages for existing cast-in-place barrier at main spans in units of anchorages incorporated into Work. Payment will be made under **"Unit Price Item – Structural Steel – Anchorages for existing CIP barrier at main spans"**.
 - .1 Unit price to include:
 - .1 Removal of concrete to create a blockout at each anchorage required to install new anchorage as indicated, in accordance with Section 02 41 16 – Structure Demolition.
 - .2 Hole drilling, anchor rod supply and installation in accordance with this Section.
 - .3 Surface preparation and grouting blockouts after anchor installation as indicated, in accordance with Section 03 30 00 – Cast-in-Place Concrete.
 - .4 Surface preparation, supply and application of pigmented concrete sealer as indicated, in accordance with Manufacturer's Recommendations.
 - .2 Locating existing reinforcement in deck and barriers will not be measured but considered incidental to the work.
 - .3 Additional removals and/or drilling required after encountering reinforcement and filling of abandoned blockouts and holes as indicated will not be measured but considered incidental to the work.
- .5 Measure steel for jump span external stirrups in units incorporated into Work. Measurement shall include all work and materials required to supply and install external stirrups, including but not limited to drilling and grouting. Payment will be made under **"Unit Price Item – Structural Steel – Jump Span External Stirrups"**.
 - .1 Contractor to determine if installation of jump span external stirrups constitutes working in confined spaces (area under jump span enclosed by abutment and wingwalls, with access opening in abutment backwall). Costs for mitigations for working in confined spaces will not be measured but considered incidental to work.
 - .2 Locating existing reinforcement in deck will not be measured but considered incidental to the work.
- .6 Measure bearing steel component recoating in individual units of bearing assemblies. Payment will be made under **"Unit Price Item – Structural Steel – Bearing steel components recoating"**.
 - .1 Bearing assembly at abutments includes girder shoe plate, base plate, and restraining plates.
 - .2 Bearing assembly at pier includes girder shoe plate, rocker plate, base plate, guide plates and anchor bolts (including nuts and washers).

- .3 Unit price to include all costs associated with cleaning, surface preparation, and recoating (metallizing) in accordance with this section.
- .7 No measurement for payment will be made under this Section for structural steel for barrier joint galvanized steel cover plates at abutment deck joints. Include cost in Section 03 30 00 – Cast-in-Place Concrete.
- .8 Cost of any temporary works required to complete the work will not be measured but considered incidental to work.
- .9 Unit prices to include all costs associated with environmental mitigations for work in accordance with Section 01 35 43 – Environmental Procedures.

1.4**REFERENCE STANDARDS**

- .1 American Association for State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO HB Standard Specifications for Highway Bridges-17th Edition 2002.
- .2 ASTM International (ASTM)
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM F2329/F2329M, Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
 - .3 ASTM A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - .4 ASTM F1554, Standard Specification for Anchor Rods, Steel 36, 55, and 105-ksi Yield Strength.
 - .5 ASTM A563, Standard Specification for Carbon and Alloy Steel Nuts.
 - .6 ASTM F436 / F436M, Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.
 - .7 ASTM A194 / A194M, Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
 - .8 ASTM A193 / A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
 - .9 ASTM A673/A673M, Standard Specification For Sampling Procedure For Impact Testing Of Structural Steel.
 - .10 ASTM F3125/F3125M, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
 - .11 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .12 ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness.
 - .13 ASTM D4417, Standard Test Methods for Field Measurements of Surface Profile of Blast Cleaned Steel.

- .3 CSA Group (CSA)
 - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S6, Canadian Highway Bridge Design Code.
 - .4 CSA S16, Design of Steel Structures.
 - .5 CSA S269.1, Falsework and formwork.
 - .6 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
 - .7 CSA W59, Welded Steel Construction, (Metal Arc Welding).
- .4 The Society for Protective Coatings (SSPC)
 - .1 NACE No. 12/AS C2.23M/SSPC CS-23-2016, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel.
 - .2 SSPC-SP 10/NACE No. 2, Near White Blast Cleaning.
- .5 Alberta Infrastructure and Transportation Technical Standards Branch
 - .1 B388- Specification for Concrete Sealers.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meetings:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify project requirements.
- .2 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
- .3 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .4 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work.

1.6 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 copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
- .2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
- .3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

1.7 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 fabricated members.
 - .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 Replace defective or damaged materials with new.
- .6 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .7 Provide Departmental Representative with delivery schedules minimum 7 days prior to shipping.

1.8 QUALITY ASSURANCE

- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with Departmental Representative in carrying out inspection and tests required.

1.9 SITE CONDITIONS

- .1 Place strip seal deck joints as per Manufacturer's instructions.
- .2 Contractor to measure existing deck joint gap and provide to Departmental Representative prior to installing strip seal deck joints.

Part 2 Products

2.1 MATERIALS

- .1 Structural steel: as indicated.
- .2 Bolts, nuts and washers: as indicated.
- .3 Anchor rods, nuts and washers: as indicated.

- .4 External stirrup rods and nuts: as indicated.
- .5 External stirrup patching below plates in recesses: as indicated.
- .6 Welding electrodes: to CSA W48 series.
- .7 Hot dip galvanizing: as indicated.
- .8 Studs: as indicated.
- .9 Neoprene pad: as indicated.
- .10 Sealer: as indicated.
- .11 Epoxy: as indicated.
- .12 Concrete sealer: type 3 according to B388- Specification for Concrete Sealers.

2.2 SOURCE QUALITY CONTROL

- .1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts 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 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.
- .3 Anchor rods for bicycle railing and barrier anchorages in main spans to be located to avoid interference with existing reinforcement.
 - .1 Use pachometer, or alternate method acceptable to the Departmental Representative, to locate existing steel in deck and barriers.

- .2 Locate anchor rods and barrier anchorages to avoid existing steel in deck and barriers. No steel permitted to be cut or damaged to place anchor rods and barrier anchorages except as noted following:
 - .1 Bottom layer of longitudinal deck steel may conflict with barrier anchorages location and may be required to be cut/drilled through when drilling hole for anchorage, subject to approval of Departmental Representative.
- .3 Drill holes in existing concrete as indicated in accordance with Manufacturer's Printed Installation Instructions. Holes shall be hammer drilled.
 - .1 Contractor to be equipped with necessary means to drill through bottom layer of longitudinal deck steel without damaging any other steel in the deck or barriers. Drilling through bottom layer of longitudinal deck steel as approved by the Departmental Representative will not be measured but considered incidental to work.
- .4 Protect holes from water accumulations, snow and ice build-ups. Clean holes before reinforcing installation in accordance with Manufacturer's Printed Installation Instructions.

3.3 FABRICATION / INSTALLATION

- .1 Do falsework in accordance with CSA S269.1.
- .2 Bearing steel component recoating:
 - .1 Do metallizing in accordance with NACE 12/AWS 2.23M/SSPC-CS 23.00.
 - .1 Protect existing neoprene pads from damage during cleaning and metallizing.
 - .2 Existing paint to be removed.
 - .3 Surface preparation to SSPC-SP-10, or near-white-metal finish obtained by blasting.
 - .4 Minimum of 2.5 mils of a sharp, angular profile depth is required.
 - .5 Apply minimum coating thickness of 130 µm.
- .3 Do fabrication and erection of structural steel in accordance with CSA S6, Design of Highway Bridges.
- .4 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 Do welding in shop unless otherwise permitted by Departmental Representative.
 - .2 Weld only at locations indicated.
 - .3 Welding of galvanized steel not permitted. Fabricate prior to galvanizing or remove galvanizing where welding will occur. Repair areas damaged by welding by metallizing per ASTM A780, method A3.
- .5 Installation of anchor rods for bicycle railing.
 - .1 Install anchor rods as indicated in accordance with Manufacturer's Printed Installation Instructions. Installation of anchor rods shall be performed by personnel trained to install adhesive anchors.
 - .2 All abandoned drilled holes shall be filled with epoxy.

- .3 Prior to installation of bicycle railing brackets, provide Departmental Representative QC/QA reports for installation of anchor rods.
- .6 Installation of anchor rods for new anchorages for existing cast-in-place barrier at main spans.
 - .1 Install anchor rods as indicated in accordance with Manufacturer's Printed Installation Instructions.
 - .2 All abandoned drilled holes shall be filled with epoxy.
 - .3 Prior to blockout grouting, provide Departmental Representative QC/QA reports for installation of anchor rods.
- .7 Install deck strip seal joints in accordance with manufacturer recommendations and as directed by the Departmental Representative.
 - .1 Leak test joints following installation to the satisfaction of the Departmental Representative.
- .8 High strength bolting: in accordance with CAN/CSA S6. Use turn-of-nut tightening method.
- .9 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.
- .10 Field splices: to approval of Departmental Representative.
- .11 Mark members in accordance with CSA G40.20/G40.21.
 - .1 Do not use die stamping.
 - .2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.

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 Bearing steel component roughness:
 - .1 Submit measured roughness of bearing steel components after completion of surface preparation and prior to metallizing.
 - .2 The profile depth shall be measured according to ASTM D4417 method C.
- .3 The field quality control for anchor rods for bicycle railing shall, as a minimum, include the following verifications for the adhesive anchor installation:
 - .1 Hole drilling method in accordance with the Manufacturer's Printed Installation Instructions.
 - .2 Anchor edge distance and spacing.
 - .3 Hole diameter and depth.
 - .4 Hole cleaning in accordance with the Manufacturer's Printed Installation Instructions.
 - .5 Anchor element type, material, diameter, and length.

- .6 Adhesive identification and expiration date.
- .7 Adhesive installation in accordance with the Manufacturer's Printed Installation Instructions.
- .8 Additional inspection procedures to verify proper usage as specified by the manufacturer.

3.5 CLEANING

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

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 16 – Structure Demolition.
- .2 Section 05 12 33 – Structural Steel for Bridges.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure asphalt plug joint system in linear metres from neat dimensions from out to out of barriers. Payment will be made under **"Unit Price Item Asphaltic Plug Joint System"**
 - .1 Unit price to include supply and installation of all components of asphalt plug joint system, including but not limited to, supply and installation of asphalt binder, steel bridging plate, centering pins, and backer rod.
 - .2 Joint surface preparation, supply and installation of evazote, joint sealant, and asphalt impregnated fiberboard at barrier joint will not be measured but considered incidental to work.
 - .3 Removal and reinstallation of existing barrier cover plate at pier deck joint adjacent to northbound lane will not be measured but considered incidental to work.
 - .4 Supply and installation of new barrier cover plate to replace missing cover plate at pier deck joint adjacent to southbound lane as indicated will not be measured but considered incidental to work.
 - .2 Cost of any temporary works required to complete the work will not be measured but considered incidental to work.
 - .3 Unit prices to include all costs associated with environmental mitigations for work in accordance with Section 01 35 43 – Environmental Procedures.

1.3 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM D1751 - 18 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .3 ASTM D5249 – Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints.
 - .4 ASTM D5329, Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements.
 - .5 ASTM D5893 – Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.

- .6 ASTM D6297 - Standard Specification for Asphaltic Plug Joints for Bridges.
- .2 CSA Group (CSA)
 - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S6, Canadian Highway Bridge Design Code.
 - .4 CSA S16, Design of Steel Structures.
 - .5 CSA S269.1, Falsework and formwork.
 - .6 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
 - .7 CSA W59, Welded Steel Construction, (Metal Arc Welding).
- 1.4 ACTION AND INFORMATIONAL SUBMITTALS**
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Asphaltic Plug Joints and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
 - .3 Site Quality Control Submittals:
 - .1 Asphaltic plug pours: provide accurate records of poured asphaltic plug items indicating date and location of pour, quality, and air temperature.
- 1.5 QUALITY ASSURANCE**
 - .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- 1.6 DELIVERY, STORAGE AND HANDLING**
 - .1 Deliver, store and handle in accordance with Section 01 61 00 – Common Product Requirements.
- 1.7 SITE CONDITIONS**
 - .1 Place asphaltic plug joint system as per Manufacturer's instructions.
 - .2 Contractor to measure existing deck joint gap and provide to Departmental Representative prior to installing asphaltic plug joint system.
- Part 2 Products**
 - 2.1 MATERIALS**
 - .1 Asphalt plug joint system: as indicated.
 - .1 Asphaltic plug material: to ASTM D6297.
 - .2 Asphaltic binder: to ASTM D6297.

- .3 Steel bridging plate: to ASTM D6297 or as recommended by manufacturer.
- .4 Centering pins: as recommended by manufacturer.
- .5 Backer rod: to ASTM D5279.
- .2 Structural steel: as indicated.
- .3 Galvanizing: hot dipped galvanizing after fabrication to ASTM A123/123M.
- .4 Sealer: as indicated.
- .5 Premoulded joint fillers: bituminous impregnated fibre board: to ASTM D1751.
- .6 Barrier joint sealer: as indicated.
- .7 Welding electrodes: to CSA W48 series.

2.2 EQUIPMENT

- .1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of cast-in-place concrete previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

- .1 Obtain Departmental Representative's written approval before placing asphaltic plug joints.
 - .1 Provide 24 hours minimum notice prior to placing of asphaltic plug joints.
- .2 Surface preparation to manufacturer's instruction.
- .3 Protect previous Work from staining.
- .4 Clean and remove stains.
- .5 Maintain accurate records of poured asphaltic plug joints to indicate date, location of pour, quality, and air temperature.

3.3 INSTALLATION/APPLICATION

- .1 Asphaltic plug joints:
 - .1 Install asphaltic plug joints to Manufacturer's instructions.

- .2 Pavement temperature for installation asphaltic plug joint shall be a minimum of 7°C and weather should be dry with no signs of imminent rain. Blockout and preparatory work can be done at lower temperature.
- .3 Let asphaltic plug joint cool to Manufacturer's instruction before opening to traffic.
 - .1 If no instructions are provided let the asphaltic plug joint cool to 49 degrees C before opening to traffic.

3.4 SURFACE TOLERANCE

- .1 Asphaltic plug joint top surface tolerance: less than 3mm gap under a 3m straightedge.

3.5 FIELD QUALITY CONTROL

- .1 Manufacturer and contractor shall supply all materials and certification forms necessary to verify material compliance for all components of the asphaltic plug joint system.
- .2 Contractor shall provide Departmental Representative a list of equipment intended for use during the asphaltic plug joint construction process.
- .3 Contractor shall have copies of all calibration certificates for thermometers on-site should the Departmental Representative request them.
- .4 Inspection or testing by Consultant not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

3.6 CLEANING

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

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 As detailed here and in the Contractor Documents, the Contractor is to supply and install pavement markings in the areas adjacent to and impacted by the Works.

1.2 MEASUREMENT AND PAYMENT

- .1 Pavement marking including reflective glass beads will not be measured for payment and is considered incidental to the work.

1.3 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.5, Low Flash Petroleum Spirits Thinner.
 - .2 CAN/CGSB 1.74, Alkyd Traffic Paint.
 - .3 CGSB1-GP-12C-83 Standard Paint Colours.
 - .4 CGSB1-GP-71-83 Method of Testing Paints and Pigments.
 - .5 CAN/CGSB-1.4-2000 – Petroleum Spirits Thinner
 - .6 CGSB-1 GP 74M-2001 – Alkyd Traffic Paint
- .2 United States Federal Standard
 - .1 FED-STD-595b – Colours used in Government Procurement
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
 - .1 Upon request submit to Departmental Representative the following material sample quantities at least 4 weeks prior to commencing work.
 - .1 Two samples of each type of paint.
 - .2 One sample of glass beads.
 - .3 Sampling to CGSB1-GP-71.

- .2 Mark samples with name of project and its location, paint manufacturer s name and address, name of paint, CGSB1 specification number and formulation number and batch number.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.6 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 The Contractor is responsible for quality control inspection throughout every stage of the work to ensure that materials and workmanship comply with the requirements of this specifications.
- .3 The Contractor to include in the Quality Control Plan actions that address all the elements that affect the quality of the line painting including, but not limited to:
 - .1 Paint Application Rates.
 - .2 Glass Bead Application Rates.
 - .3 Pavement Surface and Atmospheric Conditions.
 - .4 Line Widths, Line Lengths and Space Lengths.
- .4 The Contractor shall maintain records of Quality Control data, complaints from the public, and other details relevant to the Work and shall provide these records to the Departmental Representative daily.

1.7 TRAFFIC CONTROL

- .1 In accordance with Section 01 55 26 –Traffic Control and 01 14 00 – Work Restrictions.

Part 2 Products

2.1 MATERIALS

- .1 Paint:
 - .1 CGSB 1.74-2001-CAN/CGSB, alkyd traffic paint.
 - .2 Colour: to FED-STD-595B, yellow 33538 and white 37925.
 - .3 Upon request, Departmental Representative will supply a qualified product list of paints applicable to work. Qualified paints may be used, but Departmental Representative reserves right to perform further tests.
- .2 Thinner: to CAN/CGSB-1.4-2000.
- .3 Glass reflective beads:
 - .1 To AASHTO M247, Type 1 glass beads.
 - .2 Glass reflective beads shall have a minimum of 70% round spheres with no more than 3% irregular particles present, no more than 10% air inclusions in the glass beads, and shall be clear.

- .3 Glass reflective beads shall be applied under pressure to achieve the target embedment of 60-70% the bead diameter into the paint using a distributor, aka a bead gun.
- .4 A moisture-proofing agent, adherence coating, and flotation coating shall be added to the beads per the manufacturer requirements.
- .4 Overlay type: to CGSB1-GP-74M

2.2 SUPPLY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions, Section 01 61 00 - Common Product Requirements and Section 01 35 43 – Environmental Procedures.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer s name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer s recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
 - .3 The Contractor shall take all necessary steps to prevent contamination of the materials.
 - .4 Paint shall be protected from freezing.
- .4 The Contractor shall make all arrangements for the supply and delivery of paint and glass beads and shall provide the Departmental Representative with records of all materials received and/or returned, on a daily basis.
- .5 The Contractor shall provide, maintain and reclaim all material storage sites.
- .6 No paint formulation shall be diluted or mixed with a different formulation or with any other material, without the specific approval of the Departmental Representative.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings acceptable for product installation in accordance with MPI instructions prior to pavement markings application.
 - .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions rectified.

3.2 EQUIPMENT REQUIREMENTS

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

- .2 Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

3.3 CONDITION OF SURFACES

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

3.4 APPLICATION

- .1 New pavement markings layout to match existing pavement marking as per survey.
- .2 Unless otherwise approved by Departmental Representative, apply paint when air temperature minimum 10 degrees C, wind speed maximum 60 km/h and no rain forecast within next 4 hours.
- .3 Apply traffic paint evenly at rate of 3 m²/L to form minimum 8 mil dry film thickness, in accordance with MPI Architectural Painting Specification Manual "Preparation of Surfaces" and "Application" for "Approved Product" listing.
- .4 Do not thin paint.
- .5 Symbols and letters to dimensions indicated.
- .6 Paint lines of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.
- .8 Apply glass beads at rate of 200 g/m² of painted area immediately after application of paint.

3.5 TOLERANCE

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings as required by Departmental Representative.

3.6 REMOVAL, REPAIR OR REPLACEMENT OF UNACCEPTABLE PAVEMENT MARKINGS

- .1 All painted lines that do not meet the requirements of the Contract Documents shall be removed and correctly applied or repaired by the Contractor.
- .2 In cases where the paint is "tracked" by vehicles tires, the lines may be repaired by reapplying paint and glass beads to the damaged areas.
- .3 In case where incorrectly painted lines need to be removed, the Contractor shall use methods and equipment that will totally eliminate the pattern of the lines without damaging the integrity of the pavement surface. The methods and equipment used for such work shall be reviewed and accepted by the Departmental Representative prior to their use. Obliterating incorrectly painted lines through the sole use of paint liquid asphalt, slurry seal or other similar materials will not be permitted.
- .4 No additional payment will be made to the contractor for repair or re-work due to any reason.

3.7 HIGHWAY OPERATION

- .1 Highway operation shall be in accordance with the Contractor's approved Traffic Management Plan and shall meet the following requirements:
 - .1 General:
 - .1 Painting shall be carried out during hours of daylight between ½ hour after sunrise and ½ hour before sunset. Generally, the Contractor may paint lines during any day of the week (subject to Section 01 14 00 – Work Restrictions) but is cautioned that traffic volumes are usually higher on all highways on Friday, Saturday and Sunday.
 - .2 Operation of the painting truck against the flow of traffic will not be permitted.
 - .3 Loading glass beads or paint onto the painting truck is not permitted on a roadway surface.

3.8 PROTECTION

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

3.9 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
 - .1 Remove insulation material spilled during installation and leave work area ready for application of wall board.
- .3 Waste Management: separate waste materials for recycling.

