

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 01 - General Requirements</u>		
01 11 00	SUMMARY OF WORK	4
01 14 00	WORK RESTRICTIONS	7
01 21 00	METHODS OF MEASUREMENT AND BASIS OF PAYMENTS	6
01 25 20	MOBILIZATION AND DEMOBILIZATION	2
01 33 00	SUBMITTAL PROCEDURES	8
01 35 30	HEALTH AND SAFETY REQUIREMENTS	5
01 35 31	SPECIAL PROCEDURES FOR TRAFFIC CONTROL AND CONSTRUCTION DETOURS	5
01 35 43	ENVIRONMENTAL PROCEDURES	17
01 45 00	QUALITY CONTROL	6
01 52 00	CONSTRUCTION FACILITIES	3
01 56 00	TEMPORARY BARRIERS AND ENCLOSURES	2
01 61 00	COMMON PRODUCT REQUIREMENTS	5
01 71 00	EXAMINATION AND PREPARATION	2
01 74 11	CLEANING	2
01 77 00	CLOSEOUT PROCEDURES	2
01 78 00	CLOSEOUT SUBMITTALS	3
<u>Division 02 - Existing Conditions</u>		
02 81 01	HAZARDOUS MATERIALS	5
<u>Division 31 - Earthwork</u>		
31 11 00	CLEARING AND GRUBBING	4
31 24 14	ROADWAY EXCAVATION AND EMBANKMENT	9
<u>Division 32 - Exterior Improvements</u>		
32 11 19	GRANULAR BACKFILL	5
32 11 24	20 mm Base Course Material	5
32 12 14	Asphalt Prime Coat	4
32 12 16	Asphalt Concrete Pavement	29
32 92 22	SEEDING	8
<u>Division 33 - Utilities</u>		
33 42 13	PIPE CULVERTS	4

PART 1 - GENERAL

1.2 WORK COVERED BY
CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the partial reconstruction of the entrance road and general reconstruction of the external loop roads for the Protection Mountain Campground. The work includes but is not necessarily limited to the following:
- .1 Reconstruct the entrance road from the intersection with the Bow Valley Parkway to the culvert crossing the adjacent creek (approximately 90 m) by adding an additional lane to the existing road. The work will entail removal of trees, clearing and grubbing, subexcavation of ground adjacent the existing road, construction of the new lane embankment and paving both the new and existing lanes. The work will also include relocation of an existing telephone booth that currently is located within the right of way of the new lane.
 - .2 Reconstruction of the external west loop road of the campground. Work will include removal of the existing road surface, minor clear and grubbing where alignment has changed, subexcavation of roadway, construction of new road embankment and gravel base course.
 - .3 Applying a new lift of base course gravel on the external loop roads connector.
 - .4 Reconstruction of the external east loop road of the campground. The work will include clearing and grubbing of trees and brush where the alignment has changed, removal of the old running surface along the length of the loop road, subexcavation and construction of the road embankment and base course.
 - .5 Rehabilitation (scarify and reseed) those portions of the original alignment that has been abandoned.
 - .6 Reinstallation of the culvert where the loop connector road joins the external east loop road. The culvert is to be extended and gabion baskets reinstalled to provide full width coverage of the connector road while at the same time incorporate realignment of the culvert to better tie into to creek the uses the culvert.
- .2 The Protection Mountain Campground is located 17 kilometers east of Lake Louise on the Bow Valley Parkway (Hwy 1A).

- 1.3 CONTRACT METHOD .1 Construct Work under Unit Price price contract.
- 1.4 WORK SEQUENCE .1 The work is to be completed no later than September 30, 2014.
- 1.5 CONTRACTOR USE OF PREMISES .1 Limit use of premises for Work, and for storage to allow for
.1 Partial owner occupancy.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .5 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.
- .6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.
- 1.6 OWNER OCCUPANCY .1 Owner will occupy portions of the site adjacent the work area 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.
- 1.7 EXISTING SERVICES .1 Notify Department Representative and utility companies of intended interruption of services and obtain required permission.
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- .2 The Contractor is responsible for arranging for locates for all utilities that may be crossing the worksite. All costs associated with locating utilities is considered incidental to the work.
- .3 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian and vehicular traffic.
- .4 Provide alternative routes for personnel and vehicular traffic.
- .5 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .6 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10 Record locations of maintained, re-routed and abandoned service lines.
- .11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures .

1.8 DOCUMENTS
REQUIRED

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

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not used.

PART 1 - GENERAL

- 1.1 PRECEDENCE .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.
- 1.2 RELATED REQUIREMENTS .1 Section 01 35 43 - Environmental Procedures
- 1.3 EXISTING SERVICES .1 Provide for pedestrian and vehicular traffic for the duration of the Work.
- 1.4 USE OF SITE AND FACILITIES .1 The Work Site shall be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site 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 The Contractor must make Private Accommodation Arrangements. Office-tool trailer may be set up at a location designated by the Departmental Representative.
- .3 The Contractor shall keep the Work Site clean and free from accumulation or waste materials and rubbish regardless of the source. Snow shall be removed by the Contractor as necessary for the performance and inspection of the Work.
- .4 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take precautions as required by local health authorities and keep area and premises in a sanitary condition.
- .5 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at its expense.
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- .6 The Contractor may work 12 hours per day, six days per week with the following restrictions:
 - .1 Restricted hours for blasting if required.
 - .2 No hauling of material during inclement weather.
 - .3 No stoppage of traffic will be allowed for the period commencing at 07:00 a.m. on the day before a Statutory Holiday or long weekend to 7:00 a.m. on the day following a long weekend.

1.5 EXISTING
SERVICES

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
 - .2 There are active utilities within the worksite. These are to be protected at all times during the construction of the works.
 - .3 The locations of utilities, if any, shown on the drawings are not necessarily exact nor is there any guarantee that all the utilities in existence within the limits of the Work Site have been shown on the drawings.
 - .4 If it is determined by the Departmental Representative that Utilities affected by the permanent Work will be relocated by Others, the Contractor shall co-operate and coordinate as required with Other Contractors engaged in Utility relocation operations on the Work Site.
 - .5 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. The Contractor shall cooperate with them at all times and in all places of Work. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities.
 - .6 The Contractor shall notify the Departmental Representative and the Utility companies at least seven days in advance of any activities which may interfere with the operation of such Utilities.
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- .7 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.
- .8 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 they are preserved.
- .9 The Contractor shall Immediately report any damage to Utilities to the Departmental Representative and to the Utility company 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 tender is deemed to be confirmation that the Contractor has inspected the site and is conversant with all conditions affecting execution and completion of the work.
 - .2 The Contractor shall regularly monitor the condition of the Work Site throughout the construction period, and shall immediately notify the Owner 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 condition of the Work Site and or property on or adjoining the Work Site 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.
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- .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 condition by the Departmental Representative shall in no way limit or restrict the Contractor's responsibility to exercise proper care to prevent damage to all property within or adjacent to the Work Site, whether all such property is 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 Worker's Compensation Board of Alberta a (WCB) including, but limited to, WCB's Industrial Health and Safety regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
 - .2 The Contractor shall comply with the Canada Labour Code - Part 2 regulations as it applies to working within a Federal Government Workplace.
 - .3 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.
 - .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 Parks Canada the costs resulting from such loss or damage.
 - .5 If required, blasting shall take place between 11:00 a.m. and 3:00 p.m. The Contractor shall:
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.1 Notify the Departmental Representative at least 24 hours in advance of each scheduled blast.

.2 A list of other parties to be notified in advance of each scheduled blasting will be provided by the Departmental Representative. Contractor to notify these parties at least 24 hrs in advance of each scheduled blasting.

.3 Provide traffic management in accordance with Section 01 35 31 - Special Procedures for Traffic Control.

1.8 USE OF PUBLIC AREAS

.1 Off-road construction equipment will not be allowed on the existing Bow Valley Parkway y except at designated crossing points and loading areas. 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 standard highway trucks not exceeding legal highway load limits.

.2 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Work Site and entering public roads shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be recovered or cleaned immediately by the Contractor at no cost to the Owner. 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. The following personnel shall be included in the list:

- .1 Project Superintendent
- .2 Safety representative

- .2 The above personnel shall be perform the following duties:
 - .1 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.
 - .2 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
 - .3 The Safety Representative shall possess safety experience in general construction. Duties shall encompass all matters of safety activities from commencement or Worj until Total Performance of the Work.

1.10 MEETINGS

- .1 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.
 - .2 The Departmental Representative will schedule an initial meeting held on site after award notification. Senior representatives of the Owner, Departmental Representative, Contractor, major Subcontractors, field inspectors, and supervisors are to be in attendance.
 - .3 The Contractor will be requested to assemble his staff and sub-contractors for an environmental breifing to be conducted by Parks Canada. The briefing shall be of approximately 2 hours in duration and held at initial project start-up. The Contractor shall ensure that all his currentproject staff in attendance. The Departmental Representative and the Contractor will co-operate in setting the most appropriate time and place for the briefing. Subsequent to the initial environmental briefing, briefings will be arranged for new staff and sub-contractors showing up on the project.
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2014-07-16

- .4 Cost of attending the above meetings shall be considered incidental to the Unit Price items and no additional payment will be made.

1.11 WASTE DISPOSAL

- .1 All surplus, unsuitable and waste materials shall be removed from the job site to approved sites outside Banff National Park. Refer to Section 01 35 43 - Environmental Procedures and Environmental Protection Plan.
- .2 Deposits of any construction debris into anywaterway are strictly forbidden.
- .3 Cost for Waste Disposal scribed above shall be considered incidental to the Unit Price items and no additional payment will be made.
- .4 Waste Disposal shall be completed in accordance with Section 01 35 43 - Environmental Procedures.

1.12 WORK STOPPACE

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

PART 2

1.13 PRODUCTS

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

2014-07-16

PART 1 - GENERAL

- 1.1 REFERENCES .1 Project General Conditions
- 1.2 TENDER BID ITEMS .1 L1.0 - Mobilization/Demobilization
- .1 The payment for the work required to mobilize and demobilize equipment and labour forces to perform the work.
- .2 The Contract lump sum payment shall be full compensation for the preparatory work and operations included but limited to, those necessary for movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from project sites.
- .3 Payment will be done in two parts: 50% payable to mobilize the work and 50% payable upon completion of the work and the work site has been returned to Departmental Representative with all works completed.
- .2 L2.0 - Prime Cost Sum
- .1 The Prime Cost Sum provided for in the Unit Price Table is not a sum due 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.
- .2 Include in Contract Price a Total Prime Cost Sum of \$15,000.
- .3 Do not include in the Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .4 Such work may include, but not be limited to:
- .1 Supply and install of new entrance gates, as directed by the Departmental Representative.
- .2 Additional clearing and grubbing as may be determined by the Departmental Representative
- .3 Replacement of existing signs as may be determined by the Departmental Representative
- .4 Rehabilitation of grounds not covers under the unit price table, as may be determined by the Departmental Representative

2014-07-16

.5 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 Equipment Rental rates will be in accordance with current Alberta Road Builders 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 the project limits. Transportation time to and from site to be reimbursed only if equipment is used exclusively for additional work.

.2 Labour rates shall be employee payroll costs plus a 10% mark-up for net profit.

.3 Material costs shall be applied at Contractor's cost, including transportation, plus a 10% mark-up for net profit.

.3 U1 - Clear and Grubbing

.1 The quantity of Clearing and Grubbing for which payment will be made shall be the area in square meters that is cleared and grubbed of trees, stumps, and brush. The quantity will be determined through survey measurement of the area impacted by the work.

.2 The contract unit price for clearing and grubbing shall be full compensation for labour, equipment, and materials required to complete the work. The work includes falling and removal of any trees required to facilitate the construction, and the clearing and grubbing of any stumps, brush, and associated debris associated with preparation of the subgrade for excavation/backfill. Dispose of clearing and grubbing materials as directed by the Departmental Representative.

.4 U2 - Stripping and Excavation

.1 The quantity of Stripping and Excavation for which payment will be made shall be the volume in cubic meters stripped and excavated. The quantity shall be determined through survey measurement of cross-sections and calculation of volume using average end area methods.

2014-07-16

- .2 The contract unit price for stripping and excavation shall be full compensation for labour, equipment, and materials for excavation, hauling, dumping, and leveling of the stripped and excavated materials as per the requirements of these specifications. The stripping and excavated materials include the excavation of the existing loop roads surface and the subexcavation of the loop roads to lines and grades specified on the drawings. All materials to be hauled and dumped in the Niblock Pit. No overhaul will be considered for payment and is considered incidental to the work.
- .5 U3 - Granular Subbase
- .1 The quantity of Granular Subbase for which payment will be made shall be for the volume in cubic meters of granular subbase placed, approved and accepted by the Departmental Representative. The quantity shall be determined through survey measurement of cross-sections and calculation of volume using average end area methods.
- .2 The contract unit price for Granular Subbase shall be full compensation for labour, equipment, and material to supply, load and haul the granular subbase to the worksite, and to place and compact as per the requirements of these specifications. No overhaul will be considered for payment and is considered incidental to the work.
- .3 There are no gravel sources for the granular subbase material in the park. The Contractor is responsible for finding a source of the material outside Banff National Park.
- .4 As part of the granular subbase, a geotextile is required to be placed at the base of the excavation to provide a foundation to build the subbase on. The supply and installation of the geotextile is considered incidental to this work item and will not be measured separately for payment.
- .6 U4 - Base Course

2014-07-16

- .1 The quantity of Base Course material for which payment will be made shall be for the volume in cubic meters of base course placed, approved, and accepted by the Departmental Representative. The quantity shall be determined through survey measurement of cross-sections and calculation of volume using average end area methods.
- .2 The contract unit price for Base Course shall be full compensation for labour, equipment, and materials to supply, haul, place and compact base course materials as per the requirements of these specifications. No overhaul will be considered for payment and is considered incidental to the work.
- .7 U5 - Asphalt Paving
- .1 The quantity of Asphalt Paving for which payment shall be made is the area in square meters placed, approved and accepted by the Departmental Representative. The quantity shall be determined by measuring the total area of road surface.
- .2 The contract unit price per square meter of hot mix Asphalt Trail Surfacing shall include the supply of all asphaltic materials, hauling of the hot asphalt materials for the Plant, the site delivery of the hot mix asphalt materials to the specific road location; the complete placement and finish grading work as required to meet the specifications, the complete compaction of the hot mix asphalt materials on the road surface to meet the specifications; the maintenance of the new Asphalt Paving until final approval and acceptance by the Departmental Representative; and any other related work incidental thereto for which separate payment is not elsewhere provided.
- .8 U6 - Culvert Realignment
- .1 The quantity for culvert realignment/reinstallation of the existing culvert located at the junction of the loop connector road and the East Exterior Loop Road.

2014-07-16

- .2 The contract unit price for the realignment/reinstallation of the existing culvert shall include full compensation for labour, equipment, and materials to excavate the existing culvert and gabion baskets, realignment of the culvert to better fit the creek alignment, supply of any required extensions, and associated couplings and hardware, excavation of subgrade, supply and installation of bedding materials, culvert installation and backfill installation and compaction. Removal, repair and reinstallation of the existing gabion baskets is considered incidental to the work and will not be measured for payment.
- .9 U7 - Telephone Booth Relocation
- .1 The quantity for Telephone Booth Relocation is One (1) ea.
- .2 The contract unit price for the Telephone Booth Relocations shall include full compensation for labour, equipment, and materials to locate and remove the existing telephone line, to remove the existing telephone booth and to relocate the telephone booth and reinstall the lines to make operational the telephone booth to the location shown on the drawings. Any excavation, backfill, and concrete work associated with the relocation as well as the supply and installation of any additional cable and conduit to make good the telephone booth relocation is considered incidental to the work and shall not be measured for payment.
- .10 U8 - Seeding
- .1 The quantity of seeding for which payment shall be made is the total square meters of mechanical, hydraulic, or hand seeding installed, approved and accepted by the Departmental Representative. The quantity shall be determined through measurement of the square area defined by the limits indicated on the drawings or as directed by the Departmental Representative.
- .2 Payment for seeding shall be full compensation for all labour, equipment, materials and incidentals required to place materials in accordance with the requirements of the Specifications, Drawings and direction of the Departmental Representative.

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
SECTIONS

.1 Section 01 11 00 - Summary of Work

1.2 DESCRIPTION

.1 Mobilization and Demobilization consists of the preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, office, supplies and incidentals to and from the project sites.

.2 Any protective measures or movement of the Contractor 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.

1.3 MEASUREMENT
PROCEDURES

1. Payment shall be made under "Lump Sum PriceItem 1 - Mobilization / Demobilization".

.1 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 Contract 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.

PART 2 - PRODUCTS

2.1 PRODUCTS

.1 Not Used

Protection Mountain
Campground Loop Road
Repairs
Banff National Park
Proj No: LL13-04-080

MOBILIZATION AND
DEMOBILIZATION

Section 01 25 20
Page 2

2014-07-16

PART 3 - EXECUTION

3.1 EXECUTION .1 Not Used

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Section 01 35 30 - Health and Safety Requirements
- .2 Section 01 35 43 - Environmental Procedures
- .3 Section -1 45 00 - Quality Control
- .4 Section 01 78 00 - Closeout Submittals

1.2 MEASUREMENT
PROCEDURES

- .1 This work shall be incidental to the Contract and will not be measured for payment.

1.3 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.
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- .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.

1.4 SHOP DRAWINGS
AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
 - .2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta.
 - .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .4 Allow 14 days for Departmental Representative's review of each submission.
 - .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
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- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
 - .7 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Relationship to adjacent work.
 - .9 After Departmental Representative's review, distribute copies.
 - .10 Submit four (4) prints and one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
 - .11 Submit four(4) 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.
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- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 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.
- .15 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.5 SAMPLES .1 Not Used.

1.6 MOCK-UPS .1 Not Used.

1.7 CERTIFICATES AND TRANSCRIPTS .1 Immediately after award of Contract, submit Workers' Compensation Board status.

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

1.8 REQUIRED
CONTRACTOR
SUBMITTALS

- .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 twenty (20) 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.

.2 The Contractor shall not construe the Departmental Representative's authorization of 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.

