



Specifications for:

**Riding Mountain National Park
Wasagaming Main Parking Lot Re-
Development**

Project No. 828

February 2018



Prepared for:
Parks Canada

Prepared by:
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File No. 111217490



Certificate of Authorization
Stantec Consulting Ltd.

No. 1301

DIVISION 00

**PROCUREMENT AND CONTRACT
REQUIREMENTS**

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Appendices

- Appendix 1 – Geotechnical Report – Dyregrov
- Appendix 2 – Geotechnical Report – Stantec

END OF SECTION

Part 1 General

1.1 Drawings

.1 The following is the list of drawings for this project:

Drawing No.	Title
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	Title
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G1	Cover Sheet & Drawing Index
C1	Site Preparation and Topographic Plan
C2	Grading Plan – South
C3	Grading Plan - North
E1	Electrical Site Layout
E2	Electrical Specifications and Details
L1	Landscape Plan
L2	Wayfinding Node and Details Plan

DIVISION 01

SUPPLEMENTAL REQUIREMENTS

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Work for this Contract consists of the paving of the main parking lot complete with concrete curbs and islands. Work also includes paving of the: reconstruction of East Access Roadway; new Ominnik Trail path; Main Beach Access Path; Emergency Access Road and additional pathways within parking lot area and associated works as described in the Bid Documents.
- .2 The work, unless specifically stated otherwise, shall include mobilization of the Contractor to site, the furnishing of all material, product, plant, labour and transportation necessary to complete the work, restoration of the site upon completion and demobilization. The Contractor is solely responsible for successful completion of the works and successful operation of the system.
- .3 The work shall not be deemed complete until all components are placed in operation by the Contractor, and are operating satisfactorily.
- .4 Any minor item of the work not called for in the specifications or shown on the drawings but required to meet the intent of design and normally provided for the proper operation of the work shall be provided as if specifically called for in the contract documents.
- .5 Work not included in the Contract is indicated as N.I.C. on the drawings.

1.2 REFERENCES AND CODES

- .1 Meet the requirements of Canada National Park Act (S.C. 2000, c.32) – latest amendment.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.
- .3 Wherever codes, standards, regulations are referenced throughout the Bid Documents they shall mean the latest editions including amendments, supplements and revisions as of the date of bid closing.

1.3 CONTRACTOR USE OF SITE

- .1 Limit use of site for Work, for storage, and for access, to allow:
 - .1 Owner occupancy of existing buildings and parking lots.
 - .2 Work by other Contractors.
- .2 Confine construction activities to designate construction areas as indicated on the drawings.
- .3 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .4 Do not obstruct access to parking lots and building entrances indicated to remain open for Owner and delivery of supplies and chemicals.

- .5 Repair or replace portion of existing work which have been altered during construction operations to match existing or adjoining work as directed by Departmental Representative. Restoration may commence once weather conditions are favorable.
- .6 At completion of operations condition of existing infrastructure including access roads; equal to or better than that which existed before new work started.

1.4 EXISTING UTILITIES

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing utilites, give Owner at least 5 working days notice for necessary interruption. Minimize duration of interruptions. Carry out work at times as mutually agreed with the Owner and the Departmental Representative to minimize disturbance to adjacent housing and Owner operations.
- .3 Provide alternative routes for pedestrian and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify the Departmental Representative of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Departmental Representative to maintain critical systems.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10 Record locations of all maintained, re-routed and/or abandoned service lines.
- .11 Construct all temporary barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .12 Further to General Conditions, no responsibility will be assumed by the Owner or the Departmental Representative for accuracy or completeness of the drawings with respect to existing utilities, pipes or other objects either underground or on the surface and neither, the Owner nor the Departmental Representative shall be liable for the accuracy thereof. It shall be the responsibility of the Contractor to determine the location of all such utilities, pipes and other objects and make good any damage done to them.

1.5 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders.

- .5 Other Modifications to Contract.
- .6 Reviewed Shop Drawings.
- .7 Field Test Reports.
- .8 Copy of Approved Work Schedule.
- .9 Health and Safety Plan and Other Safety Related Documents.
- .10 Manufacturer's recommended installation instructions.
- .11 Basic Impact Assessment (As prepared by Parks Canada)
- .12 Sediment and Erosion Control Plan
- .13 Spill Response Plan
- .14 Dewatering Plan

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 WORK DESCRIPTION

- .1 Although the Bid Documents set forth the work of various trades under separate Divisions, it is not intended that the work of that trade is limited to or includes all work set forth in that particular Division. The Bidder shall delegate the extent of the Work to be done by the various trades and shall coordinate execution of the Work by all trades.
- .2 Although the specifications are separated into titled Divisions, the Owner will not be an arbitrator to establish limits of any agreements between the Contractor and his Subcontractor.

1.2 RELATED REQUIREMENTS

- .1 General Conditions
- .2 All other specification sections

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 DESCRIPTION OF WORK

- .1 A geotechnical report has been prepared by Dyregrov for the Owner's use in design and it is provided in Appendix 1 of this Tender Document for information only. In addition to this, a supplemental report has also been prepared by Stantec for parking lot pavement and pathway works and is provided in Appendix 2.
- .2 The original geotechnical report was prepared by Dyregrov Consultants in 2006.
- .3 When the geotechnical report was prepared, the scope of work included the construction of a proposed lift station and stormwater retention pond, which have since been removed from the project. Disregard any reference to a proposed lift station or stormwater retention pond as part of the Works.
- .4 Any information pertaining to soils and borehole logs is furnished by the Owner as a matter of general information only and borehole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the boreholes themselves. Neither the Owner nor the Department Representative warrants or makes any representation with respect to data or interpretations of data or opinions expressed in any geotechnical report available for the perusal of the Bidder, whether or not such report is included as part of the Bid or Contract Documents.
- .5 The Bidder should familiarize himself with the purpose and limitations of the geotechnical reports when interpreting subsurface conditions for Bid preparation purposes.
- .6 It is recommended that Bidders visit the site and examine site conditions.

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 General Conditions
- .2 Division 01 – General Requirements
- .3 Section 01 14 16 – Contractor’s Use of the Premises

1.2 ACCESS AND EGRESS

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

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the Owner and the Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Make arrangements to provide sanitary facilities for use by Contractor’s personnel. Keep facilities clean.

1.4 SPECIAL REQUIREMENTS

- .1 The working hours within the premises will be confirmed by the Owner at the Pre-construction meeting.
- .2 No Work will be permitted on the weekend of September 15-16, 2018, or October 20-21, 2018. Work on subsequent weekends will be permitted only as approved by the Departmental Representative.
- .3 Submit schedule in accordance with Section 01 32 16 – Construction Schedule.
- .4 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .5 Keep within limits of work and avenues of ingress and egress.

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 THE WORKSITE

- .1 The Owner will provide the lands upon which the work related to the proposed works will be undertaken. This site is located in the Riding Mountain National Park.

1.2 RELATED REQUIREMENTS

- .1 General Conditions
- .2 Division 01 – General Requirements
- .3 Section 01 14 00 – Work Restrictions

1.3 CONTRACTOR'S USE OF THE WORKSITE

- .1 The Contractor shall be permitted to occupy sites where they will be working in Riding Mountain National Park, free of charge from the date of award of the contract, up to and including the construction completion date. A business license from the Parks Canada Administration Office located at 135 Wasagaming Drive, Wasagaming, Manitoba, will be required as will vehicle work passes for all of the Contractor's vehicles used to complete the Work. These passes may be obtained free of charge from the Departmental Representative, Environmental Officer or at the Administration Building in Wasagaming. The sites to be occupied by the Contractor include all the roads and areas specified in the Contract Documents and as directed by the Departmental Representative.
- .2 The Contractor shall have exclusive use and control of the Worksite, but permit access to the Owner, the Departmental Representative and other Contractors on the Worksite for purposes of operations, inspections, reviews, tests and carrying out the activities related to the work.
- .3 The Owner shall have unfettered use of thoroughfares, streets, lanes and other areas within the Worksite until the Contractor requires those areas for execution of the Work, and after the Contractor has finished the portions of the Work in those areas. The Contractor shall provide detours at locations where thoroughfares, streets or lanes will be inaccessible.
- .4 Unless otherwise agreed with the Owner, the Contractor shall give seventy-two (72) hours notice to the Owner before entering a particular Area of the Worksite to execute the Work .
- .5 Only after achieving Substantial Performance, the Owner shall have use of the area and shall be responsible for Health and Safety Requirements and security of the area.
- .6 During the Contractor's use of a particular area of the Worksite to execute the Work, the Contractor shall be responsible primarily for security and for ensuring compliance with Health and Safety Regulations.
- .7 The Contractor shall be responsible for access to the Worksite by means of temporary roads, tote roads, or agreements with the appropriate authorities to use existing means of access.

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 PROVISIONAL ITEMS

- .1 The Provisional Items listed in the Bid Form are a part of the Contract.
- .2 The Contractor shall not perform Work included in the Provisional Items without prior authorization from the Departmental Representative. All Work included in the Provisional Items will be carried out within the construction areas shown on the Drawings.
- .3 The Departmental Representative reserves the right to diminish all or any portion of the items of Work listed in the Provisional Items and no claim shall be made for damages on grounds of loss of anticipated profit or for any other reason.

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 DESCRIPTION

- .1 Acceptance of Alternatives is at the sole discretion of the Owner.
- .2 Where Bid Documents stipulate a particular product, substitutions will be considered by the Departmental Representative up to fifteen (15) working days before receipt of bids.
- .3 When a request to substitute a product is made, the Departmental Representative may approve substitution and will issue an Addendum to known bidders.
- .4 If the Contractor elects to supply and/or install an alternative material/product to that specified or shown on the drawings, the Contractor shall be responsible for making all consequent adjustments and design changes, at this cost to make the alternative fit into the work. The consequent cost shall be deemed to be included in the price bid for the alternate.
- .5 Include in each Alternative costs by Work of Subcontractors whose Work is affected, including costs for modifications to their Work as may be required should the Alternative be accepted.
- .6 Claims for extras to the Contract because of the acceptance of an Alternative will not be accepted.
- .7 The Owner must be notified and approve of any changes to the previously submitted plans for work, drawings provided, or scheduling.

1.2 RELATED WORK

- .1 General Conditions
- .2 Division 01 - General Requirements

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 DESCRIPTION OF WORK

- .1 Payments will be made on the basis of the unit quantities, unit prices and lump sum prices bid on the "Bid and Acceptance Form" submitted with the Tender.
- .2 Payments for the Lump Sum items will be made on the basis of the following:
 - .1 Lump Sum items based on the Schedule of Breakdown Prices offered by the Contractor for use as a basis for progress payment. The Contractor should note that the Owner may refuse to accept any breakdown which he considers to be unbalanced and may require an adjustment to correct any such imbalance, without changing the Total Tender Price.
 - .2 For each Lump Sum item in the Schedule of Prices, the Departmental Representative will, in cooperation with the Contractor estimate the percentage of the item completed at the end of the payment period.
- .3 The prices bid for various items of work, unless specifically noted otherwise, shall include the supply of all labor, Plant, Material and Product equipment necessary to construct the Work in accordance with the specifications.
- .4 The prices bid for supply and installation shall be full compensation for supplying, hauling, installing, cleaning, testing, and placing in service together with all other work subsidiary and incidental thereto for which separate payment is not provided elsewhere.
- .5 The method of measurement of the quantities for payment and the basis for payment will be in accordance with the items described in section 1.3. All measurement will be done by the Departmental Representative using generally accepted field survey methods.
- .6 Other materials on site, whether existing structures, vegetation, topsoil, gravel, sand or other excavated or piled materials, are the property of the Owner or of the owner of the land on which the Work is located. Only those materials specifically noted in the specification or on drawings as belonging to the Contractor shall become the Contractor's property.
- .7 Where there are excess excavated materials, unsuitable materials excavated or materials of any kind that are excavated but not used in the Work, such materials are not the property of the Contractor unless authorized in writing by the Departmental Representative or specified to be disposed of by the Contractor.
- .8 Progress payments will not be made for Material and Product unless they are incorporated into the Work and an updated schedule submitted on a bi-weekly basis to the Departmental Representative.
- .9 Restoration of existing surfaces disturbed by construction to pre-construction or better condition is incidental to the Work unless otherwise specified.

1.2 RELATED REQUIREMENTS

- .1 General Conditions.
- .2 Division 01- General Requirements

- .3 All sections of the Technical Specifications (Div 02 to Div 46).

1.3 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- .1 Mobilization and Demobilization (item A.1)

Work includes the supply and installation of all materials, labour, equipment and plant to maintain access to construction sites, and all costs associated with mobilization and demobilization of the Contractor's material, labour, plant, transportation, storage, bonding, insurance, permits, temporary facilities and all other incidental requirements to complete the works in accordance with the Contract Documents.

Measurement: Field verification of the percentage of work complete as measured by the Departmental Representative.

Payment: Contract lump sum bid for Mobilization and Demobilization. 60% of the lump sum will be included in the first progress payment and the remaining 40% will be included in the final progress payment. The Departmental Representative may at their discretion, recommend partial payment if mobilization or demobilization are not complete prior to issuance of first or final progress payment respectively.

- .2 Dewatering (item A.2)

Work includes the supply, installation, operation and maintenance of all materials and equipment required to dewater excavations to allow for installation of the proposed infrastructure including dykes, cofferdams, drains, sumps, pipes, well points, pumps, hoses, power supply and all other equipment and incidental work required to keep the work area free from all sources of water damage which may affect the work or installation for which payment is not specified elsewhere. Cost to prepare and submit dewatering plan for review by the Departmental Representative to be included in the cost of Dewatering. No additional payment will be made in the event that the Contractor is required to resubmit the dewatering plan due to inadequacy as determined by the Departmental Representative.

Measurement: field measurement of percentage of work completed as accepted and measured by the Departmental Representative.

Payment: Contract lump sum price bid for Dewatering. Percentage associated with payment of Dewatering will be based on percentage of overall project underground infrastructure value installed to date.

- .3 Erosion and Sediment Control (item A.3)

Work includes the supply, installation, operation and maintenance of all materials and equipment required to prevent erosion and prevent sediment from entering bodies of water for the duration of the work including silt fences, stenlogs, straw wattles, silt screens and all other incidental work or equipment for which payment is not specified elsewhere. Cost to prepare and submit Environmental Protection Plan, Sediment and Erosion Control Plan and Spill Response Plan for review by the Departmental Representative to be included in the cost of Erosion and Sediment Control. No additional payment will be made in the event that the Contractor is required to resubmit the required protection plans due to inadequacy as determined by the Departmental Representative.

Measurement: field measurement of percentage of work completed as accepted and measured by the Departmental Representative.

Payment: Contract lump sum price bid for Erosion and Sediment Control. 10% of lump sum price bid will be paid upon submittal and acceptance of the Environmental Protection Plan, Sediment and Erosion Control Plan and Spill Response Plan. 60% of lump sum bid price will be paid upon installation of sediment and erosion control protective measures in accordance with the Sediment and Erosion Control Plan. 30% of lump sum bid price will be paid out on subsequent progress payments based on overall project percentage complete to cover costs associated with maintenance and repair of sediment and erosion control measures.

.4 Clearing and Grubbing (item B.1)

Works include clearing, grubbing, loading, hauling, unloading and disposal of all trees, stumps, roots, logs, brush, rubbish and any other surface litter from the Work site and all other incidental requirements to complete the works in accordance with the Contract Documents.

Measurement: field measurement of percentage of work completed as accepted and measured by the Consultant.

Payment: Contract lump sum price bid for Clearing and Grubbing.

.5 Stripping and Stockpiling Topsoil (items B.2, C.3a)

Works include stripping the existing topsoil over the footprint of the proposed diversion channel, containment berms and containment berm drainage ditch, stockpiling, replacement, grading, spoiling of excess topsoil and all other incidental requirements to complete the works in accordance with the Contract Documents.

Measurement: field measurement on a cubic meter basis as accepted and measured by the Consultant. Volume to be determined by calculating the difference in volume from surveyed cross sections of the existing ground by the Consultant and surveyed cross sections of the stripped ground by the Consultant prior to excavation of the drainage channel, excavation of ditches and placement of the compacted clay fill for containment berms.

Payment: Contract unit price bid for topsoil stripping, stockpiling and replacement.

.6 Excavation (items B.3, C.1b, C.2b, D.1a, D.2a, E.6)

Works include excavation of the proposed diversion, grading, loading, hauling, unloading, disposal of excess material and all other incidental requirements to complete the works in accordance with the Contract Documents.

Measurement: field measurement on a cubic meter basis as accepted and measured by the Consultant. Volume to be determined by calculating the difference in volume from surveyed cross sections of the stripped ground by the Consultant and surveyed cross sections of the diversion channel prior to replacement of the stripped topsoil.

Payment: Contract unit price bid for Common Excavation for Diversion. No separate payment will be made for utility watches, flag persons, or hydro-excavation around

existing utilities or infrastructure. No measurement or payment will be made for excavation, trenching and backfilling required for culvert installations through existing roadways; payment for this to be include din the unit price bid for the corresponding pipe.

- .7 Sub-Grade Compaction, Ditch Excavation, Boulevard Grading (item B.4, B.5, B.11, B.14,C.3b, C.4a,D.1b,D.2b,D.2g)

Works include installation of the containment berm exterior ditches including excavation, grading, loading, hauling, unloading, disposal of excess material and all other incidental requirements to complete the works in accordance with the Contract Documents.

Measurement: field measurement of percentage of work completed as accepted and measured by the Consultant.

Payment: Contract lump sum price bid for Ditch Excavation and Grading.

- .8 Granular Base Course Material (items B.6,B.10,C.1b,C.2b,C.3c,C.4b,D1c,D.2c,D.2g,E.1-3,E.7-11)

Work includes supply, compaction and grading of Granular Base Course Material for culvert crossing restorations, road raising and approaches to grades and thicknesses shown on the design drawings, including hauling, unloading, grading, compaction, testing and all incidental work for which payment is not specified elsewhere.

Measurement: Field measurement on a metric tonne basis accepted and measured by the Consultant.

Payment: Contract unit price bid for Granular Base Course Material.

- .9 Geotextiles (items B.7, C.1c, C2c, C.3e,C.4d,D.1d,D.2d)

Work includes supply and installation of Geotextile between sub-base and granular base course and all incidental work for which payment is not specified elsewhere.

Measurement: Field measurement on a square metre basis accepted and measured by the Consultant.

Payment: Contract unit price bid for Geotextile.

- .10 Asphalt Paving (items B.8, C.1a, C.2a, C.3d,C.4c,D.1e,D.2e))

Work includes the supply and installation of asphaltic concrete patches required to replace damaged asphalt roadways and pathways that require removal to allow for installation of the proposed infrastructure including asphalt, compaction, rolling, pavement marking and all incidental work for which payment is not specified elsewhere.

Measurement: Field measurement on a metric tonne basis accepted and measured by the Consultant.

Payment: Contract unit price bid for Construction of Asphalt Paving. No payment will be made for asphaltic concrete patches required as a result of Contractor carelessness or over excavation as determined by the Consultant.

.11 Concrete Sidewalk, Curb and Gutter (item B.9, B.10, E.8-10)

Work includes supply and installation of concrete sidewalk and curb and gutter to allow for installation of the Works including excavation, shoring, utility crossings, bedding, saw cutting, removal and disposal of existing sidewalk and curb, sub base material, concrete sidewalk, joint cutting, replacement of existing concrete curb and gutter where required, compaction, surface restoration and all incidental work for which payment is not specified elsewhere.

Measurement: Field measurement on a square meter basis of sidewalk and linear metre of curb and gutter installed and measured by the Departmental Representative.

Payment: Contract unit price bid for Sidewalk and Curb and Gutter work.

.12 Culverts (item B.12)

Work includes supply and installation of culverts including excavation, removal of existing pipe for online installations (where required), saw cutting and removal of existing pavement (where required), shoring, utility crossings, bedding, joining, laying, backfilling, compaction, cleaning and all incidental work for which payment is not specified elsewhere.

Measurement: Field measurement on length basis for each size of culvert installed accepted and measured by the Consultant. Measurement for length of culvert installed in a trench will be made horizontally at grade above the centreline of pipe.

Payment: Contract unit price bid for each size of culvert.

.13 Rip Rap (item B.13)

Work includes installation of the rip rap including loading, hauling, bedding, filter fabric, rip rap placement and all incidental work for which payment is not specified elsewhere.

Measurement: field measurement square meter basis accepted and measured by the Consultant.

Payment: Contract unit price bid for Rip Rap.