END OF SECTION

REFERENCE DRAWINGS:

1957 ORIGINAL DESIGN, VERMILION RIVER BRIDGE, BANFF-WINDERMERE
HIGHWAY MILE 25.9 KOOTENAY NATIONAL PARK, DEPARTMENT OF PUBLIC
WORKS CANADA

1 OF 9	PLAN AND ELEVATION
2 OF 9	WEST ABUTMENT
3 OF 9	WEST ABUTMENT STEEL REINFORCING
4 OF 9	EAST ABUTMENT
5 OF 9	EAST ABUTMENT REINFORCING
6 OF 9	PIER
7 OF 9	DECK – REINFORCED CONCRETE
8 OF 9	STANDARD HANDRAIL DETAIL
9 OF 9	STEEL SCHEDULE

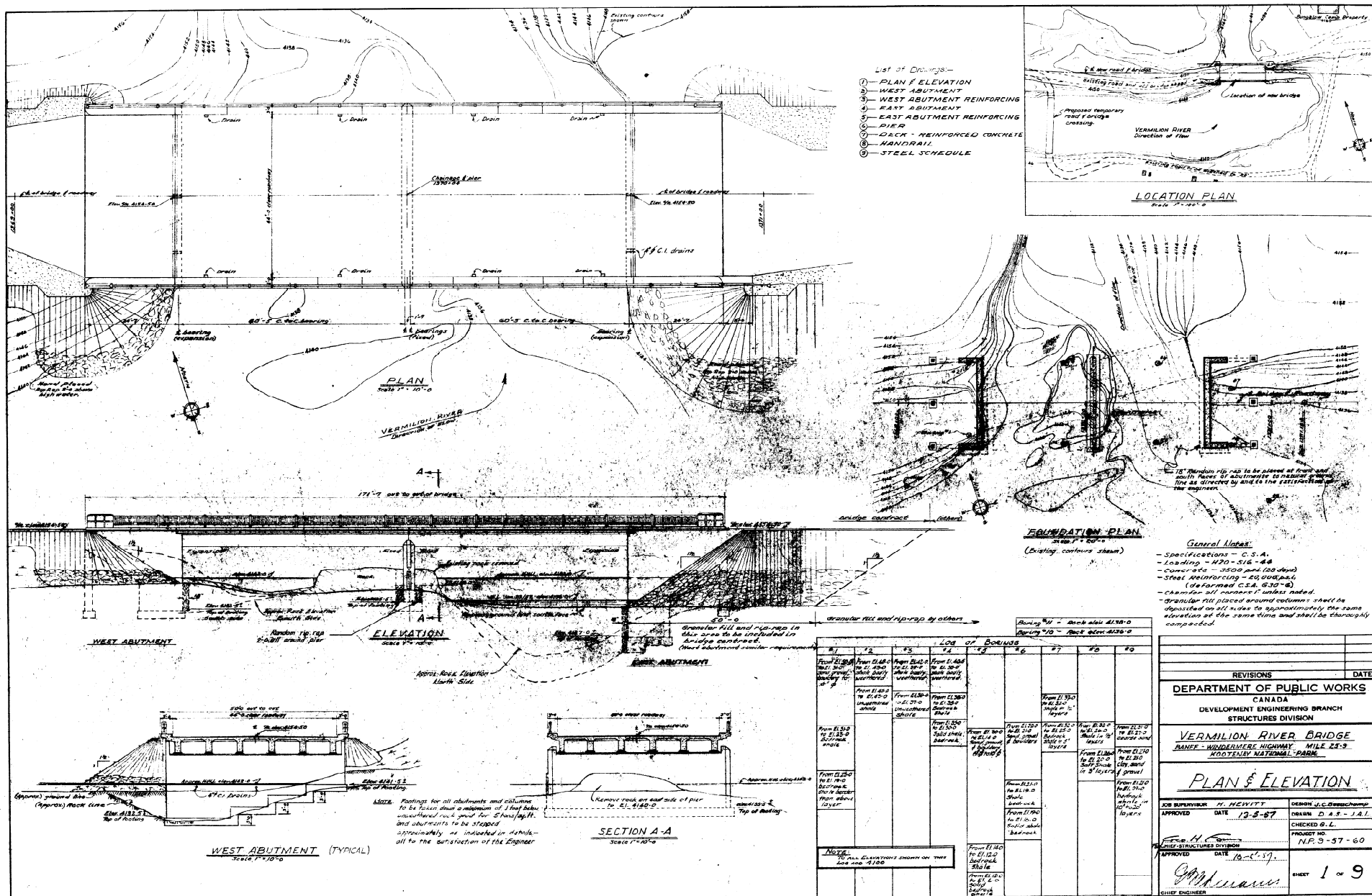
1958 PRESTRESSED ALTERNATIVE, VERMILION RIVER BRIDGE, BANFF-
WINDERMERE HIGHWAY MILE 25.9, PRECAST CONCRETE LTD

-	PRESTRESSED ALTERNATIVE
-	STRINGER DETAIL
-	PRETENSIONED ALTERNATIVE DESIGN INFORMATION
-	MISCELLANEOUS DETAILS

1990 RENOVATION, VERMILION RIVER BRIDGE, KM 41.23 HIGHWAY NO. 93A,
KOOTENAY NATIONAL PARK BRITISH COLUMBIA, PUBLIC WORKS CANADA

-	COVER SHEET
1 OF 6	GENERAL LAYOUT - EXISTING
2 OF 6	NEW GENERAL LAYOUT
3 OF 6	TRAFFIC CONTROL AND DECK RECONSTRUCTION DETAILS
4 OF 6	JOINT AND BEARING DETAILS
5 OF 6	PRECAST CONCRETE APPROACH BARRIER
6 OF 6	TRAFFIC BARRIER AND REINFORCEMENT SCHEDULE

END OF SECTION

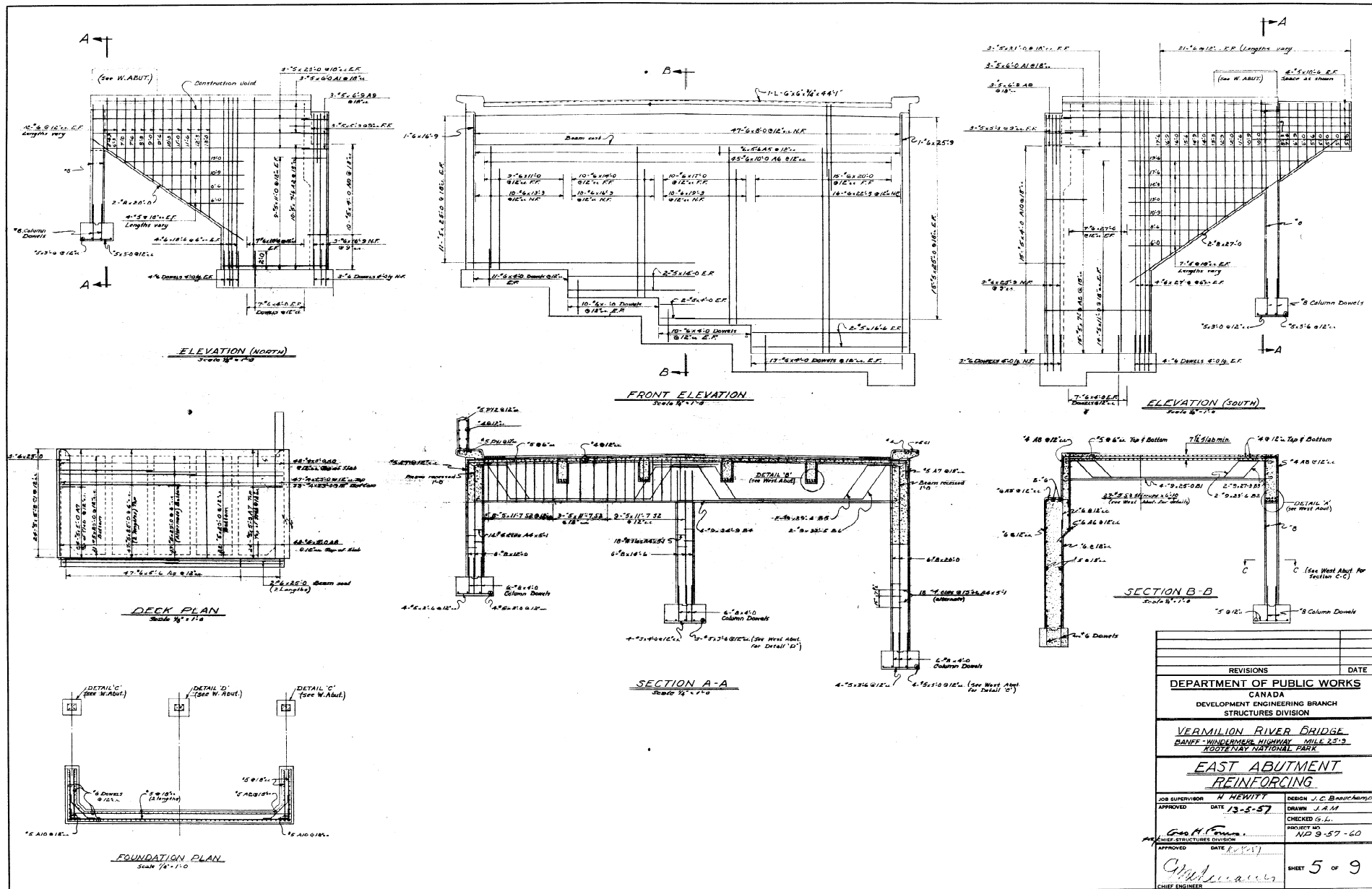


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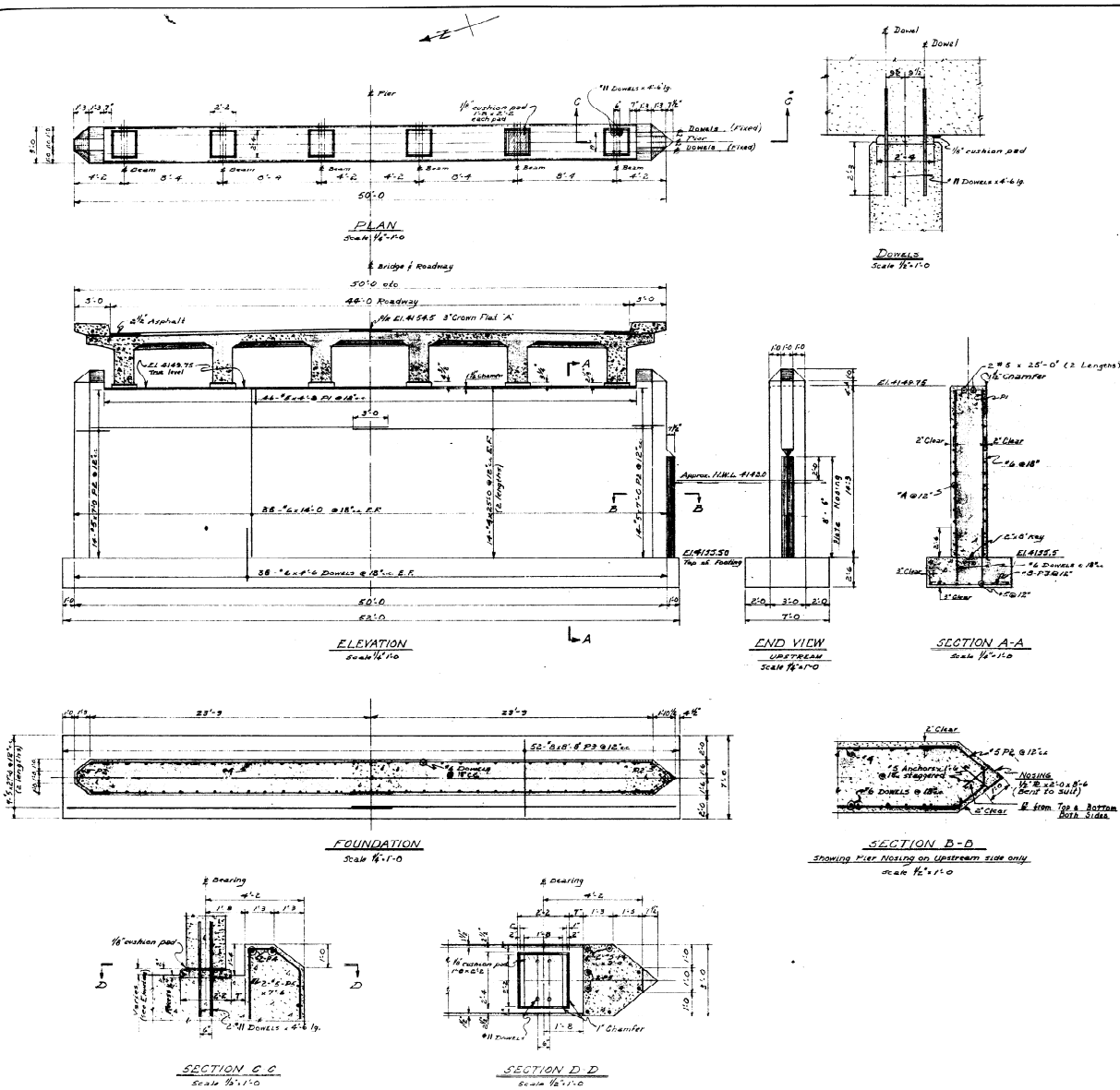








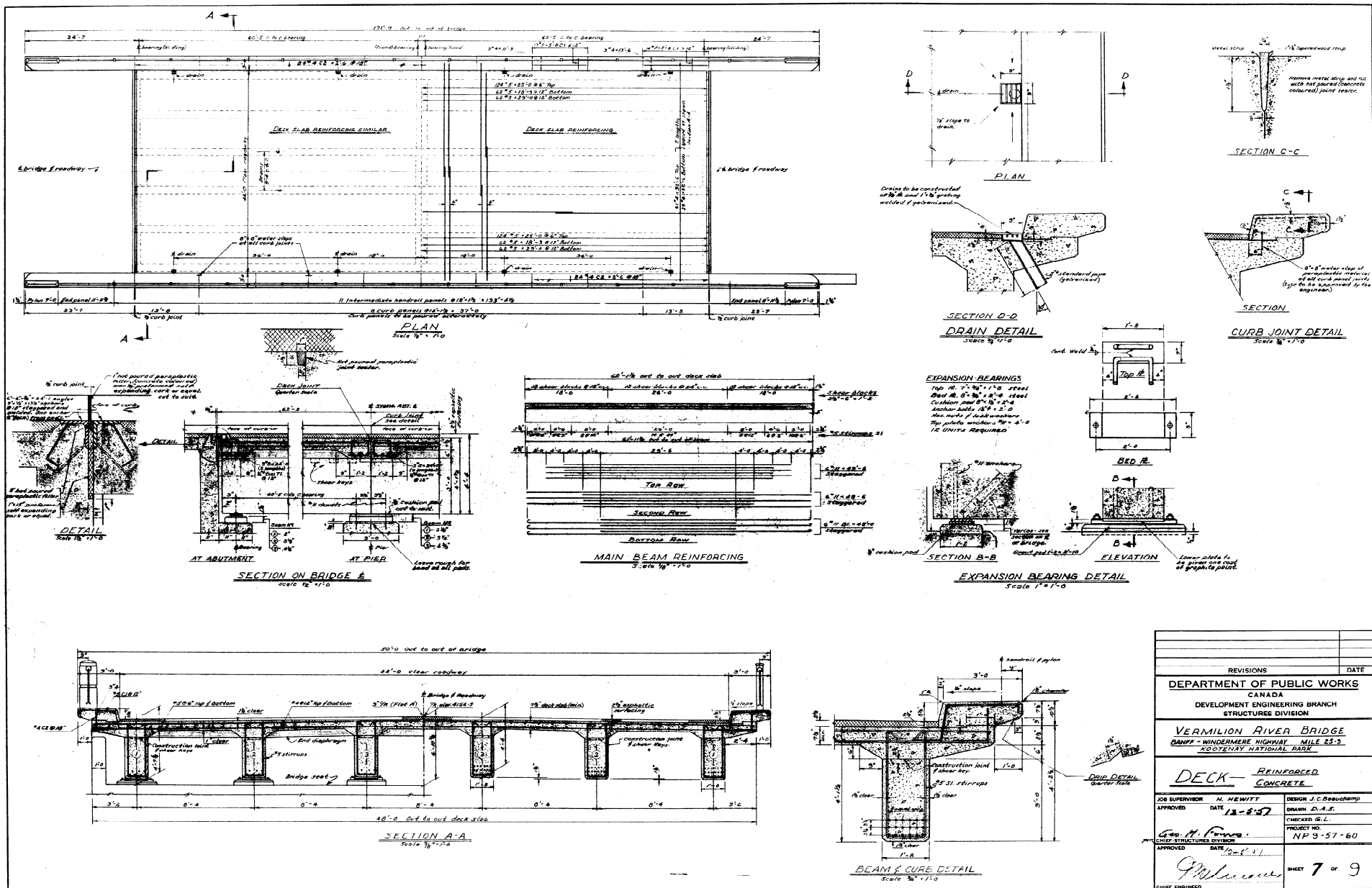
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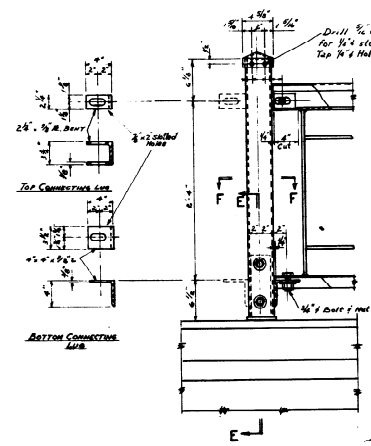
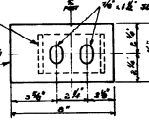
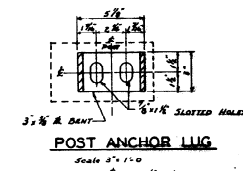
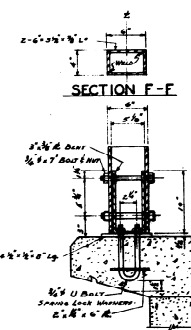
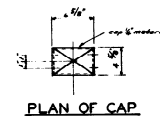
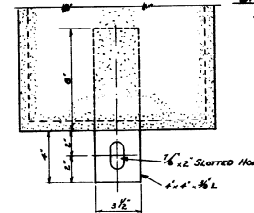
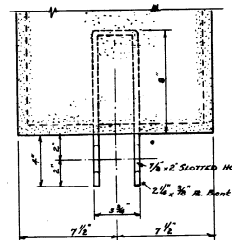
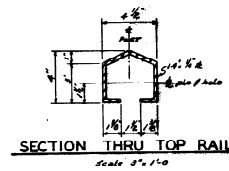
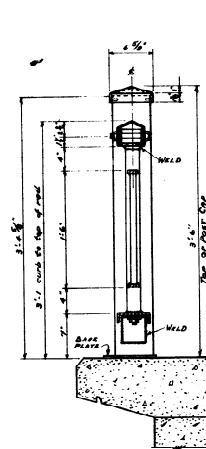
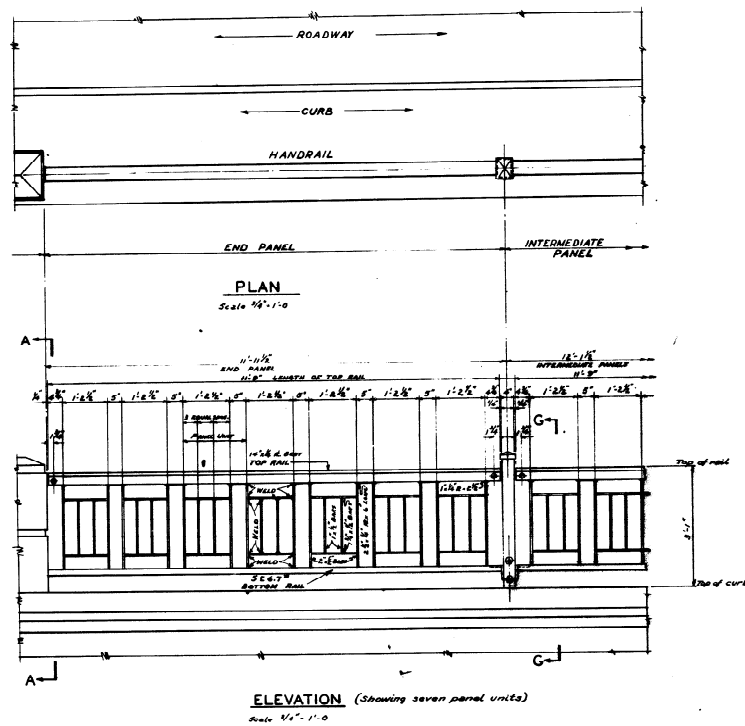


REVISIONS		DATE
DEPARTMENT OF PUBLIC WORKS		
CANADA		
DEVELOPMENT ENGINEERING BRANCH		
STRUCTURES DIVISION		
VERMILION RIVER BRIDGE		
CANADIAN-WINDERMERE HIGHWAY - MILE 2.83		
KOOTENAY NATIONAL PARK		
PIER		
JOB SUPERVISOR	H. HENRI	
APPROVED	DATE	13-5-57
DRAWN	J.A.M.	
CHECKED	S.L.	
PROJECT NO.	NPD-37-60	
APPROVED	DATE	16-5-57
CHIEF ENGINEER	SHEET 6 OF 9	

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X 30



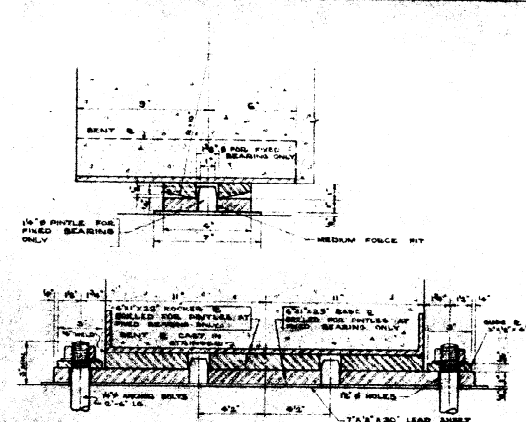


PANELS REQUIRED	STANDARD HANDRAIL DIMENSIONS			
	Panel Units	Length of Top Rail	End Panel	Intermediate Panel
1	1	6'-10 1/2"	7'-1"	7'-3"
5	5	8'-6"	8'-8 1/2"	8'-10 1/2"
6	6	10'-1 1/2"	10'-4"	10'-6"
7	7	11'-9"	11'-11 1/2"	12'-1 1/2"
8	8	13'-4 1/2"	13'-7"	13'-9"

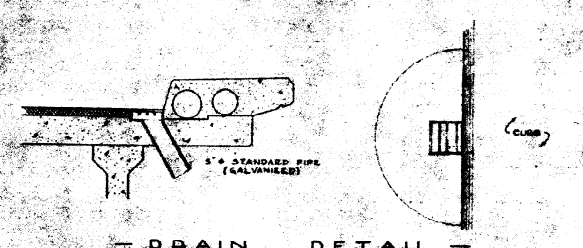
REVISIONS			DATE
DEPARTMENT OF PUBLIC WORKS			
CANADA			
DEVELOPMENT ENGINEERING BRANCH			
STRUCTURES DIVISION			
VERMILION RIVER BRIDGE			
BANFF - WINNIPEG HIGHWAY - MILE 25.9			
KOOTENAY NATIONAL PARK			
STANDARD HANDRAIL DETAIL			
JOB SUPERVISOR	J. C. BEAUCHAMP	DESIGN	M. V. E.
APPROVED	DATE 8/9/56	DRAWN	J. A. M.
		CHECKED	J. C. B.
		PROJECT NO.	NP9-57-60
CHIEF STRUCTURES DIVISION	DATE 8.4.56	SHEET	8 OF 9
CHIEF ENGINEER			

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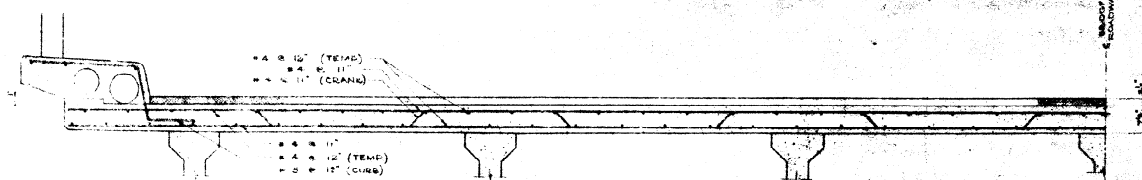
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— BEADING DETAILS —



