

TENDER DOCUMENTS



PARKS CANADA AGENCY

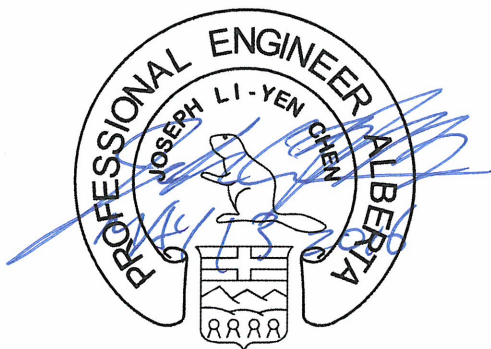
Johnston Canyon Parking Lot Upgrade

Issued for Tender

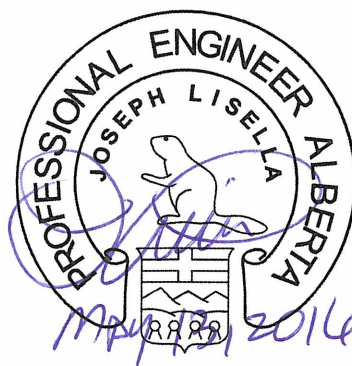


AE Project No. 2015.3475.00

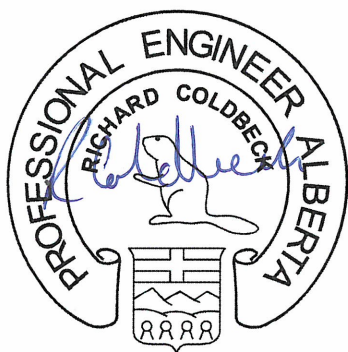
**May
2016**



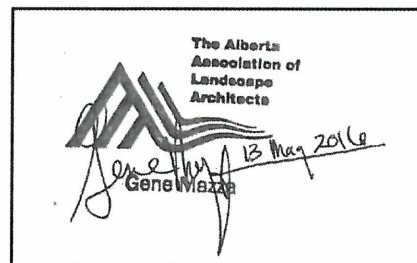
MAY 13, 2016
Date



Date



MAY 13, 2016
Date



<p>ASSOCIATED ENGINEERING QUALITY MANAGEMENT SIGN-OFF</p> <p>Signature: <u>[Signature]</u></p> <p>Date: <u>May 13, 2016</u></p>
<p>APEGA Permit to Practice P 3979</p>

END OF SECTION

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Part 1 General

1.1 SCOPE OF WORK

- .1 Scope of Work for this Contract comprises:
 - .1 Construction of a gateway, seating wall, stamped concrete, and an information kiosk, located at the Johnston Canyon Day Use Area, further identified as Landscape Architectural Work.
 - .2 Construction of pavement overlay, curb and gutter, line painting, traffic signs, removal of existing curb, removal of asphalt and supply and installation of a traffic counter at the entrance of the existing parking lot including electrical work, located at the Johnston Canyon Day Use Area, further identified as Existing Parking Lot Work and as defined in the Drawings.
 - .3 Coordination and purchasing of Parking Lot Counter system from Exile Automation. Reference 'Johnston Canyon Parking Lot' EXA-16-0245 for a complete self-contained parking lot counter display for installation at lot entrance. Contact Dean Blahut, Exile Automation, Tel 403.250.7989.
 - .4 Construction of pavement overlay, curb and gutter, line painting, trail painting, traffic signs, located at the Johnston Canyon Campground, further identified as Overflow Parking Lot Work and as defined in the Drawings.
 - .5 Removal of the existing pit privy and design, supply and installation of a new pit privy and tank including the relocation of the sanitary sewer located in the Existing Parking Lot to accommodate this installation.
 - .6 Supply and installation of XLPE ducts to accommodate power cable and telephone cable relocation in the Overflow Parking Lot. Coordination with FORTIS and TELUS for installation of the cables.
 - .7 All above Work is further identified collectively as Work.

1.2 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.3 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative.
- .2 Co-ordinate Work with that of other Contractors. If any part of the Work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Department Representative, in writing, any defects which may interfere with proper execution of Work.

1.4 OWNER OCCUPANCY

- .1 Owner will occupy the Johnston Canyon Campground during entire construction period for execution of normal operations. The Johnston Canyon Campground will be operational as of May 27, 2016.

1.5 WORK SEQUENCE

- .1 Construct Work in the stages defined below to accommodate Owner's continued use of premises during construction and public access.
- .2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.
- .3 Required stages:
 - .1 Stage 1 – XLPE Duct Installation Work.
 - .2 Stage 2 – Overflow Parking Lot Work.
 - .3 Stage 3 – Existing Parking Lot, Landscape Architectural and Pit Privy Work.
- .4 Construction of the stages will be completed in sequence. The Contractor shall allow for 2 weeks of no construction activity on site following the completion of Stage 1 to enable the installation of the power cable and telephone cable by FORTIS and TELUS. Following the completion of Stage 1 and the installation of the power and telephone cables by FORTIS and TELUS, Stage 2 Work can be initiated. Stage 3 Work can only be initiated following Substantial Performance of the Work on Stage 2.
- .5 The timing of the Stages should correspond to the milestones identified in Section 01 32 16.07 – Construction Progress Schedule
- .6 Maintain fire access/control throughout the duration of the Work.
- .7 Within seven (7) days after award of contract, submit detailed Project Schedule which includes the following milestones and activity types.
 - .1 Award.
 - .2 Submittal of Shop Drawings.
 - .3 Permits.
 - .4 Survey.
 - .5 Mobilization.
 - .6 Environmental Protection Plan (EPP), review and implementation.
 - .7 Health and Safety Plan, review and implementation.
 - .8 Traffic Accommodation strategy, review and implementation.
 - .9 Quality Management Plan.
 - .10 Waste Reduction Work Plan.
 - .11 Stage 1 Work.
 - .12 Stage 2 Work.
 - .13 Stage 3 Work.
 - .14 Final Inspection.
 - .15 Demobilization.
 - .16 Completion.

1.6 CONTRACTOR USE OF PREMISES

- .1 The Contractor shall limit use of premises for Work to allow:
 - .1 Owner Occupancy.

- .3 Public usage of the campground and dumping station throughout the duration of the Work.
- .2 Coordinate use of premises under direction of the Departmental Representative.
- .3 The Contractor shall obtain a business license from Parks Canada for Work in the National Park area.
- .4 The Contractor shall obtain a vehicle work pass from Parks Canada for all business and private vehicles it intends to use on site. All contractor vehicles on site should display the work pass.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operations, condition of existing work to be equal to or better than that which existed prior to construction, to the satisfaction of the Departmental Representative.

1.7 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute Work with no interference or disturbance to campground kiosk, campground dumping station, existing washroom facility, owner, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of Work.

1.8 EXISTING SERVICES

- .1 The Contractor shall perform utility locates and provide copies to Departmental Representative prior to undertaking any Work.
- .2 The Contractor shall obtain permission from Departmental Representative and utility companies prior to intended interruption of services.
- .3 Provide alternative access routes during Stage 1 and 2 for pedestrian and vehicular traffic to the Campground.
- .4 Provide temporary signage to indicate location of pedestrian trails from the Overflow Parking Lot to the Existing Parking Lot area, and indicate alternative parking in the Overflow Parking Lot during Stage 3 of Work.
- .5 Where unknown services are encountered, immediately advise Department Representative and confirm findings in writing.

1.9 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .1 Contract Drawings, marked up with as-built information.
 - .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 Environmental Protection Plan.
- .11 Traffic Accommodation Strategy.
- .12 Quality Management Plan.
- .13 Health and Safety Plan and Other Safety Related Documents.
- .14 Other documents as specified.
- .15 Restricted Activity Permits.

1.10 HOURS OF WORK

- .1 The Work must be performed between 7 am and 7 pm with exception as noted below.
Work may not be performed on:
 - .1 June 29, 30, 2016
 - .2 July 1, 2, 3, 30, 31, 2016
 - .3 August 2, 3, 4, 5, 2016
 - .4 September 2, 3, 4, 5, 2016
 - .5 October 7, 8, 9, 10, 2016

1.11 SURVEY RESPONSIBILITIES

- .1 The Contractor is responsible for all surveying required to construct the Work to the lines and grades shown on the Drawings. Survey Work must be tied to the nearest Alberta Survey Control Monument or temporary benchmarks established by the Department Representative. Elevations shown on the Drawings are geodetic.
- .2 The Contractor must conduct a survey circuit of the project monuments and submit a report to the Department Representative at least seven (7) days prior to installation of any works.
- .3 The Contractor is responsible for quantity survey measurements for progress payment application.
- .4 The Contractor will complete as-built survey of all Works for Record Drawings and provide the results to the Departmental Representative prior to Substantial Performance of the Work.

1.12 EROSION AND SEDIMENT CONTROL (ESC) PLAN

- .1 The Contractor must prepare an ESC plan for the project to be included in the Environmental Protection Plan described in Section 01 35 43 Clause 1.3.2. The plan must detail temporary and permanent environmental control measures that the Contractor will undertake to comply with all applicable legislation, regulations and approvals during the course of their construction. The plan should address the following items:

- .1 Pre-Construction Actions:
 - .1 Prepare and submit for review by Departmental Representative the “Environmental Protection Plan”
- .2 Construction Considerations:
 - .1 Clearing and excavation must start only after installing the sediment and runoff measures as per the plan which has been reviewed and accepted by the Departmental Representative. Only areas required for immediate construction activity and as approved by the Departmental Representative may be cleared. Additional control measures must be installed as excavation advances.
 - .2 Stockpiles can be located anywhere in the designated construction work areas approved by the Owner. They must be stabilized against erosion immediately following stockpiling operations. Runoff from the stockpile areas must be contained to prevent contamination of drainage systems.
 - .3 Sediment and debris must be prevented from reaching waterways.
 - .4 Dust control measures must be implemented to prevent wind transport of dust from disturbed soil surfaces.
 - .5 On-going inspection and maintenance of Erosion and Sediment Controls must be performed by the Contractor until restoration is achieved.
- .3 Post-Construction Activities:
 - .1 All accumulated sediment and debris must be removed as required after construction activities are complete.
 - .2 Stockpile, storage and laydown areas must be cleaned and restored to pre-construction condition.
- .4 The ESC Plan must include natural area protection measures for natural areas impacted by the project.

1.13 TRAFFIC ACCOMMODATION STRATEGY (TAS)

- .1 The Contractor must prepare a traffic accommodation strategy for the project. The TAS must detail temporary construction signage and detours for public use of the park area during all Stages of construction.
- .2 Traffic accommodation during construction for Stage 1 and 2 must allow for public access through one lane traffic in each direction at all times, from the campground access and campground kiosk to the camping area. Parking during Stage 3 of the Work will be directed to the Overflow Parking area. During all phases of construction, public access to the sanitary dump station should be maintained at all times. The plan should address the following items:
 - .1 Pre-Construction Actions:
 - .1 Prepare and submit for review by Departmental Representative the “Traffic Accommodation Strategy”.
 - .2 Receive acceptance from the Departmental Representative to proceed prior to beginning Work.

- .2 Construction Considerations:
 - .1 Vehicle and pedestrian traffic detours to enable the continuous use of the campground including the campground access, campground kiosk and sanitary dump station during daily construction operations.
 - .2 Vehicle and pedestrian traffic detour during the construction work in the existing parking lot area.
- .3 No signs or advertisements, other than warning signs, are permitted on site.
- .4 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall be diamond grade and shall conform to CAN3-Z321.
- .5 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by the Departmental Representative.
- .6 Signage shall be coordinated with other Contractors.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

- .1 The following equipment or approved equivalent shall be permitted for the following specified uses, any equipment not identified on the below list must be pre-approved prior to tender close or else it will not be permitted:
 - .1 A mini dump truck (max GVW 3 tonne).
 - .2 John Deere 135G zero swing excavator: mobilization/demobilization to site, excavation and rip-rap placement.
 - .3 John Deere 450D Bulldozer.
 - .4 Skid Steer Loader approved by Departmental Representative.
 - .5 Mini Backhoe/Excavator approved by Departmental Representative.
 - .6 Ride-on material mover Power Buggy IPB-21 or smaller: transportation of material within site.
- .1 Design, construct and maintain temporary “access to” and “egress from” work areas; including stairs or ramps or ladders, independent of finished surfaces, and in accordance with relevant provincial safety regulations.

1.2 USE OF THE WORK SITES

- .1 The work sites shall be specified by the Departmental Representative and shall only be used for the purposes of the Work. The work sites will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .2 While the work sites are under the Contractor’s control, the Contractor shall be entirely responsible for the security of the work sites and of the Work, and for the security of the Work of other contractors located on the work sites.
- .3 The Contractor shall keep the work sites clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary for the performance and inspection of the Work.
- .4 Execute Work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate Work as stated.
- .5 The Contractor will not be permitted to establish a worker's accommodation camp inside Banff National Park.
- .6 The Contractor shall be provided with a work space identified in the construction drawings. The Contractor is permitted to use this space for construction requirements and temporary facilities in accordance with the Contract Documents.
- .7 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 such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .8 Any damage to the Work Sites caused by the Contractor shall be repaired by the Contractor at its expense.

- .9 Any damage caused to the access road/trails by construction equipment shall be repaired, which may include re-grading, levelling and seeding, to the satisfaction of the Departmental Representative at the Contractor's own expense.
- .10 All equipment permitted to use Highway 1A shall not exceed the posted speed limit.
- .11 The Contractor shall have to access Bow Valley Parkway (Highway 1A) from the Trans Canada Highway by going over the bridge at the Bow River. A restricted activity permit will be required for this. Parks Canada Agency (PCA) will issue the restricted activity permit to the Contractor.
- .12 The Work must be performed between 7 am and 7 pm with exception as noted below. Work may not be performed on:
 - .1 June 29, 30, 2016
 - .2 July 1, 2, 3, 30, 31, 2016
 - .3 August 2, 3, 4, 5, 2016
 - .4 September 2, 3, 4, 5, 2016
 - .5 October 7, 8, 9, 10, 2016

1.3 SNOW CLEARING OF TRAILS

- .1 Snow clearing is not anticipated, however if required this will be the responsibility of the Contractor at no extra cost to the Owner.

1.4 UTILITIES

- .1 Existing utilities shown are for information only; the Contractor is responsible for locating any existing utilities prior to construction.
- .2 Overhead power lines are located in the overflow parking lot site.
- .3 Location of water wells and sanitary dump station are as shown in the Contract Drawings.

1.5 EXISTING SITE CONDITIONS

- .1 Submission of a tender is deemed to be confirmation that the Contractor has inspected the site and is completely familiar with all existing conditions or restrictions affecting execution and completion of the Work.
- .2 Regularly monitor the condition of the Work Site throughout the construction period.

1.6 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable provincial safety regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or adjacent to the Work Site to the extent that may be affected by conduct of work.
- .3 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property or, if Parks

Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage.

1.7 USE OF PUBLIC AREAS

- .1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas.
- .2 All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle.
- .3 All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways or trails, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at its own expense.
- .4 All activities shall be in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan prepared for the project.

1.8 SUPERVISORY PERSONNEL

- .1 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 Deputy Project Superintendent.
- .3 Health, Safety and Environment Coordinator.
- .2 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 the completion of Work.
- .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the Project Superintendent's absence.
- .4 Health, Safety and Environment Co-ordinator must:
 - .1 Have minimum 2 years' site related working experience specific to activities associated with roadway construction.
 - .2 Have working knowledge of occupational health, safety and environmental 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 responsible for implementing, enforcing daily and monitoring the Environmental Protection Plan (EPP).

- .6 Be on site during execution of Work and report directly to and be under direction of the Project Superintendent.

1.9 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 to be held on site after award notification. This meeting shall be attended by senior representatives of the Owner, the Departmental Representative, Contractor, major subcontractors and field inspectors.
- .3 Progress and status meetings will be held on a weekly basis or more frequently as directed by the Departmental Representative.
- .4 Cost of attending the above meetings shall be considered incidental to the Work and no additional payment will be made.

1.10 WASTE DISPOSAL

- .1 Refer to Section 01 35 43 - Environmental Procedures.
- .2 All surplus, unsuitable and waste materials shall be removed from the job site to approved sites outside Banff National Park, unless specified otherwise in other sections of these Specifications.
- .3 Deposits of any construction debris into any waterway are strictly forbidden unless specifically instructed to within the contract documents or by the Departmental Representative.
- .4 Cost for waste disposal described above shall be considered incidental to the Work and no additional payment will be made.

1.11 WORK STOPPAGE

- .1 Give precedence to health and safety 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.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Prime Cost Sum
- .2 Approval Process and Schedule.
- .3 Measurement procedures.

1.2 PRIME COST SUM

- .1 Include in Contract Price a Prime Cost Sum as provided in the Schedule of Quantities.
- .2 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with such prime cost sum.
- .3 Prime Cost Sum provided for in the Schedule of Quantities is not a sum due to the Contractor. Rather, payment will be made against it for any miscellaneous work not included in the Contract or under the General Conditions of the Contract.
- .4 The use of any part of Prime Cost Sum will be on sole discretion of the Departmental Representative. The Contractor cannot make any claim if some or the entire Prime Cost Sum amount is deemed unnecessary.
- .5 Prime Cost sum items may include but are not limited to:
 - .1 Trench base stabilization for the electrical conduits.
 - .2 Geogrid for subgrade preparation.
 - .3 Rock Excavation
 - .4 Relocation or insulation of existing sanitary line running underneath the pit privy location.
 - .5 Other Miscellaneous work as directed by the Departmental Representative.
- .6 Once a Prime Cost Sum item has been agreed upon with Departmental Representative, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project Schedule.

1.3 APPROVAL PROCESS AND SCHEDULE

- .1 For any additional works identified by the Parks Canada Representative, the Contractor will submit a Contract Change Notice (CCN) outlining the work to be completed, the cost of work and the impact to the schedule to the Parks Canada Representative. Once the CCN is approved, a Change Order will be required for charging any CCN item against the Prime Cost Sum
- .2 The substantial completion date for the project will only be renegotiated to reflect the schedule of the Prime Cost Sum item if the Prime Cost Sum item interferes with the critical path of the project.

1.4 MEASUREMENT PROCEDURES

- .1 Payment for work under the Prime Cost Sum will be made using negotiated rates or the material, labour and equipment rates as per the following:
 - .1 Rental rates will be in accordance with current Alberta Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.
 - .2 Transportation time to and from site to be reimbursed only if equipment is exclusively used for additional work.
 - .3 Labour rates and material costs shall be paid in accordance with the General Conditions.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

2.2 EXECUTION

- .1 Not used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 For each unit price item, Departmental Representative will calculate payment based on tendered unit price and Departmental Representative's determination of units of work item completed.
- .2 For lump sum price item, Departmental Representative will calculate payment based on tendered price and Departmental Representative's estimate of percentage of work item completed.
- .3 Method of measurement to be used is detailed in the section of the specification covering each work item.
- .4 Where a method of measurement for payment for a work item is not specified, payment for that item will be deemed to be incidental to the contract price.
- .5 For each unit price item that require survey for quantity verification, the Contractor shall submit all supporting survey data in electronic format to the Departmental Representative at least 7 days before submission of progress payment.