.14 Bollards (item E.2)

Work includes installation of bollards supplied by Parks Canada and all incidental work for which payment is not specified elsewhere.

Measurement: field measurement for each bollard installed basis accepted and measured by the Consultant.

Payment: Contract unit price bid for Bollards.

.15 Topsoil and Sod (item B.14)

Works include stripping the existing topsoil over the footprint of the proposed diversion channel, containment berms and containment berm drainage ditch, stockpiling, replacement, grading, spoiling of excess topsoil and all other incidental requirements to complete the works in accordance with the Contract Documents.

Measurement: field measurement on a cubic meter basis as accepted and measured by the Consultant. Volume to be determined by calculating the difference in volume from surveyed cross sections of the existing ground by the Consultant and surveyed cross sections of the stripped ground by the Consultant prior to excavation of the drainage channel, excavation of ditches and placement of the compacted clay fill for containment berms.

Payment: Contract unit price bid for topsoil stripping, stockpiling and replacement.

.16 Line Painting (item B.15)

Work includes painting of all parking stalls, painted medians, Wheelchair symbols, cross-walks, and para-stalls and all incidental work for which payment is not specified elsewhere.

Measurement: field measurement for line painting will be by linear meter for parking stalls and per each island, para-stall, cross-walk and Wheelchair symbol as installed basis accepted and measured by the Consultant.

Payment: Contract unit price bid for Parking Stalls, medians, cross-walks and Wheelchair symbols.

.17 Regulatory Signs (item E.1, E.9)

Work includes the install of all regulatory and Parks Canada supplied signs as shown on the design drawings and all incidental work for which payment is not specified elsewhere.

Measurement: field measurement of Regulatory Signs will be per each sign installed as accepted and measured by the Consultant.

Payment: Contract unit price bid for Regulatory Signs.

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 All other specification Sections.

1.2 ADMINISTRATIVE

- .1 The Departmental Representative in discussions with the Contractor will schedule meetings. The Contractor is responsible for coordinating with his sub-contractors, to attend.
- .2 The Departmental Representative will prepare agenda, chair meetings, record minutes, and distribute minutes to all attending parties within five (5) working days after meetings.

1.3 PRECONSTRUCTION MEETING

- .1 Upon award of Contract, Departmental Representative will request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. Meeting time and location will be determined by the Departmental Representative.
- .2 The Owner, Department Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify the Departmental Representative a minimum of five (5) business days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16 – Construction Schedules.
 - .3 Schedule of submission of shop drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .6 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .7 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
 - .8 Acceptance and warranties in accordance with Section 01 78 00 - Closeout Submittals.
 - .9 Monthly progress claims, administrative procedures, photographs, hold backs.
 - .10 Appointment of inspection and testing agencies or firms.
 - .11 Insurances, transcript of policies.
 - .12 Environmental concerns.

1.4 PROGRESS MEETINGS

- .1 After award of Contract and signing of Agreement, job progress meetings will be held on a bi-weekly basis, or as requested by the Departmental Representative, to ensure proper coordination of work.
- .2 Contractor, major Subcontractors, Departmental Representative and Owner will be in attendance.
- .3 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 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Environmental concerns.
 - .12 Review proposed changes for effect on construction schedule and on completion date.
 - .13 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 General Conditions
- .2 All other specification sections

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 Workdays: To be identified and shown as part of Bar (GANTT) Chart submission.
- .5 Duration: number of workdays (not including holidays or other nonworking periods) required to complete activity or other project element.
- .6 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
- .7 Milestone: significant event in project, usually completion of major deliverable.

1.3 REQUIREMENTS

- .1 Ensure Project Schedule and associated Master Plan are practical and remain within specified Contract dates.
- .2 Plan to complete Work in accordance with prescribed milestones and specified Contract dates.
- .3 Limit scheduled task durations to maximum of ten (10) Construction Workdays, to allow for progress reporting and monitoring.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Substantial Performance and Total Performance as defined times of completion are of essence of this contract.

1.4 SUBMITTALS

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

- .2 Submit to Departmental Representative, within ten (10) working days of Award of Contract, Bar (GANTT) Chart as Project Schedule for planning, monitoring and reporting of project progress.
- .3 **The Owner will not approve any Progress Payment until the Project Schedule is submitted to the Departmental Representative for review.**

1.5 PROJECT SCHEDULE

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return submitted Project Schedule within ten (10) working days.
- .3 If submitted Project Schedule is indicated as “revise and resubmit” resubmission required within five (5) working days.
- .4 Accepted Project Schedule is to be used as the baseline for monitoring and reporting on the Work.

1.6 PROJECT SCHEDULE REPORTING

- .1 Prepare and submit for review two (2) working days before the planned bi-weekly Project Meeting an updated Project Schedule reflecting activity changes and completions, as well as activities in progress.
- .2 No Progress Payment will be made without an updated Project Schedule.

1.7 PROJECT MEETINGS

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

Part 1 Products

1.1 NOT USED

- .1 Not used.

Part 2 Execution

2.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Shop drawings.
- .2 Product data, test reports, certificates.
- .3 Manufacturer's instructions and field reports.

1.2 RELATED WORK

- .1 All other specification sections.

1.3 ADMINISTRATIVE

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

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 **Submission of Shop Drawings in electronic format is required.**
- .2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Manitoba, Canada where specifically requested in the specifications. Shop drawings not bearing the required Engineer's stamp will be rejected and returned without being examined.
- .3 The Contractor shall prepare a schedule of the dates for provision, review and return of Shop Drawings.

- .4 The Contractor shall provide Shop Drawings to the Departmental Representative to review in orderly sequence based on the dates for provision.
- .5 The Contractor shall review all Shop Drawings before providing them to the Departmental Representative. The Contractor represents by this review that:
 - .1 The Contractor has determined and verified all applicable field measurements, field construction conditions, product requirements, catalogue numbers and similar data, or will do so, and
 - .2 The Contractor has checked and coordinated each Shop Drawing with the requirements of the Work and of the Contract documents.
- .6 Shop drawings that do not include the stamp, date, and signature of the person responsible for reviewing the shop drawings on behalf of the Contractor before submittal to the Departmental Representative will be rejected and returned without being examined.
- .7 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .8 Adjustments made on shop drawings by the Departmental Representative are not intended to change the Contract Price. If it is deemed that such adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with fabrication or the Work.
- .9 Make changes in shop drawings that the Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify the Departmental Representative in writing of any revisions other than those requested.
- .10 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 samples.
 - .5 Other pertinent data.
- .11 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.

- .2 Layout, showing dimensions, including identified field dimensions, and clearances.
- .3 Setting or erection details.
- .4 Capacities.
- .5 Performance characteristics.
- .6 Standards.
- .7 Relationship to adjacent work.
- .12 Submit product data sheets or brochures electronically for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .13 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 years of date of contract award for project.
- .14 Submit electronic copies of certificates for requirements requested in specification Sections or (one (1) electronic copy, and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract, complete with project name.
- .15 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .16 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by the Departmental Representative, no errors or omissions in compliance with the Contract Documents are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If, however, shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through the same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 No extension of Contract Time will be allowed for delays in the Work that may be caused for Departmental Representative's rejection of shop drawings.

- .21 Shop drawings that contain deviations from the Contract Documents that are not presented to the Departmental Representative in writing as specified in General Condition GC 3.10 will be rejected and returned without being examined.
- .22 Allow 12 business days for Departmental Representative's review of each submission.
- .23 The Departmental Representative's review shall not relieve the Contractor of responsibility for errors or omissions in the Shop Drawings or for meeting all requirements of the Contract Documents.

1.5 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of color digital photography in .jpg format, standard resolution monthly with progress statement as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 8 locations.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Prior to commencement of the Work, provide evidence of compliance with worker's compensation legislation at the Place of the Work, including payments due thereunder.
- .2 Submit transcription of insurance immediately 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 WORK DESCRIPTION

- .1 Health and safety considerations required to ensure that Contractor shows due diligence towards health and safety on construction sites, and meets the requirements of the local Provincial and National legislation.
- .2 The Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with the Workplace Safety and Health Act (Manitoba) and all applicable Federal requirements.

1.2 RELATED SECTIONS

- .1 General Conditions
- .2 All other specification sections (Div 01 to Div 33)

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 Manitoba
 - .1 The Workplace Safety and Health Act, C.C.S.M.C. W210 May 2014 or latest edition.
- .4 All Contractors bidding on this project must possess a valid Certificate of Recognition (COR™) for an accredited occupational health and safety program in accordance with The Workplace Safety and Health Act. Subcontractors with employees doing construction work on this site must show safety program registration verified by either the Manitoba Heavy Construction Association or by the Construction Safety Association in Manitoba.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan, and signed attestation within fifteen (15) calendar days after Award and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.

- .6 Submit WHMIS MSDS - Material Safety Data Sheets to the Departmental Representative.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within three (3) business days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within three (3) business days after receipt of comments from Departmental Representative.
- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

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

1.8 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.9 GENERAL REQUIREMENTS

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

1.10 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.

1.11 COMPLIANCE REQUIREMENTS

- .1 Comply with Manitoba Workplace Safety and Health requirements.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.12 UNFORSEEN HAZARDS

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

1.13 HEALTH AND SAFETY CO-ORDINATOR

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

1.14 POSTING OF DOCUMENTS

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

1.15 CORRECTION OF NON-COMPLIANCE

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

1.16 POWDER ACTUATED DEVICES

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

1.17 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 DESCRIPTION OF WORK

- .1 Environmental procedures required to ensure that the Contractor shows due diligence towards the protection of the Park.

1.2 RELATED SECTIONS

- .1 All other specification sections.

1.3 SUBMITTALS

- .1 Prior to the commencement of construction, the Contractor must provide written confirmation that they have read, understand and will comply with environmental procedures as outlined in this Section 01 35 43-Environmental Procedures and all applicable mitigations measures outlined in the 'Basic Impact Analysis' (BIA) completed for this project (Appendix B).

1.4 NATIONAL PARK REGULATIONS

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

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) Guidelines Order of 2012, subsequent amendments, and Parks Canada's Interim Directive on Implementation of the Canadian Environmental Assessment Act 2012.
- .2 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the work being suspended pending rectification of the issues.

1.6 ENVIRONMENTAL BRIEFING/ MONITORING

- .1 Parks Canada Agency (PCA) will designate an ESO (Environmental Surveillance Officer) who will conduct periodic and unscheduled visits to ensure project operations are being performed in conformance with the Environmental Procedures and to provide guidance 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. The ESO retains the right to halt work or take control under emergency conditions.

- .2 All staff working on the Project site during the construction phase must attend a preconstruction "Environmental Briefing" as described in the BIA, presented by the ESO or alternate designated Parks Canada staff member prior to beginning work on site.

1.7 CONSTRUCTION SITE ACCESS AND PARKING

- .1 Construction equipment and personal vehicles, as well as, staging areas to be restricted to the footprint of the proposed parking lot, existing road or designated staging area as defined by the Departmental Representative.
- .2 Designated staging or lay down areas to be staked on site, approved by the Departmental Representative and ESO. The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers' vehicles or construction machinery and shall instruct workers so that the "footprint" of the project is kept within defined boundaries.

1.8 PROTECTION OF WORK LIMITS

- .1 Work limits will be staked out by the Departmental Representative and the Contractor is to ensure trespass outside these limits does not occur. All methods of site staking/markings to be removed at completion of project, including any additional measures implemented by the Contractor to further delineate work limits.
- .2 No removal of trees or vegetation is to occur without the approval of the Departmental Representative or ESO. No ground disturbance is to occur outside of work limits. Contractor to protect roots of adjacent trees to dripline during any earthwork and avoid unnecessary traffic, dumping and storage of materials over root zones.

1.9 EROSION AND SEDIMENT CONTROL

- .1 The Contractor is to prepare an appropriate Erosion and Sediment Control Plan outlining erosion and sediment control measures to be used, including drawings identifying types and locations, to prevent surface erosion and sediment deposition for the duration of the project. Erosion and Sediment Control Plan to be submitted to the Departmental Representative for review prior to mobilization to site by the Contractor.
- .2 Erosion control measures that prevent sediment from entering any waterway, water body or wetland in the vicinity of the construction site are a critical element of the project and shall be implemented by the Contractor. If necessary, on-site sediment control measures shall be constructed and functional prior to initiating activities.
- .3 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired to the satisfaction of the Departmental Representative and ESO.
- .4 The site will be secured against erosion during any periods of construction inactivity or shutdown. Schedule work to avoid adverse weather and rutting or damage on site due to wet conditions. Sediment and Erosion control products such as erosion control blankets and wattles must be made of 100% biodegradable materials, i.e. jute, sisal or coir fiber, and be certified weed free.
- .5 Phase construction to ensure disturbed areas are restored as soon as possible.
- .6 Erosion and sediment control measures are to remain in place until the completion of the Work and the re-establishment of vegetation in landscaped areas to the satisfaction of the

Departmental Representative. Should all Works be completed prior to vegetation re-establishment to the satisfaction of the Departmental Representative, the Contractor is to Demobilize from site, and Parks Staff will remove remaining erosion and sediment control measures as required. Any cleanup or additional seeding required as a result of Parks Staff removing erosion and sediment control measures will be completed by Parks Staff.

1.10 POLLUTION CONTROL

- .1 The Contractor is to prepare an appropriate Spill Response Plan. Spill Response Plan to be submitted to the Departmental Representative for review prior to mobilization to site by the Contractor.
- .2 The Contractor shall prevent any deleterious or objectionable materials from entering any watercourse. Hazardous or toxic products to be stored on site are to be identified in the spill response plan and stored no closer than 30 metres from watercourses. Any dewatering is to be directed towards a well vegetated area away from watercourses and subject to approval from ESO.
- .3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation.
- .4 The Contractor shall have spill supplies at the construction site and maintained in good working order at all times capable of containing 110% of the largest possible spill related to the work available on site at each location of potential spill. ESO and Departmental Representative to confirm presence of spill kits. Contractor to ensure that all personnel are informed of their location and trained in their use.
- .5 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative and the ESO shall be notified immediately of any spill. If not available, RMNP Dispatch is to be contacted immediately at 1-877-852-3100. All spills over 1L are to be reported.
- .6 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .7 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.
- .8 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for on-site work by methods that are approved by the Departmental Representative or ESO.

1.11 EQUIPMENT MAINTENANCE, FUELLING AND OPERATION

- .1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside Riding Mountain National Park (RMNP) before delivery to the work site.
- .2 All equipment that could potentially be in contact with a watercourse (ie pumps, hoses, nozzles, culverts, heavy equipment) are to undergo an assessment by the ESO to evaluate potential for equipment to be a vector for invasive aquatic species. If cause for concern is

determined by the ESO, any and all equipment that could potentially be in contact with water will be pressure washed or steam cleaned outside of the park boundaries to a temperature and duration specified by the ESO. Procedure is to be observed by ESO or documentation from an approved wash facility are to be submitted prior to arrival on site.

- .3 Equipment fueling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in Section 02 81 01 Hazardous Materials. Spill kits are required in every vehicle with a slip tank.
- .5 The Contractor is to ensure that unnecessary idling of vehicles is avoided.
- .6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the ESO or the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc. anywhere within Riding Mountain National Park.
- .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .8 Fuel containers and lubricant products shall be stored only in secure locations. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight in Riding Mountain National Park.
- .9 When routine cleaning and maintenance of equipment is completed on site during construction, the contractor shall prevent any waste, sediment or debris from entering any new/existing land drainage sewer, wastewater sewer, manholes, catch basins or any watercourse.

1.12 OPERATION OF EQUIPMENT

- .1 Equipment movements shall be restricted to the 'footprint' of the construction area. The work limits shall be identified by stake and ribbon or other methods approved by the Departmental Representative. Unless authorized by the Departmental Representative, activities beyond the work limits are not permitted. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitat or trees and plant communities unless authorized by the Departmental Representative.
- .2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or topsoil) in the trees bordering parking lot work limits.
- .3 When, in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative and ESO.
- .4 Restrict vehicle movements to work limits.

- .5 Workers private vehicles are to remain within the construction footprint.

1.13 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher shall be carried and available for use on each machine.
- .2 Construction equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.
- .3 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented. Fires or burning of waste materials is not permitted.
- .4 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. RMNP Dispatch is to be notified immediately of any fire at 1-877-852-3100. The ESO and the Departmental Representative shall also be notified of any fire immediately.
- .5 Fires or burning of waste materials is not permitted.

1.14 WILDLIFE

- .1 During the Environmental Briefing all personnel shall be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.
- .2 Construction activities is limited to within a half hour of sunrise and half hour before sunset unless otherwise approved by ESO and Departmental Representative to mitigate disturbance to bats.
- .3 If wildlife is observed at or near work site, allow the animal the opportunity to leave the work area. Do not approach or harass wildlife in any way. If potentially dangerous wildlife (eg: bear, cougar, wolf, coyote, elk or moose) persistently enter work area or display aggressive behavior, notify RMNP Dispatch 1-877-852-3100 immediately and vacate area.
- .4 Feeding, baiting, luring or harassing wildlife is strictly prohibited. All garbage and food must be stored in wildlife proof containers or inside of vehicles at all times.

1.15 RELICS AND ANTIQUITIES

- .1 Discovery of any artifacts, relics, antiquities or items of historical interest found on the site shall be reported to the ESO or Departmental Representative immediately. Work is to cease, object to remain as found and Contractor to wait for instructions before proceeding.
- .2 Cultural sensitive features or objects are to be identified by ESO or Departmental Representative and marked where appropriate. Contractor to ensure they are not impacted by construction activities and that all crew members are aware of their location.
- .3 All cultural resources are protected under the National Parks Act and Regulations. Collection, removal, handling or disturbance of cultural resources is strictly prohibited.

1.16 WASTE MATERIALS STORAGE AND REMOVAL

- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing

the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments. Refer to Section 02 81 01 Hazardous Materials.

- .2 All waste (construction, trade, hazardous and domestic) shall be contained and removed in a timely manner from site to appropriate waste landfill sites located outside the park. No waste is to be burned, buried or discarded within the project site or elsewhere in RMNP. Site is to remain in tidy condition at all times.
- .3 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor, maintained in a clean condition and set back from watercourses.

1.17 GRANULAR MATERIAL, TOPSOIL, RIPRAP AND SEEDING

- .1 All topsoil, riprap and granular material used in the construction of the works to be acquired from a clean source to ensure it is free of invasive or non-native plant species. Source to be inspected during the growing season and approved prior to transport to RMNP by ESO.
- .2 Contractor shall provide a minimum of five (5) business days notice for source inspections.

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 General Conditions
- .2 Division 01 - General Requirements

1.2 REFERENCES AND CODES

- .1 The Laws and Regulations of the Province of Manitoba and all applicable Federal laws shall govern.
- .2 The Bidder shall ensure compliance on his part and on the part of all of this Subcontractors with the Manitoba Occupational Health and Safety Act and Regulations thereunder.
- .3 Works to be in accordance with the Canadian Environmental Protection Act.
- .4 Works to be in accordance with the National Parks Act.
- .5 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.
- .6 The attention of the Bidder is drawn to the requirements of the Manitoba Builders' Lien Act and Regulations thereunder.
- .7 Where the Work under this Contract is carried out within the requirements of the Manitoba Public Works Act, the Manitoba Public Works Act shall apply.

1.3 HAZARDOUS MATERIAL DISCOVERY

- .1 Contaminated site condition: If the Contractor encounters or has reasonable grounds to believe that a contaminated site exists, including solid, liquid, gaseous, thermal or radioactive irritant or contaminant, or other hazardous or toxic substance or material, they shall take all reasonable steps, including stopping of Work to ensure that no person suffers injury, sickness or death, and that neither property nor the environment is injured or destroyed as a result of the contaminated site condition. Notify the Departmental Representative immediately in writing.

1.4 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

1.5 BURNING

- .1 Comply with restrictions of federal, provincial and municipal authorities and obtain permits from authorities having jurisdictions.

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 WORK DESCRIPTION

- .1 Inspection and testing, administrative, and enforcement requirements.
- .2 Tests and mix designs.

1.2 RELATED REQUIREMENTS

- .1 Submission of samples to confirm product quality, Section 01 33 00 – Submittals Procedures.
- .2 Material and workmanship quality, reference standards, Section 01 61 00 - Common Product Requirements.

