

Parks Canada Agency

Water Treatment System

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Reference Documents:

1. DIA – Rock Creek Campground Upgrads and Expansion – Feb 2016
2. PCA Construction Signage Translation Rev 1 Nov 2016
3. Geotechnical Memo – Revised June 28, 2016
4. Technical Memo – Foundation Review – May 24, 2018

01 11 00 SUMMARY OF WORK**Part 1 General****1.1 PRECEDENCE**

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

1.2 DEFINITIONS

- .1 Saskatchewan Government Ministry of Highways and Infrastructure is referred to as “MHI”. The MHI Standard Specification Manual can be found at the following location:
 - 1. <http://www.highways.gov.sk.ca/business>
- .2 Changes in Definition, - The following changes in definitions have been made to the “BC MHI Specifications”:
 - .1 Engineer – The word “Engineer” shall mean Departmental Representative or their duly appointed representative.
 - .2 Deputy Minister – The word “Deputy Minister” shall mean Parks Canada Agency.
- .3 Grasslands National Park of Canada is referred to as “GNP” or “the Park”.
- .4 Parks Canada Agency is referred to as “PCA”.
- .5 Environmental Surveillance Officer is referred to as “ESO”.
- .6 Site means the areas on or within the limits of Construction as referenced on the Drawings and/or described in the Contract Documents.
- .7 Work means the provision of all labour, services, material, and equipment as necessary, for the Contractor to complete and perform its obligations in accordance with the Contract.
- .8 IFT mean “Issue for Tender”
- .9 IFC mean “Issue for Construction”

1.3 PROJECT LOCATION

- .1 The project is located in Grasslands National Park, Saskatchewan. Construction work is located in the Rock Creek Campground in the East Block.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The project work consists of construction of a water treatment system and maintenance building to service the newly upgraded Rock Creek Campground along with the required infrastructure for water supply and disposal.
- .2 All requirements noted within the Contract Documents shall be completed by the Contractor unless specifically stated otherwise.
- .3 Without limiting the scope of work, the work of this Contract generally comprises the following, as directed by the Departmental Representative:
 - .1 Construction of a Maintenance building including but not limited to:
 - .1 Site preparation including stripping of topsoil
 - .2 Foundation Construction

- .3 Structural
- .4 Electrical
- .5 Mechanical
- .6 Architectural Finishes
- .7 Water treatment system and associated process piping
- .2 Water and wastewater (grey and black) servicing, including but not limited to:
 - .1 Storage tanks
 - .2 Piping and Conveyance system
 - .3 Pumps
 - .4 Electrical
 - .5 Manholes
- .3 Grading and construction including excavating all types of material
- .4 Bollard installation
- .5 Landscaping
- .6 Miscellaneous construction as indicated on Drawings and Specifications.
- .7 Installation and maintenance of temporary barriers and supply and installation of temporary traffic control and other temporary construction facilities required for completion of the Work of the Project.
- .8 Miscellaneous Additional Work as directed by the Departmental Representative.
- .4 In preparation for and during construction of this project, an “Environmental Protection Plan” (EPP) is to be prepared by the Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures to ensure the desired minimal adverse effects are achieved. The Contractor’s EPP must be approved by Parks Canada Agency prior to the commencement of construction. The Departmental Representative and Parks Canada’s Environmental Surveillance Officer (ESO) will refer to the approved EPP in determining compliance with the Plan and Contract Documents. The approved EPP will form part of the Contract.
- .5 Where material and construction specifications for work covered under the Contract, including any Change Orders are not available, **the National Building Code of Canada (latest edition)** shall apply unless directed otherwise by the Departmental Representative.

1.5 CONTRACT METHOD

- .1 Construct Work under combined price Contract.

1.6 WORK BY OTHERS

- .1 The Contractor is advised that the following Work and anticipated completion in the vicinity has been or will be contracted by Parks Canada:
 - .1 Scenic Roadway, Spring 2018
 - .2 Campground Cattle Exclusion Fencing, Ongoing
 - .3 Other projects and maintenance work may occur in GNP in 2019 and 2020.
- .2 Where it is necessary that work is to proceed in areas of this project common to both the Contractor and forces of others, the Contractor shall cooperate with the other Contractors and the PCA Departmental Representative in reviewing their construction schedules and

sharing their work space, and shall coordinate their operations with the other Contractors, including traffic management and construction staging.

- .3 The Contractors shall coordinate all work on this project with other Contractors including Site Safety and Traffic Control.

1.7 **WORK SEQUENCE**

- .1 Schedule work progress to allow Owner / Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Maintain fire and emergency access on the roadways at all times.
- .3 Co-ordinate Work with other Contractors / Departmental Representatives doing maintenance, survey / testing work.
- .4 The Contractor shall prepare a meaningful bar chart or network diagram showing the proposed schedules of major work, which shall be submitted to the Departmental Representative in accordance with 01 32 16 Construction Progress Schedules.
- .5 The Contractor shall commence Work immediately after award of contract.
- .6 Construction site shall be closed to general public.
- .7 The Contractor shall Coordinate Progress Schedule during construction.
- .8 The Contractor shall
 1. Only be allowed to start work within GNP once all required submittals have been approved.
 2. Obtain Final Completion of the Work by July 31, 2019 (Contract Completion Date).

1.8 **CONTRACTOR USE OF PREMISES**

- .1 The Contractor is not permitted to extract and process native material for the production of granular aggregate anywhere inside GNP unless specifically directed by the Departmental Representative.
- .2 Contractor has unrestricted use of site subject to Section 01 14 00 –Work Restrictions and Section 01 29 01 – Site Occupancy, until Contract Completion date. The Contractor's use of the site is not exclusive of other contractors or work zones within the limits of this Contract.
- .3 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Work by other Contractors.
 - .3 Normal Campground Operations.
- .4 Coordinate use of premises under direction of the Departmental Representative.
- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 All Contractor's business and private vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from the PCA ESO or as directed by the Departmental Representative.
- .7 The Contractor and any subcontractors shall obtain a business license and vehicle work passes from the GNP office at:

101 Center Street

Val Marie, Saskatchewan

S0N 2T0

prior to commencement of the contract.

1.9 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .3 Contractor must allow access to the Work Site for other Contractors and PCA. It is up to the Contractor to plan their work accordingly.

1.10 OWNER FURNISHED ITEMS

- .1 None

1.11 CONSTRUCTION SIGNAGE

- .1 Signage shall be coordinated with other Contractors.
- .2 No signs or advertisements, other than warning signs, are permitted on site.
- .3 Signs and notices for safety and instruction shall be in both official languages. Signs shall be diamond grade and shall conform to CAN3-Z321.
- .4 The Contractor shall maintain approved signs and notices in good condition for duration of project and remove or dispose the signs off-site upon completion of project or earlier as directed by the Departmental Representative.
- .5 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts (other than Changeable Message Signs) that shall be secured at all times.

1.12 SETTING OUT OF WORK

- .1 Departmental Representative will establish control points and provide:
 - .1 One complete set of Construction Drawings.
 - .2 Alignment notes showing curve data and control point coordinates.
 - .3 Provide a list of control monuments including coordinates and elevations on request.
 - .4 Initial Layout Survey and Final As-built Drawings.
- .2 Contractor shall:
 - .1 Not permanently mark any infrastructure or feature during their setting out of the work. They shall fully remove any set out marks, markers, or other identifiers that they installed, prior to demobilizing from the Work Sites.
 - .2 Set additional control points as necessary.
 - .3 Set all work stakes necessary to complete work.
 - .4 Allow sufficient time for Departmental Representative to take measurements for payment.
 - .5 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative.

- .6 Provide survey, electronic data and red-line markups for payment and project close out.
- .3 No separate payment for setting out work, unless changes are made and approved by the Departmental Representative and additional survey costs are incurred.

1.13 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Construction, testing and commissioning of the Maintenance Building and its contents, unless explicitly paid for separately in the Unit Price Schedule, shall be made as a single Lump Sum under “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made. This payment shall be considered complete compensation for all preparation, foundation and slab and concrete walkway, building electrical, building mechanical, building structural, finishes, roofing, doors, and appliances, and all other required items and work to complete the work, with only the exception of the treatment system, which shall be paid for under separate bid items as noted.

Part 2 Products

- .1 To be in accordance with MHI - Standard Specifications Manual (latest edition), unless otherwise noted.

Part 3 Execution

- .2 To be in accordance with MHI - Standard Specifications Manual (latest edition), unless otherwise noted.

END OF SECTION

01 14 00 WORK RESTRICTIONS**Part 1 General****1.1 ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial, federal, and other regulations. Maintain access during construction.
- .2 Provide for pedestrian, cyclist, and vehicular traffic for the duration of the construction.
- .3 Construction operations shall be conducted to cause minimal inconvenience to the public and to owners of adjoining property. Existing access to property shall be maintained as far as possible and if new access must be provided, every effort shall be taken to provide the new access before the existing access is removed. Contractor will be responsible for repairing any damage incurred, at the Contractor's cost.
- .4 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.2 USE OF THE SITE AND FACILITIES

- .1 The Work Sites specified in the Contract shall only be used for the purposes of the Work.
- .2 The Work Site (limits shown on the Drawings) will be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .3 The Contractor will not be permitted to set up a camp in the National Parks. PCA regulations prohibit anyone working within the Park from using public campground facilities.
- .4 Office-tool trailer may also be set up at the Poverty Ridge Site. See Section 01 35 43 – Environmental Procedures.
- .5 All work shall be subject to Section 01 35 43 – Environmental Procedures restrictions.
- .6 The Contractor shall not store material or park equipment along the Highway Right of Way within the clear zone.
- .7 Contractor shall maintain adequate drainage at the Work Site.
- .8 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary and at their cost for the performance and inspection of the Work.
- .9 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and Section 01 35 43 - Environmental Procedures. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .10 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at their expense.
- .11 Pets shall not be brought to or maintained at the construction site or worker's camp.

1.3 WORKING TIMES

- .1 Work in GNP is permitted during daylight hours from 08:00 to 18:00, Monday to Friday unless as stipulated otherwise in the DIA.
- .2 No work will be permitted on Saturdays and Sundays unless prior written approval is granted by the Departmental Representative
- .3 Work will not occur at night to avoid the need for artificial lighting resulting in additional sensory disturbance of bats or their prey.
- .4 Construction activities will minimize light pollution as much as reasonably possible to preserve GNP's dark sky status and minimize potential impacts to wildlife.
- .5 The Contractor will not be permitted to work during the period of any Saskatchewan statutory holiday long weekend, including one day prior to and one day following. The Contractor will not be permitted to work during the following Civic Holidays or long weekends unless prior written approval is granted by the Departmental Representative:
 - .1 Statutory and Civic Holidays (2018)
 - .1 Family Day weekend: From 18:00 Thursday, February 14, 2019 to 08:00 Tuesday, February 19, 2019.
 - .2 Easter weekend: From 18:00 Thursday, April 18, 2019 to 08:00 Tuesday, April 23, 2019.
 - .3 Victoria Day weekend: From 18:00 Thursday, May 16, 2019 to 08:00 Tuesday, May 21, 2019.
 - .4 Canada Day Weekend: From 18:00 Thursday, June 27, 2019 to 08:00 Tuesday, July 2, 2019.
 - .5 Labour Day weekend: From 07:00 Friday, August 1, 2019 to 07:00 Thursday, August 6, 2019.
- .6 The Contractor will not be permitted to work during the following special events unless prior written approval is granted by the Departmental Representative:
 - .1 Special Events (2019):
 - .1 None Scheduled
- .7 Variance of the Working Times and any others are provided on the strict condition of satisfactory performance in all requirements as determined at the Departmental Representative's discretion and may be revoked at any time for any reason. It is provided on the presumption that no additional costs or any delay will be attributed to Parks Canada in relation to conducting Works in accordance with the Variance and if that is not the case, the Contractor shall not commence work under the Variance. No claims for additional costs, delays, schedule impacts, loss of productivity or other extra Works resulting from a Variance will be entertained.

1.4 UTILITIES

- .1 The Contractor shall become familiar with all utilities and services adjacent to the Work and shall be responsible for cost of repair of any damage resulting from their operations.
- .2 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. The Contractor shall co-operate with them at all times and in all places of Work. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities.

- .3 The Drawings include indicative utility details from within the area for reference however the Contractor remains fully responsible for determining the full and accurate extent of utilities within the area of their Works.
- .4 The Contractor shall notify the Departmental Representative and the Utility companies at least seven (7) days in advance of any activities which may interfere with the operation of such Utilities.
- .5 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .6 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall, in consultation with Utility owner(s), protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .7 The Contractor shall immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.5 SURVEY OF EXISTING CONDITIONS

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

1.6 ARCHAEOLOGICAL RESOURCES

- .1 As identified in the Detailed Impact Analysis, suspected or known archaeological sites and others that have high archaeological potential are in proximity to the construction limits.
- .2 The Contractor shall undertake the Works as described in Section 01 35 43 - Environmental Procedures.

1.7 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of WorkSafe SK and the Workers Compensation Act of Saskatchewan including, but not limited to, Occupational Health and Safety Regulations and General Safety Regulations. Within the Site, the Contractor has all the responsibilities of an “employer” under the *Workers Compensation Act* and the *Occupational Health and Safety Regulation* and is designated as the “Prime Contractor”.
- .2 Prime Contractor must comply with Workers Compensation Act and Occupational Health and Safety Regulation Section 20.3 Coordination of multiple employer workplaces.
- .3 Comply with all applicable safety regulations of the Workers’ Compensation Board of Saskatchewan (WCB) including, but not limited to, WCB’s Industrial Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations, when working in that province.
- .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .5 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.
- .6 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property or, if Parks Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage.

1.8 USE OF PUBLIC AREAS

- .1 Off-road construction equipment will not be allowed on the existing highway except at designated areas where the existing highway is scheduled for re-construction in this Contract, material loading areas, or alternate sites as designated and approved by the Departmental Representative.
- .2 Steel tracked equipment with cleats will not be allowed on existing campground roadways. If or when crossing existing roadways, rubber mats must be used under the tracks to protect the road. Granular, embankment and excavation materials may be hauled on existing highway but this shall be by standard highway trucks not exceeding legal highway load limits unless accepted in writing by the Departmental Representative.
- .3 Flag persons shall be provided when vehicles are entering or exiting Work Site access points and when vehicles are entering or exiting gravel storage areas in the park.
- .4 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner that will prevent dropping of materials or debris on the roadways and, where contents may otherwise be blown off during transit, such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to the Owner. All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.

1.9 USE OF PITS, QUARRIES, AND DISPOSAL SITES, OUTSIDE OF THE NATIONAL PARKS

- .1 When the Contractor is supplying material from a pit or quarry outside of the National Parks the Contractor is responsible for all permits and approvals. Pit or quarry development and reclamation must be in accordance with local and Provincial regulatory agency requirements and approved by PCA.
- .2 When the Contractor is disposing of; stripping, unsuitable, or surplus material in a pit or other disposal sites outside of the National Parks the Contractor is responsible for all permits and approvals. Disposal site or pit development and reclamation must be in accordance with local and Provincial regulatory agency requirements.
- .3 The Contractor shall bear and pay all costs, fees, and royalties for pits, quarries, or disposal sites, outside of the National Parks.
- .4 Material supplied from pits and quarries outside of the National Parks must be clean of all, seeds, organics, top soil, or contaminants. No additional payment will be made for cleaning or washing material supplied from pits and quarries outside of the National Parks.
- .5 Material supplied from pits and quarries outside of the National Parks must meet requirements in the Contract Documents.

1.10 SUBMITTALS & PERMITS

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 The Work shall be designed, constructed, and commissioned in a manner which is compliant with local authorities.
- .3 The Contractor shall be required to apply for and receive all relevant permits prior to starting Work, including building permits.

1.11 SUPERVISORY PERSONNEL

- .1 When requesting a Preconstruction Meeting, in accordance with Section 01 31 00 -Project Management and Coordination, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 At a minimum, the following personnel shall be included in the list:
 - .1 Contractor Manager
 - .2 Project Superintendent;
 - .3 Safety Representative;
 - .4 Quality Control Manager;
 - .5 Environmental Representative;
 - .6 Traffic Control Representative;
- .3 The above personnel shall perform the following duties:
 - .1 Contractor Manager with full authority, as agent of the Contractor, to act on behalf of and legally bind the Contractor in connection with the Work and the Contract. The Contractor may, at its discretion, appoint one person as both Contractor Manager and Project Superintendent.

- .2 The Project Superintendent shall be employed full time with full authority to supervise the Work, who shall be directly available to the Department Representative during all active periods of Work. Either they or their designated deputy shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work.
- .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
- .4 The Safety Representative shall possess a minimum of 2 years' construction safety supervisory experience. Their duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.
- .5 The Quality Control Representative shall be responsible for the development, implementation and execution of the Quality Management Plan and shall be the single point of contact for all quality related queries.
- .6 The Traffic Control Representative shall be responsible for the development, implementation and execution of the Traffic Management Plan and shall be the single point of contact for all traffic control related queries.
- .7 The Environmental Representative shall be responsible for the development, implementation and execution of the Environmental Protection Plan and shall be the single point of contact for all environmental related queries.

1.12 WASTE DISPOSAL

- .1 All surplus, unsuitable and waste materials shall be removed from the Work Sites to approved sites outside the National Parks. Refer to Section 01 35 43 - Environmental Procedures.
- .2 Deposit of any construction debris into any waterway is strictly forbidden.
- .3 Cost for Waste Disposal described above shall be considered incidental to the Unit Price items and no additional payment will be made.

1.13 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of the environment over cost and schedule considerations for Work as shall be indicated in the Contractor's Health and Safety Plan.

1.14 BUILDING SMOKING ENVIRONMENT

- .1 Smoking is only allowed in designated areas.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 21 00 ALLOWANCES**Part 1 General****1.1 REFERENCES**

- .1 General Conditions.

1.2 PRIME COST SUM

- .1 Included in Contract Price a total Prime Cost Sum of:
 - .1 **\$40,000** for items as listed below.
- .2 Do not include in the Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .3 Prime Cost Sum provided for in the Lump Sum Arrangement Table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of the Contract.
- .4 No interpretation of the items listed under Prime Cost Sum Allowances shall indicate that work will be included under the Prime Cost Sum. Items, tasks, and activities included in the Works elsewhere in the Contract, including Unit Price and Lump Sum Items, shall be paid as indicated in those sections and not under the Prime Cost Sum.
- .5 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
- .6 All expenditures must be substantiated with verified invoices and/or accepted daily extra work reports as noted in Measurement and Payment Procedures below.
- .7 Such work may include, but not be limited to:
 - .1 Additional stripping, excavation and disposal of waste materials as directed by the Departmental Representative;
 - .2 Danger tree assessment and removal;
 - .3 Additional relocation or removal and disposal of existing signs, guardrail, guide posts and other miscellaneous items;
 - .4 Supply and installation of permanent signs (not construction signs);
 - .5 Removal and disposal or plugging of existing culverts;
 - .6 Supply and installation of specialty items at Day Use Areas including, but not limited to, dry toilets, picnic tables, and garbage bins;
 - .7 Additional survey resulting from changes made by the Departmental Representative;
 - .8 Relocation / protection of existing utilities, including payment of utility service provider costs;
 - .9 Utility Pole Relocation;
 - .10 Additional remediation or removal and replacement of unsuitable or contaminated soils not described in the Contract Documents;
 - .11 Supply and installation of wildlife fencing;
 - .12 Additional supply and installation of seeding;

- .13 Supply and installation of additional landscaping;
- .14 Additional supply and installation of Riprap;
- .15 Additional road structure repairs;
- .16 Additional drainage improvements; ditching; culvert repairs; and cleaning;
- .17 Sub-drainage not specified in the tender documents;
- .18 Additional supply and installation of Guide Posts;
- .19 Traffic control equipment additional to is required by the applicable regulations and standards.
- .20 Relocation of existing structures;
- .21 Supply and maintenance of Departmental Representative's office trailer; and
- .22 Miscellaneous work as directed by the Departmental Representative.
- .8 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.

1.3**MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Payment for Work under the **"Lump Sum Price Item 3 – Prime Cost Sum"** made using negotiated rates or by material, labour and equipment rates as per the following:
 - .1 Rental rates will be in accordance with current Saskatchewan Heavy Construction Association's rate schedule and will be all inclusive and fully operated.
 - .2 Vehicles (ie. Pickup trucks) will be paid either at daily rates as per the Saskatchewan Heavy Construction Association's (most recent) or by mileage using National Joint Council (NJC) rates, whichever is lower. The Contractor will not be permitted to claim both daily rental and mileage rates.
 - .3 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits. Transportation time to and from site to be reimbursed only if equipment is used exclusively for additional work.
 - .4 Equipment paid on standby will be paid on 50% of the relevant Less Operator rates to a maximum of 10 hours per day.
 - .5 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
 - .6 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as accepted by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
 - .7 A claim for additional payment will be considered submitted when all required documentation has been received by the Departmental Representative.
 - .8 The Departmental Representative's, or their delegate's, signature on extra work reports is only a record of the equipment, materials and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.

- .9 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
- .10 The Departmental Representative's, or their delegate's, signature on any of the Contractor's Daily Extra Work Reports shall not be an agreement to waive any portion of the Contract regardless of any wording to the contrary.
- .11 Unless otherwise provided for in the Contract, payment on a time and materials basis represents complete payment (exclusive of GST) and reimbursement for all impacts, related costs and expenses, including, without limitation: time; labour; materials; equipment; mobilization; subcontracting; overhead; profit; general supervision; occupational tax and any other Federal or Provincial revenue legislation exclusive of GST; premiums for public liability and property damage insurance policies; bonding; for the use of all tools and equipment for which no specific rental payment provision exists; and for all costs incurred by the Contractor in supplying materials.
- .12 Reimbursement for Living Out Allowance (LOA), as agreed upon by the Departmental Representative, shall be pro-rated based on the portion of the standard 10-hour work day spent on extra work items up to a maximum of 10 hours. LOA reimbursement will only be considered for extra works completed under Force Account rates and payment for LOA will not exceed the agreed upon daily rate.

Part 2 Products

- .1 Products shall be in accordance with Sask MHI Standard Specification Manual (latest edition) or as directed by the Departmental Representative.

Part 3 Execution

- .1 Work shall be in accordance with Sask MHI Standard Specifications Manual (latest edition) or as directed by the Departmental Representative.

END OF SECTION

01 25 20 MOBILIZATION AND DEMOBILIZATIONS**Part 1 General****1.1 DESCRIPTION**

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

1.2 MEASUREMENT AND PAYMENT PROCEDURES

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

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 29 01 SITE OCCUPANCY**Part 1 General****1.1 DEFINITION OF OCCUPANCY**

- .1 The Contractor shall be permitted to lease and occupy sites where they will be working in the National Parks, free of charge from the date of award of the Contract up to and including the specified completion date. The sites to be leased by the Contractor include all the roads and areas specified in the Contract documents and as directed by the Departmental Representative.
- .2 The Contractor's occupancy of the sites identified in Contract will be deemed to have ended, when the following conditions are met to the satisfaction of Parks Canada:
 - .1 All the work identified under this Contract, has been completed.
 - .2 All sites' have been cleaned up and any outstanding deficiencies for the work identified under this Contract have been addressed to the satisfaction of the Departmental Representative.
 - .3 Contractor has removed from the park all trailers and equipment and sites have been cleaned-up to the satisfaction of the Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 31 00 PROJECT MANAGEMENT AND COORDINATION**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 CHANGES TO DESIGN

- .1 If a change from the IFC design is accepted in writing by the Departmental Representative and agreed on by the Contractor, a design variance letter will be issued by the Departmental Representative. The design variance letter must state what changes are being made from the IFC design and what the method of measurement for payment will be, if varying from the Contract Documents.
- .2 The design variance letter must be signed by both the Contractor's Representative and the Departmental Representative prior to performing the Work.
- .3 The Departmental Representative reserves the right to use as-built survey or neat line measurements for payment if for any reason tolerances are not in accordance with the IFC design.

1.3 COORDINATION

- .1 Perform coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other Contractors, and Work by Owner, under instructions of the Departmental Representative.

1.4 PROJECT MEETINGS

- .1 During the course of the Work, the Contractor shall attend weekly construction meetings as scheduled, chaired, and documented by the Departmental Representative.
- .2 The agenda will include among other things, general construction, payment, scheduling, risk, quality, environmental, and safety management items as well as any other reasonably requested by the parties.
- .3 The Contractor shall provide physical space and make arrangements for meetings at or near the Work Sites for all meetings that take place in relation to the Contract from their mobilization until their demobilization.
- .4 Meetings held outside of the time noted above (before mobilization or after demobilization) will either be held in the local PCA Field Unit offices, or at the Owner's site office, as notified by the Departmental Representative.
- .5 The Contractor will attend or otherwise ensure the attendance of their staff, subcontractors, consultants, suppliers, or other key parties all other meetings identified in the Contract or reasonably requested by the Departmental Representative in an effort to resolve specific issues as they may arise.
- .6 Meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .7 As described in Section 01 35 43 – Environmental Procedures, an environmental briefing for all staff will take place before beginning work at the site.

1.5 CONSTRUCTION ORGANIZATION AND START-UP

- .1 Within seven (7) days after award of Contract, request a Preconstruction meeting of Contract Representatives to discuss and resolve administrative procedures and responsibilities. Meeting shall be chaired by the Departmental representative who will prepare the minutes of the meeting.
- .2 Senior representatives of the Owner, Departmental Representative, Contractor, major subcontractors, field inspectors and supervisors are to be in attendance.
- .3 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 16 – Construction Progress Schedules.
 - .3 Schedule of submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
 - .5 Site safety and security in accordance with Sections 01 14 00 – Work Restrictions, 01 35 29 – Health and Safety Requirements, 01 52 00 – Construction Facilities and 01 35 43 – Environmental Procedures.
 - .6 Quality Control in accordance with Section 01 45 00 – Quality Control.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .8 Owner-furnished materials.
 - .9 Monthly progress claims, administrative procedures, photographs, and holdbacks.
 - .10 Closeout procedures and submittals in accordance with Sections 01 77 00 – Closeout Procedures and 01 78 00 – Closeout Submittals.
 - .11 Insurances and transcript of policies.
 - .12 Other business.
- .4 Comply with Departmental Representative's allocation of mobilization areas of site, for field offices and sheds, and for access, traffic, and parking facilities.
- .5 During construction, coordinate use of site and facilities through Departmental Representative's procedures for intra-project communications: submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts.
- .6 Comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
- .7 Coordinate field engineering and layout work with the Departmental Representative.

1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings if part of tender
 - .2 Specifications
 - .3 Addenda

- .4 Reviewed Shop Drawings and mix designs
- .5 Change Orders
- .6 Other modifications to Contract
- .7 Traffic Management Plan
- .8 Safety Plan
- .9 WHMIS
- .10 Environmental Protection Plan
- .11 Quality Control Plan and field test reports
- .12 Copy of accepted Work schedule and most recent updated schedule
- .13 Labour conditions and wage schedules
- .14 Equipment rate schedule and applicable versions of the relevant rate guides
- .15 Applicable current editions of municipal regulations and by-laws

1.7 SUBMITTAL SCHEDULE

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare a schedule of the required submissions and the date the submissions will be made. Include columns for Actual Date of Submission, Review Comments Received, Final Submission and Final Acceptance Received. Provide this schedule to the Departmental Representative in Excel format.
- .3 The Owner will not be responsible for any construction delays resulting from delays in submission acceptance if the submittal dates shown in the Submittal Schedule are not achieved.