Part 2 Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

This section prescribes the measurement and payment for items of Work described in the Bid and Acceptance form. The measurement and payment clauses shall be read in conjunction with the various items of work listed in the Bid and Acceptance form.

.1 General Requirements

.1 Mobilization and Demobilization

Payment for this item shall be compensation in full for costs of mobilization; permits; moving personnel, equipment, fencing, safety measures, and materials to the site; setting up temporary facilities; public notices; storage of materials; all preparation for performing the work; full demobilization of the above; site clean-up; site restoration; and costs associated with the warranty period.

Payment: Lump sum price bid.

Measurement: 50% of the lump sum will be included in the first progress payment certificate provided the Departmental Representative has verified that 10% of the Work has been completed; 50% of the lump sum will be included in the final progress payment certificate; Mobilization/ demobilization will only be paid for once, regardless of the number of times the Contractor mobilizes and demobilizes, due to any condition or circumstance.

.2 Environmental Protection Plan (EPP) and Measures

Payment for this item shall be compensation in full for the preparation of an EPP; supply and installation of all necessary erosion and sediment control measures and necessary measures indicated in the EPP; all labour, permitting, equipment and materials required to complete the work, sediment disposal; clean up; maintenance, removal of all measures at such time as approved by the Departmental Representative, and any incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on the percentage of work complete.

.3 Traffic Accommodation Strategy and Measures

Payment for this item shall be compensation in full for the preparation of a Traffic Accommodation Strategy; supply and erection of all necessary temporary signage, flag persons and detours; all labour, permitting, equipment and materials required to complete the work; clean up; and any incidental work for which payment is not specified elsewhere. This pay item includes multiple phases of the TAS to accommodate the Work as defined.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on the percentage of work complete.

.2 Demolition

.1 Clearing and Grubbing

Payment for this item shall be compensation in full for all clearing and grubbing of trees, stock piling, chipping, excavating, loading, removal and disposal, to an approved disposal site, of all roots, stumps, trees, limbs, brush, or other non-salvageable materials; all labour, permitting, equipment and materials required to complete the work; clean up, and any incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per square meter cleared and grubbed.

Measurement: Area shall be calculated from surveyed topography completed by the Contractor, with survey data submitted to the Departmental Representative for verification.

.2 Remove and Dispose Existing Curb

Payment for this item shall be compensation in full for sawcutting, breaking up; loading, hauling and unloading to an approved disposal site; protection of surface features, structures, asphalt, and appurtenances; all labour, permitting, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per linear meter of curb removed.

Measurement: Field Measured along the top of the concrete curb.

.3 Asphalt Removal

Payment for this item shall be compensation in full for sawcutting, milling asphalt to a maximum depth of 50 mm, asphalt removal, loading, hauling and disposal of asphalt waste to an approved disposal site; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per square meter of asphalt removed.

Measurement: Area shall be calculated from surveyed topography completed by the Contractor.

.4 Information Kiosk, Existing Pit Privy and Tank Demolition and Disposal

Payment for this item shall be compensation in full for demolition of the information kiosk, demolition of the pit privy and tank, loading, hauling and disposal of the demolished kiosk, pit privy and tank to a disposal site; protection of surface features, structures, and appurtenances, backfill and grading; all labour, equipment and materials required to complete the work; permitting, equipment and materials required to complete the work, clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable following the demolition and disposal of the information kiosk.

.3 Infrastructure

.1 Supply and Install Culvert Extensions

Payment for this item shall be compensation in full for extending the existing culvert; supplying of the culvert material and connections, supplying and placing of the bedding and pipe zone material; compacting the bedding and pipe zone material to the specified density; backfilling; moisture conditioning; compacting to the specified density; grading; and disposal of oversize and/or excess materials; supply and placement of rip rap, all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable following the installation of the culvert extensions.

.2 Design, Supply and Install New Pit Privy and Tank

Payment for this item shall be compensation in full for the design of the pit privy in accordance with the technical specifications identified on drawings S4 and A1, shop drawing submissions, confirmation of all utilities near the Pit Privy via hydrovac prior to construction, supply of all materials required for the pit privy and tank, installation, excavation for pit privy tank, relocation of sanitary sewer outside of pit privy footprint or insulation of sanitary sewer, grading around the pit privy structure and backfill. All labour, equipment, material; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on the percentage of work complete.

.4 Earth and Surface Works

.1 Topsoil Stripping

Payment for this item shall be compensation in full for removal and storing on site of all organic material to a minimum depth of 0.15 m, , disposal of excess topsoil to an approved disposal site, and any incidental work for which payment is not specified elsewhere. All labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per square meter of topsoil removed.

Measurement: Area shall be calculated from surveyed topography completed by the Contractor.

.2 Rough Grading

.1 Excavation

Payment for this item shall be compensation in full for excavation, removal, hauling, placing at stockpile, compaction at stockpile, any dewatering required before or during construction, levelling, grading, moisture conditioning, hauling to site for backfill, compacting of native fill. Labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per cubic meter of material excavated and embanked.

Measurement: Volumes shall be calculated by surveyed cross sections completed by the Contractor and differential digital terrain models (DTMs) developed to calculate volume.

.1 Imported Embankment

Payment for this item shall be compensation in full for hauling to site, placing at stockpile, any dewatering required before or during construction, levelling, grading, moisture conditioning, and compaction. Labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per cubic meter of material imported and embanked.

Measurement: Volumes shall be calculated by surveyed cross sections completed by the Contractor and differential digital terrain models (DTMs) developed to calculate volume.

.3 Subgrade Preparation

Payment for this item shall be compensation in full for subgrade preparation; including all excavation, grading, levelling, moisture conditioning, compacting, any soft spot repair or remediation; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per square meter of subgrade prepared.

Measurement: Area shall be calculated from surveyed topography completed by the Contractor.

.4 Supply and Install Granular Base Course

Payment for this item shall be compensation in full for supplying, loading, hauling, unloading, placement, levelling and compacting to the specified thickness and density; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per Tonne of granular base course supplied and installed.

Measurement: Tonnage will be verified by providing copies of the trucking tickets to the Departmental Representative.

.5 Supply and Install Asphalt Concrete Pavement

Payment for this item shall be compensation in full for supply of all equipment, material and labour required for the preparation of the mix design and mix formula, the supply and placing of a prime coat and/or tack coat as required, supply of aggregates and asphalt cement, mixing, transporting, placing, spreading, compacting the asphalt concrete to the specified thickness and density, and all work incidental thereto. Construction joints will be considered incidental to paving.

Payment: Unit Price bid per Tonne of hot mix asphalt concrete measured in place.

Measurement: Tonnage will be verified by providing copies of the trucking tickets to the Departmental Representative.

.6 Supply and Install Concrete Median

Payment for this item shall be compensation in full for supplying and placing concrete and curb and gutter, saw cutting and all necessary surface removal, excavation, sub-grade preparation, placement of granular materials, formwork, doweling, levelling, reinforcing, finishing, curing, sealing, surface restoration; all labour, equipment and materials required

to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable following the installation of the concrete median.

.7 Supply and Install Curb and Gutter

Payment for this item shall be compensation in full for the supply and installation of curb and gutter, including all saw cutting and all necessary surface removal, protection of newly paved asphalt concrete pavement, excavation, sub-grade preparation, placement of granular materials, formwork, supply and placing of concrete, doweling for tie-in, jointing, reinforcing, finishing, curing, sealing and backfilling, surface restoration; all labour, grading behind concrete structure and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per lineal meter of curb and gutter installed.

Measurement: Field measured along top of curb.

.5 Traffic Control Features

.1 Supply and Install Traffic Signs

Payment for this item shall be compensation in full for the supply and installation of permanent traffic signage; submission of sign proof for review and acceptance, posts and preparation work, post installation; surface restoration; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid for each traffic sign installed.

Measurement: Each.

.2 Supply and Install Information Signs

Payment for this item shall be compensation in full for the supply and installation of information signage; submission of sign proof for review and acceptance, posts and preparation work, post installation; surface restoration; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid for each information sign installed.

Measurement: Each.

.3 Pavement Marking

Payment for this item shall be compensation in full for the supply and painting of all pavement markings including gored areas; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on the percentage of work complete.

.4 Directional Arrows

Payment for this item shall be compensation in full for the supply and painting of all directional arrows; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid for each directional arrow painted.

Measurement: Each.

.5 Supply and Install Parking Lot Counter

Payment for this item shall be compensation in full for the supply and installation of the parking lot counter including coordination with supplier, electrical works, supply and install bollards, excavation, backfill, surface restoration; all labour, equipment and materials required to complete the work; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable following the installation of the parking lot counter.

.6 Landscaping

.1 Architectural Work including Seating Wall, Timber Entry and Information Kiosk

Payment for this item shall be compensation in full for the supply and install of the seating wall, supply and installation of the timber entry, supply and installation of the information kiosk, including all shop drawing submission, including all connections to the seating wall, material sample submission, including all labour, material, structural connections, foundation, reinforcing, finishing and curing; clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on the percentage of work complete.

.2 Stamped Concrete

Payment for this item shall be compensation in full for the supply of all equipment, material and labour required for the installation of the stamped concrete. Including pattern and procedure submission, construction joints, sub-grade preparation, supply and placement of granular materials, formwork, doweling, levelling, reinforcing, supply and placement of concrete, finishing, curing, sealing, clean up; and any other incidental work for which payment is not specified elsewhere will be considered incidental to feature install.

Payment: Unit Price bid per square meter of stamped concrete installed.

Measurement: Field measured area.

.3 Supply and Install of Surface Restoration

Payment for this item shall be full compensation for the installation of the topsoil material, fertilizer, mixing, transport and spreading of the seeds. The seed mix is to be provided by the Owner.

Payment: Unit price bid per square metre.

Measurement: Field measured area.

.7 Electrical

.1 Supply and Install XLPE Duct

Payment for this item shall be compensation in full for the supply and install of the XLPE duct, including excavation, placing duct, supply and installation of screened sand, warning tape and backfill. All labour, material, clean up and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable following the installation of the XLPE duct.

.8 Provisional Item

.1 Supply and Install Duct Complete with Power

Payment for this item shall be compensation in full for the supply and install of an electrical duct from washroom to parking lot counter, including excavation, placing duct, supply and installation of screened sand, warning tape and backfill, power cable pull, restoration of parking lot surface and acceptance testing. All labour, material, clean up and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable following the installation of the duct and power cable.

.9 Prime cost sum

Refer to Section 01 21 00 – Allowances

END OF SECTION

Part 1 General

1.1 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Contractor's Responsibilities:
 - .1 Make applications for payment on account monthly as Work progresses.
 - .2 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Work performed and products delivered to place of work at that date.
 - .3 Submit progress payment application to Departmental Representative within 5 working days after each month end.
 - .4 Progress payment application to show estimate of percentage of work completed against each item of Lump Sum Price Breakdown and Unit Price items.
 - .5 Progress payment application to include all labour and materials incorporated in Work and all materials stored at site.
 - .6 Progress payment application to include all agreed extras and deductions.
 - .7 Supply electronic copy of documentation to support payment application for materials on site in the form of itemized lists or unpriced purchase orders showing quantities.
 - .8 Supply other evidence required by Department Representative in support of progress claim including survey data.
- .2 Departmental Representative's Responsibilities:
 - .1 Review Contractor's payment application, prepare Progress Payment Certificate and issue to Owner within 10 working days following receipt of Contractor's payment application.
 - .2 Departmental Representative's estimate of percentage of work completed will govern calculation of payment on all Progress Payment Certificates.
 - .3 Inform Contractor of amendments to claim by copy of Progress Payment Certificate.

1.2 SCHEDULE OF VALUES

- .1 Provide schedule of values supported by evidence as Departmental Representative may reasonably direct and when accepted by Departmental Representative, be used as basis for applications for payment.
- .2 Verify unit rate quantities with Departmental Representative on site.
- .3 Include statement based on schedule of values with each application for payment.
- .4 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Departmental Representative may reasonably require to establish value and delivery of products.

1.3 PROGRESS PAYMENT

- .1 Progress payment submission to the Departmental Representative should match the structure of the Bid and Acceptance form.
- .2 Departmental Representative will issue to Owner, no later than 10 days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Departmental Representative determines to be due. If Departmental Representative amends application, Departmental Representative will give notification in writing to the Contractor giving reasons for amendment.

1.4 CHANGE ORDERS

- .1 Complete and promptly return all change price requests issued by Departmental Representative, quoting unit and/or lump sum prices as requested. Include appropriate supporting documentation to verify prices.
- .2 Do not proceed with work affected by price request until authorized to do so by Change Order.
- .3 Make no change in Work unless Change Order issued. Change Order is only valid when signed by Departmental Representative, Owner and Contractor.

1.5 SUBSTANTIAL PERFORMANCE OF WORK

- .1 Prepare and submit to Departmental Representative comprehensive list of items to be completed or corrected and apply for a review by Departmental Representative to establish Substantial Performance of Work or Substantial Performance of designated portion of Work. Failure to include items on list does not alter responsibility to complete Contract.
- .2 Departmental Representative: state date of Substantial Performance of Work or designated portion of Work in certificate.
- .3 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Departmental Representative, establish reasonable date for finishing Work.

1.6 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

- .1 After issuance of certificate of Substantial Performance of Work:
 - .1 Submit application for payment of holdback amount or partial holdback amount as deemed appropriate by Departmental Representative.
 - .2 Submit statutory declaration that accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Owner might in be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.
- .2 After receipt of application for payment and sworn statement, Departmental Representative will issue certificate for payment of holdback amount or partial holdback amount as recommended by Departmental Representative.

1.7 PROGRESSIVE RELEASE OF HOLDBACK

- .1 Refer to G.C 5 Terms of Payment

1.8 FINAL PAYMENT

- .1 Submit application for final payment when Work is completed.
- .2 Departmental Representative will review Work to verify validity of application.
Departmental Representative will give notification that application is valid or give reasons why it is not valid.
- .3 Departmental Representative will issue final certificate for payment when application for final payment is found valid.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.
- .2 Section 01 27 00 – Measurement and Payment.

1.2 ADMINISTRATIVE

- .1 The Departmental Representative will Schedule and administer weekly project meetings throughout the progress of the Work.
- .2 The Departmental Representative shall prepare agenda for meetings.
- .3 The Departmental Representative will distribute notice of each meeting four days in advance of meeting date to Owner and the Contractor.
- .4 The Contractor shall provide physical space and make arrangements for meetings.
- .5 The Departmental Representative will preside at meetings.
- .6 The Departmental Representative will record the meeting minutes, include significant proceedings and decisions and identify actions by parties.
- .7 The Departmental Representative will reproduce and distribute copies of minutes after meetings and transmit to meeting participants and, affected parties not in attendance.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

- .1 Within ten (10) days after award of Contract, the Departmental Representative will request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Representatives from Owner, Contractor, major Subcontractors and Departmental Representative will be in attendance.
- .3 The Departmental representative will establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work in accordance with 01 32 16.06
 - .3 Schedule of submission of Shop Drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences.
 - .5 Health and safety requirements.
 - .6 Traffic Accommodation Strategy.
 - .7 Environmental Protection Plan.
 - .8 Quality Management.

- .9 Waste Reduction Work plan
- .10 Delivery schedule of specified equipment.
- .11 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .12 Owner provided products.
- .13 Record Drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .14 Monthly progress claims, administrative procedures, photographs, hold backs.
- .15 Appointment of inspection and testing agencies or firms.
- .16 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

- .1 During course of Work and one week prior to project completion, progress meetings will be scheduled weekly.
- .2 Contractor, major Subcontractors involved in Work, Owner representative and Departmental Representative are to be in attendance.
- .3 The Departmental Representatives will notify parties of confirmed attendance minimum four (4) days prior to meetings.
- .4 The Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Corrective measures and procedures to regain projected schedule.
 - .6 Revision to construction schedule.
 - .7 Progress schedule, during succeeding work period.
 - .8 Review submittal schedules: expedite as required.
 - .9 Maintenance of quality standards.
 - .10 Review proposed changes for effect on construction schedule and on completion date.
 - .11 Health and safety incidents or corrective actions.
 - .12 Traffic Accommodation.
 - .13 Erosion Control/Environmental Protection.
 - .14 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 – Project Meetings.

1.2 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Sunday, excluding June 29 – 30, 2016, July 1-3, 2016, July 30-31, 2016, August 2-5, 2016, September 2-5, 2016, October 7 – 10, 2016 will provide seven-day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.

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

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Overflow Parking Lot Work between 2016 June 15 and 2016 July 31
 - .2 Existing Parking Lot Work completed by 2016 August 31
 - .3 Substantial Performance 2016 September 14
 - .4 Final Completion 2016 September 30

1.6 MASTER PLAN

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

1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Submittal of Shop Drawings.
 - .3 Permits.
 - .4 Survey.
 - .5 Mobilization.
 - .6 Environmental Protection Plan (EPP), review and implementation.
 - .7 Health and Safety Plan, review and implementation.
 - .8 Traffic Accommodation strategy, review and implementation.
 - .9 Quality Management Plan.
 - .10 Stage 1 Work.

- .11 Stage 2 Work.
- .12 Stage 3 Work.
- .13 Substantial Performance Inspection.
- .14 Demobilization.
- .15 Completion.

1.8 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress.

1.9 PROJECT MEETINGS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 45 00 – Quality Control.

1.2 REFERENCES

- .1 Not Used.

1.3 ADMINISTRATIVE

- .1 Submit to Departmental Representative the submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in the stipulated timeframe below is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 The Contractor should provide all submittals at-least two (2) weeks prior to any work that will involve the use of the information or material indicated in the submittal.
- .3 Do not proceed with Work affected by submittal until review is complete.
- .4 Present Shop Drawings, product data, samples and mock-ups in SI Metric units and as per Clause 1.4.
- .5 Where items or information is not produced in SI Metric units converted values are acceptable.
- .6 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. Shop Drawing is to be submitted under cover of a signed letter confirming that Drawings have been reviewed and approved by the Contractor. Submittals not submitted with a signed letter will be returned without being examined and considered rejected.
- .7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .8 Verify field measurements and affected adjacent Work are co-ordinated.
- .9 Contractor's responsibility for errors and omissions in submission is not relieved by the Departmental Representative's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Departmental Representative's review.
- .11 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 Province of Alberta of Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to Design Drawings and Specifications.
- .4 Allow fourteen (14) days for Departmental Representative's review of each submission.
- .5 Adjustments made on Shop Drawings by the Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.
- .6 Make changes in Shop Drawings as the 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 Connections.
 - .5 Capacities.
 - .6 Performance characteristics.
 - .7 Standards.
 - .8 Operating weight.

- .9 Wiring diagrams.
- .10 Single line and schematic diagrams.
- .11 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of Shop Drawings for each requirement requested in specification Sections and as the Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested Departmental Representative where Shop Drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within three (3) years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit 2 electronic copies of Operation and Maintenance Data for requirements stated in the technical specifications. Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.