.1 Project schedule, detailing the schedule of the workdays required from the Contractor, subcontractors, supplier and consultants to complete each activity of the project location in order to meet stages specified in Section 01 11 00. In addition for each activity, critical elements that could impact on the schedule to be identified. Submission shall include both a paper copy of the schedule and an electronic copy in Microsoft Projects format.

.2 List of subcontractors, suppliers, and consultants, their role and their key personnel, including names and positions, addresses, telephone and cellular telephone numbers.

.3 Contractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, telephone, and cellular telephone numbers. The list shall include names and telephone/cellular numbers for contact persons who are available on a 24-hour basis in the event of emergencies.

.4 Quality Control Plan in accordance with Section 01 45 00 - Quality Control.

.5 Environmental Protection Plan (EPP) which shall meet the requirements of Section 01 35 43 - Environmental Procedures.

.6 Survey Plan describing the Contractor's intended methods of surveying during this project.

.7 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. Parks Canada will supply the Contractor with a template with contact names and numbers to be used for this purpose.

.8 Health and Safety Plan - The Contractor shall have 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.

.9 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 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.
 - .10 Submit copies of Material Safety Data Sheets (MSDS)
 - .11 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
 - .3 The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing.
- .3 **Construction Phase Submittals.**
- .1 Monthly Progress Reports in accordance with Section 01 32 18.
 - .2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed the following week on a day-to-day basis. Work to be linked to activities by area or location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc.
 - .3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes 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 request for payment.
 - .4 Shop Drawings and Mix Designs - The Contractor shall submit all shop drawings and mix designs required to fabricate and/or conduct the work a minimum 30 days prior to fabrication/production.
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.5 Submit four (4) copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction, weekly.

.6 Submit copies of reports or directions issued by Federal or Provincial health and safety inspections.

.7 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-builts to the Work and the Contractor shall submit a set of Contract Drawings clearly marked as record as-built changes to the Work. The drawings are to be submitted in electronic AutoCad (.dwg) format.

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

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 35 43 - Environmental Procedures

1.2 MEASUREMENT
PROCEDURES

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

1.3 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS)
- .3 Province of Alberta
 - .1 Occupational Health and Safety Act, R.S.A. - Updated 2013.

1.4 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 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
 - .3 Contractor's Safety Policy.
 - .4 Definitions of responsibilities for project safety/organization chart for project.
 - .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.

2014-07-16

1.5 FILING OF
NOTICE

- .10 Occupational Health and Safety communication and record keeping procedures.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative 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 MSDS - Material Safety Data Sheets to Departmental Representative.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 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 File Notice of Project with Provincial authorities prior to beginning of Work.

2014-07-16

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- 1.6 SAFETY ASSESSMENT .1 Perform site specific safety hazard assessment related to project.
- 1.7 MEETINGS .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- 1.8 REGULATORY REQUIREMENTS .1 Do Work in accordance with the National Parks Act.
- 1.9 PROJECT/SITE CONDITIONS .1 Work at site will involve contact with Alberta Occupational Health and Safety
- 1.10 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.
- 1.11 RESPONSIBILITY .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.12 COMPLIANCE REQUIREMENTS .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg.
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2014-07-16

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

1.13 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.

1.14 HEALTH AND
SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
- .1 Have site-related working experience specific to activities 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.

1.15 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.

1.16 CORRECTION OF
NON-COMPLIANCE

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

2014-07-16

- .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.

1.17 BLASTING

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative.
- .2 Production of blasting powder must be done in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Do blasting operations in accordance with Section 31 24 14 - Roadway Excavation, Embankment and Compaction.

1.18 POWDER
ACTUATED DEVICES

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

1.19 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.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 All Division 01, 02, and 03 Sections

1.2 MEASUREMENT
PROCEDURES

- .1 Cost of Special Procedures for Traffic Control and Construction Detours described in the Section 01 35 31 shall be considered incidental to the Works and no additional payment will be made for the duration of the Contract.

1.3 REFERENCES

- .1 Alberta Infrastructure and Transportation Traffic Accommodation in Work Zones.
.2 Manual of Uniform Control Devices for Canada, (MUTCD) distributed by Transportation Association of Canada.

1.4 GENERAL

- .1 The Contractor shall develop and implement a Traffic Management Plan in accordance with the requirements of the current edition of the Alberta Transportation Standard - Traffic Accommodation in Work Zones, except where specified otherwise. The Traffic Management Plan will include plans specific to any detour required for this project.
.2 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs and 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.
.3 All temporary signs that are used for longer than one day shall be mounted on wood posts.

- .4 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.
- .5 The Contractor shall coordinate traffic management procedures with any other Contractors working in the area.

1.5 PROTECTION OF
PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to 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.
- .3 Close lanes of road only after receipt of written approval from Departmental Representative:
 - .1 Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of Manual of Uniform Traffic Control Devices.
- .4 Keep travelled way graded, free from pot holes and of sufficient width to accommodate two 3.7 m wide lanes of traffic, one in each direction.
- .5 The Contractor shall also provide competent supervision and/or contract personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc. are in proper working order.

- .6 The traffic control measures will be monitored by the Departmental Representative, and he may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public, and coordination with adjacent contracts.
- .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.
- .8 The Contractor shall maintain a clean, dust free construction zone by means of brooming and watering as required.

1.6 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 specified in the Traffic Management Plan submitted by the Contractor and approved by the Departmental Representative.
- .3 Place signs and other devices in locations recommended in Alberta Infrastructure and Transportation's Standard Traffic Accommodation in Work Zones. Provide intermittent signage if work zones exceed 2.0 km in length.
- .4 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.
- .5 Signs shall be wind resistant.
- .6 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.

1.7 CONTROL OF
PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly dressed and equipped to Alberta Infrastructure and Transportation's Standard Traffic Accommodation in Work Zones 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 roads.
 - .3 When vehicles are entering or exiting Gravel pits or sources in the park.
 - .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.
- .2 Delays to public traffic due to Contractor's operations: maximum 20 minutes, except during blasting operations at which time the Contractor may delay public traffic up to 45 minutes between the hours of 11:00 a.m. and 3:00 p.m.
- .3 No stoppage of traffic will be allowed for the period commencing at 07:00 a.m. on the day before a Statutory Holiday or long weekend to 7:00 a.m. on the day following a long weekend.

- .4 During hours of darkness, the Contractor shall determine requirements but as a minimum, flag persons shall be additional 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.

1.8 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 as follows:
 - .1 Speed limit reduced to 50 km/h in workzones in work periods.
 - .2 Speed limit reduced to 50 km/h on detours.
- .2 Maintain existing conditions for traffic crossing right-of-way.
- .3 No stoppage of traffic shall be allowed during inclement weather conditions.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

.1 All Divisions 01,02, 03 and 30 Sections.

1.2 PRECEDENCE

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

1.3 MEASUREMENTS
PROCEDURES

.1 Preparation and implementation of an Environmental Protection Plan in accordance with this Section 01 35 43 - Environmental Procedures will not be measured separately for payment will be considered incidental to the work.

1.4 NATIONAL PARK
REGULATIONS

- .1 The Contractor shall ensure 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 the Parks Canada Administration Office in Banff, prior to commencement of the contract.
- .3 All Contractor's vehicles are required to display a vehicle pass from Parks Canada. These permits may be obtained free of charge from the Departmental Representative, PCA Surveillance Officer or at the Park Gate.

1.5 CANADIAN
ENVIRONMENTAL
ASSESSMENT ACT

.1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) Guidelines Order of 2003 and subsequent amendments. Environmental Protection Plans are the next step to achieve the desired end results of minimal adverse environmental effect as the project is constructed.

- .2 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.

1.6 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
 - .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
 - .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
 - .5 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Descriptions of environmental protection personnel training program.
 - .3 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan.
 - .4 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .5 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .6 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
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.7 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.8 Waste Water Management Plan identifying methods and procedures for management.

.9 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.7 START-UP AND
ENVIRONMENTAL
BRIEFING

.1 All staff employed at the construction site will be subject to an approximately two hour briefing regarding their individual and collective responsibilities 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. It is recognized new employees may join the Contractor's workforce after the initial round of "environmental briefing". In that case and as required, subsequent "environmental briefings" can be presented as numbers warrant, by arrangement with the ESO through the Departmental Representative. Also, some sub-trades may be present at the site for a short time, to perform once-only duties. In these cases, the "environmental briefing" will be replaced by the Contractor explaining the environmental sensitivity at the work location to the sub-trade worker(s), and reviewing highlights of personal conduct expected, with reference to a one-page briefing summary to be provided to the Contractor by the ESO. A copy of this summary will be provided to each sub-trade worker joining the workforce at the site.

- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with 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.

1.8 CONSTRUCTION
SITE ACCESS AND
PARKING

1. The main access to the construction site is through the existing access road into the campground. The Contractor shall review both short and long term construction access requirements with the Departmental Representative, both at start-up and on an ongoing basis. In consultation with the Departmental Representative, the Contractor shall formulate an agreement for worker transportation to and from the work sites and where workers shall park their private vehicles. Generally, personal vehicles shall be parked at least 10 metres distance from any watercourse.
- .1 The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by worker's vehicles or construction machinery and shall instruct workers so that the "footprint" of the project is kept within defined boundaries.

1.9 SITE MANAGEMENT

- .1 The Contractor is to prepare an EPP which details how the work limits shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and the ESO.
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- .2 The Contractor shall control blowing dust and debris generated from the construction site by means such as covering or wetting down materials and rubbish. Dust control measures for temporary access roads mat also have to initiated.
- .3 Security services at the construction site may be desirable or necessary during the contract, especially during quiet times. Fuel tanks and other potentially deleterious substance containers must be secured by the Contractor to ensure they are tamperproof and cannot be drained by vandals.
- .4 Pets shall not be brought to or maintained at the construction site.

1.10 FIRES, FIRE
PREVENTION AND
CONTROL

- .1 Fires and burning of rubbish on site is not permitted.
 - .2 A fire extinguisher shall be carried and available for use on each machine. Basic fire fighting equipment recommended (e.g.. a water truck, minimum 500 imperial gallons with 500 feet of fire hose and a pump capable of producing 45 psi water pressure at the nozzle, three shovels, two pulaskis, and two five gallon backpack pumps) shall be maintained at the construction site at location known and easily accessible to all the Contractor's staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".
 - .3 The Departmental Representative will indicate possible sources of water for filling the water truck, It will be the Contractor's responsibility to then gain access to a recommended water source and bear all costs for it's use.
 - .4 Construction equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.
 - .5 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.
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- .6 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. If not available, Banff Dispatch shall be contacted at (403) 762 4506

1.11 EROSION
CONTROL

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan and the EPP .
- .2 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired. The Departmental Representative and ESO also will monitor erosion control and performance.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.12 EQUIPMENT
MAINTENANCE,
FUELLING AND
OPERATION

- .1 The Contractor shall ensure that all soil and any debris attached to the construction equipment to be used on the project site shall be removed (e.g. power washing) outside the Banff National Park before delivery to the work site.
- .2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 meters to the Bow River or any other streams, wetlands, water bodies or waterways shall require authorization and oversight of the Departmental Representative.

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- .3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 meters from the Bow River or any other streams, wetlands, water bodies or waterways. Gravity fed fuel system are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.
 - .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in Part 1.14 of this Section.
 - .5 Equipment used on the project shall be fuelled with E10, and low sulphur diesel fuels and shall conform to local emission requirements. The Contractor is to ensure the unnecessary idling of vehicles is avoided.
 - .6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the ESO or the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc anywhere within Banff National Park.
 - .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
 - .8 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight in Banff National Park.
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1.13 OPERATION OF
EQUIPMENT

- .1 Equipment movements shall be restricted to the "footprint" of the construction area. The work limits shall be identified by stake and ribbon or other methods approved by the Departmental Representative. Unless authorized by the Departmental Representative, activities beyond the work limits are not permitted. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitat or trees and plant communities. Some construction shall require working close to watercourses or water bodies. In these instances, the Contractor is to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) do not enter any watercourses, to the satisfaction of the Departmental Representative and ESO.
- .2 The Contractor shall instruct workers to prevent pushing, placement, leveling, storage or stockpiling of any materials in the trees bordering the right of way or into watercourses or water bodies.
- .3 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 features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative and ESO.
- .4 Workers private vehicles are to remain within the construction footprint.

1.14 WILDLIFE

- .1 During the Environmental Briefing all personnel shall be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.
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- .2 If necessary, the construction activity may be scheduled around important wildlife windows. Specific windows may involve Harlequin Ducks and/or fish, depending on the location of the worksite. The Departmental Representative will advise if any apply.
 - .3 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose display aggressive behaviour or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
 - .4 Notify the ESO and Departmental Representative immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site or crew accommodation. Other wildlife related encounters are to be reported within 24 hours. If the ESO or Departmental Representative are not available, Banff Dispatch will be contacted at (403) 762 4506.
- 1.15 POLLUTION
CONTROL
- .1 Maintain temporary erosion and pollution control features installed under this Contract.
 - .2 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses the would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metre from the Bow River.
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- .3 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and the ESO and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
 - .4 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation.
 - .5 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berm shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double lined fuel tanks can prevent spills into the environment.
 - .6 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.
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- .7 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
- .8 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative and the ESO shall be notified immediately of any spill. If not available, Banff Dispatch will be contacted at 403 762 4506. Spill response cards will be distributed during the initial Environmental Briefing with basic instructions and phone numbers.
- .9 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .10 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill condition), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.
- 1.16 HISTORICAL/
ARCHAEOLOGICAL
CONTROL
- .1 Artifacts, relics, antiquities and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and similar objects found on the work site shall be reported to the ESO or Departmental Representative immediately. The Contractor and workers shall wait for instructions before proceeding with their work.
- .2 All historical or archaeological objects found in Banff National Park are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any articles found and request direction from the ESO or the Departmental Representative.

1.17 WASTE
MATERIALS STORAGE
AND REMOVAL

- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the Canadian Environmental Protection Act.
 - .2 All wastes originating from construction, trade, hazardous and domestic source, shall not be mixed, but will be kept separate.
 - .3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried, or discarded at the construction site or elsewhere in Banff National Park. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site or recycler located outside the park. Construction waste storage containers, provided by the Contractor, shall be emptied by the Contractor when 90% full. Waste containers will have lids, and waste loads shall be covered while being transported.
 - .4 A concerted effort shall be made by the Contractor and Workers to reduce, reuse, and recycle materials.
 - .5 All efforts to prevent wildlife from obtaining food, garbage, or other domestic wastes shall be made by the Contractor and contract staff while undertaking their work in Banff National Park. Such wildlife attractants shall not be stored at the work site overnight. Lunches, coolers and food products, including waste food products, shall be securely stored away from access by animals. Daily removal of food scraps, food wrappers, pop cans or other attractive products to bear proof containers is mandatory. It is incumbent on the Contractor to notify Parks Canada and make specific arrangements to have garbage collected by Parks Canada when using existing Parks Canada Receptacles.
 - .6 The Contractor and workers shall immediately report any circumstances related to food/garbage (e.g. overflowing container or strong smell) and wildlife to the ESO or the Departmental Representative. If neither can be reached, the Contractor/worker shall immediately contact Banff Dispatch at (403) 762 4506 and report the details.
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- .7 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 CLEARING AND GRUBBING
- .1 The Contractor shall ensure that the substrate of riparian area of streams, rivers or watercourses, whether open water or frozen over shall not be disturbed by tracked, wheeled, or self-propelled equipment. The ESO or Departmental Representative will provide direction in the case of work occurring near any wetland area or watercourses.
- .2 The Contractor shall take all measures to ensure trees do not fall into streams, rivers, wetlands or water bodies or outside the clearing limits as marked by coloured flagging. Generally, work within a 30 meter buffer of watercourses, water bodies or wetlands requires the close oversight of the ESO or the Departmental Representative.
- .3 Trees inadvertently felled into streams, rivers, watercourses or outside the clearing limits shall be removed by means so as to not damage the substrate or any standing trees left outside the clearing limits. Machinery shall not go outside the clearing limits, or into streams, rivers, watercourses or water bodies to remove felled trees.
- .4 Logs and other salvage materials are to be conveyed to and placed in the storage site without spread of debris or damage to other standing trees or landscape resources outside the marked clearing or storage limits. They shall not be skidded through wetlands, waterways, or water bodies.
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- .5 During the grubbing component, stumps, roots, embedded logs and other non-soil debris shall be pulled and shaken free of loose soil and rocks before transport to the waste pit area for chipping by others.
- .6 Existing areas or vegetation disturbed as a result of this contract shall be rehabilitated using approved topsoil from the park and a native grass seed mix as specified by the Departmental Representative or the ESO.

3.2 STRIPPING

- .1 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. In the event of a work program shutdown during inclement weather, erosion control of bared soils or excavated materials stockpiles will be required. The Contractor's EPP will describe measures to be implemented in such circumstance.
 - .2 Stripping close to any watercourse, water body or wetland shall employ methods to ensure materials are not pushed, fall or are eroded into the water or wetlands. Generally, work within a 30 meter buffer of waterways or wetlands require the close oversight of the ESO and the Departmental Representative.
 - .3 No stripping shall occur outside of the designated area or within 1 meter of the drip line of existing forest.
 - .4 Stripped soil materials shall be placed and stored at locations and in amounts and form as instructed by the Departmental Representative, for later reclamation use on graded slopes. Stripping piles may require erosion control, sedimentation protection or stabilization, depending on the location and anticipated duration of storage. At the Departmental Representatives direction, the Contractor shall prepare a plan for management of each stripping pile.
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3.3 MATERIAL
LOADING, HAULING
AND PLACEMENT

- .1 During grade construction conducted close to any watercourse, water body or wetland methods shall be employed to ensure materials are not pushed, fall or are eroded into the water or wetlands.
- .2 No grade building shall occur outside of designated area or within 0.6 meters of the drip line of existing forest. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location.
- .3 Materials shall be placed at storage sites or on grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location.