1.8 PROJECT SCHEDULES

- .1 In accordance with Section 01 32 16 - Construction Progress Schedules.

1.9 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit requests for payment for review, and for transmittal to Departmental Representative. Payment request on last day of the month.
- .3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .4 Process substitutions through Departmental Representative.
- .5 Process change orders through Departmental Representative.

1.10 CLOSEOUT PROCEDURES

- .1 In accordance with Section 01 77 00 - Closeout Procedures.

Part 2 Products

- .1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

01 32 16 CONSTRUCTION PROGRESS SCHEDULES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 DEFINITIONS

- .1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (Gantt Chart): A graphic display of schedule-related information. In a 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 accepted plan for Project.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five-day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: Number of work periods (not including holidays or other nonworking periods required to complete an activity or other Project element. Usually expressed as workdays or work weeks.
- .6 Master Plan: A summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: A significant event in Project, usually completion of a major deliverable.
- .8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: Overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

- .1 Ensure the Project Schedule is practical and remains within specified Contract duration.
- .2 Ensure all the Work required for the Contract is identified in the Project Schedule. Refer to Section 01 11 00 – Summary of Work for a potential list of activities.
- .3 Include an allowance in the schedule for Work performed and paid for as Prime Cost Sum. Refer to Section 01 21 00 – Allowances for a list of activities.
- .4 Plan to complete Work in accordance with prescribed Project Schedule.
- .5 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this Contract.

- .6 After review, revise and resubmit schedule to comply with revised project schedule.
- .7 During progress of Work revise and resubmit as directed by the Departmental Representative.
- .8 Include the requirements of Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.4 SUBMITTALS

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

1.5 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
- .2 Include in Project Schedule the Contractual dates under Section 01 11 00 - Summary of Work.

1.6 MASTER PLAN

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

1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule separately identifies the Work by area and station.
- .3 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Contract Award
 - .2 Obtaining Permits
 - .3 Pre-mobilization Submittals
 - .4 Mobilization
 - .5 Site Preparation
 - .6 Foundation
 - .7 Structural
 - .8 Underground Utilities / Shrub Beds
 - .9 Electrical
 - .10 Mechanical
 - .11 Parking Lot
 - .12 Architectural Finishes
 - .13 Interim Inspection

- .14 Remediation of any noted deficiencies
- .15 Site Clean-up / Demobilization
- .16 Final Completion

1.8 **PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule on monthly basis or as and when requested by the Departmental Representative, reflecting activity changes and completions, as well as activities in progress.
- .2 Provide Weekly Progress Reports that identify completed work and Work planned for the following week in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Include as part of Project Schedule Update, a narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.9 **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 accepted dates shown on baseline schedule.
- .2 Meetings in accordance with Section 01 31 00 - Project Management and Coordination.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 33 00 SUBMITTAL PROCEDURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an 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, and written acceptance of the submittal has been issued by the Departmental Representative.
- .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 Submittals must be accompanied by a completed Quality Control Checksheet in accordance with Section 01 45 00 – Quality Control prior to submission to Departmental Representative. This completed Quality Control Checksheet represents that all the necessary requirements have been met and that the submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 Notify Departmental Representative in writing at time of submission, identifying any deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work is consistent.
- .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 accepted copy of each submission on site.

1.3 "DESIGN AND BUILD", SHOP DRAWINGS, PRODUCT DATA, AND MIX DESIGNS

- .1 "Design and Build": The term "Design" refers to all detailed design activities (survey, investigation, drawings, specifications) based on general requirements contained in the Contract Documents. "Build" refers to construction of Contractor's detailed design after design has been reviewed by the Departmental Representative. Contractor's responsibility for error and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data that are to be provided by the Contractor to illustrate details of a portion of Work. This is to be completed, submitted to the Department Representative and approved, prior to the work commencing

- .3 The term “Mix Design” means an engineered design for proportioning materials in concrete or asphalt concrete pavement including all supporting test results, materials properties, that is acceptable to the Departmental Representative.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross-references to Contract Documents.
- .5 Allow fourteen (14) calendar days for Departmental Representative’s review of each submission.
- .6 Adjustments made on shop drawings by the Departmental Representative are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with the Work.
- .7 Make changes in shop drawings as the Departmental Representative may require, consistent with the Contract Documents. When resubmitting, notify the Departmental Representative in writing of any revisions other than those requested.
- .8 Submit letter(s) of certification with all mix designs.
- .9 Accompany submissions with a transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor’s name and address.
 - .4 Identification and quantity of each shop drawing, mix design, product and sample.
 - .5 Other pertinent data.
- .10 Submissions shall 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 the Contract Documents.
 - .5 Details of appropriate portions of the Work as applicable:
 - .1 Fabrication,
 - .2 Performance characteristics,
 - .3 Standards.
- .11 After the Departmental Representative’s review, distribute copies.
- .12 Submit one (1) electronic copy of the shop drawings or mix design for each requirement requested in the Contract Documents and as requested by the Departmental Representative.

- .13 Submit one (1) electronic copy of the product data sheets or brochures for requirements requested in the Contract Documents and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of the product.
- .14 Delete information not applicable to project.
- .15 Supplement standard information to provide details applicable to project.
- .16 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .17 The review of shop drawings and mix designs by Departmental Representative is for the sole purpose of ascertaining conformance with the Contract requirements. This review shall not mean that Departmental Representative approves details of the design inherent in shop drawings, responsibility for that shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting the generality of the foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 **SAMPLES**

- .1 Material samples to be provided as outlined in the Contract Documents or as requested by the Departmental Representative.

1.5 **MOCK-UPS**

- .1 Not used.

1.6 **CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

1.7 **REQUIRED CONTRACTOR SUBMITTALS**

.1 **General**

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

.2 **Pre-Mobilization Submittals**

The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of submittals in writing. Submit the following plans and programs to the Departmental Representative for review a minimum of seven (7) days prior to mobilization to the project site:

- .1 Project schedule, detailing the schedule of the workdays required from Contractor, subcontractors, suppliers and consultants to complete each activity of the project by road segment or location in order to meet stages specified in Section 01 32 16 – Construction Progress Schedules. In addition, for each activity critical elements

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that could impact on the schedule are to be identified. Submission shall include both a paper copy of the schedule and an electronic copy in Microsoft Projects format

- .2 List of subcontractors, suppliers and consultants, their role and their key personnel, including names and positions, addresses, telephone and cellular telephone.
- .3 Plan describing methods the Contractor will have to meet their responsibilities as the Prime Contractor for Safety and Traffic Control within the Work limits and to co-ordinate Work, traffic control, site access, safety, with other Contractors working in or adjacent to the Contract Work zone.
- .4 Contractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, telephone and cellular telephone. The list shall include the names and telephone/cellular telephone for contact persons who are available on a 24-hour basis in the event of emergencies.
- .5 Work Plan, describing in detail for each activity by road segment and location, the Contractor's intended methods of construction, and materials, equipment and manpower that will be used to meet stages specified in Section 01 32 16 – Construction Progress Schedules. The Work Plan must be linked to the Project Schedule.
- .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control, including Quality Control checklist examples.
- .7 Environmental Protection Plan (EPP) that meets the requirements of Section 01 35 43 – Environmental Procedures. Submission of EPP must allow 2 weeks for review by the Parks ESO, in accordance with Section 01 35 43 – Environmental Procedures.
- .8 Site Access and Detour Plans shall include, but not be limited to, engineered Drawings and procedures for accessing all areas of the Work or for proposed detours.
- .9 Survey Plan describing the Contractor's intended methods of surveying during this project.
- .10 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. On site Contingency and Emergency Response Plan to address standard operating procedures to be implemented during emergency situations.
- .11 Contractor and any subcontractors to submit a copy of their valid Parks Canada Business License.
- .12 Health and Safety Plan - The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work. Health and Safety Plan must include in accordance with Section 01 35 29 – Health and Safety Requirements.
- .13 Sask 1st Call and Utilities Coordination Plan, including notifications to Utility Owners.
- .14 The Contractor shall not begin any Work on the Site until the Departmental Representative has provided a Notice to Proceed.

.3 Construction Phase Submittals

- .1 Monthly Progress Reports in accordance with Section 01 32 16 – Construction Progress Schedules.
- .2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis. Work to be linked to activities by road segment or location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc. Weekly Progress Reports shall be submitted at the end of each week.
- .3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes the results of all Quality Control inspections conducted by the Contractor. The reports shall be submitted to the Departmental Representative with the Weekly Progress Report. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each Weekly Progress Report.
- .4 “Design and Build” documents, Shop Drawings and Mix Designs – The Contractor shall submit all design drawings, shop drawings and mix designs required to fabricate and / or conduct the work a minimum fourteen (14) days prior to fabrication / production.
- .5 Progress Photographs:
 - .1 Format:
 - .2 Electronic: .jpg files, minimum three (3) mega pixels.
 - .3 Submission requirements: one (1) set of electronic files.
 - .4 Identification: Name and number of project, description of photograph and date.
 - .5 Viewpoints: viewpoints determined by Construction Manager or Departmental Representative.
 - .6 Submission Frequency: prior to commencement of Work and weekly thereafter with progress statement, or as directed by Construction Manager or Departmental Representative.
 - .7 Submit all electronic pictures as part of closeout package.
- .6 Submit an electronic copy of Contractor’s authorized representative’s work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
- .7 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors immediately.
- .8 Submit copies of incident and accident reports immediately.
- .9 Submit daily extra work reports in accordance with Section 01 21 00 – Allowances.
- .4 **Project Completion Submittals**
 - .1 Record Drawings -The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.

- .2 Quality Control Records – The Contractor shall submit a .pdf electronic file containing an itemized set of project quality control documentation.
- .3 All other documents noted within the Contract Documents, and under Section 01 78 00 – Closeout Submittals.
- .5 The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations and this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
- .6 The Departmental Representative may, at their sole discretion, withhold payment from the Contractor for Work completed until acceptable submittal documents have been provided by the Contractor to the Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 35 29 HEALTH AND SAFETY REQUIREMENTS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCES

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

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan in accordance with this Section and Section 01 33 00 – Submittal Procedures.

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work. This meeting may be combined with the Organization and Start-Up meeting identified elsewhere.
 - .1 At this meeting the Contractor is required to complete and sign an Attestation to certify the Contractor will comply with the requirements set out in the Attestation and the terms and conditions of the Contract
 - .2 A copy of the “Attestation and Proof of Compliance with Occupational Health and Safety (OHS)” form is part of the Invitation to Tender package.
- .2 Parks Canada recognizes that federal Occupational Health and Safety legislation places specific responsibilities upon Parks Canada as owner of the work place. In order to meet those requirements, Parks Canada has implemented a contractor safety regime to ensure roles and responsibilities assigned under Part II of the Canada Labour Code and the Canada Occupational Health and Safety Regulations are implemented and observed when involving contractor(s) to undertake work in Parks Canada work places, including on Parks Canada property.

1.6 REGULATORY REQUIREMENTS

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

1.7 PROJECT / SITE CONDITIONS

- .1 Work at site will involve contact with Saskatchewan Occupational Health and Safety.

1.8 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. 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.

1.9 RESPONSIBILITY

- .1 The Contractor shall act as the Prime Contractor in all matters relating to Occupational Health and Safety. They shall conduct their work and make all such arrangements necessary to allow them to be accepted as such by the relevant Provincial Authorities.
- .2 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.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

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

1.11 UNFORESEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or conditions 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.

1.12 HEALTH AND SAFETY REPRESENTATIVE

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum 2 years' site-related working experience specific to activities associated with roadway construction.
 - .2 Have working knowledge of occupational 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.

1.13 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.

1.14 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.

1.15 POWDER ACTUATED DEVICES

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

1.16 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

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

01 35 43 ENVIRONMENTAL PROCEDURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Preparation and implementation of an Environmental Protection Plan (EPP) in accordance with this Section 01 35 43 – Environmental Procedures and Section 01 57 13 – Temporary Erosion and Sediment Control will be measured as a single lump sum and paid under **“Lump Sum Item 2 – Environmental Protection Plan”**. This item will cover all costs including but not limited to; the production of an EPP, the supply and installation of Erosion and Sediment Control devices, and the removal of those devices if they are not permanent. Payment for mobilization shall be a Lump Sum item as follows:
 1. A total of 50% of the **“Lump Sum Item 2 – Environmental Protection Plan”** item may be claimed as soon as the Erosion and Sediment control Plan has been approved and all devices have been installed to the satisfaction of the Engineer.
 2. The remaining 50% of the lump sum bid for **“Lump Sum Item 2 – Environmental Protection Plan”** item may be claimed as part of the final Progress Claim if all temporary devices have been removed and the site remediated to natural conditions, following the successful completion of the work to the satisfaction of the Engineer.
- .2 All requirements detailed in the EPP, Section 01 35 42 – Environmental Procedures and Section 01 57 13 – Temporary Erosion and Sediment Control shall be incidental to **“Lump Sum Item 2 – Environmental Protection Plan.”**

1.2 REFERENCES

- .1 DIA – Rock Creek Campground Upgrade and Expansion – Feb 2016

1.3 SUBMITTALS

- .1 The Contractor is required to prepare an Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures and Section 01 33 00 – Submittal Procedures. The EPP document will be reviewed and accepted for use on the project by the Departmental Representative in collaboration with the Parks Canada designated ESO.

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 restricted activity permits from a Parks Canada Administration Office, prior to commencement of the Contract.
- .3 All Contractor's vehicles are required to display a vehicle work pass from PCA. These permits may be obtained free of charge from the PCA Administration Office once a business permit has been obtained.

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and subsequent amendments.
- .2 Refer to the PCA Mitigation Measures and the Detailed Impact Analysis (DIA) for the Work included with this tender. The Contractor is required to implement all recommendations and mitigations, and follow all procedures and processes whether supply, construction, administration or otherwise as described in the DIA.
- .3 The Contractor shall prepare their Environmental Protection Plan (EPP) to implement the mitigations identified in the DIA as a minimum but shall ensure that all environmental requirements under the Contract and associated with the Works are appropriately managed through their EPP processes.
- .4 Where there is a discrepancy or inconsistency between the DIA and other documents, the DIA takes precedence over other documents.
- .5 Failure to comply with or observe environmental protection measures as identified in the Contract Documents may result in the work being suspended pending rectification of the problems.

1.6 START-UP AND ENVIRONMENTAL BRIEFING

- .1 **All staff employed at the construction site will be required to attend an approximate one (1) hour environmental briefing presented by PCA prior to their commencement of work on site.** It is recognized that new employees may join the Contractors' work force after the initial round of "environmental briefing". In that case and as required, subsequent "environmental briefings" can be presented as numbers warrant, by arrangement with the ESO through the Departmental Representative. Also, some sub-trades may be present at the site for a short time, to perform once-only duties. In these cases, the "environmental briefing" will be replaced by the Contractor explaining the environmental sensitivity of the work location to the sub-trade worker(s), and reviewing highlights of personal conduct expected, with reference to a one-page briefing summary to be provided to the Contractor by the ESO. A copy of this summary will be provided to each sub-trade worker joining the work force at the site.
- .2 Parks Canada will have an ESO attending the site to inspect the construction activity for conformance with the EPP and DIA. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to inspect the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.
- .3 The ESO is not to act as daily environmental monitor, but shall check activities with the approved EPP to ensure compliance, at their discretion. The Contractor's QEP shall be responsible for ensuring all activities are conducted in accordance with the approved environmental documents.

1.7 ENVIRONMENTAL PROTECTION PLAN

- .1 The EPP is to be prepared and certified by a Qualified Person as defined by the Saskatchewan Ministry of Environment. Certification by a QP is considered incidental to the Works and no additional payment will be made.
- .2 Changes and/or revisions to the EPP may be required by the ESO as the Work progresses and more information becomes available. No additional payment will be made for changes and/or revisions to the EPP.
- .3 The Contractor's EPP will detail how the work limits shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and the ESO.
- .4 The EPP will include how the Contractor will manage all environmental risks and specify site-specific details for implementing mitigation or achieving mitigation outcomes identified in the DIA.
- .5 Spill Response and Erosion and Sedimentation Management Plans are to be included in the EPP, in accordance with this Section.
- .6 QEP resumes are to be included in the EPP for Departmental Representative and ESO review.
- .7 The Contractor shall submit the EPP in accordance with Section 01 33 00 – Submittal Procedures, yet **allow no less than 1 week for the review of their EPP** and shall address and respond to all comments raised during the review within a maximum of 1 week.

1.8 RESTRICTED ACTIVITY PERMITS

- .1 Prior to commencing any activity, the Contractor may be required to first obtain a Restricted Activity Permit (RAP) in consultation with PCA and Departmental Representative.
- .2 Prior to mobilization, Contractor is to establish what RAPs are required for the Works, for the duration of the project. Include, in the project schedule, the acquisition of the application for RAPs, allowing no less than 2 weeks for review and acceptance by the ESO.
- .3 Contractor shall list RAPs they require in the EPP.
- .4 The Contractor is required to submit an application form to the Departmental Representative for each required RAP.
- .5 RAP application details include, but are not limited to: Name of activity, start and end date of activity, location of Work, Contractor company name and address, Contractor contact name, phone number and email address and vehicle / equipment information.
- .6 Following the application submission, the Contractor may be required to provide further details regarding the Work to PCA.
- .7 Submission of a RAP application to the Departmental Representative does not permit the Contractor to commence the restricted activity.

1.9 CONSTRUCTION SITE ACCESS AND PARKING

- .1 Points of access from the existing roadway to the various construction sites will be required. The Contractor shall review both short and long term construction access requirements with the Departmental Representative, both at start-up and on an ongoing

basis. In consultation with the Departmental Representative, the Contractor shall formulate an agreement for worker transportation to and from the work sites and where workers shall park their private vehicles.

- .2 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.
- .3 Parking in tall grass shall be restricted to avoid starting grassfires from hot exhaust.

1.10 ACCIDENTAL FINDS

- .1 It is possible that a scattering of historic objects will be found within the Project limits. If significant features are encountered, stop Work in the immediate area, notify the Departmental Representative, take photographs of the findings and a GIS location reading.
- .2 Significant features include items such as:
 - .1 Structural remains, high artifact concentrations, tent platforms, log cribbing retaining features, human remains, marked trees and other various items.
 - .2 If unsure, contact the Departmental Representative immediately.
- .3 The Departmental Representative will notify the Contractor when Works can resume in the area.
- .4 Should any process or requirements regarding archeological matters listed in this Section contradict the DIA, the DIA shall take precedence.

1.11 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 A RAP application will be required for any permitted Work camps or off-highway operation of a motor vehicle.
- .2 A Contractor's office and work headquarters material laydown, equipment parking and storage area will be permitted in accordance with this Section and Section 01 14 00 - Work Restrictions.
- .3 Removal and storage of snow shall be considered incidental to the work. If coordination is required, the Contractor shall coordinate through the Departmental Representative.
- .4 The Contractor shall control blowing dust and debris generated from the construction site by means such as covering or wetting down dry materials and rubbish. Dust generated during the grade construction and or utilization of any temporary access roads must be kept at a reasonable level so as not to impart any hazard to the public. Control measures must be initiated as and when required and may require increased vigilance at the discretion of the Departmental Representative.

1.12 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION

- .1 The Contractor's QP shall prepare an Erosion and Sedimentation Management Plan (ESMP) for the components of the Contract that are undertaken in proximity to watercourses, wetlands or riparian environments. The plan shall be included in the EPP and prepared to the satisfaction of the Departmental Representative and ESO.
- .2 The ESMP shall be prepared so as to ensure that there is no release into watercourses of sediments in levels that are deleterious to fish or that would harmfully alter, disrupt, or

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destroy fish habitat. Similarly, there is to be no sediment release into areas of vegetation growth or sensitive areas of sediments in levels that would adversely alter growing or hydraulic conditions.

- .3 If necessary, on-site sediment control measures shall be constructed and functional prior to initiating construction activities.
- .4 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired. The Departmental Representative and ESO also will monitor erosion control performance.
- .5 The site will be secured against erosion during any periods of construction inactivity or shutdown.

1.13 POLLUTION CONTROL

- .1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres from watercourses.
- .2 A Spill Response Plan will be prepared by the Contractor's QP as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and PCA and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
- .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. Hazardous products shall be stored no closer than 100 metres from watercourses.
- .4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection / drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.
- .5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.
- .6 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.

- .7 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. Parks Canada Dispatch shall be notified immediately of any spill immediately and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified. Spill response cards will be distributed during the initial Environmental Briefing with basic instructions and phone numbers.
- .8 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .9 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.

1.14 **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 the National Parks before delivery to the work site.
- .2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative.
- .3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from any streams, wetlands, water bodies or watercourses. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed above.
- .5 Equipment used on the project shall be fuelled with E10, and low sulfur diesel fuels and shall conform to local emission requirements. 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 the National Parks.
- .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .8 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight the National Parks. Alternatively, the Contractor may hire a

security person employed to prevent vandalism in accordance with Section 01 52 00 - Construction Facilities.

1.15 **OPERATION OF EQUIPMENT**

- .1 Equipment movements shall be restricted to the 'footprint' of the construction area. The work limits shall be identified by stake and ribbon or other methods approved by the Departmental Representative. Unless authorized by the Departmental Representative, activities beyond the work limits are not permitted. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitat or trees and plant communities. Some of the construction shall require working close to watercourses or water bodies. In these instances, the Contractor is to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) do not enter any watercourses, to the satisfaction of the Departmental Representative and ESO.
- .2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or topsoil) in the trees bordering the right-of-way or into watercourses or water bodies.
- .3 When, in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including 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.

1.16 **FIRE PREVENTION AND CONTROL**

- .1 A fire extinguisher shall be carried and available for use on each machine and at locations within the work area in the event of fire. Basic firefighting equipment shall be maintained at the construction site at a location known and easily accessible to all the Contractors' staff.
- .2 Construction equipment shall be operated in a manner and with all original manufacturers' 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. Parks Canada Dispatch shall be notified immediately of any fire immediately and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified.
- .5 Fires or burning of waste materials is not permitted.

1.17 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 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if animals display aggressive behaviour or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
- .3 Notify the ESO and Departmental Representative immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site or crew accommodation. Other wildlife-related encounters are to be reported within 24 hours. If the ESO or Departmental Representative is not available, Parks Canada Dispatch will be contacted at a phone number provided in the Preconstruction Meeting.

1.18 RELICS AND ANTIQUITIES

- .1 Artifacts, relics, antiquities and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and similar objects found on the work site shall be reported to the ESO or the Departmental Representative immediately. The Contractor and workers shall wait for instructions before proceeding with their work.
- .2 All historical or archaeological objects found in the National Parks are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any articles found and request direction from the ESO or the Departmental Representative.

1.19 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.
- .2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.
- .3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in the National Parks. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the park. Construction waste storage containers, provided by the Contractor, shall be emptied by the Contractor when 90% full. Waste containers will have lids, and waste loads shall be covered while being transported.
- .4 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials.
- .5 All efforts to prevent wildlife from obtaining food, garbage or other domestic wastes shall be made by the Contractor and Contract staff while undertaking their work in the National Parks. Such wildlife attractants shall not be stored at the work site overnight. Lunches, coolers and food products, including waste food products, shall be securely stored away from access by animals. Daily removal of food scraps, food wrappers, pop cans or other

attractive products to wildlife proof containers is mandatory. It is incumbent on the Contractor to notify Parks Canada and make specific arrangements to have garbage collected by Parks Canada when using existing Parks Canada receptacles.

- .6 The Contractor and workers shall immediately report any circumstances related to food/garbage (e.g. overflowing container or strong smell) and wildlife to the ESO or the Departmental Representative. If neither can be reached, the Contractor/worker shall immediately contact Parks Canada Dispatch at the phone number provided in the Preconstruction Meeting and report the details.
- .7 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

1.20 PRODUCTS

- .1 As defined in the EPP, subject to review and approval by the Department Representative.

Part 2 Execution

- .1 As per the DIA.

END OF SECTION

01 45 00 QUALITY CONTROL**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.2-04, Methods of Test and Standard Practices for Concrete
- .2 Saskatchewan Ministry of Highways and Infrastructure Standard Specifications Manual (latest edition)

1.3 QUALITY CONTROL PLAN

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

1.4 TESTING BY THE CONTRACTOR

- .1 Testing required to provide quality control to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - .1 Testing all structural concrete, grout, reinforcing steel, asphalt concrete pavement, structural backfill, corrugated steel culverts, miscellaneous metals, concrete barriers, and all source acceptance testing; and
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .2 All Quality Control technicians are to be certified by Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.
- .3 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
 - .1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 Notify the Departmental Representative when sampling will be conducted;
 - .3 Within one Day after completion of testing, submit test results to the Departmental Representative; and
 - .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .4 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .5 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work

1.5 CONTRACTOR'S QUALITY CONTROL PROGRAM

- .1 The Contractor shall prepare a Quality Control Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Control Program shall be described in a Quality Control Plan. The Contractor shall submit the Manual to the Departmental Representative for review in accordance with Section 01 33 00 - Submittal Procedures. The Manual shall develop a logical system for tracking and documenting the Quality Control of the Work. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .3 The Quality Control Plan shall include the following information:
 - .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
 - .2 Title page, identifying the Contract, Contractor and copy number;
 - .3 Revision page, identifying the revision number and date of the Manual;
 - .4 Table of contents;
 - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;
 - .6 Details of measuring and testing equipment including methods and frequency of calibration;
 - .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;
 - .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
 - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;
 - .10 Procedures for shipping, packaging and storage of materials;
 - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
 - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
 - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Departmental Representative, if the Departmental Representative witnesses the tests; and
 - .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Contract Document compliance.
- .4 The Contractor shall appoint a full time qualified and experienced Quality Control Manager, 100% of their time dedicated to quality matters and who will report regularly to the Contractor's management at a level that shall ensure that Quality Control requirements are not subordinated to manufacturing, construction or delivery. The

Quality Control Manager shall be empowered by the Contractor to resolve quality matter and shall be onsite for the duration of the Contract.

- .5 The Quality Control Plan shall include samples of all forms to be filled in by the Quality Control Inspectors. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative who will add its review signature.
- .6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

1.6 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.
- .5 The Departmental Representative will provide the Contractor with an Approval to Proceed document, after performing an audit and confirming all requirements are met, as stated in Section 01 71 00 - Examination and Preparation. The Approval to Proceed must be signed by the Departmental Representative and the Contractor's representative before proceeding to the next layer.
 - .1 The Contractor shall provide a minimum of 48 hours notice to the Departmental Representative to arrange for an audit and Approval to Proceed.