1.5 REQUIRED CONTRACTOR SUBMITTALS

- .1 General
 - .1 This Clause identifies the plan, program, and documentation required prior to mobilization on site and during the construction phase.

.2 Pre-Mobilization Submittals

- .1 Submit the following plans and programs to the Departmental Representative for review a minimum of fourteen (14) days prior to mobilization to the project site. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing. The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety or environmental 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 Construction schedule for all Work in accordance with Section 01 32 16.07 – Construction Progress schedule.
 - .2 Survey of all utilities in the work area via locates and hydrovac, especially ones near the proposed pit privy location, submitted to the Department Representative.
 - .3 Construction Staging Plan.
 - .4 Environmental Protection Plan in accordance with Section 01 35 43 – Environmental Procedures.
 - .5 Traffic Accommodation Strategy in accordance with the requirements identified in Section 01 11 00 – Summary of Work.
 - .6 Quality Management Plan in accordance with Section 01 45 00 – Quality Control.
 - .7 Health and Safety Plan in accordance with Section 01 35 29.06 Health and Safety Requirements.
 - .8 Submit site-specific Health and Safety Plan within seven (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 operations found in the Work Plan.
 - .9 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and the authority having jurisdiction weekly.
 - .10 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .11 Submit copies of incident and accident reports.
 - .12 Submit WHMIS Material Safety Data Sheets (MSDS) to the Departmental Representative.
 - .13 The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within

- seven (7) days after receipt of plan. Revise plan as appropriate and resubmit plan to the Departmental Representative within seven (7) days after receipt of comments from the Departmental Representative.
- .14 The Departmental Representative's review of the 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.
- .15 On site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .16 Waste reduction work plan: written report which addresses opportunities for reduction, reuse, or recycling of materials.
- .2 The Contractor shall not begin any Work until the Departmental Representative has authorized acceptance of the submittals in writing.
- .3 Construction Phase Submittals
 - .1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis.
 - .2 Quality Control Inspection Reports – The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control Inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.
 - .3 Information Kiosk Shop Drawing.
 - .4 Timber Entry Shop Drawings.
 - .5 Pit Privy Shop Drawings.
 - .6 Curb Inlet Shop Drawing.
 - .7 Sieve analysis for granular base course as per Section 32 11 23.
 - .8 Manufacturers test data and certification for pipe culvert.
 - .9 Manufacturers product data, specifications, and certification for traffic signs and posts.
 - .10 Submit Shop Drawings for information signs, using the latest Parks Canada standards to show bilingual information, sign dimensions, and color detail for review and approval before manufacturing sign.
 - .11 Manufacturer's instructions, printed product literature and data sheets for mulch and include product characteristics, performance criteria, physical size, finish and limitations.
 - .12 Sample of medium coarse mulch.
 - .13 Manufacturer's instructions, printed product literature and data sheets for fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.
 - .14 0.5 kg container of each type of fertilizer used.
 - .15 Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of sod quality.

- .16 Manufacturer's instructions, printed product literature and data sheets for Rundle Ledge Stone including product characteristics, performance criteria, physical size, finish and limitations.
- .17 Sample for each finish product of veneer cladding specified.
- .18 Asphalt concrete mix design and trial mix test results.
- .19 Manufacturer's test data and certification that asphalt cement meets specified requirements prior to commencing work.
- .20 Procedures and pattern for stamped concrete as per Section 03 30 00 Clause 3.7.2.
- .4 Project Completion Submittals
 - .1 Record Drawings
 - .2 Quality Assurance/Quality Control Records.

1.6 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of digital photography in .jpg format, weekly with progress statement.
- .2 Project identification: name and number of project and date photograph taken indicated.
- .3 Frequency of photographic documentation: weekly.
 - .1 Prior to commencement of Work.
 - .2 Before concealment of Work.
 - .3 Upon completion of items in bid and acceptance form.
- .4 Submit 4 copies of CD with all electronic pictures as part of closeout package.

1.7 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcript of insurance five (5) days after award of Contract.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Health and safety considerations required to ensure that Parks Canada Agency (PCA) shows due diligence towards health and safety on construction sites.

1.2 RELATED SECTION

- .1 Section 01 33 00 – Submittal Procedures

1.3 REFERENCES

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

1.4 SUBMITTALS

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

1.5 FILING OF NOTICE

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

1.6 SAFETY ASSESSMENT

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

1.7 MEETINGS

- .1 Conduct weekly safety meetings at the beginning of each week to discuss the scheduled work for that week and the associated safety hazards.

1.8 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.
- .2 The Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 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.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta,
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 EMERGENCY RESPONSE PLAN

- .1 Prepare a plan to address any unforeseen or peculiar safety related factor, hazard, or condition occur during performance of Work. Advise the Departmental Representative immediately verbally and in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum two (2) years' site related working experience specific to activities associated with parking lot expansion.
 - .2 Have a working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training site orientation and ensuring that personnel on site have completed an orientation prior to completing Work.
 - .4 Be responsible for daily implementation, enforcement and monitoring of Contractor's site specific Health and Safety Plan.
 - .5 Be on site during execution of Work, report directly to and be under direction of the site supervisor.

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Alberta OH & S Act and Regulations, and in consultation with the Departmental Representative.

1.14 CORRECTION OF NON- COMPLIANCE

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

1.15 WORK STOPPAGE

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

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 GENERAL

- .1 All Contractor operations shall be performed in such a manner that no detritus from his operations shall enter any river, waterway, ditch, or wetland within Banff National Park.
- .2 If, in the opinion of the Departmental Representative or Parks Canada, full containment of Contractor's detritus is not being achieved, operations may be ordered halted until the situation is rectified.
 - .1 Contactor to adhere to requirements identified in the Parks Canada Basic Impact Analysis document provided as a reference document.

1.2 NATIONAL PARK REGULATIONS

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

1.3 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the Work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) 2012 and subsequent amendments.
- .2 The Contractor is required to prepare an Environmental Protection Plan (EPP), which will include the topics in the following sub sections.
- .3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the Work being suspended pending rectification of the problems.
- .4 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonably timely manner of any actual or potential environmental incidents or failure of protection measures.
- .5 The Contractor shall notify the ESO and the Departmental Representative immediately of any violations of environmental approvals, permits, authorizations or EPP measures.

1.4 RELICS AND ANTIQUITIES

- .1 Give immediate notice to Parks Canada if evidence of archaeological finds are encountered during construction, and wait for written instructions before proceeding with Work in this area.

- .2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on the site shall remain the property of Parks Canada. Protect such articles and request directives from Parks Canada.
- .3 Provide forty-eight (48) hours notice to Parks Canada prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Parks Canada.

1.5 WILDLIFE

- .1 Avoid or terminate activities on site that attract or disturb wildlife.
- .2 Pets are not allowed on the work site, or in any administrative or laydown areas.
- .3 All personnel will be instructed by Parks Canada's ESO the procedures to follow in the event of wildlife appearance near or intrusion into the construction site. Personnel are not to attract or approach any wildlife seen near the site, and are to vacate their location in the event of aggressive behaviour or persistent intrusion by bears, cougars, wolves, elk or moose. The ESO and the Departmental Representative are to be notified about the circumstance immediately. The Banff Warden Services will be called to determine the course of action. The general presence of wildlife observed near the construction site, any carcasses or unusual wildlife observations shall be reported to the ESO and the Departmental Representative.

1.6 FIRE PROTECTION AND CONTROL

- .1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic firefighting equipment – e.g., three (3) shovels, two (2) pulaskis, and two (2) 20 litre backpack pumps shall be maintained at the construction site at a 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".
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .3 No smoking is allowed on the construction site to ensure that accidental ignition of any flammable material is prevented. Fires or burning of waste materials are not permitted.
- .4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contacting the Banff Fire Duty Officer. Fire prevention care is to be commensurate with the Fire Index.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.
- .6 Deliberately lighting of fires or burning of waste materials is strictly not permitted.

1.7 SITE ACCESS AND PARKING

- .1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access and facilities at the work sites and within the

work limits, including day-to-day entry/egress and plans for delivery and approach for large dimension materials will be anticipated and described. The access plan shall describe worker transportation to and from the construction site, and parking of workers' private vehicles. Specific details of any vehicles to transport workers to site or site equipment to be used on the trails are to be provided.

- .2 Restrict vehicle movements to work limits.
- .3 Do not park vehicles in areas beyond work limits, unless specifically authorized by the ESO and the Departmental Representative.
- .4 A construction office is anticipated for the parking lot contract. The construction office may be located at the campground area, actual location subject to the approval of the Departmental Representative and ESO. It is anticipated the construction office may comprise the Contractor's main office, a materials testing trailer and ESO trailer and toilets.
- .5 As an alternative to the above mentioned locations, a Contractor's office and work headquarters may be established at another location at the discretion of Parks Canada. The Contractor shall prepare a plan regarding structures, equipment, waste materials management, water, power and sewage services, materials lay-down area, fuel storage, operations, etc. required at this location. The plan will be subject to review and approval by the Departmental Representative. This site may be shared with other Contractors.
- .6 A workers' accommodation camp will not be permitted.

1.8 DRAINAGE

- .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, Federal, Provincial, and Municipal laws and regulations.
- .2 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .3 Prior to directing stored water off site, obtain approval from Departmental Representative and ESO.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.9 SITE CLEARING AND PLANT PROTECTION

- .1 Vegetation Clearing:
 - .1 Protect trees and plants on site and adjacent properties as shown in the Drawings.
 - .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
 - .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .4 Avoid unnecessary traffic, dumping and storage of materials over root zones.
 - .5 Minimize stripping of topsoil and vegetation.

- .6 Restrict tree removal to areas indicated in contract documents.
- .7 Tree and vegetation clearing must occur outside of Environment Canada's restricted timing windows for migratory breeding birds, outside of May 1 to July 31.
- .8 If any vegetation clearing is proposed between May 1 and July 31, nest sweeps must be conducted seven to ten (7-10) days prior to clearing and grubbing activities.
- .9 If any nest or dens are discovered during work, the area must be flagged and work temporarily ceased until Departmental Representative has taken appropriate action.
- .10 All works shall be undertaken in a manner that prevents the introduction or minimizes the spread of invasive alien species and noxious weeds.
- .2 Soil Stripping
 - .1 Soil horizons must be excavated and stored separately. Organics and topsoil should be salvaged and replaced in the reverse order of excavation over mineral soils during re-contouring activities, wherever possible.
 - .2 Soils must be stored in separate piles on an impervious surface within temporary workspaces approved by the Departmental Representative. If soil storage is required for an extended period (greater than seven (7) days) or if heavy rain or wind is forecast, soil piles must be covered to reduce erosion loss.

1.10 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment in accordance with local authorities' emission requirements.
- .3 Spills or releases of hazardous materials or deleterious substances that may cause damage to the environment or human health shall be immediately reported to Parks Canada and, if required, to the Provincial authority.
- .4 The Contractor shall take all reasonable measures to contain all spills. The Contractor shall contain, collect and dispose of spilled products at their expense.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .6 All equipment must be properly maintained, in sound mechanical condition and free of any fuel, oil, and hydraulic fluid or coolant leaks.
- .7 Equipment must be free of external grease, loose dirt or oil and the machinery must be pressure washed prior to the start of the project.
- .8 All machinery must be equipped with emergency spill kits large enough to contain 110% of any possible spills or leaks of oil, fuel, hydraulic fluid or coolant during the project.
- .9 The operators of the equipment must be familiar with how to properly use the spill kits in the event of an emergency.
- .10 Fuel, oils, lubricants, chemicals, and any potentially hazardous material must not be dispelled into the environment.

- .11 Machinery and vehicles must keep to roads, trails, or designated temporary workspaces and turnaround points. The Departmental Representative will identify approved off-road workspaces.
- .12 Rutting and/or compaction of ground surfaces should be avoided as much as possible by keeping to designated work areas and away from wet locations.
- .13 All areas with rutting damage or noticeable compaction from heavy equipment must be re-graded and back-filled if necessary.
- .14 Any holes or depressions caused by site preparation or construction will be back-filled and compacted to an appropriate degree.

1.11 CONTRACTOR'S OPERATIONS

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

1.12 START- UP AND ENVIRONMENTAL BRIEFING

- .1 All staff employed at the construction site shall attend an orientation conducted by the Contractor 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. Each employee, having received the environmental briefing, will be issued a certification sticker to be displayed on their helmet. Employees of other service and materials providers who attend at the site – e.g., concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.
- .2 Parks Canada will have an ESO 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.

1.13 HAZARDOUS PRODUCTS AND MATERIALS

- .1 A list of products and materials to be used or brought to the construction site that are considered or defined as hazardous to the environment shall be presented in the EPP. Such products include, but are not limited to; grout, fuel, concrete finishing agents, paint, etc. A plan detailing the containment and storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the application of these products shall be presented in the EPP.
- .2 Hazardous products shall be stored no closer than 100 m from any waterway.
- .3 MSDS sheets for hazardous material are to be provided in a location accessible to all workers.

1.14 EQUIPMENT FUELLING AND MAINTENANCE

- .1 A fuel delivery, storage and distribution plan shall be submitted. Topics to be addressed in the EPP will include, but not necessarily be limited to:
 - .1 Diesel and gasoline supply vehicles, including bulk tankers shall be parked more than 100 m from rivers.
 - .2 Fuel tanks with manual or electric pump delivery systems shall be used, gravity feed is not allowed.
 - .3 Fuelling personnel shall maintain immediate attention to and presence at the fuelling operation.
 - .4 Fuelling sites will be identified by the Contractor in the EPP.
 - .5 Lubricant changes and minor repairs shall be conducted at a location identified by the Contractor in consultation with the ESO. Waste lubricants, used filters and other waste maintenance products shall be removed from Banff National Park to recycling or certified disposal sites.
 - .6 Equipment shall be inspected daily for fluid/fuel leaks and maintained in good working order.
 - .7 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds and any debris or external contaminants outside the national park before delivery to the work site.

1.15 WASTE MATERIAL STORAGE AND REMOVAL

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

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

1.16 NOTIFICATION

- .1 Parks Canada representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

- .2 Contractor: after receipt of such notice, inform Parks Canada Representative and Departmental Representative of proposed corrective action and take such action for approval by Parks Canada Representative.
 - .1 Take action only after receipt of written approval by Parks Canada representative.
- .3 Parks Canada representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Leave Work area clean at end of each day as per Section 01 74 11 – Cleaning.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment from the work site.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.

1.2 REFERENCES AND CODES

- .1 Perform Work in accordance with Contract Documents, National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.3 CANADIAN ENVIRONMENTAL PROTECTION ACT

- .1 Perform Work in accordance with Canadian Environmental Protection Act.

1.4 NATIONAL PARKS ACT

- .1 Perform Work in accordance with Canada National Parks Act and Regulations.

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 DEFINITIONS

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

1.2 QUALITY MANAGEMENT PROGRAM

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

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

1.3 TESTING

- .1 Testing required to provide Quality Control to assure that the Work strictly complies with the Contract requirements shall include, not be limited to:

- .1 Testing of all structural concrete, granular material and compaction, asphalt, and all source acceptance testing.
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .2 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:
 - .1 Wherever these standard specifications refer to standards (e.g. CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.
 - .2 The Contractor and its independent Quality Assurance testing agency that will carry out the testing must satisfy themselves that the test frequencies being completed are sufficient to ensure the quality requirements of the QMP.
- .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 the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 Notify the Departmental Representative when sampling will be conducted;
 - .3 Within one day after completion of testing, submit test results to the Departmental Representative; and
 - .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .4 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .5 Quality Assurance testing will be undertaken by the Departmental Representative through an independent CSA certified testing firm. The independent testing firm will complete random sampling, inspection, and testing for the purposes of determining the compliance with specifications and other contract documents. The frequency, location of the inspections, sampling, and tests shall be at the end of the subgrade preparation work, granular base course placement, asphalt paving and concrete placement.
- .6 The Contractor shall be responsible for third party testing of materials incorporated into the works.
- .7 The Departmental Representative may perform quality audits as desired. Such audits will not relax the responsibility of the contractor to perform work in accordance with Specifications. To facilitate this work the contractor shall:
 - .1 Notify appropriate agency and Departmental Representative in advance of work which the Departmental Representative may want to test.
 - .2 Submit samples and/or materials required for testing. As specifically requested in the Specifications or as requested by the Departmental Representative. Submit within 2 days so as not to cause delay in the work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site.

1.4 INSPECTION

- .1 Refer to GC 2.5 – Review and Inspection of Work.
- .2 Further to GC 2.5, the Contractor should notify the Departmental Representative 72 hours prior to any special tests or inspections required.

1.5 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agency will be engaged by the Department Representative for purpose of inspecting and/or testing of backfill compaction, granular base construction and asphalt placement.
- .2 Cost of the independent testing will be borne by the Departmental Representative.
- .3 The Contractor shall assist the inspector or testing agency in carrying out their duties.
- .4 Employment of inspection/testing agencies by the Owner does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Owner. Contractor shall cover the costs for retesting and re-inspection.

1.6 ACCESS TO WORK

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

1.7 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative seventy-two (72) hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.8 REJECTED WORK

- .1 Any instances of unacceptable work discovered by either the Quality Control or Quality Assurance personnel will require the preparation of a non-conformance report (NCR).
- .2 If instances of unacceptable work are discovered by the Departmental Representative, the Departmental Representative may issue a non-conformance report (NCR).
- .3 The Contractor shall expediently correct any non-conformances, whether the result of poor workmanship, use of defective products or damage; and whether incorporated in the Work or not, the Contractor shall replace or re-execute in accordance with the Contract Documents.

- .4 Payment for the work itself may be withheld until the NCR issue has been resolved to the satisfaction of the Departmental Representative.
- .5 If in opinion of the Departmental Representative, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price the difference in value between Work performed and that called for by Contract Documents, the amount of which will be determined by the Department Representative.

1.9 REPORTS

- .1 Submit one (1) electronic copy of all inspection and test reports to the Departmental Representative.
- .2 Submit to the Departmental Representative one paper copy and one electronic copy of all Non-Conformance Reports.
- .3 Provide copies to subcontractor of work being inspected or tested.

1.10 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as specified in Section 01 33 00.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

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

1.4 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 Parking is only permitted in the designated work area specified.
- .2 Provide and maintain adequate access to project site.

1.6 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.7 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with Drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

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

1.10 CLEAN-UP

- .1 Clean up to be in accordance with Section 01 74 11 – Cleaning.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.

1.2 INSTALLATION AND REMOVAL

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

1.3 HOARDING

- .1 The Contractor shall erect 1.2 m high temporary site enclosure. Provide one lockable truck gate. Maintain fence in good repair.
- .2 Paint public side of site enclosure in selected colours with one coat primer to CAN/CGSB 1.189 and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.
- .3 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, and trenches.
- .2 Provide as required by governing authorities.