1.3 REVIEW OF THE WORK

- .1 Refer to General Condition

1.4 INDEPENDENT TESTING AGENCIES

- .1 Independent Testing Agencies will be engaged by the Contractor for the purpose of quality control and/or testing portions of the Work. The testing requirements include, but are not limited to, the following:
 - .1 Sieve analysis of sands and aggregates to be supplied for the work
 - .2 Aggregates and mix design for concrete
 - .3 Standard Proctor Density curves for all backfill and granular material
 - .4 Compaction control tests for all bedding, backfill and granular material
 - .5 Spot density tests of material included in the work
 - .6 Any product testing that is required and is specified under various sections of the specifications.
- .2 Costs for independent testing agencies shall be included in the bid price.
- .3 Provide all necessary equipment required for executing quality control and testing by the appointed agencies.
- .4 Employment of quality control/testing agencies does not relax the responsibility to perform Work in accordance with the Contract Documents.
- .5 If defects are revealed during quality control and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defects and irregularities as advised by Departmental Representative at no cost to the Owner. Pay costs for retesting and re-inspection.

1.5 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to the Work, offsite manufacturing, and fabrication plants.
- .2 Cooperate to provide reasonable facilities for such access.

1.6 PROCEDURES

- .1 Notify the appropriate agency and Departmental Representative in advance of the requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing as specifically requested in specification Sections or as may be requested by Departmental Representative. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 DEFECTIVE WORK

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

1.8 REPORTS

- .1 Submit electronic copies of quality control and test reports directly from the testing agency promptly to the Departmental Representative.
- .2 Provide copies to Subcontractor of work being inspected/tested and manufacturer/fabricator of material being inspected/tested.

1.9 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested. Cost associated with the mix design should be included in the bid price.
- .2 The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by the Law of the Place of Work shall be appraised by the Departmental Representative and may be authorized as recoverable.

1.10 QUALITY ASSURANCE OF GRANULAR MATERIAL

- .1 Submit to Departmental Representative. A list of sources of material including sand, pit-run gravel and Granular Base Course – "A" base.
- .2 Provide samples to qualified geotechnical testing agency to perform sieve analysis and Standard Proctor tests for preliminary approval of aggregate materials. Contractor shall be responsible for all aggregate testing costs.

1.11 MINIMUM QUALITY CONTROL TEST FREQUENCIES FOR COMPACTION

- .1 The following frequencies of testing are the minimum required. Ensure that the work conforms to the requirements of the specifications regardless of the minimum number specified.
- .2 Provide moisture/density curves for each type of material from each source of material to be compacted to a specified density.
- .3 Field Densities:
 - .1 Subgrade Compaction – Minimum of three (3) tests for compacted subgrade under Granular “A” Base to a minimum of 95% Standard Proctor Density.
 - .2 Granular Base Course - “A” Base – Minimum of three (3) tests for compacted Granular “A” Base to a minimum of 98% Standard Proctor Density.
 - .3 Compacted Select Granular Backfill – Minimum of one (1) test per 100 linear meters of compacted select granular backfill to a minimum of 98% Standard Proctor Density.

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 Temporary utilities.

1.2 INSTALLATION AND REMOVAL

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

1.3 SUBMITTALS

- .1 Provide Submittals in accordance with Section 01 33 00 – Submittal Procedure.

1.4 INSTALLATION AND REMOVAL

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

1.5 DEWATERING

- .1 Contractor to prepare dewatering plan and provide temporary dewatering equipment required to install the Works in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.6 WATER SUPPLY

- .1 Any use of water from Owner's existing building service for construction use will be charged to the Contractor.

1.7 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture and condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

- .1 Conform with all applicable codes and standards.
- .2 Enforce safe practices.
- .3 Prevent abuse of services.
- .4 Prevent damage to finishes.
- .5 Vent direct-fired combustion units to outside.
- .5 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.8 TEMPORARY POWER AND LIGHT

- .1 Provide and pay for temporary power required during construction for temporary lighting and the operating of power tools.
- .2 Temporary power for electric cranes and other equipment requiring in excess of the supply required for temporary lighting and power tools is the responsibility of Contractor.

1.9 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax and data (Internet) hook up, lines and equipment necessary for own use.

1.10 FIRE PROTECTION

- .1 Provide and maintain adequate temporary fire protection equipment during performance of Work, as required by local municipal requirement, insurance companies having jurisdiction and governing Codes, regulations and By-Laws.
- .2 Burning rubbish and construction waste materials is not permitted on 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 WORK DESCRIPTION

- .1 Temporary facilities.
- .2 Construction aids.
- .3 Office and sheds.
- .4 Parking.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-Z321, Signs and Symbols for the Occupational Environment.
 - .2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction Methods of Test and Standard Practices for Concrete.
 - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

1.3 SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

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

1.5 HOISTING

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists and cranes shall be operated by qualified operator.

1.6 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.7 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide and maintain adequate access to project site.
- .2 Build and maintain temporary roads, sidewalk crossings, ramps and construction runways to maintain access, and snow removal during period of Work. The Contractor must submit information and specify these locations and methodology and obtain pre-approval from the Departmental Representative.
- .3 Maintain and protect traffic on affected roads during construction period expect as otherwise specifically directed by Owner or Departmental Representative.
- .4 The Contractor is solely responsible for providing temporary signage, barricades, flag persons or other measures deemed necessary to provide safe movement of vehicular and pedestrian traffic.
- .5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor is responsible for maintaining existing access roads and parking lot for the duration of the Contract and repair of damage to roads cause by construction operations. Maintain a detailed photographic record of road conditions prior to commencement of work.
- .6 Provide snow removal during the period of work.

1.8 CONSTRUCTION PARKING

- .1 Parking will be permitted on site within construction area provided it does not disrupt performance of Work.

1.9 SECURITY

- .1 Site security personnel (watchmen), is the Contractor's option.

1.10 SITE OFFICE

- .1 Provide office heat to 22 degrees C and cooling to 25 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 office.
- .4 Maintain offices in clean condition. Clean at a minimum on a weekly basis.
- .5 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

1.11 EQUIPMENT, TOOL AND MATERIAL STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 Sanitary facilities within existing buildings will not be used by construction workers.

1.13 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by Departmental Representative.
- .2 Construction sign size to be approved by Departmental Representative and shall be constructed of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.
- .3 Indicate on sign, name of Owner, Funding Agencies, Departmental Representative, Contractor and Subcontractors.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.
- .5 Provide project identification site sign as required.
- .6 Locate project identification sign as directed by Departmental Representative.
- .7 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

1.14 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways to maintain roadway in clean condition.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.
- .5 Meet the requirements stated in Section 01 74 11 – Cleaning shall also apply.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENT CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff for works near waterways.

- .2 All erosion control blankets, straw wattles, stenlogs and similar products utilized shall be made of 100% biodegradable materials.
- .3 Inspect, repair, and maintain erosion and sedimentation control measures during construction.
- .4 Prior to demobilization, Contractor to coordinate site walkthrough with Departmental Representative to ensure site restoration is in suitable condition. Upon revegetation, Parks Canada Staff will remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General

1.1 WORK DESCRIPTION

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.

1.2 RELATED WORK

- .1 General Conditions
- .2 Division 01 - General Requirements
- .3 All Technical specification sections

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-O121, Douglas Fir Plywood.
 - .2 CAN/CSA O141 - Softwood Lumber.
 - .3 CSA O151 - Canadian Softwood Plywood.

1.4 INSTALLATION AND REMOVAL

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

1.5 HOARDING AND SITE FENCING

- .1 Erect temporary snow fence around open excavations or any other areas that may pose risk to the public at the end of every working day.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.6 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard railings and barricades around deep excavations and open shafts.
- .2 Provide as recommended by local governing authorities.

1.7 ACCESS TO SITE

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

1.8 TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and maintain access to existing facilities and residents.

1.9 FIRE ROUTES

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

1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect adjacent private and public property from damage during the performance of work.
- .2 Be responsible for all damage incurred.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Meet requirements stated in Section 01 74 21 – Waste Management and Disposal.

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 WORK DESCRIPTION

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Procedures for product substitution.
- .3 Manufacturer's instructions.
- .4 Quality of Work, coordination and fastenings.

1.2 RELATED WORK

- .1 General Conditions
- .2 Division 01 - General Requirements
- .3 All Technical specifications sections

1.3 REFERENCE STANDARDS

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.4 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the Works.

1.5 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of materials, equipment or articles are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In the event of failure to notify the Departmental Representative at commencement of Work, and should it subsequently appear that Work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 SUBSTITUTIONS

- .1 The Work is based on the Materials and methods specified in the specifications.
- .2 Should substitutions be required because of unavailability the Departmental Representative will consider proposals to substitute specified products/materials with alternate products/materials.
- .3 Substitutions are not allowed unless application has been made to and prior approval has been granted by the Departmental Representative in writing.
- .4 Each proposal must:
 - .1 Include sufficient information in the form of product data, specifications, drawings, and other manufacturer's data to enable the Departmental Representative to properly evaluate the proposal.
 - .2 Identify changes required in the applicable Work which would become necessary to accommodate the substitute.
- .5 The Departmental Representative reserves the right to accept or reject any proposal without prejudice for any reason whatsoever and reserves the right to disclose or not to disclose his reasons for such rejection.
- .6 In submittal of a request for substitution it is hereby understood that the person or entity submitting the request is certifying that the proposed substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule.

1.7 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.

- .5 Remove and replace damaged products at own expense and to the satisfaction of the Departmental Representative.

1.8 TRANSPORTATION

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

1.9 MANUFACTURERS' INSTRUCTIONS

- .1 Unless otherwise indicated in the specifications, install or erect all products in accordance with manufacturer's recommendations. Do not rely on labels or enclosures that are provided with products. Obtain instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing of any conflicts between the Specifications and manufacturer's instructions so that the Departmental Representative may establish the course of action to follow.
- .3 Improper installation or erection of products due to failure in complying with these requirements authorizes the Departmental Representative to require any removal and re-installation that may be considered necessary, at no increases in Contract Price or Contract Time.

1.10 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Enforce discipline and good order among workers.
- .3 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative , whose decision is final.

1.11 COORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Ensure Work of various Subcontractors does not conflict or create interference.
- .3 Supply all items required to be built in as and when required, together with templates, measurements and shop drawings.
- .4 Ensure all workers examine the drawings and specifications covering the Work of others that may affect the performance of their own Work. Examine the Work of others and report to the Departmental Representative, in writing, any defects, or deficiencies that may affect the Work. In the absence of any report, the Contractor shall be held to have waived all claims for damage to or defects in such Work.

1.12 CONCEALMENT

- .1 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.13 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Protect Work completed or in progress.

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

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 General Conditions
- .2 Division 01 – General Requirements
- .3 All Technical specification sections

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products, debris and wildlife attractants, other than that caused by Owner or other Contractors not associated with this project.
- .2 Reuse and recycle the maximum amount of waste as possible.
- .3 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site a minimum of two (2) bear proof dump containers for collection of waste materials and debris. Dispose of waste materials and debris off site.
- .6 Clean interior/exterior Work areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
 - .1 The Owner will not perform any cleaning operations prior to the Contractor starting the Work or at any time during the progress of the Work. The Contractor is responsible for all cleaning operations.
- .7 Store volatile waste in anti- spill covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 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 other than that caused by Owner or other Contractors not associated with the project.

- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Pay all disposal / dumping/ recycling/ tipping fees for waste disposal.
- .8 Sweep and wash clean paved areas. Clean debris and dirt from catch basins and manholes.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Meet the requirements stated in Section 01 74 21 – Waste Management and Disposal.

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 WASTE MANAGEMENT OBJECTIVES

- .1 Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for recycling. Waste disposal in landfills or incinerators shall be minimized. This means careful recycling of job site waste.
- .2 The Contractor shall:
 - .1 Institute construction waste reduction practices.
 - .2 Effect optimum control of construction waste.
 - .3 Transport and dispose of waste materials that are not identified to be recycled at permitted landfill facilities.

1.2 RELATED WORK

- .1 General Conditions
- .2 All specification sections

1.3 WASTE MANAGEMENT PLAN

- .1 Waste Management Plan: The Contractor is encouraged to implement a waste management plan to maximize recycling of construction wastes. As a minimum, recycling of the following designated materials are recommended.
 - .1 Old corrugated cardboard, paper and packaging.
 - .2 Clean dimensional wood, palette wood.
 - .3 Concrete/Concrete Block/Asphalt.
 - .4 Scrap metals.
 - .5 Glass and plastics.
 - .6 Beverage containers.
 - .7 Land clearing debris.

1.4 HAZARDOUS WASTE

- .1 Separate waste defined as hazardous from recyclable and reusable materials. Place hazardous materials in designated containers.
- .2 Handle, transport and dispose hazardous materials not scheduled for reuse or recycling in accordance with applicable local, Provincial/Territorial and National regulations.
- .3 Unused chemicals, admixtures, additives, sealants, caulking, and surface coating materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .4 Divert hazardous materials from landfill and dispose of at official hazardous material collections site.
- .5 Ensure emptied containers are sealed and stored safely for disposal away from children.

- .6 Plastic containers from toxic and hazardous materials are not recyclable and must not be diverted for recycling with other plastic materials. Do not dispose of empty containers with plastic materials destined for recycling.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Protect, stockpile, store and catalogue salvaged items.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .4 Protect structural components not removed for demolition from movement or damage.
- .5 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .6 Protect surface drainage from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.

1.6 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste or volatile materials into waterways, storm, or sanitary sewers.

1.7 USE OF SITE AND FACILITIES

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

1.8 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 APPLICATION

- .1 Do Work in compliance with Waste Management Plan.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste material on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

Part 1 General

1.1 WORK DESCRIPTION

- .1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 RELATED SECTIONS

- .1 General Conditions.
- .2 Division 01 – General Requirements
- .3 Section 01 78 00 - Closeout Submittals.

1.3 INSPECTION AND DECLARATION FOR SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Contractor's Inspection: prior to application for Certificate of Substantial Performance of the Work, the Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made and that the site is clean and in condition ready for public use.
 - .2 Request Departmental Representative's Inspection.
- .2 Inspection by Departmental Representative: The Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Departmental Representative shall prepare a list of defects deficiencies and provide a signed copy to the Contractor.
- .3 Contractor shall correct Work accordingly.
- .4 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance of the Work.
- .5 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .6 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with General Conditions.

1.4 SITE CLEANUP

- .1 Refer to requirements in Section 01 52 00 – Construction Facilities and Section 01 74 00 – Cleaning.

1.5 INSPECTION AND DECLARATION FOR FINAL COMPLETION

- .1 When satisfied that the entire work is complete, make a final inspection of the Work to ensure that it is complete.
- .2 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Works have been tested and are fully operational.
 - .4 Premises are clean.
 - .5 Work is complete and ready for Final Inspection.
- .3 Final Inspection: when items noted above are completed, request final inspection of Work by Owner, Departmental Representative, and Contractor. The Departmental Representative's final review of the Work will be completed within 10 working days of the Departmental Representative's receipt of the written request from the Contractor. The final review will constitute the review precedent to the issuance of the Final Certificate for Payment.
- .4 The Departmental Representative will list defects or deficiencies determined by this review, and will provide a copy to the Contractor. The list will be recognized as a final list for acceptance of the Work under the Contract. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection, in writing.
- .5 If a re-inspection is required Departmental Representative shall conduct the re-inspection within seven days of date of the request. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection. If Work is deemed complete by the Departmental Representative submit invoice for final payment.
- .6 Final Payment: When Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to General Conditions.

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 WORK DESCRIPTION

- .1 Test reports.
- .2 Warranties.

1.2 RELATED SECTIONS

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

1.3 SUBMITTALS

- .1 Prepare and submit all testing reports including compaction, density, standard proctor, sieve analysis, televising and all other test reports outlined in this specification

1.4 WARRANTIES

- .1 Conduct joint 12-month warranty inspection, measured from time of Substantial Performance by the Departmental Representative.
- .2 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

DIVISION 02

EXISTING CONDITIONS

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 41 00 – Regulatory Requirements

1.2 REFERENCES

- .1 Reports:
 - .1 Remediation of Hydrocarbon Impacted Soil Riding Mountain National Park Townsite Washroom Wasagaming, Manitoba Final Report, March 2011 prepared by KGS Group.
 - .2 Phase III Environmental Site Assessment West Lift Station, Riding Mountain National Park – Wasagaming, Manitoba, March 2010 prepared by AECOM.

1.3 POTENTIAL CONTAMINATED SOIL

- .1 Through previous site assessments and remediation project, there is potential for encountering soil contaminated by hydrocarbons at various locations to complete the Work. These areas have been identified by Parks to be the area to the west of the existing West lift station and the Townsite Washroom. Proposed Ominnik Path work and dump station decommissioning work may be impacted.
- .2 Previous testing and remediation measures can be found in the reports referenced in this specification. Potential Bidders can obtain electronic versions of the referenced reports upon written request to the Departmental Representative.
- .3 The contractor shall take care in locating any existing liners or other remediation measures already in place and avoid damaging them. Any damage to existing liners or other remediation measures will be repaired/replaced at the expense of the Contractor.
- .4 A contaminated site condition exists when a solid, liquid, gaseous, thermal or radioactive irritant or contaminant, or other hazardous or toxic substance or material, including moulds and other forms of fungi, is present at the site of the Work to an extent that constitutes a hazard, or potential hazard, to the environment, property, or the health or safety of any person.
- .5 If the Contractor encounters a contaminated site condition of which the Contractor is not aware about or about which the Contractor has not been advised, or if the Contractor has reasonable grounds to believe that such a site condition exists at the site of the Work, the Contractor shall:
 - .1 Take all reasonable steps, including stopping the Work, to ensure that no person suffers injury, sickness or death, and that neither property nor the environment is injured or destroyed as a result of the contaminated site condition;
 - .2 Immediately notify the Departmental Representative of the circumstances in writing; and
 - .3 Take all reasonable steps to minimize additional costs that may accrue as a result of any work stoppage.

- .6 Upon receipt of a notification from the Contractor, the Departmental Representative shall promptly contact the Owner, and the Owner will determine whether a contaminated site condition exists, and shall notify the Contractor in writing of any action to be taken, or work to be performed, by the Contractor as a result of the Owner's determination.
- .7 If the Contractor's services are required by the Owner, the Contractor shall follow the direction of the Owner with regard to any excavation, treatment, removal and disposal of any polluting substance or material.
- .8 The Owner, at the Owner's sole discretion, may enlist the services of experts and specialty contractors to assist in determining the existence of, and the extent and treatment of contaminated site conditions, and the Contractor shall allow them access and co-operate with them in the carrying out of their duties and obligations.

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 33 00 – Submittal Procedures.
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 01 61 00 – Common Product Requirements.

1.2 REFERENCES

- .1 Definitions:
 - .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .2 Reference Standards:
 - .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
 - .2 Department of Justice Canada (Jus)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act).
 - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
 - .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .4 National Research Council Canada Institute for Research in Construction (NRC-IRC)
 - .1 National Fire Code of Canada-2010.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00-Product Requirements and with manufacturer's written instructions.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:

- .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
- .5 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
- .6 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
- .7 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
- .8 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .9 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
 - .6 Store hazardous materials and wastes in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment that is capable of dealing with 110% of the largest potential spill. See 1.10 Pollution Control under Section 01 35 43 Environmental Procedures.
 - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
 - .11 When hazardous waste is generated on site:

- .1 Co-ordinate transportation and disposal with Departmental Representative.
- .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
- .3 Use licensed carrier authorized by provincial authorities to accept subject material.
- .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
- .5 Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.
- .6 Only trained personnel handle, offer for transport, or transport dangerous goods.
- .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
- .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
- .12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .13 Report spills or accidents immediately to RMNP Dispatch at 1-877-852-3100, as well as, Departmental Representative and ESO. All spills over 1L are to be reported.

Part 2 Products

2.1 MATERIALS

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

Part 3 Execution

3.1 CLEANING

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

END OF SECTION

DIVISION 31

EARTHWORK

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 MEASUREMENT PROCEDURES

- .1 Measurement shall be in accordance with Section 1 29 00- Measurement and Payment.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 The Contractor will be responsible for all costs associated with generating and stockpiling the granular materials.
 - .2 The Contractor is responsible for all permits, licenses and royalties for any other excavated material.
 - .3 Source of materials to be incorporated into work or stockpiled require approval.
 - .4 If, in the opinion of the Departmental Representative, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, procure an alternative source of demonstrate that material source in questions can be processed to meet specified requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.
- .3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

Part 2 Products

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

2.2 GRADATION DESIGNATIONS

.1 Compact Select Granular Backfill

- .1 Compact Select Granular Backfill shall be maximum size 75 mm natural material, not manufactured, complying closely to the following gradation from a location approved by the Departmental Representative.