1.7 INDEPENDENT INSPECTION AGENCIES

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

1.8 ACCESS TO WORK

- .1 Allow inspection / testing agencies access to Work, including but not limited to: off site manufacturing and fabrication plants, QC testing facilities and asphalt plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.9 PROCEDURES

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

1.10 NON-CONFORMANCES

- .1 A Non-Conformance can relate to any item within the Contract including but not limited to: materials testing, lines and levels, products, design-build items, traffic accommodation, quality control, environmental, health and safety, and other general procedural matters including communication protocols.
- .2 Contractor's Internal Non-Conformance Report (NCR):
 - .1 Should the Contractor's QC reporting indicate that the Work is not in conformance, the Contractor's QC Manager shall issue an internal Non-Conformance Report (NCR) to the Contractor, with a copy to the Departmental Representative, including a response time.
- .3 The Contractor shall then respond to the QC Manager, with a copy to the Departmental Representative, with respect to the NCR, within the specified time, with proposed resolutions and corrective actions. The Contractor and/or the QC Manager shall consult with the Departmental Representative on the resolutions.
- .4 The Departmental Representative will accept or reject the proposed resolution and corrective action proposal.
- .5 Payment for the Work itself may be withheld until the NCR issue is resolved.
- .6 Owner Issued NCR:
 - .1 Should the Quality Assurance reporting indicate that the Work is not in conformance, the Departmental Representative will issue to the Contractor a NCR, including a response time.
 - .2 The Contractor shall then respond to that NCR, within the specified time, with proposed resolutions and corrective actions.
 - .3 The Departmental Representative will accept or reject the proposed resolution and corrective action proposal.
 - .4 Assurance testing and inspection will be performed to determine if the corrective action has provided an acceptable product. Acceptance and rejection will continue until the Departmental Representative determines that a quality product has been achieved.
 - .5 Payment for the Work itself may be withheld until the NCR issue is resolved.
- .7 The Completion Certificate will not be issued if there are any unresolved Non-Conformance Reports.
- .8 Appealing an NCR:

- .1 If the Contractor disputes the validity of a finding in an NCR, the Contractor may file an appeal with the Departmental Representative. The Departmental Representative and the Contractor Representative will use all reasonable efforts to refine the area of dispute and to resolve the determination of conformance with the Contract.
- .2 If the Departmental Representative and the Contractor Representative cannot come to a mutually agreeable resolution, the Work that is the subject of the Non-Conformance Report shall be re-evaluated by an independent third-party, selected by the Departmental Representative in consultation with the Contractor, at a test frequency equivalent to twice that specified in the Contract or to such other frequency as may be mutually agreed between the Departmental Representative and the Contractor.
- .3 If the appeal testing confirms the non-conformance determination, all appeal testing costs will be borne by the Contractor. If the appeal testing shows that the Work did in fact meet the requirements of the Contract, all appeal testing costs will be borne by the Owner.

1.11 OPPORTUNITIES FOR IMPROVEMENT

- .1 Should the QA review indicate that the Work is not in conformance, but the variance is deemed minor by the Departmental Representative, the Departmental Representative may issue an Opportunity for Improvement (OFI) report.
- .2 The Contractor is encouraged to review the findings and undertake such modifications to the QC Plan and the work procedures as necessary to address the issue.

1.12 REJECTED WORK

- .1 Remove defective Work, whether as a result of poor workmanship, use of defective products or damage and whether incorporated in Work or not. Replace or re-execute defective Work in accordance with Contract Documents, through the NCR process.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in the opinion of the Departmental Representative, it is not expedient to the greater benefit of the Project to remedy defective Work or Work not performed in accordance with Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work performed and that called for by Contract Documents, the amount of which shall be determined by Departmental Representative.

1.13 REPORTS

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

1.14 TESTS AND MIX DESIGNS

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

1.15 MILL TESTS

- .1 Submit mill test certificates as required in the Contract Documents.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

01 51 00 TEMPORARY UTILITIES**Part 1 General****1.1 REFERENCES**

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

- .1 The Contractor shall provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

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

1.4 DEWATERING

- .1 The Contractor shall provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.5 WATER SUPPLY

- .1 The Contractor shall provide continuous supply of potable water for construction use.

1.6 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 flameless type. Solid fuel salamanders are not permitted.
- .3 The Contractor and the Department Representative shall determine the level of propane in Department Representative's propane tank(s) prior to start construction. The Contractor is fully responsible for the propane tank(s) and provide fuel at their cost. At the Contractor's discretion, the Contractor shall remove and dispose of the propane tanks as part of the Work.
- .4 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 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.
- .5 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
- .6 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .7 Permanent heating system of building is not available for use.
- .8 The Contractor shall pay all costs for maintaining temporary heat.
- .9 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with 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.
- .10 The Contractor shall be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 **TEMPORARY POWER AND LIGHT**

- .1 The Contractor shall be responsible for all temporary power during construction for temporary lighting and operating of power tools.
- .2 Provide and maintain temporary lighting throughout project as required to maintain safe working conditions.

1.8 **TEMPORARY COMMUNICATION FACILITIES**

- .1 Provide and pay for temporary cell phone and data device lines necessary for own use.

1.9 **FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted.
- .3 Grasslands National Park do not provide or have any fire protection services.

Part 2 Products

2.1 **NOT USED**

Part 3 Execution

3.1 **NOT USED**

END OF SECTION

01 52 00 CONSTRUCTION FACILITIES**Part 1 General****1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-08, Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

- .1 The Contractor shall provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

- .1 The Contractor shall prepare site plan indicating the proposed location and dimensions of the area to be fenced and used by the Contractor, including the number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding shall be erected and maintained by the Contractor in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, and platforms.

1.5 HOISTING

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

1.6 SITE STORAGE/LOADING

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

1.7 CONSTRUCTION PARKING

- .1 Limited parking will be permitted on site provided it does not disrupt performance of Work.
- .2 The Contractor shall provide and maintain adequate access to project site for authorized personnel.
- .3 Follow vehicle parking limitations and permit requirements with the local authorities.
- .4 Personal vehicles shall not be parked on any natural or undisturbed areas. Parking will be confined to parking lots and roads or as approved by the Departmental Representative.

1.8 OFFICES

- .1 A Construction Office may be included, at the Contractors discretion and expense. Coordinate exact location with Departmental Representative.
- .2 No access to Parks Canada Buildings will be provided. Departmental Representative may grant access to use of one of the building meeting rooms for full project team weekly/bi-weekly meetings only.
- .3 The Contractor shall supply and make available a marked and fully stocked first-aid case in a readily available location.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.10 SANITARY FACILITIES

- .1 Provide portable sanitary facilities.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.11 CONSTRUCTION SIGNAGE

- .1 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .2 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.
- .3 Company signage is allowed on trailers or vehicles, not elsewhere on site.
- .4 Signage and fencing is considered incidental to the work and no separate payment shall be made.

1.12 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

- .2 Provide measures for protection and diversion of traffic, including provision of watchpersons and flagpersons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .3 Protect travelling public from damage to person and property.
- .4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .6 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .7 Dust control: adequate to ensure safe operation at all times.
- .8 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .9 Snow Removal. Contractor is responsible for snow clearing within their work site including parking lots, sidewalks, etc. as shown in the drawings 'Limit of Work'.

1.13 **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.

1.14 **FIRE PROTECTION FACILITIES**

- .1 Provide fire extinguisher and other equipment on site and maintain emergency vehicle access at all times.

1.15 **DISRUPTION**

- .1 Provide dust protection and schedule noisy work accordingly, as not to affect general public, traffic, wildlife, and adjacent facilities.
- .2 No excessive noise will be permitted. Demolition methods that contribute to excessive noise will not be permitted. Low vibration and noise demolition equipment shall be used throughout the project. Best management practices will be followed by the Contractor to reduce noise on site. Equipment and vehicles shall be in good working condition and fitted with proper noise suppressing devices. Combine noisy operations to occur in the same time period. The Contractor is to take care when dropping materials from a height, for example, when dumping concrete material into the basement. Minimize drop heights at material transfer locations. Shut or throttle down equipment (e.g. backhoes, loaders, generators, bobcats) whenever they are not in actual use. If in the opinion of the Departmental Representative there is excessive noise, the Contractor will adjust the work schedule of the activity, reduce the sound levels (e.g. use of sound barriers), or implement alternative demolition processes or quieter equipment.

Part 2 Products

- .1 NOT USED

Part 3 Execution
 .1 NOT USED

END OF SECTION

01 56 00 TEMPORARY BARRIERS AND ENCLOSURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .3 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .4 CSA O121-08, Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

- .1 The Contractor shall provide temporary controls in order to execute Work expeditiously.
- .2 The Contractor shall remove from site all such work after use.

1.4 GUARD RAILS AND BARRICADES

- .1 The Contractor shall provide secure, rigid guard rails and barricades around deep excavations and open edges of floors and roofs.

1.5 WEATHER ENCLOSURES

- .1 The Contractor shall provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs where required to keep partially demolished materials within existing buildings, and not allowing wind-blown debris to depart and be dispersed in an un-authorized manner.

1.6 ACCESS TO SITE

- .1 The Contractor shall provide and maintain access roads, sidewalk crossings, and ramps as may be required for access to Work.

1.7 FIRE ROUTES

- .1 The Contractor shall maintain access to property including overhead clearances for use by emergency response vehicles.

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 The Contractor shall protect surrounding private and public property from damage during performance of Work.
- .2 The Contractor will be responsible for damage incurred.

1.9 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products
 .1 NOT USED

Part 3 Execution
 .1 NOT USED

END OF SECTION

01 57 13 TEMPORARY EROSION AND SEDIMENT CONTROL**Part 1 General****1.1 GENERAL**

- .1 This section specifies requirements for temporary erosion and sediment control efforts, conforming to grades, dimensions and typical cross sections shown on plans or established by the Departmental Representative.

1.2 RELATED WORK

- .1 Section 01 35 43 – Environmental Procedures

1.3 MEASUREMENT FOR PAYMENT

- .1 All requirements of this section shall be considered incidental to “**Lump Sum Item 2 – Environmental Protection Plan.**”

1.4 DEFINITIONS

- .1 **Topsoil:** The top layer of soil containing organic material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .2 **Topsoil Stripping:** Excavation and stockpiling of material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .3 **Rough grading:** used to establish the rough grade (within 100 mm) of the final, finished grade. However, rough grading will also be used to ensure positive drainage from the construction site, in collaboration with erosion and sediment control measures also employed onsite. Rough grading is typically the second activity undertaken on site, after the top soil is stripped and is followed immediately by installation of erosion control measures.
- .4 **Sub grade Elevation:** Elevation immediately below pavement or engineered structure.
- .5 **Housekeeping Pad:** A gravel pad of washed rock, installed at all entrances and exits of the construction site. A housekeeping pad is used to minimize the mud tracked from onsite, offsite on machinery wheels. Provisions (such as fencing) is to be installed to ensure site traffic leaving the site passes over the housekeeping pads installed.
- .6 **Approvals:** Federal, provincial, and/or municipal regulatory agencies may require that the work plan of activities before, during or after the construction activities be reviewed and approved (with mitigative measures in place as part of the work plan). Such agencies may issue permits or authorizations which may include special work instruction or mitigative requirements which must be followed for the duration of construction activities.
- .7 **Erosion and Sediment Plan (E&S plan):** shows the site and anticipated erosion and sediment control measures required for the contractor to follow.
- .8 **Perimeter Erosion and Sedimentation measures:** temporary surface structures used to inhibit the transportation of eroded soil by runoff water from a disturbed site. The minimum acceptable standard product for this application will be Silt Fence, installed as per manufacturer recommendations.
- .9 **Anti Erosion Matting:** temporary surface matting installed to reduce the erosion of surface soils from the finished grade of the site. Anti-erosion matting may be biodegradable

or not, as noted on the engineering drawings; and may be used to ensure soil stability prior to vegetation grow establishment. The minimum acceptable standard product for this application will be S75 Erosion Control Blanket, installed as per manufacture recommendations.

- .10 **Internal Erosion and Sedimentation measures:** Temporary surface structures and surface preparation techniques used to reduce the velocity of run off water or include the soil stability, on site; thus reducing erosion and sedimentation run-off. Techniques include temporary anti erosion matting (biodegradable), equipment track rilling (perpendicular to the direction of run off flow), hydroseeding (using tackifier), tarping of stock piles (to reduce wind erosion), or any other method approved by the engineer.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Adhere to municipal, provincial, and national codes, which often have local requirements for erosion and sediment control measures.
- .2 Construction activities occur near or in a water body, special consideration is required. The Contractor must not proceed with any activity (including site stripping, excavation, alteration of drainage course, etc.) of any kind prior to written authorization from the engineering and applicable approvals in place (such as from Department of Fisheries and Oceans, provincial environmental regulatory agencies, and/or municipal authorities). It is the contractor's responsibility to ensure all approvals required for the construction activities are available in legible hard-copy on site at all times during the duration of the construction project. All requirement outlines in approval must be followed.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 The Contractor shall supply all labor, materials and equipment required for erosion and sediment control procedures required, as approved by the Engineer prior to construction activities.

Part 3 EXECUTION

3.1 EROSION AND SEDIMENT PLAN

- .1 Erosion and Sedimentation Control Plan to be submitted to the engineer including:
- .1 Sketch (plan view) of similar scale to engineering construction drawing, of construction site and proposed E&S activities, clearly identifying the location, products, methods and procedures proposed to achieve successful erosion and sediment control
- .2 Written description of installation procedure, schedule of installation and maintenance of the proposed erosion and sediment control plan.

3.2 PERIMETER EROSION AND SEDIMENTATION MEASURES

- .1 To be installed as per manufacture recommendations and to the satisfaction of the engineer

3.3 INTERNAL EROSION AND SEDIMENTATION MEASURES

- .1 To be installed as per manufacture recommendations and to the satisfaction of the engineer

3.4 HOUSEKEEPING PAD

- .1 Housekeeping pads can be used to limit the tracking of mud from onsite to offsite. A housekeeping pad is not required, however if implemented, can follow the noted below:
 - .1 Pad to be composed of 20-40mm clean gravels, minimum depth of 300mm, installed at the site entrance, entirely on the site
 - .2 Minimum plan dimensions to be 6m wide (min) wide by 6m long (min)
 - .3 Maintenance to include ensuring minimum depth and dimensions of gravel maintained, gravel are sweep off road and back onto site at the end of each day.
 - .4 Provisions (such as fencing or barricades) are to be used to direct all site traffic through the housekeeping pad, to ensure its use by all site traffic.

3.5 ANTI EROSION MATTING

- .1 To be installed as per manufacture recommendations and to the satisfaction of the engineer

END OF SECTION

01 61 00 COMMON PRODUCT REQUIREMENTS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCE STANDARDS

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in the Contract Documents.
- .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 Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 QUALITY

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

1.4 AVAILABILITY

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

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and miscellaneous metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

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

1.8 QUALITY OF WORK

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 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.
- .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.

1.9 CO-ORDINATION

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

1.10 CONCEALMENT

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

1.11 REMEDIAL WORK

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

1.12 FASTENINGS

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

1.13 PROTECTION OF WORK IN PROGRESS

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

Part 2 Products

- .1 Materials shall be in accordance with the drawings or specifications, or as directed by the Departmental Representative.

Part 3 Execution

- .1 Work shall be completed in accordance with the applicable manufactures recommendations, or as directed by the Departmental Representative.

END OF SECTION

01 71 00 EXAMINATION AND PREPARATION**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 EXISTING SERVICES

- .1 Before commencing work, the Contractor shall arrange and pay to establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 The Contractor shall remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.3 REFERENCES

- .1 Owner's identification of existing survey control points and property limits.

1.4 QUALIFICATIONS OF SURVEYOR

- .1 Qualified surveyor, licensed to practise in Place of Work, acceptable to Departmental Representative.

1.5 SURVEY REQUIREMENTS

- .1 The Departmental Representative shall identify the location of all work sites.
- .2 The Contractor shall be responsible for all other survey and layout work identified in the Contract documents and as required to complete the works including but not limited to:
 - .1 Establishing lines and levels, locate and layout, by instrumentation.
 - .2 Staking for grading, cut and fill.
 - .3 Staking for slopes and top of embankment, sub-base course, base course and centreline for paving.
 - .4 Establishing culverts, catch basin structures, invert elevations and locations.
 - .5 Re-establishing Reference Survey Control Points that are in danger of being damaged or destroyed.
- .3 Survey Accuracy:
 - .1 All survey work shall be tied into the existing Control Monument Network with grid coordinates in UTM Zone 13 NAD 83. Departmental Representative will provide information on Control Points.
 - .2 All traverses will be closed and balanced. All level loops and traverses will be tied into the Control Monument Network.
 - .3 Secondary Control Points will be tied into and relative to Control Monument Network. Accuracy for Control Point surveys shall be to second order:
 - .4 Horizontal shall be less than $r = 5(d+0.2)$ where "r" is in cm and "d" is in km
 - .5 Vertical shall be less than $0.008 \times \sqrt{k}$ where k is distance in kilometres.

- .4 Staking accuracy shall be:
 - .1 All structures shall be within 20 mm of Design elevation and horizontal
- .5 The Departmental Representative will complete quality assurance construction survey measurements to verify grades and alignment, interim survey re-measurements for excavation limits and final neat line measurements to verify payment quantities for completed works.

1.6 **RECORDS**

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

1.7 **SUBMITTALS**

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

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 73 00 EXECUTION**Part 1 General****1.1 SUBMITTALS**

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

1.2 MATERIALS

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

1.3 PREPARATION

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

1.4 EXECUTION

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

- .3 Remove and replace defective and non-conforming Work.
- .4 Remove samples of installed Work for testing.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Restore work with new products in accordance with requirements of Contract Documents.
- .7 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 **WASTE MANAGEMENT AND DISPOSAL**

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

Part 2 Products

- .1 NOT USED

Part 3 Execution

- .1 NOT USED

END OF SECTION

01 74 11 CLEANING**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Contractor to provide on-site wildlife proof containers they require for collection of waste materials and debris.
- .5 Remove waste material and debris from site at end of each working day.
- .6 Dispose of waste materials and debris off site.
- .7 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 The Departmental Representative and Environmental Surveillance Officer may, at their total discretion, require the Contractor to suspend work activities until such a time as the Work Site is cleaned and debris, waste, and animal attractants are satisfactorily managed. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.

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 Prior to final review, remove surplus products, tools, construction machinery and equipment.
- .3 Remove waste products and debris including that caused by Owner or other Contractors.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Inspect finishes, and ensure specified workmanship and operation.
- .7 Remove dirt and other disfiguration from exterior surfaces.
- .8 Sweep and wash clean paved areas.

- .9 Remove all construction debris and accumulated dirt from completed drainage systems; manholes; catch basins; and all piping.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 74 21 CONSTRUCTION / DEMOLITION WASTE MANAGEMENT AND DISPOSAL**Part 1 General****1.1 WASTE MANAGEMENT GOALS**

1. Prior to start of Work the Contractor shall conduct a meeting with the Departmental Representative to review and discuss Waste Management Goals.
2. Waste Management Goal: as much as possible of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

1.2 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Inert Fill: inert waste - exclusively asphalt and concrete.
- .3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .4 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .6 Separate Condition: refers to waste sorted into individual types.
- .7 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

1.3 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to recycled and salvaged are to be removed from site to recycling facility without storing on site. Materials to be recycled on site are to be placed in final location with minimum of rehandling. Stockpiles of concrete in areas other than final buried location will not be permitted.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Separate recyclable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility. Transport and deliver recyclable items to recycling facilities.
- .4 Protect surface drainage, mechanical and electrical from damage and blockage.
- .5 Separate and store materials produced during dismantling of structures in designated areas.
- .6 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.

1.4 LIST OF SALVAGE ITEMS

- .1 As indicated on the Drawings.

1.5 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, and paint thinner into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

1.6 USE OF SITE AND FACILITIES

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

1.7 SCHEDULING

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

Part 2 Products

- .1 NOT USED

Part 3 Execution**3.1 APPLICATION**

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

3.2 CLEANING

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

3.3 DIVERSION OF MATERIALS

- .1 On-site sale of recyclable materials is not permitted.

END OF SECTION

01 77 00 CLOSEOUT PROCEDURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for Final Inspection.
 - .4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative, and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 78 00 CLOSEOUT SUBMITTALS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 CLOSEOUT SUBMITTALS

- .1 The Contractor shall provide the following documents and information to the Departmental Representative prior to them being eligible for Final Completion as detailed in Section 01 77 00 – Closeout Procedures.

1.3 AS-BUILTS AND SAMPLES

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

1.4 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque Drawings and in copy of the Project Manual.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.

- .3 Details not on original Contract Drawings.
- .4 References to related shop drawings and modifications.
- .4 Specifications: legibly mark each item to record actual construction, including:
 - .1 Changes made by Addenda and change orders.

1.5 **FINAL SURVEY**

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

1.6 **WARRANTIES AND BONDS**

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

02 81 00 HAZARDOUS MATERIAL**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCES

- .1 Export and Import of Hazardous Waste Regulations (EIHW Regulations), SOR/92-637.
- .2 National Fire Code of Canada 1995.
- .3 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).
- .4 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

1.3 DEFINITIONS

- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): A Canada-wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Retain current Material Safety Data Sheet (MSDS) for each hazardous material required on site. Submit MSDS to Departmental Representative upon request.

1.5 STORAGE AND HANDLING

- .1 Coordinate 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 current National Fire Code of Canada requirements.
- .4 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.

- .5 Abide by the following 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 which are in good condition.
 - .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 not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .6 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .7 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 **TRANSPORTATION**

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Coordinate transportation and disposal with Departmental Representative.
 - .2 Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
 - .3 Use only a licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept the material.
 - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.

- .7 Provide a photocopy of all shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
- .9 Report any discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 Products

2.1 MATERIALS

- .1 Only bring on site the quantity of hazardous materials required to perform Work.
- .2 Maintain MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

END OF SECTION

03 10 00 CONCRETE FORMING AND ACCESSORIES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121-[M1978(R2003)], Douglas Fir Plywood.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA O153-[M1980(R2003)], Poplar Plywood.
 - .6 CSA O437 Series-[93(R2006)], Standards for OSB and Waferboard.
 - .7 CSA S269.1-[1975(R2003)], Falsework for Construction Purposes.
 - .8 CAN/CSA-S269.3-[M92(R2003)], Concrete Formwork, National Standard of Canada.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings for formwork and falsework.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Saskatchewan.
- .4 MSDS in accordance with Section 02 81 01 - Hazardous Material.
- .5 Indicate method and schedule of construction, shoring, stripping, and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1 for falsework drawings and CAN/CSA S269.3 for formwork drawings.
- .6 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 The Contractor shall separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 The Contractor shall place materials defined as hazardous or toxic waste in designated containers.
- .3 The Contractor shall ensure emptied containers are sealed and stored safely for disposal away from children.

- .4 The Contractor shall use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low volatile organic compounds (VOC's).
- .5 The Contractor shall dispose concrete waste in the roadway embankment as approved by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.
 - .2 Forms for exposed surfaces including the cast in place concrete shall be new material, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.
 - .3 All form material for exposed surfaces shall be full-sized sheets, as practical. The re-use of any forms must have the acceptance of the Departmental Representative.
- .2 The minimum acceptable forming for all exposed concrete where the pour height is 1.5 m or less shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Where the pour height is greater than 1.5 m the minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 200 mm maximum on centres. Strong-backs or walers placed perpendicularly to the supports shall be employed to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 50 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.
- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities that are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.
- .6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in color.
- .7 Form release agent shall be non-toxic, biodegradable, low VOC.
- .8 Falsework materials shall conform to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with Drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.
- .3 Do not place shores and mud sills on frozen ground.

- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1/A23.2.
- .6 Align form joints and make watertight and keep form joints to minimum.
- .7 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
- .10 Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .11 Clean formwork in accordance with CSA-A23.1/A23.2 before placing concrete.

3.2 **REMOVAL AND RESHORING**

- .1 Remove formwork when concrete has reached 50% of its design strength, and replace immediately with adequate reshoring.
- .2 Reuse formwork and falsework subject to requirements of CAN/CSA-A23.1.

END OF SECTION

03 20 00 CONCRETE REINFORCING**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Reinforcing steel supplied and incorporated into the Work shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.
- .1 If bars are substituted at the Contractor’s request, and as a result more steel is used than specified, no additional payment shall be made.

1.2 REFERENCES

- .1 All standards listed below shall be the latest issue at the time of tender.
- .2 ASTM International
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
 - .2 ASTM A1064/A1064M, Standard Specification for Carbon Steel Wire and Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - .3 ASTM A276/A276M, Standard Specification for Stainless Steel Bars and Shapes
 - .4 ASTM A955/A955M, Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcing
- .3 CSA International
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3, Design of Concrete Structures.
 - .3 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20/G40.21 , General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC, Reinforcing Steel Manual of Standard Practice.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
 - .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacing, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.

- .5 Indicate sizes, spacing and locations of chairs, spacers and hangers.
- .4 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
- .1 Provide type B unless otherwise indicated.

1.4 **QUALITY CONTROL**

- .1 Submit in accordance with Section 01 45 00 - Quality Control.
 - .1 Mill Test Report: provide Departmental Representative with certified copy of mill test report of reinforcing steel.
- .2 Submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 **MATERIALS**

- .1 As per drawings

2.2 **FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, unless indicated otherwise.
- .2 All hooks and bends shall be bent using the pin diameters and dimensions as recommended in the Reinforcing Steel Institute of Canada (RSIC), Manual of Standard Practice.
- .3 Obtain the Departmental Representative's approval for locations of reinforcement splices other than those shown on placing Drawings.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 **SOURCE QUALITY CONTROL**

- .1 Provide the Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, prior to commencing reinforcing work.
- .2 Inform the Departmental Representative of proposed source of material to be supplied.

Part 3 Execution**3.1 FIELD BENDING**

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

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 All lifting and handling shall be done using devices that do not mark, mar, damage or distort the members and assemblies in any way.
- .5 Galvanized material shall be stacked or bundled and stored to prevent wet storage stain as per American Hot Dip Galvanizers Association (AHDGA) publication "Wet Storage Stain".
- .6 Delivery of a damaged product will be cause for rejection.
- .7 Ensure cover to reinforcement is maintained during concrete pour.
- .8 Protect coated portions of bars with covering during transportation and handling.
- .9 Metal accessories such as anchor bolts, coverplates and electrical boxes that are exposed to the atmosphere shall be electrically isolated from the steel reinforcement.
- .10 Repair of galvanizing shall only be done if bare areas are infrequent, small and suitable for repair as determined by the Departmental Representative.

3.3 CLEANING

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

END OF SECTION

03 30 00 CAST-IN-PLACE CONCRETE**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Cast-in-place concrete shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.
 - .1 Concrete placed beyond dimensions indicated will not be measured for payment.
 - .2 Supply and installation of joint fillers and joint sealers, concrete sealer, and all other items and work required to complete the work will not be measured but considered incidental to work.
 - .3 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, ducts, voids, fillets scoring and chamfers.
 - .4 No deductions will be made for volume of concrete less than 0.1 m² in cross sectional area displaced by individual drainage openings.
- .2 Environmental mitigations required in accordance with Section 01 35 43 –Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment shall be made to the Contractor.