1.5 ACCESS TO SITE

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

1.6 PUBLIC TRAFFIC FLOW

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

1.7 FIRE ROUTES

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

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.9 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished building finishes and equipment during performance of Work.

- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule seven (7) days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

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 45 00 - Quality Management.
- .2 All Technical Specification sections.

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 the specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, the Departmental Representative reserves the right to have such products or systems tested to prove or disprove conformance.
- .4 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.
- .5 Cost for such testing will be borne by the Owner in the event of conformance with Contract Documents or by the Contractor in event of non-conformance.

1.3 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials, and in otherwise utilizing recycled and recovered materials in execution of Work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with the Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the project.

1.4 AVAILABILITY

- .1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify the 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. In accordance with Section 01 33 00 – Submittal Procedures, submit all required documentation at least two weeks before product use. If more than two weeks is required due to product delay, notify the Departmental Representative immediately.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in a 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 coating materials (paint) shall be stored in a clean, dry, well-ventilated area, protected from sparks, flame, direct rays of the sun and extreme heat or cold. If stored on a concrete floor the material shall be elevated (e.g. on a pallet) while being stored. Storage conditions shall meet requirements of the Supplier product data sheet.
- .8 Remove and replace damaged products at own expense and to satisfaction of the Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to the Departmental Representative's satisfaction. Use touch-up materials to match original.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by the Departmental Representative. Unload, handle and store such products.

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

- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the 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 the Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. The Departmental Representative reserves the 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 the Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 CONCEALMENT

- .1 The Departmental Representative will inspect all Work prior to any concrete pours or backfilling. The Contractor shall notify the Departmental Representative 24 hours before any pour or backfilling operation for inspection.
- .2 Concealment of Work that has not been inspected shall be considered just cause for rejection of said Work.

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.
- .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 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

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

1.15 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 ALTERNATE PROPOSED PRODUCTS

- .1 Product Data Sheets and MSDS for all alternate proposed products shall be provided to Departmental Representative for approval a minimum of one (1) week prior to intended use.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

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

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris 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. Obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site.
- .6 Inspect finishes and ensure specified workmanship and operation.
- .7 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .8 Remove dirt from exterior surfaces.
- .9 Sweep and wash clean finished overlay surface and paved areas within the work site.
- .10 Clean drainage systems.

- .11 Remove debris and surplus materials from site.
- .12 Remove snow and ice from access to site.

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 78 00 – Closeout Submittals.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
- .2 Substantial Performance Inspection:
 - .1 Notify the Departmental Representative in writing when Work is considered ready for Substantial Performance and request the Departmental Representative's inspection.
 - .2 Accompany the Departmental Representative on preliminary inspection to determine items listed for completion or correction.
 - .3 Comply with the Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance and those determined in the final inspection.
 - .4 Notify the Departmental Representative of completion of items of Work listed in executed certificate of Substantial Performance and those determined in the final inspection.
- .3 Completion Tasks: submit certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies have been completed.
 - .3 Work: complete and ready for final inspection.
- .4 Final Inspection:
 - .1 When Completion Tasks noted above have been completed, request final inspection of Work by the Departmental Representative and Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request re-inspection.

1.3 FINAL CLEANING

- .1 Undertake a final cleaning in accordance with Section 01 74 11.

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 77 00 – Closeout Procedures.

1.2 RECORD DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for the 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 on site.
- .3 Label record documents and samples on site apart from documents used for construction.
 - .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 the Departmental Representative.

1.3 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. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not shown on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .4 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed.
 - .2 Changes made by Addenda and change orders.

- .5 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records required by individual specifications sections.
- .6 Provide digital photos, if requested, for site records.
- .7 The Contractor shall provide as built drawings to Departmental Representative at project completion.

1.4 WARRANTIES AND BONDS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 PROTECTION

- .1 Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to the satisfaction of the Engineer at no additional cost.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Asphalt pavement designated for removal and disposal is to be disposed of outside of Banff National Park.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 PREPARATION

- .1 Prior to commencing removal operation, inspect and verify with the Engineer, areas, depths and lines of asphalt pavement to be removed.

3.2 EQUIPMENT

- .1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from a stringline and capable of removing part of pavement surface to depths or grades indicated.

3.3 REMOVAL BY DEMOLITION

- .1 Remove existing asphalt pavement to lines and grades as indicated on the Drawings and as approved by the Engineer.
- .2 Use equipment and methods of removal and hauling that do not damage or disturb underlying pavement.
- .3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .4 Provide for suppression of dust generated by removal process.

3.4 REMOVAL BY COLD MILLING

- .1 Remove existing pavement to lines and grades required to meet the intermediate or finished pavement surface elevations and slopes indicated on drawings within specified tolerances as follows:
 - .1 Mill pavement to uniform depth or variable depth within designated areas as indicated on the Drawings. Variable depth milling operations shall require an automatic grade control device to maintain desired depth, uniform transverse and longitudinal slopes.
- .2 Prevent contamination of removed asphalt and concrete pavement with other materials.
- .3 Provide for suppression of dust generated by removal process.

3.5 SWEEPING

- .1 Directly following milling, thoroughly clear remaining asphalt or concrete pavement surfaces of debris resulting from removal operations using vacuum type street cleaning machines.

3.6 FINISH TOLERANCES

- .1 Finished surfaces in areas where asphalt pavement has been milled to be within ± 5 mm of grade specified but not uniformly high or low.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Definitions:
 - .1 Demolition: Destruction and removal of building or structure.
 - .2 Waste Audit (WA): detailed inventory of materials in building. Indicates quantities of reuse, recycling and landfill:
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .2 Indicates quantities of reuse, recycling and landfill.
 - .3 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
 - .4 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.
- .2 Reference Standards:
 - .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).
 - .2 Transport Canada (TC):
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings:
 - .1 Convene pre-demolition meeting one (1) week prior to beginning.
 - .2 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.
 - .3 Hold project meetings every week.
 - .4 Ensure key site personnel attend.
 - .5 Reporting Requirements: WMC to complete.
 - .6 WMC must provide written report on status of waste diversion activity at each meeting.
 - .7 Departmental Representative will provide written notification of change of meeting schedule established upon contract award twenty-four (24) hours prior to scheduled meeting.
- .2 Scheduling: meet project time lines without compromising specified minimum rates of material diversion:
 - .1 Notify Departmental Representative in writing when unforeseen delays occur.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Hazardous Materials:
 - .1 Provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.
- .3 Certificates:
 - .1 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
 - .2 Written authorization from Departmental Representative is required to deviate from approved disposal site.
- .4 Sustainable Design Submittals:
 - .1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial regulations.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Storage and Protection:
 - .1 Protect in accordance with Section 31 22 13 – Rough Grading.
 - .2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Parks Canada.
 - .3 Remove and store materials to be salvaged, in manner to prevent damage.
 - .4 Store and protect in accordance with requirements for maximum preservation of material.
 - .5 Handle salvaged materials as new materials.

1.6 SITE CONDITIONS

- .1 Site Environmental Requirements:
 - .1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

- .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers:
 - .1 Ensure proper disposal procedures are maintained throughout the project.
- .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Departmental Representative's guidance.
- .6 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .2 Existing Conditions:
 - .1 Remove contaminated or hazardous materials as directed by Departmental Representative from site, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner.

Part 2 Products

2.1 EQUIPMENT

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

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.

3.2 REMOVAL OF HAZARDOUS WASTES

- .1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Removal of pavements and curbs:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
 - .2 Protect adjacent joints and load transfer devices.

- .3 Protect underlying and adjacent granular materials.
- .4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving,
- .5 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.
- .6 Remove designated trees during demolition:
 - .1 Obtain written approval of Departmental Representative prior to removal of any trees.
- .7 Stockpile topsoil for final grading and landscaping:
 - .1 Provide erosion control and seeding if not immediately used.
- .8 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site as instructed by Departmental Representative.
 - .2 Trim disposal areas to approval of Departmental Representative.
- .9 Backfill:
 - .1 Backfill in areas as indicated and in accordance with Section 31 22 13 – Rough Grading.

3.4 STOCKPILING

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

- .1 Remove stockpiled material as directed by Engineer, when it interferes with operations of project.
- .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .3 Transport material designated for alternate disposal using approved haulers in accordance with applicable regulations:
 - .1 Written authorization from Engineer is required to deviate from approved disposal sites.
- .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations:
 - .1 Disposal Facilities: use approved facilities.

- .2 Written authorization from Engineer is required to deviate from disposal facilities.

3.6 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work.
 - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.8 PROTECTION

- .1 Repair damage to adjacent materials or property caused by selective site demolition.

END OF SECTION

Part 1 General

1.1 Related Sections

- .1 This section of the specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with the all other parts.

1.2 REFERENCES

- .1 CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .2 CSA-O86.1, Engineering Design in Wood (Limit States Design).
- .3 CSA-O153, Poplar Plywood.
- .4 CSA S269.1, Falsework for Construction Purposes.
- .5 CAN/CSA-S269.3, Concrete Formwork.

1.3 DRAWINGS

- .1 Submit shop drawings for review in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate method and schedule of construction, rate of pour, materials, arrangement of joints, ties, shores, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings and CAN/CSA-S269.3 for formwork drawings.
- .3 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.
- .4 Each drawing submission shall bear stamp and signature of qualified Professional Engineer registered or licensed in the Province of Alberta.
- .5 Locate construction joints where shown on drawings or as approved by Departmental Representative. In general, locate construction joints at midspan. Maximum spacing 15 m unless noted otherwise.

Part 2 Products

2.1 MATERIALS

- .1 Formwork lumber: plywood and wood formwork materials to CSA-O86 and CSA-O153.
- .2 Falsework materials: to CAN/CSA S269.1.
- .3 Steel Forms: to CAN/CSA S16.1.
- .4 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface, and leaving no metal within 25 mm of concrete surface when forms have been removed. Use tapered plastic cones on faces of concrete to facilitate grouting.
- .5 Form release agent: chemically active release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps, preventing concrete from sticking to forms.

Part 3 Execution

3.1 ERECTION

- .1 Verify lines, levels and centers before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Departmental Representative 's approval for use of earth forms.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA-S269.1.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1.
- .6 Obtain Departmental Representative 's permission before framing openings not indicated.
- .7 Align form joints and make watertight. Keep form joints to minimum.
- .8 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
- .9 Use 20 mm chamfer strips on external corners of concrete members, unless specified otherwise.
- .10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .11 Clean formwork in accordance with CSA-A23.1.
- .12 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 3 days for slabs on grade and footings.
 - .2 Time after placing concrete is cumulative number of days, not necessarily consecutive, during which the temperature of the air in contact with concrete is above 10°C and concrete has been damp or thoroughly sealed from evaporation and loss of moisture.
 - .3 Strip forms only after concrete has hardened adequately and has attained sufficient strength to support safely all superimposed loads to which it may be subjected.
- .13 Continue concrete curing in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .14 Re-use formwork and falsework subject to requirements of CSA-A23.1.

END OF SECTION

Part 1 General

1.1 Related Sections

- .1 This section of the specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 References

- .1 SP-66, ACI Detailing Manual.
- .2 CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .3 CSA-A23.3, Design of Concrete Structures.
- .4 CSA G30.14, Deformed Steel Wire for Concrete Reinforcement.
- .5 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
- .6 CSA-G40.21, Structural Quality Steels.
- .7 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.
- .2 Inform Departmental Representative of proposed source of material to be supplied.

1.4 SHOP DRAWINGS

- .1 Submit Shop Drawings including placing Drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate bar bending details, lists and quantities of reinforcement on Shop Drawings.
- .3 On Placing Drawings, indicate sizes, spacings, locations and quantities of reinforcement and mechanical splices, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare Reinforcement Drawings in accordance with SP-66, ACI Detailing Manual.
- .4 Detail lap lengths and bar development lengths to CSA-A23.3. Bar development lengths in tension shall be in accordance with Table 12-1, “Other Cases”, unless otherwise indicated. Bar location factor “k1”, for all horizontal reinforcement shall be 1.3 unless otherwise noted. Provide Class B tension lap splices in accordance with Clause 12.15.1.

1.5 SUBSTITUTES

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

Part 2 Products

2.1 MATERIALS

- .1 Reinforcing steel: billet steel, grade 400R and 400W (where indicated on Drawings), deformed bars to CSA G30.18, unless indicated otherwise.
- .2 Chairs, bolsters, bar supports, spacers: to CSA-A23.1.
- .3 Mechanical splices: subject to approval of Engineer.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1.
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on Placing Drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

Part 3 Execution

3.1 FIELD BENDING

- .1 Do not field bend reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.
- .4 Field bending shall not be done during the following occurrences:
 - .1 On bar sizes larger than 35 M.
 - .2 When the ambient air temperature is lower than 8°C.
 - .3 By means of hammer blows or other impact loading.
 - .4 While the application of heat is required, the bar temperature is in the range from 200°C to 340°C.

3.2 PLACING REINFORCEMENT

- .1 Prior to closing wall forms and placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .2 Place reinforcing steel as indicated on reviewed Placing Drawings and in accordance with placing tolerances specified in CSA-A23.1.
- .3 Place, support and space reinforcing in alignment to position indicated and as follows:
 - .1 Slabs on grade: Support reinforcement on and secure to supports.
 - .2 Provide additional bars necessary to support dowels, stirrups or straight bars.
 - .3 Supports are to be purpose made and maintain integrity and water-tightness of concrete construction.

- .4 Provide tiers and spacers for slab reinforcing to prevent movement or displacement during concrete pour and to maintain specified reinforcing cover as shown on the Drawings. All reinforcing to be secured in place prior to concrete placement.
- .5 Steel members used as support for cast-in-place piping or pipe sleeves shall not be welded to wall or slab reinforcing members.
- .6 All reinforcing steel shall be cleaned to the satisfaction of the Departmental Representative, and free of any rust, scale, mortar, concrete spatter, paint, oil, mud, ice, or other foreign substances which will reduce bond, prior to placement of concrete.

END OF SECTION

Part 1 General

1.1 Related Sections

- .1 This section of the specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 References

- .1 ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
- .4 ASTM D1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .5 CGSB 51-GP-51M, Polyethylene Sheet for Use in Building Construction.
- .6 CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .7 CSA-A23.2, Methods of Test for Concrete.
- .8 CAN/CSA-A5, Portland Cement.
- .9 CAN/CSA A3001, Cementitious Materials for Use in Concrete.

1.3 CERTIFICATES

- .1 Minimum four (4) weeks prior to starting concrete work submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that the following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Supplementary cementing materials.
 - .3 Grout.
 - .4 Admixtures.
 - .5 Aggregates.
 - .6 Water.
- .2 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.
- .3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1 and that mix design is adjusted to prevent alkali aggregate reactivity problems.
- .4 Provide results of a current, applicable petrographic examination of proposed aggregates in accordance with ASTM C295.

- .5 Submit mix designs and aggregate tests for Departmental Representative's review, minimum of four (4) weeks prior to starting concrete work. The Departmental Representative's review of mix designs is for general conformance with specified requirements only, and in no way mitigates the Contractor's obligation to provide concrete suitable for placing in the locations shown and meeting all specified requirements.

1.4 CONSTRUCTION QUALITY CONTROL

- .1 Submit proposed quality control procedures for Departmental Representative's approval.

Part 2 Products

2.1 MATERIALS

- .1 Portland cement: to CAN/CSA3001.
- .2 Supplementary cementing materials: to CAN/CSA-A3001.
- .3 Water: to CSA-A23.1.
- .4 Aggregates: to CSA-A23.1. Coarse aggregates to be normal density.
- .5 Air entraining admixture: to ASTM C260.
- .6 Chemical admixtures: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.
 - .1 Compressive strength: 30 MPa at twenty-eight (28) days.
- .8 Curing compound: to CSA-A23.1 and to ASTM C309, Type 1-chlorinated rubber.
- .9 Premoulded joint fillers:
 - .1 Sponge rubber: to ASTM D1752 (except for density), Type I, firm grade.
- .10 Polyethylene film 0.15 mm: to CGSB 51-GP-51M.
- .11 Pressure injected epoxy grout: submit product information for approval.
- .12 Bonding agent: sand-cement slurry to CSA A23.1.
- .13 Use of calcium chloride not permitted.
- .14 Separation board: asphalt impregnated fibre board.
- .15 Waterproof grout and chemical waterproofing. Waterproofing compound, consisting of a patented formula of chemicals, cement and special treated quartz which waterproofs by crystalline growth through the capillary voids in the concrete – KRYSTOL, XYPEX, PERMAQUICK or approved alternative.

2.2 CONCRETE MIXES

- .1 Use the following criteria for concrete mix designs for application indicated:

Mix	Application
M1	Slab-on-grade, footings
M2	Lean mix concrete, mud slabs

- .2 Proportion normal density concrete in accordance with CSA-A23.1 Alternative 1 (Performance), to give following properties:

Mix	M1	M2
CSA Exposure Class	C-1 S-2	F-2
Minimum Specified Strength (MPa)	35	25
Age (days) for Specified Strength	56	28
Maximum W/CM Ratio	0.40	0.55
Maximum Aggregate Size	20	20
Exposure to Sulphate Attack	Y	Y
Alkali Aggregate Reactivity Addressed (Y/N)	Y	Y
Aggressive Chemical/Waste/Other	N	N
Air Content Category	1	2
Curing	2	1
Color (Y/N)	Y	N
Materials		
SCM Usage (Y/N)	Y	Y
Fly Ash Class (30% maximum)	F or CI	F or CI

Table Notes:

- .1 As per mix design for the strength required
- .3 Maximum slump at time and point of discharge:
- .1 Footings, foundations, slabs-on-grade - 60 mm.
- .2 If superplasticizers are used to assist concrete placement, the noted slumps are prior to the addition of the superplasticizers. The slump following addition of the superplasticizer to be less than 120 mm.
- .4 Volume stability to be considered in mix proportions to prevent creep and shrinkage in accordance with Cl.4.1.1.9 and Cl.4.3.6 of CSA A.23.1.

- .5 Do not change concrete mix without prior approval of Departmental Representative. Should change in materials source be proposed, the new mix design is to be approved by Engineer.
- .6 Mix design to minimize shrinkage and to maximize water-tightness.
- .7 Temperature of the concrete during discharge into the forms is to be between 10°C and 20°C. The temperature of the mix is to be maintained below 20°C maximum temperature. Typical methods of reducing mix temperature include evaporative cooling of aggregate stockpiles, use chilled batch water or the inclusion of ice to the mix at the plant, taking care to maintain the design water/cementing material ratio. Obtain Engineer's approval of proposed method of temperature control.
- .8 The plaza slab-on-grade and kiosk base slab shall have integral color throughout the concrete. The contractor shall submit to the architect a sample of concrete 400 mm x 400 mm x 50 mm with an integral color. The sample will include the a non-slip additive top coating and concrete sealer.