Sieve Size	Percent Passing
75 mm	100
25 mm	80 - 100
4.75 mm	40 - 70
75 micro m	0 - 15

.2 Bedding Sand (Class B)

- .1 Sand shall be dry, unfrozen, fine granular material, maximum size 9.5 mm complying with the following gradation:

Sieve Size	Percent Passing
9.5 mm	100
75 micro m	8 max.

.3 Granular Base Course – “A” Base

- .1 “A” Base shall be maximum size 19 mm granular material complying with the following gradation:

Sieve Size	Percent Passing
19 mm	100
12.5 mm	75 - 90
4.75 mm	40 - 70
425 um	10 - 30
75 um	8 – 15

- .2 Min. crush count shall be 35% and is defined as the percentage by weight of aggregate particles retained on a 4.75 mm sieve which have at least one freshly fractured face.
- .3 Max. Los Angeles abrasion loss shall be 45% to ASTM test procedures.
- .4 Max. shale content shall be 12% and is defined as the percent by weight of the particles retained on a 4.75 mm sieve that are shale particles.

.4 Granular Sub-Base Material

- .1 Granular sub-base material shall be well graded granular material complying with the following gradation:

Sieve Size	Percent Passing
50 mm	100
4.75 mm	25 - 60
75 um	4 – 15

- .2 Other properties as follows:

- .1 Los Angeles degradation maximum loss by mass of 40 % for 50mm sub-base tested in accordance with grading A of ASTM C131.

2.3 SOURCE QUALITY CONTROL

- .1 Provide Departmental Representative sieve analysis and Standard Proctor test results of all aggregate gradations identified in this specifications to be used for the Works in accordance with Section 01 45 00 – Quality Control.
- .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .3 Advise Departmental Representative 4 weeks minimum in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 PREPARATION

- .1 Aggregate source preparation:
 - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials.
 - .2 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 - .3 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
 - .4 Trim off and dress slopes of waste material piles and leave site in neat condition.
 - .5 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.
- .2 Processing:
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .3 Stockpiling:
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 m for coarse aggregate and base course materials.
 - .2 Maximum 2.0 m for fine aggregate and sub-base materials.
 - .3 Maximum 1.5 m for other materials.
- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.

3.3 PLACEMENT AND COMPACTION

- .1 Granular Sub-base and Base Course shall be placed and compacted in lifts not exceeding 150 mm and shall be compacted using pneumatic tired rollers or other equipment approved by the Departmental Representative.
- .2 Water shall be added as required to ensure aggregate compaction is at the optimum moisture content.
- .3 Each layer shall be compacted to a minimum density of 98% standard proctor density. The Contractor shall not place additional material on a compacted layer until the moisture content of the layer is at or below optimum.
- .4 Placement and compaction of aggregate material for trench backfill shall be in accordance with Section 31 23 33.01 Excavating, Trenching and Backfilling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 31 14 13 – Soil Stripping and Stockpiling
- .3 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 MEASUREMENT PROCEDURES

- .1 Measurement and Payment for clearing and grubbing shall be included with the construction of the associated underground works for which clearing and grubbing is required.

1.3 REFERENCES

- .1 Abide by the laws and regulations of the Province of Manitoba and Parks Canada particularly with regard to fire regulations and public safety.
- .2 Observe regulations of Manitoba Conservation and Parks Canada.
- .3 The regulations of the Manitoba Workplace Safety and Health, and Parks Canada apply to the work in this section.

1.4 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 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 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.
- .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
- .5 Grubbing consists of excavation and disposal of stumps and roots to not less than specified depth below existing ground surface.

1.5 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses and root systems of trees which are to remain.
 - .1 Repair damaged items to approval of Departmental Representative

- .2 Replace trees designated to remain, if damaged, as directed by Departmental Representative. Excavations shall be carried out in such a manner so as to minimize damage to existing root systems for trees designated to remain. Roots over 50mm in diameter that must be cut to facilitate an excavation shall be neatly pruned with a saw prior to excavation and coated with an appropriate wound dressing to prevent infection.

Part 2 Products

2.1 NOT USED

- .1 Not Used

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures in accordance with approved Erosion and Sediment Control Plan to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.

3.2 PREPARATION

- .1 Inspect site and verify with Departmental Representative limits of Clearing and Grubbing and items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify Departmental Representative in ample time to minimize interruption of service.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and walks free of dirt and debris.

3.3 CLEARING

- .1 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 as directed by Departmental Representative, 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 Departmental Representative.
- .4 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

3.4 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.

3.5 REMOVAL AND DISPOSAL

- .1 Dispose of cleared and grubbed materials off site at an approved disposal location determined by the Contractor.
- .2 Cut timber greater than 125 mm diameter into 3000 mm lengths and stockpile as indicated. Stockpiled timber becomes property of Departmental Representative.
- .3 Remove diseased trees identified by Departmental Representative and dispose of this material to approval of Departmental Representative.

3.6 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for stripping of topsoil to approval of Departmental Representative.

3.7 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 31 11 00 – Clearing and Grubbing
- .3 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .4 Section 32 91 19.13 – Topsoil Placement and Grading

1.2 MEASUREMENT PROCEDURES

- .1 Measurement shall be in accordance with Section 01 29 00 - Measurement and Payment.

1.3 REFERENCES

- .1 Abide by Federal and Provincial Government Regulations with regards to stream crossings, diversions or alterations to drainage patterns.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures in accordance with approved Erosion and Sediment Control Plan to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.

3.2 STRIPPING OF TOPSOIL

- .1 All areas to be excavated are to have topsoil stripped and stockpiled.
- .2 Ensure that procedures are conducted in accordance with applicable Federal and Provincial requirements.
- .3 Remove topsoil before construction procedures commence to avoid compaction of topsoil.
- .4 Handle topsoil only when it is dry and warm.
- .5 Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation by alternative disposal.

- .6 Areas to be stripped are to be cleared and grubbed where required as directed by the Departmental Representative in accordance with Section 31 11 00 – Clearing and Grubbing.
- .7 Strip topsoil to minimum 0.3 m.
 - .1 Avoid mixing topsoil with subsoil.
- .8 Pile topsoil in berms in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2.5 - 3 m.
- .9 Dispose of unused topsoil in location as indicated by Departmental Representative.
- .10 Protect stockpiles from contamination and compaction. Implement ground protection underneath stripped, excavated or stockpiled materials.

3.3 PREPARATION OF GRADE

- .1 Verify that grades are correct and notify Departmental Representative if discrepancies occur.

3.4 PLACING OF TOPSOIL

- .1 Place topsoil in accordance with section 32 91 19.13 – Topsoil Placement and Grading.

3.5 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .2 Section 32 91 19.13 – Topsoil Placement and Grading.

1.2 MEASUREMENT PROCEDURES

- .1 Measurement shall be in accordance with Section 01 29 00 - Measurement and Payment.

1.3 REFERENCES

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

1.4 EXISTING CONDITIONS

- .1 Known underground and surface utility lines and buried objects are as indicated on site plan.
- .2 Refer to dewatering in Section 31 23 33.01 - Excavating, Trenching and Backfilling.

Part 2 Products

2.1 MATERIALS

- .1 Fill materials in accordance with of Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Excavated or graded material existing on site 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 of substrate previously installed under other Sections or Contracts are acceptable for rough grading installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 STRIPPING OF TOPSOIL

- .1 Topsoil to be stripped and stockpiled in accordance with section 31 14 13 – Soil Stripping and Stockpiling.

3.3 GRADING

- .1 Grade to landscaped areas, ditches, swales and granular surface areas to elevations as indicated on the design drawings.
- .2 Rip rap for swales where required to be in accordance with Section 31 37 00 – Rip Rap.
- .3 Rough grade to 100 mm below finished grade for landscaped areas to allow for placement of topsoil and seeding. Topsoil placement and grading to be in accordance with section 32 91 19.13 - Topsoil Placement and Grading.
- .4 Grade ditches to depth required for maximum run-off.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm minimum before placing fill over existing ground. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .6 Compacted Clay fill to be in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .7 Compact filled and disturbed areas to Standard Proctor Density, as follows:
 - .1 85% under landscaped areas.
 - .2 98% under paved and walk areas.
- .8 Do not disturb soil within branch spread of trees or shrubs to remain.

3.4 CLEANING

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

3.5 PROTECTION

- .1 Protect existing fencing, trees, landscaping, 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 REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 31 05 16 – Aggregate Materials.
- .3 Section 31 11 00 – Clearing and Grubbing.
- .4 Section 31 14 13 – Soil Stripping and Stockpiling.
- .5 Section 31 22 13 – Grading.
- .6 Section 33 05 16 – Manholes and Catch Basin Structures.
- .7 Section 33 41 00 – Storm Utility Drains.

1.2 MEASUREMENT PROCEDURES

- .1 Measurement shall be in accordance with Section 01 29 00 - Measurement and Payment.

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of surplus excavated material as directed by the Departmental Representative.
- .2 Drill cuttings and/or spent drilling fluids must be collected and removed from site and properly disposed of at the cost of the Contractor.

1.5 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

- .3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
- .4 Prior to beginning excavation Work, notify applicable Departmental Representative and authorities having jurisdiction to establish location and state of use of buried utilities and structures.
- .5 Confirm locations of buried utilities by careful soft digging or soil hydrovac methods.
- .6 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
- .7 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative.
- .8 Record location of maintained, re-routed and abandoned underground lines.
- .9 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

1.6 DEFINITIONS

- .1 Excavation will include trenches and shafts.
- .2 Shafts means a vertical or inclined opening excavated below ground level.
- .3 Trench means an excavation having a depth width measured at the bottom.
- .4 Shoring will include bracing, sheeting, planking, circular steel sleeves and trench cages.
- .5 Trenchless installation methods are methods of installing pipe inside a hole that has been made between shafts by coring, horizontal drilling, jacking, tunneling or similar methods with minimal excavation and surface disruption.

Part 2 Products

2.1 MATERIALS

- .1 For granular bedding and backfill material requirements, refer to Section 31 05 16 - Aggregate Materials.
- .2 Compacted common backfill shall consist of unfrozen in-situ material excavated from the trench with no stones or lumps exceeding 150 mm in diameter. Organic material, Silty material or other unsuitable material as determined by the Departmental Representative shall not be used for compacted common backfill material.

- .3 Compacted clay fill shall consist of unfrozen in-situ clay material excavated from the trench with no stones or lumps exceeding 150 mm in diameter. Compacted clay fill shall be free of deleterious materials such as roots, organic material, ice, snow, or other unsuitable materials. In the event that suitable or sufficient quantity of clay material is not available from proposed excavations, Contractor shall import suitable clay fill material as approved by the Departmental Representative where clay fill is required.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures in accordance with approved Erosion and Sediment Control Plan to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.

3.2 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3 PREPARATION/PROTECTION

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .3 Protect buried services that are required to remain undisturbed.

3.4 STRIPPING OF TOPSOIL

- .1 All areas to be excavated to be stripped in accordance with Section 31 14 13 - Soil Stripping and Stockpiling.

3.5 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative.
 - .1 Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.
- .4 Implement ground protection underneath stripped, excavated or stockpiled materials.

3.6 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated on the design drawings.
- .2 Install underground infrastructure by trenchless installation methods where specified. Where field conditions are such that underground infrastructure cannot be installed using trenchless methods, install underground infrastructure in a trench using the class of backfill specified for the installation location after receiving written approval from the Departmental Representative.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Excavation of shafts to be kept to a minimum as pipe installation shall be installed by trenchless methods.
- .5 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
 - .1 Implement ground protection underneath striped, excavator or stockpiled materials.
 - .2 Excavations shall be excavated with walls as nearly vertical as possible, and with shoring or bracing, where required. Bracing and shoring shall be constructed at the Contractor's expense and in accordance with current standards. Placing and removal of shoring, bracing, sheet piling or cages shall be undertaken in a manner that permits proper backfilling.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material off site or as directed by the Departmental Representative.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Departmental Representative when bottom of excavation is reached.
- .12 Obtain Departmental Representative approval of completed excavation.
- .13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .14 Correct unauthorized over-excavation as follows:
 - .1 Fill areas with compacted select granular backfill material as defined in section 31 05 16 – Aggregate Materials.
- .15 Hand trim, make firm and remove loose material and debris from excavations.
- .16 Were required, saw cut and removed existing pavement to allow for excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.7 SHORING

- .1 Use suitable type of shoring for soil conditions.
- .2 Provide shoring design stamped, signed and dated by a Professional Engineer experienced in shoring design and licensed to practice in the Province of Manitoba when shoring is required.
- .3 Install shoring in a manner to support sides of excavation and prevent ground movement that may damage pipes and structures being constructed and cause damage to existing adjacent pavements, buildings and other structures.
- .4 Use type or method of shoring that will not disturb the compacted foundation and bedding when being removed.
- .5 Arrange with the Professional Engineer who designed the shoring system to inspect the shoring system during construction and certify, in writing to the Departmental Representative, that construction is in conformance with the approved design.
- .6 Leave the shoring system in place until such time as the Professional Engineer who designed the shoring system has provided written approval to remove. Provide a copy of the written approval to the Departmental Representative before removal.
- .7 Remove shoring from excavations as backfilling proceeds unless otherwise indicated in the Specifications, or directed by the Departmental Representative to leave shoring permanently in place. Cut-off shoring permanently left in place 1.2 metres below grade unless otherwise indicated in the Specifications or directed by the Departmental Representative.
- .8 Repair shoring, boulevards, pipes, utilities and structures as directed by the Departmental Representative that are damaged or disturbed by shoring failure or when removing shoring.

3.8 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below:
 - .1 Compact Select Granular Backfill – Where this class of backfill is specified, the trench shall be backfilled entirely with select granular backfill, in accordance with Section 31 05 16 – Aggregate Material, in layers no greater than 150 mm thick. Compact each layer with a vibratory compactor to at least 98% of Standard Proctor Density. Obtain approval from the Departmental Representative before proceeding with the next layer.
 - .2 Compacted Common Backfill – Backfill the excavation with suitable excavated material in maximum 300 mm thick layers to the grade required for backfill in accordance with the drawings and specifications or as directed by the Departmental Representative. Compact each layer by mechanical means to a density equivalent to that of the surrounding unexcavated material. Obtain approval from the Departmental Representative before proceeding with the next layer.
 - .3 Compacted clay fill – fill with suitable excavated clay material, or imported clay material, in maximum 300 mm thick layers to the required grades in accordance with the drawings and specifications or as directed by the Departmental

Representative. Compact each layer by mechanical means to a minimum 85 % of Standard Proctor Density. Obtain approval from the Departmental Representative before proceeding with the next layer.

3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place compacted sand bedding a minimum of 100 mm below the invert of the pipe being installed and pipe surround sand a minimum of 200 mm above the top of the pipe for the entire trench width.

3.10 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
 - .3 Do not use backfill material which is frozen or contains ice, snow or debris.
 - .4 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .3 Compacted Select Granular Backfill shall be used in all excavations under or within 1.0 m of any existing or proposed paved or granular surface.
 - .4 Compacted Common Backfill shall be used in all excavations in a landscaped area.

3.11 DEWATERING

- .1 The bottom of the excavation shall be maintained in a condition to permit the proper installation of the pipe or underground structures. Installed pipes shall not be used as a drain. The Contractor shall provide, at his own expense, all portable dewatering equipment (including power, pumps and discharge hose) to drain the excavations as required to install the proposed works.
- .2 If required, the Contractor shall construct, supply, maintain and operate all necessary dykes, cofferdams, drains, sumps, well points, pumps and any other equipment that may be required to keep the work area free from all sources of water damage which may affect the Work.
- .3 Contractor to prepare a dewatering plan to be submitted to the Departmental Representative for review a minimum of seven (7) days prior to construction.
- .4 Dewatering equipment discharge to be into well vegetated areas away from any water body and approved by the Departmental Representative.

3.12 RESTORATION

- .1 Upon completion of Work, place topsoil in accordance with Section 32 91 19.13 – Topsoil Placement and Grading. Topsoil placement to disturbed areas shall be incidental to the work and no measurement for payment will be made.

- .2 Upon completion of Work disturbed areas to be seeded in accordance with Section 32 92 19.13 – Mechanical Seeding. Seeding of topsoiled areas shall be incidental to the work and no measurement for payment will be made.
- .3 Upon completion of Work, areas where asphalt pavement was removed to be replaced in accordance with Section 32 12 16 – Asphalt Paving.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The work described herein shall consist of the installation of geotextile.

1.2 RELATED SECTIONS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 31 37 00 – Rip-Rap
- .3 Section 33 41 00 – Storm Utility Drains

Part 2 Products

2.1 MATERIAL

- .1 Geotextile material for upwelling trench and rip-rap shall be non-woven polyester in accordance with CGSB 148.1 – 1705/m², with minimum thickness of 1.7mm or as approved by the departmental representative.

Part 3 Execution

3.1 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated.
- .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 600 mm over previously laid strip.
- .5 Install pins or place piles of sub-base material as required to hold geotextile fabric in place.
- .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 4 hours of placement.

3.2 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.
- .2 Place a minimum of 150mm of granular material over the geotextile fabric before driving construction vehicles over the geotextile fabric.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The work described herein shall consist of the installation of Rip-Rap.

1.2 RELATED SECTIONS

- .1 Section 31 32 19.01 – Geotextiles.
- .2 Section 33 41 00 – Storm Utility Drains.

1.3 REFERENCES

- .1 ASTM C127, Method of Test for Specific Gravity and Absorption of Coarse Aggregate.
- .2 CSA Standard A23.2.2, Test for Sieve Analysis of Fine and Coarse Aggregate.

1.4 ACTION AND INFORMATION SUBMITTALS

- .1 Submit sieve analysis results from approved testing laboratory to the Engineer prior to placement.

Part 2 Products

2.1 MATERIALS

- .1 Rip rap shall be reasonably well graded 75mm to 150mm material with at least sixty percent 150mm diameter size. Rock used shall be hard, dense, durable fieldstone or rock fragments having a specific gravity of at least 2.6 and a limit of 2 percent absorption, in accordance with ASTM C127.
- .2 Geotextile shall be non-woven polyester conforming to Section 31 32 19.01 – Geotextiles.

Part 3 Execution

3.1 PLACING

- .1 Geotextile shall be placed in conformance with Section 31 32 19.01 – Geotextiles.
- .2 Rip rap shall be placed in the locations and to the depth and elevations shown on the drawings. Larger boulders shall be uniformly distributed and the smaller boulders and cobbles shall fill the spaces in between resulting in a well-keyed, void free stable surface. The placement operation shall be such that the rip rap geotextile shall not be dislodged or torn during installation.

END OF SECTION

DIVISION 32

EXTERIOR IMPROVEMENTS

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The Work described herein shall consist of the installation of asphalt patches.

1.2 RELATED SECTIONS

- .1 Section 31 05 16 – Aggregate Materials.
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.3 REFERENCES

- .1 The Manitoba Infrastructure and Transportation Standard Construction Specifications No. 800(I) – Bituminous Pavement and Recycled Bituminous Pavement and No. 920 – Aggregate for Bituminous Pavement in effect on the date of closing.

Part 2 Products

- .1 All products shall conform to The Manitoba Infrastructure and Transportation Standard Construction Specifications No. 800(I) – Bituminous Pavement and Recycled Bituminous Pavement and No. 920 – Aggregate for Bituminous Pavement unless otherwise noted in the specifications and drawings.
- .2 Granular sub-base material and granular base course “A” base material shall conform to Section 31 05 16 – Aggregate Materials.

Part 3 Execution

- .1 All works to be executed in accordance with The Manitoba Infrastructure and Transportation Standard Construction Specifications No. 800(I) – Bituminous Pavement and Recycled Bituminous Pavement and No. 920 – Aggregate for Bituminous Pavement except where noted below.
- .2 Asphalt patching work to be completed on paved asphalt surfaces damaged or removed to allow for installation of proposed underground infrastructure. Asphalt surfaces damaged or removed as a result carelessness or over-excavation by the Contractor will be replaced at the Contractor’s expense.
 - .1 The Contractor shall saw cut the asphalt pavement full-depth along the limits designated. The asphalt pavement shall be removed and disposed of off-site at a location determined by the Contractor.
 - .2 The Contractor shall place and compact granular sub-base material and base course material such that the following section is achieved:
 - .1 Minimum of 300 mm thick of crushed sub-base material

.2 Minimum of 150 mm thick of base course material

Match existing sub-base and base course thicknesses if greater than specified.

Placement and compaction of granular sub-base and base course material shall be in accordance with Sections 31 05 16 – Aggregate Materials.