1.2 REFERENCES

- .1 Abbreviations and Acronyms:
 - .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
 - .2 Type GU, GUb and GUL - General use cement.
 - .3 Type MS and MSb - Moderate sulphate-resistant cement.
 - .4 Type MH, MHb and MHL - Moderate heat of hydration cement.
 - .5 Type HE, HEb and HEL - High early-strength cement.
 - .6 Type LH, LHb and LHL - Low heat of hydration cement.
 - .7 Type HS and HSb - High sulphate-resistant cement.
 - .8 Fly ash:
 - .1 Type F - with CaO content less than 15%.
 - .2 Type CI - with CaO content ranging from 15 to 20%.
 - .3 Type CH - with CaO greater than 20%.
 - .9 GGBFS - Ground, granulated blast-furnace slag.
- .2 Reference Standards
 - .1 ASTM International.
 - .1 ASTM C260/ C260M Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

- .3 ASTM C494/ C494M Specification for Chemical Admixtures for Concrete.
- .4 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
- .5 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .6 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .7 ASTM D2240, Standard Test Method for Rubber Property – Durometer Hardness
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 CSA International
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium. (Consists of A3001, A3002, A3003, A3004 and A3005)
 - .2 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction.
 - .3 CAN/CSA-G40.20/G20.21, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 32 16 – Construction Progress Schedules, convene pre-installation meeting one (1) week prior to beginning concrete works.
- .2 Ensure key personnel, site supervisor, Departmental Representative, speciality Contractor - finishing, forming, concrete producer and testing laboratories attend.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature, and test samples taken as per the Contract documents.
- .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.
- .4 MSDS in accordance with Section 01 35 29 – Health and Safety Requirements and Section 01 35 43 – Environmental Procedures.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 Provide Departmental Representative with valid and recognized certificate from plant delivering concrete, in accordance with Section 01 33 00 – Submittal Procedures.

- .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
- .2 Ensure testing laboratory and personnel are certified to CSA A283.
- .3 In accordance with Section 01 33 00 – Submittal Procedures, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .4 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 In accordance with Section 01 61 00 - Common Product Requirements.
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes' maximum after batching.
- .3 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
- .4 Deviations to be submitted for review by Departmental Representative.
- .5 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.Products

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in this Section.

2.2 PERFORMANCE CRITERIA

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

2.3 MATERIALS

- .1 As per drawings

2.4 MIXES

- .1 As per drawings

Part 3 Execution**3.1 PREPARATION**

- .1 Obtain the Departmental Representative's acceptance before placing concrete.
 - .1 Provide 24 hours' notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Pumping of concrete is permitted only after acceptance of equipment and mix by Departmental Representative.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain the Departmental Representative's acceptance of proposed method for protection of concrete during placing and curing.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 INSTALLATION/APPLICATION

- .1 Cast-in-place concrete work in accordance with drawings.

3.3 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described this Section.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 7 and 28 days.
 - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Contractor to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and departmental representative.
- .4 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-destructive methods for testing concrete: to CSA A23.1/A23.2.
- .6 Inspection or testing by the Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of their contractual responsibility.

3.4 PROTECTION

- .1 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA A23.1/A23.2. No additional payment for cold weather requirements shall be made.
 - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
 - .2 Do not let walls of shelter touch formwork.
 - .3 Provide sufficient space for removal of formwork for finishing.
 - .4 Use heating equipment approved by Departmental Representative.
 - .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
- .7 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
- .8 For concrete abutments, and footings: cure at 10 degrees C for additional 4 days.
 - .1 Keep concrete surfaces continually moist while protected.
 - .2 Provide fogging equipment to allow for mist spray curing before start of deck pour.
- .9 Unformed surfaces: cure with burlap and water.
 - .1 Place two layers of damp burlap on surface of concrete.
 - .2 Overlap each strip by minimum 75 mm and secure against displacement by wind.
 - .3 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .10 Formed surfaces:
 - .1 No additional curing will be required if formwork is left in place for seven days or more.
 - .2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven (7) day period.
- .11 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

03 35 00 CONCRETE FINISHING**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 03 20 00 - Cast-In-Place Concrete.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
- .2 CSA International
 - .1 CAN/CSA-A23.4, Concrete Materials and Methods of Concrete Construction.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Concrete Finishing shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Temporary lighting: Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.
- .2 Electrical power: Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area: Make work area water tight protected against rain and detrimental weather conditions.
- .4 Temperature: Maintain ambient temperature of not less than [10] degrees C from [7] days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
- .5 Moisture: Ensure concrete substrate is within moisture limits.
- .6 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .7 Ventilation:
 - .1 Ventilate enclosed spaces.
 - .2 Provide continuous ventilation during and after coating application.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .3 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. Products

1.6 SEALING COMPOUNDS

- .1 Surface sealer: to CAN/CGSB-25.20, Type 2 - water based, clear.
- .2 Surface sealers are not manufactured or formulated with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium and their compounds.

1.7 CURING COMPOUNDS

- .1 Select low VOC, water-based, organic-solvent free curing compounds.

1.8 MIXES

- .1 Mixing ratios in accordance with manufacturer's written instructions.

Part 2 Execution**2.1 EXAMINATION**

- .1 Verify that slab surfaces are ready to receive work and elevations are as instructed by

2.2 APPLICATION

- .1 Apply concrete finishing floor hardener in accordance with manufacturer's written instructions.
- .2 Sealants: type 3 as specified in Section 07 92 00.
- .3 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with sealant.
- .4 Apply floor treatment in accordance with Sealer manufacturer's written instructions.
- .5 Clean over spray. Clean sealant from adjacent surfaces.

2.3 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.

2.4 PROTECTION

- .1 Protect finished installation in accordance with manufacturer's instructions.

END OF SECTION

05 50 00 METAL FABRICATION**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 03 20 00 - Cast In Place Concrete.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A53/A53M-12 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
 - .2 ASTM A240/A240M-14 - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.
- .2 ASTM A307-14 - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 ASTM A500/A500M-13 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- .3 ASTM B456-11e1 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- .3 AWS (American Welding Society) D1.6/D1.6M-2007 – Structural Welding Code - Stainless Steel.
- .4 Canadian General Standards Board (CGSB)
 - 1. CAN/CGSB-1.40-97 - Anti-corrosive Structural Steel Alkyd Primer.
 - 2. CAN/CGSB-1.181-99 - Ready-Mixed, Organic Zinc-Rich Coating.
- .5 Canadian Standards Association (CSA)
 - 1. CAN/CSA-G401-14 - Corrugated Steel Pipe Products.
 - 2. CAN/CSA-G40.20-13/G40.21-13 - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - 3. CAN/CSA-G164-M92 (R2003) - Hot Dip Galvanizing of Irregularly Shaped Articles.
 - 4. CSA-W47.1-09(R2014) - Certification of Companies for Fusion Welding of Steel Structures.
 - 5. CSA-W48-14 - Filler Metals and Allied Materials for Metal Arc Welding.
 - 6. CSA-W55.3-08(R2013) - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - 7. CSA-W59-13 - Welded Steel Construction (Metal Arc Welding).
- .6 SSPC (The Society for Protective Coatings) (formerly SSPC - Steel Structures Painting Council) - Steel Structures Painting Manual.

1.3. SUBMITTALS

- 1. Section 01 33 00: Submission procedures.

2. Shop Drawings:

1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
2. Indicate welded connections using standard welding symbols. Indicate net weld lengths.

1.4. MEASUREMENT AND PAYMENT PROCEDURES

- .1 Metal Fabrication shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.

1.5 QUALITY ASSURANCE

1. Products of This Section: Manufactured to ISO 9000 certification requirements.
2. Welders' Certificates: Submit to Section 3T01 33 003T requirements, certifying welders employed on the Work, verifying qualification within the previous 12 months to CSAW47.1 (steel), CSA-W55.3, AWS D1.6/D1.6M.
3. Welded Steel Construction: CSA-W59.
4. Welded Stainless Steel Construction: AWS D1.6/D1.6M.

Part 2 Products

2.1 MATERIALS - STEEL

1. As per drawings

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 70 00: Verify existing conditions before starting work.
- .2 Verify that field conditions are acceptable and are ready to receive work.
- .3 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

- .1 Clean and strip primed steel items to bare metal and aluminum where site welding is required.
- .2 Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- .1 As per drawings

3.4 SCHEDULE

- .1 The following Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.

- .1 Vanity and Bench Brackets: Steel, galvanized finish, with galvanized fasteners.
- .2 Anchor Bolts: Galvanized.
- .3 Downspouts: galvanized.
- .4 Janitor Sink Surround: Stainless steel sheet, 0.67 mm thickness, with formed drain pan.
- .5 Toilet Partition Head Brace: Steel, prime paint finish.

END OF SECTION

06 10 00 ROUGH CARPENTRY**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 05 50 00 - Metal Fabrications: Setting anchors in concrete.
- .2 Section 08 11 00 - Metal Door and Frames
- .3 Section 08 91 00 - Louvres and Vents

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C36/C36M03, Standard Specification for Gypsum Wallboard.
 - .2 ASTM C57805a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - .3 ASTM C128905a, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - .4 ASTM D176188(2000), Standard Test Methods for Mechanical Fasteners in Wood.
 - .5 ASTM D505505, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood Joists.
 - .6 ASTM D545605a, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB11.3M87, Hardboard.
 - .2 CAN/CGSB51.32M77, Sheathing, Membrane, Breather Type.
 - .3 CAN/CGSB51.34M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .4 CAN/CGSB71.26M88, Adhesive for Field Gluing Plywood to Lumber Framing for Floor Systems.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA A123.203, Asphalt Coated Roofing Sheets.
 - .2 CAN/CSAA247M86, Insulating Fiberboard.
 - .3 CSA B1111974(R2003), Wire Nails, Spikes and Staples.
 - .4 CAN/CSAG164M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA O112 SeriesM1977(R2006), CSA Standards for Wood Adhesives.
 - .7 CSA O121M1978(R2003), Douglas Fir Plywood.
 - .8 CSA O12206, Structural Glued Laminated Timber.
 - .9 CSA O14105, Softwood Lumber.
 - .10 CSA O15104, Canadian Softwood Plywood.
 - .11 CSA O153M1980(R2003), Poplar Plywood.

- .12 CAN/CSAO325.092(R2003), Construction Sheathing.
- .13 CSA O437 Series93(R2006), Standards on OSB and Waferboard.
- .4 National Lumber Grades Authority (NLGA)
 - 1. Standard Grading Rules for Canadian Lumber 2005..
- .5 Truss Design and Procedures for Light Metal Connected Wood Trusses, Truss Plate Institute of Canada.
- .6 Western Red Cedar Lumber Association (WRCLA) - Grading Rules.
- .7 Underwriters' Laboratories of Canada (ULC)
 - 1. CAN/ULC-S706-97, Mineral Fibre Thermal Insulation for Buildings.

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.5 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Rough Carpentry shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.

Part 2 Products

2.1 FRAMING AND STRUCTURAL MATERIALS

- .2 Lumber: unless specified otherwise, No. 1/no. 2 SPF U/N, moisture content 19% (Sdry) or less in accordance with following standards:
 - .1 CSA O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 Interior Lumber Exposed to View: Western Red Cedar
 - .1 Grade: No. 2 and Better Clear.
 - .2 Surface Texture: Saw Textured.
 - .3 Moisture Content: Kiln-dried
 - .4 Size: As shown on the drawings
- .4 Framing and board lumber: in accordance with NBC, except as follows:
- .5 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.

2.2 PANEL MATERIALS

- .1 Plywood, OSB and wood based composite panels: to CAN/CSAO325.0.
- .2 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .4 Poplar plywood (PP): to CSA O153, standard construction.
- .5 Interior matformed wood particleboard: to ANSI 208.1.
- .6 Matformed structural panelboards (OSB wafer): to CAN3O437.0.
- .7 Insulating fibreboard sheathing: to CAN/CSAA247.
- .8 Glass fibre board sheathing: nonstructural, rigid, faced, fibreglass, insulating exterior sheathing board.
- .9 Expanded polystyrene sheathing: to ASTM C578.
- .10 Gypsum sheathing: to ASTM C36/C36M.

2.3 ACCESSORIES

- .1 Exterior wall sheathing paper: to CAN/CGSB51.32 single ply spun-bonded olefin type coated impregnated as indicated.
- .2 Polyethylene film: to CAN/CGSB51.34, Type 1.
- .3 Roll roofing: to CSA A123.2, Type S.
- .4 Air seal: closed cell polyurethane or polyethylene.
- .5 Sealants: in accordance with Section 07 92 10 - Joint Sealing
- .6 Sub flooring adhesive: to CGSB71.26, cartridge loaded.
- .7 General purpose adhesive: to CSA O112 Series.
- .8 Nails, spikes and staples: to CSA B111.
- .9 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .10 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
- .11 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation.
- .12 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.
- .13 Roof sheathing HClips: formed "H" shape, thickness to suit panel material, extruded 6063T6 aluminum alloy type approved by Departmental Representative.

2.4 FASTENER FINISHES

- 1. Galvanizing: to CAN/CSAG164 ASTM A653, use galvanized fasteners for exterior work, interior, highly humid areas, and treated lumber.

Part 3 Execution

3.1 PREPARATION

- .1 Store wood products.

3.2 INSTALLATION

- .1 Comply with requirements of NBC 2005 Part 9 supplemented by following paragraphs.
- .2 Install members true to line, levels and elevations, square and plumb.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install spanning members with "crownedge" up.
- .5 Select exposed framing for appearance. Install lumber and panel materials so that grademarks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .6 Install sub flooring and combined subfloor and underlay with panel endjoints located on solid bearing, staggered at least 800mm.
- .7 Install wall sheathing in accordance with manufacturer's printed instructions.
- .8 Install roof sheathing in accordance with requirements of NBC.
- .9 Install furring and blocking as required to spaceout and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, electrical equipment mounting boards, and other work as required.
- .10 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
- .11 1. Align and plumb faces of furring and blocking to tolerance of 1:600.
- .12 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .13 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .14 Install sleepers as indicated.
- .15 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

3.3 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.
- .3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.4 SCHEDULES

- .1 Electrical equipment mounting boards: Plywood, DFP or CSP sanded grade, square edge 19 mm thick.

END OF SECTION

06 18 20 STRUCTURAL COMPOSITE LUMBER**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 05 50 00 - Metal Fabrications.
- .2 Section 06 10 00 - Rough Carpentry .

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D176188(2000), Standard Test Methods for Mechanical Fasteners in Wood.
 - .2 ASTM D545605a, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O141-05(R2014), Softwood Lumber.
 - .3 CSA 086-14, Engineering Design in wood.
- .3 National Lumber Grades Authority (NLGA):
 - .1 Standard Grading Rules for Canadian Lumber 2014.

1.3 SUBMITTALS

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings Submittals: in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Clearly indicate the type of product, layout, shop applied finishes, shop and erection details, including cuts, holes, fastenings, camber and connection hardware. Drawings to be signed by Registered Professional Engineer, registered in the Province of Saskatchewan.
 - .2 No fabrication work to be performed until shop drawings are approved and returned. Review of the shop drawings by the Consultants does not relieve the Engineer appointed by the manufacturer of his responsibilities.

1.4 QUALITY ASSURANCE

- .1 A qualified agency approved by ICBO or the Standards Council of Canada shall be employed by the manufacturer for the purpose of monitoring the quality assurance production process on a random unannounced basis. The qualified independent agency shall approve or establish and maintain procedures for quality assurance. The manufacturer shall warrant all products to be free from manufacturing errors or defects in workmanship or materials.
- .2 Fabricating plant: Approved by ICBO or Standards Council of Canada certified testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Arrange delivery of members in accordance with construction schedule to avoid double handling.
- .2 Use padded, non-marring slings for handling structural composite lumber.
- .3 Protect corners with wood blocking.
- .4 Slit underside of membrane covering during storage at Site. Do not deface member.
- .5 Store structural composite lumber, blocked off ground and separated with stripping, so air may circulate around all faces of members.
- .6 Cover top and sides with opaque moisture resistant membrane if outside.
- .7 Protect stored composite lumber from direct exposure to sun.
- .8 Do not bring into contact composite lumber with bare/raw metal of any kind.

1.6 PROTECTION

- .1 Maintain protection of structural composite members until cover is installed.

1.7 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Structural Composite Lumber shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.

Part 2 Products**2.1 LUMBER MATERIAL**

- .1 LVL - Materials to comply with CCMC Report No. 08675-R, laminated in a continuous press with all grain parallel with the length of the member. Adhesive used in lamination is a phenol formaldehyde exterior-type adhesive which complies with MF No. 06185 and CAN/CSA 0437-93.

2.2 MANUFACTURER

- .1 Structural composite lumber shall be manufactured in a plant approved by ICBO or Standard Council of Canada under the supervision of a certified third party inspection agency.

2.3 IDENTIFICATION

- .1 Structural composite lumber shall be identified with stamps noting the name and plant number of the manufacturer, the grade, the National Evaluation Service committee report number, CCMC number and the certified inspection agency.
- .2 Manufacturer to submit written certificate indicating grade, name of plant number of the manufacturer, NESC report number, CCMC number and certified inspection agency.
- .3 Stamps or identification to be approved on the upper top surface of the beam type.

2.4 FASTENERS

1. Including machine bolts, washers, lag bolts, drift pins, dowels and such like. Shall conform to C.S.A. B33.1 - 1961; nails, spikes and staples shall conform to C.S.A. B111 - 1974, galvanized when in direct contact with wood products.

2.5 CONNECTION STEEL

- .1 Shall be mild structural steel, conforming to C.S.A. G40.21 - M1992, Grade 350W hotdip galvanized, stainless steel grade 304L, or clear anodized Aluminum 6061-T6. If cables are specified use galvanized structural strand, as specified on Consultant drawings.
- .2 All connection steel to be fabricated to required precision and to architectural quality. Any warping or distortion which may arise due to fabrication process will not be acceptable.

Part 3 Execution**3.1 EXAMINATION**

- .1 Prior to fabrication, check all dimension relating to this section of work. Report any discrepancies to the Consultant.
- .2 2. Prior to site erection, examine all site conditions and ensure an acceptable condition.

3.2 PERFORMANCE

1. Products shall be proven by testing as demonstrated either by ICBO, CCMC or NER evaluation.

3.3 WARRANTY

1. The products delivered shall be free from any defects in workmanship in material and the design of members shall be adequate to carry the specified loads for the life of the project.

3.4 FABRICATION

- .1 All fabrication to be executed by a reputable high quality timber fabricator experienced in fine architectural work.
- .2 All work to be done in an enclosed shop environment. All timber components of the structure shall be fabricated with tolerances as follows:
 1. thickness + 1.5mm
 2. depth + 1.5mm
 3. all other dimensions + 1.5 mm
- .3 Dimensional tolerances outside of these ranges and not affecting structural performance may be acceptable if confirmed in writing by the Consultant.

3.5 FINISHING

- .1 Surface preparation shall be adequate sanding to remove visible turning or cutting marks.
- .2 All checks within 2 years of substantial completion deemed visually unacceptable to client should be repaired.

- .3 The LVL surface may contain voids and burns consistent with the surface texture of architectural grade LVL. No filler shall be used.

3.6 **ERECTION**

- .1 Erect structural composite lumber in accordance with final reviewed shop drawings.
- .2 Make adequate provision for possible erection stresses. Set members level and plumb to correct positions. Securely brace members and anchor in place to maintain plumbness until permanently secured by finished structure.
- .3 Fit structural composite lumber closely and accurately, without trimming, cutting or other modifications, unless approved in writing by the Consultant.
- .4 Site cutting or boring of structural composite lumber, other than shown on shop drawings not permitted without written consent of the Consultant.
- .5 Site assembly of fabricated parts including connectors to be in accordance with Consultant's structural drawings and approved shop drawings.
- .6 Take extreme care during erection not to damage components, to preserve their visual integrity. Damaged or visually impaired assemblies may be rejected at the discretion of the consultant.

END OF SECTION

06 20 00 FINISH CARPENTRY**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 06 10 00 - Rough Carpentry
- .2 Section 09 91 00 – Painting: Painting and finishing of finish carpentry items.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-99, Particleboard.
 - .2 ANSI A208.2-02, Medium Density Fibreboard (MDF).
 - .3 ANSI/HPVA HP-1-2004, Standard for Hardwood and Decorative Plywood.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 TM E1333-96(2002), Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 2003.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB11.3-M87, Hardboard.
- .5 Canadian Plywood Association (CanPly)
 - .1 The Plywood Handbook 2005.
- .6 Canadian Standards Association (CSA International)
 - .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
 - .2 CAN/CSAG164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O121-M89(R2003), Douglas Fir Plywood.
 - .5 CAN/CSA O141-91(R1999), Softwood Lumber.
 - .6 CSA O151-04, Canadian Softwood Plywood.
 - .7 CSA O153-M1980(R2003), Poplar Plywood.
 - .8 CSA Z760-94, Life Cycle Assessment.
- .7 Western Red Cedar Lumber Association (WRCLA) - Grading Rules.
- .8 National Lumber Grades Authority (NLGA)
- .9 Standard Grading Rules for Canadian Lumber 2005.

1.3 SUBMITTALS

- 1. In accordance with Section 01 33 00 - Submittal Procedures.

2. Shop Drawings Submittals: in accordance with Section 01 33 00 Submittal Procedures.
 1. Indicate details of construction, profiles, jointing, fastening and other related details.
 2. Indicate materials, thicknesses, finishes and hardware.

1.4 **QUALITY ASSURANCE**

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.5 **DELIVERY, STORAGE, AND HANDLING**

- .3 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .1 Protect materials against dampness during and after delivery.
 - .2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

1.6 **MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Finish Carpentry shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.

Part 2 Products

2.1 **LUMBER MATERIAL**

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA O141.
 - .2 AWMAC custom grade, moisture content as specified.
- .2 Machine stress rated lumber is acceptable.
- .3 Hardwood lumber: moisture content 9 % or less in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC custom grade, moisture content as specified.
- .4 Douglas fir plywood (DFP): To PS 1-09, APA A-B Marine Grade, veneer core, 19 mm thick.
 - .1 Urea-formaldehyde free.
 - .2 FSC Certified.
 - .3 Acceptable material: Marine Tech, as manufactured by Plum Creek Timber Company Ltd.
- .5 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .1 Urea-formaldehyde free.

- .6 Hardwood plywood: to ANSI/HPVA HP-1
 - .1 Urea-formaldehyde free.
- .7 Poplar plywood (PP): to CSA O153, standard construction.
 - .1 Urea-formaldehyde free.
 - .2 Interior mat-formed wood particleboard: to ANSI A208.1. Urea-formaldehyde free.
- .8 Birch plywood: to AWMAC Paint Grade.
 - .1 Urea-formaldehyde free.
- .9 Fibreboard must contain less than 10 % roundwood by weight, using a weighted average over a three month period at manufacturing locations.
 - .1 Urea-formaldehyde free.
- .10 Hardboard:
 - .1 To CAN/CGSB-11.3.
 - .2 Urea-formaldehyde free.
- .11 MDF (medium density fibreboard) core: to ANSI A208.2, Grade 150-MR10, 25 mm
 - .1 Medium density fibreboard must:
 - .1 Meet the performance requirements of ANSI A208.2.
 - .2 Urea-formaldehyde free.
 - .2 Acceptable material: Medex, as manufactured by Sierra Pine Composite Solutions.
- .12 HDF (high density fibreboard): to ANSI A208.2, 19 mm thick, core density 800 kg/m , face density 960 kg/m .
 - .3 High density fibreboard must:
 - .1 Meet the performance requirements of ANSI A208.2.
 - .2 Urea-formaldehyde free.
 - .4 Acceptable manufacturer: West Fraser Timber Co. Ltd.
- .13 Nails and staples: to CSA B111.
 - .1 Wood screws: stainless steel, steel plain, type and size to suit application.
 - .2 Sealant: in accordance with Section 07 92 00 - Joint Sealant

2.2 MANUFACTURED UNITS

- .1 Vanities:
 - .1 Fabricate to AWMAC custom quality grade, decorative laminate.
 - .2 Frames: Section 05 50 00.

2.3 FABRICATION

- .1 Set nails and countersink screws apply stained plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
 - .1 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

- .2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 70 00: Verify existing conditions before starting work.
- .2 Verify adequacy of backing and support framing.
- .3 Verify location and sizes of utility rough-in associated with work of this section.
- .4 Verify relative humidity is within the range to be maintained during occupancy.

3.2 INSTALLATION

- .1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .3 Form joints to conceal shrinkage.

3.3 CONSTRUCTION

- .1 Fastening:
 - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
 - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .2 Standing and running trim:
 - .1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.
 - .2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.
 - .3 Make joints in baseboard, where necessary using a 45 degrees scarf type joint.
 - .4 Install door and window trim in single lengths without splicing.
- .3 Interior and exterior frames:
 - .1 Set frames with plumb sides level heads and sills and secure.
- .4 Panelling:

- .1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.
- .2 Secure panelling and perimeter trim using concealed fasteners.
 - .1 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

END OF SECTION

07 21 13 BOARD INSULATION**Part 1 General****1.1 SECTION INCLUDES**

- .1 Board insulation protection as indicated on the drawings.

1.2 RELATED SECTIONS

- .1 Section 03 30 00 - Cast In Place Concrete.

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C578-09e1: Standards Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Underwriters Laboratories of Canada (ULC)
 - 1. CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - 1. Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction Waste Management And Disposal.

- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.7 MEASUREMENT AND PAYMENT PROCEDURES

- .4 Board Insulation shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.

Part 2 Products

2.1 INSULATION

- .1 Extruded polystyrene (XPS): to CAN/ULC-S701.
- .2 Type: 4.
- .3 Compressive strength: 240 kPa.
- .4 Thickness: 50 mm, 100mm (as indicated on Drawings)
- .5 Size: 610 mm x 2440 mm.
- .6 Edges: shiplapped

2.2 ADHESIVE

- .1 Adhesive (for polystyrene): to CGSB 71-GP-24.
- .2 Type: 1.
- .3 Class: A.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 INSULATION INSTALLATION

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.
- .3 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .4 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 EXAMINATION

- .1 Examine substrates and immediately inform Departmental Representative in writing of defects.
- .2 Prior to commencement of work ensure:
- .3 1. Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris

3.4 PERIMETER FOUNDATION INSULATION

- .1 Exterior application: extend boards 1800 mm horizontally in the soil below finish grade, slop away at a ratio of 1:5, from bottom and outside face of perimeter concrete thickened edge beam. (as indicated in drawings)

3.5 BELOW-SLAB INSULATION

- .1 Place insulation under slabs on grade after base for slab is complete. Lay boards on level compacted fill as shown on the drawings.
- .2 Extended boards under entire area of slab.
- .3 Cut and fit insulation tight to protrusions or interruptions to insulation plane.
- .4 Prevent insulation from being displaced or damaged while placing vapour retarder and placing slab.