Part 3 Execution

3.1 GENERAL

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

3.2 WORKMANSHIP

- .1 Obtain Departmental Representative's approval before placing concrete. Provide twenty-four (24) hr notice prior to placing of concrete.
- .2 Pumping of concrete is permitted (see 2.2.1.7).
- .3 Ensure reinforcement, spacers and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .5 Ensure all reinforcing steel and formwork is clean and free of all foreign debris and in accordance with Section 03 20 00 - Concrete Reinforcing, and Section 03 10 00 - Concrete Forming and Accessories.
- .6 Do not place fresh concrete against any surfaces, such as existing concrete, rebar or formwork, that have a surface temperature of less than 0°C.
- .7 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .8 Do not place load upon new concrete until authorized by Departmental Representative.
- .9 All concrete is to be consolidated using internal vibrators. Use pencil vibrators where larger sizes would be unsuitable.

3.3 INSERTS

- .1 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 mm x 100 mm not indicated must be approved by Departmental Representative.

- .2 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Departmental Representative before placing of concrete.
- .3 Check locations and sizes of sleeves and opening shown on structural and civil drawings with mechanical and electrical drawings.
- .4 Set special inserts for strength testing as required for non-destructive method of testing concrete.
- .5 Anchor bolts:
 - .1 Place anchor bolts to templates under supervision of trade supplying anchors, prior to placing concrete.

3.4 CONSTRUCTION JOINTS

- .1 Locate as shown on drawings and elsewhere as required to Section 03 10 00 - Concrete Forming and Accessories.
- .2 Joints are to be straight and true to line.
- .3 Sandblast joint surfaces to obtain clean concrete, free of all laitance, unsound concrete and roughened to 5 mm amplitude.
- .4 Apply bonding agent to concrete surfaces for all construction joints.

3.5 PLACING GROUT

- .1 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.

3.6 SURFACE TOLERANCE

- .1 Concrete tolerance in accordance with CSA-A23.1 Table 22: Class B slab finish.
- .2 Follow slopes shown on drawings.

3.7 FINISHING

- .1 Finish concrete in accordance with drawings, CSA-A23.1.
- .2 Finish plaza slab and kiosk slab according to landscape drawings and specifications. Contractor to submit procedures and pattern for stamped concrete for review. Procedures shall include size of slab pours; product information on release agents, anti-slip surface applied agents; and manufacturer's instructions on use of forms.
- .3 Concrete walking surfaces shall be finished with non-slip finish. Contractor to submit data sheets with suggested products that can be added to the surface of concrete to provide an anti-slip surface.
- .4 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated. All concrete edges are to be made true and smooth with no sharp corners.
- .5 Exposed interior surfaces to have a smooth form finish.
- .6 Exposed exterior concrete surfaces are to have a smooth form finish. Unexposed concrete surfaces are to have a plain, smooth form finish except those specified as having sandblasted finish. Sandblasted finish to be approved by Departmental Representative.

- .7 Finish all formed concrete in contact with backfill with a rough form finish.
- .8 All tie recesses are to be grouted with waterproof grout.
- .9 Where honeycomb areas, cold joints, inclusions or other areas of imperfections are discovered, cut off affected area and patch with waterproof grout, or as approved by Departmental Representative.
- .10 Use procedures acceptable to Engineer or those noted in CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.
- .11 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

3.8 CURING

- .1 In accordance with CSA-A23.1.
- .2 Refer to table in Par. 2.2 for curing regime.

3.9 Hot Weather Concreting

- .1 Hot weather concreting procedures to be followed when ambient air temperature exceeds 20°C during the placing period.
- .2 Temperature of concrete placed during hot weather not to exceed the limits specified in Paragraph 2.2.7.

3.10 JOINT FILLERS

- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening with stainless steel fasteners.
- .2 Locate and form isolation and expansion joints as indicated. Install joint filler.

3.11 CRACK REPAIR

- .1 Utilize the best possible care and construction techniques to minimize cracking of concrete slabs.
- .2 Cracks which do appear shall be routed out on each face and repaired with water proof grout or epoxy in accordance with manufacturer's recommendations, except that cracks which are in excess of 0.50 mm width, or deemed by the Departmental Representative to be structurally detrimental, or subject to movement shall be epoxy grouted.
- .3 Obtain approval from Departmental Representative of pressure grouting techniques and epoxy materials to be utilized prior to proceeding with the work.
- .4 Depth of epoxy grouting shall be sufficient to restore structural integrity as required, but shall not be less than 100 mm.
- .5 Cure crack repairs to manufacturer's instructions.

3.12 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a testing laboratory designated by Departmental Representative in accordance with CSA-A23.1.

- .2 Take concrete samples for testing in accordance with CSA A23.2. One (1) strength test shall consist of a minimum of four (4) test cylinders for each 50 m³ of concrete, or portions of each mix type of concrete or each separate type of structural element in any one (1) day's pour. For concrete with specified fifty-six (56) day strength, strength test shall consist of minimum four (4) test cylinders. Test first cylinder at seven (7) days, one (1) at twenty-eight (28) days and the remaining two (2) cylinders at fifty-six (56) days. For concrete with specified twenty-eight (28) day strength, strength test shall consist of minimum three (3) test cylinders. Test first cylinder at seven (7) days and remaining two (2) at twenty-eight (28) days.
- .3 Owner will pay for costs of tests as specified.
- .4 Departmental Representative will take additional test cylinders during cold weather concreting. Cure such cylinders on job site under same conditions as concrete which they represent.
- .5 Nondestructive Methods for Testing Concrete shall be in accordance with CSA-A23.2. Make good concrete surfaces after completion of tests.
- .6 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 REFERENCES

- .1 BC Building Code.
- .2 CAN/CSA-A179, Mortar and Grout for Unit Masonry.
- .3 CAN/CSA-A370, Connectors for Masonry.
- .4 CAN/CSA-A371, Masonry Construction for Buildings.
- .5 CAN/CSA-A3004.
- .6 International Masonry Industry All-Weather Council (IMIAC):
 - .1 Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- .7 South Coast Air Quality Management District (SCAQMD):
 - .1 SCAQMD Rule 1168-05, Adhesive and Sealant Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 QUALITY ASSURANCE

- .1 Work of this section shall be done by tradesman with a minimum of (5) years' experience in this type of work. Written evidence of credentials and experience along with a list of relevant projects must be submitted to the consultant prior to proceeding with the work.
- .2 Design and installation of stone facing is to meet all applicable code requirements. Engineering and the provision of engineered shop drawings and letters of assurance of the work of this section including but not limited to anchor, dowel or tie components is the responsibility of the contractor.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations.
 - .2 Store and protect dimension stone veneer cladding from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.6 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Air temperature -7 degree C and below. Heat sand and mixing water to a minimum of 20 degree C and a maximum of 70 degree C. Provide enclosures and heat to maintain an air temperature above 0 degree C. Ensure that temperature of unit when laid is not less than -7 degree C.
 - .2 Air temperature -7 degree C to -4 degree C. Heat sand and mixing water to a minimum of 20 degree C and a maximum of 70 degree C. Provide heat to both sides of walls. Use windbreaks when wind speed is in excess of 25 km/hr.
 - .3 Air temperature -4 degree C to 4 degree C. Heat sand and mixing water to a minimum of 20 degree C and a maximum of 70 degree C.
 - .4 Air temperature below 0 degree C, grouting may be proceed providing temperature of grout is not less than 20 degree C and grout in the wall is maintained above 0 degree C for a 24 hour period.
- .2 Field Measurements:
 - .1 Make field measurements necessary to ensure the proper fit of all members.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 General: design, fabricate and install stonework to withstand normal loads from wind, gravity, movement of building structure, seismic and thermally induced movement, as well as to resist deterioration under conditions of normal use including exposure to weather, without failure.

2.2 MATERIALS

- .1 All stone shall be of sound stock and uniform texture, and shall be free from holes, seams, shake, clay pockets, spills, stains, starts and other defects which will impair the strength, durability and appearance of the work.
 - .1 Stone dimensions, type and colour as indicated on the contract documents.
- .2 Hydrated Lime: to ASTM C207, Type S.
- .3 Mortar Aggregate: to CSA-A82.56-M76 washed, clean, sharp and free of organic matter.
- .4 Mortar: Type N, mortar for brick veneer masonry based on proportion specification in accordance with csa-A179.
- .5 Water: potable, clean and free of deleterious amounts of acids, alkalies or organic materials.
- .6 Grout aggregate: To CAN3-A23.1.
- .7 Admixtures: Not permitted without Consultant approval.
- .8 Accessories:
 - .1 Anchors, Dowels, sizes and configurations required for support of stone, applicable superimposed loads and seismic loads.

- .2 Stone Facing Ties: Hot dipped galvanized conforming to CSA-A370-94.
Approved Type: Fero Engineering Masonry Connectors and Accessories, Slotted Rap-Tie Rubble Masonry Support.
- .9 Surface Sealer: Non sheen, water based penetrating sealer. Approved type: Aquamix, Sealer's Choice Gold; or preapproved sealer.

2.3 MORTAR MIXING

- .1 Thoroughly mix mortar ingredients in proper quantities needed for immediate use to requirements of CSA-A179 ASTM C270.
- .2 Provide uniformity of mix and colouration.
- .3 Start masonry work after mortar is tested and approved by Consultant.
- .4 Use mortar within two (2) hours after mixing at temperatures of 26 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for dimensional stone veneer cladding installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence Consultant.
 - .2 Inform Consultant 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 Consultant.

3.2 PREPARATION

- .1 Waterproof exterior slabs on back prior to setting.
- .2 Clean stone surfaces by washing with stiff fibre brush and water.

3.3 INSTALLATION

- .1 Verify all measurements and dimensions coordinate the installation of inserts for this work with other trades. Ensure locations and sizes of cuts outs to accommodate equipment, gateway post anchors, fixtures and other adjoining construction have been coordinated.
- .2 Arrange stone segments to match existing building stone veneer work pattern in conformance with the standards established in the approved mock-up.
- .3 Stone faced walls:
 - .1 Mortar shall be used to stabilize and facilitate the execution of the site stone walls. Finish mortar joints to match existing building stone work mortar joints.
- .4 Apply mortar to both vertical and horizontal surfaces.
- .5 Tamp stone facing firmly into place.

- .6 Do not adjust stone facing after laying. Where resetting stone facing is required remove and clean stone and reset in new mortar.
- .7 Prop and anchor projecting stones until above is set.
- .8 After mortar has initially set up, tool joints where required, wipe wall surfaces with suitable brush or burlap to remove mortar protrusions and re-tool the joints.
- .9 Do not interrupt bond below or above openings.
- .10 Omit mortar from vertical joints at base of stone facing wall directly above the final finished grade to provide weep holes. Leave a minimum 50 mm high open joint, spaced 600 mm centres.
- .11 Application of Sealer: Curing of mortar, cleaning and application of sealer shall be in strict accordance with the manufacturers written instructions.

3.4 PROTECTION

- .1 Keep work dry using waterproof, non-staining coverings that extend over walls and sides sufficient to protect walls from wind driven rain, until completed and protected or covered by other permanent construction.
- .2 Protect completed masonry in accordance with the following:
 - .1 0 degree C to 4 degree C – Protect work from rain or snow for 24 hours.
 - .2 -4 degree C to 0 degree C – Cover work completely for 24 hours.
 - .3 -7 degree C to -4 degree C – Cover work completely with insulating blankets for 24 hrs
 - .4 Below -7 degree C – Maintain temperature of work above 0 degree C for 24 hours by enclosure and supplementary heat.

3.5 AJUST AND CLEAN

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Clean stone as work progresses.
 - .1 Allow mortar droppings on stone to partially dry then remove by means of brushing with a stiff fibre brush.
- .3 Clean soiled surfaces with a non staining cleaning solution. Use non metallic tools in cleaning operations.
- .4 Use alternative cleaning solutions and methods for difficult to clean stone only after consultation with masonry unit manufacturer.
- .5 At completion of work, all holes or defective mortar shall be pointed or replaced as directed.

3.6 PROTECTION

- .1 Protect stone from damage resulting from subsequent construction operations.
- .2 Use protection materials and methods which will not stain or damage stone.

- .3 Remove protection materials upon Substantial Performance of Work, or when risk of damage is no longer present.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This section of the specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 REFERENCES

- .1 CSA B111, Wire Nails, Spikes and Staples..
- .2 CSA O86, Engineering Design in Wood.
- .3 CSA O121, Douglas Fir Plywood.
- .4 CSA O141, Softwood Lumber.
- .5 CSA O151, Canadian Softwood Plywood.
- .6 CSA O153, Poplar Plywood.
- .7 CSA O325, Construction Sheathing.
- .8 National Building Code of Canada (NBC) 2010.

1.3 QUALITY ASSURANCE

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
- .3 Qualifications of Wood Truss Fabricator: Minimum of five (5) years experience in design and manufacturing comparable wood trusses. Minimum of five (5) years experience in the erection of comparable wood trusses.

1.4 DESIGN CRITERIA FOR WOOD TRUSSES

- .1 Design roof trusses, bracing bridging, connectors to requirements of CSA O86, latest version to safely carry wind, snow and drift loads as ascertained by National Building Code of Canada, 2010, and as shown on Drawings.
- .2 Deflection under live load only shall not exceed 1/360 of span.

1.5 CERTIFICATES

- .1 Identify lumber and timber by official grade mark containing symbol of grading agency, mill number or name, grade of lumber, species or species groupings or combination designation, rules under which graded and condition of seasoning at time of manufacture.

1.6 SHOP DRAWINGS AND TRUSS DESIGN

- .1 Submit Shop Drawings in accordance with the Section 01 33 00 – Submittal Procedures.

- .2 Product data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit Drawings stamped and signed by professional engineer registered or licensed in Alberta.
- .4 Clearly indicate species, sizes and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing and tie-down details, and detailed nailing requirements for ledgers and other connectors.
- .5 Submit stress diagram indicating design load on each truss member, special loads, allowable stress increase and deflection limits.
- .6 Prepare engineering design and Shop Drawings, for each truss type, under the supervision of a Professional Engineer registered to practice in Alberta. Submit an overall plan, with the individual drawings, to indicate the location of each truss type. All Shop Drawings shall bear the seal and signature of the design engineer.
- .7 Lateral support for the top chord of the trusses will be provided by the specified roof decking. For each type of truss, the truss designer shall indicate the minimum diameter and length of nail and nail spacing/pattern required to laterally support the compression chord members. Nail size and spacing required for diaphragm action and coverall building stability as specified by applicable codes. Unless otherwise specified on the Drawings use 65 mm long nails spaced as 150 o/c at edge supports and at 300 o/c at intermediate supports.
- .8 If the proposed truss design is such that the web members require lateral support between panel points, the Design Shop Drawing shall detail the method of bracing including connections, to the roof diaphragm and/or structural component.
- .9 The Engineer will review the Shop Drawings for general conformance to the Drawings and Specifications. Responsibility for supplying and finishing the complete work as specified and shown on the Drawings shall rest with the Contractor. Commence fabrication only after the Engineer has reviewed the Shop Drawings.
- .10 Supply to the site with the truss Shop Drawings, a copy of TPIC brochure "Handling, Erection and Bracing of Wood Trusses".

1.7 DELIVERY/STORAGE

- .1 Protect materials from weather in transit and on site.
- .2 Store materials on raised supports. Cover materials with tarpaulins or polyethylene sheets to prevent moisture absorption, impairment of structural properties and impairment of aesthetic features.

Part 2 Products

2.1 LUMBER AND TIMBER MATERIALS

- .1 Except as indicated or specified otherwise, lumber and timber shall be Western Red Cedar identified as Northern Species using NLGA Classification with SS grade according to Table 5.3.1D of CSA O86. This includes all columns, beams, braces, truss members and structural decking shown on the Drawings.
- .2 Machine stress-rated lumber is acceptable for all purposes.
- .3 Glued end jointed (finger-jointed) lumber is not acceptable.
- .4 Framing and board lumber: in accordance with NBC 2010 except as indicated otherwise.
- .5 Cants, curbs, nailers for roofing: spruce species, NLGA No. 2 Grade.
- .6 Wood Furring: Spruce species, NLGA No. 2 Grade.

2.2 PANEL MATERIALS

- .1 Panels to be of type, grade and thickness as specified in accordance with the following standards:
 - .1 Douglas fir plywood: to CSA O121, sheathing grade, except that exposed wood shall be G1S.
 - .2 All plywood to be exterior grade, fabricated using waterproof glue.

2.3 FASTENINGS AND HARDWARE

- .1 In accordance with NBC 2010 as supplemented by the following requirements except where specified type is indicated.
- .2 Nails, spikes and staples to CSA B111. All nail fasteners in contact with Western Red Cedar shall be stainless steel grade S316
- .3 All bolted connections: to ASTM F1554, Grade 55 (yield strength – 380 MPa, tensile strength 517 MPa), bolt diameter as indicated on Drawings, complete with nuts and washers.
- .4 Fastener Finishes:
 - .1 All steel plates, anchor rods, nails and bolt fasteners in direct contact with Western Red Cedar shall be fabricated using stainless steel grade S316.

2.4 FABRICATION OF WOOD TRUSSES

- .1 Fabricate wood trusses in accordance with approved Shop Drawings.
- .2 Fabricate wood trusses in a properly equipped shop by skilled workmen under strict rules of inspection and quality control as required by related codes and standards.
- .3 Cut truss members to accurate length, angle, and size to assure tight joints for finished trusses.
- .4 Assemble truss members to design configuration by securing tightly in jigs or with clamps.
- .5 Connect members using metal connector plates as designed by the Truss Fabricator.

Part 3 Execution

3.1 WOOD FRAME CONSTRUCTION

- .1 Comply with requirements of NBC 2010 except where specified otherwise.
- .2 Countersink bolts as indicated on Drawings.

3.2 ROOF FASCIAS, CANTS, NAILERS CURBS

- .1 Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing and sheet metal work and roof mounted equipment and other items as indicated.
- .2 Secure with stainless steel 9 mm bolts where indicated, galvanized nails elsewhere. Locate fastenings within 300 mm from ends and uniformly spaced between. Space bolts at 1200 mm and nails at 600 mm centres except where indicated otherwise.
- .3 Staple vapour retardant sheet strip to underside of nailers before installation. Apply strip continuous with 20 mm overlap at joints, free of wrinkles and tears, with at least 200 mm exposed for overlap on roof deck.

3.3 ERECTION OF WOOD TRUSSES

- .1 Refer to TPIC Brochure "Handling, Erection and Bracing of Wood Trusses".
- .2 Hoist trusses into position with cables, spreader bars, strongbacks, as required, secured at designated lift points in accordance with manufacturer's instructions.
- .3 Make adequate provisions for possible erection stresses.
- .4 Exercise care to keep out-of-plane bending of trusses to minimum. Install temporary horizontal and cross bracing to hold trusses plumb and true and in safe condition until permanent bracing is installed.
- .5 Nail decking to trusses with nails at the minimum spacing indicated previously in this section or with nails at spacing specified on the Drawings.
- .6 Install permanent bracing and related components prior to application of loads to trusses.
- .7 Trusses with loose connection plates are not acceptable.
- .8 Restrict construction loads to prevent overstressing of truss members. Do not drill holes in truss members nor use lag screws or bolts in or through members.
- .9 Do not cut or remove any truss members.
- .10 Fasten 19 x 89 and/or 38 x 89 bridging and bracing members to trusses members with two (2) nails at each truss member - unless specified otherwise on the Drawings.
- .11 Upon completion of truss installation, the truss supplier shall visit the site and provide written confirmation that installation, including bracing, has been properly completed. If necessary, the site shall be revisited after deficiencies have been corrected.