.3 The asphalt patches shall be Bituminous Pavement Class A material and match existing pavement thickness.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section includes the following:
 - .1 Concrete Pavers
 - .2 Joint Sand
 - .3 Setting Bed Sand
 - .4 Base Aggregate

1.2 REFERENCES

- .1 ASTM International
 - .1 C 33, Standard Specification for Concrete Aggregates.
 - .2 C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 C 144 Standard Specifications for Aggregate for Masonry Mortar.
 - .4 C 936, Standard Specification for Solid Concrete Interlocking Paving Units.
 - .5 C 979, Standard Specification for Pigments for Integrally Coloured Concrete.
- .2 CSA Group
 - .1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-[04(R2009)], Mortar and Grout for Unit Masonry.
 - .3 CSA A231.1/A231.2-[06(R2010)], Precast Concrete Paving Slabs/Precast Concrete Pavers.
 - .4 CSA A283-[06(R2011)], Qualification Code for Concrete Testing Laboratories.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Concrete Pavers:
 - .1 Samples for verification: Submit three representative full-size samples of each paver type, thickness, colour and finish that indicate the range of colour variation and texture expected upon project completion for approval by Departmental Representative.
 - .2 Accepted samples become the standard of acceptance for the product produced.
 - .3 Test results from an independent testing laboratory for compliance of concrete pavers with ASTM C 936.
 - .4 Manufacturer's catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.
 - .2 Setting Bed Sand:

- .1 Provide three representative one pound samples in containers of Setting Bed Sand materials.
- .2 Test results from an independent testing laboratory for sieve analysis per ASTM C 136 conforming to the grading requirements of ASTM C 144.
- .3 Polymeric Joint Sand:
 - .1 Test results from an independent testing laboratory for sieve analysis per ASTM C 136 conforming to the grading requirements of ASTM C 144.
 - .2 Samples for Initial Selection: Provide three representative samples in containers of Polymeric Joint Sand material, cured and dried, for colour selection.
 - .3 Samples for Verification: Provide three one pound samples in containers of Polymeric Joint Sand.
- .4 Base Aggregate:
 - .1 Test results from an independent testing laboratory for sieve analysis per ASTM C 136.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in precast concrete paver installations.
 - .2 Utilize a Manufacturer that has experience manufacturing concrete pavers on projects of similar nature or project size.
- .2 Source Limitations:
 - .1 Obtain Concrete Pavers from one source location with the resources to provide products of consistent quality in appearance and physical properties.
 - .2 Obtain Joint and Setting Bed Sands from one source with the resources to provide materials and products of consistent quality in appearance and physical properties.
 - .3 Obtain Polymeric Joint Sand from one source with the resources to provide materials and products of consistent quality in appearance and physical properties.
- .2 Mock-ups:
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct 1 x 1 m area mock-up.
 - .3 Mock-up will be used:
 - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
 - .2 To determine surcharge of bedding layer, joint sizes, lines, laying patterns, colours and texture.
 - .3 Locate where directed.
 - .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with work.

- .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.5 DELIVERY, STORAGE AND HANDLING

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

2 PRODUCTS

2.1 CONCRETE PAVERS

- .1 Concrete pavers: to CSA A23.1/A23.2 and as follows:
 - .1 Size: 200 mm x 100 mm x 80 mm height.
 - .2 Shape: as indicated.
 - .3 Colours: submit samples to Departmental Representative for approval.
 - .4 Standard end, corner, border units as required.
- .2 Manufactured in molds, with spacers, suitable for installation and delivered on site in cubes of laying panels in protective wrapping.
- .3 Pigment in concrete pavers: to ASTM C 979/C 979M.

2.2 BEDDING AND JOINT MATERIAL

- .1 POLYMERIC JOINT SAND
 - .1 Provide Polymeric Joint Sand meeting the minimum material and physical properties as follows:
 - .1 Compression Strength: proven resistance to compression of 550 PSI after drying for 7 days under controlled conditions (73°F (23°C) at 50% humidity).
 - .1 Test sand sample shape: cylinder (2" (5 cm) dia. X 4" (10 cm) high).
 - .2 Gradation as shown Table 1 below.

**TABLE 1 – JOINT SAND
GRADATION REQUIREMENTS FOR JOINT SAND**

ASTM C 144		
Sieve Size	Natural Sand Percent Passing	Manufactured Sand Percent Passing
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 75
No. 50 (0.300 mm)	10 to 30	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075)	0 to 1	0 to 10

.2 SETTING BED SAND

- .1 Provide Setting Bed Sand as follows:
 - .1 Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
 - .2 Do not use limestone screenings, stone dust, or sand material that does not conform to the grading requirements of ASTM C 33.
 - .3 Do not use mason sand or sand conforming to ASTM C 144.
- .2 Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
- .3 Conform to the grading requirements of ASTM C 33 with modifications as shown in Table 2 below:

**TABLE 2 – SETTING BED SAND
GRADATION REQUIREMENTS FOR SETTING BED SAND**

ASTM C 33	
Sieve Size	Percent Passing
3/8 in (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10
No. 200 (0.075)	0 to 1

2.3 EDGE RESTRAINTS

- .1 Edge restraints shall be plastic.
- .2 PVC or medium density polyethylene, industrial and flexible type edging, manufactured for use in paver installation, complete with connectors and pre-manufactured anchoring locations for spikes.
 - .1 Anchoring: to manufacturer's instructions. Galvanized, spiral, steel anchor spikes 9.5 mm diameter x 254 mm length, 1 per 300 mm of edging and at 100 mm each side of joints.

2.4 CLEANING COMPOUND

- .1 Clear, organic solvent, designed and recommended by manufacturer for cleaning concrete pavers of contamination encountered.

2.5 SEALING COMPOUND

- .1 Clear exterior type, water based, specially formulated for application on precast concrete pavers.

3 EXECUTION

3.1 EXAMINATION

- .1 Examine areas indicated to receive paving for compliance with requirements for installation tolerances and other conditions affecting performance for the following items before placing the Concrete Pavers.
 - .1 Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
 - .2 Verify that Geotextiles, if applicable, have been placed according to drawings and specifications.
 - .3 Verify that the Base Aggregate materials, thickness, compacted density, surface tolerances and elevations conform to specified requirements.
 - .4 Provide written density test results for soil subgrade, Base Aggregate materials to the Owner, General Contractor and paver installation subcontractor.
 - .5 Verify location, type, and elevations of edge restraints, concrete curbing, concrete collars around utility structures, and drainage inlets.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.
 - .1 Beginning of Bedding Sand and Concrete Paver installation signifies acceptance of Base and edge restraints.

3.2 PREPARATION

- .1 Verify that the subgrade soil is free from standing water.

- .2 Stockpile Setting Bed Sand, Joint Sand, Base Aggregate materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.
- .3 Remove any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities before placing the Geotextile.
- .4 Keep area where pavement is to be constructed free from sediment during entire job. Remove and replace all Geotextile, Joint Sand, Setting Bed Sand, and Base Aggregate materials contaminated with sediment with clean materials.
- .5 Complete all sub drainage of underground services within the pavement area in conjunction with subgrade preparation and before the commencement of Base Aggregate construction.
- .6 Prevent to damage underdrain pipes, overflow pipes, observation wells, or inlets and other drainage appurtenances during installation. Report all damage immediately.
- .7 Compact soil subgrade uniformly to at least 95 percent of Standard Proctor Density per ASTM D 698 for pedestrian areas. Compact soil subgrade uniformly to at least 98 percent Modified Proctor per ASTM D 1557 for vehicular areas. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils.
- .8 Backfill all service trenches within the pavement area to the sub- grade level with approved material placed in uniform lifts not exceeding 4 in. (100 mm) loose thickness. Compact each lift to at least 100 percent Standard Proctor Density as specified in ASTM D 698.
- .9 Trim the subgrade to within 0 to ½ in. (0 to 13mm) of the specified grades. Do not deviate the surface of the prepared subgrade by more than 3/8 in. (10mm) from the bottom edge of a 39 in. (1m) straight edge laid in any direction.
- .10 Proof-roll prepared subgrade according to requirements in Division 31 to identify soft pockets and areas of excess yielding. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting and replace with compacted backfill or fill as directed.
- .11 Do not proceed with further pavement construction, under any circumstances, until the subgrade has been inspected by the Departmental Representative.

Note: Mechanical tampers (jumping jacks) are recommended for compaction of soil subgrade and aggregate base around lamp standards, utility structures, building edges, curbs, tree wells and other protrusions. Compact areas, not accessible to roller compaction equipment, to the specified density with mechanical tampers. **CAUTION** – Proceed with care around the perimeters of excavations, buildings, curbs, etc. These areas are especially prone to consolidation and settlement. Do not place wedges of backfill in these areas. If possible particularly in these areas, proceed with backfilling and compacting in shallow lifts, parallel to the finished surface.

3.3 INSTALLATION

- .1 EDGE RESTRAINTS
 - .1 Provide concrete edge restraints as indicated.
 - .1 Install job-built concrete edge restraints to comply with requirements in Section 32 16 15.

- .2 Provide concrete edge restraint along the perimeter of all paving as indicated. Install the face of the concrete edge restraint, where it abuts pavers vertical down to the sub base.
 - .3 Construct concrete edge restraint to dimensions and level specified and support on a compacted sub base not less than 6 in (150 mm) thick.
 - .2 Provide plastic or metal edge restraints as indicated.
 - .1 Provide plastic or metal edge restraints along the perimeter of all paving as indicated and supported on a minimum of 6 inches (150 mm) of Base Aggregate.
 - .2 Provide 10" spiral galvanized or stainless steel spike to fasten plastic edge restraint at 24 inches on center for straight sections and 12 inches on center for curved sections.
- .2 GEOTEXTILES
 - .1 Provide separation geotextile on bottom and sides of prepared soil subgrade. Secure in place to prevent wrinkling or folding from equipment tires and tracks.
 - .2 Overlap ends and edges a minimum of 18 in. (450 mm) in the direction of drainage.
- .3 BASE AGGREGATE
 - .1 Provide the Base Aggregate material in uniform lifts not exceeding 4 in. (100 mm) over the compacted Subgrade material and compact to at least 100 percent Standard Proctor Density as per ASTM D 698.
 - .2 Tolerance: Do not exceed the specified surface grade of the compacted Base Aggregate material more than $\pm 3/8$ in. (10 mm) over a 10 ft. (3 m) long straightedge laid in any direction.
 - .3 Compact and grade the upper surface of the base sufficiently to prevent infiltration of the bedding sand into the base both during construction and throughout its service life. Blend segregated areas of the granular base by the application of crushed fines that have been watered and compacted into the surface.
- .4 SETTING BED SAND
 - .1 Provide and spread Setting Bed Sand evenly over the Base Aggregate course and screed to a nominal thickness of 1 in. (25 mm).
 - .1 Protect screeded Setting Bed Sand from being disturbed by either pedestrian or vehicular traffic.
 - .2 Screed only the area which can be covered by pavers in one day.
 - .3 Do not use Setting Bed Sand material to fill depressions greater in the base surface.
 - .2 Keep moisture content constant and density loose and constant until Concrete Pavers are set and compacted.
 - .3 Screed the Setting Bed Sand using either an approved mechanical spreader (e.g.: an asphalt paver) or by the use of screed rails and boards.
 - .4 Carefully maintain spread Setting Bed Sand in a loose condition, and protected against incidental compaction, both prior to and following screeding. Loosen any

incidentally compacted sand or screeded sand left overnight before further paving units are placed.

- .5 Provide lightly screeded Setting Bed Sand in a loose condition to the predetermined depth, only slightly ahead of the paving units.
- .6 Fully protect screed Setting Bed Sand against incidental compaction, including compaction by rain. Remove any screeded Setting Bed Sand that is incidentally compacted prior to laying of the paving units.
- .7 Inspect the Setting Bed Sand course prior to commencing the placement of the Concrete Pavers. Acceptance of the Setting Bed Sand occurs with the initiation of Concrete Paver placement.

.5 CONCRETE PAVERS

- .1 Replace Concrete Pavers with chips, cracks, voids, discolourations, and other defects that might be visible in finished work.
- .2 Mix Concrete Pavers from a minimum of three (3) bundles simultaneously drawing the paver vertically rather than horizontally, as they are placed, to produce uniform blend of colours and textures. (Colour variation occurs with all concrete products. This phenomenon is influenced by a variety of factors, e.g. moisture content, curing conditions, different aggregates and, most commonly, from different production runs. By installing from a minimum of three (3) bundles simultaneously, variation in colour is dispersed and blended throughout the project).
- .3 Exercise care in handling face mix concrete pavers to prevent surfaces from contacting backs or edges of other units.
- .4 Provide Concrete Pavers using laying pattern as indicated. Adjust laying pattern at pavement edges such that cutting of edge pavers is minimized. Cut all pavers exposed to vehicular tires no smaller than one-third of a whole paver.
- .5 Use string lines or chalk lines on Setting Bed Sand to hold all pattern lines true.
- .6 Set surface elevation of pavers 1/8 in. (3 mm) above adjacent drainage inlets, concrete collars or channels.
- .7 Place units hand tight against spacer bars. Adjust horizontal placement of laid pavers to align straight.
 - a. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
- .8 Provide space between paver units of 1/32 in. (1 mm) wide to achieve straight bond lines.
- .9 Prevent joint (bond) lines from shifting more than $\pm 1/2$ in. (± 13 mm) over 50 ft. (15 m) from string lines.
- .10 Fill gaps between units or at edges of the paved area that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
- .11 Cut Concrete Pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- .12 Prevent all traffic on installed Concrete Pavers until Joint Sand has been vibrated into joints. Keep skid steer and forklift equipment off newly laid Concrete Pavers that have not received initial compaction and Joint Sand material.

- .13 Vibrate Concrete Pavers into leveling course with a low-amplitude plate vibrator capable of a to 5000-lbf (22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:
 - .1 After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
 - .2 Compact installed Concrete Pavers to within 6 feet (2 meters) of the laying face before ending each day's work. Cover Concrete Pavers that have not been compacted and leveling course on which pavers have not been placed, with nonstaining plastic sheets to prevent Setting Bed Sand from becoming disturbed.
- .14 Protect face mix Concrete Paver surface from scuffing during compaction by utilizing a urethane pad.
- .15 Remove any cracked or structurally damaged Concrete Pavers and replace with new units prior to installing Joint Sand material.
- .6 JOINT SAND
 - .1 Polymeric Joint Sand
 - .1 Install Polymeric Joint Sand per manufacturers recommended instructions.
- 3.4 FIELD QUALITY CONTROL
 - .1 Verify final elevations for conformance to the drawings after sweeping the surface clean.
 - .1 Prevent final Concrete Paver finished grade elevations from deviating more than $\pm 3/8$ in. (± 10 mm) under a 10 ft (3 m) straightedge or indicated slope, for finished surface of paving.
 - .2 Lippage: No greater than 1/32 in. (0.8 mm) difference in height between Concrete Pavers and adjacent paved surfaces.
- 3.5 REPAIRING, CLEANING AND SEALING
 - .1 Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
 - .2 Cleaning: Remove excess dirt, debris, stains, grit, etc. from exposed paver surfaces; wash and scrub clean.
 - .1 Clean Concrete Pavers in accordance with the manufacturer's written recommendations.
 - .3 Seal as indicated.
 - .1 Apply Sealer for Permeable Concrete Pavers in accordance with the sealer and paver manufacturer's written recommendations.
- 3.6 PROTECTION
 - .1 Protect completed work from damage due to subsequent construction activity on the site.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The Work described herein shall consist of the installation of concrete sidewalks, curbs and gutters.

1.2 RELATED SECTIONS

- .1 Section 31 05 16 – Aggregate Materials.

1.3 REFERENCES

- .1 The Manitoba Infrastructure and Transportation Standard Construction Specifications No. 860(I) – Concrete Curbing, No. 870 – Construction of Sidewalks and No. 930(I) – Aggregate for Portland Cement Concrete in effect on the date of closing.

Part 2 Products

- .1 All products shall conform to The Manitoba Infrastructure and Transportation Standard Construction Specifications No. 860(I) – Concrete Curbing, No. 870 – Construction of Sidewalks and No. 930(I) – Aggregate for Portland Cement Concrete unless otherwise noted in the specifications and drawings.
- .2 Granular sub-base and base course material shall conform to Section 31 05 16 – Aggregate Materials.

Part 3 Execution

- .1 All works to be executed in accordance with The Manitoba Infrastructure and Transportation Standard Construction Specifications No. 860(I) – Concrete Curbing, No. 870 – Construction of Sidewalks and No. 930(I) – Aggregate for Portland Cement Concrete except where noted below.
- .2 Any concrete curb, gutter and sidewalk damaged or removed to allow for installation of proposed underground infrastructure shall be replaced. Concrete curb, gutter or sidewalk that is damaged or removed as a result of carelessness or over-excavation by the Contractor will be replaced at the Contractor's expense.
- .3 The Contractor shall saw cut and remove pavement sections to the designated limits. Any concrete material removed shall be disposed of off-site at a location determined by the Contractor.
- .4 Accessibility Ramps to be consistent with the latest City of Winnipeg Standard Construction Specification.
- .5 Concrete curb and gutter shall match existing section of curb and gutter being replaced.

- .6 Curb and gutter dowels and joints shall conform so those shown in the Manitoba Infrastructure and Transportation Standard Cross Sections for Barrier Concrete Curbing and Semi-Mountable Concrete Curbing.
- .7 Concrete sidewalk renewal to match existing section of sidewalk being replaced.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures.
- .2 Section 31 14 13 – Soil Stripping and Stockpiling.
- .3 Section 31 22 13 – Grading.

1.2 MEASUREMENT AND PAYMENT

- .1 Measurement shall be in accordance with Section 01 29 00 – Measurement and Payment.

1.3 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.

Part 2 Products

2.1 TOPSOIL

- .1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
- .2 Topsoil shall be from stripped material stockpiled on site or imported topsoil.
- .3 Topsoil from previously stripped stockpile shall:
 - .1 Be free from subsoil, slag, clay, stones, lumps or other unsuitable material.
 - .2 Be approved for use by the Departmental Representative prior to placement.
- .4 Topsoil imported to site shall:
 - .1 Be from an approved source as outlined in section 01 35 43.
 - .2 Consist of a screened clay-textured or loam-textured dark topsoil, a fertile friable material neither of heavy clay nor of very light sandy nature containing by volume, a minimum of 4% for clay loams and 2% for sandy loams to a maximum 25% organic matter (peat, rotted manure or composted material) and capable of sustaining vigorous plant growth.
 - .3 Contain no toxic elements or growth inhibiting materials.
 - .4 Finished surface free from:
 - .1 Debris and stones over 25 mm diameter.
 - .2 Quackgrass rhizomes, Canada thistle roots or other non-native or invasive plants.
 - .5 Consistence: friable when moist.

2.2 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 48 kg of available N per hectare.
 - .3 Phosphorus (P): 96 kg of phosphate per hectare.
 - .4 Potassium (K): 48 kg of potassium per hectare.
 - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .6 Ph value: 5.9 to 7.0.

2.3 SOURCE QUALITY CONTROL

- .1 Contractor is responsible for amendments to supply topsoil as specified.

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.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.

3.2 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify 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 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 75 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.

- .3 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

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

3.6 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required where directed by Departmental Representative.

3.7 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 91 19.13 – Topsoil Placement and Grading.

1.2 MEASUREMENT AND PAYMENT

- .1 Measurement shall be in accordance with Section 01 29 00 – Measurement and Payment.

1.3 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 seed, and fertilizer.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements:
 - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
- .3 Storage and Handling Requirements:
 - .1 Store fertilizer off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.5 WARRANTY

- .1 For seeding, 12 months warranty period is extended to 1 full growing season.
- .2 End-of-warranty inspection will be conducted by Departmental Representative.

Part 2 Products

2.1 GRASS SEED

- .1 Grass seed mixture for restorations shall be as follows:
 - .1 Lawn areas:
 - .1 40% Kentucky Bluegrass
 - .2 40% Creeping Red Fescue

- .3 20% Perennial Ryegrass
- .2 All other areas (native mix):
 - .1 30% Awned Wheatgrass
 - .2 15% Junegrass
 - .3 20% Slender Wheatgrass
 - .4 10% Fringed Bromegrass
 - .5 15% Canada Wildrye
 - .6 10% Ticklegrass
- .2 Seed shall be minimally Certified Canada No. 1 Grade quality seed varieties, in accordance with the Canadian Seeds Act and Regulations, and having a minimum purity of 95% and germination of 80% with a combination of purity and germination that provide a Pure Living Seed of 80%.
- .3 Seed shall be free of impurities and disease. A seed analysis certificate must be provided to the Departmental Representative from an accredited laboratory and must be approved before purchase is finalized and any blending of seed-lots into a mix.