3.6 CLEANING

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

END OF SECTION

07 26 00 VAPOUR RETARDERS**Part 1 General****1.1 SECTION INCLUDES**

- .1 Sheet and sealant materials for controlling vapour diffusion.

1.2 RELATED SECTIONS

- .1 Section 07 21 16 – Batt Insulation: Insulation.
- .2 Section 07 27 00 – Air Barriers: An air barrier as an integral part of a complete stud wall, window assembly.
- .3 Section 07 92 00 – Joint Sealants: Sealants.
- .4 Section 08 11 00 – Metal Doors and Frames: Door frames.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - 1. CAN/CGSB-51.34-M-86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

- .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.
- .3 Mock-up will be used to judge workmanship, substrate preparation, and material application.
- .4 Locate where directed where indicated.
- .5 Allow 14 days for inspection of mock-up by Departmental Representative before proceeding with vapour barrier work.
- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Vapour Retarders shall be considered incidental to “Unit Price Item 1 – Maintenance Building” and no separate payment shall be made.

Part 2 Products**2.1 SHEET VAPOUR BARRIER**

- .1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
- .2 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer. To Section 07 92 00 - Joint Sealing.
- .3 Staples: minimum 6 mm leg.
- .4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

Part 3 Execution

3.1 INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall and ceiling assemblies prior to installation of gypsum board to form continuous retarder.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed

3.2 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour barrier as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Install staples through lapped sheets at sealant bead into wood substrate.
 - .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Install staples through lapped sheets at sealant bead into wood substrate.
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 **ELECTRICAL BOXES**

- .1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
 - .1 Install moulded box vapour barrier.
 - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.6 **CLEANING**

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

END OF SECTION

07 27 00 AIR BARRIERS**Part 1 General****1.1 SECTION INCLUDES**

- .1 Materials and installation methods providing air vapour barrier materials and assemblies.
- .2 Air seal materials to connect and seal openings, joints, and junctions between other air seal materials and assemblies.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 – Rough Carpentry: Sheathing membrane.
- .2 Section 07 92 00 – Joint Sealants.
- .3 Section 08 11 00 – Metal Doors and Frames.
- .4 Section 09 21 16 – Gypsum Board Assemblies.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13-M87, Sealing Compound, One Component, Elastomeric Chemical Curing.
 - .2 CAN/CGSB-19.24-M90, Multi-Component, Chemical Curing Sealing Compound.
 - .3 CGSB 19-GP-14M-84, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
 - .4 CAN/ULC-S705.1-01-AM3 - Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material - Specification.
 - .5 CAN/ULC-S705.2-05 – Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities – Specification.
- .2 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Applicator: company specializing in performing work of this section with minimum experience with installation of air/vapour barrier systems.
 - .2 Completed installation must be approved by the material manufacturer.
- .2 Mock-ups:
 - .3 Construct mock-up in accordance with Section 01 45 00 – Quality Control.
 - .4 Construct typical exterior wall panel, 3 m long by 1 m wide, incorporating insulation, building corner condition, junction with roof system and illustrating materials interface and seals.

- .5 Locate where directed.
- .6 Mock-up may remain as part of finished work.
- .7 Allow 24 hours for inspection of mock-up.
- .3 Site Meetings: as part of Manufacturer's Services schedule site visits, to review Work, at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Avoid spillage: immediately notify Departmental Representative if spillage occurs and start clean up procedures.
- .3 Clean spills and leave area as it was prior to spill.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 – Construction/Demolition Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.8 AMBIENT CONDITIONS

- .1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.9 SEQUENCING

- .1 Sequence work in accordance with Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Charts.
- .2 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.10 WARRANTY

- .1 Provide warranty under provisions of Section 01 78 00 - Closeout Submittals.
- .2 Warranty: include coverage of installed sealant and sheet materials which:
 - .1 Fail to achieve air tight and watertight seal.
 - .2 Exhibit loss of adhesion or cohesion.
 - .3 Do not cure.

1.11 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Air Barriers shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.

Part 2 Products**2.1 SHEET MATERIALS**

- .1 Contractor to submit proposed materials for acceptance by the Departmental Representative prior to construction.
- .2 Sheet Seal: self-adhesive bitumen laminated to high-density polyethylene film, nominal total thickness of 1.0 mm,
- .3 Primer recommended by sheet seal manufacturer appropriate to application.
- .4 Roof Sheet Seal: Self adhesive elastomeric bitumen membrane reinforced with a glass mat, sanded upper surface.
- .5 Transition Sheet Seal: Isobutylene-Isoprene and Ethylene Propylene Diene Monomer blend Butyl EPDM, black colour, 1.2 mm thick.
- .6 Foam-In-Place Seal: Maximum 25 percent expansion, spray-applied polyurethane foam insulation; in conformance with CAN/ULC-S705.1.
- .7 Sheathing Membrane: Refer to Section 06 10 00 – Rough Carpentry.

2.2 SEALANTS

- .1 Butyl Sealant: CGSB 19-GP-14M, butyl rubber base, single component, solvent release, non-skinning, Shore "A" Hardness Range of 10 to 30; black colour.
- .2 Primer: recommended by sealant manufacturer appropriate to application.
- .3 Substrate Cleaner: non-corrosive type recommended by sealant manufacturer compatible with adjacent materials.

2.3 ADHESIVES

- .1 Mastic Adhesive: compatible with sheet seal and substrate, thick mastic of uniform consistency.
- .2 Adhesive: compatible with sheet seal and substrate, permanently non-curing, Stedfast Rubber Cement.

2.4 ACCESSORIES

- .1 Foam-In-Place Seal: Maximum 25 percent expansion, spray-applied polyurethane foam insulation; in conformance with CAN/ULC-S705.1.

Part 3 Execution**3.1 MANUFACTURER'S INSTRUCTIONS**

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

3.2 GENERAL

- .1 Perform Work in accordance with manufacturer's written requirements for materials and installation.

3.3 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept work of this section.
- .2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.
- .3 Report unsatisfactory conditions in writing.
- .4 Do not start work until deficiencies have been corrected.
- .5 Beginning of Work implies acceptance of conditions.

3.4 PREPARATION

- .1 Remove loose or foreign matter, which might impair adhesion of materials.
- .2 Ensure substrates are clean of oil or excess dust; masonry joints struck flush, and open joints filled; and concrete surfaces free of large voids, spalled areas or sharp protrusions.
- .3 Ensure substrates are free of surface moisture prior to application of self-adhesive membrane and primer.
- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.5 INSTALLATION

- .1 Install materials in accordance with manufacturer's instructions.
- .2 Secure sheet seal to gypsum board materials with self-adhesive.
- .3 Caulk with sealant to ensure complete seal.
- .4 Position lap seal over firm bearing.
- .5 Secure roof sheet seal with self-adhesive. Caulk to complete seal. Position lap seal over firm bearing.
- .6 Lap transition sheet seal onto roof vapour retarder and seal with adhesive.
- .7 Caulk to ensure complete air seal.
- .8 Position lap seal over firm bearing.
- .9 Install sheet seal between window and door frames and adjacent wall seal materials with self- adhesive.
- .10 Caulk to ensure complete seal.
- .11 Position lap seal over firm bearing.
- .12 Install foam-in-place seal at window perimeter shim spaces. Allow for deflection of structure at head space.
- .13 Apply sealant within recommended application temperature ranges.
- .14 Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.6 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 – SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work.

3.7 CLEANING

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

3.8 PROTECTION OF WORK

- .1 Protect finished work in accordance with Section 01 78 40 – Maintenance Requirements.
- .2 Do not permit adjacent work to damage work of this section.
- .3 Ensure finished work is protected from climatic conditions.

3.9 SCHEDULE

- .1 Wall Air Seal over Exterior Surface of Gypsum Sheathing: Self-adhesive sheet seal. Roof Air Seal over Exterior Surface of Deck: Self-adhesive sheet seal.
- .2 Sheet seal opening liner at sill and lower 150 mm of jambs. Sheet seal opening liner at head and jambs, lapped over sill liner.
- .3 Lap sheet seal from wall surface over full bearing to window frame with 25 mm of full contact.
- .4 Lap sheet seal over window head flashing.
- .5 Lap wall air seal over sheet seal at head and jambs. Lap sheet seal over wall air seal at window sill.
- .6 Edge seal with sealant.
- .7 Wall and Roof Junction: Lap sheet seal from wall seal material with 150 mm of contact over firm bearing to roof air seal membrane with 100 mm of full contact. Seal with sealant.

END OF SECTION

07 40 00 METAL ROOFING AND SIDING PANELS**Part 1 General****1.1 SECTION INCLUDES**

- .1 Preformed, prefinished metal roof panels.
- .2 Miscellaneous trim, flashing, closures and accessories.
- .3 Fastening devices

1.2 RELATED SECTIONS

- .1 Section 06 10 00 - Rough Carpentry
- .2 Section 07 27 00 - Air Barriers
- .3 Section 07 62 00 - Sheet Metal Flashing and Trim

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
 - .2 ASTM D523-14, Standard Test Method for Specular Gloss.
 - .3 ASTM D822/D822M-13, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .2 Canadian General Standards Board (CGSB).
 - 1. CAN/CGSB-19.13-M87, Sealing Compound, One Component, Elastomeric, Chemical Curing

1.4 DESIGN REQUIREMENTS

- .1 Design Requirements for Roof Systems:
 - .1 System Design: Metal roof system as designed by the manufacturer shall be a complete system. All components of the system shall be supplied by the same manufacturer.
 - .2 Roof Panels: Steel panels shall be designed in accordance with the AISI ColdFormed Steel Design Manual.
 - .3 Design Loads: Design load application shall be in accordance with local building code.
 - .4 Wind Loads: The design wind loads shall be based on the wind criteria in accordance with local building code.
 - .5 Deflection: Deflection of the wall system is not to exceed 1/180th of the span for the specified live loading.
 - .6 Thermal Expansion and Contraction: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base

calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

- .7 Temperature Change (Range): 20 deg C, ambient; 40 deg C, material surfaces
- .8 Accessories and Fasteners: Accessories and fasteners shall be capable of resisting the specified design wind suction forces in accordance with local building code.
- .2 Design Requirements for Wall Systems:
 - .1 System Design: Metal wall a system as designed by the manufacturer shall be a complete system. All components of the system shall be supplied by the same manufacturer.
 - .2 Wall Panels: Steel panels shall be designed in accordance with the AISI ColdFormed Steel Design Manual.
 - .3 Design Loads: Design load application shall be in accordance with local building code.
 - .4 Wind Loads: The design wind loads shall be based on the wind criteria in accordance with local building code.
 - .5 Deflection: Deflection of the wall system is not to exceed 1/180th of the span for the wind load based on serviceability limit states.
 - .6 Thermal Expansion and Contraction: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss. Temperature Change (Range): 20 deg C, ambient; 40 deg C, material surfaces.
 - .7 Expansion Joints: Design expansion joints to accommodate movement in cladding and between cladding and structure to prevent permanent distortion or damage to the cladding.
 - .8 Accessories and Fasteners: Accessories and fasteners shall be capable of resisting the specified design wind suction forces in accordance with local building code.
 - .9 Tolerances: Design wall system to maintain the following erection tolerances. Maximum variation from plane or location shown on shop drawings: 20 mm/10 m (3/4 inch/30 feet). Maximum offset from true alignment between two adjacent members abutting end to end in line: 1 mm (0.04 inches).

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.
 - 1. Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural frame.
 - 2. Ensure each shop drawing submitted has been stamped by licensed professional engineer registered in Saskatchewan.
- .2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - 1. Submit duplicate 300 x 300 mm samples of each sheet metal material.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 - Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel, Metal and Plastic waste in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Ensure emptied containers are sealed and stored safely.
- .7 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .8 Unused paint, caulking, and sealing compound materials must be disposed of at an official hazardous material collections site as approved by Departmental Representative.
- .9 Unused paint, caulking, and sealing compound 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.
- .10 Fold up metal banding, flatten and place in designated area for recycling.

1.7 WARRANTY

- .1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: 40 year after the date of Substantial Completion.

1.8 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Metal Roofing and Siding Panels shall be considered incidental to **"Unit Price Item 1 – Maintenance Building"** and no separate payment shall be made.

Part 2 Products**2.1 ROOF SYSTEM COMPONENTS:**

- .1 Roof System: Tradition100-4 on Solid Substrate by Vicwest; or approved equivalent.
 1. Underlayment: Membrane shall be Lastobond by Soprema or Ice and Water Shield by W.R. Grace or approved equivalent.
 2. Clip System:
 1. Thermally responsive clips to be fabricated from a minimum of 0.91 mm (.036") steel, with minimum Z275 galvanized coating designed to accommodate expansion and contraction of the roof sheet.
 2. Roof Fasteners: As specified by manufacturer, to resist wind uplift and sliding snow forces.
 3. Pre-finished Roof Sheet, exposed to exterior.

1. Profile: Tradition 100-4, with I-style ribs at 400 mm spacing.
2. Panel: Z275 galvanized (zinc coated) sheet steel conforming to ASTM A653M structural quality Grade 230 having a nominal core thickness 0.76mm (0.030").
4. Snap Cap:
 1. Provide 25 mm high snap caps for full length of the roof panel and retained by panel clips, fabricated from Z275 galvanized (zinc coated) sheet steel conforming to ASTM A653M structural quality Grade 230 having a minimum nominal core thickness 0.61mm (0.024"). Finish and colour to match roof sheet.
5. Exterior Fascia: Minimum 0.79 mm thick precoated steel, interlocking edges, concealed fastened, colour to match roof panels.
6. Trim, Closure Pieces, Caps, Flashings, Fascias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
7. Coating: Prepainted WeatherXL; Colour as selected from manufacturer's standard colour range, similar to QC18315 or approved equivalent.

2.2 WALL SYSTEM COMPONENTS:

- .1 Wall System: Pre-painted steel - SMP by Cascadia Metals; or or approved equivalent.
 - .1 Pre-finished Flat Wall Sheet, exposed to exterior.
 - .1 Panel: 55% aluminum-zinc alloy coated sheet steel conforming to conforming to the requirements of ASTM A792 (or A792M) with a minimum coating of AZ50(AZM150).
 - .2 24 gauge thickness.
 - .3 Color: As selected by Consultant from Manufacturer's standard colour range minimum 30 colours. Both top and underside of flashing exposed to view to be finished with the same colour.
 - .4 Concealed Finish: Pretreat with manufacturer's standard white or lightcolored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).
 - .2 Clip System:
 1. Wall Fasteners: As specified by manufacturer.

2.3 ACCESSORIES:

- .1 Flashing: In accordance with Section 07 62 00. Formed from same materials as the roof sheet. Custom fabricated to suit Departmental Representative details, as required.
- .2 Closures: Foam and metal closures to suit profiles selected, to manufacturer's recommendations.
- .3 Sealants: In accordance with manufacturer's recommendation and Section 07 92 00.

2.4 FABRICATION:

- .1 Fabricate components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.

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METAL ROOFING AND SIDING PANELS

- .2 Fabricate all components of the system in the factory, ready for field installation.
- .3 Provide roof and wall sheets and all accessories in longest practicable length to minimize field lapping of joints.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine work of other Sections upon which work of this Section depends
- .2 Report all discrepancies to consultant before beginning work on the roof system.

3.2 INSTALLATION

- .1 Roof Materials:
 - .1 Underlayment: Install underlayment fully adhered to solid substrate according to manufacturer's recommendations. Ensure all joints are properly lapped and sealed. Tie in with barriers on adjacent surfaces to ensure airtight construction. Provide a continuous seal around all openings in the insulated metal roof system.
 - .2 Clip: Attach Tradition clips using fasteners as recommended by the manufacturer, to suit the substrate.
- .2 Roof Panel Installation
 - .1 Install exterior prefinished roof panels on panel support clips, using manufacturer's proper construction procedure. Ensure metal roofing sheet sidelap is positively retained by clips, and proper sheet coverage is maintained.
 - .2 Install the snap-cap at all side laps as shown on the approved shop drawings. Mitre snap-cap as required to resist water entry.
 - .3 Where indicated on approved shop drawings, secure the end-lap of metal roofing sheets in accordance with the manufacturers specifications and details to provide a weather-tight seal. Exposed fasteners to match colour of the roof sheet.
 - .4 Provide notched and formed closures, sealed against weather penetration, at changes in pitch, and at ridges and eaves, where required.
 - .5 Install all companion flashing, gutters and ventilators as shown on the shop drawings. Use concealed fasteners when possible. Exposed fasteners to match colour of roof sheet.
- .3 Wall Panel Installation
 - .1 Flashing:
 - .1 Install starter flashing, drip and other flashing, and corners, edgings, window and door flashing as shown on the drawings.
 - .2 Exterior Cladding:
 - .3 Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
 - .4 Install exterior cladding and soffit in accordance with manufacturer's standard installation procedures, providing proper laps and detailing to ensure a weathertight face.
 - .5 Install finishing flashing and cap flashing.

.2 Sealants:

1. Install sealants at junctions with adjoining work, and where shown on the drawings, in accordance with Section 07 92 00.

3.3 **CLEAN-UP**

- .1 Clean exposed panel surfaces in accordance with manufacturer's instructions.
- .2 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Departmental Representative and only where appearance after touch-up is acceptable to Departmental Representative.
- .3 Replace damaged panels and components that, in opinion of the Departmental Representative, cannot be satisfactorily repaired.

END OF SECTION

07 42 93 METAL SOFFIT PANELS**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 07 92 00 - Joint Sealants.
- .3 Section 09 21 16 - Gypsum Board Assemblies

1.2 REFERENCES

- .1 ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
- .2 ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coat by the Hot-Dip Process; 2006a.
- .3 ASTM A 276 - Standard Specification for Stainless Steel Bars and Shapes; 2006.
- .4 ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- .5 ASTM A 240 - Standard Specification for Stainless Steel Sheet and Plate; 2007.
- .6 ASTM A 480 - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2006b.
- .7 ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.
- .8 ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, 2003.
- .9 ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.

1.3 SUBMITTALS

- .1 Product Data: Panel manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
 - .1 Finish manufacturer's data sheet showing physical and performance characteristics.
 - .2 Storage and handling requirements and recommendations.
 - .3 Fabrication instructions and recommendations.
 - .4 Specimen warranty for finish, as specified herein.
- .2 Shop Drawings:
 - .1 Show layout and elevations, dimensions and thickness of panels, finishes and textures, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Submit duplicate 400 x 400 mm size profile specified.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 QUALIFICATION

- .1 Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.
- .2 Panel System Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
 - .1 Approved by metal panel manufacturer.
- .3 Installer: Experienced in performing work of the type specified in this section.
 - .1 With experience in installation of metal panel system similar to the work of this section.
 - .2 Approved by panel system manufacturer.
- .4 Design Engineer's Qualifications: When required by building authority having jurisdiction, Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of Work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 – Common Product Requirements
- .2 Deliver, store and protect material in accordance with panel manufacturer's recommendations.
- .3 Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .4 Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.6 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Metal Soffit Panels shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.

Part 2 Products

2.1 METAL SOFFIT PANELS

- .1 Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
 - .1 Finish: Match finish and color of metal roofing panels
 - .2 Sealant: Factory applied within interlocking joint.
- .2 Flush-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges and a flat pan with one groove between panel edges; with flush joint between panels.
 - .1 Material: Same material, finish, and color as metal roofing panels.

- .2 Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - 1. Thickness: 1mm.
 - 2. Surface: Smooth, flat finish.
 - 3. Exterior Finish: Mica fluoropolymer.
 - 4. Color: Match color of metal roofing panels
- .3 Panel Coverage: 304.8mm
- .4 Panel Height: 25.4mm

2.2 MISCELLANEOUS MATERIALS

- .1 Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metalliccoated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- .2 Panel Accessories: Provide components required for a complete weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
- .3 Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.
- .4 Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- .5 Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

2.3 FABRICATION

- .1 Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- .2 On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- .3 Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- .4 Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal

Section 07 42 93

METAL SOFFIT PANELS

Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.4 FINISHES

- .1 Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- .2 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- .3 Aluminum Panels and Accessories: Mica Fluoropolymer: AAMA 2605. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify dimensions, tolerances, and interfaces with other work are acceptable for metal panel installation.
- .2 Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturers written instructions.
- .3 Verify subgirts have been installed perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane. Space at intervals indicated.
- .4 Notify in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PRESENTATION

- .1 Protect adjacent work areas and finish surfaces from damage during installation.

3.3 INSTALLATION

- .1 Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- .2 Comply with instructions and recommendations of metal panel manufacturer and panel system manufacturer, as well as with approved shop drawings.
- .3 Install metal panels securely with extruded aluminum mounting clips to allow mounting clips to slide along extruded aluminum panel frame and interlock with the framing members of the panel allowing for panel expansion and seismic movement
- .4 Erect siding plumb, level, and true.
- .5 Use concealed fasteners unless otherwise approved by manufacturer.
- .6 Do not rout, bend, or otherwise form panels in field unless required by panel system manufacturer and approved by the architect. Comply with metal panel manufacturer's instructions and recommendations for field forming.

- .7 Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- .8 Provide expansion joints where indicated.
- .9 Where joints are designed for field applied sealant, seal joints completely with specified sealant.
- .10 Replace damaged products. Individual panels are removable without the need to remove adjacent panels.

3.4 TOLERANCES

- .1 Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch (1.6 mm).
- .2 Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch (3 mm).

3.5 CLEANING

- .1 Remove site cuttings from finish surfaces.
- .2 Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.
- .3 Clean aluminum surfaces in accordance with recommendations found in AAMA 609 and 610. Do not use aggressive alkaline, TSP, acid cleaners, or abrasive cleaners on aluminum surfaces.
- .4 Clean stainless steel surfaces with non-abrasive detergents, soap, ammonia and warm water; rinse with clean water.

END OF SECTION

07 46 23 WOOD SIDING - PREFINISHED**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 07 27 00 - Air Barriers.
- .3 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .4 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- .1 American Hardboard Association (AHA):
 - .1 AHA A135.6; Hardboard Siding.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3 - M87, Hardboard.
 - .2 CAN/CGSB-11.5 - M87, Hardboard, Precoated, Factory Finished, for Exterior Cladding.
 - .3 CAN/CGSB-11.6 - M87, Installation of Exterior Hardboard Cladding.
 - .4 CAN/CGSB-51.32 - M77, Sheathing, Membrane, Breather Type.

1.3 PERFORMANCE REQUIREMENTS

- .1 Design hardboard siding assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under condition indicated:
 - .1 Wind Loads: Assemblies to withstand maximum wind pressure, suction loads acting normal to plane of surface in accordance with National Building Code of Canada 2010 to loads as follows:
 - .2 Deflection Limits: Assemblies to withstand test pressures with deflection no greater than 1/240 of the span and no evidence of material failure, structural distress, or permanent deformation exceeding 0.2 percent of the clear span.
 - .3 Test Pressures: 150 percent of inward and outward, upward and downward wind-load design pressures.
- .2 General Performance: Hardboard siding assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- .3 Design hardboard siding assemblies to allow for thermal movement of component materials caused by variation in ambient temperature range of 80 degrees C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
- .4 Maximum deviation from vertical and horizontal alignment of erected panels: 1 to 1000.

1.4 SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.
- .3
 1. Indicate dimensions and thickness of siding, fastening and anchoring methods, detail and location of joints and gaskets, thermal movement provision, wall openings, head, jamb and sill details, materials and finish, compliance with design criteria and requirements of related work on Shop Drawings.
- .4 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Submit duplicate 400 x 400 mm size profile specified.
- .6 Submit manufacturer's installation instructions.

1.5 QUALIFICATION

- .1 Manufacturer: company specializing in producing hardboard siding with experience and with sufficient capacity to produce and deliver required units without causing delay in work.
- .2 Installer: person specializing in hardboard siding installations with experience approved by manufacturer.
- .3 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with contractor's representative to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 – Common Product Requirements
- .2 Deliver, store and protect material in accordance with panel manufacturer's recommendations.
- .3 Store in an unheated structure or under cover until application. Siding may be temporarily stored outside if at least 4 inches off the ground and on a flat, well drained surface protected from moisture with a shed pack or waterproof cover.

1.7 WARRANTY

- .1 Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official covering performance and finish, including color, fading, and chalking.
- .2 Warranty Period, Siding Material: 25 years from date of Substantial Completion
 - .1 First 5 years: 100 percent of the purchase price of the damaged siding exclusive of installation labor.

- .3 Warranty Period, Paint Finish: 15 years from date of Substantial Completion
 - 1. First 5 years: 100 percent of the cost of labor and materials required to refinish the affected siding

1.8 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Wood Siding shall be considered incidental to “Unit Price Item 1 – Maintenance Building” and no separate payment shall be made.

Part 2 Products

2.1 MATERIALS

- .1 As per drawings or approved equivalent.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that substrate surfaces and wall openings are ready to receive work.

3.2 PREPARATION

- .1 Prepare substrates using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- .2 If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- .3 Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

3.3 INSTALLATION

- .1 Install siding in accordance with manufacturer's written instructions and shop drawings.
- .2 Allow for thermal movement.
- .3 Maintain following installation tolerances:
 - .1 Maximum variation from plane or location shown on shop drawings: 10 mm/10 m of length and up to 20 mm/100 m.
 - .2 Maximum deviation for vertical member: 3 mm in an 8.5 m run.
 - .3 Maximum deviation for a horizontal member: 3 mm in an 8.5 m run
 - .4 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.
- .4 Erect siding plumb, level, and true.
- .5 Do not install component parts that are observed to be defective, including warped, bowed, dented, and broken members.
- .6 Anchor panels securely per engineering recommendations and in accordance with

3.4 INCIDENTAL SITE FINISHING

- .1 Carefully set exposed nails flush with siding coating.
- .2 Touch-up blemished siding materials to match siding colour.

3.5 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Leave work areas clean, free from grease, finger marks and stains.
- .3 Make sure weep holes and drainage channels are unobstructed and free of dirt and sealants.

END OF SECTION

07 62 00 SHEET METAL FLASHING AND TRIM**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 07 61 00 - Sheet Metal Roofing.
- .2 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A653/A653M-13, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 - .2 ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM B32-08 (2014), Standard Specification for Solder Metal.
 - .4 ASTM D523-14, Standard Test Method for Specular Gloss.
 - .5 ASTM D822/D822M-13, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .2 Canadian Roofing Contractors Association (CRCA)
 - 1. Roofing Specifications Manual 1997.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing
 - .2 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement
- .4 Canadian Standards Association (CSA International)
 - 1. CSA B272-93(R2000), Pre-fabricated Self-Sealing Roof Vent Flashings.

1.3 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

1.4 QUALITY ASSURANCE

- .1 PreInstallation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 32 16 - Construction Schedule:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements

1.6 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Sheet Metal Flashing and Trim shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.