3.4 WOOD FINISHING

- .1 All exposed wood shall be finished and protected with a natural transparent stain. Suggested manufacturer for providing an exterior stain product is Cetol SRD TRANSLUCENT, SIKKENS CETOL SIK250XXX. The color suggested is natural for the kiosk and gateway structures. Contractor may request an alternate product and submit to architect for approval.

- .2 Manufacture's recommendation suggests that the wood moisture content must be lower than 18% during application.
- .3 The wood surface must be prepared as per manufacture's recommendation.
- .4 The contractor will submit a sample of the wood product with one coat of the stain applied on the visible face. The sample shall be minimum 140mm x 300mm and shall represent the wood grain structure without any other defects present in the wood.

END OF SECTION

Part 1 General

1.1 Section Includes

- .1 Section includes, but is not limited to:
 - .1 Standing Seam Metal roofing.
 - .2 Z girts.
 - .3 Insulation.
 - .4 Waterproofing and air/vapour barrier membrane underlay to standing seam metal roofing.
 - .5 Gypsum sheathing over metal decking.
 - .6 Metal flashing, closures, trim and brake shapes in connection with standing seam metal roofing.
 - .7 Clamp on snow fence system.

1.2 Related Sections

- .1 This section of the specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.3 MEASUREMENT FOR PAYMENT

- .1 All units of measurement for payment will be as specified in Section 01 27 00 - Measurement and Payment and shall be considered to be included in the Contract Price.

1.4 Reference Standards

- .1 ASTM Standards:
 - .1 ASTM A653/A653M-15: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A924/A924M-13: Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 CSA Standards:
 - .1 CSA-S136-12 PACKAGE: Consists of S136.12 - North American Specification for the Design of Cold-Formed Steel Structural Members and S136.1-12 - Commentary on North American Specification for the Design of Cold-Formed Steel Structural Members.
- .3 Canadian Sheet Steel Building Institute (CSSBI) Publications:
 - .1 CSSBI 20M-99: Standard for Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications.
 - .2 CSSBI B16-94: Prefinished Sheet Steel for Building Construction.
 - .3 CSSBI S14-2000: CSSBI How to Series - Lightgauge Steel Roofing and Siding.
 - .4 CSSBI S8-2001: Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
 - .5 CSSBI Pub. No. 38.6-79: Metric Standard for Sheet Steel Cladding.

- .6 CSSBI Pub. No. 40.6-79: Metric Zinc Coated (Galvanized) Sheet Steel for Structural Building Products.
- .7 CSSBI Pub. No. 40.7-79: Prefinished and Post-Painted Galvanized Sheet Steel for Exterior Building Products.
- .4 ULC Standards:
 - .1 CAN/ULC-S101-14: Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN/ULC-S107-10: Fire Tests of Roof Coverings.
 - .3 CAN/ULC-S702-09: Thermal Insulation, Mineral Fibre for Buildings.
 - .4 CAN/ULC-S702.2-10: Mineral Fibre Thermal Installation for Building, Part 2: Application Guidelines
 - .5 CAN/ULC-S704-11: Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.5 Quality Assurance

- .1 Manufacturer's Qualifications:
 - .1 Fabricate job site manufactured metal roof panels by one manufacturer. Furnish proof of capacity and facilities to fabricate quality without delaying progress of the work and have at least five (5) years' experience in the successful completion of projects of similar size and design.
- .2 Installers Qualifications:
 - .1 Erect roofing using erection forces permanently employed by the manufacturer or be an erection company franchised or approved by the manufacturer, and furnish written proof if requested by the Departmental Representative.
 - .2 Have minimum of five (5) years' experience in the installation of job site manufactured sheet metal roofing system specified in this Section.
 - .3 Maintain a competent crew of skilled mechanics under the regular direct supervision of a crew supervisor with a minimum of five (5) years roofing experience and all of whom have had previous satisfactory experience using roofing materials and methods specified herein.
- .3 Source Quality Control:
 - .1 Inspection to ensure that the coil stock material is of proper thickness and type.
 - .2 Inspection to ensure that the specified finishes meet applicable standards.
- .4 Professional Structural Engineer Qualifications: A professional structural engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing standing seam metal roofing systems engineering services of the kind indicated.
 - .1 Engineering services are defined as those performed for installations of standing seam metal roofing system that are similar to those indicated for this Project in material, design, and extent.

- .5 Field Quality Control:
 - .1 Inspect substrate prior to roofing system installation to verify substrate complies with shop drawings, layout and specified tolerances.
 - .2 Inspect coil and panel product to ensure that the material is properly packaged and undamaged.
 - .3 Final inspection to verify panel installation complies with shop drawings and specified tolerances.

1.6 Design Criteria

- .1 Design standing seam metal roofing to provide for thermal movement of component materials caused by ambient temperature range of 120EC without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
- .2 Design roofing to achieve a Class "A" rating in accordance with CAN/ULC-S107.
- .3 Include expansion joints to accommodate movement in roof system and between roof system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration. Design system for concealed anchorage system.
- .4 Design members to withstand dead load and wind loads including wind uplift calculated in accordance with ABC 2014 and other applicable local regulations, to maximum allowable deflection of 1/240 of span.
- .5 Provide for positive drainage of condensation occurring within construction and water entering at joints, to exterior face of roof in accordance with NRC "Rain Screen Principles". Control movement of water behind facing of roof cladding to ensure that water is not retained and that elements will not be strained, restrained or damaged by water and ice. Locate weepers, vents and drain holes in such position as not to contribute to staining, streaking or marking of the roof cladding or other exterior finishes.
- .6 Design metal cladding to be water tight and adequately ventilated to prevent ice damming and condensation buildup.
- .7 Design roof system to accommodate specified erection tolerances of structure.
- .8 Maintain following installation tolerances:
 - .1 Maximum variation from plane or location shown on approved shop drawings: 10 mm/10 m of length and up to 20 mm/100 m.
- .9 Appearance: Consider "Appearance" requirements of equal importance to "performance" requirements in the design and subsequent approval of the metal roof system.
- .10 Provide metal roof panels capable of being formed on the job site in continuous lengths. Horizontal lap joints not permitted.

1.7 Job Mock-up

- .1 Construct a portion of finished roof system in a location agreed to by the Departmental Representative, to establish a standard of construction, workmanship, and appearance, showing panel jointing, sealing, fastening, flashing, waterproofing membrane, insulation and clamp on snow fence system.
- .2 Do not continue with Work of this Section until Departmental Representative has reviewed and accepted the mock-up. The approved mock-up of the roof system will become the minimum acceptable standard of workmanship.
- .3 The accepted mock-up may remain as part of the Work.

1.8 Submittals

- .1 Submit shop drawings, product data and samples in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit complete shop drawings for review and acceptance prior to fabrication.
 - .1 Indicate dimensions, openings, details, plans and sections of each condition, materials, thicknesses and finish, anchor details, methods of installation, joints necessary to accommodate thermal movement, waterproofing and air/vapour barrier membrane, clamp on snow fence system, compliance with design criteria and requirements of related work.
 - .2 Indicate panel length, width, bow, camber and squareness tolerances.
 - .3 Ensure all shop drawing submitted, are signed and sealed by qualified Professional Engineer Registered in the Province of Alberta.
- .3 Submit Product data for review and acceptance prior to fabrication:
 - .1 Submit product data for waterproofing and air/vapour barrier membrane to be used and application instructions. Include:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Limitations.
 - .2 Submit manufacturer's detailed installation instructions.
- .4 Submit samples prior to fabrications.
 - .1 Submit duplicate 300 mm long x full width samples of roof system, including standing seam joint, closures, fastening clips, caps, ridge caps, snow fence clamp and 300 mm length of pipe to snow fence, representative of materials, finishes and colours.
 - .2 Submit samples of the type of waterproofing and air/vapour barrier membrane to be used and application instructions.

1.9 Delivery, Storage & Handling

- .1 Deliver prefinished coil stock adequately protected from damage during shipment.
- .2 Handle coils with non-marring slings to prevent bending of panels or coils and to avoid marring of exposed finishes.

- .3 Protect roof panels from work of other trades after installation. Where work is performed on or above roof after roofing has been installed, take all precautions necessary to protect roof from damage, scratches and the like. Ensure all scaffolding and staging is not supported directly on roofing; provide protective blocking and sheathing to prevent damage. Cover all adjacent roofing as required to prevent splattering of materials onto roof surface.
- .4 Temporarily cover areas of standing seam roofing used for walking on, transportation of materials and the like, with 25 mm thick polystyrene sheets. DO NOT AT ANY TIME WALK OR WORK DIRECTLY ON ROOF PANELS.
- .5 Use seaming machines with polyurethane or rubber wheels which will not scratch metal surface. STEEL WHEELED SEAMING MACHINES ARE NOT ACCEPTABLE.
- .6 Require workers who will be working and walking on roof to wear clean, soft-soled work shoes that will not pick-up stones or other abrasive material which could damage panel surfaces.
- .7 Replace all roof panels which have been scratched, marred, dented or otherwise damaged.

1.10 Warranty Certificate

- .1 Provide a written warranty certificate (WC) in the name of Parks Canada using ARCA standard form Warranty Certificate, stating that the roofing system, including flashing, will remain weather tight for a minimum period of five (5) years from date of Substantial Performance Certificate, and that any and all damage resulting from failure to provide above stated performance will be repaired to the satisfaction of the Parks Canada at no additional cost.

Part 2 Products

2.1 Materials

- .1 Sheet steel: exposed to exterior, 0.61 mm base metal thickness, commercial grade to ASTM A653/A653M, grade 33, with Z275 zinc coating to ASTM A924/A924M, factory precoated with system Baycoat Perspectra series or Vicwest Weather-X Series finish, colour as selected by the Departmental Representative from the manufacturer's extended range of colours, dry film thickness of 0.025 mm on exposed surface and galvanized to Z275 on reverse side, conforming to test procedures of CSSBI Technical Bulletin No. 20M.
- .2 For copings and flashings provide prefinished material to match roofing.
- .3 Screws: stainless steel type as recommended by the manufacturer.
- .4 Sealants: one component silicone sealant to CAN/CGSB-19.13-M87.
- .5 Touch-up paint: as recommended by panel manufacturer.
- .6 Isolation coating: alkali resistant bituminous paint.

2.2 Components

- .1 Exterior sheet to roofing: preformed coated metal, to standing seam profile of 38 mm deep ribbed section 305 mm wide sheets, standing seam, of 0.61 mm thickness base metal, one piece continuous panel length.

- .2 Accessories: cap flashings, drip flashings, external ridge flashings, copings and closures, of same material and finish as roofing, brakeformed to shape.
- .3 "Z" Girts: to ASTM A653/A653M, Grade 33, 1.2 mm minimum base metal thickness, galvanized to ASTM A924M with Z275 zinc coating, size as indicated on the drawings.
- .4 Neoprene Washers: Black neoprene washers between clips and "Z" bars as required to provide a thermal break in the system.
- .5 Hold Down Clip Assembly: to ASTM A653/A653M, galvanized to ASTM A653/A653M, galvanized, fixed and 2-part expanding clip as recommended by the manufacturer, to suit design requirements.
- .6 Snow Fence: C-1 clamp-on plates system, snow guard systems with additional ice guards, complete with 19 mm diameter pipe, powder coat finish to colour to match standing seam roofing. Acceptable Product:
 - .1 Tra-Mage Inc, C-1 clamp on system.
 - .2 ASG4000G-U standing seam pipe - style snow guard system.
 - .3 Other preapproved product.
- .7 Waterproofing Membrane and air/vapour barrier: Prefabricated, self-adhesive, flexible, composite of polyolefin sheeting and rubberized asphalt, non-slip sanded surface one side, nominal thickness of 1 mm, 910 mm wide; one of the following:
 - .1 Grace "Ice and Watershield".
 - .2 Henry Companty "RF200" (WINTER GRADE ONLY)
 - .3 Carlisle WIP 400
 - .4 Soprema Lastobond Pro-HT-S.
 - .5 Other preapproved product.
- .8 Primer: bituminous primer, as recommended by the membrane manufacturer.
- .9 Fasteners for girts: carbon steel, case hardened and plated, purpose made for attachment to steel from 0.9 mm to 12.7 mm thickness plus thickness of gypsum board and waterproof and air/vapour barrier membrane. Hex head washer style, self-drilling.
- .10 Acceptable types:
 - .1 SRL-38 as manufactured by Skyline.
 - .2 TS40 standing seam roofing system as manufactured by Thermal Systems KWC Ltd.
 - .3 CM38 standing seam roofing system as manufactured by Custom Metal Contracting Inc.
 - .4 Accu-Steel standing seam roofing and siding system by Flynn Canada Ltd.
 - .5 New Tech SS-150.
 - .6 Igloo Erectors Ltd. SR40.

2.3 Fabrication

- .1 Form roofing in continuous one-piece lengths and manufacture to actual field dimensions.
- .2 Shop fabricate flashings in 3050 mm maximum lengths.

Part 3 EXECUTION

3.1 Inspection

- .1 Inspect delivered materials upon receipt to ensure that no damage has occurred during shipment.
- .2 Inspect substrates where panels are to be installed and verify that tolerances have been met.
- .3 Do not start work until unsatisfactory conditions have been corrected.

3.2 Preparation

- .1 Protect metal surfaces in contact with concrete or other cementitious surface with isolation coating. Protect galvanized surfaces from dissimilar metal surfaces and other metals, using isolation coating to prevent electrolysis.

3.3 Workmanship

- .1 Install all roof assemblies in accordance with reviewed shop drawings and manufacturer's recommendations.
- .2 Apply roofing over clean dry surfaces. Do not allow water or snow to be trapped in flutes of metal deck.
- .3 Ensure all material is dry (as manufactured) at time of installation.
- .4 Complete any section of the roofing system on the same day.

3.4 Application/Air/Vapour Barrier & Waterproofing Membrane

- .1 Apply membrane only in dry weather when the ambient temperature is 5EC or higher. Cut the membrane into 3 to 5 m lengths and re-roll. Starting at the low point of the slope, install continuous horizontal lengths of membrane in shingle fashion. Peel back 300 - 600 mm of release paper, align membrane on the lower edge of the roof and place the first 300 - 600 mm. Pull the release paper under the membrane and continue to peel it from the membrane. Force membrane into firm contact with gypsum board to eliminate wrinkling and air entrapment. Overlap the leading edge of the previous roll at side or at end a minimum of 150 mm. Seal traverse end of each roll by heating with propane torch to melt the polyethylene and fuse the surface together.
- .2 Ridge application: Cut membrane into 1.2 to 1.8 m lengths. Peel the release paper and centre the sheet over the ridge. Drape and press the membrane into place, working from the centre of the ridge outward in each direction. Overlap all ends and edges a minimum of 150 mm.
- .3 Ensure complete coverage of roof surfaces around all appurtenances. Seal all protrusions to ensure air/vapour and waterproof seal.
- .4 Weather lap membrane minimum 150 mm at all joints and completely and continuously seal in place.
- .5 Seal all protrusions to ensure waterproof seal.

3.5 Installation/Girt and Insulation

- .1 Install of "Z" girts transverse to roof slope with screws securing the bottom legs through the air/vapour barrier and waterproofing membrane, gypsum sheathing and into the upper flutes of the metal decking, at maximum 400 mm oc and maximum 75 mm from ends. Space girts at 600 mm oc maximum or as required to suit design criteria.
- .2 Space joints in standing seam metal roofing Z girts or install notched drainage holes to allow for drainage over membrane layer.
- .3 Ensure there are "Z" girts at all ends and edges and around openings to provide a solid framing for standing seam roofing.
- .4 Install insulation over waterproofing and air/vapour barrier membrane and between girts in two equal layers, leaving 25 mm space between top of insulation and underside of metal roofing. Stagger joints minimum 300 mm between layers. Butt insulation boards tight together to achieve a complete thermal barrier.
- .5 Ensure workers who will be working and walking on waterproofing membrane to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material which could damage waterproofing membrane.

3.6 Installation/Roof Panels

- .1 Install roofing to "Z" girts with hold down clip assemblies at each standing seam where they cross "Z" girt. Screw hold down clip assembly to "Z" girts using fasteners recommended by the manufacturer, complete with finish compatible with materials being fastened. Clip on exterior roof sheet.
- .2 Form seams in direction of water-flow and make water tight.
- .3 Install roof sheets in one continuous length per location. Horizontal laps will not be acceptable. Install standing seam panels plumb, straight and true to adjacent work. Form seams so that projecting right angles of standing seams are not facing into direction of prevailing winds.
- .4 Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten roofing system to building structure.
- .5 Flash roof penetrations with material matching roof panels, and make water tight.
- .6 Install flashings at rake corners, eaves and ridges and where necessary to provide weather tightness and a finished appearance. Provide formed flashings and closures, sealed to arrest direct weather penetration between panels and at abutting building surfaces. Install flashing to overlap top edge of gutters to direct water into gutters.
- .7 Fasten snow fence to standing seam, in strict accordance with manufacturer's recommendations and as indicated on the reviewed shop drawings. Install to entire length of building at bottom edge of roofing. Fasten clamp plates to each standing seam. Install continuous pipe through each clip. Install straight and true to line, parallel to base edge of roof as indicated.
- .8 Ensure that the completed installation is free from noise, rattles, wind whistles, or noise due to thermal movement.

3.7 Control/Expansion Joints

- .1 Construct expansion joints as indicated on the reviewed shop drawings and as recommended by the manufacturer.

- .2 Use cover sheets, of brake formed profile, of same material and finish as adjacent material.
- .3 Use mechanical fasteners to secure sheet materials.
- .4 Assemble and secure roof system to structural frame so stresses on sealants are within manufacturers' recommended limits.

3.8 Cleaning

- .1 Wash down exposed interior and exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths. Wipe interior surfaces clean as part of final clean-up.
- .2 Remove excess sealant with recommended solvent.
- .3 Touch up minor paint abrasions with touch-up paint.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 WORK INCLUDED

- .1 The following work is included:
 - .1 Supply and install of traffic signs.
 - .2 Supply and install of information signs.