3.4 EXCAVATION AND
PLACEMENT

- .1 Excavation will be undertaken to the construction drawings.
 - .2 All sediment control measures shall be implemented by the Contractor prior to the commencement of work in the vicinity of any water bodies, watercourses or wetlands.
 - .3 Special precautions may be required during excavation in the vicinity of intermittent or active drainage channels. See "Specific Concerns".
 - .4 Placement of rip rap shall be undertaken without contacting the watercourse or wetted margins of the stream, unless approved by the Departmental Representative.
 - .5 Fisheries protection windows may impact the timing of the work so that stream disturbance is prevented. See "Specific Concerns".
-

- .6 If a pump-out sump to dewater excavations will be required, the Contractor is to prepare an EPP which details how the dewatering shall be undertaken, to the satisfaction of the Departmental Representative and the ESO. Water containing suspended materials shall not be pumped into watercourses, drainage system or on to land, except with the permission the of the Departmental Representative and ESO.

3.5 CONCRETE
MANAGEMENT

- .1 Where concrete work is to take place, the EPP must include the following concrete management elements:
- .1 Concrete mixer truck washout must be contained in an approved facility with wash products taken back to the concrete batching yard for disposal.
- .2 Rolling concrete mixers with surplus concrete in amounts less than one cubic meter of wet concrete may waste this concrete in the grade right-of way as directed by the Departmental Representative and well away from and in areas that drain well away from watercourses. Surplus amounts in excess of one cubic meter are to returned to the batching yard.
- .3 Water contaminated on the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.

3.6 FINE GRADING,
TOPSOIL PLACEMENT,
AND SEEDING

- .1 Any exposed slopes that have been cut, filled, or fine graded or disturbed in any way will require cover by stripped soil and chip compost materials and seeded. Environmental concerns related to these activities largely focus on erosion prevention and sediment control. The Contractor is to present a plan for placement, spreading and stabilization of reclamation materials that controls erosion and prevents sedimentation, to the satisfaction of the Departmental Representative and ESO.
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2014-07-16

3.7 SPECIFIC
CONCERNS RELATIVE
TO EROSION CONTROL
AND SEDIMENTATION

- .1 The Contractor shall prepare an Erosion and Sedimentation Management Plan for the components of the contract that are undertaken in proximity to watercourses, wetlands, or riparian environments. This plan shall be to the satisfaction of the Departmental Representative and ESO. If sediment ponds are required, they shall be designed to settle all sediment particles 0.02 mm or larger. The ponds shall also be designed to handle 1:5 year storm events, with overflow spill capacity for 1:10 year storm events and emergency spillway capacity for 1:100 year storm events.
- .2 An important desired end result is to allow no release into watercourses of sediments in levels that are deleterious to fish or that would harmfully alter, disrupt, or destroy fish habitat. Similarly, there is to be no sediment release into areas of vegetation growth or sensitive areas of sediments in levels that would adversely alter growing or hydraulic conditions. The target is 0 mg/L of TSS over background levels. The threshold is a maximum instantaneous increase of 25 mg/L over background levels when background levels are < 250 mg/L. or a maximum instantaneous increase of 10% over background levels when background levels are > 250 mg/L. This threshold shall not be exceeded.

3.8 SPECIFIC
CONCERNS RELATED TO
FISH AND FISH
HABITAT CULVERTS

- .1 Two small creeks are the areas being reconstructed is currently being assessed to see if fish habitat regulations apply to this project. The Departmental Representative will advise the Contractor if it is deemed to fit within the regulations governing working adjacent fish habitat.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 All Divisions 01,02,03 and 30 Sections

1.2 MEASUREMENT
PROCEDURES

- .1 This work shall be incidental to the Contract and will not be measured for payment.

1.3 TESTING BY THE
CONTRACTOR

- .1 Testing required providing quality control to assure that the Work strictly complies with the Contract requirements shall include, but no be limited to:
- .1 Testing all structural concrete, grout, reinforcing steel, asphalt concrete pavement, structural backfill, precast concrete box culverts, structural corrugated steel culverts/arches, misc. metals, concrete barriers, retaining walls, and all source acceptance testing; and
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .2 Testing proposed shall be based on testing requirements in the August 2007 Transportation Standard Specifications for Highway Construction Manual and subsequent updates.
- .3 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 Departmental Representative in advance to enable the Departmental Representative to witness test if 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 the tests, and the date of the tests.
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- .4 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contact requirements.
- .5 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.
- .6 The minimum frequency for Quality Control during the embankment construction will be as follows:
 - .1 Embankment Construction with fine grained or granular soil - Standard Proctor by ASTM D698 - 1 per change in material or 1 per week, whichever is more frequent.
 - .2 Embankment construction with fine grained or granular soil - Field density by: ASTM D1556 - Sand Cone, ASTM D1267 - Balloon, or ASTM D2922 - Nuclear. To be done 1 per 1000 m2 per lift, spaced randomly across full width of embankment.
 - .3 Embankment construction with blasted rock or oversize granular - Field observation with daily field report, done full time during blasted rock placement
 - .4 Culvert Installation - Field Density - minimum 2 per 300 mm lift per culvert, spaced through the length and depth of the culvert backfill.

1.4 CONTRACTOR'S
QUALITY CONTROL
PROGRAM

- .1 The Contractor shall prepare a Quality Control Program. The purpose of the program shall be to ensure the performance of the Work in accordance with the Contract requirements.
- .2 The Quality Control Program shall be described in a Quality Control Manual. The Contractor shall submit the Manual to the Departmental Representative for review in accordance to Section 01 33 00 - Submittal Procedures. The Manual shall develop a logical system for tracking and documenting the Quality Control of the Work. 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.

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- .3 The Quality Control Manual shall include the following information:
- .1 Distribution list, providing a list of names to whom the Manual shall be distributed
 - .2 Title page including Contract no, revision page with dates of revisions, and a Table of Contents
 - .3 Details of measuring and testing equipment and methods, including calibration
 - .4 Details of special processes as identified by the Departmental representative, including qualifications of personnel and certification.
 - .5 Procedures for shipping, packaging, and storage of materials and equipment.
 - .6 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.
 - .7 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 Quality Control Manager.
 - .8 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 Departmental Representative, if the Departmental Representative witnesses the tests.
 - .9 Forms used to ensure application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance.
- .4 The Contractor shall appoint a Quality Control Manager who shall report regularly to the Contractor's management at a level which shall ensure the Quality Control requirements are not subordinated to manufacturing, construction or delivery. The Quality Control Manager shall be empowered by the Contractor to resolve quality matters.
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- .5 The Quality Control Manual shall include samples of all forms to be filled in by the Quality Control Inspectors. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative who will add its review signature.
- .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. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

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 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 will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.
-

1.6 INDEPENDENT
INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative.

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 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.9 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
 - .2 Make good other Contractor's work damaged by such removals or replacements promptly.
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- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.10 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative.

1.11 TESTS AND MIX
DESIGNS

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

1.12 MILL TESTS

- .1 Submit mill test certificates as requested.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 01 35 31 - Special Procedures for Traffic Control and Construction Detours.
- 1.2 MEASUREMENT PROCEDURES .1 This work shall be incidental to the Contract and will not be measured for payment.
- 1.3 INSTALLATION AND REMOVAL .1 Provide construction facilities in order to execute work expeditiously.
.2 Remove from site all such work after use.
- 1.4 SITE 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.
- 1.5 CONSTRUCTION PARKING .1 Provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
.2 Build and maintain temporary roads and provide snow removal during period of Work..
.3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.
- 1.6 SECURITY .1 If required by the Contractor, provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays. The Contractor is advised that some random acts of vandalism to equipment have occurred within the Park.
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1.7 OFFICES

- .1 Provide office 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.

1.8 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.

1.9 SANITARY
FACILITIES

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

1.10 CONSTRUCTION
SIGNAGE

- .1 No other signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.11 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.

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 01 35 31 - Special Procedures for Traffic Control and Construction Detours.
- .2 Section 01 52 00 - Construction Facilities
- 1.2 MEASUREMENT PROCEDURES .1 This work shall be incidental to the Contract and will not be measured for payment.
- 1.3 INSTALLATION AND REMOVAL .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.
- 1.4 HOARDING .1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- 1.5 GUARD RAILS AND BARRICADES .1 Provide secure, rigid guard rails and barricades around deep excavations.
- 1.6 ACCESS TO SITE .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- 1.7 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.
- 1.8 FIRE ROUTES .1 Maintain access to property including overhead clearances for use by emergency response vehicles.
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2014-07-16

1.9 PROTECTION FOR
OFF-SITE AND PUBLIC
PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 Section 01 45 00 - Quality Control.

1.2 REFERENCES

- .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 born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
-

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

1.4 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 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 miscellaneous 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.
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- .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.

1.10 CONCEALMENT

- .1 The Departmental Representative will inspect all work prior to any concrete pours. The Contractor shall notify the Departmental Representative 24 hours before any pour for inspection .

1.11 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.

1.12 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 non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
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- .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.

1.13 PROTECTION OF
WORK IN PROGRESS

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

1.14 EXISTING
UTILITIES

- .1 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.

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 01 21 00 - Methods of Measurement
- 1.2 MEASUREMENT PROCEDURES .1 This work shall be incidental to the contract and will not be measured for payment.
- 1.3 REFERENCES .1 Owner's identification of existing survey control points and property limits.
- 1.4 QUALIFICATIONS OF SURVEYOR .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Departmental Representative.
- 1.5 SURVEY REFERENCE POINTS .1 Existing base horizontal and vertical control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Departmental Representative.
- .4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.
- 1.6 SURVEY REQUIREMENTS .1 Contractor will be responsible for all staking and layout.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, cut and fill.
-

- .4 Stake slopes and top of embankment as required during construction.

1.7 EXISTING SERVICES

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

1.8 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.9 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform with Contract Documents.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 Section 01 35 31 - Special Procedures for Traffic Control and Construction Detours.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 77 00 - Closeout Procedures.

1.2 MEASUREMENT
PROCEDURES

- .1 This work shall be incidental to the Contract and will not be measured for payment.

1.3 PROJECT
CLEANLINESS

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

- 1.4 FINAL CLEANING
- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
 - .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
 - .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
 - .4 Remove waste 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 , and ensure specified workmanship and operation.
 - .8 Sweep and wash clean paved areas.
 - .9 Remove dirt and other disfiguration from exterior surfaces
 - .10 Clean drainage systems

PART 2 - PRODUCTS

- 2.1 NOT USED
- .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED
- .1 Not Used.

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 01 74 11 - Cleaning.
.2 Section 01 78 00 - Closeout Submittals.
- 1.2 MEASUREMENT PROCEDURES .1 This work shall be incidental to the Contract and will not be measured for payment.
- 1.3 ADMINISTRATIVE REQUIREMENTS .1 Acceptance of Work Procedures:
.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
.2 Request Departmental Representative inspection.
.2 Departmental Representative Inspection:
.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
.2 Contractor Design-Builder to correct Work as directed.
.3 Final Inspection:
.1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
.2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
- 1.4 FINAL CLEANING .1 Clean in accordance with Section 01 74 11 - Cleaning.
.1 Remove surplus materials, excess materials, rubbish, tools and equipment.
-

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 71 00 - Examination and
Preparation
- .4 Section 01 77 00 - Closeout Procedures

1.2 MEASUREMENT
PROCEDURES

- .1 This work shall be
incidental to the Contract and will not be
measured for payment.

1.3 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.
 - .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.
-

1.4 RECORDING
INFORMATION ON
PROJECT RECORD
DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual.
- .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 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .4 Specifications: mark each item to record actual construction, including:
 - .1 Changes made by Addenda and change orders.
- .5 Other Documents: maintain inspection certifications and field test records required by individual specifications sections.

1.5 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.6 WARRANTIES AND
BONDS

- .1 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
 - .2 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.
 - .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.
- .3 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.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS
- .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 35 43 - Environmental Procedures
- 1.2 REFERENCES
- .1 Definitions:
 - .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.
 - .2 Reference Standards:
 - .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations SOR/2005-149.
 - .2 Department of Justice Canada (Jus)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).
 - .2 Transportation of Dangerous Goods Regulations T-19.01-SOR/2001-286.
 - .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .4 National Research Council Canada Institute for Research in Construction (NRC-IRC)
 - .1 National Fire Code of Canada-2010.
- 1.3 MEASUREMENT PROCEDURES
- .1 This work shall be incidental to the Contract and will not be measured for payment.
-

1.4 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data:
 - .1 Submit current copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.
 - .2 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

1.5 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 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
 - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
 - .4 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
 - .5 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

- .1 When hazardous waste is generated on site:
 - .1 Co-ordinate transportation and disposal with Departmental Representative.
 - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
 - .5 Label container(s) with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Only trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
 - .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
 - .2 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .3 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.
-

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Description:
 - .1 Bring on site only quantities hazardous material required to perform Work.
 - .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

PART 3 - EXECUTION

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management:
 - .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
 - .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
 - .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
 - .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
 - .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
 - .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
 - .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
 - .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
-

- .1 Hazardous wastes recycled in manner constituting disposal.
- .2 Hazardous waste burned for energy recovery.
- .3 Lead-acid battery recycling.
- .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 Section 01 35 51 - Special Procedures for Traffic Control and Construction Detours.
- .2 Section 01 35 43 - Environmental Procedures

1.2 MEASUREMENT
PROCEDURES

- .1 Quantities for payment in square meters, measured within defined limits, for clearing and grubbing areas according to these specifications, shall include all labour, equipment and materials to satisfactorily complete this item of work. Payment shall be under Unit Price Item - Clearing and Grubbing.
- .2 No overhaul will be paid for grubbing

1.3 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to within 300 mm of the ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Flush cutting consists of cutting trees, stumps or vegetative growth to within 100 mm of the ground, leaving the root structure undisturbed and disposing of felled trees, previously uprooted trees, and stumps and clearing debris as specified.
- .3 Grubbing consists of excavation and disposal of stumps and roots to not less than specified depth below existing ground surface.
- .4 Chipping consists of shipping wood debris, except merchantable timber, to wood chips. Finished wood chip material shall be able to pass through a 100 mm by 100 mm screen.
- .5 Merchantable timber is all timber with a butt diameter in excess of 150 mm and top down to 100 mm,

1.4 QUALITY
ASSURANCE

- .1 All Quality Control testing by the Contractor.
-

1.5 STORAGE AND
PROTECTION

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing pavement, utility lines, water courses, and root systems of trees which are to remain.
 - .1 Repair damaged items to approval of Departmental Representative.
 - .2 Replace trees designated to remain, if damaged, as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Not used.

PART 3 - EXECUTION

3.1 TEMPORARY
EROSION AND
SEDIMENTATION
CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the requirements of the EPP and requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

- .1 Inspect site and verify with Departmental Representative items designated to remain.
 - .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
-

.2 When utility lines which are to be removed are encountered within area of operations, notify Departmental Representative in ample time to minimize interruption of service.

- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and walks free of dirt and debris.

3.3 CLEARING

- .1 Clear as directed by Departmental Representative, by cutting trees and vegetative growth.
- .2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative .
- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
- .4 All clearing shall be felled in such a manner that surrounding vegetation is preserved along construction limits. Stumps remaining within 3.0 metres of cleared perimeter are to be cut flush with ground and vegetative mat left undisturbed.

3.4 GRUBBING

- .1 Remove and dispose of roots and designated stumps from indicated grubbing areas.
 - .2 Grub out stumps and roots to not less than 200 mm below ground surface.
 - .3 Grubbing ripper teeth depth shall be kept as shallow as possible to minimize contamination of topsoil with subsoil. This may require individual ripping of stumps in some locations. In addition, while removing stumps, roots or embedded logs, the Contractor shall shake them on site to remove as much soil as possible.
-

3.5 REMOVAL AND
DISPOSAL

- .1 Remove cleared and grubbed materials to disposal area designated by Departmental Representative .
- .2 Chip cleared and grubbed vegetative material on site as directed by Departmental Representative.
- .3 Merchantable timber shall be disposed of as directed by the Departmental Representative.

3.6 FINISHED
SURFACE

- .1 Leave ground surface in condition suitable for stripping of topsoil to approval of Departmental Representative.
- .2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed.

3.7 CLEANING

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 Section 01 35 31 - Special Procedures for Traffic Control and Construction Detours.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures
- .4 Section 31 11 11 - Clearing and Grubbing
- .5 Section 32 11 19 - Granular Sub-base
- .6 Section 33 42 13 - Pipe Culverts

1.2 DESCRIPTION

- .1 This item consists of the excavation and disposal of all materials in conformity with the lines, grades and dimensions indicated on the drawings, and includes:
 - .1 Existing roadway stripping and excavation
 - .2 New roadway stripping and excavation
 - .3 Reconstruction of existing loop road, access roads, entrances, embankments, and other earthworks necessary for the the construction of the Works.
 - .4 Removal and disposal of unsuitable materials from excavations.
 - .5 Transportation of excavated materials to Niblock Pit
 - .6 Finishing of top surfaces and slopes
 - .7 Spreading of topsoil in reclaimed areas
 - .8 Maintenance of the work set forth under this section in a finished condition until portion thereof has been accepted by the Departmental Representative.

1.3 MEASUREMENT AND
PAYMENT PROCEDURES

- .1 Stripping: measure in cubic metres calculated from cross sections using average end area calculations in areas of excavation.
 - .1 The Contractor will take initial cross sections after clearing and grubbing completed.
 - .2 Stripping unit price to include cost of placing material on reclaimed areas upon completion of excavation and embankment.

2014-07-16

- .3 Payment for stripping will be done through the Unit Price Tables Item - Stripping and Excavation
- .2 Common Excavation: Common excavation will be measured in cubic metres, calculated from cross sections taken at the completion of the excavation work using average end area calculations.
- .3 Payment for excavation will be done through the Unit Price Tables Item - Stripping and Excavation.
- .4 Embankment construction will not be measured for payment under this section and is considered incidental to Unit Price Item - Granular Subbase
- .5 No overhaul will be paid for any of any of the Work covered in this section.
- .6 No separate payment for:
- .1 Excavating unnecessarily beyond lines established by Departmental Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.
 - .2 Scarifying or benching existing slopes or existing road surfaces.
 - .3 Removing and disposing of roots, stumps and other materials excavated during waste operation.
 - .4 Burying existing culverts from old road.
 - .5 Removing unsuitable material from embankment attributable to negligence.
 - .6 Watering, drying and compacting.
 - .7 Finishing.

1.4 REFERENCES

- .1 Definitions:
- .1 Rock Excavation: excavation of:
 - .1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort with a Caterpillar D9 crawler bulldozer or equivalent to be considered integral with parent mass.