2.2 WATER

- .1 Free of impurities that would inhibit germination and growth.
- .2 Supplied by Departmental Representative at designated source.
- .3 Water for required irrigation will be supplied via hydrant or hose bib.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for mechanical seeding installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 SEED BED PREPARATION

- .1 Do not perform work under adverse field conditions as determined by Departmental Representative.
- .2 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials off site.
- .3 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.

- .4 Fine grade surface free of humps and hollows to smooth, even grade, elevations indicated to tolerance of plus or minus 25 mm, surface draining naturally.
- .5 Cultivate fine graded surface approved by Departmental Representative to 25 mm depth immediately prior to seeding.

3.3 SEED PLACEMENT

- .1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.
- .2 For mechanical seeding:
 - .1 Mechanical landscape drill seeder ("Brillion" type or equivalent) which accurately places seed at specified depth and rate and rolls in single operation.
 - .2 Use equipment and method acceptable to Departmental Representative.
 - .3 Seed to be placed at a rate of 15 kg/ha to 22 kg/ha. Actual rate depends on topsoil depth, fertility, moisture and time of year. The lower rate can be used early in the season with good top soil and moisture conditions. Use higher rate for later in the season and conditions that are less than ideal.
- .3 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.
- .4 Sow half of required amount of seed in one direction and remainder at right angles as applicable.
- .5 Incorporate seed by light raking in cross directions.
- .6 Consolidate mechanically seeded areas by rolling area if soil conditions warrant or if directed by Departmental Representative with equipment approved by Departmental Representative immediately after seeding.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .2 Perform following operations from time of seed application until acceptance by Departmental Representative:
 - .1 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.

- .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Departmental Representative.
- .4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
- .5 Adjust protection barrier as necessary to protect against deterioration due to pedestrian or other traffic as needed.

3.6 FINAL ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Areas are uniformly established free of rutted, eroded, bare or dead spots and extent of weeds apparent in grass is acceptable.
 - .2 Areas seeded in fall will be accepted in following spring, one month after start of growing season provided acceptance conditions are fulfilled.
 - .3 Should acceptance be granted to the Contractor prior to the removal of erosion and sediment control measures, Parks will remove these at a later date with their own forces and correct any damage associated with their removal.

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations until time of acceptance.
 - .1 Water seeded area to maintain optimum soil moisture level for continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.
 - .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Departmental Representative.
 - .4 Control weeds by mechanical means utilizing acceptable integrated pest management practices.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 32 91 19.13.

1.2 MEASUREMENT AND PAYMENT

- .1 Measurement shall be in accordance with Section 1 29 00- Measurement and Payment.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule sod laying to coincide with preparation of soil surface.
 - .2 Schedule sod installation when frost is not present in ground.
 - .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 19 - Project Meetings.

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 sod, geotextile and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements, 01 35 43 - Environmental Procedures.
- .3 Samples.
 - .1 Submit:
 - .1 Sod for each type specified.
 - .1 Install approved samples in 1 square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.
 - .2 Obtain approval of samples by Departmental Representative.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.
- .5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.

1.6 DELIVERY, STORAGE AND HANDLING

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

2 PRODUCTS

2.1 MATERIALS

- .1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.
 - .1 Turf Grass Nursery Sod types:
 - .1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed of cultivars of Kentucky Bluegrass, containing not less than 40% Kentucky Bluegrass cultivars, not less than 40% Creeping Red Fescue and 20% Perennial Ryegrass.
 - .2 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivar.
 - .3 Number One Named Cultivars: Nursery Sod grown from certified seed.
 - .2 Turf Grass Nursery Sod quality:
 - .1 Not more than 1 broadleaf weed and up to 1% native grasses per 40 square metres.
 - .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
 - .3 Mowing height limit: 35 to 65 mm.
 - .4 Soil portion of sod: 6 to 15 mm in thickness.
- .2 Commercial Grade Turf Grass Nursery:
 - .1 Mow sod at height directed by Departmental Representative within 36 hours prior to lifting, and remove clippings.
 - .2 Not more than 5 broadleaf weeds and up to 20% native grasses per 40 square metres.
- .3 Water:
 - .1 Supplied by Departmental Representative at designated source.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain written approval from Departmental Representative of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13 - Topsoil Placement and Grading. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, elevations indicated, to tolerance of plus or minus 8 mm, for Turf Grass Nursery Sod and plus or minus 15 mm for Commercial Grade Turf Grass Nursery, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; in location as directed by Departmental Representative in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

3.3 SOD PLACEMENT

- .1 Ensure sod placement is done under supervision of certified Landscape Planting Supervisor.
- .2 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.
- .3 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .4 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.4 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Start laying sod at bottom of slopes.
- .2 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
 - .2 Not less than 3-6 pegs per square metre.
 - .3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by Departmental Representative.

- .3 Drive pegs to 20 mm above soil surface of sod sections.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.
- .3 Waste Management: separate waste materials for compost and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling and compost containers and bins from site and dispose of materials at appropriate facility.
 - .2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

3.6 PROTECTION BARRIERS

- .1 Protect newly sodded areas from deterioration with snow fence on rigid frame as directed by Departmental Representative.
- .2 Remove protection 3 weeks after installation as directed by Departmental Representative.

3.7 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
 - .1 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.8 ACCEPTANCE

- .1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.
- .2 Sodded Commercial Grade Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
 - .1 Sodded areas are properly established.
 - .2 Extent of surface soil visible when grass has been cut to height of 60 mm is acceptable.
 - .3 Sod is free of bare or dead spots and extent of weeds apparent in grass is acceptable.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.

- .3 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.
- .4 When environmental conditions allow, all sodded areas showing shrinkage cracks shall be top-dressed and seeded with a seed mix matching the original.

3.9 MAINTENANCE DURING WARRANTY PERIOD

- .1 Repair and re-sod dead or bare spots to satisfaction of Departmental Representative.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 32 91 19.13

1.2 REFERENCES

- .1 Definitions:
 - .1 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.
- .2 Reference Standards:
 - .1 Agriculture and Agri-Food Canada (AAFC).
 - .1 Plant Hardiness Zones in Canada-[2000].
 - .2 Canadian Nursery Landscape Association (CNLA)
 - .1 Canadian Standards for Nursery Stock-[2006].
 - .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling: obtain approval from Departmental Representative of schedule 7 days in advance of shipment of plant material.
- .2 Schedule to include:
 - .1 Quantity and type of plant material.
 - .2 Shipping dates.
 - .3 Arrival dates on site.
 - .4 Planting Dates.

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 trees, shrubs, ground cover, fertilizer, mycorrhiza, anti-desiccant, anchoring equipment, and mulch and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements, 01 35 43 - Environmental Procedures.
- .3 Samples:
 - .1 Submit samples of mulch, topsoil mix to Departmental Representative.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape

Installation designation.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Protect plant material from frost, excessive heat, wind and sun during delivery.
 - .2 Protect plant material from damage during transportation:
 - .1 Delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
 - .2 Delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.
 - .3 Protect foliage and root balls using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.
- .3 Storage and Handling Requirements:
 - .1 Immediately store and protect plant material which will not be installed within 1 hours in accordance with supplier's written recommendations and after arrival at site in storage location approved by Departmental Representative.
 - .2 Protect stored plant material from frost, wind and sun and as follows:
 - .1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in sand or topsoil and watering to full depth of root zone.
 - .2 For pots and containers, maintain moisture level in containers. Heel-in fibre pots.
 - .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.
 - .3 Store and manage hazardous materials in accordance with manufacturer's written instructions.

1.7 WARRANTY

- .1 For plant material as itemized on plant list the 12 months warranty period is extended to 24 months.
- .2 Contractor hereby warrants that plant material as itemized on plant list will remain free of defects in accordance with General Conditions, but for 1 full growing season, providing adequate maintenance has been provided.
- .3 End-of-warranty inspection will be conducted by Departmental Representative.
- .4 Departmental Representative reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

2 PRODUCTS

2.1 PLANT MATERIAL

- .1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for

Nursery Stock.

- .1 Source of plant material: grown in Zone 2b in accordance with Plant Hardiness Zones in Canada; unless approved by the Departmental Representative. Plant material to be sourced from a location no further than 500km from Riding Mountain National Park.
- .2 Plant material must be planted in zone specified as appropriate for its species.
- .3 Plant material in location appropriate for its species.
- .2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- .3 Trees: with straight trunks, well and characteristically branched for species.
- .4 Trees larger than 200 mm in caliper: half root pruned during each of two successive growing seasons, the latter at least one growing season before arrival on site.

2.2 WATER

- .1 Supplied by Departmental Representative at designated source.

2.3 STAKES

- .1 T-bar, steel, 40 x 40 x 5 x 2440 mm or Wood, pointed one end, 38 x 38 x 2300 mm.

2.4 WIRE TIGHTENER

- .1 Type 1: galvanized steel
- .2 Type 2: turnbuckle, galvanized steel, 9.5 mm diameter with 270 mm open length.

2.5 GUYING WIRE

- .1 Type 1: steel, 3 mm wire.
- .2 Type 2: 1.5 mm diameter multi-wire steel cable.
- .3 Type 3: 3 mm diameter multi-wire steel cable.

2.6 CLAMPS

- .1 U-bolt: galvanized, 13 mm diameter, c/w curved retaining bar and hex nuts.
- .2 Crimp type.

2.7 ANCHORS

- .1 Wood:
 - .1 Type 1: 38 x 38 x 460 mm.
 - .2 Type 2: 38 x 67 x 600 mm.
- .2 Drive-in type.
 - .1 Type 1: 13 mm diameter x 75 mm long, aluminum.
 - .2 Type 2: 18 mm diameter x 120 mm long, aluminum.

- .3 Screw-in type:
 - .1 Type 1: 100 mm diameter steel disc.

2.8 GUYING COLLAR

- .1 Tube: plastic, 13 mm diameter, nylon reinforced.

2.9 TRUNK PROTECTION

- .1 Plastic: perforated spiralled strip.
- .2 Burlap: clean 2.5 kg/m² minimum mass and 150 mm minimum wide, and twine fastener.

2.10 MULCH

- .1 Natural Bark chip material to be certified weed and pest free. Source to be approved by Departmental Representative.

2.11 FERTILIZER

- .1 Synthetic commercial type as recommended by manufacturer.
 - .1 Ensure new root growth is in contact with mycorrhiza.
 - .2 Use mycorrhiza as recommended by manufacturer's written recommendations.

2.12 ANTI-DESICCANT

- .1 Wax-like emulsion.

2.13 FLAGGING TAPE

- .1 Fluorescent, orange colour.

2.14 SOURCE QUALITY CONTROL

- .1 Obtain approval from Departmental Representative of plant material prior to planting.
- .2 Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal, Provincial or Territorial regulations.

3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for planting installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from [Departmental Representative.

3.2 PRE-PLANTING PREPARATION

- .1 Proceed only after receipt of written acceptability of plant material from Departmental Representative.
- .2 Remove damaged roots and branches from plant material.
- .3 Apply anti-desiccant to conifers and deciduous trees in leaf in accordance with manufacturer's instructions.
- .4 Locate and protect utility lines.
- .5 Notify and acquire written acknowledgment from utility authorities before beginning excavation of planting pits for trees and shrubs.
- .6 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 EXCAVATION AND PREPARATION OF PLANTING BEDS

- .1 Establishment of sub-grade for planting beds in accordance with Section 31 22 13 - Rough Grading.
- .2 Preparation of planting beds in accordance with Section 32 91 19.13 - Topsoil Placement and Grading.
- .3 For individual planting holes:
 - .1 Stake out location and obtain approval from Departmental Representative prior to excavating.
 - .2 Excavate to depth and width as indicated.
 - .3 Remove subsoil, rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.
 - .4 Scarify sides of planting hole.
 - .5 Remove water which enters excavations prior to planting. Notify Departmental Representative if water source is ground water.

3.4 PLANTING

- .1 For bare root stock, place 150 mm backfill soil in bottom of hole.
 - .1 Plant trees and shrubs with roots placed straight out in hole.
- .2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball.
 - .1 Do not pull burlap or rope from under root ball.
- .3 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.

- .4 Plant vertically in locations as indicated.
 - .1 Orient plant material to give best appearance in relation to structure, roads and walks.
- .5 For trees and shrubs:
 - .1 Backfill soil in 150 mm lifts.
 - .1 Tamp each lift to eliminate air pockets.
 - .2 When two thirds of depth of planting pit has been backfilled, fill remaining space with water.
 - .3 After water has penetrated into soil, backfill to finish grade.
 - .2 Form watering dish as indicated.
- .6 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.
- .7 Water plant material thoroughly.
- .8 After soil settlement has occurred, fill with soil to finish grade.

3.5 TRUNK PROTECTION

- .1 Install trunk protection on deciduous trees as indicated.
- .2 Install trunk protection before installation of tree supports.

3.6 TREE SUPPORTS

- .1 Install tree supports as indicated.
- .2 Use double stake tree support for deciduous trees less than 3 m in height and evergreens less than 2 m in height.
 - .1 Place one stake on prevailing wind side and 150 mm minimum from trunk.
 - .2 Drive stake 300 mm minimum into undisturbed soil beneath roots.
 - .1 Ensure stake is secure, vertical and unsplit.
 - .3 Install 150 mm long guying collar 1500 mm above grade.
 - .4 Thread Type 1 guying wire through guying collar tube.
 - .1 Twist wire to form collar and secure firmly to stake. Cut off excess wire.
- .3 Use 3 guy wires and anchors for deciduous trees greater than 3 m in height and evergreens greater than 2 m in height.
 - .1 Use Type 2 guying wire with clamps for trees less than 75 mm in diameter and Type 3 guying wire with clamps for trees greater than 75 mm in diameter.
 - .2 Use Type 1 anchors for trees less than 75 mm in diameter and Type 2 anchors for trees greater than 75 mm in diameter.
 - .3 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens and 1/2 height for deciduous trees. Collar mounting height not to exceed 2.5 m above grade.
 - .4 Guying collars to be of sufficient length to encircle tree plus 50 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.
 - .5 Install anchors at equal intervals about tree and away from trunk so guy wire will form 30 degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.

- .6 Attach guy wire to anchors. Tension wire and secure by multi-wraps or installing clamps.
 - .7 Install wire tightener ensuring that guys are secure and leave room for slight movement of tree.
 - .8 Saw tops off wooden anchors which extend in excess of 100 mm above grade or as directed by Departmental Representative.
 - .9 Install flagging tape to guys as indicated.
- .4 After tree supports have been installed, remove broken branches with clean, sharp tools.

3.7 MULCHING

- .1 Ensure soil settlement has been corrected prior to mulching.
- .2 Spread mulch as indicated.

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following maintenance operations from time of planting to acceptance by Departmental Representative.
 - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
 - .1 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
 - .2 Remove weeds.
 - .3 Replace or respread damaged, missing or disturbed mulch.
 - .4 For non-mulched areas, cultivate as required to keep top layer of soil friable.
 - .5 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
 - .6 Remove dead or broken branches from plant material.
 - .7 Keep trunk protection and guy wires in proper repair and adjustment.
 - .8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

3.9 MAINTENANCE DURING WARRANTY PERIOD

- .1 From time of acceptance by Departmental Representative to end of warranty period, perform following maintenance operations.
 - .1 Reform damaged watering saucers.
 - .2 Replace or respread damaged, missing or disturbed mulch.
 - .3 For non-mulched areas, cultivate monthly to keep top layer of soil friable.
 - .4 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
 - .5 Apply fertilizer in early spring as indicated by soil test.
 - .6 Remove dead, broken or hazardous branches from plant material.
 - .7 Keep trunk protection and tree supports in proper repair and adjustment.
 - .8 Remove trunk protection, tree supports and level watering saucers at end of warranty period.

- .10 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
- .11 Submit monthly written reports to Departmental Representative identifying:
 - .1 Maintenance work carried out.
 - .2 Development and condition of plant material.
 - .3 Preventative or corrective measures required which are outside Contractor's responsibility.

3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Divert discarded burlap, wire and plastic plant containers materials from landfill to plastic recycling facility.
 - .3 Dispose of unused fertilizer at official hazardous material collection site.
 - .4 Dispose of unused anti-desiccant at official hazardous material collections site approved by Departmental Representative.
 - .5 Divert unused wood and mulch materials from landfill to composting facility approved by Departmental Representative.

3.11 CLOSEOUT ACTIVITIES

- .1 Submit maintenance reports for trees, shrubs, and other plantings.

END OF SECTION

DIVISION 33

UTILITIES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .2 Section 33 41 00 – Storm Utility Drains.

1.2 MEASUREMENT PROCEDURES

- .1 Measurement shall be in accordance with Section 01 29 00 - Measurement and Payment.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM A48/A48M-03(2012), Standard Specification for Gray Iron Castings.
 - .2 ASTM A123/A123M-2012, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM C117-13, Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .4 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM C139-11, Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - .6 ASTM C478M-13, Standard Specification for Precast Reinforced Concrete Manhole Sections (Metric).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit drawings for all pre-cast reinforced concrete manholes, risers, frames and covers.
 - .2 Submit shop drawings for oil/grit separators.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect manholes from nicks, scratches, and blemishes.

- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Precast maintenance hole units: to ASTM C478M, circular or oval.
 - .1 Top sections flat slab top type with opening offset for vertical ladder installation.
- .2 Precast catch basin section : to ASTM C478M
- .3 Joints: made watertight using 'Ram-nek" flexible bituminous gasket
- .4 Mortar shall conform to the following mix:
 - .1 1 part cement, type 50 sulphate resistant
 - .2 1 parts clean sharp sand
 - .3 water to provide workability
- .5 In freezing weather, heat sand and cement and apply mortar warm. Protect joints from freezing until mortar has set.
- .6 Grout to be non-shrink type. Grout shall have a minimum 28 day compressive strength of 15 MPa. Cement used in grout shall be sulphate resistant meeting the current CSA Standard A5 for Portland Cement, Type 50. Water used for mixing grout shall be clean and free from oil, acid, alkali, organic matter or other deleterious substances. Water shall be equal to potable (drinking) water in physical and chemical properties.
- .7 Ladder rungs: to CSA G30.12, No.25M billet steel deformed bars, hot dipped galvanized to CSA G164.
 - .1 Rungs to be safety pattern (drop step type).
- .8 Adjusting rings: to ASTM C478M.
- .9 Frames, gratings, covers as indicated as follows:
 - .1 Metal gratings and covers to bear evenly on frames.
 - .1 Frame with grating or cover to constitute one unit.
 - .2 Assemble and mark unit components before shipment.
 - .2 Gray iron castings: to ASTM A48/A48M, strength class30B.
 - .3 Castings: coated with two applications of asphalt varnish sand blasted or cleaned and ground to eliminate surface imperfections.
 - .4 Maintenance hole frames and covers: cover cast with complete with two 25 mm square lifting holes.
- .10 Granular bedding and backfill: in accordance with Section 31 05 16 - Aggregate Materials.
- .11 Manholes and catch basins to conform to typical sections provided in the drawings.
- .12 Manhole rim adjustment rings to be cast iron and be compatible with existing manhole frames and covers.

2.2 OIL GRIT SEPARATOR

- .1 Oil Grit Separator to be Stormceptor model STC 1000 or approved equal.
- .2 Stormceptor to be designed for submerged conditions where noted on the drawings.

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 manholes installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.
- .2 Obtain approval of Departmental Representative before installing manholes and catch basins.

3.3 MANHOLE AND CATCH BASIN INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Complete units as pipe laying progresses.
 - .1 Maximum of 3 units behind point of pipe laying will be allowed.
- .3 Dewater excavation to approval of Departmental Representative and remove soft and foreign material before placing concrete base.
- .4 Set precast concrete base on 150 mm minimum of sand bedding compacted to 95% Standard Proctor Density.
- .5 Construct manholes and catch basins in accordance with the details in the drawings.
- .6 Backfill in accordance with Section 31 23 33.01 Excavating, Trenching and Backfilling.
- .7 Installing units in existing systems:
 - .1 Where new unit is installed in existing run of pipe, ensure full support of existing pipe during installation, and carefully remove that portion of existing pipe to dimensions required and install new unit as specified.
 - .2 Make joints watertight between new unit and existing pipe.