Part 2 Products**2.1 SHEET METAL MATERIALS**

- .1 Zinc coated steel sheet: 0.46 mm thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.
- .2 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 37 with AZ180 aluminum-zinc alloy coating, 0.46 mm base metal thickness.
- .3 Clear organic coating where unpainted.
- .4 Acceptable material: Galvalume Plus manufactured by ArcelorMittal Dofasco Inc. or approved equivalent

2.2 PREFINISHED STEEL SHEET

- .1 Prefinished aluminum – zinc alloy coated steel with factory applied silicone modified polyester.
- .2 Colour: match adjacent composite wall panel colour, sheet metal roofing colour, steel siding colour, manufactured gutters and downspouts colour.
- .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
- .4 Coating thickness: not less than 25 micrometres.
- .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
 - .1 Outdoor exposure period 1000 hours.
 - .2 Humidity resistance exposure period 1000 hours.

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: dry sheathing to CAN/CGSB51.32, and No. 15 perforated asphalt felt to CSA A123.3.
- .4 Sealants: one part, non-sag to CAN/CGSB-19.13, type 2, MCG-2-25, colour selected by Departmental Representative from manufacturer's standard range.
- .5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Solder: to ASTM B32, alloy composition.
- .9 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .10 Touchup paint: as recommended by prefinished material manufacturer.
- .11 Pre-manufactured Stack Flashings: to CSA B272-93, 1.6 mm aluminum x 305 mm high, pre-moulded sleeve with integral flange and separate cap.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form flashings and copings to profiles indicated of 0.46mm thick galvanized steel sheet where not visible from below.
- .2 Form flashings and copings to profiles indicated of 0.46 mm thick prefinished steel sheet where visible from below.
- .3 Form flashings and copings to profile indicated of 0.46 mm thick aluminum-zinc alloy coated steel sheet where visible from below.

Part 3 Execution

3.1 INSTALLATION

- .1 Install galvanized steel flashing and other sheet metal work in accordance with applicable CRCA 'FL' series details.
- .2 Install zinc sheet metal flashing in accordance with: SMACNA - Architectural Sheet Metal Manual, 5th Edition, Chapter 6.
- .3 Use concealed fastenings except where approved before installation.
- .4 Provide underlay under sheet metal.
- .5 Secure in place and lap joints 100 mm.
- .6 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips.
- .7 Lock end joints and caulk with sealant.
- .8 Insert metal flashing under cap flashing to form weather tight junction.
- .9 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .10 Caulk flashing at cap flashing with sealant.

- .11 Install pans, where shown around items projecting through roof membrane.

3.2 **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.
- .3 Leave work areas clean, free from grease, finger marks and stains

END OF SECTION

07 71 23 MANUFACTURED GUTTERS AND DOWNSPOUTS**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 07 40 00 - Metal Roofing and Wall Panels
- .2 Section 07 62 00 - Sheet Metal Flashing and Trim.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A653/A653M-13- Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 Sheet Metal & Air Conditioning Contractors' National Association (SMACNA)
 - 1. SMACNA - Architectural Sheet Metal Manual, 7th Edition (2012).

1.3 SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and datasheets for prefabricated items in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- .4 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Submit two 200 mm length samples, representative of component design, finish, colour, and configuration.
- .6 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.

1.5 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for size and method of rain water discharge.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Transport, handling, storage and protection of materials: in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- .3 Prevent contact with materials during storage which may cause discolouration, staining, or damage.

1.7 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Gutters and Downspouts shall be considered incidental to “**Unit Price Item 1 – Maintenance Building**” and no separate payment shall be made.

Part 2 Products**2.1 MATERIALS**

- .1 Pre-Coated Galvanized Steel: ASTM A653/A653M, Z275 zinc coating; 0.60 mm core steel, shop pre-coated with modified silicone polyester coating, colour selected from manufacturer’s standard colours.

2.2 COMPONENTS

- .1 Gutters: SMACNA 6” Half Round style profile.
- .2 Downspouts: SMACNA Round style profile.
- .3 Accessories: Profiled to suit gutters and downspouts.

2.3 ACCESSORIES

- .1 Anchorage Devices: SMACNA requirements, Type recommended by fabricator.
- .2 Gutter Supports: SMACNA requirements, half round style gutter hangers.
- .3 Downspout Supports: Round downspout bracket.
- .4 Fasteners: Galvanized steel with soft neoprene washers. Finish exposed fasteners same as flashing metal.
- .5 Protective Back Coating: Bituminous.
- .6 Splash Pads: Precast concrete, size 355 mm x 3048 mm.

2.4 FABRICATION

- .1 Form gutters and downspouts of profiles, to SMACNA requirements; gutters 152 mm Ø; downspouts 101 mm Ø.
- .2 Fabricate with required connection pieces.
- .3 Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- .4 Hem exposed edges of metal.
- .5 Fabricate gutter and downspout accessories; seal watertight.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Existing Conditions: in accordance with Section 01 71 00 – Examination and Preparation.
- .2 Verify that surfaces are ready to receive work.

3.2 **INSTALLATION**

- .1 Install gutters, downspouts, and accessories to manufacturer instructions.
- .2 Join fittings with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- .3 Slope gutters 4 mm/m.
- .4 Seal metal joints watertight.
- .5 Connect downspouts to downspout boots. Seal connection watertight

END OF SECTION

07 92 00 JOINT SEALANTS**Part 1 General****1.1 SECTION INCLUDES**

- .1 Preparing substrate surfaces.
- .2 Sealant and joint backing.

1.2 RELATED SECTIONS

- .1 Section 07 26 00 – Vapour Retarders.
- .2 Section 07 27 00 – Air Barriers: Sealants required in conjunction with air barrier.
- .3 Section 08 80 50 – Glass and Glazing: Sealants required in conjunction with glazing methods.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.
 - .2 ASTM C920-08, Standard Specification for Elastomeric Joint Sealants.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .2 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .3 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - 1. Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit duplicate samples of each type of material and colour.
- .5 Cured samples of exposed sealants for each colour where required to match adjacent material.
- .6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
- .7 Instructions to include installation instructions for each product used.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .6 Unused sealant material 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.
- .7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Departmental Representative.
- .8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .9 Fold up metal banding, flatten, and place in designated area for recycling.

1.7 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - 1. Do not proceed with installation of joint sealants under following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
 - 2. When joint substrates are wet.
- .2 Joint-Width Conditions:
 - 1. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
 - 1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

- .2 Ventilate area of work.

1.9 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Joint Sealants shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.

Part 2 Products

2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Sealant type 1: Silicone One Part
 - .1 TO CAN/CGSB-19.13-M87, type 2, Class 25, shore A hardness of 25 - 30, non sag, neutral curing.
 - .2 Sealant Type 2: One component paintable acrylic latex.
- .2 To CAN/CGSB-19.17-M90.
 - .1 Sealant type 3 (horizontal joint sealant): Self levelling polyurethane
- .3 Multi component, chemical curing, self levelling, polyurethane sealant, conforming to CAN/CGSB-19.24-M90, type 1, Class B.
 - .1 Sealant type 4:
 - .4 One component, mildew resistant, silicone rubber sealant, conforming to ASTM C920.
 - .5 Acoustical Sealant. To ASTM C919.
 - .6 Primer: Non-staining type recommended by sealant manufacturer.
 - .7 Preformed Compressible and Non-Compressible back-up materials.
 - .8 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
- .9 Bond Breaker Tape.
 - 1. Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Perimeters of exterior openings where frames meet exterior facade of building, between fibre cement siding and trim and adjacent materials, around door, window and louvre installations, and to all other exterior joints: Sealant type 1.
- .2 Exterior joints in horizontal wearing surfaces (as itemized): Sealant type 3.
- .3 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type 2.

- .4 Interior control and expansion joints in floor surfaces: Sealant type 3.
- .5 Perimeters of interior frames, as detailed and itemized: Sealant type: 2.
- .6 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, stone top vanities): Sealant type: 4.
- .7 Exposed interior control joints in drywall: Sealant type: 2.

2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Sealant.

- .1 Apply sealant in accordance with manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.
- .2 Apply sealant using gun with proper size nozzle.
- .3 Use sufficient pressure to fill voids and joints solid.
- .4 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .5 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .6 Remove excess compound promptly as work progresses and upon completion.
- .7 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .8 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION

08 11 00 HOLLOW METAL DOORS AND FRAMES**Part 1 General****1.1 SECTION INCLUDES**

- .1 Non-rated, fire rated, steel frames.
- .2 Non-rated, fire rated, thermally insulated steel doors

1.2 RELATED SECTIONS

- .1 Section 08 71 00 – Door Hardware: Hardware, silencers, and weatherstripping.
- .2 Section 08 91 00 – Louvres and Vents
- .3 Section 09 91 00 – Painting: Field painting of doors

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A653/A653M-13, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 - .2 ASTM B29-03(2009), Standard Specification for Refined Lead.
 - .3 ASTM B749-03(2009), Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating (Withdrawn).
 - .2 CGSB 41-GP-19MA-84, Rigid Vinyl Extrusions for Windows and Doors (Withdrawn).
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel, Includes Update No. 1 (2014).
 - .2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2006.
 - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 2009.
- .5 National Fire Protection Association (NFPA)
 - 1. NFPA (Fire) 80, Standard for Fire Doors and Other Opening Protectives, 2013 Edition.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
 - .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.
 - .3 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

- .4 CAN/ULC-S702-14, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
- .5 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.4 **SYSTEM DESCRIPTION**

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 for ratings specified or indicated.
- .2 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104 and listed by nationally recognized agency having factory inspection services.

1.5 **SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data: in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, arrangement of hardware, fire rating and finishes.
- .5 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing, fire rating and finishes.
- .6 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.6 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.7 **WASTE MANAGEMENT AND DISPOSAL:**

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

1.8 **MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Hollow Metal Door and Frames shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.

Part 2 Products

2.1 **MATERIALS**

- .1 Design, materials, construction of metal doors and frames are the minimum standard of quality.
- .2 Hot dipped galvanized steel sheet: to ASTM A653M, A40, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.

Section 08 11 00

HOLLOW METAL DOOR AND FRAMES

- .3 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653M, ZF75.

2.2 DOOR CORE MATERIALS

- .1 Honeycomb construction:
 - .1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3
 - .2 3 kg per ream minimum, density: 16.5 kg/m minimum sanded to required thickness.
- .2 Stiffened: face sheets welded, insulated core.
 - .1 Fiberglass: CAN/ULC-S702, density 24 kg/m . PP
- .3 Temperature Rise Rated (TRR) Core: Composition to provide fire-protection rating and limit temperature rise on unexposed side of door to 250 C at 30 or 60 minutes, as determined by governing code requirements, core tested as part of a complete door and frame assembly, in accordance with CAN4-S104, and listed by a nationally recognized testing agency having a factory inspection service.

2.3 ADHESIVES

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Polystyrene: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMER

- .1 Touchup prime CAN/CGSB1.181.

2.5 PAINT

- .1 Field paint steel doors and frames in accordance with Section 09 91 00 - Painting. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.

2.6 ACCESSORIES

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior top Caps: steel.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with countersunk oval head sheet metal screws.
- .4 Metallic paste filler: to manufacturer's standard. Fire labels: metal riveted. Sealant: Section 07 92 00.
- .5 Glazing: Section 08 80 50.
- .6 Make provisions for glazing and provide necessary glazing stops.
 - .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws.
 - .2 Design exterior glazing stops to be tamperproof.

2.7 FRAMES FABRICATION GENERAL

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 1.6 mm welded thermally broken type construction.
- .4 Interior frames: 1.6 mm welded type construction.
- .5 Blank, reinforce, drill and tap frames for mortised, templated hardware, using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.

2.8 FRAME ANCHORAGE

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

2.9 FRAMES: WELDED TYPE

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .5 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .6 Securely attach floor anchors to inside of each jamb profile.
- .7 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.10 DOOR FABRICATION GENERAL

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated. Exterior doors: hollow steel construction. Interior doors: honeycomb construction.
- .2 Fabricate doors with longitudinal edges welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .3 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.

- .4 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .5 Reinforce doors where required, for surface mounted hardware. Provide flush steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .6 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .7 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in conformance with CAN4-S104 and list by nationally recognized agency having factory inspection service and construct as detailed in FollowUp Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .8 Manufacturer's nameplates on doors are not permitted.

2.11 **DOORS: HONEYCOMB CORE CONSTRUCTION**

- .1 Form face sheets for interior doors from 1.2 mm sheet steel with honeycomb core laminated under pressure to face sheets.

2.12 **HOLLOW STEEL CONSTRUCTION**

- .1 Form face sheets for interior doors from 1.2 sheet steel.
- .2 Reinforce doors with vertical stiffeners, securely welded to face sheets at 150 mm on centre maximum.
- .3 Fill voids between stiffeners of interior doors with core.

2.13 **THERMALLY BROKEN FRAMES**

- .1 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .2 Fabricate thermally broken frames separating exterior parts from interior parts with continuous interlocking thermal break.
- .3 Apply insulation.

Part 3 Execution

3.1 **MANUFACTURER'S INSTRUCTIONS**

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

3.2 **INSTALLATION GENERAL**

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

3.3 FRAME INSTALLATION

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air barrier and vapour retarder.

3.4 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
- .3 Hinge side: 1.0 mm.
- .4 Latch side and head: 1.5 mm.
- .5 Finished floor, top of carpet non-combustible sill and thresholds: 10 mm.
- .6 Adjust operable parts for correct function.
- .7 Install louvres.

3.5 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.6 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

3.7 ERECTION TOLERANCES

- .1 Section 01 73 00: Tolerances.
- .2 Maximum Diagonal Distortion: 1.5 mm measured with straight edges, crossed corner to corner.
- .3 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
- .4 Hinge side: 1.0 mm.
- .5 Latch side and head: 1.5 mm.
- .6 Finished floor, non-combustible sill and thresholds: 10 mm.

END OF SECTION

08 71 00 DOOR HARDWARE – COMMON REQUIREMENTS**Part 1 General****1.1 SECTION INCLUDES**

- .1 Hardware for hollow steel, wood doors.
- .2 Thresholds, weatherstripping, seals, and door gaskets.

1.2 RELATED SECTIONS

- .1 Section 08 11 00 - Metal Doors and Frames.

1.3 REFERENCES

- .1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
 - .1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-69.17-M86(R1993), Bored and Preassembled Locks and Latches
 - .2 CAN/CGSB-69.18-M90/ANSI/BHMA A156.1-1981, Butts and Hinges
 - .3 CAN/CGSB-69.19-93/ANSI/BHMA A156.3-1984, Exit Devices
 - .4 CAN/CGSB-69.20-M90/ANSI/BHMA A156.4-1986, Door Controls (Closers)
 - .5 CAN/CGSB-69.21-M90/ANSI/BHMA A156.5-1984, Auxiliary Locks and Associated Products
 - .6 CAN/CGSB-69.22-M90/ANSI/BHMA A156.6-1986, Architectural Door Trim
 - .7 CAN/CGSB-69.24-M90/ANSI/BHMA A156.8-1982, Door Controls - Overhead Holders.
 - .8 CAN/CGSB-69.28-M90/ANSI/BHMA A156.12-1986, Interconnected Locks and Latches
 - .9 CAN/CGSB-69.29-93/ANSI/BHMA A156.13-1987, Mortise Locks and Latches
 - .10 CAN/CGSB-69.30-93/ANSI/BHMA A156.14-1991, Sliding and Folding Door Hardware
 - .11 CAN/CGSB-69.31-M89/ANSI/BHMA A156.15-1981, Closer/Holder Release Device
 - .12 CAN/CGSB-69.32-M90/ANSI/BHMA A156.16-1981, Auxiliary Hardware
 - .13 CAN/CGSB-69.33-M90/ANSI/BHMA A156.17-1987, Self-closing Hinges and Pivots
 - .14 CAN/CGSB-69.34-93/ANSI/BHMA A156.18-1987, Materials and Finishes
- .3 NFPA - National Fire Protection Agency:
 - .1 NFPA80 Standard for Fire Doors and Other Protectives (2013)
- .4 Door and Hardware Institute (DHI)
 - .1 AHC and EHC certification programs.

1.4 SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .3 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
- .4 After approval samples will be returned for incorporation in the Work.
- .5 Submit contract hardware list in accordance with Section 01 78 00 – Closeout Submittals.
- .6 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .7 Submit manufacturer's installation instructions.
- .8 Provide operation and maintenance data for door closers, locksets, door holders electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.5 QUALITY ASSURANCE

- .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 31 01 – Project Management.
- .5 Hardware Supplier Personnel: Employ (Locally) an Architectural Hardware Consultant (AHC) to manage and assist in the work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .3 Store finishing hardware in locked, clean and dry area.

1.7 MAINTENANCE

- .1 Provide maintenance materials in accordance with Section 01 78 00 Closeout Submittals.
- .2 Supply two sets of wrenches for door closers, locksets, and fire exit hardware.

1.8 WARRANTY

- .1 In addition to Section 01 78 00: Warranties.
 - .1 Provide ten (10) year manufacturer warranty for door closers.

- .2 Provide seven (7) year warranty for locksets
- .3 Provide three (3) year warranty for exit devices

1.9 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Door Hardware shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.

Part 2 Products

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products only for similar items.
- .2 Design, materials, construction and finishes specified are minimum acceptable standard of quality.

2.2 DOOR HARDWARE

- .1 Locks and latches: Schlage or approved equivalent
 - .1 Sargent 10 Line functions as scheduled.
 - .2 LL Design.
 - .3 Normal strikes: box type, lip projection not beyond jamb.
 - .4 Cylinders: key into keying system as noted.
- .2 Butts and hinges: McKinney, Markar, Pemko or approved equivalent
 - .1 Butts and hinges: to CAN/CGSB-69.18, listed in Hardware Schedule.
- .3 Door Closers and Accessories: LCN or approved equivalent
 - .1 Door controls (closers): to CAN/CGSB-69.20, listed in Hardware Schedule, size in accordance with CAN/CGSB-69.20, table A1, finished to match adjacent hardware.
 - .2 Door controls - overhead holders: to CAN/CGSB-69.24, listed in Hardware Schedule.
 - .3 Closer/holder release devices: to CAN/CGSB-69.31, listed in hardware schedule.
 - .4 Power-operated pedestrian doors: to CAN/CGSB-69.26.
 - .5 Power assist and low energy power operated doors: to CAN/CGSB-69.35.
- .4 Auxiliary locks and associated products: Schlage. or approved equivalent
- .5 Architectural door trim: Standard Metal, Gallery Specialty Hardware.
- .6 Miscellaneous hardware: CAN/CGSB-69.22, listed in Hardware Schedule.
 - .1 Door protection plates: kick plate type, 1.27 mm thick aluminum.
- .7 Auxiliary hardware: Gallery Specialty Hardware, Standard Metal.
- .8 Stops: CAN/CGSB-69.32, listed in Hardware Schedule.
- .9 Stop, wall mounted type.
 - .1 O/H Stop & Holders: Schlage. or approved equivalent
- .10 Thresholds: KN Crowder or approved equivalent:

1. Full width of door opening, extruded aluminum mill finish, serrated surface, with thermal break of rigid PVC.
- .11 Weatherstripping: K.N. Crowder, Pemko or approved equivalent
- .12 Head and jamb seal:
 - .1 Extruded aluminum frame and solid, hollow closed cell neoprene nylon brush, pile, vinyl insert, clear anodized finish.
 - .2 Adhesive backed neoprene, vinyl covered foam material.
- .13 Door bottom seal:
 - .1 Extruded aluminum frame and closed cell neoprene sweep, clear anodized finish.
- .14 Vent: as per drawings

2.3 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.
- .6 Supply through bolts for door closers and exit devices for installation at mineral core wood doors.
- .7 Not permitted: Self-tapping and self-drilling fasteners.

2.4 KEYING

- .1 Doors, factory keyed differently, keyed alike, keyed alike in groups, master keyed, grand master keyed as directed. Prepare detailed keying schedule in conjunction with Departmental Representative
- .2 Provide keys in duplicate for every lock in this contract.
- .3 Provide three masterkeys for each MK or GMK group.
- .4 Stamp keying code numbers on keys.
- .5 Provide removable construction master keying supply 6 Keys
- .6 Provide all permanent keys to Departmental Representative.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 **INSTALLATION**

- .1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.
- .2 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .3 Install key control cabinet.
- .4 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .5 Install through bolts for door closer and exit device application to mineral core doors. Install floor stops only where application does not permit installation of wall stops.
- .6 Remove construction cores when directed by Departmental Representative; install permanent cores and check operation of locks.

3.3 **FIELD QUALITY CONTROL**

- .1 Hardware Supplier's Architectural Hardware Consultant and Electrified Hardware Consultant will inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's written instructions and as specified.

3.4 **ADJUSTING**

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.

3.5 **CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.6 **DEMONSTRATION**

- .1 Brief maintenance staff regarding:
 - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
 - .2 Description, use, handling, and storage of keys.

- .2 Use, application and storage of wrenches for door closers locksets and fire exit hardware.
- .3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.7 SCHEDULE

- .1 The door hardware schedule is furnished for whatever assistance it may afford contractors. Examine drawings and specification, determine extent and hardware quality required. Should any particular door or item be omitted in any schedule hardware group, provide such a door or item with hardware same as required for similar purposes.
- .2 All hardware to be commercial grade.
- .3 Hardware group No. 1:
 - .1 3 Hinge AB800 114 X 101 US26 D HA
 - .2 1 Lockset 21 8243 LNL MK 32D CSA
 - .3 1 Closer 351 O MC EN CSA
 - .4 1 Kick Plate K10A 250 x 860 32D CSM
 - .5 1 Wall Stop S121 26D CSM
 - .6 1 Weatherstrip W-18 1 X 914, 2 X 2133 CA CKN
 - .7 1 Threshold CT-65 914 AL CKN
 - .8 1 Door Sweep W-24S 914 CA CKN
- .4 Hardware group No. 2: (universal)
 - .1 3 Hinge AB850 114 X 114 US26D HA
 - .2 1 Deadlock 21 4877 MK 32D CSA
 - .3 1 Privacy Set 8265 LNL 32D CSA
 - .4 1 Closer 351 O MC EN CSA
 - .5 1 Overhead Stop 6-336 630 CRX
 - .6 1 Kick Plate K10A 250 x 860 32D CSM
 - .7 1 Weatherstrip W-18 1 X 914, 2 X 2133 CA CKN
 - .8 1 Door Sweep W-24S 914 CA CKN
- .5 Hardware group No. 3:(male + female)
 - .1 1 Continuous Hinge 780-112HD 2134 CLR HA1 Deadlock 21 4877 MK 32D CSA
 - .2 1 Privacy Set 8265 LNL 32D CSA
 - .3 1 Closer 351 O MC EN CSA
 - .4 1 Kick Plate K10A 250 x 860 32D CSM
 - .5 1 Wall Stop S121 26D CSM
 - .6 1 Weatherstrip W-18 1 X 914, 2 X 2133 CA CKN
 - .7 1 Door Sweep W-24S 914 CA CKN

END OF SECTION

09 91 00 PAINTING**Part 1 General****1.1 SECTION INCLUDES**

- .1 Surface preparation and field application of paints and coatings.

1.2 RELATED SECTIONS

- .1 Section 05 50 00 - Metal Fabrications.
- .2 Section 08 11 00 – Metal Doors and Frames.

1.3 REFERENCES

- .1 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual.
 - .2 MPI - Maintenance Repainting Manual.

1.4 SUBMITTALS

- .1 Submit product data and instructions for each paint and coating product to be used.
- .2 Submit product data for the use and application of paint thinner.
- .3 Submit two copies of Workplace Hazardous Materials Information System
- .4 (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
- .5 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 Submit manufacturer's installation and application instructions.

1.5 STORAGE AND HANDLING

- .1 Provide and maintain dry, temperature controlled, secure storage.
- .2 Store materials and supplies away from heat generating devices.
- .3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.
- .4 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.6 SITE CONDITIONS

- .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary
- .2 Utilities.
- .3 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .4 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.

- .5 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .6 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.
- .7 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Place materials defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.
- .4 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal.
- .5 Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

1.8 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Supply and Install of Painting shall be considered incidental to **“Unit Price Item 1 – Maintenance Building”** and no separate payment shall be made.

Part 2 Products

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer, except epoxy tile like finish and varnish finish may be from manufacturers other than the primary paint manufacturer.
- .3 Conform to latest MPI requirements for all painting work including preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual "Approved Product" listing.
- .5 Provide paint products meeting MPI "Environmentally Friendly" E3 ratings based on VOC (EPA Method 24) content levels.

2.2 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written instructions. Obtain written approval from Departmental Representative for tinting of painting materials.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

- .3 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.3 EXTERIOR PAINTING

- .1 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
 - .1 EXT 5.3B - Alkyd gloss level 5 finish.
- .2 Dimension Lumber: columns, beams, exposed joists, underside of decking, siding, fencing, etc.
 - .1 EXT 6.2L - Semi-transparent stain finish.

2.4 INTERIOR PAINTING

- .1 Structural Steel and Metal Fabrications: columns and miscellaneous metal.
 - .1 INT 5.1K – Epoxy modified latex (tile like) gloss level 6 finish.
- .2 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
 - .1 INT 5.3N – Institutional low odour/low VOC gloss level 5 finish.
- .3 Galvanized Metal: very high contact/very high traffic areas (doors, frames, railings and handrails, etc.)
 - 1. INT 5.3M – High performance architectural latex gloss level 6 finish, VOC range E2.
- .4 Galvanized Metal: high contact/very high traffic areas (cell walls, ceilings).
 - 1. INT 5.3M – High performance architectural latex gloss level 5 finish, VOC range E2.
- .5 Galvanized Metal: low contact/low traffic areas (overhead decking, pipes, ducts, etc.)
 - 1. INT 5.3N – Institutional low odour/low VOC gloss level 2 finish.
- .6 Dressed Lumber: doors, door and window frames, casings, mouldings, cabinets, etc.:
 - .1 INT 6.3E – Polyurethane varnish gloss level 4 finish, over stain, VOC range E3.
 - .2 INT 6.3K - Polyurethane varnish gloss level 5 finish, VOC range E3.
 - .3 INT 6.3V – Institutional low odour/low VOC gloss level 5 finish.
- .7 Wood Panelling and Casework: partitions, panels, doors, shelving, millwork etc.:
 - .1 INT 6.4E – Polyurethane varnish gloss level 4 finish, over stain, VOC range E3.
 - .2 INT 6.4T – Institutional low odour/low VOC gloss level 5 finish.
 - .3 INT 6.4J – Polyurethane varnish gloss level 4 finish, VOC range E3.
- .8 Wood Horizontal Surfaces: floors and stairs.
 - 1. INT 6.5C – Polyurethane varnish gloss level 6, VOC range E3.
- .9 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock" type material, etc.
 - .1 INT 9.2F – Epoxy modified latex (tile-like) gloss level 6 finish.
 - .2 INT 9.2M - Institutional low odour/low VOC gloss level 5 finish.

- .10 Plaster and gypsum board ceilings: gypsum wallboard, drywall, "sheet rock" type material, etc.
 - .1 INT 9.2F – Epoxy modified latex (tile-like) gloss level 6 finish.
 - .2 INT 9.2M – Institutional low odour/low VOC gloss level 3 finish.
- .11 Concrete Masonry Units, Cementitious Backer Board.
 - .1 INT 4.2E – Institutional low odour/low VOC gloss level 5 finish.
 - .2 INT 4.2G – Epoxy (tile like) finish for wet environments gloss level 6 finish.
- .12 Solid Mineral Profile Panelling.
 - .1 INT 9.2M – Institutional low odour/low VOC gloss level 1.