2014-07-16

1.5 QUALITY
ASSURANCE

- .2 Boulder or rock fragments measuring in volume 1 cubic metre or more.
- .2 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.
- .3 Unclassified Excavation: excavation of whatever character other than stripping encountered in the Work.
- .4 Stripping: excavation of organic material and topsoil covering original ground.
- .5 Over Haul: authorized hauling in excess of free haul distance that excavated material is moved.
- .6 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.
- .7 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.
- .8 Borrow Material: material obtained from areas outside right-of-way and required for construction of embankments or for other portions of work.
- .9 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .2 Reference Standards:
 - .1 ASTM International
 - .1 ASTM D 698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³) (600 kN-m/m³).
- .1 Regulatory Requirements:
 - .1 Adhere to regulations of authority having jurisdiction when blasting is required.
 - .2 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.
- .2 All Quality Control testing by the Contractor

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Embankment materials require approval by Departmental Representative .
- .2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.
- .3 Borrow material:
 - .1 Obtain from sources such as quarry, or borrow pit as approved or as designated by Departmental Representative.
 - .1 Earth Embankment materials to consist of acceptable earth material and processed rock material free from objectionable quantities of organic matter, frozen soil, stumps, trees, moss, and other unsuitable materials.
 - .2 Earth embankment materials will be materials that have been sorted with all stones and particles larger than 150 mm removed from the material
 - .3 The granular material will be processed so that there will be no more than 25 % by volume stones and particles between 100 and 150 mm in diameter. The balance of the granular material will be of a particle size less than 100 mm and be well graded.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that condition of substrate is acceptable for trail embankment Work:
 - .1 Visually inspect substrate in presence of Departmental Representative .
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

2014-07-16

3.2 COMPACTION
EQUIPMENT

- .1 Compaction equipment: vibratory rollers or vibrating plate compactors capable of obtaining required density in materials on project.
 - .1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.
 - .2 Replace or supplement equipment that does not achieve specified densities.
- .2 Operate compaction equipment continuously in each embankment when placing material.

3.3 WATER
DISTRIBUTORS

- .1 Apply water with equipment capable of uniform distribution.

3.4 STRIPPING

- .1 Commence topsoil stripping of areas on approval by the Departmental Representative after clearing and grubbing debris have been removed from these areas.
- .2 Strip topsoil to depths as directed by Departmental Representative. Do not mix topsoil with subsoil.
- .3 Stockpile in locations as directed by Departmental Representative.
- .4 Dispose of unused topsoil as directed by Departmental Representative off site.
- .5 Remove clearing and grubbing debris from stripping.
- .6 Spread organic stripping, on completion of excavation and embankment construction, on slopes and trim, on reclaimed areas, or remove from site if quantity exceeds ability to grade on site.

3.5 EXCAVATING

- .1 General:
 - .1 Notify Departmental Representative when unsuitable trail embankment materials are encountered and remove to depth and extent directed.
 - .2 Sub-excavate below subgrade in cut sections only as directed by Departmental Representative .

2014-07-16

-
- .1 Compact top 150 mm below sub-excavate to minimum 95% maximum dry density, to ASTM D 698.
 - .2 Replace with approved embankment material and compact to specified embankment density.
 - .3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points in accordance with Drawings.
 - .4 The dimensions of the excavations and embankments shall be in accordance with the typical sections accompanying these specifications. The dimensions of any or all excavations and embankments may be increased or decreased at any time by the Departmental Representative as conditions and circumstances may determine.
- .2 Drainage:
- .1 Maintain profiles, crowns and cross slopes to provide good surface drainage.
 - .2 Provide ditches as work progresses to provide drainage.
- .3 Borrow Excavation:
- .1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.
 - .2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.
 - .1 Departmental Representative to designate extent of borrow areas and allowable depth of excavation.
 - .2 Remove waste and stripping material from borrow pits to designated locations.
 - .3 When work is completed, leave borrow area in a condition that is acceptable by the Departmental Representative. Direction will be given as to any reclamation work that may be required upon completion of the work. All costs related to the reclamation of the borrow area if required is considered incidental to the work and will not be measured for payment.
- 3.6 GEOTEXTILE .1 Geotextile is required in all excvations prior to the placement of embankment materials.
-

2014-07-16

- .2 Geotextile to be used is the Nilex 2016 or equivalent.
- .3 The excavations are to be prepared as per the manufacturer's instructions for the installation of the geotextile. The geotextile is to cover both the sides and bottom of the road excavations as a single unit.
- .4 Overlap the individual lengths of geotextile as recommended by the manufacturer's instructions.

3.7 EMBANKMENTS

- .1 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces.
 - .1 Method used to be to be pre-approved in writing by Departmental Representative.
- .2 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized.
- .3 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .4 Drain low areas before placing materials.
 - .1 Place and compact to full width in layers not exceeding 150 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.
- .5 Where material consists of rock:
 - .1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 0.6 m.
 - .2 Distribute rock material to fill voids with smaller fragments to form compact mass.
 - .3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.

3.8 COMPACTION

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.

2014-07-16

- .2 Deposit, spread, and level, embankment material in layers 150mm maximum thickness before compaction.
 - .1 Compact each layer of embankment until compaction equipment achieves no further significant consolidation.
 - .2 Ensure required compaction for each layer before placing any material for next layer.
- .3 Stones larger than 100 mm in diameter shall not be placed within 150 mm of subgrade elevation.
- .4 Compact each layer to minimum 95% maximum dry density: ASTM D 698 except top 150 mm of subgrade.
 - .1 Compact top 150 mm to 98% maximum dry density.
- .5 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.9 PROOF ROLLING

- .1 Proof roll using a suitable compaction and proof rolling equipment which is acceptable and useful for the loop road construction work. Departmental Representative shall review and approve all proof rolling equipment prior to use on the trail project.
- .2 Proof roll subgrade.
- .3 Make sufficient passes with proof roller to subject surface to three separate passes of the loaded tire. Departmental Representative to determine level of proof rolling.
- .4 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove subgrade material to depth and extent as directed by the Departmental Representative.
 - .2 Backfill excavated subgrade with common material and compact in accordance to this Section.

3.10 FINISHING

- .1 Shape entire roadbed to within 25 mm of design elevations.

2014-07-16

- .2 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock .
- .3 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

3.11 CLEANING

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

3.12 PROTECTION

- .1 Maintain finished surfaces in condition conforming to this section until acceptance by Departmental Representative .
- .2 Provide silt fences and erosion protection as required to mitigate and prevent impacts to adjacent properties.

END OF SECTION

PART 1 - GENERAL

- 1.1 DESCRIPTION .1 The work covered under this section includes:
- .1 Preparation of subgrade for placement of granular materials
 - .2 Supply of pit run granular material for construction of the road subbase.
 - .3 Load and haul excavated granular backfill materials.
 - .4 Place and compaction of granular backfill materials to construct the trail sub-base embankment to the lines and grades specified on the drawings.
- 1.2 MEASUREMENT AND PAYMENT .1 The Quantity of Granular Backfill for which payment shall be made shall be the the number of cubic metres (m3) of granular materials incorporated into the Work to build the sub-base embankment for the access and loop roads and accepted by the Departmental Representative. The quantity shall be determined through survey measurement of cross-sections and calculation of volume using average end area methods.
- .2 Payment for Granular Backfill will be under the Unit Price Table Item - Granular subbase and will encompass all labour, equipment, materials, hauling, and excavation required to place granular backfill to the lines and grades specified on the drawings.
 - .3 Supply, excavation, loading, hauling, placing, compacting, water for compaction and drying will be incidental to the work.
 - .4 No overhaul will be paid for this Work.
- 1.3 RELATED REQUIREMENTS .1 Section 01 35 31 - Special Procedures for Traffic Control and Construction Detours.
- .2 Section 01 35 43 - Environmental Procedures.
 - .3 Section 31 24 14 - Trail Excavation, Embankment and Compaction
-

.4 Section 32 11 14 - Granular Base Course.

1.4 REFERENCES

- .1 ASTM International
- .1 ASTM C 117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D 1557-09, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D 1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.5 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.6 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused granular material to a pit location approved by the Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 The granular backfill material will be granular pit run material sourced outside the Park. The contractor is responsible for all costs to acquire and supply the pit run materials for the Works.
- .2 The Granular Backfill will be comprised of gravel materials excavated and processed to the following specification:
 - .1 No particles will have a diameter in excess of 150 mm.
 - .2 The granular backfill will not have more than 25 % by volume particles having a diameter between 100mm and 150mm.
 - .3 The balance of the particle size for granular backfill will be less than 100 mm and be well graded.

PART 3 - EXECUTION

3.2 PLACEMENT AND
INSTALLATION

- .1 Place granular backfill after subgrade surface is inspected and approved in writing by Departmental Representative.
 - .2 Placing:
 - .1 Construct granular sub-base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .5 Place materials using methods that will not tear or displace the placed geotextile in the bottom of the excavated roadbeds.
 - .6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
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- .8 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
- .1 Ensure compaction equipment is capable of obtaining required material densities.
- .4 Compacting:
- .1 Compact to density not less than 98% corrected maximum dry density maximum dry density to ASTM D 1557.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .5 Proof rolling:
- .1 Proof rolling may be required to prove an area before placing of base materials and/or asphalt, at the discretion of the Departmental Representative.
- .2 Obtain written approval from Departmental Representative to use non standard proof rolling equipment.
- .3 Proof roll at level in granular base as indicated.
- .1 If use of non standard proof rolling equipment is approved, Departmental Representative to determine level of proof rolling.
- .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .5 Where proof rolling reveals areas of defective subgrade:
- .1 Replace sub-base material and compact in accordance with this section.
- .2 Replace base material and compact in accordance with this Section.
- .6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Departmental Representative and replace with new materials in accordance with this section at no extra cost.
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3.3 SITE TOLERANCES .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

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

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 The work covered under this section includes:
 - .1 Preparation of sub-base for placement of 20 mm Base Course
 - .2 Supply and haul 20 mm Base Course materials.
 - .3 Place and compaction of 20 mm base course materials to construct the trail base to the lines and grades specified on the drawings.

1.2 MEASUREMENT AND PAYMENT

- .1 The Quantity of 20 mm Base Course Material for which payment shall be made shall be the the number of cubic meters (m3) of 20 mm base course material incorporated into the Work to build the base course for the trail and accepted by the Departmental Representative. The quantity shall be determined through survey measurement of cross-sections and calculation of volume using average end area methods.
- .2 Payment for 20 mm Base Course will be under the Unit Price Table Item - Base Course Material and will encompass all labour, equipment, materials, hauling, and excavation required to supply and place 20 mm base course materials to the lines and grades specified on the drawings.
- .3 Supply, excavation, loading, hauling, placing, compacting, water for compaction and drying will be incidental to the work.
- .4 No overhaul will be paid for this Work.

1.3 RELATED REQUIREMENTS

- .1 Section 01 35 31 - Special Procedures for Traffic Control and Construction Detours.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 31 24 14 - Trail Excavation, Embankment and Compaction
- .4 Section 32 11 19 - Granular Backfill.

1.4 REFERENCES

- .1 ASTM International
 - .1 ASTM C 117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D 1557-09, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D 1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.5 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.6 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused granular material to a pit location approved by the Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 The contractor is responsible to locate a source outside the park and supply 20 mm base course material that meets AT Designation 2 Class 20 base aggregate. The contractor will be responsible for all charges related to the sourcing and supply of this material.

PART 3 - EXECUTION

3.2 PLACEMENT AND
INSTALLATION

- .1 Place 20 mm Base Course material after sub-base surface is inspected and approved in writing by Departmental Representative.
 - .2 Placing:
 - .1 Construct 20 mm base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .5 Place material to full width in uniform layers not exceeding 100 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
 - .3 Compaction Equipment:
 - .1 Ensure compaction equipment is capable of obtaining required material densities.
 - .4 Compacting:
 - .1 Compact to density not less than 98% corrected maximum dry density maximum dry density to ASTM D 1557.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
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- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
 - .5 Proof rolling:
 - .1 Proof rolling may be required to prove an area before placing of base materials and/or asphalt, at the discretion of the Departmental Representative.
 - .2 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730mm.
 - .3 Obtain written approval from Departmental Representative to use non standard proof rolling equipment.
 - .4 Proof roll at level in granular base as indicated.
 - .1 If use of non standard proof rolling equipment is approved, Departmental Representative to determine level of proof rolling.
 - .5 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
 - .6 Where proof rolling reveals areas of defective subgrade:
 - .1 Replace base, sub-base and subgrade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade material with granular backfill and compact in accordance to Section 32 11 19 - Granular Backfill.
 - .3 Replace excavated sub-base material with granular backfill and compact in accordance to Section 32 11 19 - Granular Backfill.
 - .4 Replace base material and compact in accordance with this Section.
 - .7 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Departmental Representative and replace with new materials in accordance with this section at no extra cost.
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3.3 SITE TOLERANCES .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and application of asphalt prime to granular base surface prior to asphalt paving as approved by the Departmental Representative.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 32 12 16 – Asphalt Concrete Pavement

1.3 MEASUREMENT PROCEDURES

- .1 Supply, Delivery and Application of asphalt prime will be will not be measured separately and will be considered incidental to **“Unit Price Item - Asphalt Trail Surfacing”**.

1.4 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D140-01, Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.1-M89, Cutback Asphalts for Road Purposes.
 - .2 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.5 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two - 1 L samples of asphalt prime proposed for use in new, clean, air tight sealed, wide mouth, bottles made with plastic, to Departmental Representative, at least 2 weeks prior to commencing work.
- .3 Sample asphalt prime coat materials in accordance with ASTM D140.
- .4 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

1.6 QUALITY ASSURANCE

- .1 Upon request from Departmental Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials to ASTM D140.
- .2 Provide, maintain and restore asphalt storage area.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures and with the Waste Reduction Work Plan.
- .2 Divert unused asphalt materials to facility capable of recycling materials.

Part 2 Products

2.1 MATERIAL

- .1 Asphalt material: to CAN/CGSB-16.1 grade: RM-20, MC-30, MC-250. CAN/CGSB-16.2 grade: SS-1.
- .2 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .3 Water: clean, potable, free from foreign matter.

2.2 EQUIPMENT

- .1 Pressure distributor to be:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 3 m.
 - .3 Applied at controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .2 Equipped with meter registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
 - .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
 - .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .5 Equipped with accurate volume measuring device or calibrated tank.
 - .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .7 Equipped with nozzle spray bar, with operational height adjustment.
 - .8 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 APPLICATION

- .1 Obtain Departmental Representative's approval of granular base surface before applying asphalt prime.
- .2 Cutback asphalt:
 - .1 Heat asphalt prime to a temperature for pumping and spraying as recommended by the supplier.
 - .2 Apply asphalt prime to granular base at rate recommended by the supplier and approved by the Departmental Representative.
 - .3 Apply on dry surface unless otherwise directed by Departmental Representative.
- .3 Anionic emulsified asphalt:
 - .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application.
 - .2 Mix thoroughly by pumping or other method approved by Departmental Representative.
 - .3 Apply diluted asphalt emulsion at rate recommended by the supplier and approved by the Departmental Representative.
 - .4 Apply diluted asphalt emulsion on damp surface unless otherwise directed by Departmental Representative.
- .4 Apply asphalt prime only on unfrozen surface.
- .5 Do not apply prime when air temperature is less than 10 degrees C or when rain is forecast within 2 hours.
- .6 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.
- .7 Where traffic is to be maintained, treat no more than one-half width of surface in one application.
- .8 Prevent overlap at junction of applications.
- .9 Do not prime surfaces that will be visible when paving is complete.
- .10 Apply additional material to areas not sufficiently covered as directed by Departmental Representative.
- .11 Keep traffic off primed areas until asphalt prime has set.
- .12 Permit prime to set before placing asphalt paving.

3.2 USE OF SAND BLOTTER

- .1 If asphalt prime fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.
- .2 Allow sufficient time for excess prime to be absorbed.

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- .3 Apply second application of sand blotter as required.

END OF SECTION

Part 1 GENERAL NOTE: ASPHALT TO BE SUPPLIED BY CONTRACTOR.

1.1 PRODUCTS TO BE SUPPLIED UNDER THIS SECTION:

- .1 AT Designation Class 16 Asphalt Aggregate to be supplied by the Contractor from Asphalt Plants located outside Banff National Park.
- .2 RELATED SECTIONS
 - .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 35 31 – Special Procedures for Traffic Control and Construction Detours
 - .3 Section 01 35 43 - Environmental Procedures.
 - .4 Section 31 24 14 - Roadway Excavation, Embankment and Compaction.
 - .5 Section 32 11 19 – Granular Backfill.
 - .6 Section 32 11 24 – 20 mm Base Course Material.
 - .7 Section 32 12 14 - Asphalt Prime.

1.1 DESCRIPTION

- .1 Hot Mix Asphalt Concrete Pavement (HMACP) shall consist of supplied AT Designation Class 16 Asphalt Aggregate and asphalt cement, combined in a hot mix plant as hereinafter specified, placed and compacted to the specified density on a prepared surface in conformity to the lines, grades, dimensions and cross-sections as shown on the Drawings or as directed by the Departmental Representative. The mix type for this application is H1 (Alberta Transportation Mix Type)

1.2 MEASUREMENT PROCEDURES, UNIT PRICE ADJUSTMENTS AND PENALTY ASSESSMENTS

- .1 Accepted HMACP will be measured in square meters and will be paid for at the unit price for Asphalt Concrete Pavement subject to unit price adjustments and assessments hereinafter specified. Payment shall be compensation in full for supply of asphalt concrete mix including all materials, supply and application of prime/tack coat, processing, Plant mixing, supply, loading, hauling, paver laying, compacting, finishing surface, raking, interim lane marking, quality control testing, safety, and maintenance. **Payment shall be under “Unit Price Item – Asphalt Paving”.**
- .2 Supply of anti-stripping agent(s) IF REQUIRED and approved by the Departmental Representative, will be paid under “Prime Cost Sum:”. The Prime Cost Sum, as set out in the Unit Price Table, is not to be considered a sum due to the Contractor; rather, it is a sum against which payment will be made to the Contractor as supported by supplier invoices and weight tickets.
- .3 Removal and Disposal of Fillet and Ramp Material. The removal and disposal of fillet and/or ramp material will be considered incidental to the Work and will not be paid for separately. Material is to be disposed of as directed by the Departmental Representative.