- DRAIN DETAIL -

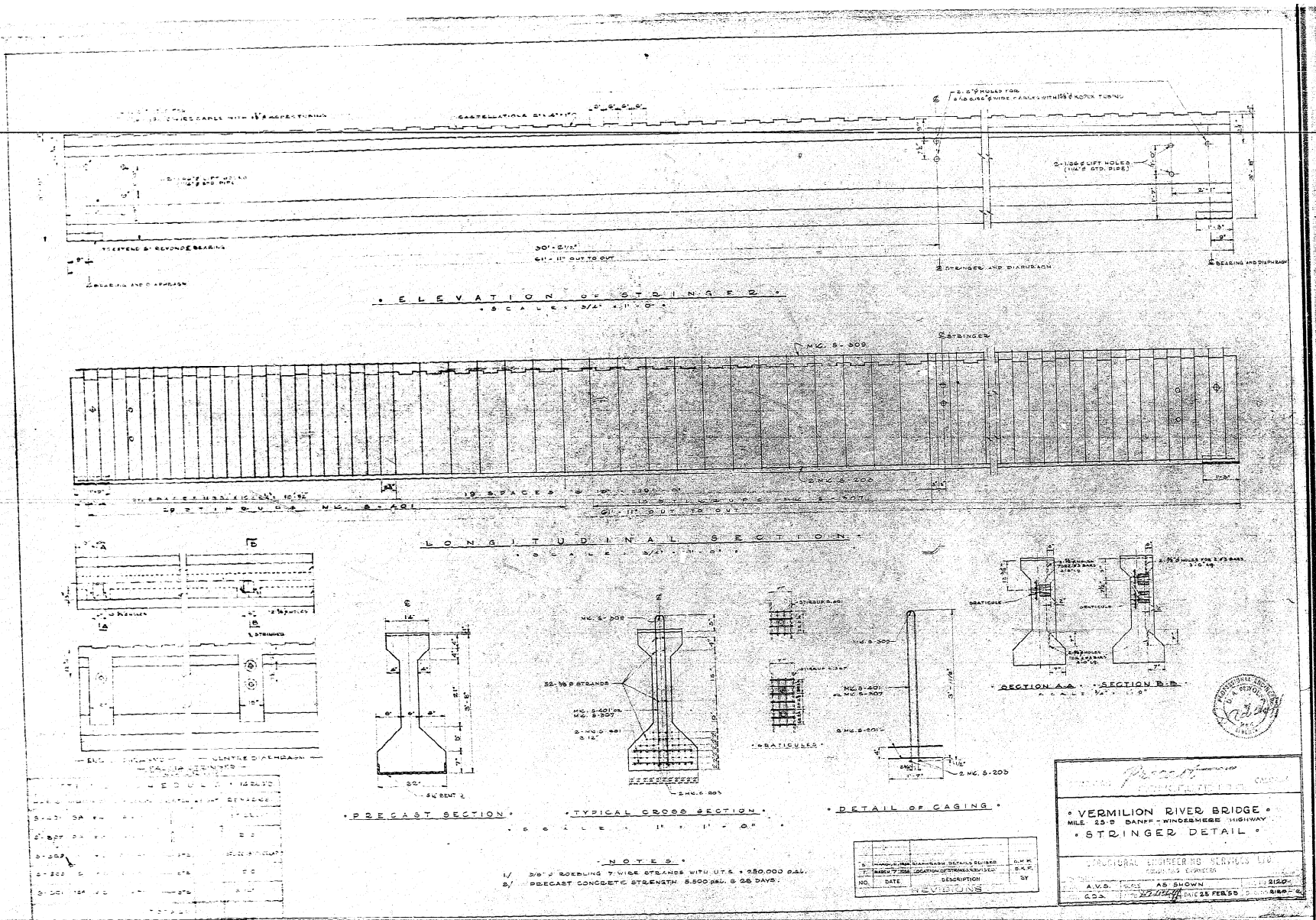


- CROSS SECTION THROUGH DECK -



EDMONTON *Precast* CALGARY
 CONCRETE LTD.
 VERMILION RIVER BRIDGE
 MILE 28-0 SANIT. UNDERMERE HIGHWAY
 MISCELLANEOUS DETAILS
 STRUCTURAL ENGINEERING SERVICES LTD.
 CONSULTING ENGINEERS
 1000-100 AVE. S.W. CALGARY, ALTA. T2C 1P5
 TEL. 262-1111 FAX 262-1111

X30



X30

DESIGN INFORMATION

CONCRETE :- CIP DECK - $f'_c = 4000$ psi @ 28 DAYS
 STRINGER - $f'_c = 5500$ psi @ 28 DAYS, $f_c = 0.4 f'_c$
 $f_{ci} = 4400$ psi MIN @ TIME OF RELEASE
 $f_{ci} = 0.6 f'_c$

STEEL :- $\frac{3}{8}$ " ϕ - 7 WIRE STRANDS - HTS. UTS 250,000 psi
 $f_{si} = 175,000$ psi = 70% UTS
 $f_{st} = 140,000$ psi = 56% UTS

SPAN :- 60'-5" \pm TO \pm OF BEARINGS

BENDING MOMENTS @ $\frac{1}{4}$

IMPACT = 270% DISTRIBUTION FACTOR $\frac{7}{3}$

DL STRINGER	-	232 ^{1K}
DL CIP DECK	-	299 ^{1K}
DL DIAPHRAGM	-	20 ^{1K}
TOTAL ON PRECAST SECTION	-	551 ^{1K}
DL ASPHALT	-	80 ^{1K}
LL ON ROADWAY	-	724 ^{1K}
TOTAL ON COMPOSITE SECTION	-	804 ^{1K}

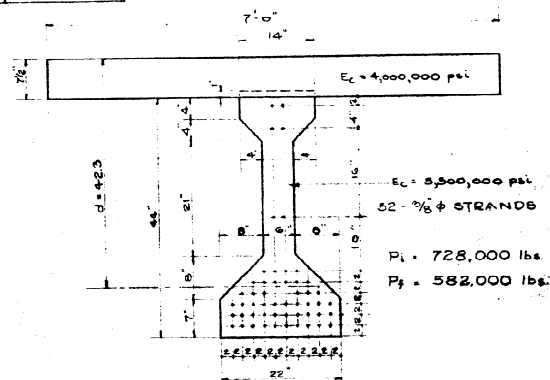
SECTION PROPERTIES :-

PRECAST SECTION

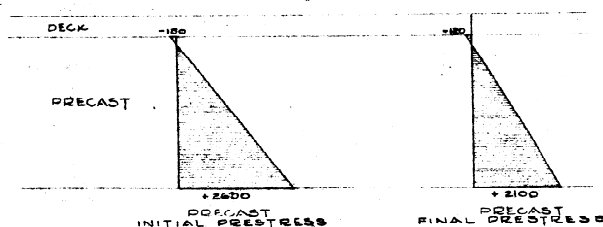
A = 488 in²
 I = 18,000 in⁴
 S = 1008 in³
 R = 8.77 in
 R = 2075 in³

COMPOSITE SECTION

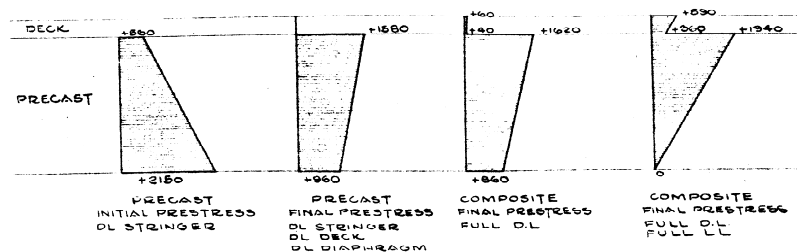
A = 1118 in²
 I = 32,000 in⁴
 S = 321,007 in³
 R = 8155 in³



STRESSES AT END



STRESSES AT $\frac{1}{4}$



SHEAR AT 6'-0" FROM $\frac{1}{4}$ BRG

WORKING LOADS

TOTAL SHEAR ON PRECAST SECTION = 29.0"
 TOTAL SHEAR ON COMPOSITE SECTION = 32.0"

ULTIMATE LOADS

TOTAL SHEAR ON PRECAST SECTION = 29.0"
 ULTIMATE SHEAR ON COMP. SECTION = 147.7"

$v = 242$ psi
 $f = 797$ psi
 $s_t = 127$ psi < $0.03 f'_c$

$v = 748$ psi
 $f = 707$ psi
 $s_t = 448$ psi > $0.03 f'_c$
 $a = 31$

SPACING OF 2-LEG - NO. 4 STIRRUPS = $\frac{42.5 \times 16,000}{\tan 4 \times 176,700} = 6.4$

HORIZONTAL SHEAR @ JOINT BETWEEN STRINGER AND DECK

ULTIMATE SHEAR STRESS = 3040 ^{1K}/IN.

SAFETY FACTORS

CAPACITY = 2920 ^{1K}
 EQUAL TO $1 \times (DL) + 2.15 \times (LL)$
 OR $2.15 (DL + LL)$

CIP SLAB

S = 6.50'
 E = 6.40'
 P = 13.25"
 M = 2.10 in³/ft
 A_s REQ'D = 0.430 in²/ft
 A_s PROVIDED = 0.44 in²/ft

SPECIFICATIONS :-

- DESIGN LOAD A.A.S.H.O. H20-S16-44
- DISTRIBUTION OF LOADS IN ACCORDANCE WITH A.A.S.H.O. SPEC. 1992.
- DESIGN IN ACCORDANCE WITH DFR CRITERIA.
- REINFORCING SHALL BE INTERMEDIATE GRADE DEFORMED BARS $f_y = 40,000$ psi.



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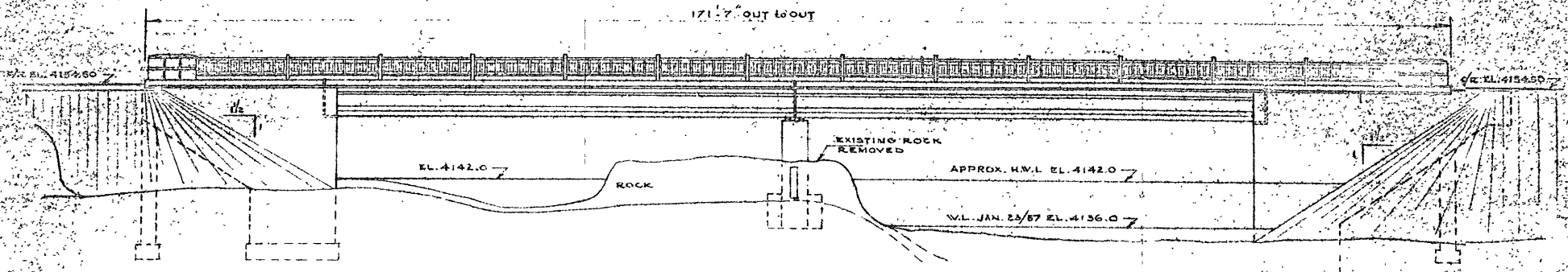
VERMILION RIVER BRIDGE
 MILE 25.9 BANFF - WINDERMERE HIGHWAY
 PRE-TENSIONED ALTERNATIVE
 DESIGN INFORMATION

STRUCTURAL ENGINEERING SERVICES

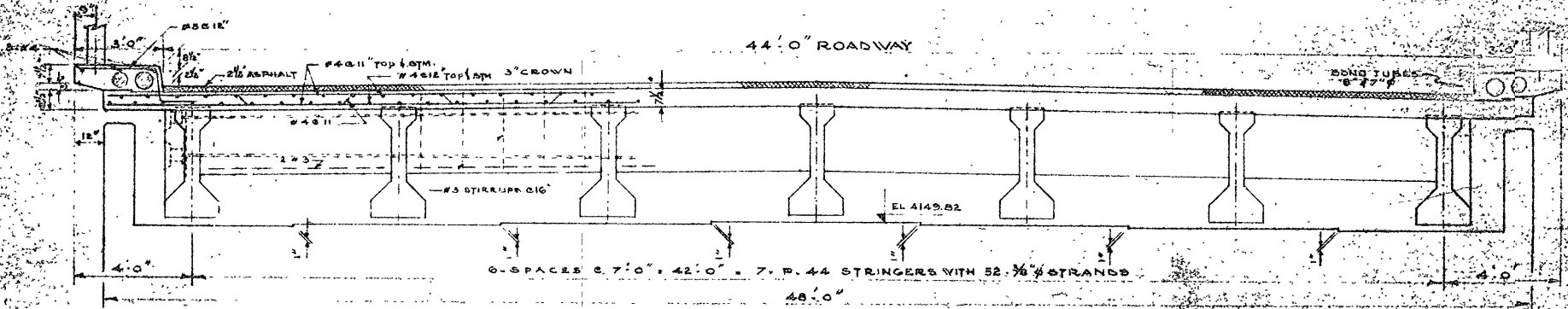
EDMONTON J.S.D. 2120
 A.D.R. 2120-3
 FEB/98

1. MARCH 7, 1998 LOCATION OF STRANDS IN DECK
 NO. DATE DESCRIPTION REVISIONS

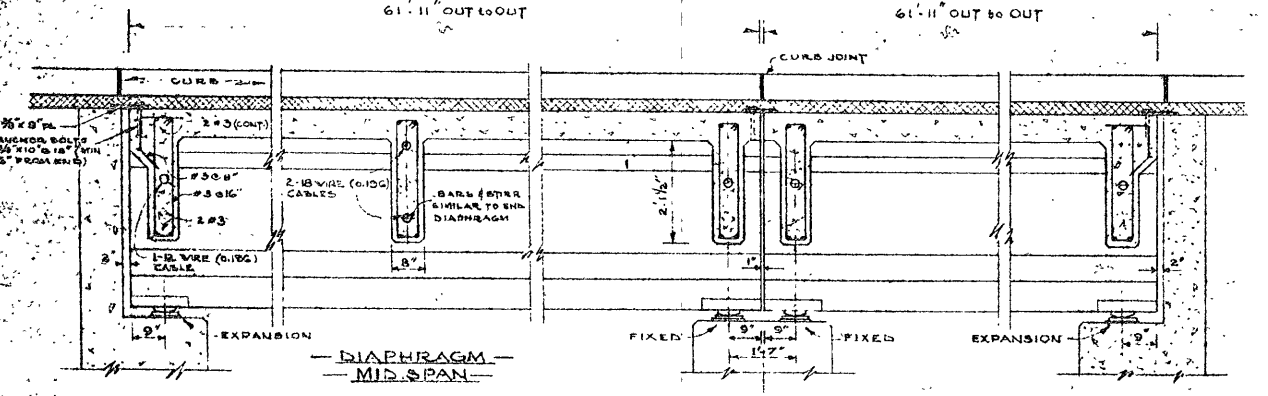
AA001993



ELEVATION
SCALE 1/8" = 1'-0"



CROSS SECTION
SCALE 3/8" = 1'-0"



WEST ABUTMENT
SCALE 1/4" = 1'-0"

PIER

EAST ABUTMENT

GENERAL NOTES:

1. DESIGN LOADING H. 20.0 B. 16' 44'
2. PRESTRESS DESIGN IN ACCORDANCE WITH D.B.R. CRITERIA FOR PRESTRESSED CONCRETE BRIDGE
3. CONCRETE STRENGTH AT 28 DAYS: PRECAST PRESTRESSED CONCRETE - 5500 P.S.I. C.I.P. DECK & DIAPHRAGMS - 4000 P.S.I.
4. PRETENSIONING STRANDS TO BE 1/2" 7 WIRE STRANDS WITH U.T.S. 250,000 P.S.I.
5. DIAPHRAGMS TO BE LATERALLY POST-TENSIONED. INT. DIAPHRAGM 2-1/2" WIRE (0.100) CABLES. EXT. DIAPHRAGM 1-1/2" WIRE (0.100) CABLES



EDMONTON

Precast CONCRETE LTD.

CALGARY

— PRESTRESSED ALTERNATIVE —
TO
— VERMILION RIVER BRIDGE —
BANFF WINDERMERE HIGHWAY MILE 25.9

STRUCTURAL ENGINEERING SERVICES LTD.
CONSULTING ENGINEERS

EDMONTON	SCALE AS SHOWN	FILE NO. 2120
DRAWN BY K.P.	DATE JULY 17, 1967	DWG. NO. 2120 P. 1
CHECKED BY	APP'D.	

15X



**Public Works
Canada**

Western Region

for

**Environment
Canada**

Parks Service

**Travaux publics
Canada**

Région de l'Ouest

pour

**Environnement
Canada**

Service des parcs

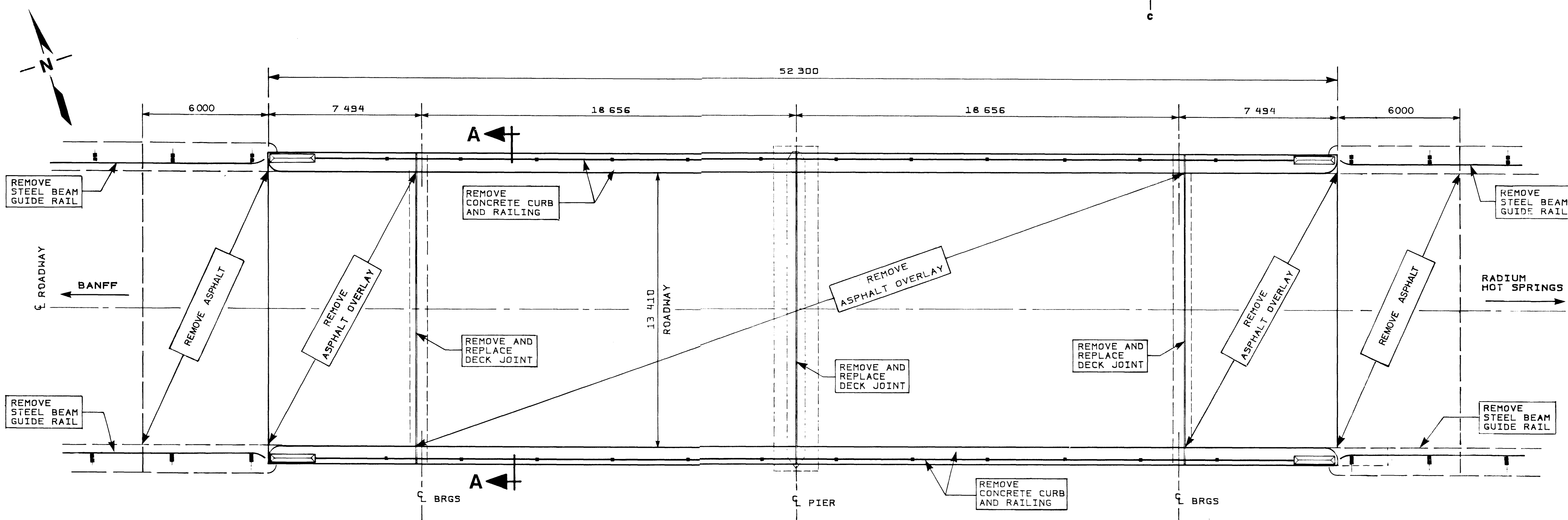
Kootenay National Park

REHABILITATION

VERMILION RIVER BRIDGE, km 41.23

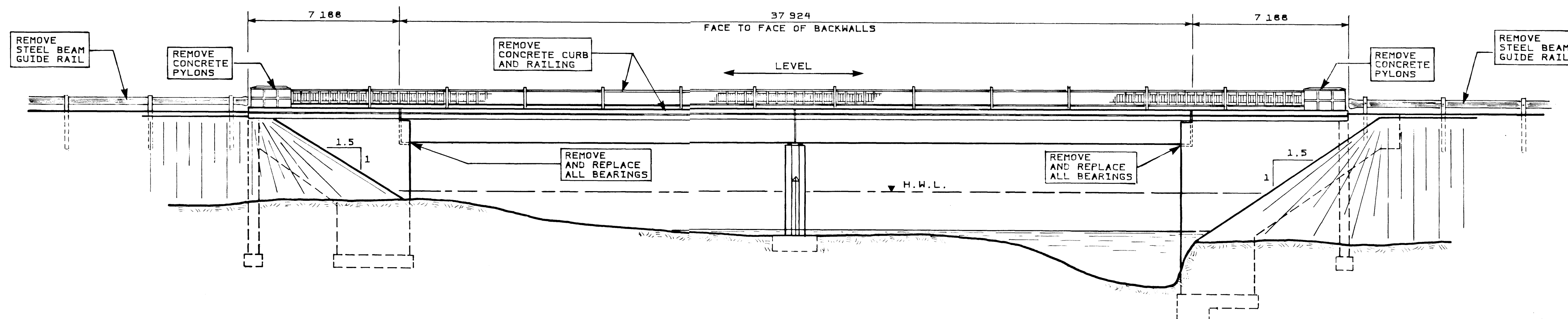
HIGHWAY No. 93A





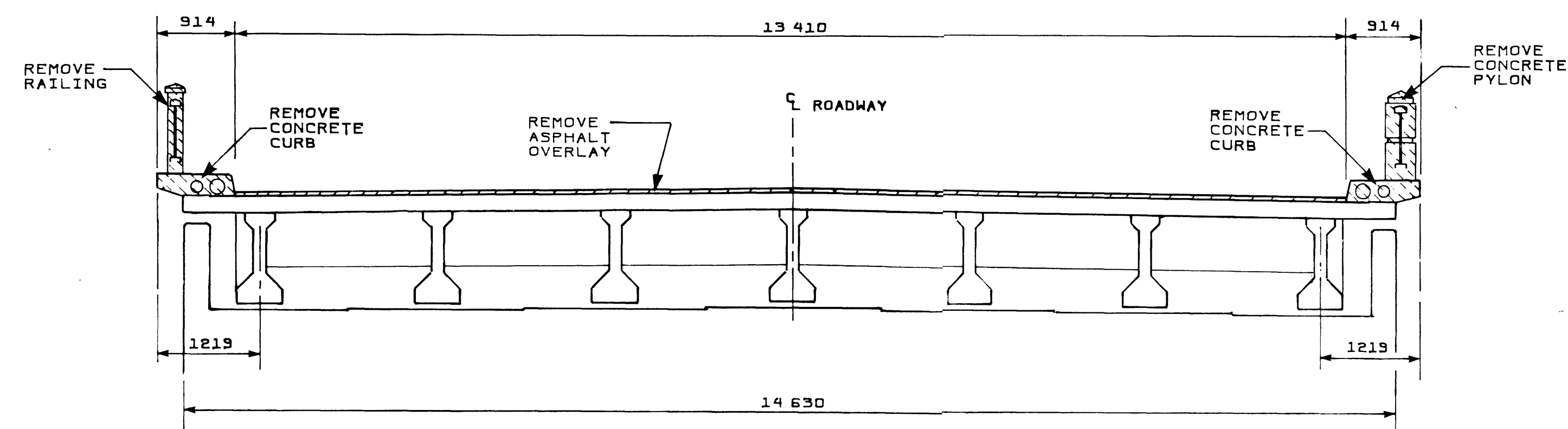
P L A N

SCALE 1 : 125



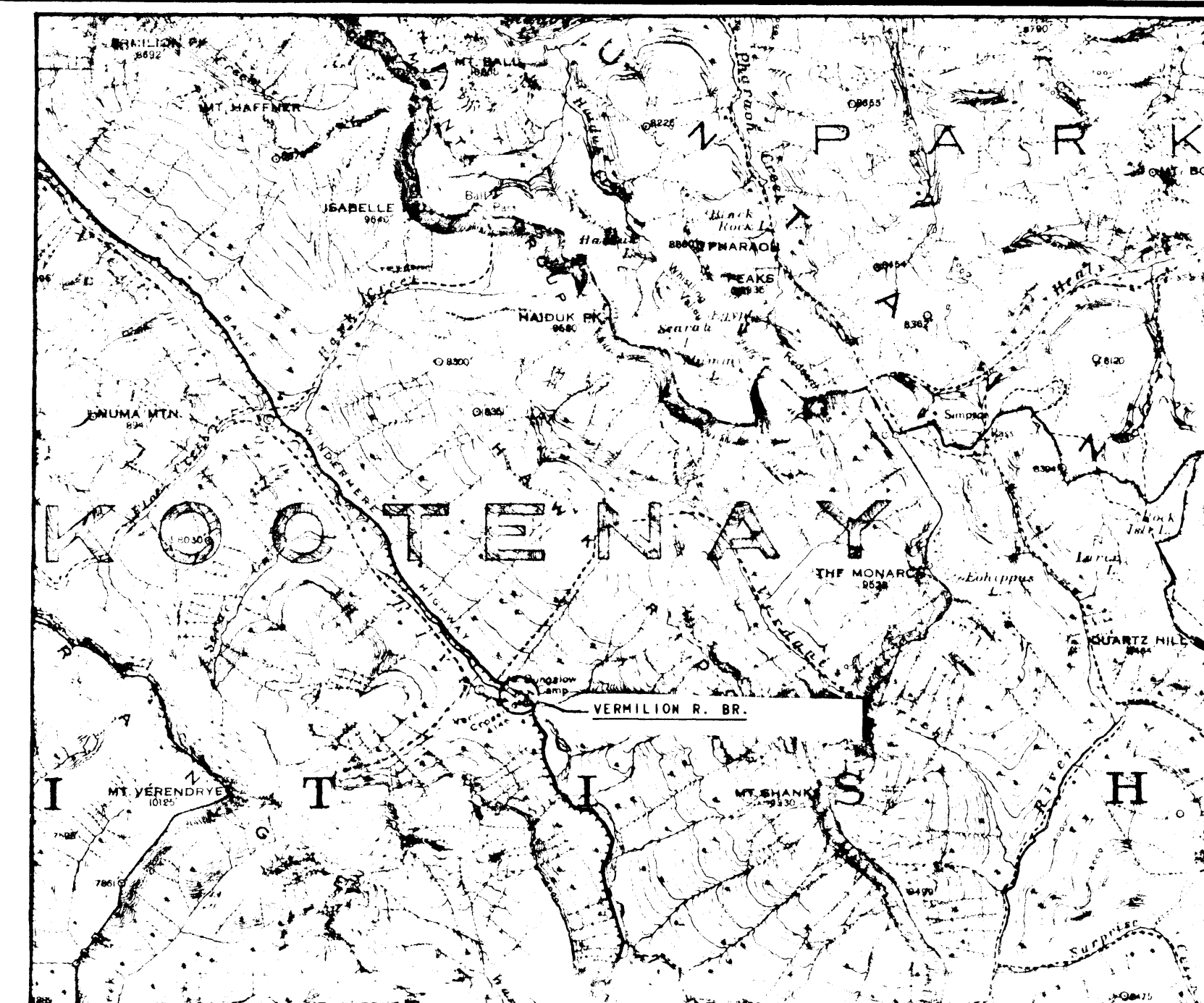
ELEVATION

SCALE 1 : 125



SECTION A-A

SCALE 1 : 50



LOCATION MAP

SCALE 1 : 126,720

NOTES :