Part 3 Execution

3.1 GENERAL

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.
- .2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.

3.2 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re- installed after painting is completed.
- .5 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .6 Place "WET PAINT" signs in occupied areas as painting operations progress.

- .7 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.
- .8 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .9 Where possible, prime non-exposed surfaces of new wood surfaces before installation.
- .10 Use same primers as specified for exposed surfaces.
- .11 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
- .12 Apply wood filler to nail holes and cracks.
- .13 Tint filler to match stains for stained woodwork.
- .14 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .15 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.
- .16 Touch up of shop primers with primer as specified
- .17 Do not apply paint until prepared surfaces have been accepted by Departmental Representative

3.4 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .4 Sand and dust between coats to remove visible defects.
- .5 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .6 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .7 Finish closets and alcoves as specified for adjoining rooms.
- .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.
- .2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

- .5 Do not paint over nameplates.
- .6 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .7 Paint natural gas piping yellow.
- .8 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .9 Paint fire protection piping.
- .10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .11 Do not paint interior transformers and substation equipment.

3.6 SITE TOLERANCES

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

END OF SECTION

31 23 33.01 EXCAVATING, TRENCHING AND BACKFILLING**Part 1 General****1.1 DESCRIPTION**

- .1 This section specifies requirements for excavating trenches and backfilling for installation of water mains and their appurtenances.

1.2 RELATED SECTIONS

- .1 Section 33 11 17 – HDPE Water Mains and Valves
- .2 Section 33 31 13 - Gravity Main Piping

1.3 MEASUREMENT PROCEDURES

- .1 Measurement and payment for trench excavation, conditioning, compaction, backfilling and compaction testing shall be considered incidental to “**Unit Price Item 7 – Gravity Main Piping**” and “**Unit Price Item 8 – Water Mains and Valves**” and no separate payment shall be made. This work is incidental to all related sections and should be included in the linear meter measurement and payment of the respective pipe or main being installed in that section. Additionally, no payment for trenching, conditioning, compaction and backfilling will be made for “**Unit Price Item 6 – Manholes**”, “**Unit Price Item 9 – Potable Water Storage Tank**”, “**Unit Price Item 10 – Black Water Storage Tank**”, and “**Unit Price Item 11 – Grey Water Storage Tank**” which is considered incidental to the bid item.
- .2 Payment for trench excavation, compaction, conditioning, backfilling and compaction testing for the electrical wire shall be made under “**Unit Price Item 13c – Water Treatment System – Supply and Install Trenched in Electrical Wire**” and no separate payment shall be made.
- .3 The cost of supplying, placing, maintaining and removal of shoring, bracing, cofferdams, underpinning and dewatering equipment will be incidental to the pipe installation. No extra payment will be made.
- .4 No additional payment will be made for the method selected for utility pipe installation, trenching and backfilling such as ditch witching, open trench or directional drilling.

1.4 PROTECTION

- .1 Existing Buried Utilities
 - .1 Size, depth and location of existing utilities shown on Drawings are for guidance only; completeness and accuracy are not guaranteed.
 - .2 Prior to commencing any excavation work, notify applicable utility authorities, Sask 1st call and establish location and state of use of buried services. Clearly mark such locations to prevent disturbance during work.
 - .3 Maintain and protect from damage, water, sewer, gas, electric or other utilities encountered.
 - .4 Obtain written authorization of Owner of utility and the Departmental Representative before moving or otherwise disturbing utility.

.2 Existing Surface Features

- .1 Protect existing buildings, trees and other plants, lawns, fencing, service poles, wires or paving located within right of way or adjoining properties from damage while work is in progress. Repair to Engineer's satisfaction any damage which may occur.
- .2 Where excavation necessitates root or branch cutting do so only under direct control of the Departmental Representative.
- .3 Protect existing trees and shrubs whenever possible during trenching activities.

.3 Shoring and Bracing

- .1 Whenever shoring, sheeting, timbering and bracing of excavations is required, engage services of a professional engineer to design and assume responsibility for adequacy of shoring and bracing.
- .2 When requested by the Departmental Representative, submit for review drawings and calculations signed and stamped by the professional engineer responsible for their preparation.
- .3 Close sheeting, when required, to be designed and constructed to prevent adjacent soil or water from entering excavation.

.4 Environmental Protection

- .1 Excavation increases the risk of erosion and other environmental degradation (primarily due to soil erosion). Ensure the site is protected from these impacts, as per the EPP and to the satisfaction of the Department Representative.

.5 Flooding

- .1 Protect open excavation against flooding and damage from surface water runoff or groundwater seepage.

1.5 SAFETY REQUIREMENTS

- .1 Observe and adhere to all applicable sections of the Occupational Health and Safety Act covering the worker safety in trenches and excavations, shoring and bracing as required. Open cut trenches shall be shaped as required by the Act and the Accident Prevention Regulations of the Occupational Health and Safety Division of the Department of Labor and Municipal Ordinances and as may be necessary to protect life, property, the environment and the Work.
- .2 Adhere to all crossing permit (railway, pipeline, telecommunications, etc) requirements.
- .3 Provide barricades, flares, etc. to adequately denote area of excavation adjacent to roadways and public thoroughfares.

Part 2 Products**2.1 BEDDING MATERIAL**

- .1 Sand bedding for pipes and conduit as shown on the drawings shall be as per the City of Saskatoon Specification – Supply of Aggregates - 03001.3.2.7 Pipe Bedding Aggregate and as shown in the table below:

Sieve Designation	Percent by Weight Passing
19.00 mm	100
12.50 mm	75-100
4.75 mm	45-70
2.00 mm	28-50
850 µm	18-36
425 µm	12-26
150 µm	7-15
75 µm	5-10

2.2 BACKFILL MATERIAL

- .1 Native soil may be used for backfill material, unfrozen and free from deleterious material and with moisture content within 2% of optimum.
- .2 To minimize fill settlement under self-weight, excavated soil with a moisture content exceeding 2% of optimum shall be conditioned and dried prior to use as backfill.
- .3 Wet fill material must be dried or blended with drier material to produce a uniform homogenous material prior to use as a trench backfill.

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove trees, shrubs, vegetation, fences and other obstructions, ice and snow, from surfaces to be excavated within limits indicated on the approved construction drawings.
- .2 Strip top soil from within limits of excavation and stockpile as directed, for respreading after backfilling. Avoid intermixing of subsoil fill materials with organic material and from other forms of contamination.

3.2 DEWATERING

- .1 Keep excavation dry while work is in progress.
- .2 Dispose of water in a manner not detrimental to public health, environment, public and private property or any portion of work completed or under construction.

3.3 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions indicated on drawing. Existing ground profiles are approximate only. If an open trench method is used for pipe installation, then;
 - .1 The Contractor shall confine his activities to the immediate area of the trench. All activities outside trench boundaries shall be performed so as not to damage other existing features. Every effort shall be made to restrict the trench widths to minimize the area disturbed.
 - .2 All excavated material shall be piled at least 1.0 m clear of the trench top to prevent material from falling back into the excavation. The material shall be piled in such a manner that it will not endanger the work, or obstruct other work or rights-of-

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EXCAVATING, TRENCHING AND BACKFILLING

way. Sufficient clear space must be left on one side of the trench to accommodate the surveyor's stakes.

- .2 Notify the Departmental Representative when soil at proposed elevation of trench bottom appears unsuitable for backfill. Remove unsuitable material and replace with material approved by the Departmental Representative.
- .3 Notify the Departmental Representative if new construction conflicts with a discovered obstruction. Allow sufficient time to consider alternative alignment to avoid conflict with obstruction. Modify alignment as directed by the Departmental Representative
- .4 Unless otherwise authorized by the Departmental Representative, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m of open trench at end of days' operation.
- .5 Place suitable excavated materials required for trench backfill in approved location.
- .6 Dispose of surplus and unsuitable material at a location approved by the Departmental Representative.
- .7 Do not obstruct flow of surface drainage or natural watercourses.
- .8 The Contractor shall confirm the method selected for excavation such as ditch witching, open trench or directional drilling with the Departmental Representative.
- .9 Excavate rock if encountered to a level 150 mm below the invert of the pipe.

3.4 **TRENCH BOTTOM PREPARATION**

- .1 Where required due to removal of unsuitable material or unauthorized over excavation, bring bottom of excavation to design grade with approved native material.

3.5 **BACKFILLING**

- .1 General backfilling:
 - .1 Native soil shall be used as backfill material.
 - .2 No boulders, rock, ice, snow, organic material or debris shall be permitted in the trench. These unsuitable materials shall be hauled away.
 - .3 All surplus excavated material shall also be hauled away, or disposed of as directed. In the event of deficiency of backfill material, suitable material shall be supplied by the Contractor at his expense.
 - .4 All trenches shall be backfilled as the work proceeds and no more than 15 m shall be left open at the end of a day's work.

3.6 **BACKFILL COMPACTION**

- .1 The Contractor shall be responsible for adequate compaction of the trenches and for the correction of settlement during the maintenance period of the Contract. Mechanical compaction equipment shall not be used until there is sufficient cover to prevent damage to the pipe.
- .2 The type of compaction equipment shall be chosen with regard to minimizing the vibration effect on nearby buildings and utilities. The Contractor shall inspect the condition of buildings prior to construction. The Contractor is responsible for any damage caused to buildings due to construction.

3.7 TESTING BACKFILL COMPACTION

- .1 Compaction results shall be based on a minimum of one density test per 100 meters of trench for each 1.0 meter of compacted vertical backfill. Additional tests may be called for by the Owner as deemed necessary.
- .2 If a density test indicates insufficient compaction at any depth, then two more densities, that are proportionally representative of trench length, shall be taken at that depth. If the average of these tests is below the required density, the trench shall be re-excavated and re-compacted to meet the specified density.
- .3 This testing in no way relieves the Contractor of his maintenance responsibilities with respect to settlements as specified. The Contractor shall repair any settlement and damaged surface improvements due to the settlement which occurs during the maintenance period.
- .4 The cost of all initial testing will be borne by the Contractor. Non-conformity with the specified density or moisture content shall constitute sufficient grounds for rejection of the work.
- .5 Compaction in the pipe zone (300mm above the obvert of the pipe and below) shall be to 95% SPMDD. Compaction above the pipe zone shall be to 98% SPMDD.

3.8 RESTORATION

- .1 Replace topsoil as directed by Departmental Representative.
- .2 Restore traveled areas to the pavement or concrete structure shown on the contract drawing.
- .3 Clean and reinstate areas affected by work as directed.

END OF SECTION

31 24 13 STRIPPING AND EXCAVATION**Part 1 GENERAL**

- .1 This section specifies requirements for excavation, drainage excavation, borrow excavation, embankment construction and disposal of material in accordance with this specification.

1.1 DESCRIPTION

- .1 This item consists of the excavation and disposal of all materials in conformity with the lines, grades and dimension indicated in the Contract Documents and as directed by the Departmental Representative and includes:
- .1 Stripping of organic material.
 - .2 Common excavation.
 - .3 Removal and disposal of waste/unsuitable / surplus materials from excavation, embankment and borrow areas.
 - .4 Transportation of excavated materials.
 - .5 Finishing of top surfaces and slopes.
 - .6 Maintenance of the work set forth under this section in a finished condition until any portion thereof has been accepted as completed by the Departmental Representative.

1.2 RELATED WORK

- .1 Erosion and Sediment Control - Section 01 35 43

1.3 DEFINITIONS

- .1 **Topsoil:** The top layer of soil containing organic material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .2 **Topsoil Stripping:** Excavation and stockpiling of material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .3 **Common Excavation:** Excavation, haul placement, and compaction of all on site materials whatever nature, which are not included under the definition of topsoil stripping, waste excavation borrow excavation or rock excavation including dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and excavated with heavy construction equipment; also rock, concrete or masonry less than 1.0 m³ in volume shall be classified as common excavation.
- .4 **Waste Excavation:** Excavation and removal from site or disposed on site as designated by the Engineer of any material unsuitable for use in work or surplus to requirements.
- .5 **Sub grade Elevation:** Elevation immediately below engineered structure.

1.4 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor in accordance with Section 01 45 00 – Quality Control.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Waste shall be disposed of at a suitable disposal facility outside of the National Parks.

1.6 TRAFFIC PROVISIONS

- .1 Provide and maintain roadways, walkways and detours for vehicular and pedestrian traffic as directed by Engineer.

1.7 MEASUREMENT FOR PAYMENT

- .1 Unless otherwise noted in these documents:
 - .1 **Stripping** of topsoil and stockpiling onsite shall be incidental to the unit price items.
 - .2 **Common excavation** will be incidental to the unit price items and shall include compaction of excavated material in fills to 98% Standard Proctor Density and within 2% of optimum moisture content, any dewatering or conditioning required before or during construction, leveling, grading, trimming or similar work, watering for compaction. Over-excavation will not be paid for. There will be no provision of overhaul or double handling payment.
 - .3 **Waste excavation** will be incidental to the unit price items and should cover excavation, trucking and hauling to a contractor arranged, suitable disposal location outside of the park.
 - .1 Separating of organic material from non-organic material and stockpiling, as directed by the Departmental Representative, is considered incidental to the Work and no additional payment will be made.
 - .2 The Contractor shall take care not to contaminate suitable surplus materials with Unsuitable / Waste materials. Unsuitable / Waste materials shall be stockpiled separately.
 - .3 Written Approval to Proceed must be completed by the Departmental Representative prior to sub-excavation for the removal of unsuitable material(s).
 - .4 No additional payment will be made for:
 - .1 Extra handling of windrowed materials blended on embankment slopes.
 - .2 Watering, drying or compacting soils to achieve specified densities inclusive of all compaction efforts.
 - .3 Construction, maintenance and restoration of haul roads.
 - .4 Watering for dust control.
 - .5 Excavating unnecessarily beyond design lines established by Departmental Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.
 - .6 If overcut, no payment will be made for filling an area back to grade.
 - .7 Loading hauling, placing and compaction of boulders less than 1.5 cubic metres into large embankments.

- .8 Scarifying or benching existing slopes or existing road surfaces.
- .9 Removing unsuitable material from embankment attributable to negligence.
- .10 Overhaul or Double Handling
- .11 Proof rolling.
- .12 Compaction of material (150 mm) below subgrade horizon in areas of cut.
- .13 Placing material in stockpiles, grading, or maintaining the stockpile site.
- .14 Finishing.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 The Contractor shall supply all labour, materials and equipment required for site grading.

Part 3 EXECUTION

3.1 COMPACTION

- .1 Compaction equipment must be capable of obtaining required densities for materials on project. Equipment that does not achieve specified densities must be replaced.
- .2 All material placed in embankments shall be spread and bladed smooth in successive layers, not to exceed 0.15 m in depth when compacted and to the full width of the cross-section. Each layer shall be compacted by approved means to a minimum of 95% Standard Proctor Density (unless directed in writing by the engineer otherwise). Materials placed in the upper 0.3 m of embankments shall not contain rock which has a diameter larger than 0.15 m. The material in each layer shall be compacted at the optimum moisture content plus or minus 2%, unless otherwise required. In case of controversy, the degree of compaction and/or moisture content will be determined by in situ density testing before the succeeding layer is placed.
- .3 Compaction over the entire surface area of each layer shall be obtained by equipment to meet the specified density requirements. Hauling equipment will not be accepted in lieu of compaction equipment. Compaction to the specified density shall be obtained uniformly throughout each layer.
- .4 Where moisture content tests indicate that material being used for embankment is above optimum moisture content, the material shall be thoroughly worked and conditioned until it is within 2% of optimum moisture content.
- .5 Where moisture content tests indicate the material for embankment is below optimum moisture, water shall be added. The material shall be thoroughly disked and broken down, water added in amounts as required, and the material thoroughly worked to mix the water uniformly throughout the soil prior to placement.

3.2 WATER DISTRIBUTORS

- .1 Apply water with equipment capable of uniform distribution and in a manner acceptable to engineer.

3.3 EXCAVATING

- .1 General:
 - .1 Notify the Departmental Representative when waste materials are encountered and remove to depth and extent as approved by the Departmental Representative. This material shall be hauled to and stockpile at the designated pit locations.
 - .2 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative and replace with acceptable embankment material and compact. Compact top 300 mm below final subgrade elevation to minimum 100% Standard Proctor density, ASTM D698 (AASHTO T99). No subcut in ditches or backslope unless Departmental Representative approved.
 - .3 The dimensions of the excavations and embankments shall be, in accordance with the typical sections accompanying these specifications, but the dimensions of any or all excavations and embankments may be increased or decreased at any time by the Departmental Representative as conditions and circumstances may determine.
- .2 Maintain grades to keep excavations free of running or standing water.

3.4 COMMON EXCAVATION

- .1 Commence topsoil stripping of areas on acceptance by the Departmental Representative after clearing and grubbing debris have been removed from these areas.
- .2 Strip topsoil to depths as verified by the Departmental Representative. Do not mix topsoil with subsoil. Stripping depth will vary.
- .3 Stockpile stripped materials at locations directed by the Departmental Representative. The Contractor is advised that there is limited storage area for this material.
- .4 Stripped soil materials shall be placed and stored at locations and in amounts and form as instructed by the Departmental Representative, for later reclamation use on graded slopes. Stripping piles may require erosion control, sedimentation protection or stabilization, depending on the location and anticipated duration of storage. At the Departmental Representatives direction, the Contractor shall prepare a plan for management of each stripping pile.
- .5 Do not place material which is frozen or place material on frozen surfaces.
- .6 Maintain a slightly sloped surface during construction to ensure ready run off of surface water.
- .7 After a period of wet weather remove or scarify, dry and re-compact embankment materials softened by moisture.
- .8 Wetting or drying of fill material shall be carried out such that in place fill has a moisture content of optimum plus or minus 2%.
- .9 With material containing less than 20% by volume of stone or rock fragments none of which may be larger than 75 mm:
- .10 Place and compact to full width in uniform layers not exceeding 150 mm loose thickness. Engineer may authorize thicker lifts if specified compaction can be achieved.
- .11 Compact each layer to a density of between 98% and 100% of Standard Proctor.

3.5 DUST CONTROL

- .1 Control dust during construction operations by watering.

3.6 FINISHING AND TOLERANCES

- .1 Grading shall include the removal and/or satisfactory placement of all materials necessary for the construction and preparation of embankment, slopes, drainage works, alignment, to the grade and cross-section originally encountered onsite.
- .2 Blade finish surfaces in cut and fill areas free from ruts, depressions, rocks in excess of 75 mm and debris.
- .3 Roll finished surfaces to a tight dense condition.
- .4 Surfaces to be within 75 mm of original elevations but not uniformly high or low.
- .5 Trim between constructed slopes and edge of clearing to provide drainage.

3.7 PROTECTION

- .1 Maintain finished surfaces in condition conforming to this section until acceptance by the Departmental Representative.

END OF SECTION

32 37 00 EXTERIOR SITE FURNISHINGS**Part 1 General****1.1 SECTION INCLUDES**

- .1 Materials and installation of standard manufactured catalogue items such as signage and bollards.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.

1.3 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.
- .4 Provide maintenance data for care and cleaning of site furnishings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 MEASUREMENT AND PAYMENT

- .1 Wood Bollard:
 - .1 Wood Bollards shall be paid for by each unit fully installed and accepted by the Departmental Representative under “**Unit Price Item 2a – Wood Bollard**” which will be considered complete payment for the supply and install of the item. The price shall include supply and installation of all work and materials incidental thereto.

Part 2 Product**2.1 WOOD BOLLARD**

- .1 Acceptable Lumber Materials:
 - .1 Use Code: 4.1
 - .2 Product Group: D
 - .3 Lumber: SPF
 - .4 Preservative: CA
 - .5 Method: Incision Pressure Treatment

Part 3 Execution**3.1 INSTALLATION**

- .1 Assemble furnishings in accordance with manufacturer's instructions.
- .2 Install furnishing true, plumb, anchored, and firmly supported, as indicated.

.3 Touch-up damaged finishes to approval of Parks Representative.

END OF SECTION

32 91 19 TOPSOIL PLACEMENT AND GRADING**Part 1 General****1.1 DESCRIPTION**

- .1 Topsoil to be native organic soils stripped and screened from the Contract Work area and stockpiled as directed by the Departmental Representative. The use of imported topsoil is to be approved by the departmental representative.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 01 78 00 - Closeout Submittals.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Topsoil placement and finishing shall be measured in square meters by field measurement of work acceptably installed within the areas indicated in the contract documents or as approved by the departmental representative.
- .2 Payment for topsoil placement shall be full compensation for all supply, testing, labour, equipment, materials and incidentals required to screen stripping material, prepare the finished grade, load, haul from stockpiles, place, fine grade, and prepare the topsoil materials for planting in accordance with the requirements of the Contract Documents and direction of the Departmental Representative. Payment will be made under **“Unit Price Item 3 – Imported Topsoil Placement and Fine Grading”**.
- .3 Topsoil used in Shrub Beds shall be considered incidental to **“Unit Price Item 5b – Soaker Bed”** and no separate payment shall be made.
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.4 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-[2005], Guidelines for Compost Quality.
- .3 Canadian Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[December 2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.
- .4 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 TESTING OF TOPSOIL

- .1 Testing of topsoil: Contractor will pay the cost of testing topsoil to the satisfaction of the ESO.
- .2 The contractor shall test the topsoil for the following.
 - .1 Weed seed count test
 - .2 Basic soil fertility and nutrient analysis, including but not limited to Salinity (Detailed & Basic), pH, Conductivity, Particle Size (Sieve, Hydrometer, Pipette, ASTM 422-63), Organic Matter, Cation Exchange Capacity, Nitrogen, and Sulphur.
 - .3 Fertilizer recommendations.
- .3 In this specification, a range of measurable physical and chemical properties is set out as acceptable in a growing medium. Compliance with the specification is to be determined by testing for those properties. When imported soil is used, it shall be tested and modified as necessary by the admixture of other components and amendments to bring the properties within appropriate ranges, unless otherwise specified.
- .4 All testing shall only be performed by an accredited commercial lab in Saskatchewan.
- .5 Failure to test and provide appropriate documentation of test results may be considered grounds for rejection of a proposed growing medium and removal of such material at the contractor's expense.
- .6 When this Guideline is adopted as part of a contract, or when the contract requires testing of growing medium and its components, the contractor shall meet all requirements of this section, or the corresponding specifications of the contract. The contractor's signature to the contract shall signify that the contractor has read and fully understands the requirements for growing medium and testing.
- .7 The contractor shall guarantee that the soil submitted for laboratory testing is a representative sample taken (according to the lab recommendations) from the soil that will be delivered to the site.
- .8 All topsoil testing to be reviewed and approved by the Owners representative, prior to topsoil being delivered to site.

1.6 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality control submittals:
 - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products**2.1 TOPSOIL**

- .1 Topsoil acceptance shall be at the sole discretion of the Departmental Representative.
- .2 Topsoil for seeded areas and planting beds: mixture of particulates, microorganisms and organic matter that provides suitable medium for supporting intended plant growth.
 - .1 Native topsoil to be stripped from on-site sources.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Finished surface free from:
 - .1 Debris and stones over 100 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

2.2 SOURCE QUALITY CONTROL

- .1 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.
- .4 Testing of topsoil will be carried out by testing laboratory designated by Parks Representative, or approved by Parks Representative.
 - .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

Part 3 Execution**3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 In accordance Section 01 35 43 – Environmental Procedures
- .2 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 sediment and erosion control drawings, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- .3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .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 that protrudes more than 75mm above surface.
- .3 Dispose of removed material off site.
- .4 Cultivate entire area that is to receive topsoil to minimum depth of 150 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 100 mm.
- .3 Spread topsoil as indicated to following minimum depths after settlement.
 - .2 100 mm for seeded areas.
 - .1 600 mm for shrub beds.
- .4 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.
- .2 Prepare loose friable bed by means of cultivation and subsequent raking.
- .3 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
- .4 Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 **ACCEPTANCE**

- .1 Parks Representative will inspect and test 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 Parks Representative.

3.7 **CLEANING**

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

END OF SECTION

32 92 19 HYDRAULIC SEEDING**Part 1 General****1.1 DESCRIPTION OF WORK**

- .1 The work covered by this Section shall consist of hydraulically seeding in areas within the limits of construction, or as designated by the Departmental Representative.
- .2 No mechanical seeding will be allowed for this project.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 32 91 19.13 - Topsoil Placement and Grading.

1.3 MEASUREMENT PROCEDURES

- .1 Hydraulic Seeding will be measured by the square metre acceptably installed resulting in full grass growth, 75% germination and growth of specified seed mixture, within the dimensions indicated in the Contract Documents or as approved by the Departmental Representative. Payment for hydraulic seeding shall be full compensation for all labour, equipment, materials, water, amendments, and incidentals required to place the materials in accordance with the requirements of the Contract Documents and direction of the Departmental Representative. Payment shall be paid under **“Unit Price Item 9 – Hydraulic Seeding”**
- .2 Areas of blending into existing landscape will not be measured for payment.
- .3 Maintenance is incidental and will not be paid for separately.
- .4 Mobilization and demobilization required for this Work shall be incidental to the work and no additional payment will be made.
- .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.4 SUBMITTALS

- .1 Product Data.
 - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide product data for:
 - .1 Seed.
 - .2 Mulch.
 - .3 Tackifier.
 - .4 Fertilizer.
 - .3 Submit in writing to Parks representative 14 days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.

- .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.5 **QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties to be provided to the Departmental Representative.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.6 **SCHEDULING**

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

1.7 **WASTE MANAGEMENT AND DISPOSAL**

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

Part 2 Products

2.1 **SEED**

- .1 Seed shall be Certified Canada No. 1 Grade quality seed varieties, in accordance with the Canadian Seeds Act and Regulations, and having a minimum purity of 97% and germination of 75%. Seed shall be free of impurities and disease.
- .2 Seed mix for all applications to be the following, by weight:
 - 20% Western Wheatgrass
 - 20% June Grass
 - 15% Bluegrass
 - 15% W. Porcupine
 - 15% Needle and Thread Grass
 - 15% Blue Grama
- .3 Seeding rate to be 25 kg/ha for hydraulic seeding.
- .4 Seed certificate to be approved by the PCA ESO prior to ordering.
- .5 Seed mix shall be free of Scentless Chamomile, Downy Brome and Canada Thistle.

2.2 **MULCH**

- .1 Mulch to be specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I Mulch:

- .2 Tackifier: water soluble vegetable carbohydrate powder.

2.3 WATER

- .1 Water to be free of impurities that would inhibit germination and growth.
- .2 In accordance Section 01 35 43 – Environmental Procedures

2.4 FERTILIZER

- .1 To meet Canada "Fertilizers Act" and "Fertilizers Regulations".
- .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
- .3 Inoculants: inoculant containers to be tagged with expiry date.

Part 3 Execution

3.1 GENERAL

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

3.2 WORKMANSHIP

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Parks Representative.
- .3 Do not perform work under adverse field conditions such as wind speeds over 10km/h, frozen ground or ground covered with snow, ice or standing water.
- .4 Provide signage to identify what areas have been seeded and advise people to stay off.