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- .4 The following end product properties of the HMACP will be measured for acceptance in accordance with Section 2.3.4, Acceptance Sampling and Testing.
- .1 Density.
 - .2 Actual Asphalt Content.
 - .3 Gradation.
 - .4 Smoothness.
 - .5 Segregation

1.3 DEFINITIONS

- .1 Asphalt Cement: specified type and grade of asphalt binder used in HMACP.
- .2 Asphalt Concrete Mix Aggregates: aggregates after the combination of all processed aggregates used in HMACP.
- .3 Asphalt Concrete Mix: high quality, carefully controlled, hot plant mix of asphalt cement and dense graded, high quality crushed coarse aggregate, and RAP (if applicable), blend sand material(s) as required, used in HMACP.
- .4 Hot Mix Asphalt Concrete Pavement (HMACP): paver laid, asphalt concrete mix placed and compacted on a prepared surface in conformity to the lines, grades, dimensions and cross-sections as shown on the Drawings or as directed by the Departmental Representative.
- .5 Job Mix Formula: the job mix formula establishing the aggregate proportioning, target aggregate gradation, and approved design asphalt cement content to be used for production of HMACP which requires the written approval of the Departmental Representative, on the basis of a **Contractor submitted mix design**.
- .6 Quality Control: The sum of all Contractor activities to ensure a product meets contract specification requirements which may include material handling and construction procedures, calibration and maintenance of equipment, production process control and any sampling, testing and inspection that is done for these purposes. **The Contractor is entirely responsible for quality control.**
- .7 Quality Assurance: The Departmental Representative's sampling and testing of the end product for the purpose of determining acceptance/rejection and payment. Unless otherwise specified, the latest edition of the following standard Alberta Transportation test methods (ATT) indicated below will be used:

	TEST DESCRIPTION	TEST METHOD
1	Sampling Mixes	ATT-37
2	Coring	ATT-5
3	Extraction	ATT-12
4	Correction Factor, Extracted Asphalt Content	ATT-12 Part III
5	Percent Fracture	ATT-50
6	Sieve Analysis	ATT-26

7	Density, Immersion Method, Waxed Asphalt Concrete Specimens	ATT-6
8	Density, Immersion Method, Saturated Surface Dry Asphalt Concrete Specimens	ATT-7
9	Voids Calculations, Asphalt Concrete Specimens	ATT-36
10	Percent Compaction, Asphalt Concrete Pavement	ATT-67
11	Forming Marshall Specimens, Field Method	ATT-13
12	Moisture Content, Oven Method Asphalt Concrete Mixes	ATT-15
13	Smoothness of Pavements, Profilograph Method	ATT-59
14	Stratified Random Test Sites for A.C.P. Projects	ATT-56
15	Appeal Testing, Asphalt Content, Density and Gradation	ATT-68
16	Asphalt Content, Ignition Method	ATT-74
17	Correction Factor, Ignition Asphalt Content	ATT-74 Part II
18	Asphalt Content	AASHTO T164 , T287 or ATT-12 or ATT-74
19	Segregation	Paving Guidelines and Segregation Rating Manual
20	Theoretical Film Thickness (Ft)	TLT-311

.8 AA Acceptance Limits:

- .1 Acceptance limits for Density are the limiting values of the Lot Mean within which a Lot will be accepted at full, increased, or reduced payment for Density, as shown in Table No. 1.
- .2 Acceptance limits for Actual Asphalt Content are the limiting values of the Lot Mean within which a Lot will be accepted at full or reduced payment, as shown in Table No. 2.

.9 Asphalt Content:

- .1 Design Asphalt Content: the asphalt cement content as established by the submitted mix design, and as approved in writing by the Departmental Representative.
- .2 Approved Asphalt Content: the design asphalt cement content or subsequent adjustments to it, as approved in writing by the Departmental Representative.
- .3 Actual Asphalt Content: The amount of asphalt cement in the asphalt concrete mix as determined by testing done under the Departmental Representative's quality assurance program and includes an amount to correct for the asphalt cement lost due to absorption by the aggregates. This correction will be determined for each change in aggregate or asphalt binder.

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- .10 End Product Specification (EPS):
A specification that does not specify methods of construction. Under EPS, the end product will be accepted or rejected according to a specified acceptance plan. The Departmental Representative will monitor the Contractor's control of process that produces the items of construction. The Contractor is entirely responsible for quality control during production and placement of HMA CP. The end product acceptance is the responsibility of the Departmental Representative and includes a statistically oriented program of acceptance testing.
- .11 Lot:
A Lot is a portion of Work being considered for acceptance and is defined as follows:
- .1 One day's plant production of more than four hours where approved changes of the following criteria have not occurred:
- .1 Job Mix Formula.
.2 Pavement Density requirement.
.3 Project.
- A change in any one of the above may require a new Lot designation.
- .2 One day's plant production of less than four hours will be dealt with as follows:
- .1 The material will be added to the previous day's Lot with the same criteria as specified in 1.2.12.1 unless testing indicates that mix is subject to unit adjustment. Then this production will be designated as a Lot.
.2 If it is the last time the mix is produced with these criteria then the production will be designated as a Lot.
.3 If the Departmental Representative suspects a portion of a Lot is substandard; he may order extra testing to define the area and severity of the deficiency. A new Lot will be designated for this portion if the extra testing indicates the HMA CP is subject to unit price adjustment or rejection.
- .12 Lot Mean and Range
Lot Mean is the arithmetic mean of a set of five or more test results constituting the sample for the Lot. The Range represents the difference between the highest and lowest values within the previously noted set of test results.
- .13 Stratified Random Sample
A set of test measurements taken one each from five or more separate (stratified) areas or segments within a Lot, in an unbiased way.
- .14 Rejection Limit
- .1 Density and Actual Asphalt Content - Rejection limit for density and actual asphalt content is the limiting value of the Lot Mean beyond which a Lot is rejected and not paid for as shown in Table No. 's 1 and 2.
- .2 Gradation - Rejection limit for gradation is the limiting value of the Lot mean beyond which a Lot is rejected and not paid for as shown in Table No. 3.

2014-02-24

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- .3 Smoothness - Rejection limit for smoothness is the limiting value of the Profile Index (PrI) beyond which a Lot is rejected and not paid for as shown in Table No. 4.
- .15 Segregated Area
- .4 An area of the pavement where the texture differs visually from the texture of the surrounding pavement. For the purposes of classifying pavement segregation, only segregated areas greater than 0.1 sq. m. and centre-of-paver streaks greater than 1 m in length will be considered. Moderate or severe segregated areas which do not meet these size parameters will be considered obvious defects.
- .16 Segregation Severity
- .1 None - Completely uniform surface texture; the matrix of asphalt and fine aggregate is in place between the coarse aggregate.
- .2 Slight - The matrix, asphalt cement, and fine aggregate is in place between the coarse aggregate. However there is more stone in comparison to the surrounding acceptable mix.
- .3 Moderate - Significantly more stone is visible than in the surrounding acceptable asphalt concrete; moderately segregated areas usually exhibit a lack of continuous contact with the surrounding matrix.
- .4 Severe - Appears as an area of very stony mix, with stone against stone with very little or no matrix.
- .5 Centre-of- Paver Streak - Appears as a continuous or semi-continuous longitudinal “streak” typically located in the middle of the paver “mat”.
- .17 Surface Defects are identified as:
- .1 Individual bumps and dips that are 12 mm or greater. Bumps and dips between 8 and 12 mm will be subject to a penalty per bump or dip.
- .2 Areas of segregation greater than 0.1 sq. m.
- .3 Areas containing excess or insufficient asphalt cement.
- .4 Improper matching of longitudinal and transverse joints on the final lift of the HMA CP.
- .5 Roller marks in final lift of the HMA CP.
- .6 Cracking or tearing of the HMA CP.
- .7 Tire marks in the surface of the HMA CP.
- .8 Sampling locations not properly repaired.
- .9 Improperly constructed patches.

1.4 REFERENCES

- .1 ASTM International (ASTM).

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- .1 ASTM C 88, Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
 - .2 ASTM C 117, Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C 123, Test Method for Lightweight Pieces in Aggregate.
 - .4 ASTM C 127, Test Method for Specific Gravity and Absorption of Coarse Aggregate.
 - .5 ASTM C 128, Test Method for Specific Gravity and Absorption of Fine Aggregate.
 - .6 ASTM C 131, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .7 ASTM C 136, Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .8 ASTM D 995, Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
 - .9 ASTM D 1559, Test Method for Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.
 - .10 ASTM D 2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 - .11 ASTM D 3203, Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
 - .12 ASTM D 4791, Test Method for Flat and Elongated Particles in Coarse Aggregate.
 - .13 ASTM D 6373, Standard Specification for Performance Graded Asphalt Binder.
 - .14 ASTM E1274, Standard Test Method for Measuring Pavement Roughness Using a Profilograph
- .2 Asphalt Institute (AI).
 - .15 Asphalt Institute MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types Sixth Edition.
 - .3 Association of American State Highway and Transportation Officials (AASHTO).
 - .1 AASHTO M320, Performance-Graded Asphalt Binder
 - .2 AASHTO T40, Standard Method for Sampling Bituminous Materials
 - .3 AASHTO T164, Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Place materials defined as hazardous and toxic in designated containers.

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- .3 Remove from site and dispose of hazardous or toxic materials at appropriate recycling facility.

1.6 END PRODUCT ACCEPTANCE OR REJECTION

- .1 General: The Contractor shall provide an HMA CP end product conforming in quality and accuracy of detail to dimensional and tolerance requirements of specifications and Drawings. Where no tolerances are specified, standard of workmanship shall be in accordance with normally accepted good practice.
- .2 End Product Acceptance.
 - .1 Acceptance at Full or Increased Payment - Acceptance of any Lot at full or increased payment will occur if it contains no obvious defects and if:
 - .1 the Lot Mean for Density of the compacted asphalt concrete mix in the Lot is not in penalty or rejection according to the criteria outlined in Table No. 1.
 - .2 the Lot Mean for Actual Asphalt Content of mix, obtained by extraction, is within 0.3 of the Approved Asphalt Content;
 - .3 For Smoothness, full payment will occur if the Profile Index of all the Lot, in the top lift of pavement, are not in penalty or rejection according to the criteria outlined in Table No. 4. Increased payment will occur if the Profile Index of all lots in the Lot, in the top lift of pavement, are zero.
 - .4 Individual bumps and dips in top lift of pavement do not exceed 8 mm.
 - .5 For gradation, full payment will occur if there are no Lot Mean Adjustments for gradation and increased payment will occur if there are no Lot Mean Adjustments and the Maximum range as shown in Table No. 5 is not exceeded for any sieve size in the Lot.
 - .3 End Product Rejection
 - .1 If the Lot Mean for Density, Actual Asphalt Content or Gradation are outside the applicable acceptance limits, then the Lot is rejected automatically, regardless of the values of the other control characteristics.
 - .2 If the smoothness of the top lift of any lot is outside the acceptance limit, then the lot is rejected automatically, regardless of the values of the other control characteristics.
 - .3 The finished surface of any lift shall have a uniform close texture and be free of visible signs of poor workmanship. Any obvious defects as determined by the Departmental Representative such as, but not limited to the following, will be cause for automatic rejection of asphalt concrete pavement regardless of the values of any other control characteristic:
 - .1 individual bumps and dips that exceed 12 mm. The Departmental Representative may reject asphalt concrete pavement with individual bumps and dips exceeding 8 mm and less than 12 mm.
 - .2 segregated areas not already covered in Section 1.6.3.

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- .3 areas of excessive or insufficient asphalt cement.
 - .4 improper matching of longitudinal and transverse joints.
 - .5 roller marks.
 - .6 tire marks.
 - .7 cracking or tearing.
 - .8 improperly repaired sampling locations.
 - .9 improperly constructed patches.

When asphalt concrete pavement is rejected by reason of obvious defects, the minimum area of rejection will be the Lot size defined in Section 1.2.12 of this specification.

- .4 Rejected work shall be promptly repaired, remedied, overlaid, or removed and replaced all in a manner acceptable to the Departmental Representative. The Contractor shall be responsible for all costs including materials.
- .5 No payment will be made for work in any Lot which has been rejected, until the defects have been remedied.

1.7 MEASUREMENT AND PAYMENT

.1 General

The unit prices for the following items of work shall be full compensation for all supply of materials, all labour, material, tools, equipment, and incidentals necessary to complete the work in accordance with these specifications.

- .2 Hot Mix Asphalt Concrete Pavement Materials shall be supplied by Contractor and is to haul and deliver to the Banff Legacy Trail job site and completely install within the trail area.

Part 2 Products

2.1 MATERIALS

.1 Aggregate:

- .1 **Supplied by the Contractor.** Mix design using aggregates is included with the tender package
- .2 Contractor has to carry out its own mix design using the aggregate supplied .

.2 Asphalt Cement

- .1 **Supplied by the Contractor.** Asphalt cement in accordance with Table No. 11.
- .2 Any change in asphalt cement type or grade must be approved by the Departmental Representative.

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- .3 Asphalt cement shall conform to all applicable requirements of this specification and AASHTO M320, Performance-Graded Asphalt Binder.
- .3 Responsibility for Mix Design
- .1 Preparing and submitting the asphalt mix design(s) is the responsibility of the Contractor. All costs incurred in mix design formulation are the responsibility of Contractor. Shipping costs for samples sent to the Departmental Representative for verification and approval of the mix design(s) are responsibility of Contractor.
- .2 The Contractor shall use a professional engineering company and a qualified testing laboratory, licensed to practice in Alberta, to assess the aggregate materials proposed for use and to carry out the design of the asphalt concrete mix.
- .4 Requirements for Mix Design(s)
The asphalt concrete mix design shall follow Marshall Method of Mix Design as outlined in latest edition of the Asphalt Institute Manual Series No. 2 (MS-2). Mix design, at the Design Asphalt Content, shall meet all the requirements in Table No. 11 for the asphalt concrete mix indicated.
- .5 Approval of Mix Design.
The Contractor shall submit the mix design(s) to the Departmental Representative for approval. The Contractor's submission shall include the following information:
- .1 Aggregate source name(s) and location(s).
- .2 Gradation of each aggregate to be used in the asphalt concrete mix.
- .3 Percentage by mass of each aggregate to be used in the asphalt concrete mix.
- .4 Mix design gradation of the combined aggregates.
- .5 Aggregate characteristics including sand equivalent, percentage of fractured faces, bulk specific gravity, L.A. Abrasion Loss, and Plasticity Index when combined at the mix design gradation..
- .6 All Marshall mix design characteristics, including all mix void properties and graphs used in arriving at the final mix design, bulk specific gravity of combined aggregates, and asphalt absorption of combined aggregates.
- .7 Recommended Design Asphalt Content expressed as a percentage by dry weight of aggregate.
- .8 Maximum theoretical specific gravity of the asphalt concrete mix, at the recommended design asphalt content, and at asphalt contents considered above and below design asphalt content.
- .9 Identification of each asphalt supplier by name, location and type and grade of asphalt cement to be supplied.
- .10 For each asphalt cement supplied, a current typical analysis, temperature-viscosity chart, the specific gravity, and the recommended mixing and compaction temperatures for the preparation of the mix design specimens.

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- .11 RAP is not permitted to be used in this mix design.
 - .12 The laboratory determined correction factor to account for the un-extracted asphalt cement due to absorption by the aggregates.
- .6 Verification of Mix Design.
- .1 Provide representative samples of each of the aggregate components, including RAP if used, and asphalt cement for verification purposes. A sufficient quantity of each component shall be provided to result in a 100 kg sample of combined aggregate at design proportions. The Departmental Representative will require up to five working days from time of receipt of sample to verify the mix design. Cost of such mix design verification will be borne by the Departmental Representative.
 - .2 As a part of asphalt mix design evaluation, the Departmental Representative may determine the following properties:
 - .1 Bulk Specific gravity for asphalt mix aggregate.
 - .2 Marshall Density.
 - .3 Theoretical maximum specific gravity of asphalt mix at design asphalt content and at each asphalt content considered by Contractor above and below design asphalt content.
 - .3 Difference between property values submitted by Contractor and property values as determined by the Departmental Representative shall not exceed the amounts shown in Table 11.
 - .4 The asphalt mix design(s) shall be rejected if maximum permissible variations are exceeded.
 - .5 Any change in nature or sources of aggregate(s), or where a new mix design is desired by the Contractor, a complete mix design will be required. This new mix design shall be subject to the approval of the Departmental Representative.
 - .6 The Departmental Representative will not accept any asphalt concrete mix produced prior to the Contractor receiving written approval of the mix design from the Departmental Representative.
 - .7 Aggregate proportioning and asphalt content for the approved mix design will form the job mix formula for the production of asphalt concrete mix.
 - .8 The Contractor shall be totally responsible for production of aggregates and asphalt concrete mixes in conformance with the specifications.
- .7 Variation from Approved Job Mix Formula
- .1 After the job mix formula gradation and proportioning of various aggregate sizes have been established and approved, no alteration will be permitted.
 - .2 The Lot Mean Marshall air voids shall not vary from approved mix design air voids by more than 0.5%.

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- .3 If there are any deviations from the approved job mix formula, or any alterations of aggregate proportioning, the Departmental Representative will determine if a new mix design is required.
 - .4 Any deviation whatsoever from the approved job mix formula shall require the prior written approval of the Departmental Representative and the Departmental Representative will not accept any asphalt mix produced prior to this approval.
 - .5 If the sum of any approved deviations are in excess of any one of the following limits away from the approved job mix formula, a new mix design is required:
 - +/-5% passing the 5,000 μm sieve;
 - +/-1.0% passing the 80 μm sieve;
 - +/-0.3% asphalt cement content; and/or
 - +/- 1.0% in target proportion of RAP.
 - .6 Any change in the approved job mix formula shall not result in a Theoretical Film Thickness value less than specified in Table No. 11.