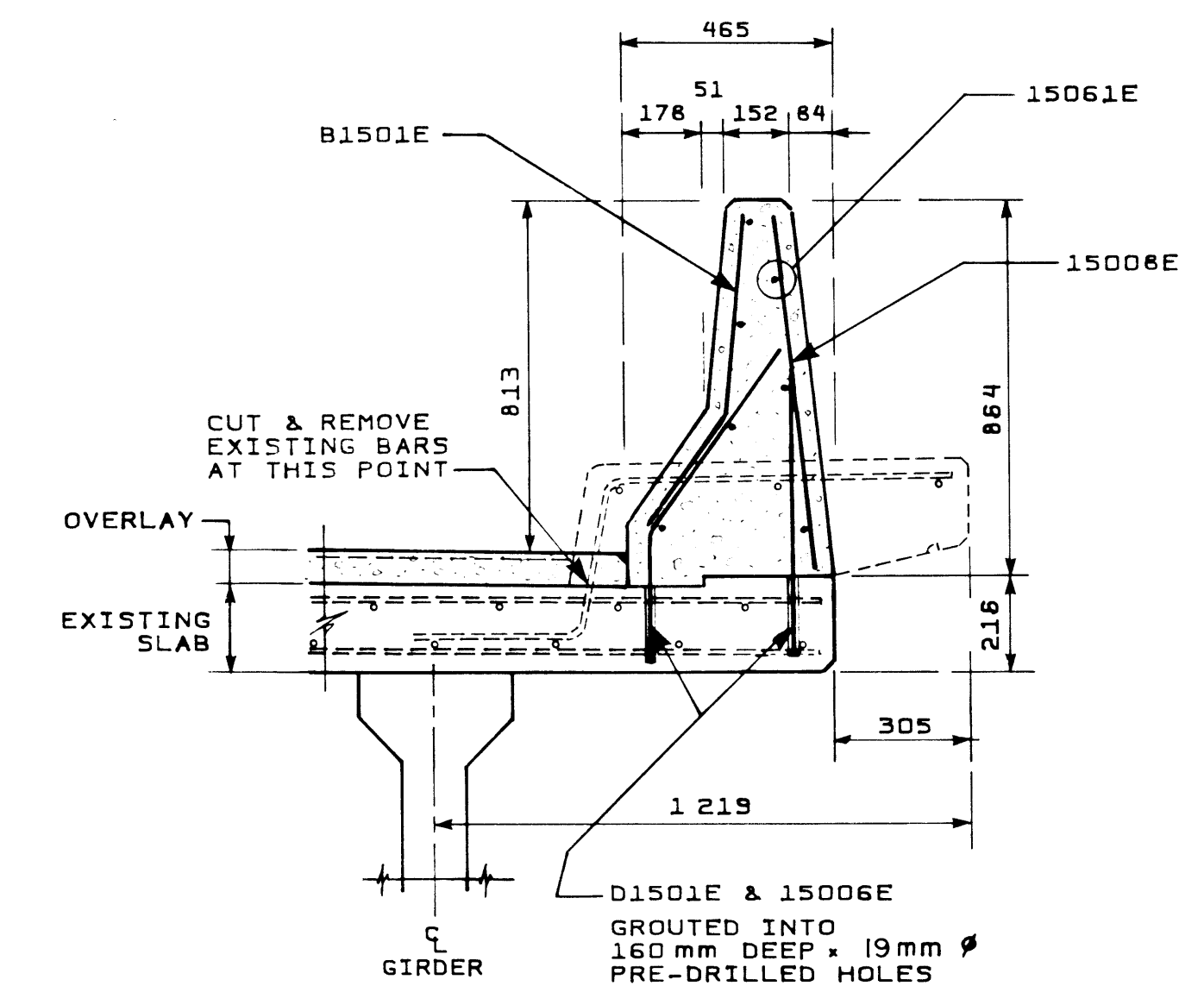
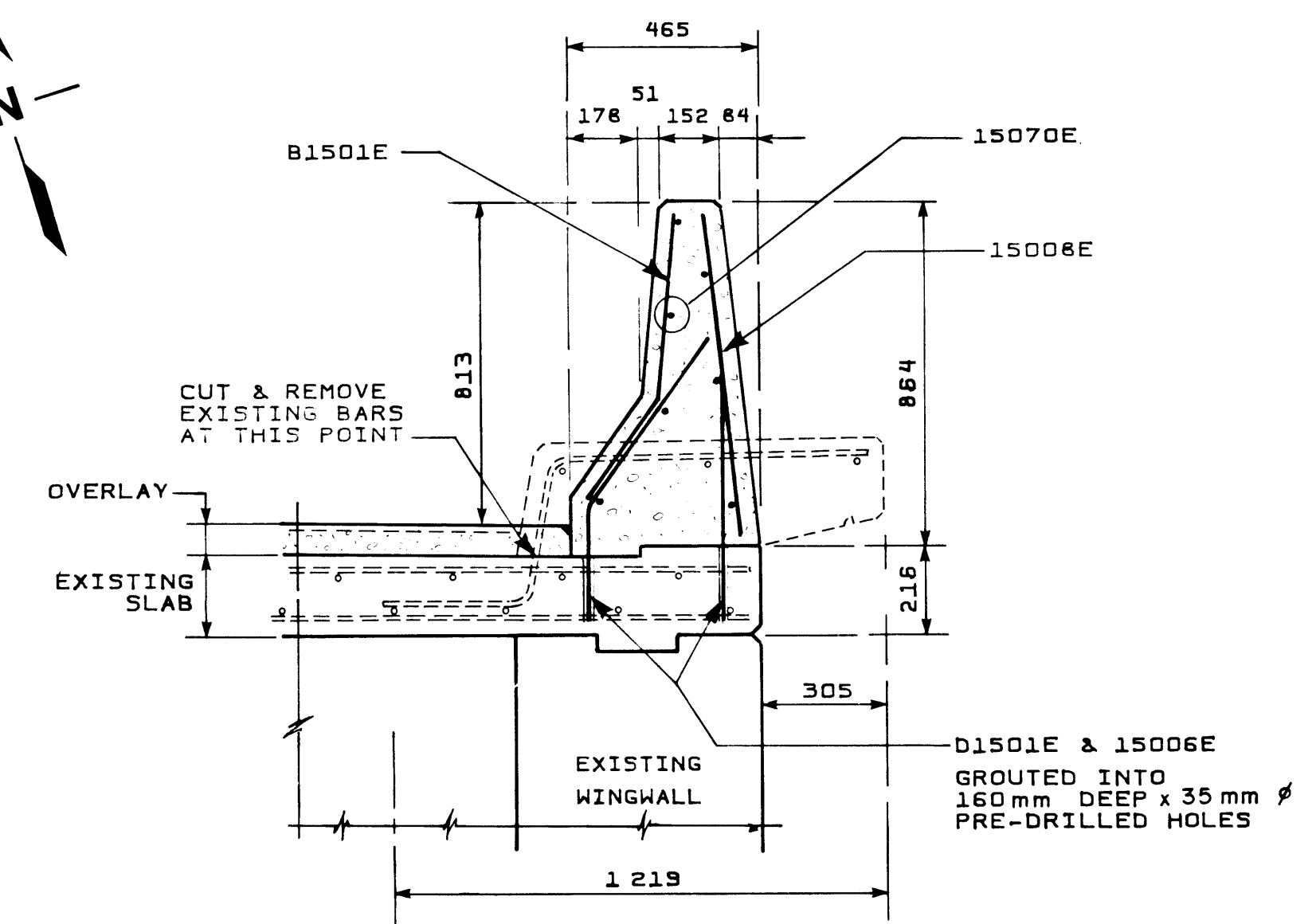
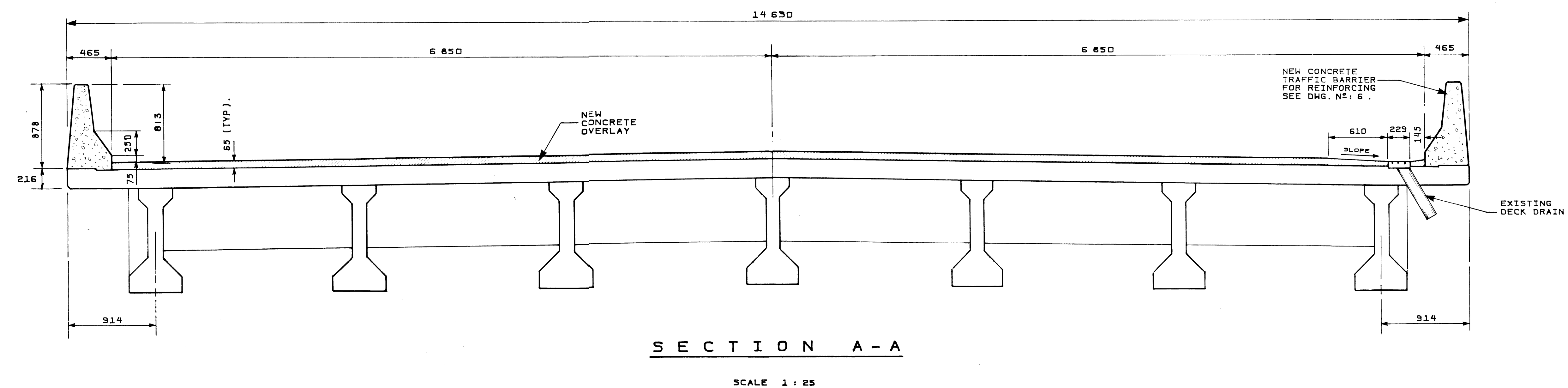
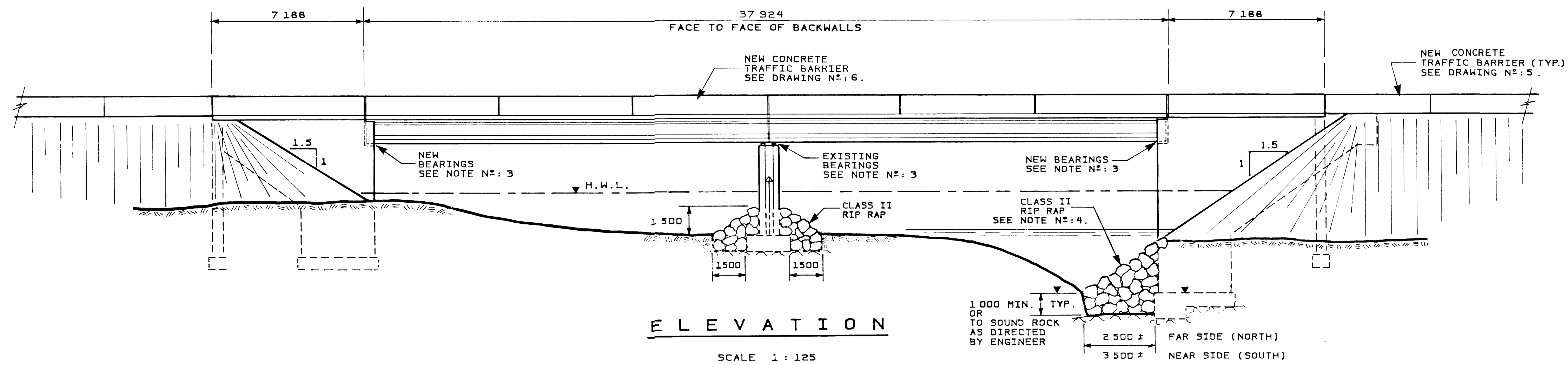
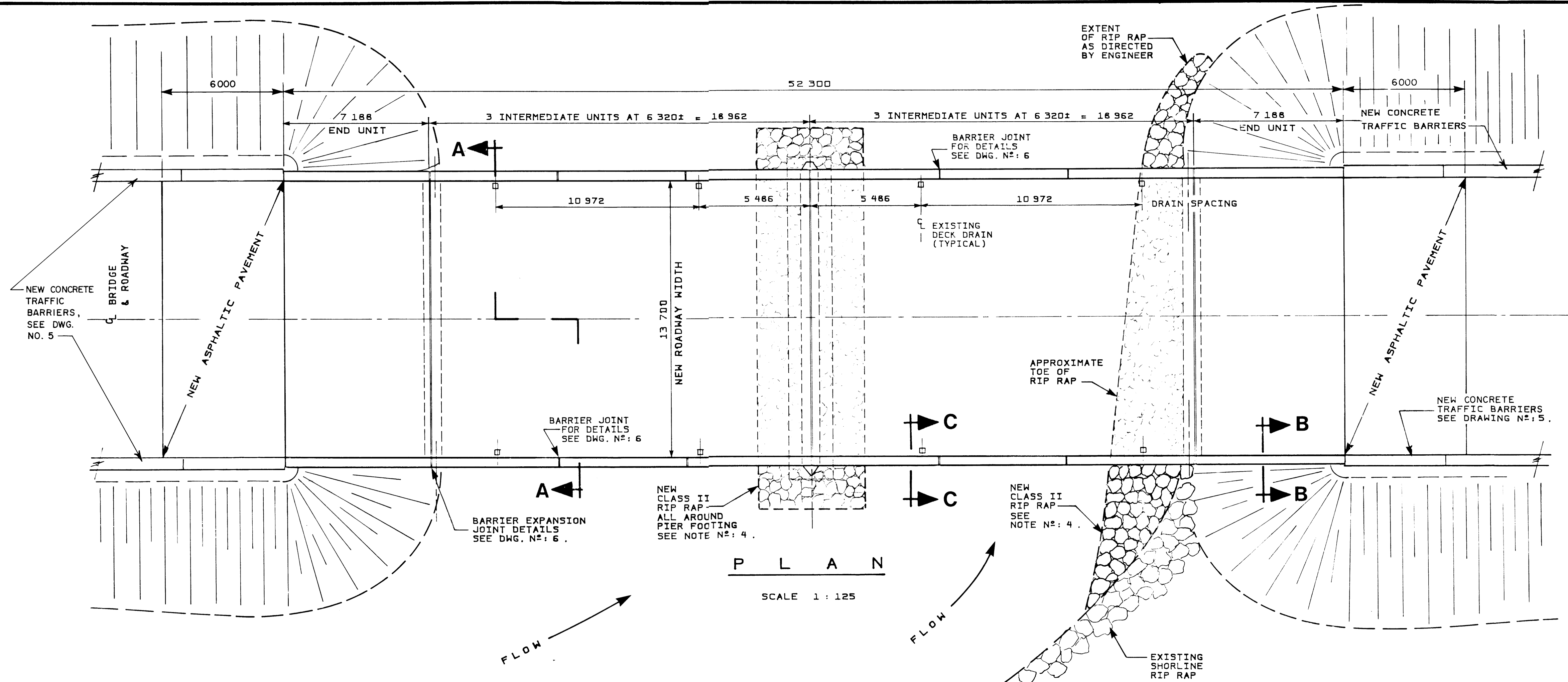
- CONTRACTORS TO VISIT SITE TO VERIFY CONDITIONS AND SURVEY EXTEND OF WORK PRIOR TO SUBMITTING BID.
- CONTRACTORS TO VISIT SITE TO VERIFY ALL DIMENSIONS PRIOR TO PROCEEDING WITH WORK. ANY DISCREPANCIES ARE TO BE REPORTED DIRECTLY TO THE ENGINEER, WHO WILL THEN INSTRUCT THE GENERAL CONTRACTOR ON HIS NEXT COURSE OF ACTION. FAILURE TO REPORT ANY DISCREPANCIES WILL IMPLY THAT ALL WORK CONFORMS WITH THE DESIGN DOCUMENTS AND ANY COSTS RESULTING WILL BE INCURRED WHOLELY BY THE GENERAL CONTRACTOR.
- THE SPECIFICATIONS MARKED "SPECIFICATIONS" ARE AN INTEGRAL PART OF THIS CONTRACT AND ARE TO BE READ IN CONJUNCTION WITH THE DRAWINGS. THE WORK SHALL BE PERFORMED ACCORDINGLY.
- THE EXISTING DRAWINGS ARE AVAILABLE UPON REQUEST BY THE GENERAL CONTRACTOR FROM THE ENGINEER. NOTE THAT THE EXISTING DRAWINGS DO NOT NECESSARILY DESCRIBE THE AS-BUILT CONDITIONS. HENCE, ITEMS # 1 AND # 2 MUST BE FOLLOWED.

GENERAL NOTES :

- SPECIFICATIONS : PROJECT SPECIFICATIONS (HEREINAFTER THESE WILL BE REFERRED TO AS SPEC'S), AASHTO SPECIFICATIONS-1977, CSA STANDARDS AND AS NOTED.
- DESIGN CODE : CSA CAN3-S6-88 UNLESS NOTED OTHERWISE.
- UNITS : 1. CHAINAGES AND ELEVATIONS IN m.
2. DIMENSIONS IN mm
3. AS NOTED.
- STRUCTURAL STEEL : TO CSA CAN3-G40.21-M81, GRADE 300H UNLESS NOTED OTHERWISE.
- CONCRETE STRENGTH AT 28 DAYS : SEE SPEC'S.
1. BARRIERS : 30 MPa MINIMUM.
2. FIBRE REINFORCED CONCRETE OVERLAY : 30 MPa MINIMUM.
- REINFORCING STEEL : TO CSA G30.12-M1977 OR G30.16-M1977, GRADE 400 DEFORMED BARS. SEE SPEC'S.
- EPOXY COATED REINFORCING BARS (DESIGNATED XXXE) SEE SPEC'S.
- CONCRETE COVER FOR REINFORCING BARS : 75 mm UNLESS NOTED OTHERWISE.
- CHAMFER EXPOSED EDGES 20mm UNLESS NOTED OTHERWISE.
- CONCRETE FINISH : SEE SPEC'S.
- HOT DIP GALVANIZING : TO CSA G164-M1981, MINIMUM THICKNESS 90µm AFTER FABRICATION.
- WELDING : TO CSA W59-1982, UNLESS NOTED OTHERWISE, SEE SPEC'S.