- .3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready for operation, complete installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or other necessary work.
- .8 Set frame and cover to required elevation with pre-cast adjustment rings.
- .9 Place frame and cover on top section to elevation as indicated.
 - .1 If adjustment required use concrete ring.
- .10 Clean units of debris and foreign materials.
 - .1 Remove fins and sharp projections.
 - .2 Prevent debris from entering system.

3.4 FRAMES AND COVERS

- .1 Frames and covers for catch basins and manholes shall conform to details found in drawings.
- .2 Frames and covers shall be installed as follows:
 - .1 Curb and gutter frame and cover for catch basins to be installed in existing pavement.
 - .2 Grated cover for catch basins to be installed in existing parking lot.
 - .3 Ditch inlet grate cover for catch basins to be installed in landscaped areas.
 - .4 Solid cover for all manhole installations.

3.5 OIL GRIT SEPARATORS

- .1 Oil and grit separators to be installed as per the manufacturers recommendations at the locations and elevations noted on the drawings.

3.6 ADJUSTMENT OF EXISTING MANHOLE RIM ELEVATION

- .1 Raise existing manhole rim elevations with cast iron adjustment rings to the elevations noted on the drawings.

3.7 ABANDONMENT OF EXISTING MANHOLES

- .1 Abandon existing manholes by removing the frame and cover, flat top reducers and riser sections to a minimum of 1.2 metres below existing or proposed finished grade.
- .2 Plug sewers and sewer services connected to abandoned manhole by completely plugging each end of the pipe entering the manhole with mortar or concrete a minimum of 300 millimetres thick.
- .3 Existing manholes frames and covers are to be salvaged and as directed by the Departmental Representative.

3.8 REMOVAL AND REPLACEMENT OF EXISTING MANHOLES AND CATCH BASINS

- .1 Remove and replace existing manholes and catch basins where indicated on the drawings. Install replacement manholes and catch basins in accordance with the drawings.
- .2 Cut fully through existing sewer pipe or catch basin lead pipe leaving neat, square ends before removing the entire catch basin or manhole. Alternatively, remove existing sewer pipe or catch basin lead pipe at a joint location within the excavation.
- .3 Install new sewer pipe of specified size and type from new manhole or catch basin to existing sewer pipe or catch basin lead that is to remain in service. Connect to existing corrugated steel pipes with concrete collar in accordance with Section 33 41 00 – Storm Utility Drains.
- .4 Remove existing manholes by completely removing the entire structure from the ground.
- .5 Plug sewers and sewer services where cut off from existing manhole with mortar or concrete a minimum of 300 millimetres thick.
- .6 Existing manholes frames and covers are to be salvaged and as directed by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .2 Section 31 32 19.01 – Geotextiles.

1.2 MEASUREMENT AND PAYMENT

- .1 Measurement shall be in accordance with Section 01 29 00 – Measurement and Payment.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C443M-07, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
 - .2 ASTM D2620, Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.
 - .3 ASTM D3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe Tubing
 - .4 ASTM D3034-08, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - .5 ASTM D3350-10, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- .2 Plastic Pipe Institute
 - .1 TR-33 Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe
 - .2 TN-13 General Guidelines for Butt, Saddle and Socket Fusion of Unlike Polyethylene Pipes and Fittings
 - .3 TN-38 Bolt Torque for Polyethylene Flanged Joints
 - .4 TN-42 Recommended Minimum Training Guidelines for PE Butt Fusion Joining Operators for Municipal and Industrial Projects
- .3 CSA International
 - .1 CSA B137 Series, Thermoplastic Pressure Piping Compendium.
 - .1 CSA B137.1-02, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
 - .2 CSA A3000-08, Cementitious Materials Compendium.
 - .3 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.
 - .4 CSA B1800-11, Thermoplastic Non-pressure Pipe Compendium.
 - .1 CSA B182.1-11, Plastic Drain and Sewer Pipe and Pipe Fittings.
 - .2 CSA B182.2-11, PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings.

- .3 CSA B182.11-11, Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit complete details regarding manufacturer's pipe plant, and quality control procedures, if requested by the Departmental Representative.
- .3 Pipe certification to be on pipe.
- .4 Submit details regarding Contractor's experience with HDPE pipe installations providing job records, personnel names and experience records of personnel who will be responsible for pipe joint fusions.
- .5 Submit procedures to be followed for pipe fusion as to conform with this specification.
- .6 Submit pipe jointing procedures as recommended by the pipe manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

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

1.6 HEAT FUSION JOINTS – QUALIFICATONS

- .1 Individuals performing heat fusion joining shall have training and experience in the use of the fusion procedure.

Part 2 Products

2.1 PVC PIPE

- .1 Type PSM Polyvinyl Chloride (PVC): to ASTM D3034.
 - .1 Standard Dimensional Ratio (SDR): 35.
 - .2 Separate gasket and integral bell system.
 - .3 Nominal lengths: 6 m.

2.2 HDPE PIPE

- .1 Type High Density Polyethylene (HDPE): to ASTM D3350 and ASTM F714 with PE 3608 or PE 4710 resin.
 - .1 Dimension Ratio (DR): 17

2.3 CONCRETE PIPE

- .1 Pipe and fittings shall be extra strength concrete conforming to the current ASTM C14, Standard for Non-reinforced Concrete Sewer, Storm Drain and Culvert Pipe, for pipe up to 450 mm in diameter.
- .2 Concrete pipe and fittings 525 mm in diameter and larger shall be Class II reinforced concrete conforming to the current ASTM C76-11 Standard for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- .3 Each length of pipe 525 mm in diameter and smaller shall be complete with a rubber gasket.
- .4 Each length of pipe 600 mm in diameter and larger shall be complete with either a rubber or "Ram-nek" flexible bituminous gasket.

2.4 CEMENT MORTAR

- .1 Portland cement: to CSA A3000.
- .2 Mix mortar 1 part by volume of cement to two parts of clean, sharp sand mixed dry.
 - .1 Add only sufficient water after mixing to give optimum consistency for placement.
 - .2 Do not use additives.

2.5 PIPE BEDDING AND SURROUND MATERIALS

- .1 Sand conforming to Section 31 05 16 - Aggregate Materials

2.6 BACKFILL MATERIAL

- .1 Backfill material shall be in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

2.7 UPWELLING TRENCH MATERIAL

- .1 Granular material for upwelling trench construction shall be clean granular material (low fines) with a maximum size of 150mm and a minimum size of 50mm.
- .2 Gabion baskets shall be constructed of stainless steel or galvanized steel material, have a maximum opening size of 50mm and conform to the dimensions shown on the drawings.
- .3 Outlet grate shall be stainless steel conforming to the dimensions shown on the drawings.
- .4 Geotextile, refer to section 31 32 19.01 0 Geotextiles.

2.8 CONCRETE COLLAR

- .1 Concrete used for concrete collars shall have a 28 day compressive strength of no less than 20 MPa. Cement used in concrete shall be sulphate resistant, meeting current CSA Standards A 23.1 Type 50 or HS Portland Cement. Water used for concrete shall be clean and free from oil, acid, alkali, organic matter or other deleterious substances and shall be equal to potable (drinking) water in physical and chemical properties.
- .2 Reinforcing steel to meet CSA-G30.18 and be grade 400 MPa.

- .3 Provide adequate support of reinforcement (according to CRSI Manual of Standard Practice)
- .4 Chairs, bolster bar supports and spacers shall have sufficient strength to support the reinforcing under normal construction conditions. Brick shall not be used for bar supports.
- .5 Bars to be fabricated in accordance with CSA-A23.1.

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 distribution piping installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Departmental Representative.
 - .2 Remove defective materials from site as directed by Departmental Representative.

3.3 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Trench alignment and depth require approval of Departmental Representative prior to placing bedding material and pipe.

3.4 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Bedding shall be in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling.

3.5 PIPE INSTALLATION

- .1 Gravity sewer shall be installed by trenchless methods where specified.
- .2 Provide the locations and sizes of shafts to the Departmental Representative for review prior to excavating.

- .3 Join pipe section together in shafts before inserting into installation hole. Pull or push entire length of pipe into installation hole from end of last pipe with bells facing away from pulling or pushing direction (for PVC or concrete pipe). Installation methods where tension is applied to a pipe section will be permitted for HDPE installations only.
- .4 Ensure the force applied to the section of pipe being pulled or pushed into the installation hole does not result in spigots being inserted into the bell beyond the manufacturer's recommended insertion depth.
- .5 Pull back the entire length of pipe already in the installation hole if a length of pipe is to be withdrawn from the installation hole.
- .6 Install pipe to the line and grade shown on the Drawings or as determined by the Departmental Representative.
- .7 Keep pipe joint deflections within the manufacturer's recommendations.
- .8 Remove construction debris and materials from sewers before performing video inspection.
- .9 Repair damage to underground and surface structures due to surface subsidence and soil heaving caused by trenchless installation methods.
- .10 Where field conditions are such that sewers cannot be installed using trenchless methods install sewers in a trench using the type of backfill specified for the installation location after receiving written approval from the Departmental Representative.
- .11 Allowable variance from centreline of pipe alignment shall be:
 - .1 Maximum 100mm horizontally.
 - .2 Maximum 25mm vertically above design grade at any one location.
 - .3 Maximum 50mm vertically below design grade at any one location.
- .12 Allowable ponding in pipe due to combined variance outlined in 3.5.11 shall not exceed 50mm.
- .13 Should pipe exceed allowable variances or allowable ponding, the pipe shall be corrected in a manner acceptable to the Departmental Representative.
- .14 Handle pipe using methods approved by Departmental Representative.
 - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .15 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points.
- .16 Install plastic pipe and fittings in accordance with CSA B182.11.
- .17 Pipe joints (PVC and Concrete):
 - .1 Install gaskets in accordance with manufacturer's written recommendations.
 - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and foreign material.

- .5 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned and lubricated and replaced before joining is attempted.
- .6 Complete each joint before laying next length of pipe.
- .7 Minimize joint deflection after joint has been made to avoid joint damage.
- .8 At rigid structures, install pipe joints not more than 1.2 m from side of structure.
- .9 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- .18 Pipe Joints (HDPE)
 - .1 Pipe joints shall be made in accordance with manufacturer's recommendations.
 - .2 Square the end of each pipe section to be fused using the facing tool of the fusion machine or approved pipe cutters.
 - .3 Remove cuttings and burrs from the pipe.
 - .4 Line up pipes in the fusion machine to ensure that pipe ends meet squarely and completely over the entire surface to be fused. Misalignment shall not exceed one-tenth of the wall thickness of the pipe.
 - .5 Check the pressure due to friction before each joint is made, using procedures provided by the manufacturer of the pipe.
 - .6 Clean the pipe ends.
 - .7 Check temperatures and insert the heater plate in the jointing machine between the pipe ends.
 - .8 Move the pipe ends against the heater plate and apply the required hydraulic pressure ensuring that the gauge reading includes the recommended heating pressure and the pressure due to friction.
 - .9 Maintain a constant pressure for formation of a continuous small bead of 3 mm diameter around the pipe.
 - .10 Constant pressure shall be maintained for the time intervals:
 - .1 average wall thickness up to and including 15 mm - 15 seconds
 - .2 above 15 mm - 25 seconds
 - .11 Remove pressure, open the machine, remove the heater plate and close the machine.
 - .12 Apply the required hydraulic pressure ensuring that the gauge reading includes both the recommended fusion pressure plus the pressure due to friction.
 - .13 Maintain constant pressure until the surface of the fusion bead is cool to the touch.
 - .14 Remove pressure and move the fused joint through the machine.
 - .15 Lower the pipe into the prepared pipe bedding, and backfill in the pipe zone immediately.
- .19 When stoppage of Work occurs, block pipes as directed by Departmental Representative to prevent creep during down time.

- .20 Cut pipes as required for special inserts, fittings or closure pieces as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .21 Make watertight connections to manholes.
 - .1 Use shrinkage compensating grout when suitable gaskets are not available.
- .22 Use prefabricated saddles or field connections approved by Departmental Representative, for connecting pipes to existing sewer pipes.
 - .1 Joints to be structurally sound and watertight.

3.6 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Backfill shall be in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling.

3.7 CONNECTION TO EXISTING MANHOLE

- .1 Connect new sewers to existing manholes at locations and elevations shown on the drawings.
- .2 Excavate required depth and core neat hole in lift station a maximum of 25mm larger than the outside diameter of the sewer.
- .3 Connect pipe with approved interference fit flexible rubber boot or gasket inserted into the cored hole.

3.8 UPWELLING TRENCHES

- .1 Upwelling trenches shall be installed with materials conforming to this specification and the details shown in the drawings.

3.9 CONNECTION TO EXISTING PIPE WITH CONCRETE COLLAR

- .1 Connection to existing corrugated steel pipes is to be made with a concrete collar conforming to this specification and the details shown in the drawings.

3.10 PLUGGING, ABANDONING AND REMOVAL OF EXISTING SEWERS

- .1 Abandon existing sewers and sewer services by completely plugging each end at a manhole or where cut off with mortar or concrete a minimum of 300mm thick.
- .2 Existing sewers specified to be removed shall be completely removed, loaded and disposed of at a location determined by the Contractor. Sewers removed in the exiting parking lot shall be backfilled with compacted select granular material.

3.11 FIELD TESTING

- .1 All PVC gravity sewer to be tested for deflection with a mandrel by pulling a cylindrical shaped mandrel constructed with 9 evenly spaced arms through the sewer after installation of the sewer services and no sooner than 24 hours after compaction of backfill.

Position the mandrel a minimum of 4 metres in front of the camera if deflection testing is performed with video inspection.

Allowable deflection to be no greater than 0.15 times the pipe SDR as indicated in table 3.11.1 of this specification. Deflection is expressed as a percent of the base inside diameter of the sewer pipe as defined in the ASTM standard to which the pipe is manufactured.

Sewer pipe that does not allow the mandrel to pass will be considered to have failed deflection testing and is to be replaced or re-bedded as directed by the Departmental Representative.

Table 3.11.1 Mandrel Dimensions for SDR 35 PVC Pipe

Nominal Pipe Size (mm)	Mandrel Arm Radius (mm)	Mandrel Contact Length (mm)
250	115.70	200
300	137.46	250
375	168.17	300
450	205.41	350
525	242.03	450
600	272.03	500

- .2 All gravity sewer mainline to have television inspection performed.
- .3 Television inspection shall be done by personnel skilled and qualified in the use of the television inspection equipment. All televising equipment shall be the most current video format. The Contractor shall supply two sets of videos and a summary report to the Departmental Representative. Inspection shall be between manholes or other appropriate locations where the equipment may be installed or removed. The section to be inspected shall not be broken down into units smaller than the distance between manholes or other appropriate locations as detailed above. The sewer shall be cleaned prior to the television inspection being done.

3.12 CLEANING

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

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The work described in herein shall consist of the supply and placement of culverts to complete the Works.

1.2 RELATED SECTIONS

- .1 Section 31 23 33.01 – Excavation, Trenching and Backfilling

1.3 REFERENCES

- .1 The most current version of The City of Winnipeg Standard Construction Specification Division 4 – CW 3610 Installation of Culverts and all other sections referenced with in CW 3610 in effect on the date of closing shall apply for all Works.

Part 2 Products

2.1 MATERIALS

- .1 Products are to be in accordance with products listed under CW 3610 found on the City of Winnipeg website at: <http://www.winnipeg.ca/matmgt/spec/>.

Part 3 Execution

- .1 All works to be executed in accordance with CW 3610 except where noted on the drawings.

END OF SECTION

APPENDIX 1

GEOTECHNICAL REPORT - DYREGROV

DYREGROV CONSULTANTS

CONSULTING GEOTECHNICAL ENGINEERS

1666 DUBLIN AVE.
WINNIPEG, MANITOBA
R3H 0H1
(204) 632-7252
FAX (204) 632-1442

February 14, 2006

File #252795

Stantec Consulting Ltd.
905 Waverley Street
Winnipeg, Manitoba
R3T 5P4

Attention: Mr. Tim Stratton, P.Eng.

Dear Sir:

Re: Wasagaming Townsite
Storm Sewer Study

We attach our December 22, 2005 letter report of the logging and sampling of test holes for the above-noted project and associated soil moisture contents. Subsequent to the submission of this report, you have asked that we provide general comments for specific considerations which have previously been reported to you.

Our responses to your request are reiterated as follows:

1. Test Hole 3 - Possible Lift Station Site
 - water level at 2.17 m at completion of drilling
 - could be higher
 - buoyancy might be a problem
 - sand between 0.22 and 1.83 m and 3.96 and 5.18 m
 - depending on depth of excavation, groundwater will have to be controlled or cut off to prevent caving conditions. Well points in the lower sand might work or sheeting into the lower clay to cut off.
2. Test Holes 1 & 5 (as instructed, Test Hole 5 not drilled)
 - groundwater at 1.29 m at Test Hole 1 at time of drilling near the top of the sand layer
 - sand layer from 1.22 to 4.72 m
 - sand is probably quite permeable. High water level (at this time of year - December 2005) might suggest no outlet or one at a high elevation.

3. Storm Sewer Construction
 - high groundwater levels and sand deposits will make excavations, generally, difficult but variable. Well point systems will probably be required at some/many locations depending on depth of excavations.
4. Test Holes 10 & 5 (test holes not drilled)
 - at Test Hole 10, groundwater at 4.42 m at completion of drilling. It would be expected to be higher once it had stabilized.
 - excavations for big manholes could vary in difficulty due to wet sand (3.05 - 3.96 m) and high groundwater.
5. High water table will present difficulties for some pipe installations and structures (manholes and lift stations).

You propose to excavate ponds to 2.0 to 2.4 m deep at test holes 2 and 4. Excavations at the test holes would be in the sands. Water levels would be above the base of the pond which would make excavations difficult unless the water levels could be lowered. Side slopes would likely have to be very flat and erosion likely a problem. The foregoing would probably be true for all of the foregoing.

Major concern would be if the sand deposit in which the ponds are built has no natural outlet. This could result in overflow of the ponds.

I trust that the foregoing is acceptable for your present purposes.

Yours truly,

DYREGROV CONSULTANTS

Per:



A.O. Dyregrov, P.Eng.

DYREGROV CONSULTANTS
CONSULTING GEOTECHNICAL ENGINEERS

1666 DUBLIN AVE.
WINNIPEG, MANITOBA
R3H 0H1
(204) 632-7252
FAX (204) 632-1442

December 22, 2005

File #252795

Stantec Consulting Ltd.
905 Waverley Street
Winnipeg, Manitoba
R3T 5P4

Attention: Mr. Tim Stratton, P.Eng.

Dear Sir:

Re: Wasagaming Townsite
Storm Sewer Study

As requested, we have undertaken the logging and sampling of test holes for the above-noted study. The test holes were located by yourselves and positioned by Parks Canada on site.

The logs of the test holes are attached, which include the results of soil moisture testing. The logs are self-explanatory but you should note that the groundwater levels were taken on completion of the test drilling which would not be representative of stable conditions. The groundwater levels should be monitored again to obtain the stabilized conditions.

You should also note that contaminated soils were present in Test Hole 11.

After your review of the test hole logs, I would be pleased to discuss any questions which you may have.

Yours truly,

DYREGROV CONSULTANTS

Per: 

A.O. Dyregrov, P.Eng.

Attch.

TEST HOLE LOGS **WASAGAMING TOWNSITE, STORM SEWER STUDY**

TEST HOLE 1

Location - south of Buffalo, 9.8 m west of Columbine
 Drilled - December 14, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 1.22	<u>Fill</u> , clay, gravel, soft		
1.22 - 4.72	<u>Sand</u> , very wet	1.22	22.1
		3.05	22.9
4.72 - 6.10	<u>Clay</u> , silty, stones & pebbles, highly plastic, dark grey, firm	4.88	19.7
6.10	End of Hole		

Note:

- Standpipe installed, tip at 6.09 m below grade (top of casing 0.81 m above grade).
- Water level at 1.29 m below grade at completion.

TEST HOLE 2

Location - 200.0 m north of Buffalo, 15.1 m west of Columbine
 Drilled - December 14, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 0.91	<u>Topsoil</u> , organic, peat-like, sandy		
0.91 - 2.74	<u>Sand</u> , very wet	1.83	23.8
2.74 - 6.10	<u>Clay</u> , silty, stones & pebbles, highly plastic, dark grey, firm	5.18	28.0
6.10	End of Hole		

Note:

- Standpipe installed, tip at 5.35 m (top 0.73 m above grade).
- Water level at 1.35 m below grade (2.08 m from top of pipe).