1.3 REFERENCES

- .1 Alberta Transportation (AT) Standard Specifications for Highway Construction (current edition).
- .2 Transportation Association of Canada Manual of Uniform Traffic Control Devices.
- .3 AT Traffic Accommodation in Work Zones (Current Edition).
- .4 ASTM D4946, Performance Requirements Type III, High Intensity Retroreflective Sheeting.
- .5 AT's Design Bulletin #50.
- .6 Exterior Signage Standards and Guidelines – Parks Canada

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for traffic signage, including product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
 - .3 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants, paints and coatings used in the signage, comply with VOC and chemical component limits or restrictions requirements.
- .3 Shop Drawings:
 - .1 Submit information sign's shop drawings, based on the schematics provided in the drawings and Parks Canada Agency's latest standards. The design is to include bilingual information, sign dimensions, and color details.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Sign supports to be capable of withstanding the combination of following loads:
 - .1 Wind loads in any direction of 0.39 kPa on signboards and supports.
 - .2 Dead load of signboards and sign supports.
- .2 Structural deflections and vibration in accordance with American Association of State Highway and Transportation Officials (AASHTO), "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals".

2.2 MATERIALS

- .1 Sign supports:
 - .1 Timber posts:
 - .1 CAN/CSA-Z809 or FSC or SFI certified sawn timber posts, pressure treated.
 - .2 Posts to be treated in accordance with CAN/CSA O80 Series.
 - .2 Base plates for ground mounted signs: to ASTM B209M. Base plates for overhead supports: to ASTM B209M.
 - .3 Tubular support caps for ground mounted signs: to ASTM B210M or fabricated from aluminum plate as specified in ASTM B209M. Castings for overhead signs: to ASTM B211M.
 - .4 Anchor and connecting bolts, 'U' clamps and miscellaneous hardware for overhead sign installations: fabricate from 304 stainless steel as specified in ASTM A276.
 - .5 Fasteners: bolts, nuts, washers and other hardware for roadside signs to be cast aluminum alloy, or galvanized steel.
- .2 Signboards:
 - .1 Information Signs are to be Plywood: to CSA O121, 19 mm thick. Overlaid Douglas Fir, Medium Density CAN/CSA-Z809 or FSC or SFI certified, overlaid one side only with fibre or plastic sheet surfacing material.
 - .2 Traffic Signs are to be Aluminum sheet: to ASTM B209M, precut to required dimensions.

Part 3 Execution

3.1 INSTALLATION

- .1 Signs to be installed in accordance with AT's Standard Specification for Highway Construction.

3.2 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by traffic signage installation and salvage operations.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This Section covers items common to Division 26. This Section supplements requirements of the General Conditions and all of Division 01.
- .2 The Contractor shall furnish all labour, materials and necessary tools and equipment to provide complete and operating electrical systems, as set forth on the plans and in these specifications and as called for elsewhere in the Contract Documents. Any work which is obviously necessary or reasonably implied to complete the work, even if not shown or specified, shall be carried out as if it were both shown and specified.
- .3 The Contractor shall review the information contained in the appendices to determine the scope of supply of the Owner preselected equipment and his own scope of supply relating to the installation of the Owner preselected equipment.

1.2 INTENT

- .1 The electrical drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of the work. The Drawings are not to be scaled to determine accurate measurements. Take field measurements when material and equipment dimensions are dependent upon site features, process and mechanical installations.
- .2 The Drawings do not show all conduits, cables, fastenings and supports. Provide conduit, cables, cable trays, fastenings and supports as required to implement the drawings, process and instrumentation diagrams, schematics, riser diagrams, single line diagrams and all electrical documents.
- .3 The electrical drawings do not show every circuit that is to be installed under this Contract. Specific circuiting requirements for power circuits above the 208 V level are generally shown on the Drawings. Cables which are not shown on the cable schedules are to be sized based on the equipment circuit breaker and in accordance with the Canadian Electrical Code (CEC). Circuits are to be installed per the specific information included here. The plan drawings provide the general locations for the equipment to be circuited.
- .4 Branch circuit wiring for 120/208 V equipment, lighting and receptacle circuits including conduits, and any structural floor or wall penetration requirements are generally not shown. The Contractor is responsible for determining the circuiting requirements for these circuits based on the branch circuit schedules, the locations of equipment and devices indicated on the plan drawings, and the wiring

requirements given in other Sections of these specifications and the CEC. The circuiting requirements for instrumentation and control wiring are generally shown on the Drawings.

1.3 EXAMINATION OF THE DOCUMENTS

- .1 Prior to submitting Tender, the Contractor shall visit the site and thoroughly investigate locations, connections and details of all services and systems which in any way affect or tie-in with work of these specifications and drawings.
- .2 No extra payment will be allowed for work resulting from conditions which would have been evident upon a thorough examination of the site.
- .3 Notify Engineer, in writing, fourteen (14) days prior to Tender closing date of any discrepancies or points of doubt or contention. Failing this, allow in the Tender for the most expensive course of action.

1.4 CODES AND STANDARDS

- .1 Do complete installation in accordance with the Canadian Electrical Code, latest edition in effect at the time, except where specified otherwise.
- .2 Abbreviations for electrical terms to CSA Z85.

1.5 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.6 PERMITS, FEES AND INSPECTION

- .1 The Contractor shall submit to Electrical Inspection Department and utility, the necessary number of drawings and specifications for examination and approval prior to commencement of Work.
- .2 Notify Engineer of changes required by Electrical Inspection Department prior to making any changes.
- .3 The Contractor shall obtain all required permits, pay all fees levied and furnish Certificates of Acceptance from Electrical Inspection Department and other authorities having jurisdiction on completion of work to Engineer.

1.7 MATERIAL AND EQUIPMENT

- .1 Provide materials and equipment in accordance with Division 01.
- .2 Equipment and material shall be new and CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department. This approval to be arranged with knowledge of this by the Engineer.
- .3 Factory assemble control panels and component assemblies

1.8 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-09 Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2.
 - .3 CAN3-C235-83 (R2006), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
 - .1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.
- .3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.9 DEFINITIONS

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.
- .2 For purposes of this Contract, the term "Contractor" means the Electrical Room Skid Builder.

1.10 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

- .3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.11 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS.
- .3 Submit for review single line electrical and fire alarm riser diagrams in glazed frames and locate as indicated.
 - .1 Electrical distribution system in electrical rooms on skids.
- .4 Submit for review fire alarm riser diagram, plan and zoning in glazed frames at fire alarm control panel and transponders.
- .5 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta, Canada.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 Refer to Section 01 33 00 - Submittal Procedures.
 - .6 If changes are required, notify Engineer of these changes before they are made.
- .6 Quality Control:
 - .1 Provide CSA certified equipment and material.
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of contract.
 - .5 Submit, upon completion of Work, load balance report.
 - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Engineer.

- .7 Manufacturer's Field Reports: submit to Engineer manufacturer's written report, within three (3) days of review, verifying compliance of Work and electrical system and instrumentation testing.

1.12 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.
- .2 Qualifications: electrical Work shall be carried out by qualified, licensed electricians or apprentices as per the conditions of the Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .3 Site Meetings:
 - .1 Initial site meeting to brief the contractor concerning his interface with the electrical room skid.

1.13 SYSTEM START-UP

- .1 Instruct Engineer and operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 Check, adjust, balance and calibrate components and instruct operating personnel, during functional testing at the skid assembly plant and at the construction site.
- .3 Provide these services for such period as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.14 OPERATING INSTRUCTIONS

- .1 Refer to Section 01 78 00 - Closeout Submittals.
- .2 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- .3 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.

- .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
- .3 Safety precautions.
- .4 Procedures to be followed in event of equipment failure.
- .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .4 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- .5 Post instructions where directed.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval documentation to the Engineer.
- .3 Factory assembled control panels and component assemblies.

2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS ON BOARD THE SKID

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.
- .2 Provide power and control wiring to the HVAC units sitting outdoors beside the skids.

2.3 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction and inspection authorities.
- .2 Porcelain enamel signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: lamicaid 3 mm, matt white finish, black core, lettering accurately aligned and engraved into core mechanically attached with self-tapping screws.
 - .2 Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters
- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Engineer prior to manufacturing.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets: indicate system and voltage.
- .8 Transformers: indicate capacity, primary and secondary voltages.

2.6 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.

- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 25 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish.
 - .2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

Part 3 Execution

3.1 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

- .2 Provide a CSA label for each skid as an assembly.

3.3 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fitting.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Locate light switches on latch side of doors.

3.4 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1400 mm.
 - .2 Wall receptacles: 300 mm.
 - .3 Panelboards: as required by Code or as indicated.
 - .4 Fire alarm stations: 1500 mm.
 - .5 Fire alarm horns: 2100 mm.
 - .6 Wall mounted speakers: 2100 mm.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.6 FIELD QUALITY CONTROL

- .1 Load Balance:
 - .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

- .3 Provide upon completion of work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests in accordance with Division 01 45 00 - Quality Control
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .5 Systems: fire alarm system and communications.
 - .6 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Engineer.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.7 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

May 2016

1 General

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CAN/CSA C22.2-09 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.
 - .3 CSA C22.2 No. 227.1-06 Electrical Non-Metallic Tubing.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: submit manufacturers' printed product literature, specifications and datasheets:
- .3 Quality assurance submittals:
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 All waste shall be managed and disposed of in accordance with Section 01 74 21 - Construction Waste Management.

2 Products

2.1 CONDUITS

- .1 Rigid PVC conduit: to CSA C22.2 No. 211.2.
- .2 ENT conduit: to CSA C22.2 No.227.1-06.

2.2 CONDUIT FITTINGS AND CONNECTORS

- .1 Fittings and connectors: to CAN/CSA C22.2 No. 18, manufactured for use with rigid PVC and ENT specified.

2.3 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Concrete proof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion protected against ingress of concrete.
- .2 Concrete proof expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection protected against ingress of concrete.
- .3 Concrete proof expansion fittings for linear expansion at entry to panel protected against ingress of concrete.

2.4 FISH CORD

- .1 Polypropylene.

3 Execution

3.1 MANUFACTURERS' INSTRUCTIONS

- .1 Compliance: comply with manufacturers' written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Embed conduits in at least 100 mm of concrete.
- .2 Use rigid PVC conduit and ENT in concrete.
- .3 Minimum conduit size for lighting and power circuits: 19 mm.
- .4 Install fish cord in empty conduits.
- .5 Remove and replace blocked conduit sections:
 - .1 Do not use liquids to clean out conduits.
- .6 Dry conduits out before installing wire.

3.3 CONDUIT EMBEDDED IN CONCRETE

- .1 Locate in accordance with Section 26 05 00.
- .2 Protect conduits from damage where they stub out of concrete.
- .3 Install sleeves where conduits pass through slab or wall.

- .4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed:
 - .1 Use cold mastic between sleeve and conduit.
- .5 Conduits in slabs: minimum slab thickness four (4) times conduit diameter.
- .6 Encase conduits completely in concrete with minimum 100 mm concrete cover.
- .7 Organize conduits in slab to minimize cross overs.
- .8 All conduit positions shall be recorded for as-built and coordination purposed.
- .9 Seal all end of conduits against ingress of debris, including immediately after form strip down.

3.4 RIGID PVC UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Provide drainage fittings.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 23 - Final 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 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .3 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of all fallen timber and surface debris.
- .4 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments of specified size, to not less than specified depth below existing ground surface.

1.2 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees, natural features, bench marks, utility lines, site appurtenances, water courses, root systems of trees which are to remain.
 - .1 Repair damaged items to approval of Departmental Representative.
 - .2 Replace damaged trees designated to remain, as directed by Departmental Representative. The replacement will not be paid for directly but will be considered as a subsidiary obligation of the contractor.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site and verify with Consultant, items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Consultant 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 Consultant 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.

3.2 CLEARING

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

3.3 GRUBBING

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

3.4 REMOVAL AND DISPOSAL

- .1 Timber greater than 75 mm diameter shall be salvaged, cut to 3000 mm lengths, and stockpiled within the right of way in locations designated by the Parks Canada. Stockpiled timber becomes property of the Owner.
- .2 Cleared material not required to be salvaged, and grubbed material, shall be piled within the right of way and later buried in disposal pits at locations designated by the Parks Canada. Parks Canada/Consultant will determine when acceptable material from disposal pits can be used in the construction of embankments. Surplus material from disposal pits shall be disposed of as directed by the Departmental Representative.

- .3 Bury to approval of Departmental Representative by:
 - .1 Consolidating.
 - .2 Covering with minimum 500 mm of mineral soil.
 - .3 Finishing surface.

3.5 FINISHED SURFACE

- .1 Leave ground surface in condition suitable stripping of topsoil to approval of Parks Canada/Consultant.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Not Used.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

- .1 Ensure that procedures are conducted in accordance with applicable Provincial requirements.
- .2 Remove topsoil before construction procedures commence to avoid compaction of topsoil.
- .3 Handle topsoil only when it is dry and warm.
- .4 Strip topsoil to a depth of minimum 0.15 m in parking lot area and 0.15m outside parking lot area.
 - .1 Avoid mixing topsoil with subsoil.
- .5 Pile topsoil in berms in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2.5 m.
- .6 Dispose of unused topsoil to an approved disposal site.
- .7 Protect stockpiles from contamination and compaction.
- .8 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 The work shall consist of excavating earth materials from the ditches, hauling, compacting and finishing earth material for the Roadway embankment, parking areas. The work shall be completed to the lines, grades and dimensions as shown on the Drawings or as designated by the Departmental Representative.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 EXISTING CONDITIONS

- .1 Examine geotechnical investigation report for subsurface conditions.
- .2 Contractor to confirm underground and surface utility lines and buried objects before work commencement.

Part 2 Products

2.1 MATERIALS

- .1 Excavated or graded material existing on site suitable to use as fill for grading work if approved by Departmental Representative.
- .2 Any unsuitable material to be disposed as directed by Departmental Representative.
- .3 Imported material suitable to use as fill for grading work if approved by Departmental Representative.

Part 3 Execution

3.1 EXAMINATION

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

3.2 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to follow design grades as specified in Design Drawings.
- .3 Grade ditches to depth required for maximum run-off as indicated in Drawings.
- .4 Compact filled and disturbed areas to corrected maximum dry density, as follows:
 - .1 95% under landscaped areas.
 - .2 98% under paved and walk areas.
- .5 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 TESTING

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by the Contractor for all quality control testing.

3.4 CLEANING

- .1 Progress Cleaning
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.5 PROTECTION

- .1 Protect natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM):
 - .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN m/m³).
 - .2 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN m/m³).

1.3 DEFINITIONS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 SUBGRADE PREPARATION

- .1 In areas where excavation is to subgrade or in any case less than 300 mm below that elevation, the subgrade will be scarified to a depth of 300 mm and the scarified material windrowed to the side.
- .2 Subgrade to be finished to the parking lot elevations.
- .3 The exposed surface shall then be brought to its optimum moisture content and compacted to 98% of Standard Proctor Density ASTM D698.

3.2 COMPACTING

- .1 Compact to density not less than 98% corrected maximum dry density.
- .2 If any soft spot is identified, replace unsuitable material with approved engineered fill.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade surface.
- .4 Apply water as necessary during compaction to obtain specified density.

- .5 If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected to value not greater than 2% moisture above optimum value for compaction in accordance with ASTM D1557.

3.3 SITE TOLERANCES

- .1 Reshape compacted surface to be within plus or minus 25 mm of elevation as indicated but not uniformly high or low.
- .2 Blade finished surfaces in cut and fill areas free from ruts, depressions, rocks in excess of 50 mm and debris.
- .3 Roll finished surfaces to a tight, dense condition.
- .4 Finished surface to provide positive drainage and be free from standing water.

3.4 PROTECTION

- .1 If the Subgrade is properly compacted per specs and tested to certify same, the Contractor will be responsible for protection until such time as the Contractor completes required pavement over said surfaces and through final acceptance of the project.

3.5 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM):
 - .1 ASTM D3786, Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method.
 - .2 ASTM D4355, Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
 - .3 ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .4 ASTM D4533, Standard test Method for Trapezoid-Tearing Strength of Geotextiles.
 - .5 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide Width Strip Method.
 - .6 ASTM D4632, Standard Test Method for Breaking Load and Elongation of Geotextiles (Grab Method).
 - .7 ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - .8 ASTM D4833, Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SUBMITTALS

- .1 Submit to Consultant following samples at least 2 days prior to beginning Work.
 - .1 Minimum length of 2 m of roll width of geotextile.
 - .2 Minimum of 1 m seam with at least 300 mm of geotextile on both sides of seam.
- .2 Submit to Consultant two copies of mill test data and certificate at least four (4) weeks prior to start of Work, and in accordance with Section 01 33 00 - Submittal Procedures.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 During delivery and storage, protect geotextile from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 All waste shall be managed and disposed.

Part 2 PRODUCTS

2.1 MATERIAL

- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 4 m minimum.
 - .2 Composed of: minimum 85% by mass of polypropylene or polyester with inhibitors added to base plastic to resist deterioration by ultra violet and heat exposure for sixty (60) days.
- .2 Physical properties:
 - .1 Grab Tensile Strength: to ASTM D4632, minimum 900 N.
 - .2 Mullen Burst Strength: to ASTM D3786, minimum 1500 N.
 - .3 Puncture Strength: to ASTM D4833, minimum 500 N.
 - .4 Trapezoid Tear Strength: to ASTM D4533, minimum 350 N.
 - .5 Ultraviolet Radiation Resistance: to ASTM D4355, minimum 70% strength retention at 500 hours.
- .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D4751, 212 μm (U.S. Sieve Size No. 70).
 - .2 Permissivity: to ASTM D4491, 0.2 seconds -1.
 - .3 Securing pins and washers: to CAN/CSA G40.21, Grade 300W, hot dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.
 - .4 Factory seams: sewn in accordance with manufacturers' recommendations.
 - .5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

Part 3 EXECUTION

3.1 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with pins with washers.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Overlap each successive strip of geotextile 300 mm over previously laid strip. Overlapped joints and seams shall be measured as a single layer of cloth.
- .5 Pin successive strips of geotextile with securing pins at interval at midpoint of lap as indicated in table below.

Embankment	Spacing, (M)
Steeper than 1V on 3H	0.6
1V on 3H to 1V on 4H	1
Flatter than 1V on 4H	1.5

- .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .7 After installation, cover with overlying layer within four (4) hours of placement.
- .8 Replace damaged or deteriorated geotextile to satisfaction of Prime Consultant.
- .9 Place and compact soil layers in accordance with the appropriate specification section.

3.2 CLEANING

- .1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

3.3 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

Part 2 Products

2.1 MATERIALS

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

Part 3 Execution

3.1 REMOVING PAVEMENT MARKINGS

- .1 Remove sealing compound which has protruded excessively, where indicated by Consultant. Dispose of removed material.
- .2 Exercise care to avoid dislodging of coarse aggregate particles, excessive removal of fines, damage to bituminous binder or damage to joint and crack sealers.
- .3 Removal of pavement markings to be high pressure water blasting, as directed by the Consultant.

3.2 PAVEMENT SURFACE CLEANING

- .1 Remove dust, contaminants, loose and foreign materials, oil and grease and curing compound prior to application of pavement marking.
- .2 Pavement cleaning to be high pressure water blasting, as directed by the Prime Consultant.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 The work shall consist of supplying, hauling, dumping, spreading and compacting base material on a prepared surface at locations indicated in the Contract Drawings.