LIST OF DRAWINGS

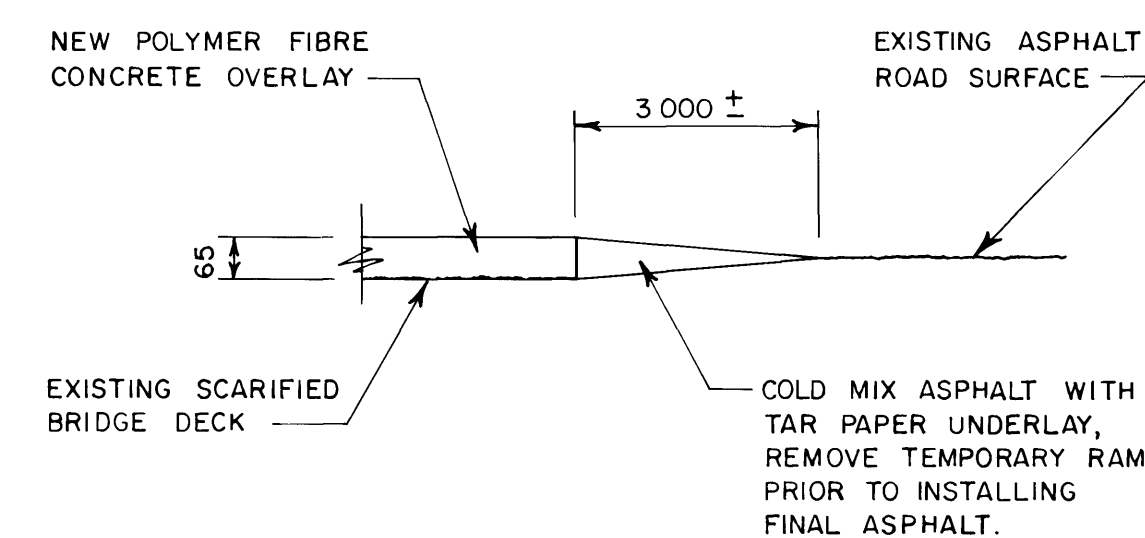
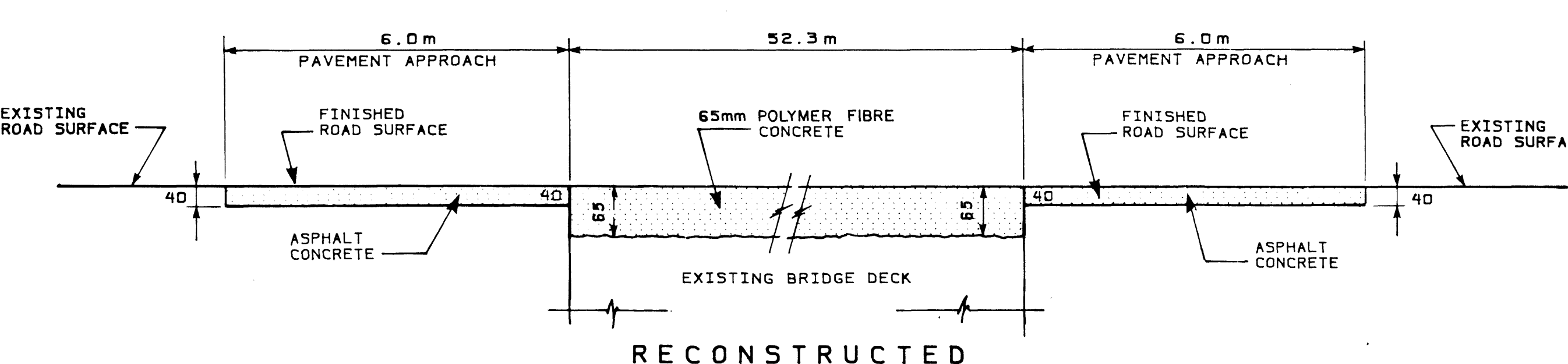
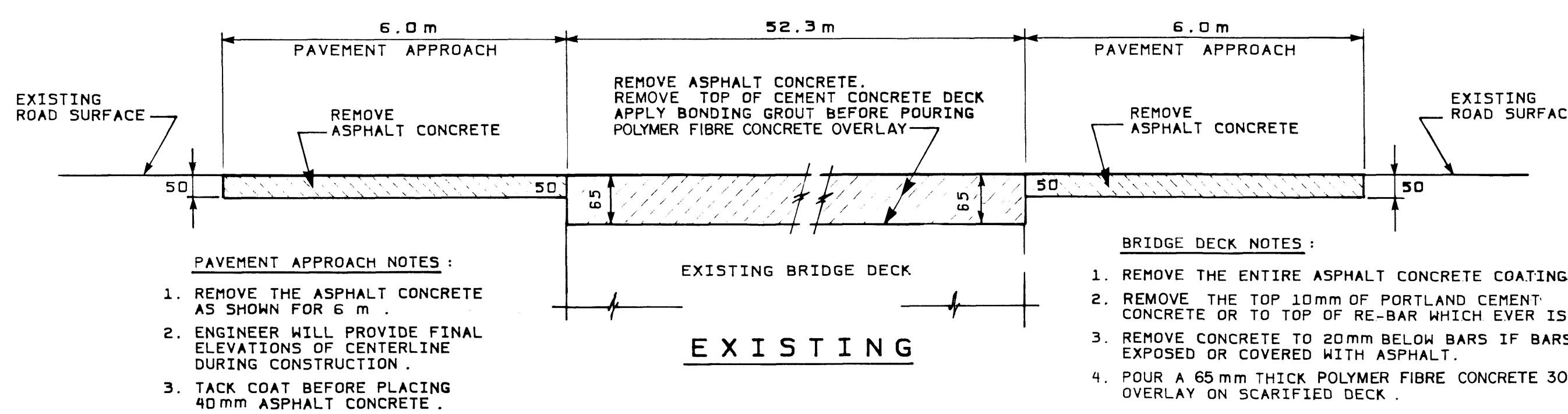
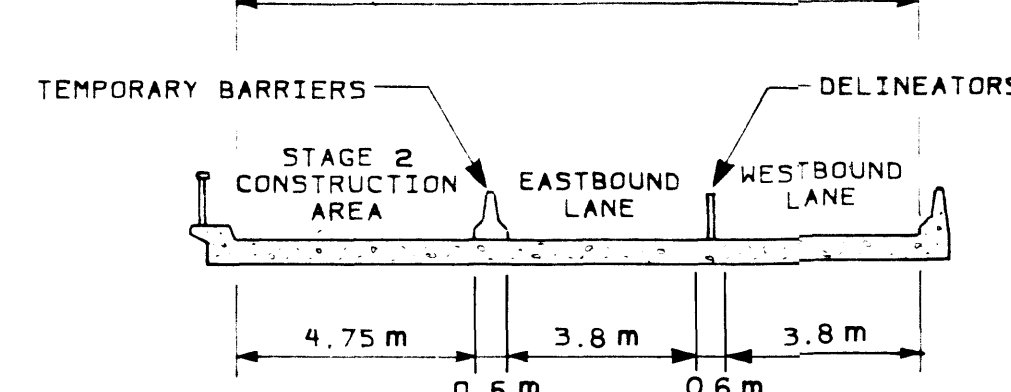
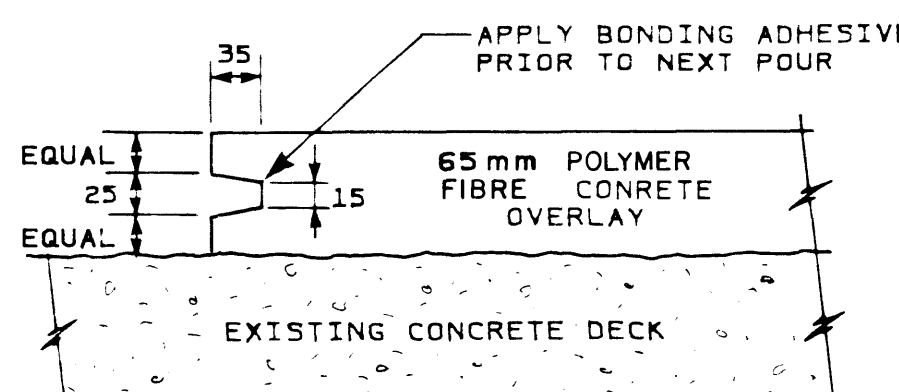
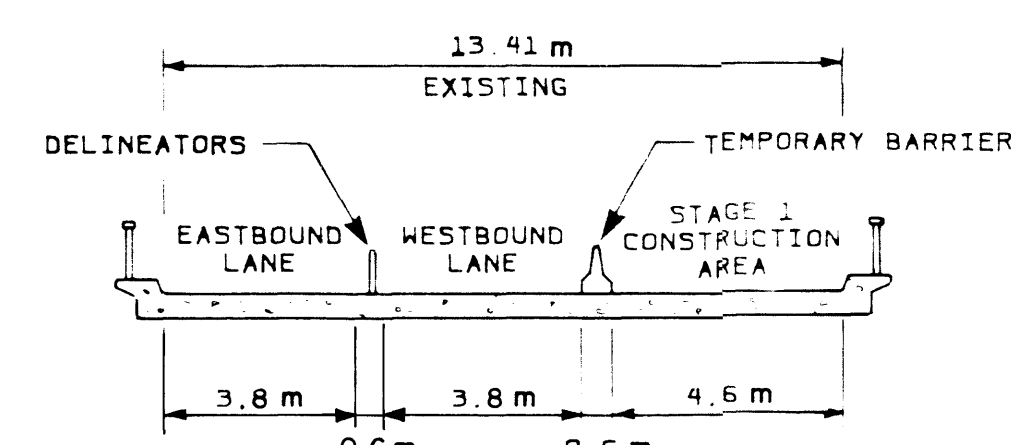
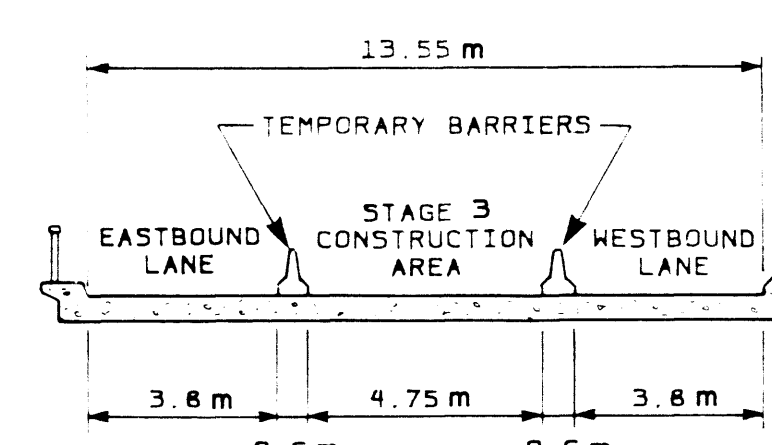
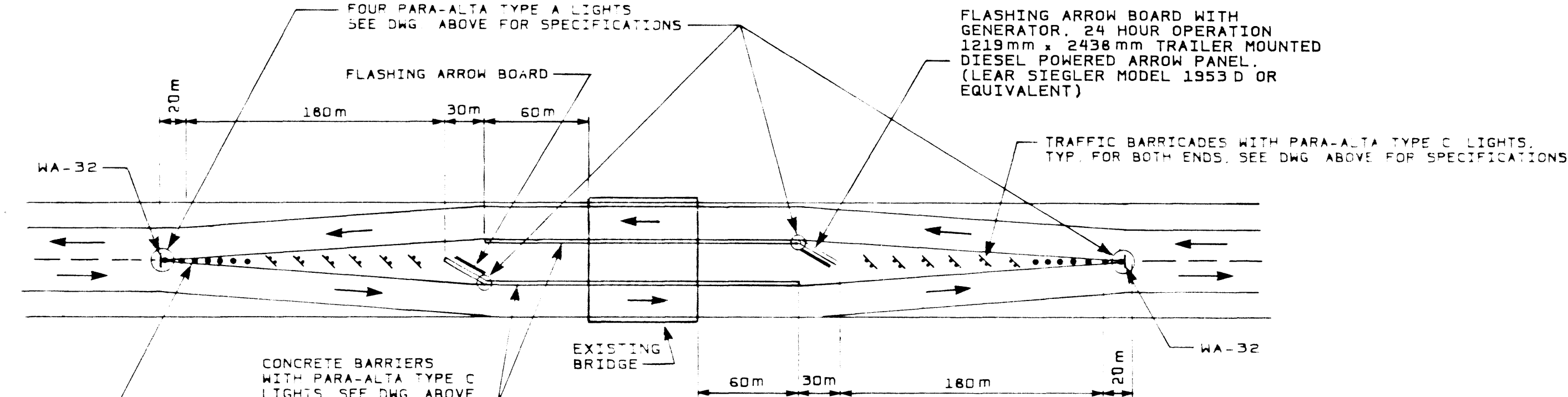
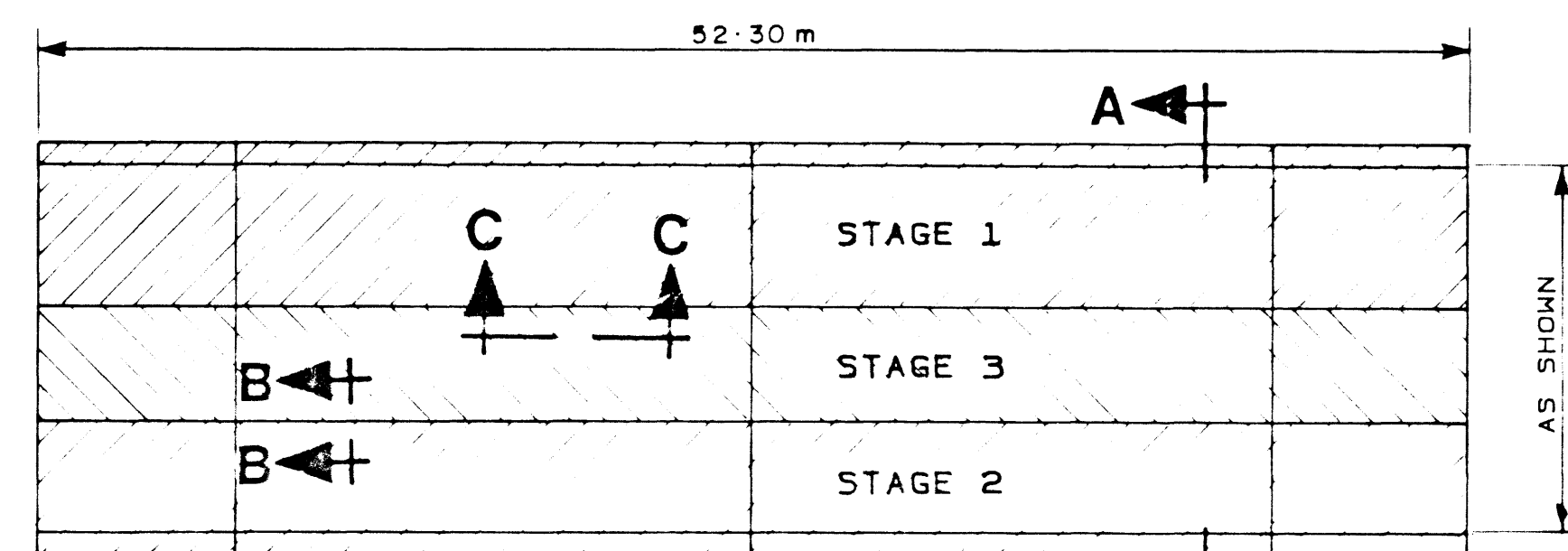
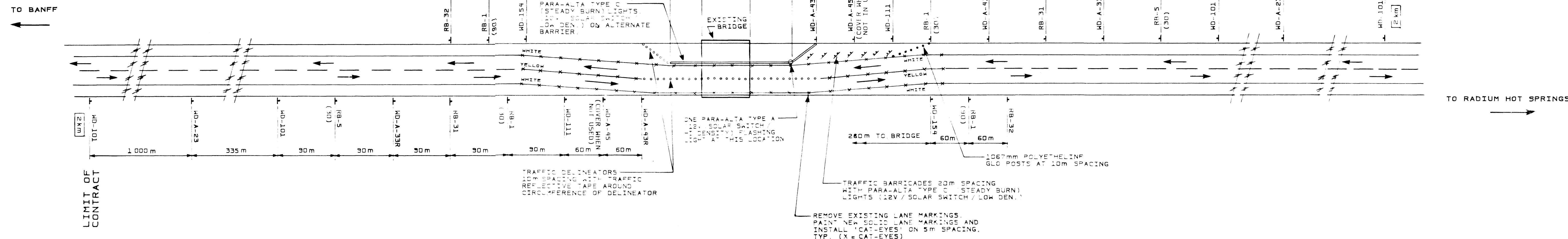
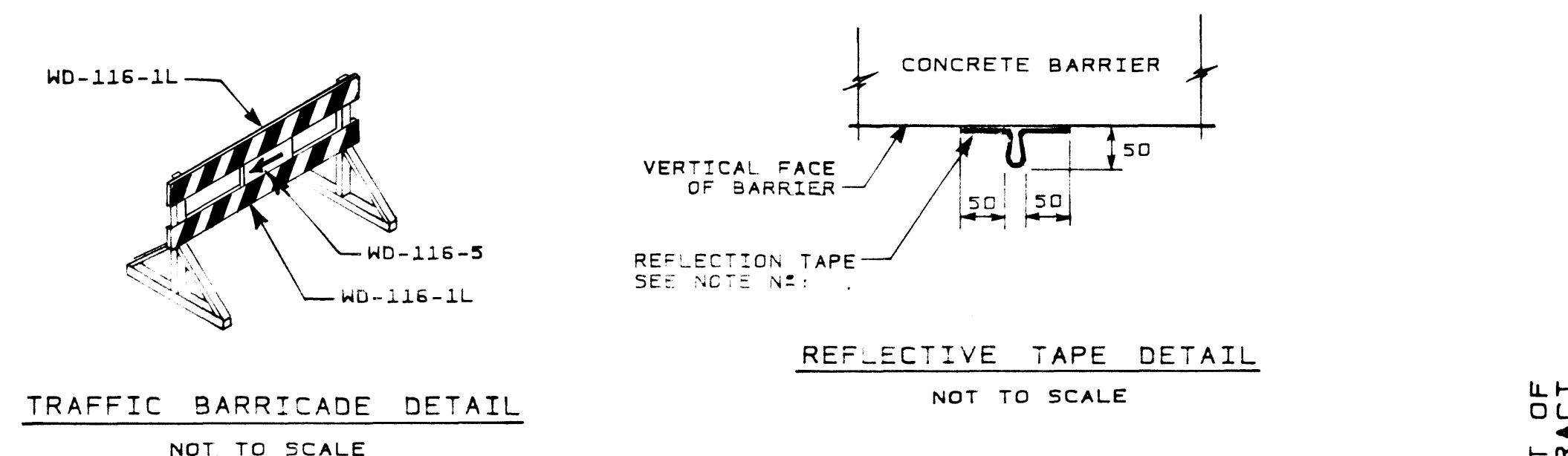
- GENERAL LAYOUT - EXISTING
- NEW GENERAL LAYOUT
- TRAFFIC CONTROL AND DECK RECONSTRUCTION DETAILS
- JOINT AND BEARING DETAILS
- PRECAST CONCRETE APPROACH BARRIER
- TRAFFIC BARRIER AND REINFORCING SCHEDULE



NOTES:

1. FOR GENERAL NOTES SEE DWG. N°: 1.
2. SCALE AS SHOWN.
3. SANDBLAST CLEAN AND REPAINT EXISTING EXPOSED METAL SURFACES AT ABUTMENTS AND PIER BEARINGS.
4. ESTIMATED QUANTITY OF RIP RAP = 250 m³.

NUMBER	DESCRIPTION OR MESSAGE
WD-101	CONSTRUCTION AHEAD
WD-A-23	ROADWAY NARROWS
RB-5	MAX. SPEED AHEAD (30)
RB-31	DO NOT PASS
WD-A-41	ROAD WORK
RB-1	MAX. (30)
WD-111	BE PREPARED TO STOP
WD-A-43L	DIVERSION LEFT
WD-A-43R	DIVERSION RIGHT
WD-154	END CONSTRUCTION
WD-A-45	FLAGPERSON (WHEN NECESSARY)
WD-A-23	ROADWAY WIDENS (SIGN REVERSED)
RB-32	PASSING PERMITTED
WD-A-33L	LEFT LANE ENDS
WD-A-33R	RIGHT LANE ENDS
WA-32	TEMPORARY DIVIDED HIGHWAY



NOTES:
1. TEMPORARY RAMP TO BE USED ON ALL STAGES REQUIRING TRAFFIC PRIOR TO INSTALLING FINAL ASPHALT, TYPICAL FOR BOTH ENDS OF BRIDGE.

TEMPORARY RAMP DETAIL
NOT TO SCALE

NOTES:
1. FOR GENERAL NOTES SEE DRAWING N° 1.
2. SCALE AS SHOWN.

DECK TOP RE-CONSTRUCTION
NOT TO SCALE

Designed by
Conçu par K. 5000

Checked by
Examiné par

Drawn by
Dessiné par H. J. BRONEDER

Checked by
Examiné par K. 5000

Approved by
Approuvé par

Manager - Bridge Services
Manager - Gestionnaire des Ponts

project
projet

VERMILION RIVER BRIDGE

BANFF WINDERMERE HWY.

KILOMETRE 41.23

KOOTENAY NATIONAL PARK

BRITISH COLUMBIA

drawing
dessin

TRAFFIC CONTROL AND
DECK RECONSTRUCTION

DETAILS

AA001988

1990 RENOVATION

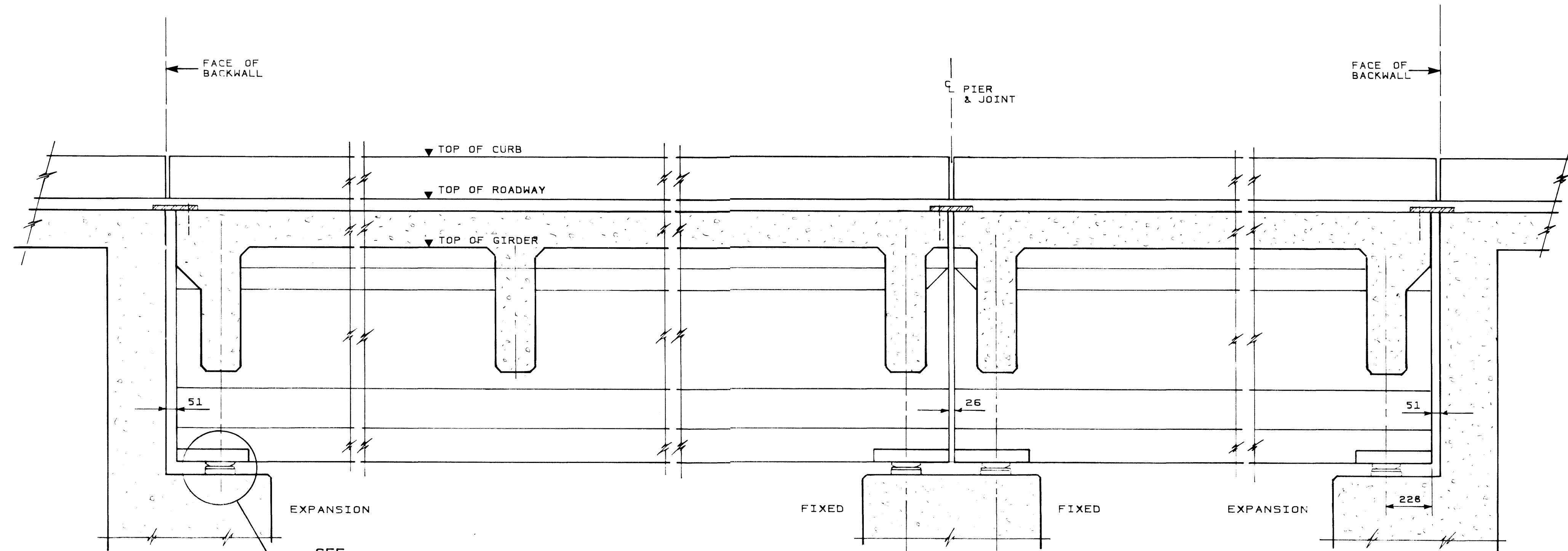
project no
no du projet

669046

drawing no
dessin no

3 OF 6

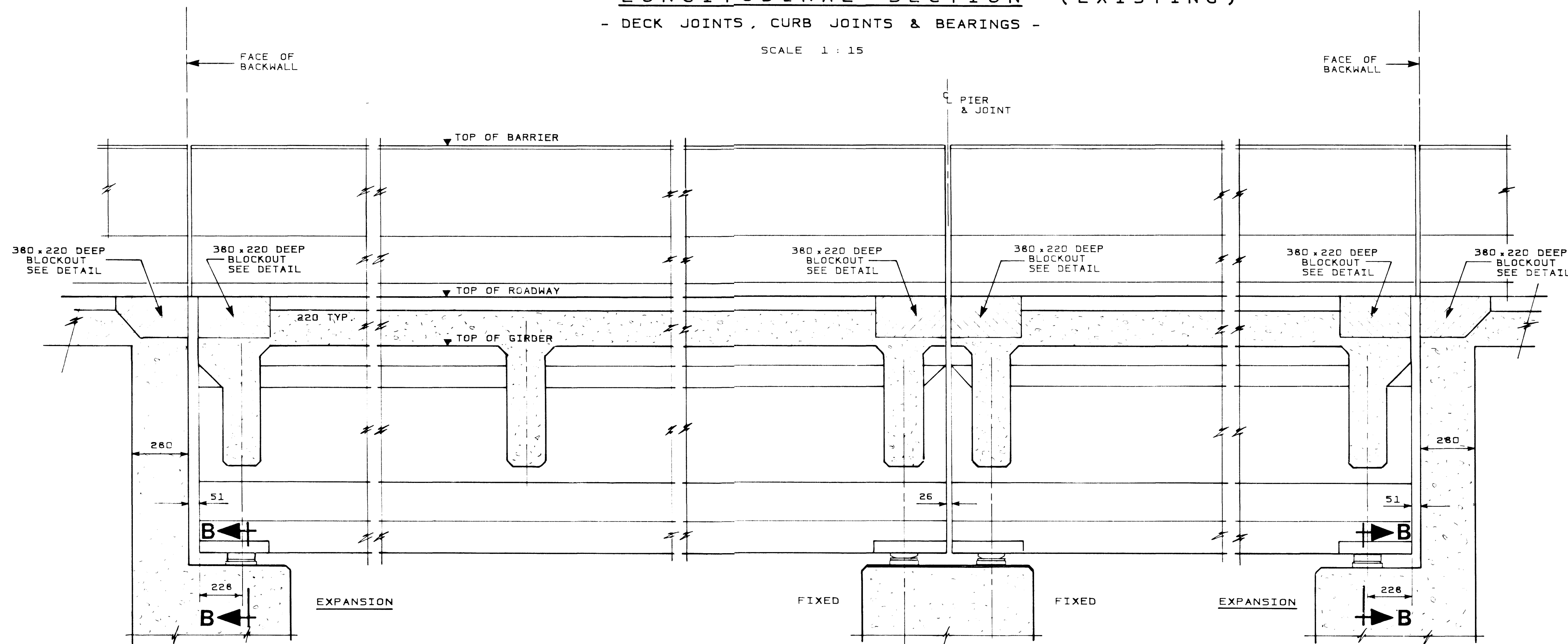
Date
69/10/23
90/03/19
90/03/22
90/04/06