TEST HOLE 3

Location - 10.0 m west of east property line, 30.5 m north of Wasagaming
 Drilled - December 14, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 0.22	Grass & topsoil		
0.22 - 1.83	<u>Sand</u> , some organics, loose	0.91	10.5
1.83 - 3.96	<u>Clay</u> , silty, very sandy, light brown, medium plastic, soft, firm 2.29 - 3.96	2.13	25.5
3.96 - 5.18	<u>Sand</u> , wet	4.27	23.2
5.18 - 6.10	<u>Clay</u> , silty, stones & pebbles, highly plastic, dark grey	5.79	25.0
6.10	End of Hole		

Note:

- Standpipe installed flush to grade, tip at 6.10 m.
- Water level at 2.17 m from grade.

TEST HOLE 4

Location - 27.5 m north of SE corner of Admin. Building, 37.0 m east of SE corner of Admin. Building
Drilled - December 14, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 0.46	<u>Topsoil</u>		
0.46 - 7.92	<u>Sand</u> , silty, very wet, at 3.05 m standard penetration test 9 blows/foot	0.91	19.8
		2.44	20.8
		3.05	26.0
		4.57	29.8
7.92 - 8.08	<u>Sand</u> , clayey, low plasticity	7.93	19.2
8.08 - 15.2	<u>Sand</u> , silty, very wet		
15.2 - 18.29	<u>Clay</u> , silty, stones & pebbles, highly plastic, dark grey, firm	15.24	37.2
18.29	End of Hole		

Note:

- Standpipe installed, tip at 6.02 m.
- Water level at 1.38 m below grade.

TEST HOLE 6

Location - 42.5m north of SE corner of Recycle Compound, 5.6 m east of SE corner of Recycle Compound
Drilled - December 14, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 1.07	<u>Fill</u> , clayey gravel	0.91	10.4
1.07 - 4.27	<u>Organic</u> , peat-like	2.13	289.6
		4.27	42.3
4.27 - 6.71	<u>Sand</u> , some organics, very wet	5.79	28.0
6.71 - 7.62	<u>Clay</u> , silty, brown, soft	7.62	54.3
7.62 - 9.14	<u>Sand</u> , very wet	8.23	23.6
9.14	End of Hole	9.14	20.9

Note:

- Standpipe installed, tip at 5.73 m (top of casing 0.87 m above grade).
- Water level at grade at completion.

TEST HOLE 7

Location - 31.0 m north of Boat Cove Road, 15.2 m west of Park Lot Road
Drilled - December 14, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 1.07	<u>Sand</u>	0.61	16.4
1.07 - 4.57	<u>Clay</u> , silty, stones & pebbles, highly plastic, dark grey, firm, brown at 1.52 to 2.74, dark grey 2.74 to 4.57	1.22	19.6
		3.05	22.1
		4.57	16.1
4.57	End of Hole		

Note:

- Standpipe installed, tip at 4.37 m from grade (top of pipe 0.81 m above grade).
- Water level at completion 2.011 m below grade.

TEST HOLE 8

Location - site 342 in Campground

Drilled - December 15, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 6.1	<u>Clay</u> , silty, sandy, stones & pebbles, highly plastic, tan, firm	0.91	13.7
		2.44	12.8
		4.27	14.2
		5.79	14.9
6.1	End of Hole		

Note:

- Water level at 5.59 m on completion.

TEST HOLE 9

Location - between sites 391 and 390 in Campground

Drilled - December 15, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 1.52	<u>Fill</u> , clay, gravel	0.91	20.6
1.52 - 6.10	<u>Clay</u> , silty, very sandy, pebbles & stones, highly plastic, firm	1.83	25.6
		4.27	17.1
		5.79	16.7
6.10	End of Hole		

Note:

- Water level at 5.48 m at completion.

TEST HOLE 10

Location - 6.0 m north of Wasagaming, 3.0 m east of Buffalo

Drilled - December 15, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 1.22	<u>Fill</u> , clay, gravel	0.91	17.4
1.22 - 3.05	<u>Clay</u> , sandy, highly plastic, soft	2.44	25.6
3.05 - 3.96	<u>Sand</u> , loose, wet	3.35	28.0
3.96 - 4.57	<u>Clay</u> , silty, stones & pebbles, highly plastic, very wet, very soft	4.27	28.3
4.57	End of Hole		

Note:

- Standpipe installed, tip at 4.57 m from grade.
- Water level at 4.42 m from grade at completion.

TEST HOLE 11

Location - 6.0 m north of Buffalo, 8.5 m east of Ta-Wa-Pit

Drilled - December 15, 2005

Depth (m)	Soil Description	Depth (m)	Moisture Content (%)
0.0 - 0.91	<u>Fill</u> , clay, gravel, brown		
0.91 - 2.13	<u>Fill</u> , gravel, clay, dark brown	1.22	12.8
2.13 - 3.35	<u>Clay</u> , silty, stones & pebbles, highly plastic, dark grey, firm, very strong hydrocarbon odour	2.44	37.0
3.35 - 4.57	<u>Clay</u> , sandy, loose, wet, hydrocarbon odour not as strong	4.27	30.1
4.57	End of Hole		

Note:

- Standpipe installed, tip at 4.57 m from grade.
- Water level at 3.49 m from grade on completion.

APPENDIX 2

GEOTECHNICAL REPORT - STANTEC



January 19, 2018
File: 111217490

Attention: Morgan Proven
Parks Canada Agency
PO Box 299
135 Wasagaming Drive
Onalole, Manitoba
R0J 1N0

Dear Morgan,

Reference: Wasagaming Parking Lot Re-Development, Riding Mountain National Park, Manitoba

1. PROJECT DESCRIPTION

Stantec Consulting Ltd. (Stantec) was retained by Parks Canada Agency to provide professional consulting services for the design of the project noted above. In assisting the civil team, Stantec's geotechnical team conducted a desktop review of available information to provide recommendations on the construction and design of the parking lot re-development.

This desktop review focused on 5 project components, being:

1. The main parking lot;
2. A new bus loop located along the perimeter of the main parking lot;
3. The Ominnik Marsh trail connection;
4. The main beach path; and
5. The re-purposed emergency access road.

2. DOCUMENTATION

The available documentation reviewed included two geotechnical reports dated December 22, 2005 and February 14, 2006 by Dyrevrov Consultants, as well as photographs and complementary information provided by email by Parks Canada Agency. Copies of the 2005 and 2006 geotechnical reports are provided in **Appendix B**.



January 19, 2018
Morgan Proven
Page 2 of 11

Reference: Wasagaming Parking Lot Re-Development, Riding Mountain National Park, Manitoba

3. DESIGN RECOMMENDATIONS

3.1 MAIN PARKING LOT

The existing granular surfaced parking lot is to be paved with an asphalt surface.

Available Information

A parking lot testpit log (TH6) from the 2005 Dyregrov Consultants geotechnical report indicated the following soil structure within the granular parking area:

- 0.00 to 1.07 m: fill, clayey gravel, 10 percent moisture content;
- 1.07 to 4.27 m: organic, peat-like, 289 percent moisture content;
- 4.27 to 6.71 m: sand, some organics, very wet, 28 percent moisture content;
- 6.71 to 7.62 m: clay, silty, brown, soft, 54 percent moisture content; and
- 7.62 to 9.14 m: sand, very wet, 24 percent moisture content.

Photographs of testpits put down within the granular surfaced parking area in 2017 were provided to Stantec by Parks Canada. The photographs indicated 0.15 to 0.45 m of granular base material, underlain by 0.76 to 0.92 m of clayey gravel fill. The three testpits were terminated at a reddish layer which is assumed to be the organic, peat-like material encountered in TH6.

Discussion of Alternatives

The presence of a 3.2 m thick layer of organic, peat-like material under the parking lot is of significance. Under pavements, organic peat-like materials can cause potential problems including:

1. The organic, peat-like material is very weak and the pavement structure must be sufficient to prevent stresses from traffic loadings from causing deflections or deformations of the pavement surface;
2. If the load of the pavement increases (the thickness of the existing granular and clayey gravel fill varies from 1.07 m at TH6 to 1.82 m at the North testpit), it can result in increased settlements in the organic, peat-like layer; and
3. If site drainage patterns are altered, the change in the moisture content of the organic, peat-like material can result in a significant volume change.

While the existing granular surfaced parking lot has been in-place for some time, granular surfaces are not as susceptible to failure (deformation and cracking) as a more rigid pavement surfacing, such as asphalt.



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Morgan Proven
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Reference: Wasagaming Parking Lot Re-Development, Riding Mountain National Park, Manitoba

The parking lot pavements are designed for light duty traffic only. Three alternatives are provided for the parking lot surfacing with the risk of isolated surface failures increasing with each.

Alternative 1: Granular Surface

A granular surface is most flexible and easiest to repair should deformations occur. The following is recommended:

- The surface of the new granular should be crowned near the middle of the parking lot and sloped to the east and west side at a 1.5 to 2.0 percent slope;
- The new surface elevation should be chosen to reduce, as best possible, the thickness of the cuts and fills over the parking lot;
- The parking lot should be graded to accommodate 200 mm of new granular surfacing;
- The exposed subgrade should be compacted to at least 95 percent of standard Proctor maximum dry density and any soft or deflecting areas should be excavated an additional 200 mm and replaced with new granular; and
- The new granular surfacing material should be compacted to at least 95 percent of standard Proctor maximum dry density.

Alternative 2: Graded Aggregate Seal

A graded aggregate seal, as commonly used on low volume roads in Manitoba, could be applied as surfacing. The graded aggregate seal is more tolerant to surface movements than the asphalt surface and is easier to maintain. The following is recommended:

- Prepare the parking lot as above for the granular surface;
- Place two applications of high-float emulsion and graded aggregate; and
- Fog coat the surface.

Alternative 3: Asphalt Surface

A hot-mix asphalt surface is the most common, durable and aesthetically pleasing type of pavement surface but it is also the most susceptible to damage if settlement from the organic, peat-like layer occurs. The following is recommended:

- Prepare the parking lot as above for the granular surface except increase the thickness of the granular base to 300mm and compact to at least 98 percent of standard Proctor maximum dry density; and



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Morgan Proven
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Reference: Wasagaming Parking Lot Re-Development, Riding Mountain National Park, Manitoba

- Place and compact 60 mm of asphalt surface mix.

3.2 BUS LOOP

The bus loop will be located around perimeter of the parking lot. There is no specific geotechnical information available for the proposed bus loop. As it will be located on the perimeter of the parking lot, it is assumed that some thickness of the organic, peat-like material encountered in TH6 may also exist under portions of the bus loop.

For the bus loop, heavy duty traffic has been considered and only an asphalt surfaced pavement structure is recommended.

- The new surface elevation/profile should be chosen to reduce, as best possible, the thickness of the cuts and fills along the bus loop;
- The bus loop should be graded to accommodate a 400 mm pavement structure;
- The exposed subgrade should be compacted to at least 95 percent of standard Proctor maximum dry density and any soft or deflecting areas should be excavated an additional 200 mm and replaced with new granular;
- Place a geogrid, Tensar TriAx TX5 or equivalent, over the total subgrade width;
- Place 300 mm of new granular base and compact to at least 98 percent of standard Proctor maximum dry density; and
- Place a total of 100 mm of asphalt surface mix in two separate 50-mm lifts, tack coating between lifts.

3.3 OMINNİK MARSH TRAIL CONNECTION

The new Ominnik Marsh Trail starts at the north of the parking lot, runs along the west side and will connect the parking lot to Boat Cove Road. We understand that there was a paved trail in this area at one time but it has since been covered with topsoil and sodding. A new trail is recommended and, to develop the requirements, it has been assumed that the underlying soils are similar to those within the parking lot. Recommendations are as follows:

- Remove all topsoil/organic materials from the footprint of the path;
- If fill is required to achieve final grade, use any local sand and gravel material;
- Avoid deep cuts (greater than 0.5 m) to avoid encountering the organic, peat-like material encountered at the parking lot. Alternatively, the presence/location of the organic material could be investigated prior to completion of the final design;

Design with community in mind



January 19, 2018
Morgan Proven
Page 5 of 11

Reference: Wasagaming Parking Lot Re-Development, Riding Mountain National Park, Manitoba

- The exposed subgrade should be compacted to at least 95 percent of standard Proctor maximum dry density;
- Place a root barrier fabric on the compacted subgrade;
- Place 150mm of new granular base extending at least 150 mm wider than the asphalt surface to provide shoulder support to the asphalt;
- Compact the new granular base to at least 95 percent of standard Proctor maximum dry density;
- Surface with 50 mm of asphalt surface mix; and
- Provide a 2 percent cross slope across the paved surface.

3.4 MAIN BEACH PATH

We understand that the main beach pathway is paved, is generally in good condition and the pavement structure is unknown. The TH4 testpit log (area located east of the Main Beach Path) from the 2005 Dyregrov Consultants geotechnical report indicated a subsoil consisting of silty sand, and similar subsoil conditions are assumed for the design of the path. It is understood that the Main Beach Path may be subjected to infrequent heavy truck loadings.

Two alternatives are provided for consideration.

Alternative 1: Resurfacing

If the rehabilitated pathway is to follow the same grade and alignment and is to be the same width as the existing, resurfacing with 50 mm of asphalt surface mix is recommended as the primary rehabilitation approach.

We understand that there are several locations where tree roots have impacted the existing surface. In these areas, the path pavement could be raised over the roots using the approach provided below for full rehabilitation.

There may also be areas with extensive edge cracking and for these, the damaged asphalt should be removed and replaced prior to placing the new asphalt overlay.

The existing asphalt surface should be cleaned and tack coated prior to placing the new asphalt overlay.



January 19, 2018
Morgan Proven
Page 6 of 11

Reference: Wasagaming Parking Lot Re-Development, Riding Mountain National Park, Manitoba

Alternative 2: Full Replacement

If alignment/grade changes are being considered or if the new pathway will be wider than the existing, full replacement is recommended.

The new pathway pavement structure would be the same as recommended for the Ominnik Marsh Trail above.

3.5 RE-PURPOSED EMERGENCY ACCESS ROAD

We understand that the pavement structure of the Emergency Access Road is not known, that the first 20 m (approximate) is in poor condition, and the remainder is in good condition. The road connects to 1st Street and may occasionally be used for emergency access.

The recommendation is to reconstruct the initial 20 m section and to resurface the remaining section by placing an asphalt overlay. Recommendations are as follows:

- In the first 20 m, remove the existing pavement structure to a depth of 400 mm below final grade;
- The exposed subgrade should be graded and compacted to at least 95 percent of standard Proctor maximum dry density and any soft or deflecting areas should be excavated an additional 200 mm and replaced with new granular;
- Place 300 mm of new granular base and compact to at least 98 percent of standard Proctor maximum dry density;
- Place and compact 50 mm of asphalt surface mix;
- Clean and tack coat the entire paved surface, including the initial 20 m section;
- If necessary, place asphalt levelling material in depressions or as required to restore proper pavement cross slope; and
- Overlay with 50 mm of new asphalt surface mix.

3.6 EAST SIDE ACCESS ROAD

The East Side Access Road is asphalt surfaced and runs from Boat Cove Road, along the east side of the parking lot to the north end of the parking lot, over approximately 350m.

Available Information

Traffic data for the East Side Access Road is not available and the following has been assumed:

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- For the section from Boat Cove Road to the south end of the parking lot, it is assumed that traffic loadings will be similar to the Bus Loop road around the parking lot perimeter. This section is approximately 120 m in length; and
- For the remaining 230 m along the east side of the parking lot, it is assumed that most traffic will be light duty with occasional heavier service vehicles.

There is no available data for the East Side Access Road pavement, either from boreholes or visual assessment. Therefore, the development of the recommendations provided below has been based solely on available Google Earth Street View imagery, dated June, 2016.

While the presence of loose granular material on the pavement surface obscures the asphalt surface at many locations, the Street View imagery indicates the following:

- The main pavement distress includes moderate to severe alligator cracking;
- There are numerous recent asphalt repairs consisting of a thin lift of hot mix asphalt spread on the paved surface as well as evidence of past similar repairs;
- Severe edge cracking on both the southernmost and northernmost portions of the access road;
- Slight to moderate corrugations/rippling in several areas; and
- There is minimal drainage ditch depth, particularly on the east (upstream) side.

While alligator cracking is associated with structural failure, there is no evidence of wheel path rutting. The nature of the alligator cracking, small blocks, is typical of a pavement structure with poor drainage which correlates to the observed shallow ditches.

Discussion of Alternatives (Sections)

For rehabilitation, it is suggested that the access road be considered in two sections, based on anticipated traffic loadings.

Boat Cove Road to the South End of the Parking Lot

Reconstruction is recommended for this 120-metre section where the existing asphalt is undergoing significant cracking, and the new pavement will be subjected to the heavy bus traffic. An example of the alligator cracking is provided in the following image:



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Figure 1 -Example of Alligator Cracking



The following is recommended:

- The roadway should be graded to accommodate a 400-mm pavement structure;
- The exposed subgrade should be compacted to at least 95 percent of standard Proctor maximum dry density and any soft or deflecting areas should be excavated an additional 200 mm and replaced with new granular;
- Place 300 mm of new granular base and compact to at least 98 percent of standard Proctor maximum dry density;
- Place a total of 100 mm of asphalt surface mix in two separate 50-mm lifts, with tack coating between lifts; and
- Reinststate the open ditch on either side.



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Remaining 230 m Along the East Side of the Parking Lot

It is anticipated that the remaining section of the east side access road will not be subjected to the bus traffic and therefore reconstruction is not required. However, significant alligator cracking and repairs are evident, as shown in the following image:

Figure 2 -Evidence of Alligator Cracking



The following is recommended.

- Remove the existing asphalt pavement;
- Grade the exposed granular to the required cross slope and compact; and
- Place two 50-mm lifts of asphalt surface mix, using tack coating between lifts.

4. SPECIFICATIONS

As requested, the specifications provided below refer to the City of Winnipeg (CW) standard construction specifications:

- Granular surfacing material to meet Base Course Material requirements as per Table CW 3110.2;



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- Granular Base course materials to meet Base Course Material requirements as per Table CW 3110.2;
- Granular material used for the repair of soft or deflecting areas to meet Crushed Sub-Base Materials requirements as per Table CW 3110.1;
- Surface course hot mix asphalt (HMA) to meet Type 1 requirements as per Table 1, CW 3410-R5.1;
- Base course HMA to meet Type III requirements as per Table 1, CW 3410-R5.1;
- Tack coat to meet the requirements of CW 3410 Section 5.5.2;
- Geogrid to meet the requirements of CW 3135; and
- Provide Polyspun 300 root barrier fabric or approved equivalent.

5. CONSTRUCTION CONSIDERATIONS

The presence of the organic, peat-like material under the parking lot, bus loop road and Ominnik Marsh trail can create difficulties for construction. It is suggested that the use of heavy truck traffic during construction be either well managed or restricted in these areas based on observed surface deflections. Also, compaction of the subgrade/granular in these areas should be achieved without vibration, compacting in static mode only. Compaction of the asphalt surfacing will require vibration.

6. CLOSURE

This report has been prepared by Stantec Consulting Ltd. ("Stantec") for the sole benefit of the Parks Canada Agency and its agents, and may not be used by any third party without the express written consent of Stantec Consulting Ltd. Any use, which a third party makes of this report, is the responsibility of such third party. Use of this report is subject to the Statement of General Conditions provided in **Appendix A**. It is the responsibility of Parks Canada Agency who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Stantec Consulting Ltd. should any of these not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report;
- Basis of the report;
- Standard of care;
- Interpretation of site conditions;

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- Varying or unexpected site conditions; and
- Planning, design or construction.

We trust the above information meets with your present requirements. Should you have any questions or require further information, please contact us.

We appreciate the opportunity to assist you in this project.

Regards,

Stantec Consulting Ltd.

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Attachment:

- Appendix A – Statement of General Conditions
- Appendix B – Geotechnical Reports

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APPENDIX A

STATEMENT OF GENERAL CONDITIONS

STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec's present understanding of the project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec at the time of the work at field observation locations (i.e., specific sites, areas, or traverses) and through interpretation of both digital aerial photography and LiDAR data. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated behaviour of materials or geomorphic processes. Extrapolation of in situ conditions can only be made to some limited extent beyond the field observation locations. The extent depends on variability of the soil, surficial materials, bedrock, soil moisture and groundwater conditions as influenced by geological processes, construction activity, and land use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report, Stantec must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec will not be responsible to any party for damages incurred as a result of failing to notify Stantec that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer or geoscientist; Stantec cannot be responsible for site work carried out without being present.