2.2 ACCEPTANCE SAMPLING AND TESTING

- .1 General
 - .1 During the progress of the Work, tests will be carried out on materials and workmanship in order to ensure compliance with the requirements of the specifications.
 - .2 Where it is required in these specifications that the Contractor submit samples of materials or mixtures to the Departmental Representative for approval, these samples shall be submitted in sufficient time for proper testing.
 - .3 The Departmental Representative's approval of any materials or mixture shall in no way relieve the Contractor from his obligation to provide materials, mixtures, and workmanship in accordance with the specifications.
 - .4 Where specified, random sampling procedures shall be followed, and where no specific random sampling procedure is specified the sampling procedure shall be as identified by the Departmental Representative in the case of acceptance testing and by the Contractor in the case of quality control testing.
 - .5 The Departmental Representative shall have access to the Work at all times for taking samples. The Contractor shall provide any assistance necessary for taking samples and shall reinstate pavement layers or other structures to the satisfaction of the Departmental Representative at the positions where samples have been taken. Compensation for providing assistance with sampling and for reinstatement where samples are taken shall be included in the unit price bid for the various items of Work tested and no separate payment will be made.
 - .6 The Contractor shall provide and prepare, to the satisfaction of the Departmental Representative, a suitable site for the parking of a mobile laboratory trailer. The Contractor shall provide a continuous supply of water and power to the mobile laboratory trailer, at his own expense.

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- .2 Methods of Testing for Acceptance and Appeal Testing
- .1 Unless otherwise specified, the latest edition of the applicable ASTM or AASHTO standards will be used to determine material characteristics.
- .1 In all test methods used as reference in this specification, metric sieves as specified in Canadian General Standards Board Specification 8-GP-2M shall be substituted for any other specified wire cloth sieves Table No. 13.
- .2 In all cases the latest amendment or revision current at the closing date of the tender is implied when reference is made to one of the above standards in the specification.
- .3 Quality Control Testing
- .1 Quality control testing is the responsibility of the Contractor throughout every stage of the Work from the crushing and production of aggregates to the final accepted product. Tests performed by the Departmental Representative will not be considered to be quality control tests.
- .2 The Contractor shall provide and pay for equipment and qualified personnel to obtain all quality assurance core samples and perform all quality control testing necessary to determine and monitor the characteristics of the materials produced and incorporated into the work, and the final product produced.
- .3 If the Contractor elects to use RAP, the asphalt content and gradation of the RAP shall be determined at a minimum frequency of one per 1,000 tonnes of RAP and a minimum of ten samples shall be tested for each RAP source.
- .4 When required by the Departmental Representative, the RAP rheology shall be determined at a minimum frequency of one per 5,000 tonnes of RAP and a minimum of three samples shall be tested for each RAP source.
- .5 Test methods are described in Section 2.3.2, Methods of Testing for Acceptance and Appeal Testing. Minimum testing frequencies of quality control testing are listed in Table No. 12. The Departmental Representative may require an increase in the frequency of any quality control test, which the Contractor has proposed. The Contractor shall arrange and pay for any additional tests required by the Departmental Representative.
- .6 Results of all quality control tests shall be submitted to the Departmental Representative as they become available. In addition, the quality control test results for mix asphalt content and aggregate gradation shall be provided to the Departmental Representative no later than 12:00 noon of the day following placement.
- .7 The Contractor shall bear the cost of all consulting services retained by him.
- .8 The Contractor shall be totally responsible for production of aggregate and mixes that meet all the specified requirements.
- .4 Acceptance Sampling and Testing
- .1 General: Within this specification, certain requirements, limits, and tolerances are specified regarding the quality of materials and workmanship to be supplied.

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- Compliance with these requirements where so specified, shall be determined by statistical testing as described in this section.
- .2 Acceptance testing is the responsibility of the Departmental Representative.
 - .3 The Contractor shall provide to the Departmental Representative all quality assurance density cores and any additional cores requested by the Departmental Representative for quality assurance testing for asphalt content and gradation by 12:00 noon of the day following placement, unless otherwise permitted by the Departmental Representative.
 - .4 Prior to the Contractor obtaining the cores, the Departmental Representative may provide the Contractor with new or different random sample locations. The Departmental Representative may have the Contractor obtain cores for quality assurance testing at any time throughout the project for any Lot.
 - .5 All cores provided to the Departmental Representative shall be in their original condition. Core preparation or sawing shall be done by the Departmental Representative.
 - .6 All costs associated with pavement coring for both quality control and quality assurance testing shall be the responsibility of the Contractor.
 - .7 Initial acceptance testing will be performed free of cost to the Contractor. The Contractor shall be responsible for the cost of all quality assurance testing performed on material that is used to replace or overlay material that has been previously rejected.
 - .8 The Contractor shall be responsible for the cost of all quality assurance retesting performed following attempts to improve smoothness or to remove bumps or dips.
 - .9 After all quality control tests for the Lot are reported to the Departmental Representative, the Departmental Representative will provide the Contractor with a copy of the results of acceptance tests within one working day of their availability.
 - .10 If the Departmental Representative determines that certain test results are faulty due to testing equipment malfunction, improper testing procedures, or calculations, he will replace the faulty tests with new tests.
 - .11 If the testing equipment malfunction, improper testing procedures, or calculations were on the part of the Departmental Representative, the Contractor shall be reimbursed \$50 per location for obtaining cores.
- .5 Acceptance Sampling and Testing Procedures
- .1 Density, Asphalt Content and Gradation
 - .1 Pavement sampling will be done using stratified random sampling procedures. A minimum of five tests per Lot will be selected as follows:
 - .1 The Lot will be divided into five or more segments of approximately equal quantity.

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- .2 In each segment a test site will be located by using random numbers to determine the longitudinal distance from the end of the segment and the lateral distance from the edge of the segment. In no case will a lateral distance be less than 0.5 m from the shoulder or 0.3 m from any other edge of a mat except when matching mats, in which case the test site may be within 0.3 m of the joint.
 - .2 For lifts of 20 mm or less, samples for asphalt content and gradation may be obtained by the Departmental Representative using the Sampling Mix Behind Paver method. If sufficient numbers of mix samples cannot be obtained in this manner, stratified random core samples shall be taken by the Contractor as determined by the Departmental Representative in order to perform the minimum five tests per Lot.
 - .2 Smoothness
 - .1 The surface of the lots in the final lift of asphalt concrete pavement will be profiled by the Departmental Representative in accordance with ASTM E1274, Standard Test Method for Measuring Pavement Roughness Using a Profilograph, using a California Cox model profilograph. Other makes of profilograph machines may be used if they have been individually approved by the Departmental Representative. Profiles will be made approximately at the traffic wheel paths.
 - .2 Smoothness testing will also be undertaken on all passing, climbing, deceleration and acceleration lanes that are greater than 100 m in length, and on all interchange ramps. Tapers will not be subject to smoothness testing.
 - .3 Smoothness testing will extend completely across all transverse joints between existing pavement and HMA CP placed under this Contract. Penalty assessments and acceptance/rejection criteria will apply to all such bumps and dips identified.
 - .4 PrI assessment for smoothness will be determined starting at the location where all wheels of the profilograph are on HMA CP placed under this contract.
 - .5 Weather permitting, acceptance testing for smoothness will normally be completed within two weeks following the completion of all paving work subject to smoothness testing.
 - .3 Asphalt Concrete Mix Sampling
 - .1 Sampling of the asphalt mixture for Marshall compaction comparison will be done by the Departmental Representative using the procedures identified AASHTO T40, Sampling Bituminous Materials.
 - .4 Exclusions to Random Sampling
 - .1 Random sampling methods will not be applied when the Departmental Representative samples mix behind the paver on lifts of 20 mm or less;

2014-02-24

nor to small areas such as tapers, approaches, areas of handwork, gores;
nor for asphalt mix used for isolated leveling and repair of failed areas.

- .6 Inspections for Pavement Segregation
 - .1 Inspection by the Contractor
 - .1 The Contractor shall perform a daily inspection of the paving operations on all lifts of pavement to identify any instances of pavement segregation.
 - .2 If segregation is evident, the Contractor shall take immediate corrective action to his operations to prevent any further occurrence of segregation.
 - .2 Inspections by the Departmental Representative during Construction
 - .1 The Departmental Representative shall inspect the top lift of pavement. Typically, each pavement Lot would be inspected, as soon as possible after the Lot is placed. During the inspection(s) of the top lift, the Departmental Representative will identify and record any areas of moderate and severe segregation and any areas of center-of-paver streak. Areas requiring repair shall be marked. The Departmental Representative will provide the Contractor with a written assessment (location and severity) of the segregated areas as soon as possible following each inspection.
 - .3 Inspection by the Departmental Representative Following Construction
 - .1 The Departmental Representative shall conduct a second inspection of the top lift, normally two weeks after the completion of all paving work. During this inspection, the Departmental Representative will identify and record any areas of slight, moderate, and severe segregation and any areas of centre-of-paver streak which were not identified in the inspections during construction. The Departmental Representative will provide the Contractor with a written assessment (location and severity) of the segregated areas as soon as possible following this inspection.
- .7 Repairing Pavement Segregation
 - .1 Pavement segregation identified during the inspection performed two weeks after the completion of paving operations will not require repair. However, this shall not relieve the Contractor from his responsibility to repair any obvious defects, deteriorated repairs, or failures which become evident within the warranty period.
 - .2 Pavement segregation identified in the inspections performed during construction shall be repaired by the Contractor at his expense and in accordance with the following:

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- .1 Moderate and severe segregation in the top lift of pavement and on entrances and intersections shall require repair.
 - .3 Slight segregation on any lift of pavement will not require repair.
 - .4 Moderate segregation on lower lifts will not require repair.
 - .3 Only moderate and severely segregated centre-of-paver streak on the top lift of pavement will require repair.
 - .4 The following methods of repair are pre-approved:
 - .1 Moderate Segregation - The Contractor has the option of using a slurry patch or a hot mix patch.
 - .2 Severe Segregation - The Contractor has the option of removal and replacement or overlay.
 - .5 Any other methods of repair proposed by the Contractor will be subject to the approval of the Departmental Representative with the exception that the application of asphalt (by distributor, hand spraying, squeegeeing, etc.) shall not be permitted as a method of repair under any circumstances.
 - .6 Repairs for segregation using an overlay shall be for the entire pavement width.
 - .7 Repairs for segregation using removal and replacement shall be for the trail width as applicable, depending on the extent of the segregated area. The full depth of the asphalt lift shall be removed and replaced with new HMA CP using an appropriate paver and cold milling equipment.
 - .8 All HMA CP material used for overlay and removal and replacement repairs shall have a tack coat applied prior to placement and will be subject to the requirements of Section 1.5, End Product Acceptance or Rejection.
 - .9 The Departmental Representative will mark out the area of repair. The "marked area" shall extend a minimum of 0.5 metres beyond the segregated area. For centre-of-paver streak, the "marked area" shall extend a minimum of 100 mm laterally and 0.5 metres longitudinally beyond the streak.
 - .10 All repairs shall be regular in shape and finished using good workmanship practises to provide an appearance suitable to the Departmental Representative.
 - .11 Traffic shall be kept off all repairs for a sufficient period of time to ensure that tracking does not occur.
 - .12 All hot mix and other repairs for which compaction is normally required shall be properly compacted.
 - .13 In the event repairs cover existing roadway lines or markings, the Contractor shall reinstate the lines and markings at his expense and to the satisfaction of the Departmental Representative.

2014-02-24

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- .14 Repairing pavement segregation will not affect the assessment of segregation payment adjustments.
 - .15 Repairs shall be completed during construction or shortly after construction, except when prevented by inclement weather or seasonal shutdown. In these cases, the Contractor shall complete the repairs prior to June 15 of the following year.
- .8 Appeal of Acceptance Test Results and Appeal Testing
- .1 Density, Asphalt Content, and Gradation
 - .1 The Contractor may appeal the results of acceptance testing of Density, Asphalt Content, or Gradation for any rejected or penalized Lot only once.
 - .2 Appeals will only be considered if cause can be shown. Quality control test results for Density that are provided to the Departmental Representative subsequent to the Contractor's receipt of the quality assurance test results for that Lot will not be considered when evaluating cause for an appeal.
 - .2 The following procedures will apply for an appeal:
 - .1 For Gradation and Asphalt Content appeals, the Contractor shall serve notice of appeal to the Departmental Representative, in writing, within 48 hours of receipt of the test results.
For all other appeals notice shall be served to the Departmental Representative, in writing, within 24 hours of receipt of the test results.
 - .2 The Departmental Representative will arrange and pay for an independent testing laboratory certified to operate in the Province of Alberta, to perform the appeal testing. The personnel employed or testing laboratory retained by the Contractor for quality control testing on the project will not be used for appeal testing.
 - .3 The Departmental Representative will determine the number and location of the new tests for each segment in accordance with Section 2.3.4, Acceptance Sampling and Testing. The Contractor shall sample the pavement at such locations and provide the samples to the Departmental Representative.
 - .6 The new values, thus determined, in all cases, will be binding on the Contractor and the Departmental Representative.
 - .3 Smoothness
 - .1 The Contractor may appeal acceptance test results of Smoothness of any rejected or penalized Sublot once.
 - .2 The appeal shall be in writing and submitted within 24 hours of receipt of the test results.
 - .3 Any attempt to improve Smoothness on the appealed lot after the Departmental Representative has tested the Lot for acceptance

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- shall void the appeal and the original test results will apply.
- .4 The appeal testing will be performed by an independent firm that is approved by the Departmental Representative to undertake the Smoothness testing.
 - .5 The new results will be binding on the Contractor and the Departmental Representative.
- .4 Segregation Rating
- .1 The Contractor may appeal the segregation rating in any portion of the Work or the entire project for lane km(s) that are not in bonus.
 - .2 The following procedures will apply for an appeal:
 - .1 The Contractor must serve written notice of the appeal to the Departmental Representative within 7 days of receipt of a written segregation assessment. The written notice shall detail the locations and nature of the appeal.
 - .2 The Departmental Representative will determine a representative sample of the portion of the Work appealed, and will reassess this area with new assessors. Generally, this reassessment will be completed within 1 week of the Departmental Representative's receipt of the written notice of appeal.
 - .3 Based on the reassessment of the representative sample, the Departmental Representative will determine whether or not a reassessment of the entire appealed work is necessary.

Part 3 Execution

- .1 All equipment shall be designed and operated to produce an end product HMA CP complying with all the requirements of this specification.
- .2 Mixing plants shall be operated in accordance with manufacturer's recommendations and shall be calibrated prior to commencing production of the specified mix. Contractor shall provide the Departmental Representative with a certificate of calibration which certifies that plant has been calibrated to produce uniform mixture in accordance with job mix formula.
- .3 Storage facilities for asphalt cement shall be capable of heating material under effective and positive control and shall contain provision for measuring and sampling. Each tank shall contain only one asphalt cement type and grade.
- .4 Contractor shall supply all the equipment necessary to add liquid anti-stripping agent or lime when specified by the Departmental Representative. If liquid anti-stripping agent is specified it shall be added in-line with liquid asphalt cement when it is being pumped into the storage tank. If lime is specified as an anti-stripping agent the following shall apply:

2014-02-24

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- .1 Hydrated lime shall be blended by pugmill into the cold aggregate feed.
 - .2 Sufficient water shall be added at pugmill to ensure a minimum of 3% moisture content in the aggregate.

Addition of the liquid anti-stripping agent is considered incidental to the Work and no separate payment will be made.

.5 Mix Production: Contractor to Provide

- .1 Prior to mix production, a minimum of 10,000 tonnes of crushed aggregate for the HMA CP, when combined at design proportions, shall be stockpiled. Aggregate production shall continue in such a manner that a minimum quantity of 10,000 tonnes, or the quantity required to complete the work, whichever is less, is maintained in stockpile at all times.
 - .2 Aggregate and asphalt shall be combined to produce a uniform mixture of specified gradation at an asphalt content in accordance with the approved job mix formula and in which all particles of aggregate are uniformly coated.
 - .3 Unless otherwise specified, the maximum mixing temperature for all grades of asphalt cement shall be 155°C.
 - .4 Plant emissions shall not exceed the limits set by Alberta Environment.
 - .5 The asphalt plant must be equipped with pollution control devices in addition to, or in replacement of the standard cyclone dust collectors, to effectively eliminate the emission of dust and smoke pollutants into the atmosphere. The use of secondary dust collection systems which require the discharge of dust polluted water into natural drainage system will not be allowed. Regardless of the requirements stated in the above, the asphalt plant operation must comply with all environmental pollution control regulations applicable in the work area.
 - .6 A uniform mixture shall be produced in which all particles are thoroughly coated. Aggregate particles shall not be coated with residue from fuel combustion.
 - .7 The Contractor shall dispose of rejected asphalt concrete mix or removed asphalt concrete pavement in a manner acceptable to the Departmental Representative.
- .6 Pavers
- .1 Pavers shall be self propelled and operated with automatic electronic screed controls to maintain required levels, cross fall, and joint matching.
- .7 Rollers
- .1 Rollers shall have a compaction capability to match plant production rates in order to achieve the minimum specified compaction.
- .8 Preparation of Existing Surface
- .1 Failed areas in existing surfaces shall be repaired as directed by the Departmental Representative. Areas requiring repair will be identified by the

Departmental Representative in consultation with Contractor. This work will be paid from the Prime Cost Sum.