LONGITUDINAL SECTION (EXISTING)

- DECK JOINTS, CURB JOINTS & BEARINGS -

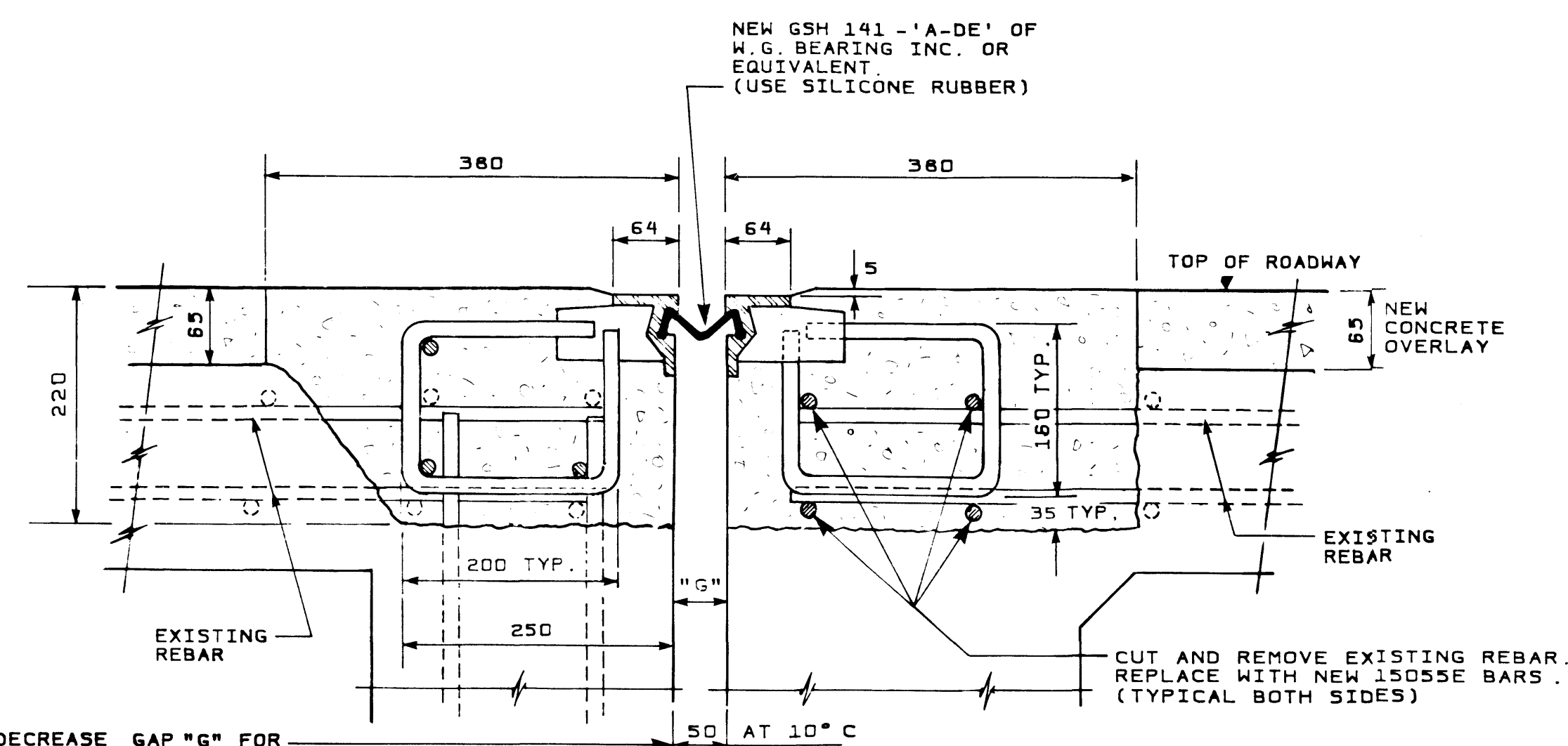
SCALE 1:15



LONGITUDINAL SECTION (NEW)

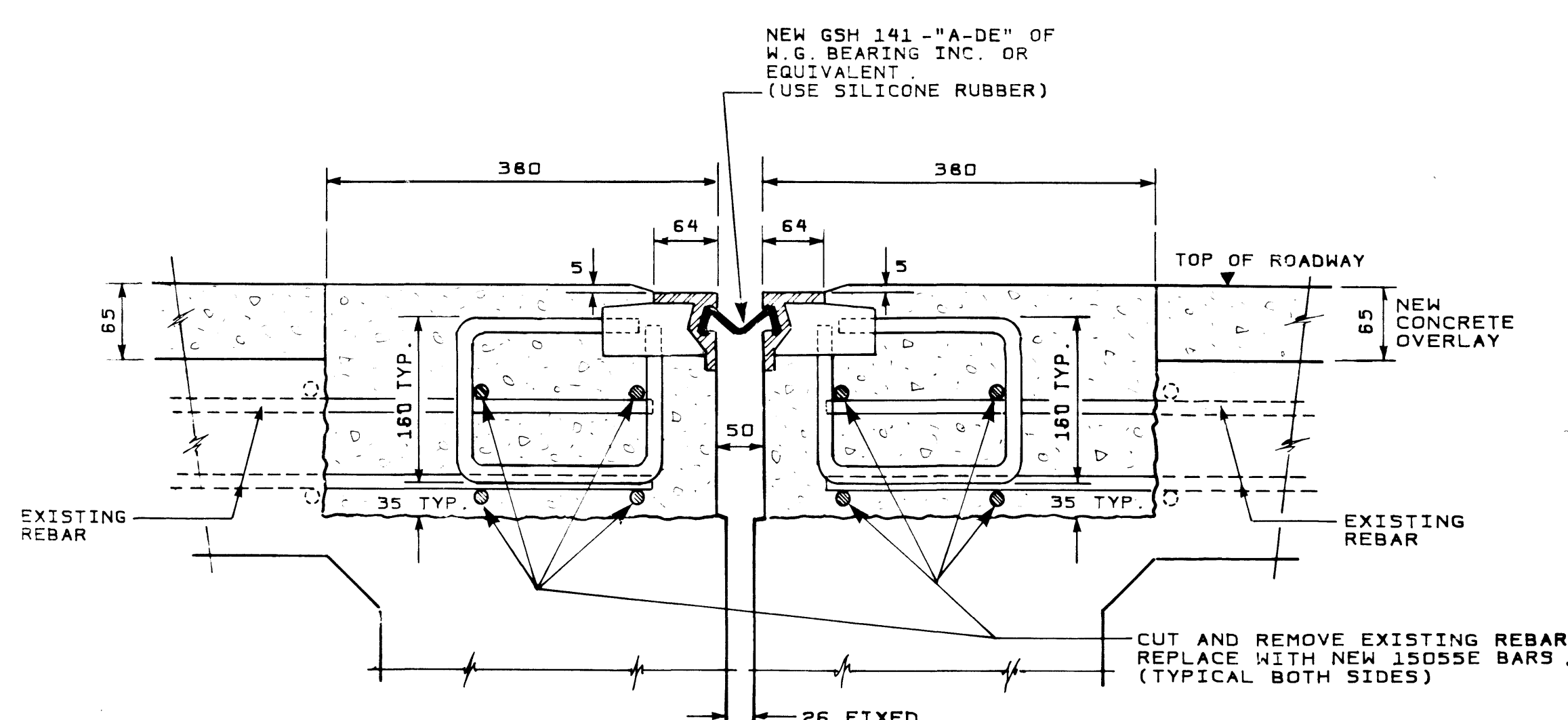
- DECK JOINTS, BARRIER JOINTS & BEARINGS -

SCALE 1:15



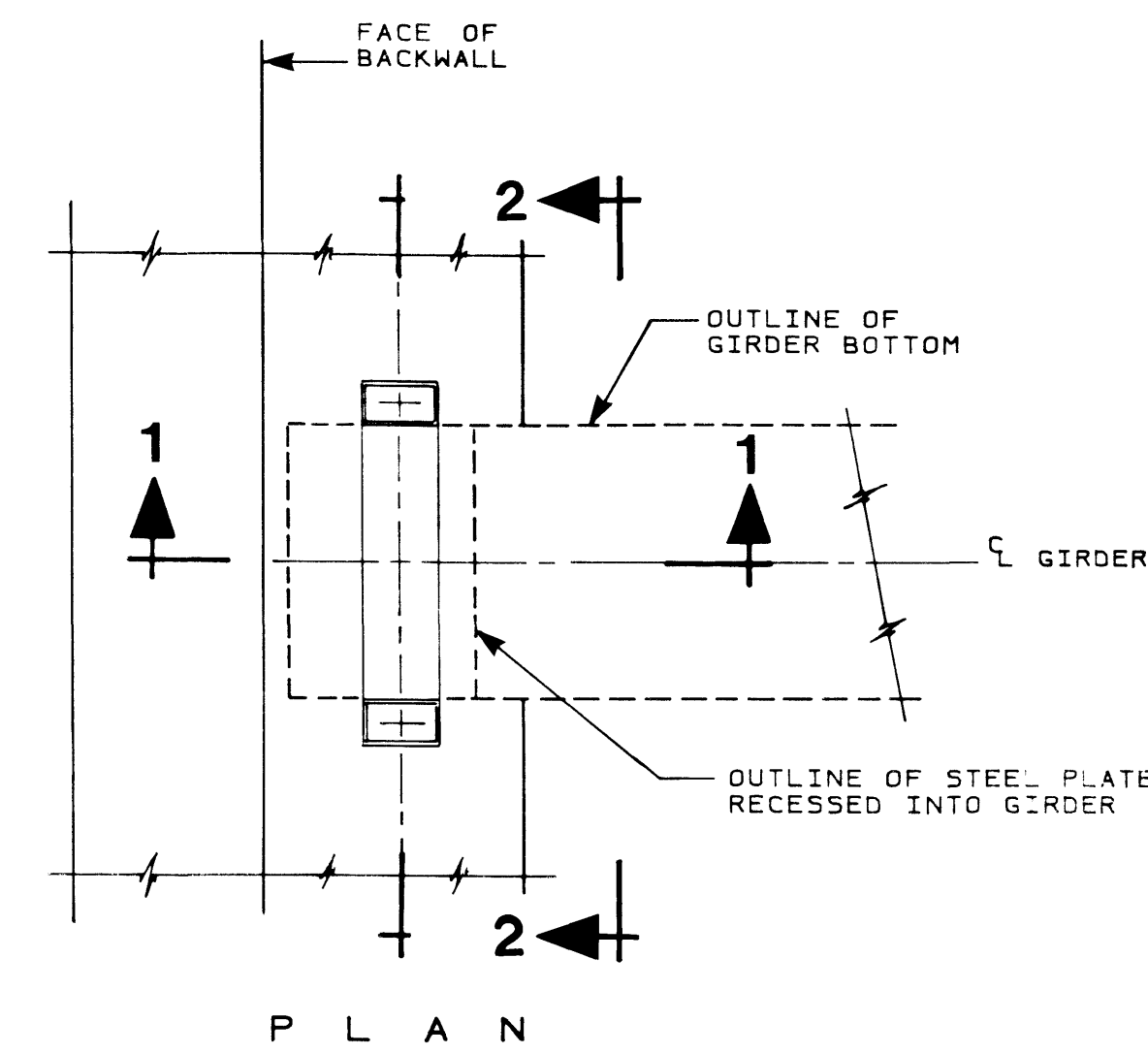
NEW EXPANSION JOINTS (AT ABUTMENTS)

SCALE 1:5

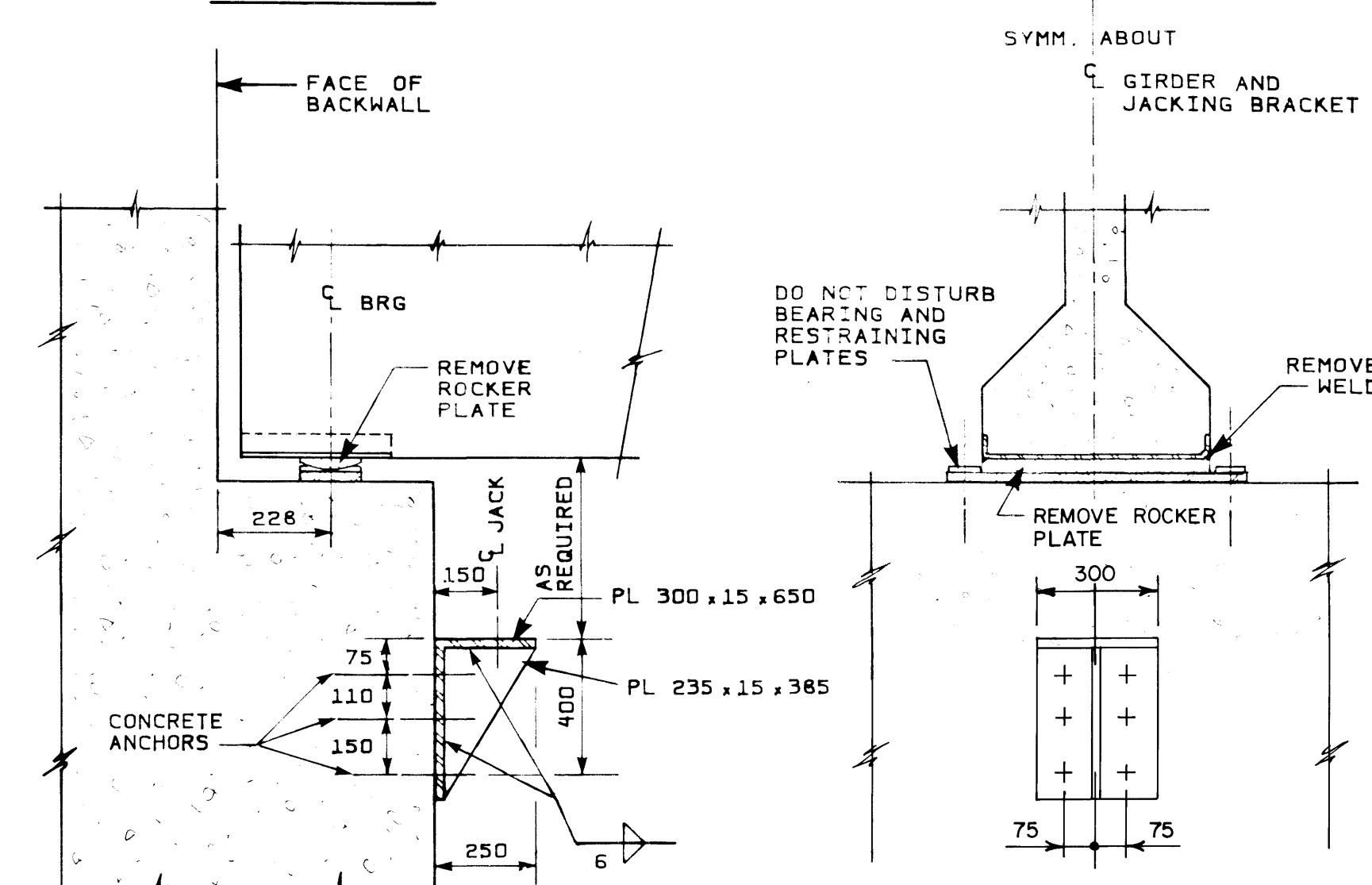


NEW FIXED JOINT (AT PIER)

SCALE 1:5



PLAN



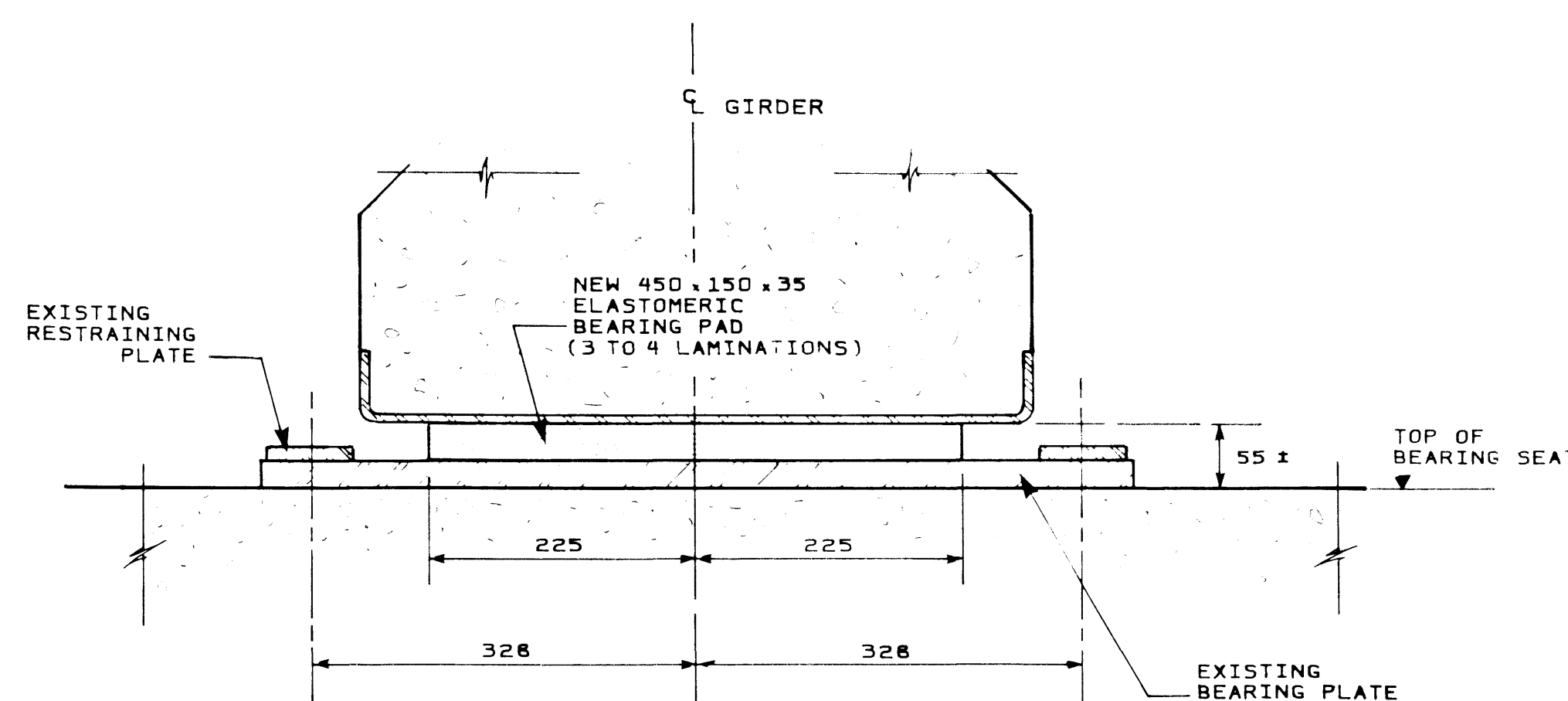
SECTION 1-1

SECTION 2-2

BEARING DETAIL

SEE NOTE N° 3.

SCALE 1:15



DETAIL SECTION B-B

SCALE 1:5

NOTES:

- FOR GENERAL NOTES SEE DRAWING N° 1.
- SCALE AS NOTED.
- JACKING:
 - STEEL FOR JACKING BRACKETS: TO CSA G40.21, GRADE 300W.
 - JACKING BRACKETS MAY BE REUSED.
 - CONCRETE ANCHORS TO BE HILTI HVA M24 x 290 ANCHORS OR APPROVED EQUIVALENT.
 - DO JACKING OF SEVEN BEAMS AT ONE SPAN END SIMULTANEOUSLY.
 - JACKING LOAD PER BEAM: DEAD LOAD = 30 TONNES, LIVE LOAD = 20 TONNES, IMPACT = 5 TONNES.
- CONTRACTOR TO ARRANGE TRAFFIC CONTROL DURING JACKING OPERATION.

Designed by / Conçu par K. SOOD

Checked by / Examiné par [Signature]

Drawn by / Dessiné par H. J. BRONEDER

Checked by / Examiné par K. SOOD

Approved by / Approuvé par [Signature]

MANAGER - BRIDGE SERVICES / MANAGER - GESTIONNAIRE DES PONTS

project / projet

VERMILION RIVER BRIDGE

BANFF WINDERMERE HWY.