1.2 DEFINITIONS

- .1 Acceptance Limit: The maximum or minimum value for a test result above or below which the section of roadway shall be rejected.
- .2 Acceptance Testing: The testing performed to determine compliance with the specification regarding certain requirements, limits and tolerances for the quality of materials and workmanship to be supplied.
- .3 Surface Defects: Surface defects that are due to the Contractor's operation shall include but shall not be limited to the following:
 - .1 Potholing.
 - .2 Surface failures.
 - .3 Ravelling.
 - .4 Rutting.
 - .5 Bumps or dips.
 - .6 Irregular cross slopes.
 - .7 Segregation.

1.3 REFERENCES

- .1 ASTM International:
 - .1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D1557-09, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative sieve analysis, Atterberg Limits, percent fractured faces and percent lightweight pieces of materials proposed for use at least two (2) weeks prior to commencing work.

Part 2 Products

2.1 MATERIALS

- .1 Granular base course materials shall meet the following requirements:
 - .1 Base aggregate shall be composed of sound, hard and durable particles of sand, gravel and rock free from injurious and quantities of elongated soft or flaky particles, shale, loam, clay balls and organic or other deleterious materials.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117.
 - .1 Granular base course gradation to meet the following:

SIEVE DESIGNATION	PERCENT BY WEIGHT PASSING CANADIAN METRIC SIEVE SERIES
18.0 mm	100.0
12.5 mm	75.0 – 100.0
5.0 mm	50.0 – 75.0
2.0 mm	32.0 – 52.0
900 um	20.0 – 35.0
400 um	15.0 – 25.0
160 um	8.0 – 15.0
71 um	6.0 – 11.0
Plasticity Index	0 – 6.0
Fractured Face %	50.0 Minimum
Lightweight Pieces %	5.0 Maximum

- .2 Crushed particles at least 50% of particles by mass of the material retained on the 5.00 mm sieve to have at least one (1) freshly fractured face.

Part 3 Execution

3.1 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and stockpile, aggregates as noted below.
 - .1 Handle and transport aggregates to avoid segregation, contamination and degradation.

- .2 No stockpiling of aggregate to be permitted on site unless otherwise directed by the Departmental Representative. Do not stockpile on completed pavement surfaces. Stockpile on an impervious, previously disturbed site as approved by the Departmental Representative.
- .3 Stockpile aggregates in sufficient quantities to meet project schedules.

3.2 PLACING

- .1 Place granular base after subgrade is inspected and approved by Departmental Representative in writing.
- .2 Place granular base mix to avoid mixing with subgrade material.
- .3 Construct granular base to depth and grade in areas indicated.
- .4 Ensure no frozen material is placed.
- .5 Place material only on clean unfrozen surface, free from snow and ice.
- .6 Place material using methods which do not lead to segregation or degradation of aggregate.
- .7 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.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .10 If excess moisture originating from external causes including but not limited to precipitation and/or Contractor's operation is present in the subgrade, sub-base, and/or base course prior to the acceptance of the completed surfacing structure; the Contractor shall dry the subgrade, sub-base, and/or base course to not less than the specified density or the optimum density in accordance with the requirements for Moisture-Density Proctor at no additional cost to the Owner.

3.3 COMPACTION

- .1 Compaction equipment to be capable of obtaining required base course densities.
- .2 Shape and roll alternately to obtain smooth even, uniformly compacted base course.
- .3 Apply water as necessary during compaction to obtain the specified density. Water will not be paid directly but considered a subsidiary to the contract.
- .4 In areas not accessible to rolling equipment, compact to the specified density with mechanical tampers approved by Departmental Representative.
- .5 Correct surface irregularities by loosening and adding or removing material until the surface is within specified tolerance.
- .6 Base mix shall not be compacted if the atmospheric temperature is less than 2°C.

- .7 The section of base course shall be considered acceptable if it has no surface defects and is true to grade and cross-section and if:
 - .1 The average density meets or exceeds 100% maximum dry density in accordance with ASTM D698.
 - .2 All individual test results are greater than 98% of maximum density.
 - .3 The moisture content is less than or equal to the optimum moisture content.
- .8 If the density for any section of the roadway are outside the acceptance limits outlined in Section 3.3.7 the section shall be rejected as unacceptable work and the following shall apply:
 - .1 The Contractor shall have the opportunity to remedy existing base course by re-rolling or by any other method suggested by the Contractor and approved by the Departmental Representative. The Contractor may request that the section of the roadway be retested during or after the completion of the remedial attempts.
 - .2 The section shall be tested a total of 3 times free of cost to the Contractor. The Contractor shall pay the cost of any additional testing.
 - .3 If the base course in the section remains outside the acceptance limits after the remedial attempts, the Contractor shall remove and replace all the base course in that section.
- .9 Any section with surface defects shall be rejected as unacceptable work.
 - .1 Surface defects shall be repaired in a manner acceptable to the Departmental Representative.

3.4 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.

3.5 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.6 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 WORK INCLUDED

- .1 Supply and install asphalt pavement in location indicated on the Drawings.
- .2 Notify Departmental Representative of proposed date for installation and schedule shipments to coincide with construction schedule.
- .3 Application of prime coat and tack coat.

1.2 RELATED SECTIONS

- .1 Rough Grading - Section 31 22 13.
- .2 Granular Base Course - Section 32 11 23.

1.3 REFERENCES

- .1 Alberta Transportation Standard Specifications for Highway Construction (current edition).
- .2 Alberta Transportation Test Methods as listed in the Standard Specifications for Highway Construction.
- .3 Alberta Transportation's Design Bulletin #13, #27 and #47.

1.4 SUBMITTALS

- .1 Submit submittals in accordance 01 33 00 – Submittal Procedure.
- .2 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least one (1) week prior to commencing work.

Part 2 Products

2.1 MATERIALS

- .1 All materials supplied by Contractor to Alberta Transportation specification for "Aggregate Production and Stockpiling", Specification 3.2.
- .2 Asphalt Type M1 with PG 52-34 Asphalt Cement.
- .3 All granular base course to be Designation 2, Class 25.

Part 3 Execution

3.1 ASPHALT PAVEMENT

- .1 All work to be executed in accordance with:
 - .1 Alberta Transportation Standard Specifications for Highway Construction, (current edition).
 - .2 Alberta Transportation's Design Bulletin #13, "Revisions to Pavement Design Manual for Selection of ACP Mix Types and Asphalt Binder Grades", dated July 2003.
 - .3 Alberta Transportation's Design Bulletin #27, "Provision of Additional Pavement Width to Allow for Two Future Overlays", dated October 2006.
 - .4 Alberta Transportation's Design Bulletin #47, "Paving and Upgrading of Highway Intersection with Gravel/Paved Roadways at the Time of Grading or First Stage Paving and Final Paving or Pavement Rehabilitation", dated April 2007.
 - .5 Prime Coat and Tack Coat as per Alberta Transportation Standard Specifications for Highway Construction, (current edition).

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

- .1 The following work is included:
 - .1 Supply and paint traffic lines and markings.

1.2 REFERENCES

- .1 Alberta Transportation Standard Specification for Highway Construction (current version).
- .2 Alberta Transportation Pavement Marking Guide (current version).
- .3 Alberta Transportation Pavement Marking Guide (current version). Figure TCS-C-501.3.
- .4 AT Design Bulletin #56.

Part 2 Products

2.1 MATERIALS

- .1 The Contractor shall choose the glass beads, paint and durable paint materials to be supplied from the list of Proven Products shown in the Alberta Transportation Products List, found on the Department's web page. The Contractor shall be responsible for ensuring that the quality of the paint and beads supplied meets the requirement specified.
- .2 The Contractor shall advise the Departmental Representative of any change in paint formulation.
- .3 The Contractor shall provide the Departmental Representative with the following information prior to commencing the Work:
 - .1 Name and mailing addresses of the suppliers and manufacturers.
 - .2 Formulation to be supplied.
 - .3 Written confirmation from the manufacturer that the materials to be supplied meet all specified requirements.
 - .4 The Contractor shall verify that all materials delivered and used in the Work are the type ordered.

Part 3 Execution

3.1 EQUIPMENT REQUIREMENTS

- .1 The Contractor shall provide all equipment necessary for completion of the Work including, but not limited to the painting truck, a pilot truck, a crash attenuator vehicle and all ancillary equipment such as fork lifts, hoists, pumps and transport vehicles required to load, unload and transport the paint and glass beads.

3.2 APPLICATION

- .1 All painting shall be carried out during hours of daylight between an 0.5 hour after sunrise and an 0.5 hour before sunset.
- .2 Loading of glass beads or paint onto the painting truck is not permitted on a roadway surface.
- .3 All painted lines shall be uniformly applied at a minimum rate of not less than 38 L/km of solid 100 mm wide line. Glass beads shall be applied immediately following the paint application at a uniform rate of not less than 600 g/L of paint.
- .4 The Contractor may heat alkyd paint to a maximum temperature of 65°C prior to application to the paved surface to reduce drying time. The Contractor shall use due care in heating the paint because of it's volatile nature. Waterborne paints shall not be heated.
- .5 Painting shall not be performed during the following conditions:
 - .1 When the temperature is below 0°C for alkyd paints and 10°C for waterborne paints.
 - .2 When wind conditions cause overspray.
 - .3 When the visibility is less than 700 m.
 - .4 During period of rainfall.
 - .5 Area to be painted shall be clean and dry during the application of paint and shall be inspected by the Contractor prior to painting.

3.3 TOLERANCE

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 All paint shall be applied at the proper locations in accordance with the drawings or as directed by Departmental Representative.
- .3 All painted lines shall be uniform in thickness and free of tire tracking, with no splatter excessive overspray or other defects.
- .4 Remove incorrect markings in accordance with Section 32 01 11.01 – Pavement Cleaning and Marking Removal.

3.4 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 DESCRIPTION

- .1 This Section specifies requirements for replacement of the topsoil with the objective to restore topsoil to meet the equivalent land capability requirements specified in the Conservation and Reclamation Regulation and following best management practices.
- .2 Individual Drawings should be referred to for a description of the designated area(s), design grades, contours and elevations.

1.3 MEASUREMENT FOR PAYMENT

- .1 All units of measurement for payment will be as specified in Section 01 27 00 – Measurement and Payment and as shown in the Unit Price Table.
- .2 Preparation of sub grade for placing of topsoil will not be measured for payment.

1.4 REFERENCES

- .1 Agriculture and Agri-Food Canada:
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment:
 - .1 PN1340-2005, Guidelines for Compost Quality.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water:
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .4 Guidelines for Alternative Soil Handling Procedures During Pipeline Construction, Alberta Pipeline Environmental Steering committee, June 1996.
- .5 C&R/IL/94-5, Conservation and Reclamation, Information Letter, Environmental Protection Guidelines for Pipelines.
- .6 Alberta Environment and Alberta Sustainable Resource Development, Best Management Practices for Pipeline Construction in Native Prairie Environments, October 2003.

1.5 DEFINITIONS

- .1 Topsoil: The top layer of soil containing organic material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .2 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.

- .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley Black or Loss On Ignition (LOI) test.
- .3 Product must be sufficiently decomposed (i.e., stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25), and contain no toxic or growth inhibiting contaminants.
- .4 Composed bio solids to: CCME Guidelines for Compost Quality, Category (B).

1.6 SUBMITTALS

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

1.7 QUALITY ASSURANCE

- .1 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.

1.9 CONSERVATION AND RECLAMATION REQUIREMENTS

- .1 The Contractor shall make every effort to progressively reclaim the disturbed surface as quickly as possible, unless the timing of clean-up and reclamation has been scheduled to accommodate frozen or unfrozen ground conditions.
- .2 The Contractor shall reclaim all constructed haul roads that are not remaining as surface improvements.
- .3 The Contractor shall contour the site grading so that it is comparable with pre-disturbance conditions and the adjacent undisturbed land unless otherwise directed in writing by the Departmental Representative.
- .4 The Contractor shall establish drainage on the graded areas that is compatible with existing drainage on the adjacent undisturbed land.
- .5 The Contractor shall alleviate compaction in all replaced upper subsoil before topsoil replacement.
- .6 The Contractor shall alleviate any compaction in replaced topsoil. Depth of cultivation or other mechanical treatments shall be controlled to avoid topsoil mixing with upper subsoil.
- .7 The Contractor shall make every effort to minimize the degradation of topsoil/subsoil through compaction, rutting, loss or organic matter, or soil mixing so that successful reclamation of the right-of-way can occur.

1.10 SOIL HANDLING

- .1 Frozen or Unfrozen Soil Conditions:
 - .1 The Contractor shall only use the appropriate soil handling procedures for frozen or unfrozen ground conditions unless otherwise authorized in writing by the Departmental Representative.

.2 Problem Soils:

- .1 The contractor shall determine the appropriate soil handling procedures for any problem soils encountered by obtaining written direction from the Departmental Representative before changing any soil handling procedures.

Part 2 Products

2.1 TOPSOIL

- .1 Topsoil for seeded areas: Existing material onsite.

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 requirements of authorities having jurisdiction, the sediment and erosion control drawings, and the sediment and erosion control plan, specific to site, in accordance with the ESC Plan.
- .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 OF EXISTING GRADE

- .1 Verify that grades are correct. If discrepancies occur, notify the Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 25 mm diameter and other deleterious materials:
 - .1 Remove debris which protrudes more than 50 mm above surface.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 50 mm by means of discs, spike tooth harrows or other means acceptable to the Departmental Representative:
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL

- .1 Topsoil shall be excavated from designated stockpiles on site, hauled and placed in it's final position.
- .2 Place topsoil after Departmental Representative has accepted subgrade.

- .3 Spread topsoil as indicated on the Drawings to the following minimum depths after settlement:
 - .1 150 mm for seeded areas.
- .4 Manually spread topsoil around obstacles.
- .5 Do not place topsoil when either topsoil or subsoil is frozen, excessively wet, extremely dry, or in a condition inhibiting proper grading, cultivation or compaction.
- .6 Fine grade the area until the surface is smooth. Remove all lumps, rocks, roots and other debris from the finished material and work area.
- .7 Upon completion of excavation, stockpile sites shall be trimmed and graded to a neat uniform appearance.
- .8 Fine grade to eliminate rough or low areas and to ensure positive drainage.
- .9 For sodded areas compact topsoil with suitable rollers to the satisfaction of the Departmental Representative.

3.4 FINISH GRADING

- .1 Leave surfaces smooth, uniform and firm against deep footprinting.
- .2 Final grade to be within 30 mm of final grade elevations shown on Drawings, as part of final acceptance by the Departmental Representative.
- .3 Finished topsoil on slopes of 4H:1V or steeper shall be cat tracked perpendicular to the slope. Tracked equipment shall be run up and down all sloped surfaces, if the time between topsoil placement and seeding exceeds sixty days, leaving track indentations that run horizontally to the slope.

3.5 COMPACTION

- .1 Topsoil placement to be compacted to 85% Standard Proctor Density.

3.6 ACCEPTANCE

- .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Topsoil replacement and general reclamation shall meet minimum reclamation standards as provided for in the Conservation and Reclamation Regulation.

3.8 FINAL RECLAMATION

- .1 The Contractor shall re-vegetate and stabilize the contoured surface with the seed mixture from the Owner and adequate fertilizer. Other forms of re-vegetation that are not described in the application shall only be applied when directed in writing by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 The work shall consist of supplying and installing pipe culverts as indicated on the Contract Drawings and as directed by Departmental Representative.

1.2 REFERENCES

- .1 CAN3-G401-93, corrugated steel pipe products.
- .2 AAHSTO M294 – Standard specification for corrugated polyethylene pipe 300 mm to 1500 mm diameter.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit manufacturer's test data and certification at least four (4) weeks prior to commencing work.
 - .2 Certification to be marked on pipe

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 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.

Part 2 Products

2.1 CORRUGATED STEEL PIPE

- .1 Corrugated steel pipe: to CAN3-G401 of length and diameter noted on Contract Drawings.
- .2 If couplers are required they should be of the bolt type.
- .3 Pipe and couplers to have a wall thickness of 2.0 mm.

2.2 EARTH BEDDING AND BACKFILL

- .1 Earth bedding and backfill material requires approval by Departmental Representative.
- .2 Material used for bedding and backfill not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.

Part 3 Execution

3.1 INSTALLATION OF CULVERTS

- .1 Bedding:
 - .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
 - .2 Level and prepare earth on bottom of excavation. Compact to a minimum of 98% of the maximum density.
 - .3 Place bedding in unfrozen condition.
- .2 Laying Pipe Culverts:
 - .1 The invert elevations of culverts shall be placed at elevations shown in Contract Drawings.
 - .2 Begin pipe placing at downstream end.
 - .3 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
 - .4 Lay pipe with outside circumferential laps facing upstream.
 - .5 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.
- .3 Joints: Pipe Culverts:
 - .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.

3.2 BACKFILLING

- .1 Backfill around and over culverts as directed by Departmental Representative.
- .2 Place earth 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 D698 taking special care to obtain required density under haunches.
- .4 Protect installed culvert with minimum 600 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 After the earth backfill has been placed and compacted around the culvert, the remainder of the embankment shall be constructed in accordance with the requirements in Section 31 22 13 – Rough Grading.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 22 13 - Rough Grading.
- .3 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 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.
 - .4 Fertilizer.
 - .3 Submit in writing to Departmental Representative seven (7) days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.
 - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 SCHEDULE

- .1 Schedule hydraulic seeding to coincide with preparation of soil surface.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Seed: supplied by Parks Canada Agency.

- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 900%.
- .3 Tackifier: water dilutable, liquid dispersion.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 18/18/18 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form. Rate shall be 300kg/ha.
- .6 Inoculants: inoculant containers to be tagged with expiry date.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.
- .3 Do not perform work under adverse field conditions such as wind speeds over 15 km/h, frozen ground or ground covered with snow, ice or standing water.
- .4 Protect seeded areas from trespass until plants are established.

3.2 PREPARATION OF SURFACES

- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
- .2 Obtain Consultant's approval of grade and topsoil depth before starting to seed.

3.3 PREPARATION OF SLURRY

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental Representative. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.4 SLURRY APPLICATION

- .1 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
 - .3 Capable of seeding by 100 m hand operated hoses and appropriate nozzles.
- .2 Slurry mixture applied per hectare.
 - .1 Seed: mixture 75 kg.
 - .2 Mulch: Type I, 1500 kg.
 - .3 Tackifier: 50 kg.
 - .4 Water: Minimum 30,000 L.
 - .5 Fertilizer: 300 kg, ratio 18/18/18.
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed:
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300mm into adjacent grass areas to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.
- .7 Protect seeded areas from trespass satisfactory to Departmental Representative.
- .8 Remove protection devices as directed by Departmental Representative following acceptance.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of seed application until acceptance by Departmental Representative.
- .2 Grass Mixture:
 - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Water seeded areas to maintain optimum soil moisture level for germination and continued growth. Control watering to prevent washouts.

3.6 ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Plants are uniformly established. Seeded areas are free of rutted, eroded, bare or dead spots.
 - .2 Areas have been fertilized.

- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.7 CLEANING

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

END OF SECTION