- .2 Before asphalt mix is placed, dirt and other objectionable material shall be removed from the surface to be paved, by brooming or other methods and is considered incidental to the Work and no separate payment will be made.
- .3 Existing fillets and ramps at approaches to railway crossings and bridge structures, or adjacent to paved surfaces or other structures, shall be removed to depths shown on plans or in a manner acceptable to the Departmental Representative. Removed material shall be disposed of and exposed surfaces shall be prepared in a manner acceptable to the Departmental Representative.
- .4 Where new surfacing materials are placed against an existing pavement structure, the joint shall be of a vertical butt type, well bonded, sealed, and finished to provide a continuous, smooth profile across the joint. To accomplish this, the existing pavement shall be cold-milled to expose a vertical surface, of a depth equal to the thickness of the lift, against which new pavement is to be placed. In longitudinal section the minimum slope of the milled area shall be 200:1. In plan the Contractor shall cut the joint in any of the following ways:
 - .1 The joint shall be cut at 45° to the centreline of the roadway across the full width of the mat; or
 - .2 The joint shall be cut at 45° to the roadway centreline across the travel lanes and contiguously at 90° to the roadway centreline elsewhere: or
 - .3 For median cross-over's and bridges the joint shall be cut parallel to the crossing.
 - .4 When the existing pavement has been removed in advance of the paving of the joint area, the Contractor shall construct a smooth taper at the joint area to a slope of at least 50:1. The taper may be placed on tar paper and shall be removed when paving is resumed. The traverse joint shall be straight and have a vertical face when the taper is removed.
 - .5 Contact edges of existing mats and contact faces of curbs, gutters, manholes, sidewalks and bridge structures shall be coated with a thin film of liquid asphalt material before placing the asphalt mix.
 - .6 Tack coat or a prime coat in accordance with Section 32 12 14, Asphalt Prime and Section 32 12 15, Asphalt Tack Coat.
 - .7 The tack or prime coat shall be allowed to cure prior to placing asphalt concrete mix.
 - .8 Areas that require preliminary levelling will be identified by the Departmental Representative. Generally, areas that show depressions, rutting or other deformations to a depth of 15 mm or greater will be designated by the Departmental Representative for preliminary levelling and all the following shall apply:

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- .1 material for preliminary levelling shall be the same designation and class as specified for the subsequent lift of HMAACP.
 - .2 asphalt concrete mix for preliminary levelling shall be spread by means of a motor grader or other methods approved by the Departmental Representative.
 - .3 only pneumatic tired rollers will be allowed for compaction, and a minimum density of 91% of the Marshall density, as determined by the Departmental Representative, is required.
 - .4 preliminary levelling is intended to be a separate operation and shall not be done as part of the construction of the subsequent lift of HMAACP.
 - .5 The preliminary levelling course with a final lift shall be considered as a single lift when Smoothness is assessed in Table No. 4.
 - .6 For the purposes of determining the unit price adjustments, preliminary levelling is not considered a lift.

.9 Transportation and Delivery of Mixtures

- .1 Truck boxes shall be clean, free from accumulations of asphalt concrete mix and foreign material.
- .2 Excess truck box lubricants such as light oil, detergent, or lime solutions shall not be allowed to contaminate the asphalt concrete mix, and shall be disposed of in an environmentally acceptable manner. Petroleum based truck box lubricants shall not be used.
- .3 During transport, the mix shall be completely covered to protect it from precipitation and excessive heat loss by securely fastened waterproofed tarpaulins, unless otherwise approved by the Departmental Representative.
- .4 No loads shall be sent out so late in the day as to prevent completion of the spreading and compaction of the mixture during daylight, unless artificial light satisfactory to the Departmental Representative is provided.

.10 Placing the Asphalt Concrete Mix

- .1 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when the weather is rainy.
- .2 Asphalt concrete mix shall be placed only on clean, dry, and unfrozen surfaces.
- .3 Unless otherwise shown on the plans, the asphalt concrete mix shall be placed in the following lift thicknesses:
 - .1 in a single lift when the design compacted total thickness is 70 mm or less.
- .4 If, during construction, it is found that the spreading and finishing equipment in operation leaves tracks or indented areas that are not satisfactorily corrected by the subsequent operations, or if it produces other permanent blemishes, the use of

such equipment shall be discontinued and other satisfactory spreading and finishing equipment shall be provided by the Contractor.

- .5 Longitudinal joints shall not be permitted in any lane on the final lift of asphalt concrete.
- .6 Longitudinal joints shall be offset a minimum of 150 mm from one lift to the next.
- .7 Longitudinal and transverse joints shall be vertical butt type, well bonded and sealed, and finished to provide a continuous, smooth profile across the joints. Surplus material will be disposed off in a manner acceptable to the Departmental Representative.
- .8 If required by the Departmental Representative the contact edge of any mat placed by the Contractor shall be coated with a thin film of liquid Tack Coat before placing the adjacent mat and is considered incidental to the Work and no separate payment will be made.
- .9 When paving is discontinued in any lane or in any lift, the mat shall be tapered to a slope of 10 horizontal to 1 vertical. The taper may be placed on tar paper and shall be removed when paving is resumed. The transverse joint shall be straight and have a vertical face when the taper is removed.
- .10 Transverse construction joints from one lift to the next shall be separated by at least 2 metres.
- .11 Where the construction of a final lift of pavement next to a concrete curb section or curb and gutter section will be delayed, the Contractor shall construct a temporary asphalt concrete mix fillet next to the concrete section in accordance with the plans or as directed by the Departmental Representative. These fillets shall be removed when paving is resumed.
- .12 Road intersections and entrances shall be paved in accordance with the plans or as directed by the Departmental Representative. Unless otherwise permitted by the Departmental Representative, the asphalt mix shall be spread on intersections by means of a paver as paving of the main lanes passes by.
- .13 Contact faces of curbs, gutters, manholes, and sidewalks shall be coated with asphalt Tack Coat using a hand applicator before placing the asphalt mix and is considered incidental to the Work with no separate payment being made.
- .14 All longitudinal joints shall be straight and uniform with no lateral waviness. Any mat contact that is not straight or uniform, as determined by the Departmental Representative, shall be trimmed by saw-cutting or using some other method acceptable to the Departmental Representative prior to placing the adjacent mat. The material removed shall be disposed of to the satisfaction of the Departmental Representative and is considered incidental to the Work and will not be paid for separately.
- .15 Any mat with a contact edge that has deteriorated, cracked, or slumped due to improper compaction or vehicle traffic shall be trimmed by saw-cutting or some other method acceptable to the Departmental Representative prior to placing the

adjacent mat. The length of the contact edge to be trimmed, removed, and disposed of will be as determined by the Departmental Representative and is considered incidental to the Work and will not be paid for separately.

.11 Compacting the Mix

- .1 All asphalt concrete mix, shall be thoroughly compacted, and after final rolling the finished surface of the mat shall be free from segregation, waves, hairline cracks, and other obvious defects.
- .2 After final rolling is complete, the Contractor shall ensure that the finished mat has cooled for a minimum of two hours before opening the section of traffic.

Table No. 1 - Unit Price Adjustment for Density

% OF MARSHALL DENSITY	UNIT PRICE ADJUSTMENT -DOLLARS PER TONNE				
	DESIGN LIFT THICKNESS				
Lot Mean	35 MM OR GREATER LOWER LIFTS	LESS THAN 35 MM AND GREATER THAN 20 MM LOWER LIFTS	20 MM LOWER LIFTS	35 MM OR GREATER TOP LIFT ONLY	LESS THAN 35 MM AND GREATER THAN 20 MM TOP LIFT ONLY
98.0 and higher	+ 0.50	+ 0.50	+ 0.50	+ 0.50	+ 0.50
97.9	+ 0.45	+ 0.45	+ 0.45	+ 0.45	+ 0.45
97.8	+ 0.40	+ 0.40	+ 0.40	+ 0.40	+ 0.40
97.7	+ 0.35	+ 0.35	+ 0.35	+ 0.35	+ 0.35
97.6	+ 0.30	+ 0.30	+ 0.30	+ 0.30	+ 0.30
97.5	+ 0.25	+ 0.25	+ 0.25	+ 0.25	+ 0.25
97.4	+ 0.20	+ 0.20	+ 0.20	+ 0.20	+ 0.20
97.3	+ 0.15	+ 0.15	+ 0.15	+ 0.15	+ 0.15
97.2	+ 0.10	+ 0.10	+ 0.10	+ 0.10	+ 0.10
97.1	+ 0.05	+ 0.05	+ 0.05	+ 0.05	+ 0.05
97.0	0.00	0.00	0.00	0.00	0.00
96.9	-0.10	0.00	0.00	-0.10	0.00
96.8	-0.20	0.00	0.00	-0.20	0.00
96.7	-0.30	0.00	0.00	-0.30	0.00
96.6	-0.40	0.00	0.00	-0.40	0.00
96.5	-0.50	0.00	0.00	-0.50	0.00
96.4	-0.60	0.00	0.00	-0.60	0.00
96.3	-0.70	0.00	0.00	-0.70	0.00
96.2	-0.80	0.00	0.00	-0.80	0.00
96.1	-0.90	0.00	0.00	-0.90	0.00
96.0	-1.00	0.00	0.00	-1.00	0.00
95.9	-1.10	0.00	0.00	-1.10	-0.10
95.8	-1.20	0.00	0.00	-1.20	-0.20
95.7	-1.30	0.00	0.00	-1.30	-0.30
95.6	-1.40	0.00	0.00	-1.40	-0.40

% OF MARSHALL DENSITY	UNIT PRICE ADJUSTMENT -DOLLARS PER TONNE				
	DESIGN LIFT THICKNESS				
Lot Mean	35 MM OR GREATER LOWER LIFTS	LESS THAN 35 MM AND GREATER THAN 20 MM LOWER LIFTS	20 MM LOWER LIFTS	35 MM OR GREATER TOP LIFT ONLY	LESS THAN 35 MM AND GREATER THAN 20 MM TOP LIFT ONLY
95.5	-1.50	0.00	0.00	-1.50	-0.50
95.4	-1.60	0.00	0.00	-1.60	-0.60
95.3	-1.70	0.00	0.00	-1.70	-0.70
95.2	-1.80	0.00	0.00	-1.80	-0.80
95.1	-1.90	0.00	0.00	-1.90	-0.90
95.0	-2.00	0.00	0.00	-2.00	-1.00
94.9	-2.20	0.00	0.00	-2.20	-1.10
94.8	-2.40	0.00	0.00	-2.40	-1.20
94.7	-2.60	0.00	0.00	-2.60	-1.30
94.6	-2.80	0.00	0.00	-2.80	-1.40
94.5	-3.00	0.00	0.00	-3.00	-1.50
94.4	-3.20	0.00	0.00	-3.20	-1.60
94.3	-3.40	0.00	0.00	-3.40	-1.70
94.2	-3.60	0.00	0.00	-3.60	-1.80
94.1	-3.80	0.00	0.00	-3.80	-1.90
94.0	-4.00	0.00	0.00	-4.00	-2.00
93.9	50% OF UNIT PRICE	-0.10	0.00	OVERLAY OR RM. &RP.	-2.20
93.8	50% OF UNIT PRICE	-0.20	0.00	OVERLAY OR RM. &RP.	-2.40
93.7	50% OF UNIT PRICE	-0.30	0.00	OVERLAY OR RM. &RP.	-2.60
93.6	50% OF UNIT PRICE	-0.40	0.00	OVERLAY OR RM. &RP.	-2.80
93.5	50% OF UNIT PRICE	-0.50	0.00	OVERLAY OR RM. &RP.	-3.00
93.4	50% OF UNIT PRICE	-0.60	0.00	OVERLAY OR RM. &RP.	-3.20
93.3	50% OF UNIT PRICE	-0.70	0.00	OVERLAY OR RM. &RP.	-3.40
93.2	50% OF UNIT PRICE	-0.80	0.00	OVERLAY OR RM. &RP.	-3.60
93.1	50% OF UNIT PRICE	-0.90	0.00	OVERLAY OR RM. &RP.	-3.80
93.0	50% OF UNIT PRICE	-1.00	0.00	OVERLAY OR RM. &RP.	-4.00
92.9	50% OF UNIT PRICE	-1.10	-0.10	OVERLAY OR RM. &RP.	-4.20
92.8	50% OF UNIT PRICE	-1.20	-0.20	OVERLAY OR RM. &RP.	-4.40
92.7	50% OF UNIT PRICE	-1.30	-0.30	OVERLAY OR RM. &RP.	-4.60
92.6	50% OF UNIT PRICE	-1.40	-0.40	OVERLAY OR RM. &RP.	-4.80
92.5	50% OF UNIT PRICE	-1.50	-0.50	OVERLAY OR RM. &RP.	-5.00
92.4	50% OF UNIT PRICE	-1.60	-0.60	OVERLAY OR RM. &RP.	-5.20

% OF MARSHALL DENSITY	UNIT PRICE ADJUSTMENT -DOLLARS PER TONNE				
	DESIGN LIFT THICKNESS				
Lot Mean	35 MM OR GREATER LOWER LIFTS	LESS THAN 35 MM AND GREATER THAN 20 MM LOWER LIFTS	20 MM LOWER LIFTS	35 MM OR GREATER TOP LIFT ONLY	LESS THAN 35 MM AND GREATER THAN 20 MM TOP LIFT ONLY
92.3	50% OF UNIT PRICE	-1.70	-0.70	OVERLAY OR RM. &RP.	-5.40
92.2	50% OF UNIT PRICE	-1.80	-0.80	OVERLAY OR RM. &RP.	-5.60
92.1	50% OF UNIT PRICE	-1.90	-0.90	OVERLAY OR RM. &RP.	-5.80
92.0	50% OF UNIT PRICE	-2.00	-1.00	OVERLAY OR RM. &RP.	-6.00
91.9	50% OF UNIT PRICE	-2.20	-1.10	REMOVE & REPLACE	-6.20
91.8	50% OF UNIT PRICE	-2.40	-1.20	REMOVE & REPLACE	-6.40
91.7	50% OF UNIT PRICE	-2.60	-1.30	REMOVE & REPLACE	-6.60
91.6	50% OF UNIT PRICE	-2.80	-1.40	REMOVE & REPLACE	-6.80
91.5	50% OF UNIT PRICE	-3.00	-1.50	REMOVE & REPLACE	-7.00
91.4	50% OF UNIT PRICE	-3.20	-1.60	REMOVE & REPLACE	-7.20
91.3	50% OF UNIT PRICE	-3.40	-1.70	REMOVE & REPLACE	-7.40
91.2	50% OF UNIT PRICE	-3.60	-1.80	REMOVE & REPLACE	-7.60
91.1	50% OF UNIT PRICE	-3.80	-1.90	REMOVE & REPLACE	-7.80
91.0	50% OF UNIT PRICE	-4.00	-2.00	REMOVE & REPLACE	-8.00
90.9	REMOVE & REPLACE	50% OF UNIT PRICE	-2.20	REMOVE & REPLACE	50% OF UNIT PRICE
90.8	REMOVE & REPLACE	50% OF UNIT PRICE	-2.40	REMOVE & REPLACE	50% OF UNIT PRICE
90.7	REMOVE & REPLACE	50% OF UNIT PRICE	-2.60	REMOVE & REPLACE	50% OF UNIT PRICE
90.6	REMOVE & REPLACE	50% OF UNIT PRICE	-2.80	REMOVE & REPLACE	50% OF UNIT PRICE
90.5	REMOVE & REPLACE	50% OF UNIT PRICE	-3.00	REMOVE & REPLACE	50% OF UNIT PRICE
90.4	REMOVE & REPLACE	50% OF UNIT PRICE	-3.20	REMOVE & REPLACE	50% OF UNIT PRICE
90.3	REMOVE & REPLACE	50% OF UNIT PRICE	-3.40	REMOVE & REPLACE	50% OF UNIT PRICE
90.2	REMOVE & REPLACE	50% OF UNIT PRICE	-3.60	REMOVE & REPLACE	50% OF UNIT PRICE
90.1	REMOVE & REPLACE	50% OF UNIT PRICE	-3.80	REMOVE & REPLACE	50% OF UNIT PRICE
90.0	REMOVE & REPLACE	50% OF UNIT PRICE	-4.00	REMOVE & REPLACE	50% OF UNIT PRICE
89.9	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR R. & R.
89.8	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
89.7	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
89.6	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
89.5	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
89.4	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
89.3	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.

% OF MARSHALL DENSITY	UNIT PRICE ADJUSTMENT -DOLLARS PER TONNE				
	DESIGN LIFT THICKNESS				
Lot Mean	35 MM OR GREATER LOWER LIFTS	LESS THAN 35 MM AND GREATER THAN 20 MM LOWER LIFTS	20 MM LOWER LIFTS	35 MM OR GREATER TOP LIFT ONLY	LESS THAN 35 MM AND GREATER THAN 20 MM TOP LIFT ONLY
89.2	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
89.1	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
89.0	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.9	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.8	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.7	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.6	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.5	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.4	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.3	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.2	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.1	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
88.0	REMOVE & REPLACE	REMOVE & REPLACE	50% OF UNIT PRICE	REMOVE & REPLACE	OVERLAY OR RM. &RP.
87.9 and lower	REMOVE & REPLACE	REMOVE & REPLACE	REMOVE & REPLACE	REMOVE & REPLACE	OVERLAY OR RM. &RP.

- Notes: 1 - Single Lifts Only are considered as a Top Lift;
2 - Preliminary Levelling is not considered as a Lift.
3 - Rm. = Remove, Rp. = Replace

Table No. 2 - Unit Price Adjustment for Actual Asphalt Content

Deviation of Actual Asphalt Content from Approved Asphalt Content	Unit Price Adjustment for Asphalt Content (PAa) \$ per tonne			
	Top Lift		Lower Lift	
	Below	Above	Below	Above
From 0 to 0.30	0.00	0.00	0.00	0.00
From 0.31 to 0.35	-1.10	-0.90	-1.10	-0.90
From 0.36 to 0.40	-2.20	-1.80	-2.20	-1.80
From 0.41 to 0.45	-3.30	-2.70	-3.30	-2.70
From 0.46 to 0.50	-4.40	-3.60	-4.40	-3.60
From 0.51 to 0.55			-5.50	-4.50
From 0.56 to 0.60			-6.60	-5.40

From 0.61 to 0.65			-7.70	-6.30
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Notes:

- For top lift deviations of more than 0.50% the Contractor shall either remove and replace or overlay the previous placed mix, as directed by the Departmental Representative.
- For lower lift deviations of more than 0.65%, the Departmental Representative with determine whether removal and replacement is necessary. For material that is allowed to stay in place, payment will be at 50% of the unit price bid.