KILOMETRE 41.23

KOOTENAY NATIONAL PARK

BRITISH COLUMBIA

drawing / dessin

JOINT AND BEARING DETAILS

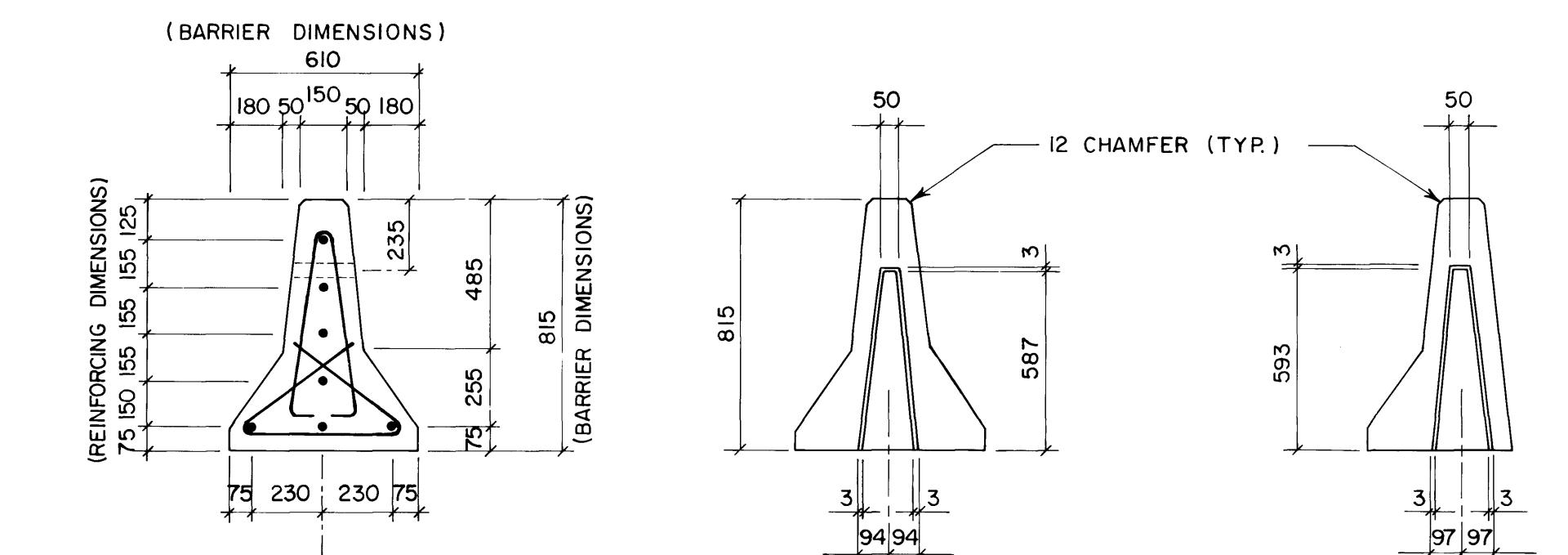
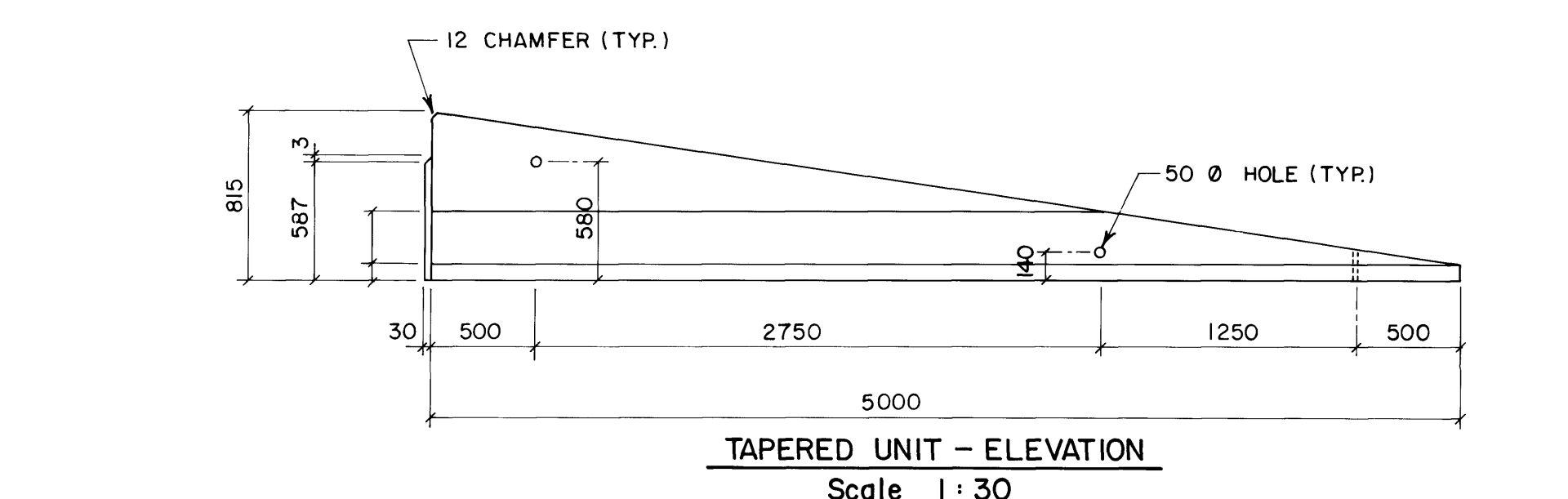
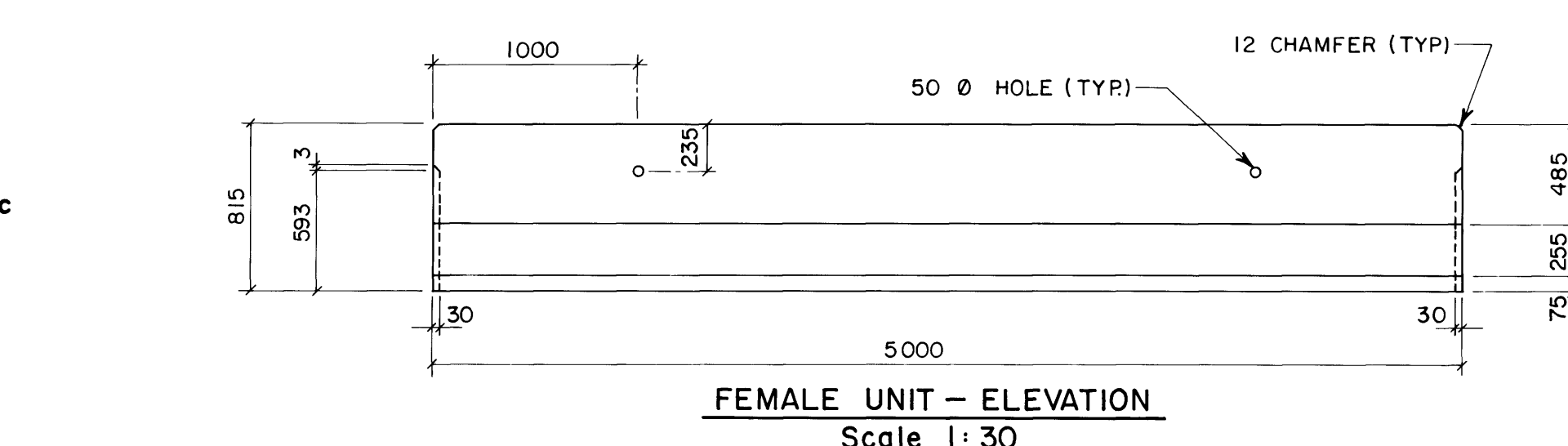
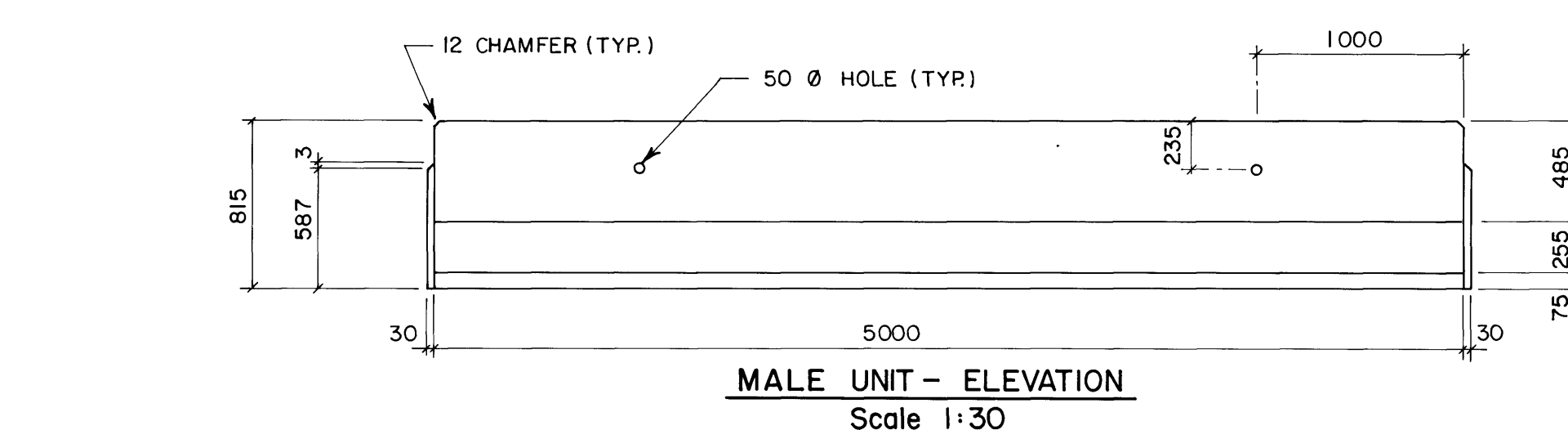
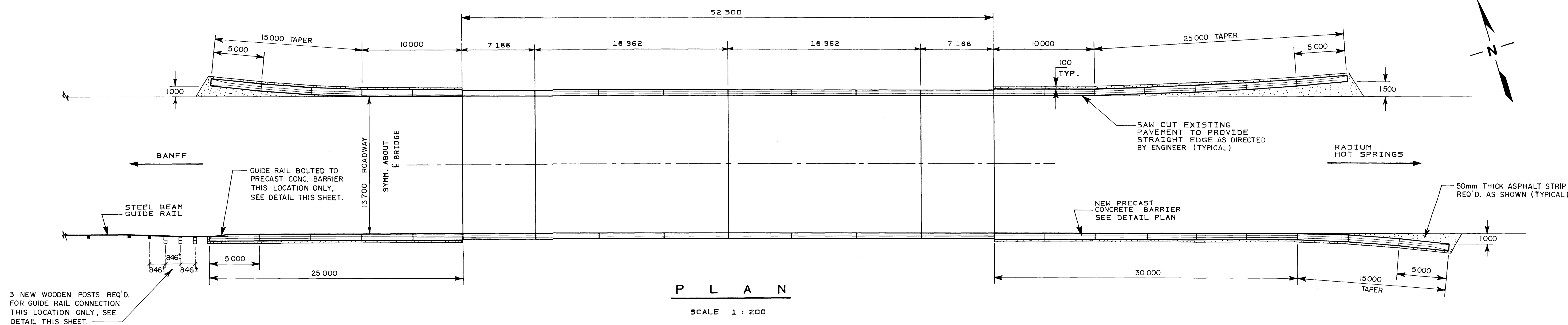
AA001989

1990 RENOVATION

project no / no du projet 669046

drawing no / dessin no 4 OF 6

Date
90/02/01
90/03/22
90/03/27
90/04/05

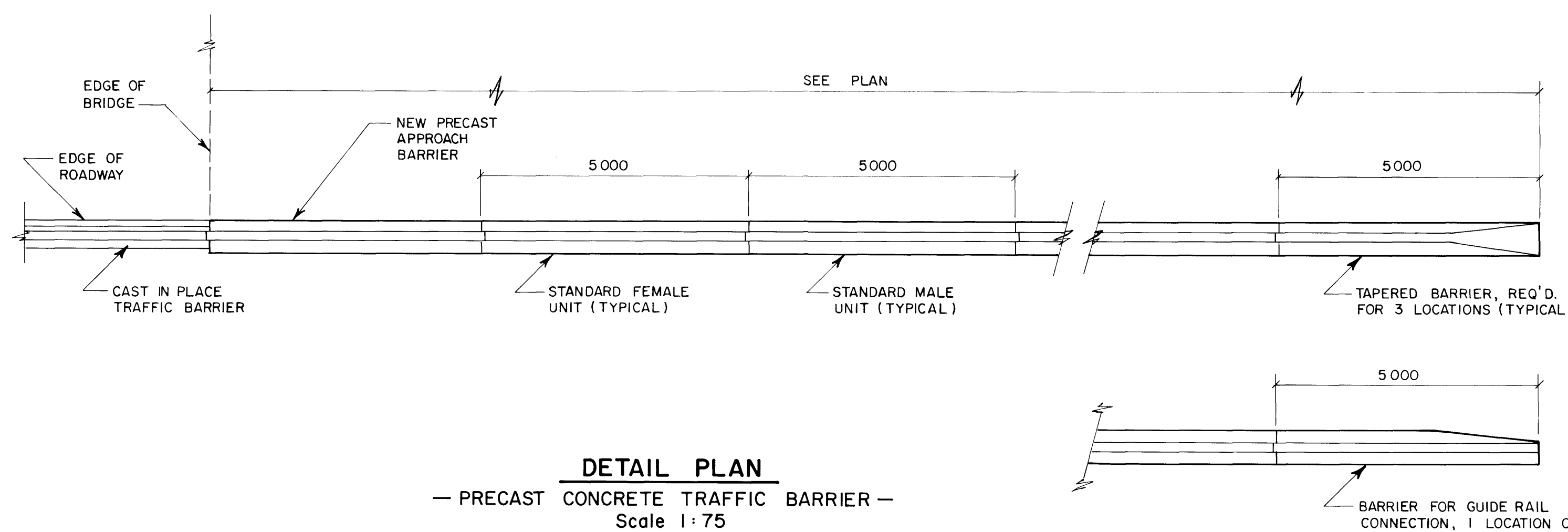


PRECAST MALE UNIT - END VIEW Scale 1:20
CAST IN PLACE ABUTMENT BARRIER - END VIEW Scale 1:20
PRECAST BARRIER DETAILS

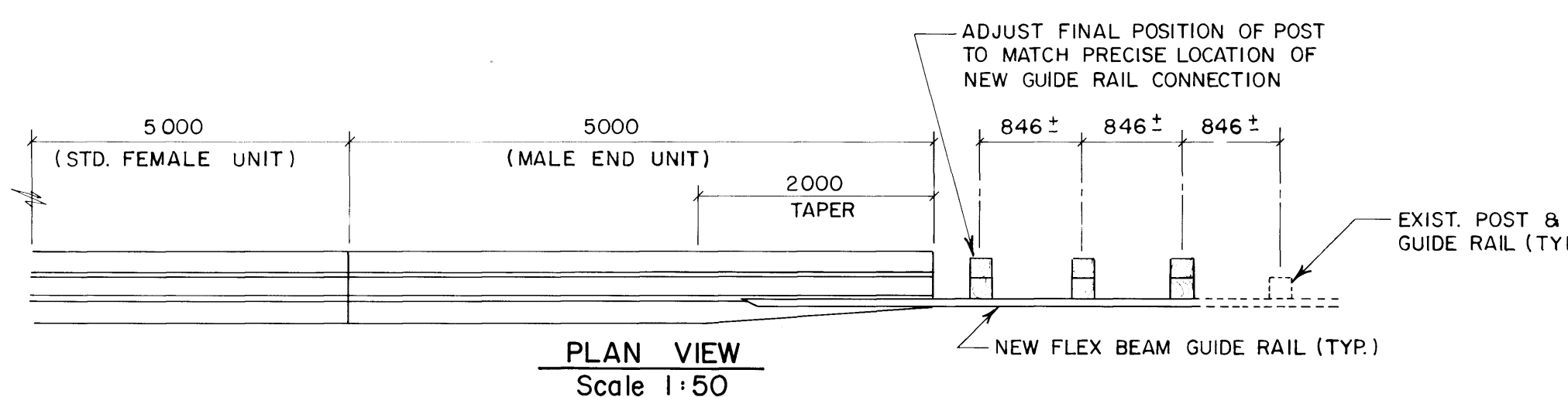
NOTES:

- ALL REINFORCING BARS ARE EPOXY COATED (GRADE 400).
- VERTICAL BARS = 10 M @ 300.
- HORIZONTAL BARS = 10 M (SPACING AS SHOWN).
- COVER ON ALL STEEL MIN 50 MM.
- CONTRACTOR MAY MAKE MINOR ADJUSTMENTS TO STEEL LOCATIONS AND SIZES TO SUIT FABRICATION BUT MUST MAINTAIN SAME PERCENTAGE OF STEEL.
- CONTRACTOR TO PROVIDE AND INSTALL FOR EACH END UNIT A STEEL PIN (GRADE 400) 45 Ø X 1000 LONG.

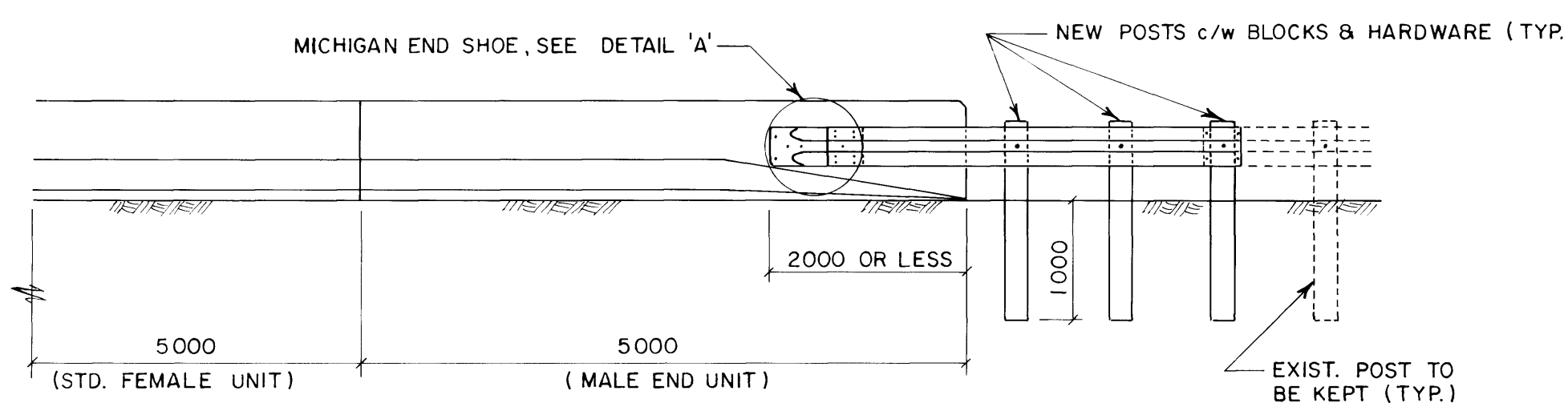
PLAN SCALE 1:200



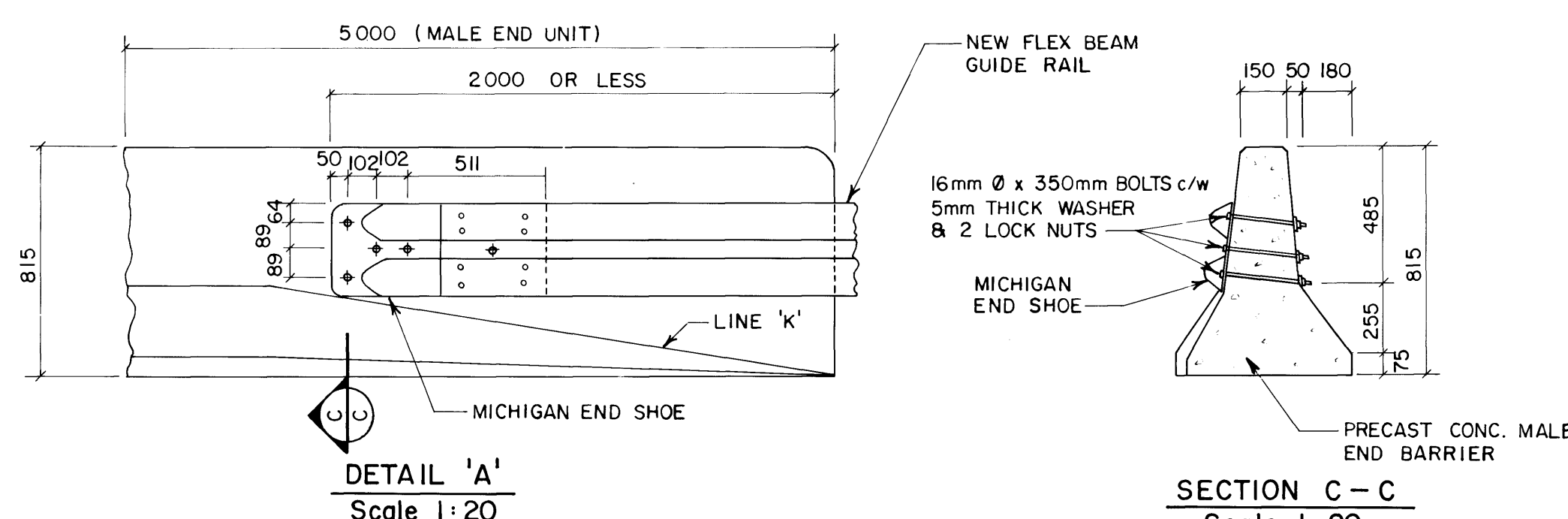
DETAIL PLAN
- PRECAST CONCRETE TRAFFIC BARRIER -
Scale 1:75



PLAN VIEW
Scale 1:50



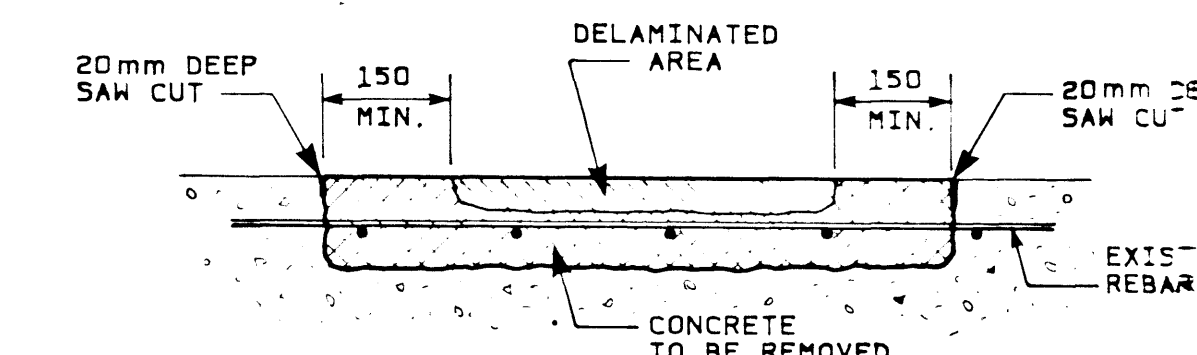
ELEVATION
Scale 1:50



DETAIL 'A'
Scale 1:20
GUIDE RAIL CONNECTION TO TRAFFIC BARRIER

NOTES:

- PROVIDE NEW GUIDERAIL POSTS (191 X 191 X 2000 u TREATED).
- PROVIDE NEW GUIDERAIL AND MICHIGAN END SHOE C/W BOLTS AS INDICATED ON DWG. (AMCO WESTEEL - SYSTEM NO. 1 OR EQUIVALENT).
- PLACE GUIDERAIL, ADJUSTING FROM 2000 MM FROM END OF BARRIER SUCH THAT THE GUIDERAIL HEIGHT WILL BE THE SAME AS THAT OF THE EXISTING GUIDERAIL. THE BOTTOM CORNER OF THE FASTENED NEW GUIDERAIL WILL BE TOUCHING LINE "K".



DELAMINATION REPAIR NOTES:

- REMOVE DELAMINATED AREAS WHICH HAVE BEEN MARKED BY ENGINEER.
- REMOVE CONCRETE BY HYDRODEMOLITION AS INDICATED IN THE SPECIFICATION.
- USE HAND TOOLS TO REMOVE CONCRETE AND WIRE-BRUSH TO REMOVE RUST FROM UNDERSIDE OF BARS IF NECESSARY.
- USE COMPRESSED AIR TO REMOVE ANY REMAINING GRIT AND DUST.
- APPLY TWO COATINGS OF EPOXY PAINT ON ALL EXPOSED CONCRETE AND RE-BARS.
- FILL THE DELAMINATED VOID WITH POLYMER FIBRE REINFORCED CONCRETE AT THE SAME TIME AS THE GENERAL DECK OVERLAY IS POURED.

CONCRETE DELAMINATION REPAIR DETAILS

NOT TO SCALE

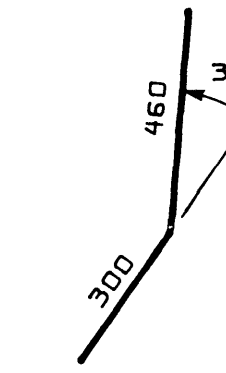
NOTES:

- FOR GENERAL NOTES SEE DRAWING N°: 1.
- SCALE AS SHOWN
- FOR INSTALLATION OF BARRIERS ACCORDING TO DRAWING CONSTRUCT SUFFICIENT BASE UTILIZING BASE COURSE MATERIALS BEFORE PLACING ASPHALT.