Table No. 3 - Maximum Deviation for the Lot Mean from the Gradation Limits Specified in Table No. 10

Sieve Size, μm	Lot Mean
16,000, 12,500, 10,000	+/- 2%
5,000, 1,250, 630, 315	+/- 1%
160, 80	+/- 0.5%
80 Deviation = <1.0%	1.0 for each 1% Deviation
80 Deviation >1.0%	2.0 for each additional 0.1% Deviation

Table No. 10 - Specifications for Aggregates

Designation 1			
Percent Passing Metric Sieve	Class Sieve Size, μm		16
	20,000		
	16,000		100
	12,500		80 - 92
	10,000		70 - 84
	5,000		50 - 65
	1,250		26 - 45
	630		18 - 38
	315		12 - 30
	160		8 - 20
	80		4 - 10
% Fracture by Weight			see Table No. 11
Plasticity Index (PI)			NP
L.A. Abrasion Loss Percent Max.			40

Table No. 11 - Asphalt Concrete Mix Characteristics (Mix Type H1 – Alberta Transportation)

% MF, -5000 (Min) (Note 1)	% Fractures +5000 (2 Faces) (min)	Asphalt Cement Grade	Marshall Stability N (min)	No. of Blows	Air Voids	VMA % (min) by % Air Voids 3.5, 4.0	Voids filled with Asphalt %	Flow (mm)	Retained Stability % (min)
75	98 (one face) 90	150-200A	12,000	75	see Note 2	13.0, 13.5	65 to 75	2.0 to 3.5	70

Note 1: The percentage of Manufactured Fines in the -5,000 micron sieve portion of the combined aggregate.

Note 2: The design air voids will be chosen as the lowest value, within the range of 3.5 to 4.0% inclusive, such that all other mix design criteria are met.

Note 3: The minimum Theoretical Film Thickness requirement shall be as follows:

3.9 and 4.0 % = 6.0 µm

3.7 and 3.8% = 6.1 µm

3.5 and 3.6% = 6.2 µm

Note 4: To meet the current requirements of AASHTO M320, Performance-Graded Asphalt Binder

Table No. 12 - Quality Control Testing Requirements

Test	Minimum Frequency
AGGREGATE PRODUCTION	(Note 2)
ASPHALT MIX PLANT 1. Calibration 2. Inspection	Once per project or as required (note 1)
SAMPLES 1. Asphalt Cement 2. Tack, Prime and Fog Materials 3. Cold Feed Aggregate 4. Mix 5. QA Cores- Stratified Random Test Sites Chosen By the Departmental Representative. i) QA Cores for Pavement Density ii) QA Cores for Asphalt Content and Gradation	(note 1) (note 1) (note 1) (note 1) (note 1) (note 1) One segment for each lot One per segment for selected Lots as directed by Departmental Representative
TESTS WITH SPECIFIED MINIMUM FREQUENCIES 1. Mix Asphalt Content 2. Correction Factors 3. Mix Moisture Content 4. Aggregate Sieve Analysis	(note 2) As Required (note 2) (note 2)

Test	Minimum Frequency
TESTS WITH SPECIFIED MINIMUM FREQUENCIES	
1. Field Formed Marshall Briguettes	(note 1)
2. Density Immersion Method, Saturated Surface Dry	(note 1)
3. Void Calculations, Cores or Formed Specimens	(note 1)
4. Temperatures	(note 1)
5. Percent Compaction, Cores or Nuclear Density	(note 1)
Note 1: Minimum frequency not specified. Note 2: When a Lot has eight hours of plant production or more, a minimum of four plant checks plus four asphalt contents and four sieve analysis of the combined aggregate are required. When a Lot has less than eight hours of plant production, these tests shall be performed once for every two full hours of plant production.	

Table No. 13 - Sieve Designations

Sieves in Accordance with: AASHTO Designation: M92 ASTM Designation: E11	U.S. Standard Series Opening & Designation	Metric Sieves in accordance with: CGSB Spec.8-GP-2M µm
125.0 mm	5"	125 000
75.0 mm	3"	80 000
63.0 mm	2-1/2"	63 000
50.0 mm	2"	50 000
37.5 mm	1-1/2"	40 000
25.0 mm	1"	25 000
19.0 mm	3/4"	20 000
16.0 mm	5/8"	16 000
12.5 mm	1/2"	12 500
9.5 mm	3/8"	10 000
4.75 mm	#4	5 000
2.36 mm	#8	2 500
2.00 mm	#10	2 000
1.70 mm	#12	1 600
1.18 mm	#16	1 250
0.850 mm	#20	800
0.600 mm	#30	630
0.425 mm	#40	400
0.300 mm	#50	315
0.150 mm	#100	160
0.075 mm	#200	80
0.045 mm	#325	45

Protection Mountain
Campground Loop Road
Reconstruction
Banff National Park
Proj No: LL13-04-080

ASPHALT CONCRETE PAVEMENT

SECTION 32 12 16

Page | 30

2014-02-24

END OF SECTION

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 31 - Special Procedures for Traffic Control and Construction Detours.
- .3 Section 01 35 43 - Environmental Procedures

1.2 DESCRIPTION OF
WORK

- .1 The work covered by the specification shall consist of mechanically and/or hydraulically seeding and fertilizing areas within the limits of construction or as designated by the Departmental Representative.

1.3 MEASUREMENT FOR
PAYMENT

- .1 Mechanical, hydraulic and/or Hand Seeding will be measured by each square meter acceptably installed, complete with fertilizer, and resulting in full grass growth, 75% germination and cover, within the dimensions indicated on the Drawings or as approved by the Departmental Representative. Payment for seeding shall be full compensation for all labour, equipment, materials and incidentals required to place materials in accordance with the requirements of the Specifications, Drawings and direction of the Departmental Representative. Payment shall be paid under "Unit Price Item - Seeding".
- .2 Areas of blending into existing landscape will not be measured for payment.
- .3 Maintenance is incidental and will not be paid for separately.

1.4 SUBMITTALS

- .1 Product Data
 - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide product data for:
 - .1 Seed
 - .2 Mulch
 - .3 Tackifier/Soil Stabilizer
 - .4 Fertilizer
-

.3 Submit in writing to Departmental Representative 14 days prior to commencing work:

- .1 lume capacity of hydraulic seeder, in litres
- .2 Amount of materia to be used per tank based on volume.
- .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.5 QUALITY ASSURANCE

- .1 Test reports: certified test reports showing compliance with specified performance characteristics and physical properties.

1.6 MATERIAL DELIVERY, HANDLING AND STORAGE

- .1 Use all means necessary to protect all materials before, during and after installation. Provide adequate protection to materials which may deteriorate if exposed to weather.
- .2 Fertilizer whall be packaged in waterproof bags labelled clearly, indicating net mass, analysis and manufacturer. Store on pallets and protect from weather.
- .3 Seed to be stored in dry waterproof place and shall be protected from damage by heat, rodents and other causes. Deliver and store grass seed in original packages with label indicating:
- .1 analysis of seed mixture
 - .2 percentage of pure seed by weight
 - .3 year of production
 - .4 net mass
 - .5 date tagged and location.

PART 2 - PRODUCTS

2.1 SEED

- .1 Seed shall be Certified Canada No. 1 Grade quality seed varieties, in accordance with the Canadian Seeds Act and Regulations, and having a minimumpurity if 97% and germination of 75%. Seed shall be free of impurities and disease.

- .2 Seed mix to be used will be confirmed by the Departmental Representative. Tentatively, the seed mix for all applications to be the following, by weight:
 - .1 15% Adanac Slender Wheatgrass
 - .2 15% Fringed Bromegrass 'Nutracoat'
 - .3 15% Nortran Tufted Hairgrass 'Nutracoat'
 - .4 15% Fowl Bluegrass 'Nutracoat'
 - .5 10% ARC Plateau Rocky Mountain Fescue
 - .6 5% ARC Mountain Junegrass
 - .7 10% ARC Glacier Alpine Bluegrass
 - .8 10% ARC Sentinel Spike Trisetum 'Nutracoat'
 - .9 5% Citation III Perennial Ryegrass
- .3 Seeding rate to be 25kg/ha for mechanical seeding and 50 kg/ha for hydraulic seeding.
- .4 Seed mix shall be free of Scentless Chamomile, Downy Bromw and Canada Thistle.

2.2 FERTILIZER

- .1 Fertilizer 1 shall be 39-0-0 100% slow release polymer coated sulphur coated urea. This fertilizer shall be applied at time of seeding at a rate of 125kg/ha.
- .2 Fertilizer 2 shall be Milorganite 6-2-0 or approved alternate. Milorganite is a fertilizer product manufactured from various microbes used to digest sewage sludge. This fertilizer shall be applied at the time of seeding at 500kg/ha. Supplier: Professional Gardner, Phone: 403 263 4200

2.3 WATER

- .1 Water shall be free of impurities that would inhibit germination and growth.

2.4 SOIL
STABILIZER/TACKIFIER

- .1 Soil stabilizer/tackifier shall be a non toxic, colourless copolymer emulsion with no less than 52.6% solids. Available product is: Soil Master WR or approved alternate. Supplier: Target Products Phone: 1-800-575-7700.
-

- 2.5 MULCH .1 Wood fibre mulch shall be manufactured from virgin wood fibres and contain not less than 3% of an organic tackifier by volume. Cellulose type products are not acceptable. Acceptable product is: Eco Fibre Plus of approved alternate. Supplier: Professional Gardiner, Phone: 403-263-4200.

PART 3 - EXECUTION

- 3.1 GENERAL SEEDING .1 Contractor shall advise Departmental Representative prior to the start of seeding operations.
- .2 Contractor shall mechanically remove any weeds prior to seeding. Weed removal method to be approved by Departmental Representative prior to the commencement. This will be incidental to the Work.
- .3 Contractor shall ensure that equipment is steam cleaned, free of soil and seed from previous project to prevent site contamination.
- .4 Seeding shall be done upon completion of stripped soil/chip compost placement.
- .5 Contractor shall not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil, or soil covered with snow or standing water.
- .6 Contractor shall hydraulic seed only during dry weather conditions with no rain forecasted for the next 24 hours and ensuring a seasonably dry seedbed to provide proper curing of the soil stabilizers/tackifier. Contractor shall check weather conditions to ensure soil stabilizer has sufficient time to cure prior to a heavy rainfall.
- .7 Seeding shall be done to ensure catch satisfactory to the Departmental Representative's approval. In areas where seed fails to germinate for whatever reason, the Contractor shall re-cultivate and reseed until acceptable germination takes place.
-

- .8 Contractor shall carry out seeding in locations shown on Drawings, or as directed by Departmental Representative. Seeding shall be done as follows:
- .1 Mechanical and Hand Seeding: 3:1 (H:V) slopes or flatter
 - .2 Hydraulic Seeding: Grades between 3:1 and 1.5:1 slopes.

3.2 MECHANICAL
SEEDING

- .1 The following application rates are the minimum required for mechanical seeding:

Grass Seed	25 kg/hectare
Fertilizer 1: 30-0-0	125 kg/hectare
Fertilizer 2: Milorganite	500 kg/hectare

- .2 Contractor shall apply fertilizer onto prepared seedbeds ensuring even coverage at specified rates.
- .3 The Contractor shall mechanically sow seed during calm weather using a drill seeder. Sow half of the required amount of seed in one direction and the remainder at right angles to the first application.
- .4 The Contractor shall clean all structures and natural features not designated to be seeded, to the satisfaction of the Departmental Representative.
- .5 The Contractor shall ensure that at all times during the seeding, that no vehicles are parked within the path of public travel and the Contractor shall provide warning devices as directed by the Departmental Representative to ensure safe operations.

3.3 HYDRAULIC
SEEDING

- .1 The following application rates are the minimum required for hydraulic seeding:

Grass Seed:	50 kg/hectare
Fertilizer 1: 30-0-0	125 kg/hectare
Fertilizer 2: Milorganite	500 kg/hectare
Mulch	500 kg/hectare
Soil Stabilizer/tackifier	1300 L/hectare
Soil Master WR	
Water	30,000 L (min)

- .2 The Contractor shall measure quantities of materials by weight, or weigh calibrated volume measurement, to the satisfaction of the Departmental Representative.
 - .3 The Contractor shall fill the tank half full with required water and add mulch while continuing to fill with water. Seed mix and fertilizer is to be added. All material is to be added into the hydraulic seeder under agitation. The Contractor shall pulverize mulch with tackifier and charge slowly into seeder.
 - .4 The Contractor shall charge soil stabilizer/tackifier into the seeder after all other material is well mixed in seeder. Contractor shall mix slowly to avoid foaming but thoroughly to complete slurry.
 - .5 The Contractor shall use hydraulic seeding equipment with a minimum slurry tank capacity of 4500 litres.
 - .6 The Contractor's equipment shall have an agitation system for slurry capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and mechanical method:
 - .1 Pumps shall be capable of maintaining a continuous non-fluctuating flow of solution.
 - .2 Equipment shall be capable of seeding up to 150 m distance from hydraulic seeder using hand operated hoses and appropriate nozzles.
 - .7 The Contractor shall apply slurry when wind velocities will not affect the application and cause the mixture to be blown.
 - .8 The Contractor shall apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed. Ensure good contact of slurry with soil with minimal air pockets.
 - .9 The Contractor shall use the correct nozzle(s) for application and use hoses to access difficult to reach surfaces and to control application.
-

- .10 The Contractor shall ensure that the application is uniform and the surface is evenly covered. Contractor shall blend into retained landscape approximately 1 metre.
- .11 The Contractor shall clean all structures, appurtenances and natural features not designated to be seeded of any overspray, to the satisfaction of the Departmental Representative.
- .12 The contractor shall ensure that at all times during the seeding, that no vehicles are parked within the path of public travel and the Contractor shall provide warning devices as directed by the Departmental Representative to ensure safe operations.

3.4 MAINTENANCE
DURING
ESTABLISHMENT
PERIOD

- .1 Establishment period is a minimum of four months of continuous growing season. Growing season shall not be divided by winter.
 - .2 The Contractor shall repair and reseed dead or bare spots, as directed in these specifications to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In case of erosion, the Contractor shall be compensated at the specified unit rates for reseeding.
 - .3 For areas or poor seed germination, as determined by the Departmental Representative, the soil shall be scarified or re-cultivated as directed by the Departmental Representative, and the seeding and fertilizer undertaken as specified. This work is incidental to the contract.
 - .4 Mechanical weed control shall be undertaken as determined by the Departmental Representative. Hand pulling of weeds may be required. This work is incidental to the contract.
-

3.5 CONSTRUCTION
COMPLETION
ACCEPTANCE

- .1 Seeded areas will be accepted by the Departmental Representative provided that all areas are uniformly established and turf is not eroded or rutted and relatively free of weeds. Seeded areas to be growing for a minimum of four continuous months prior to construction completion acceptance inspection.
- .2 Areas seeded in the fall will be accepted in the following spring, a minimum of four months after the growing season, provided acceptance conditions are fulfilled.

3.6 MAINTENANCE
DURING WARRANTY
PERIOD

- .1 Maintenance shall occur for one full year from Construction Completion Acceptance. The estimated period of maintenance within one calendar year shall be from approximately April 1 to October 31. The Contractor will be required to employ all of the necessary measures to establish and maintain all seeding in an acceptable, vigorous and healthy growing condition.
- .2 The Contractor shall repair and reseed dead or bare spots, as directed in these specifications to Departmental Representative's satisfaction, to allow establishment of seeds prior to acceptance. In case of erosion, the Contractor shall be compensated at the specified unit rates for reseeded.
- .3 For areas of poor seed germination or as determined by the Departmental Representative, the soil shall be scarified or re-cultivated as directed by the Departmental Representative, and seeding and fertilization undertaken as specified. This work is incidental to the Contract.
- .4 Weed control shall be undertaken as determined by the Departmental Representative. Hand pulling of weeds may be required. This work is incidental to the contract.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
-

Protection Mountain
Campground Loop Road
Repairs
Banff National Park
Proj No: LL13-04-080

SEEDING

Section 32 92 22

Page 9

2014-07-16

END OF SECTION

END OF SECTION

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

- .1 Section 01 33 00 - Submittals
- .2 Section 01 35 43 - Environmental Procedures
- .3 Section 31 24 14 - Trail Excavation,
Embankment and Compaction

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves, Testing,
Woven Wire, Metric.
- .2 CSA International
 - .1 CAN/CSA G401-07, Corrugated Steel Pipe
Products.

1.3 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit in accordance with Section 01 33 00
Submittal Procedures.
- .2 Certification: to be marked on pipe.
- .3 Test and Evaluation Reports:
 - .1 Submit manufacturer's test data and
certification at least 4 weeks prior to
beginning Work.

1.4 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 in accordance with
manufacturer's recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials
with new.
-

1.5 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Section 01 35 43 - Environmental Procedures.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by the Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 CORRUGATED
STEEL PIPE

- .1 Corrugated steel pipe: to CAN/CSA-G401.
- .2 Culverts to be annular or spiral with annular ends. Coupling bands to be two piece annular bolted with minimum width of nine corrugations.
- .3 Minimum wall thickness to be 2.0 mm.
- .4 Corrugations to be 68 mm x 13 mm.
- .5 For all exposed culvert ends, 2:1 mitred end sections will be required.

2.2 CUT ENDS

- .1 All exposed ends of CSP to have sloped end sections.
 - .2 All cut edges shall be made smooth by grinding so that all burrs are removed. Any damaged galvanizing shall be restored by zinc metallizing in accordance with CSA G401.
 - .3 Where an existing culvert is extended, up to 3 m of the existing culvert end shall be removed as directed by the Departmental Representative.
-

2.3 GRANULAR
BEDDING AND
BACKFILL

- .1 Granular bedding and backfill material to be supplied by the Contractor and shall

PART 3 - EXECUTION

3.1 TRENCHING

- .1 Do trenching Work in accordance with Section 31 24 14 - Trail Excavating, Trenching and Backfilling.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.2 BEDDING

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place 200 mm minimum thickness of approved granular material on bottom of excavation and compact to 95% minimum of maximum density to ASTM D 698.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.3 LAYING
CORRUGATED STEEL
PIPE CULVERTS

- .1 Begin pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.4 JOINTS:
CORRUGATED STEEL
CULVERTS

- .1 Corrugated steel pipe:
.1 Match corrugations or indentations of coupler with pipe sections before tightening.
-

.2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.

.3 Insert and tighten bolts.

.4 Repair spots where damage has occurred to spelter coating by applying two coats of zinc rich paint approved by the CSP supplier. Allow each coat to dry before placing second coat, bedding or backfill.

3.5 BACKFILLING

- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
- .2 Place granular backfill material in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to 98% maximum density to ASTM D 698 taking special care to obtain required density under haunches.
- .4 Protect installed culvert with minimum 900 mm cover of compacted fill before heavy equipment is permitted to cross.
 - .1 During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.
- .5 Place backfill in unfrozen condition.
- .6 Place riprap.

3.6 CLEANING

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

END OF SECTION