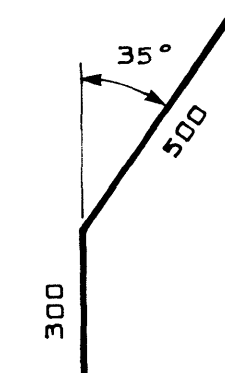
REINFORCING SCHEDULE (LENGTHS IN MILLIMETRES)

LOCATION	CONCR. m ³	REINF. kg	STRAIGHT BARS				BENT BARS			
			NO.	SIZE	LENGTH	MARK	NO.	SIZE	LENGTH	MARK
BARRIERS	27	2730E	28	15	7 000	15070E	348	15	800	B1501E
			84	15	6 200	15062E				
			348	15	800	15008E	348	15	760	D1501E
			348	15	600	15006E				
JOINTS	7	570E								
			66	15	5 500	15055E				

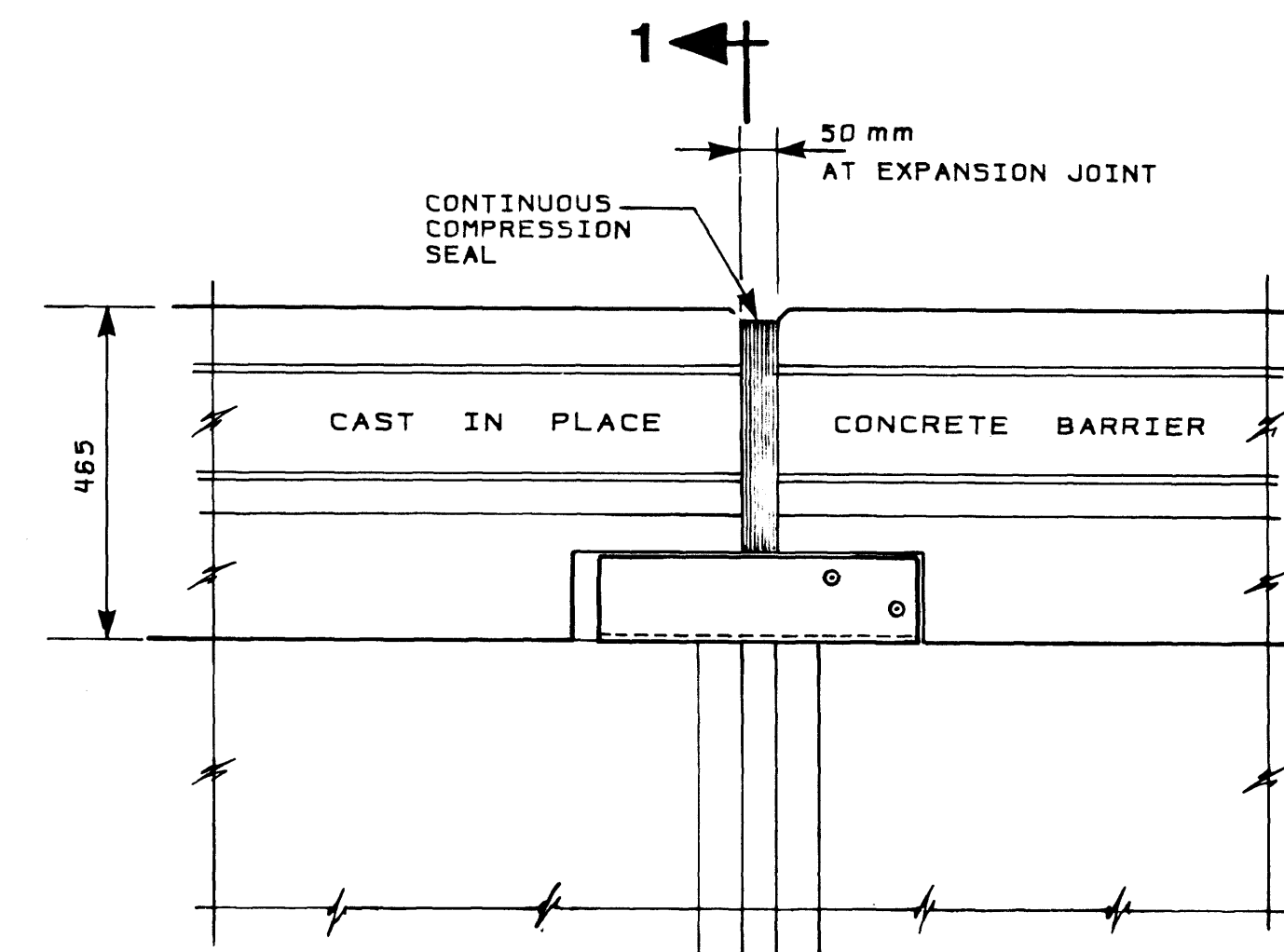
BENDING DIAGRAMS ALL DIMENSIONS ARE OUT TO OUT



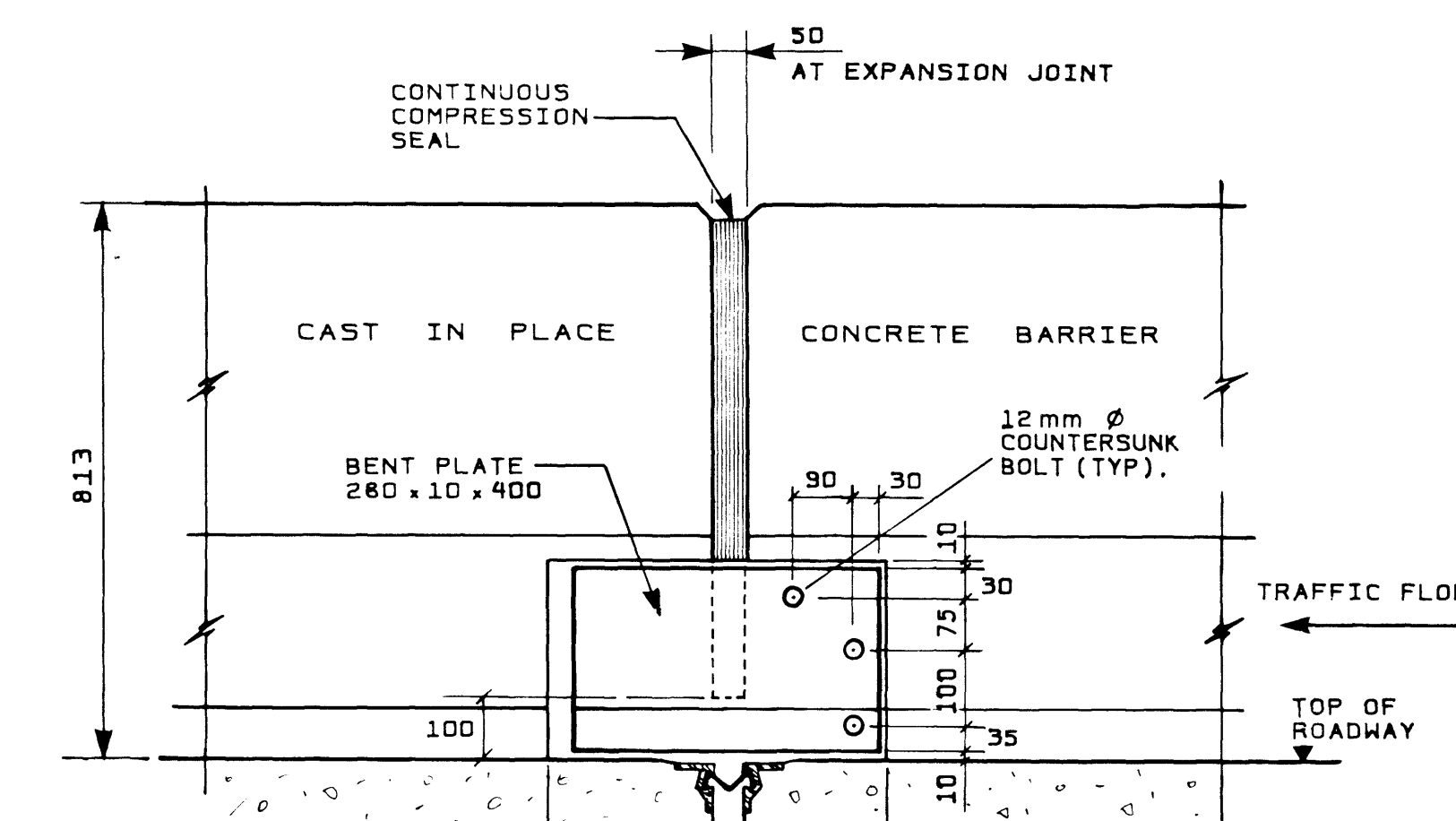
B1501E



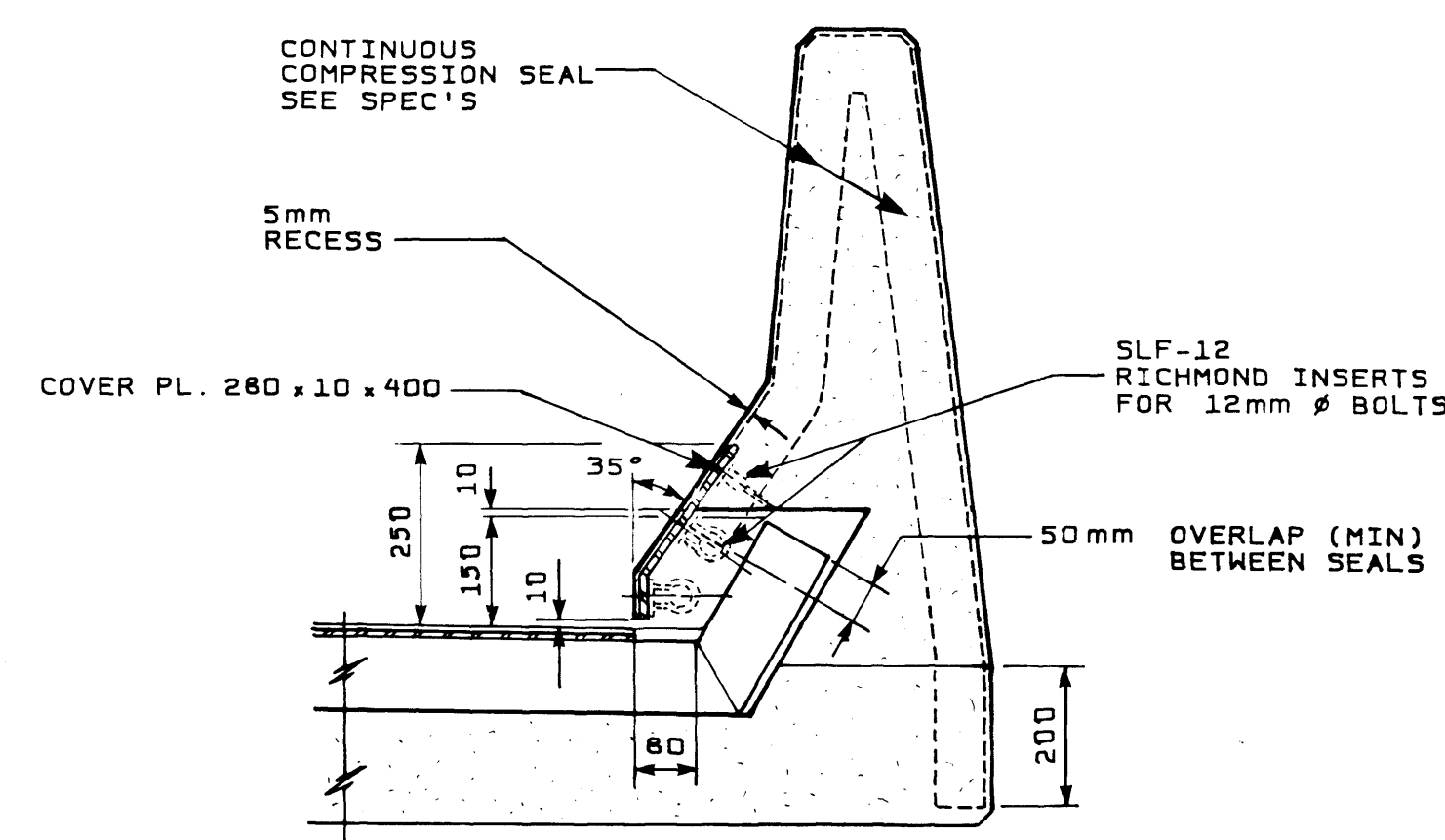
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P L A N



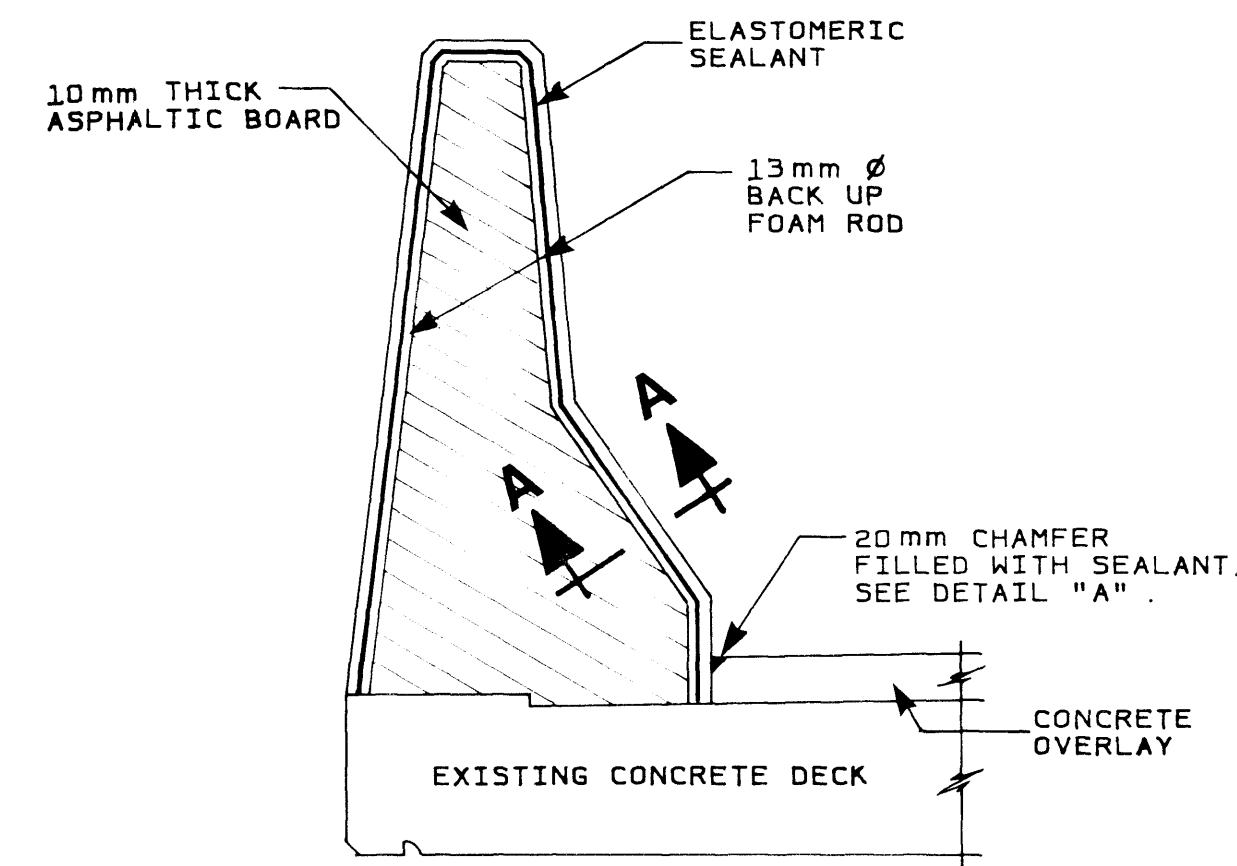
ELEVATION



SECTION 1-1

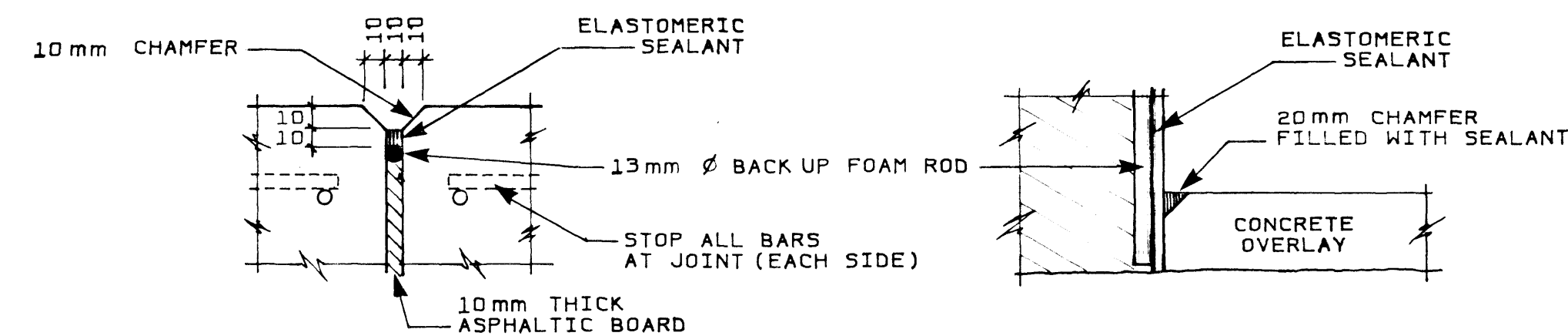
BARRIER EXPANSION JOINT DETAIL (AT ABUTMENTS AND PIER)

SCALE 1 : 10



SECTION THRU TYPICAL BARRIER JOINT

SCALE 1 : 10



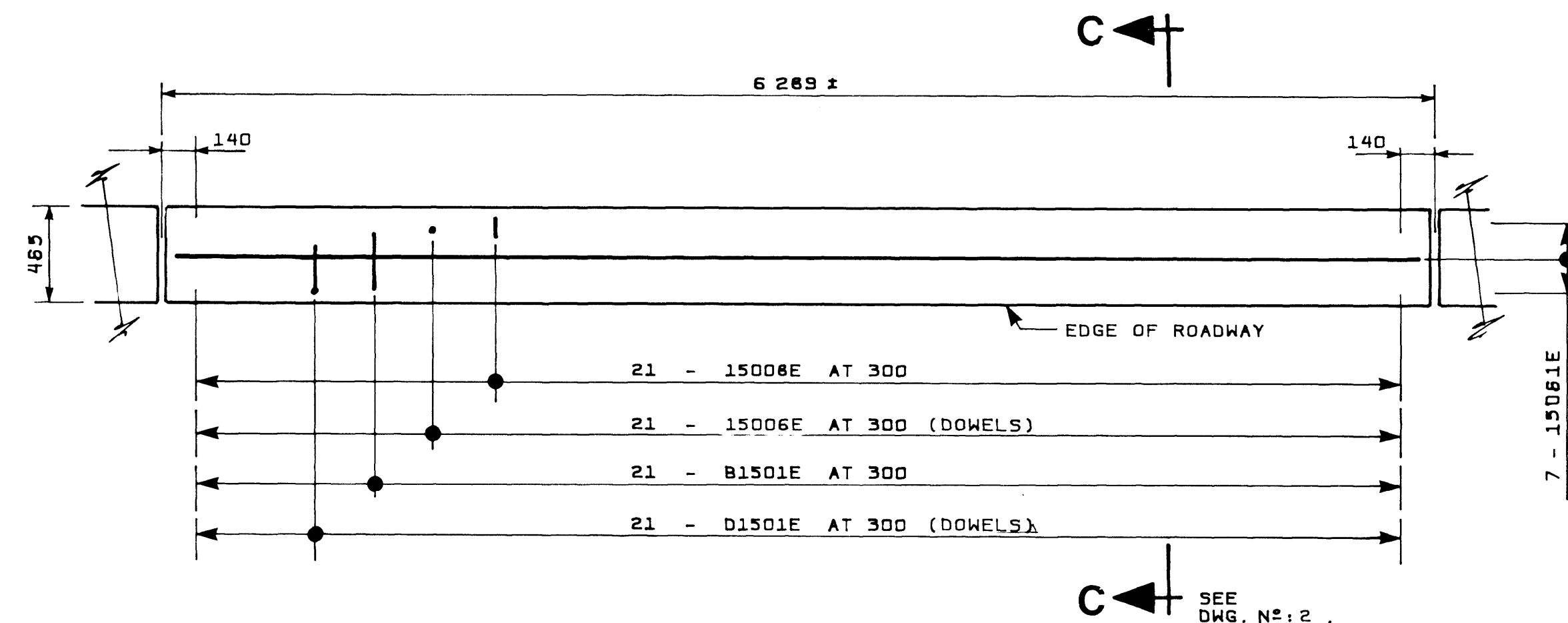
SECTION A-A

NOT TO SCALE

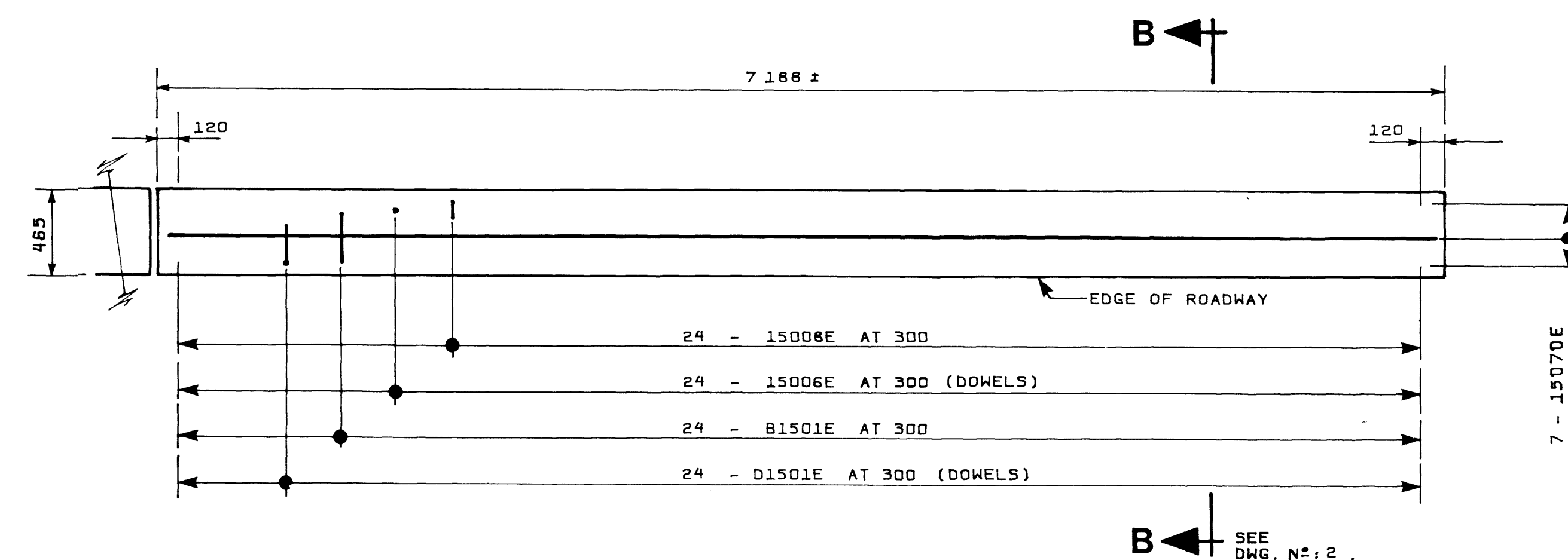
DETAIL "A"

NOT TO SCALE

TYPICAL BARRIER JOINT DETAILS



PLAN OF INTERMEDIATE UNIT (12 REQUIRED)



PLAN OF END UNIT (4 REQUIRED)

BARRIER REINFORCING DETAILS

SCALE 1 : 25

NOTES:

- FOR GENERAL NOTES SEE DWG. N°: 1.
- SCALE AS NOTED.
- BARS AND QUANTITIES DESIGNATED WITH "E" TO BE EPOXY COATED.
- IT IS CONTRACTORS RESPONSIBILITY TO CHECK QUANTITIES INDICATED ON THIS DRAWING.