3.3 PREPARATION OF SURFACES

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

3.4 HYDRAULIC SEEDING

- .1 Hydraulic seeding is to be performed as per the manufacturer's recommendations with the following application rates as the minimum required for hydraulic seeding:
 - .1 Seed: 25 kg/hectare
 - .2 Mulch: 1500 kg/hectare, or as per manufacturers recommendations
 - .3 Tackifier: As per Manufacturer's Instructions
 - .4 Water: 30,000 L/hectare, or as per manufacturers recommendations
- .2 The Contractor shall measure quantities of materials by weight, or weight calibrated Contractor to calculate and submit applicable area of coverage per tank load of slurry in accordance with Section 01 33 00 – Submittal Procedures
- .3 Contractor shall physically stake and identify limits of tank coverage prior to seeding to the satisfaction of Departmental Representative.
- .4 Each tank load of slurry shall be fully applied within the designated boundaries for each load as staked volume measurement, to the satisfaction of the Departmental Representative.
- .5 The Contractor shall fill the tank half full with required water and add mulch while continuing to fill with water. Seed mix and fertilizer is to be added. All material is to be added into the hydraulic seeder under agitation. The Contractor shall pulverize mulch with tackifier and charge slowly into seeder.
- .6 The Contractor shall charge soil stabilizer/tackifier into seeder after all other material is well mixed in seeder. Contractor shall mix slowly to avoid foaming but thoroughly to complete slurry.
- .7 The Contractor shall use hydraulic seeding equipment with a minimum slurry tank capacity of 4500 litres.
- .8 The Contractor's equipment shall have an agitation system for slurry capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and mechanical method:
 - .1 Pumps shall be capable of maintaining a continuous non-fluctuating flow of solution.
 - .2 Equipment shall be capable of seeding up to 150m distance from hydraulic seeder using hand operated hoses and appropriate nozzles.
- .9 The Contractor shall apply slurry when wind velocities will not affect the application and cause the mixture to be blown.
- .10 The Contractor shall apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed. Ensure good contact of slurry with soil with minimal air pockets.
- .11 The Contractor shall use the correct nozzle(s) for application and use hoses to access difficult to reach surfaces and to control application.

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

3.5 **MAINTENANCE DURING ESTABLISHMENT PERIOD**

- .1 Establishment period is a minimum of four months of continuous growing season. Growing season shall not to be divided by winter.
- .2 The Contractor shall repair and reseed dead or bare spots, as directed in the Contract Documents, to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In the case of erosion, the Contractor shall be compensated at the specified unit rates for reseeding.
- .3 For areas of poor seed germination and growth, as determined by the Departmental Representative, the soil shall be scarified or re-cultivated as directed by the Departmental Representative, and seeding and fertilizing undertaken as specified. This work is incidental to the Contract.
- .4 The Contractor shall perform following operations from time of seed application until acceptance by Departmental Representative.
 - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Mow grass at least once per month. Remove clippings which will smother grass.
 - .3 Control weeds by mechanical means utilizing acceptable integrated pest management practices.
 - .4 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.6 **ACCEPTANCE**

- .1 Seeded areas will be accepted by the Departmental Representative provided that all areas are uniformly established and turf is not eroded or rutted and relatively free of weeds. Seeded areas to be growing for a minimum of four continuous months prior to construction completion acceptance inspection.
- .2 Areas seeded in fall will be accepted in following spring, a minimum of four months after start of growing season, provided acceptance conditions are fulfilled.
- .3 Minimum 75% growth by area of coverage of specified seed mixture must be present in order to be acceptable.
- .4 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.7 **CLEANING**

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

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Rock Creek Campground &
Day Use Area

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Parks Canada Agency

Water Treatment System

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END OF SECTION

Section 32 92 19
HYDRAULIC SEEDING

32 93 10 TREES, SHRUBS, AND GROUNDCOVER PLANTING**Part 1 General****1.1 SUMMARY**

- .1 Section Includes:
 - .1 Materials and installation for plant material, accessories, planting, tree support, mulching and maintenance.
- .2 Related Sections:
 - .1 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 REFERENCES

- .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-[2001].
- .3 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992, c.34.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

1.3 DEFINITIONS

- .1 **Mycorrhiza:** association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data for:
 - .1 Fertilizer.
 - .2 Mulch.
- .3 Submit samples for:
 - .1 Mulch.

1.5 MEASUREMENT AND PAYMENT

- .1 Shrubs installed as per the drawings, shall be counted by number installed on site and shall be paid for under “**Unit Price Item 5a – Supply and Install Shrub**”, which will be considered complete payment for the supply and install of the item. The price shall include supply and installation of all work and materials incidental thereto.
- .2 **Soaker Beds** shall be measured for each bed successfully installed as per the drawings and will include all items shown on the drawings with the exception of the Shrubs which will

be paid for as noted above, and the manholes as noted in Section 33 05 15. Payment for successfully completed beds shall be paid under “**Unit Price 10b – Soaker Bed**” and work shall include but is not limited to;

- .1 Preparation
- .2 Stripping
- .3 Excavation
- .4 wasting of excavated material onsite or hauling and disposal outside of the park
- .5 geotextiles
- .6 perforated drain pipe
- .7 washed rock
- .8 compacted clay pipe support
- .9 hose and attachments
- .10 imported topsoil
- .11 mulch
- .12 finishing and fine grading
- .13 and any incidentals to complete the work as designed.

1.6 **QUALITY ASSURANCE**

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 **STORAGE AND PROTECTION**

- .1 Protect plant material from frost, excessive heat, wind and sun during delivery.
- .2 Immediately store and protect plant material which will not be installed within 12 hours after arrival at site in storage location approved by Parks Representative.
- .3 Protect plant material from damage during transportation:
 - .1 When 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 When 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.
- .4 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.
 - .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.

1.8 SCHEDULING

- .1 Obtain approval from Parks 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.

1.9 MAINTENANCE

- .1 Contractor shall maintain plant material until construction completion.
- .2 There shall be no maintenance of plant material during warranty period.

Part 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 4A or 5 in accordance with Plant Hardiness Zones in Canada.
 - .2 Plant material must be planted in zone indicated 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 except where specified otherwise.

2.2 WOODCHIP MULCH

- .1 Wood chip: varying in size, free of bark, small branches and leaves.

2.3 WATER

- .1 Free of impurities that would inhibit plant growth.

2.4 FERTILIZER

- .1 Synthetic commercial type as recommended by soil test report and approved by the ESO.

2.5 SOURCE QUALITY CONTROL

- .1 Obtain approval from Department 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.

Part 3 Execution**3.1 PRE-PLANTING PREPARATION**

- .1 Ensure plant material acceptable to Parks Representative.
- .2 Remove damaged roots and branches from plant material.

3.2 EXCAVATION AND PREPARATION OF PLANTING BEDS

- .1 Preparation of planting beds is specified in Section 32 91 19.13 - Topsoil Placement and Grading.
- .2 For planting bed layout:
 - .1 Stake out location and obtain approval from Parks Representative prior to planting.

3.3 PLANTING

- .1 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.
- .2 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.
- .3 For trees and shrubs:
 - .1 Backfill soil in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.
 - .2 Form watering saucer as indicated.
- .4 Water plant material thoroughly.
- .5 After soil settlement has occurred, fill with soil to finish grade.
- .6 Dispose of burlap, wire and container material off site.

3.4 MULCHING

- .1 Ensure soil settlement has been corrected prior to mulching.
- .2 Spread mulch evenly and remove from base of shrubs.

END OF SECTION

33 05 15 MANHOLES**Part 1 General****1.1 SECTION INCLUDES**

1. This section specifies requirements for supply and installation of the manholes

1.2 RELATED SECTIONS

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

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Sump Pit Manhole will be paid for based on number of units installed under “**Unit Price Item 6a – Sump Pit Manhole**”. Payments shall be compensation in full for excavation, supply of materials, installation of the perforated 1220 mm diameter manhole complete with all connections, connectors, adaptors, grouting, trenching, bedding, soaker pit, benching, standard 710mm diameter I.D top, backfill and compaction.
- .2 Shallow Manhole (Catch Basin) will be paid for based on number of units installed as per the drawings under “**Unit Price 6b – Shallow Manhole – Gravity and Grey Water**”. Payments shall be compensation in full for excavation, supply of materials, installation of the manhole complete with all connections, connectors, adaptors, grouting, trenching, bedding, benching, standard 710mm or 910mm diameter I.D. top, frame and cover, any risers required, backfill and compaction and fine grading.
- .3 The survey and layout of drainage structures as per requirements identified in this Section, will not be measured directly for payment but shall be considered incidental to the Work
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.4 SUBMITTALS

1. Submit shop drawing for manholes.
2. Submit shop drawings for the Black Water Tank and appurtenances.
3. Submit shop drawings for the Grey Water Tank and appurtenances
4. Submit shop drawings for the Treated Water Tank and appurtenances

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products**2.1 MATERIALS**

- .1 Precast manhole units: to ASTM C478M, circular, top sections flat slab top type with opening offset suitable for vertical ladder installation.

- .2 All inlets and outlets are to be cleanly-cored (in the field or in manufacturing facilities if appropriate, hammer knock out is not acceptable. All inlets/outlets are to be secured in place with a compression type gaskets, suitable to provide some flexibility and mobility.
- .3 Blackwater Manhole: N/A
- .4 Greywater Manhole (conveyance): must be a 1200mm standard manhole (benching to be field verified) complete with field benching and 50 mm drop from inlet to outlet, across the manhole.
- .5 Greywater Manhole (soaker beds): Must be a 700mm or 900mm manhole, all manhole inlets/outlets and internal benching as per the design drawings
- .6 Joints as follows:
 - .1 Manhole shall have all joints made watertight utilizing rubber gaskets conforming to the requirements of CSA-A257.3 and ASTM C448, preformed bituminous gasket or other approved sealant.
- .7 Mortar:
 - .1 Aggregate to CAN3-A82.56.
 - .2 Masonry Cement: to CAN/CSA-A3000-A8 sulphate resistant Type 50.
- .8 Ladder rungs:
 - .1 to CAN/CSA-G30.18, NO.25M billet steel deformed bars, hot dipped galvanized to Can/CSA-G164, rungs to be safety pattern drop step type.
- .9 Adjusting rings:
 - .1 Adjusting rings to ASTM C478M.

Part 3 Execution

3.1 EXCAVATION AND BACKFILL

- .1 Excavation and backfill are incidental to the Work.
- .2 Obtain approval of Departmental Representative before installing manholes or catch basins.

3.2 INSTALLATION

- .1 Place bedding and surround material in unfrozen condition.
- .2 Do excavation and backfilling in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Install manhole, bedding material and all connections and appurtenances to manufacturers specifications
- .4 Construct units in accordance with the drawings, plumb and true to alignment and grade.
- .5 Dewater excavation to approval of Engineer and remove soft and foreign material before placing concrete base.
- .6 Set precast concrete base on a minimum of 150 mm approved granular bedding (c/w fines) compacted to 98% Standard Proctor.

- .7 Place manhole frame and cover on top section to 150mm above finished surface elevation as shown on the civil drawings. If adjustment required use concrete grade rings. Purge and make smooth and watertight using bituminous gasket.

END OF SECTION

33 11 17 WATER MAINS AND VALVES**Part 1 General****1.1 DESCRIPTION**

- .1 This section specifies requirements for supplying and installing pressure water main pipe and appurtenances.

1.2 RELATED SECTIONS

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

1.3 SCHEDULING OF WORK

- .1 Contractor to schedule work to minimize interruptions to existing services within Grasslands National Park.
- .2 The Contractor shall submit a schedule of expected interruptions for approval by the Departmental Representative.
- .3 Contractor to notify the Departmental Representative at least 48 hours prior to any anticipated interruptions in the existing water service.

1.4 MEASUREMENT PROCEDURES

- .1 Contractor to supply and install water mains and valves including, all bends, plugs, tees, reducers and other appurtenances are incidental to the water main installation work under the applicable size for “**Unit Item 13 – Water Mains and Valves**”. Measurement shall be in lineal meters of finished, installed length. Price shall be full compensation for all necessary work for the supply and installation of water mains, including pipe laying, jointing/fusing, thrust blocking, testing, flushing, cathodic protection, disinfection and marker posts as depicted on the drawings and detailed in this section.
- .2 Curb stop valves to be paid for per unit supplied and installed, including backfilling, cathodic protection, operating rod, valve box assembly, valve lid and all necessary connections to the water main and all incidentals thereto for which separate payment is not included elsewhere. Payment shall be made under “**Unit Price 13d – Water Mains and Valves – Curb Stop Valve**”.
- .3 Trench excavation compaction and backfill to be installed as per Section 31 23 33.01. No additional payment will be made for Trench excavation, compaction and backfill.
- .4 Tracer wire to be supplied and installed as part of the water distribution system. No additional payment will be made for tracer wire installation. See section 2.9 below for minimum tracer wire requirements (or an approved equal). Tracer wire manufacturer specifications are to be provided to the engineer for approval before installation.

Part 2 Products**2.1 PIPE**

- .1 High Density Polyethylene Pipe (HDPE) pipe for potable water use DR 11 with a pressure class of 160 PSI or approved equivalent.

- .2 PEX pipe shall be SDR9 pipe for potable water or approved equivalent.
- .3 For diameters from 25mm through 75mm, High Density Polyethylene (HDPE) pipe and fittings shall meet the requirements of AWWA C901.
- .4 For diameters from 100mm-inches through 800mm, HDPE pipe and fittings shall meet the requirements of AWWA C906.
- .5 The pipe and fittings shall be made from HDPE resin having a material designation code of PE4710 or higher
- .6 The material shall meet the requirements of ASTM D 3350 and shall have a minimum cell classification of PE445474C.
- .7 HDPE Pressure Pipe for potable water shall meet the requirements of NSF 61, complete with blue indication stripes. Plain black pipe may not be used.
- .8 The minimum acceptable standard for HDPE pipe shall be as supplied by SclairePipe, WL Plastics, JMEagle or approved equal.
- .9 All installation methods are to be in accordance with the manufacturer's recommendations by qualified personal. The contractor shall produce their HDPE installation certification upon request.

2.2 HDPE BUTT FUSION FITTINGS

- .1 Butt Fusion Fittings shall meet the requirements of ASTM D3261. Molded and fabricated fittings shall have a pressure rating equal to or greater than the pipe unless otherwise specified on the plans.
- .2 Fabricated bend and tee fittings shall have a minimum of 3 segments. Fabricated bend fittings over 45 degrees through 90 degrees shall have a minimum of four segments.
- .3 Field fabricated fittings are not allowed.
- .4 The minimum acceptable standard for HDPE Butt fusion fittings shall be as supplied by IPEX, SclairePipe, WL Plastics or approved equals.
- .5 All installation methods are to be in accordance with the manufacturer's recommendations by qualified personal. The contractor shall produce their HDPE installation certification upon request. Training in accordance with ASTM F 6220 for butt fusion.

2.3 ELECTROFUSION FITTINGS

- .1 Electrofusion Fittings shall be made of HDPE material with a minimum material designation code of PE4710.
- .2 Electrofusion Fittings shall have a manufacturing standard of ASTM F 1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.
- .3 All electrofusion fittings shall be suitable for use as pressure conduits, and have nominal burst values of four times the Working Pressure Rating (WPR) of the fitting.
- .4 The minimum acceptable standard for electrofusion fittings shall be as supplied by IPEX, SclairePipe, McElroy or approved equals.
- .5 All installation methods are to be in accordance with the manufacturer's recommendations by qualified personal. The contractor shall produce their HDPE installation certification upon request. Training in accordance with ASTM F 1055 for electrofusion

2.4 JOINTS & FITTINGS

- .1 Joints, bends, tees will be fused as per manufacturers specifications by certified personnel.
- .2 A male threaded HDPE transition fitting “series 710 Carbon steel form poly-cam” or approved equivalent to be used for the 25mm (1”) HDPE DR 11 to a threaded stainless steel adaptor for the connections to the stainless steel riser for the spigots.

2.5 VALVES AND VALVE BOXES

- .1 Valves are to be Victaulic Series 772H NRS Groove x Groove gate valves or approved equivalent with a Victaulic Coupling for HDPE-to-steel pipe, style 907, suitable for bury
- .2 50 and 65mm HDPE spigot service curb stop to be “Ball Valve Curb Stop – B77-444-NL style” or approved equivalent, suitable for bury
- .3 Both valves types are to be fitted with top and bottom valve box and casing assemblies complete with operating rod and valve box lid adjustable to the approximate 1.5m design depth of the water mains.

2.6 SUBSURFACE PROTECTION

- .1 Denso tape or approved equivalent.
- .2 Install sacrificial Anode as per manufacturer’s specifications (2.3 kg anode).
- .3 Trace wire shall be installed and connected to the existing

2.7 PIPE DISINFECTION

- .1 All water mains and appurtenances shall be disinfected under supervision of the Departmental Representative in accordance with the latest version of AWWA C651, “Disinfecting Water Mains”.
- .2 Disinfection flush water to be disposed of by the contractor, as approved by the engineer.

2.8 TRACER WIRE

- .1 Tracer wire to be a minimum 12-gauge solid copper wire with plastic coating and attached along the piping system every 3m with PVC tape.
- .2 The tracer wire shall be extended to the surface at each curb stop valve or wooden bollard (as shown on the civil drawings) and wrapped around the base of the valve/bollard with sufficient coiled length so that it can be extended to 0.3m above the ground for ease of access.

Part 3 Execution**3.1 PREPARATION**

- .1 Clean pipes, fittings, valves, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects. Mark and remove defective materials from site.

3.2 TRENCHING, BEDDING AND BACKFILL

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

- .2 Trench alignment and depth shall be in accordance with the drawings or as approved by the Departmental Representative.
- .3 Do not backfill trenches until installed work has been inspected and approved by the Departmental Representative.

3.3 **PIPE INSTALLATION**

- .1 Install pipes to manufacturer's standard instructions and specifications.

3.4 **VALVE AND FITTING INSTALLATION**

- .1 Install valves and fittings to manufacturer's recommendations at locations indicated on the approved drawings.
- .2 Support valves located in valve boxes or valve chambers by means of preserved wood blocks located between valve and solid ground.
- .3 All subsurface bolted connections in contact with the soil shall be stainless steel and wrapped in denso tape and shall have adequate cathodic protection as per manufacturer specifications.

3.5 **THRUST BLOCKS**

- .1 Install cast in place concrete thrust blocks as per City of Regina specifications.

3.6 **HYDROSTATIC AND LEAKAGE TESTING**

- .1 The Contractor shall provide labor, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.
- .2 The Contractor shall notify the engineer at least 24 hours in advance of all proposed tests. Perform pressure tests in presence of the engineering or engineer representative.
- .3 Where any section of system is provided with concrete thrust blocks, do not conduct tests until at least one (1) days after placing concrete.
- .4 Hydrostatic leakage testing is recommended and shall comply with AWWA C651, ASTM F 2164, ASTM F 1412, AWWA Manual of Practice M55 Chapter 9, and PPI Handbook of Polyethylene Pipe Chapter 2 (2nd Edition). If the test section fails this test, the Contractor shall repair or replace all defective materials and/or workmanship at no additional cost to the Owner.
- .5 Leak tests of HDPE water system shall be conducted in accordance with ASTM F2164. The pipeline should be slowly filled with potable water and all trapped air bled off. The main should undergo a hydrostatic pressure test using pressure at the lowest elevation in the system at 150 psi. The pressure shall be maintained constant for 4-hour period by adding makeup water. After 4-hour period is completed, the pressure shall remain steady within 5% (7.5 psi) of a target 150 psi test pressure for one hour
- .6 The total test time should not exceed 8 hours. If the pipeline has to be retested – the pipe must be depressurized and allowed to “relax” for at least 8 hours before the next testing sequence
- .7 Test pipeline in sections not exceeding 365 m in length, unless otherwise authorized by the Departmental Representative.
- .8 Test pipeline including service connections after all backfilling is complete, Contractor shall provide potable water for testing.

- .9 Payment for pressure and leakage testing shall be considered included in the price paid per linear foot for water main installation.
- .10 Pneumatic (compressed air) leakage testing of HDPE, PVC or PEX pressure piping is prohibited for safety reasons

3.7 **FLUSHING AND DISINFECTING**

- .1 After installation and pressure testing, disinfect water line according to AWWA C651
- .2 Flushing and disinfecting operations shall be witnessed by the Engineer. The Contractor shall notify the engineer at least 48 hours before the proposed date when disinfection will commence.
- .3 Flushing may proceed upon acceptance of disinfection by the Departmental Representative.
- .4 Dechlorination, is to be performed by adding neutralizing chemicals (AWWA C651-86, Appendix B) to the chlorinated water as it is flushed from the system and before it enters the receiving environment.
- .5 After final flushing, the Departmental Representative will allow 12 hours to pass before collecting water samples for bacteriological testing. The water main is to be flushed for not more than five (5) minutes before taking the sample. One sample is to be taken from each spigot location.
- .6 Bacteriological samples are to be collected by the Contractor in approved sample bottles obtained for the approved testing laboratory. The sample bottles shall be sterilized and contain a dechlorination reagent. Never rinse sample bottle before testing. The locations where each sample is taken must be clearly identified on the drawings provided with each sample bottle. Indicate the sample is from the newly constructed water main.
- .7 No new water main will be put into service until all excess pipe lubricant has been flushed from the main and the results of the bacteriological tests have been provided and approved by the Departmental Representative. Once satisfactory water quality and bacteriological test results have been confirmed, the water main can be used for potable water distribution.
- .8 If the initial disinfection fails to produce satisfactory bacteriological samples, the mains shall be reflushed and re-sampled. If check samples show the presence of coliform organisms, then the water main shall be rechlorinated and flushed until satisfactory results are obtained.

END OF SECTION

33 11 18 POTABLE WATER STORAGE TANK**Part 1 General****1.1 SECTION INCLUDES**

1. Materials and installation for fibreglass Potable Water Tank and associated appurtenances.

1.2 RELATED SECTIONS

1. Excavating, Trenching and Backfilling Section 31 23 33.01
2. Electrical and control systems Section 32 21 00.01

1.3 REFERENCES

1. Underground Water Tanks in Canada:
 - .1 American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 - .2 ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
 - .3 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
 - .4 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement will be as a lump sum for the supply and install of the 30,000 Liter Fibreglass potable water tank and appurtenances under **“Unit Price Item 9 – Potable Water Storage Tank”**. The payment shall include transportation, stripping, excavating, fittings, bedding, backfilling and all related appurtenances, testing and commissioning of:
 - .1 30,000 Liter Fibreglass potable water tank and appurtenances
 - .2 150mm metallic pump sump and pit-less adaptor
 - .3 The process piping, contact chamber piping, air-vacuum valves, pressure relief valve, pressure reducing valve, pressure tank, and chemical storage tank.
 - .4 Connection piping and related appurtenances.
 - .5 And all work and materials incidental to work, for which separate payment is not provided elsewhere.
 - .6 Electrical and instrumentation will be paid for separately. Refer to electrical drawings.

1.5 DESIGN REQUIREMENTS

1. Tank
 - .1 Contractor to meet the design requirements as shown in the approved construction civil drawings.

- .2 Tank to be suitable for AASHTO load rating of H-20, for given cover provided (as shown on the design drawings).
 - .3 Contractor to provide a shop drawing from the manufacturer for approval by the engineer to verify the tank specifications have been met prior to ordering and installation.
 - .4 Tank to have suitable buoyancy mitigation, as recommended by the manufacture. Buoyancy mitigation system to be detailed on the shop drawings and stamped by a professional engineer.
 - .5 Tank to be completed with access hatches, vents, and piping, as shown on the design drawings. All access hatches, piping and other appurtenances that rise above surface must extend a minimum of 300 mm above finished ground surface (surface grading to slope away from the surface appurtenances, vents and accesses).
 1. Manway access hatch to be 750x750 mm (minimum) checker plate stainless steel lockable/tamper proof and watertight swing door.
 - .6 The tank and all related appurtenances, fasteners and connections are to be NSF 61 – suitable for potable water certified
2. Connection Pipe (between pump sump and tank)
- .1 Pipe to be 100mm PVC SDR 35. Pipe and related appurtenance to be NSF 61 – suitable for potable water use
 - .2 Suitable, sealed connections to the treated water tank (installed as per tank manufacture recommendations)
 - .3 Suitable, sealed connection to the pump sump. The connection between the pump sump and the connection pipe is to be mechanically restrained unless otherwise approved by the engineer. Every effort must be made to ensure stress between the pump sump and the connection pipe is minimized and a long term seal is maintained.
3. Pump Sump
- .1 Shop drawings are to be submitted to show the intended pump sump design and material selection, for approval by the engineer, prior to installation.
 - .2 Pump sump to conform to typical water well installation standards. All installation procedures, fittings and appurtenances are to be NSF 60/61 compliant suitable for potable water use. Entire pump sump casing to be bed in self compacting, free draining gravel to depth of 150mm above the pit-less adapter discharge elevation.
 - .3 Casing to be metallic 150mm (6”) Sch 40 pipe, complete with a sealed endcap to ensure a fully water tight system. Inline tee to be suitable to accept a 100mm pipe connection from treated water tank (via bell type connection, suitable for water pipe connections).
 - .4 If the pump sump and all related appurtenances to be stainless steel, stainless steel to be grade 304/L, 316/L or approved equal. All welding procedures to be undertaken by qualified personnel.
 - .5 If pump sump and all related appurtenances are to be standard grade steel, all welding procedures to be undertaken by qualified personnel, followed by the removal of all rough edges and applying an epoxy coating to the entire interior and

exterior of the pump sump. Any epoxy coating used to be NSF 60/61 compliant suitable for potable water use.

- .6 Plastic pipe is not considered suitable for the pump sump unless approved by the engineer.
- .7 Casing cap to be sealed with suitable well cap, ensuring a water tight seal and tamper proof access (As supplied by Wolsey waterworks, or approved equal).
- .8 Pit-less adaptor to be certified for NSF61 potable water use and installed into the pump sump casing, as shown on the design drawings (As supplied by Wolsey waterworks, or approved equal). Suitable for discharge connection to 65mm DR11 HDPE treated water line. HDPE connection to be completed with a mechanical restraint unless otherwise approved by engineer.

1.6 SUBMITTALS

- 1. Shop drawings to indicate:
 - .1 Tank details, components and dimensions as shown in the drawing details.
 - .2 Storage facilities and product handling and erection.
 - .3 Openings, sleeves, inserts and related appurtenances as shown on the drawings.
 - .4 Manufacture certified AASHTO load rating for depth of bury of tank shown on drawings
 - .5 Pump sump, connection, and tank details, including proposed suppliers, materials, coatings and burial techniques.
- 2. Each drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Canada.

1.7 WASTE MANAGEMENT AND DISPOSAL

- 3. Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 TANK MATERIALS

- 1. Supply and install all potable water tank materials to manufacturers specifications and approved construction drawings (or approved equivalent).
- 2. Tank Design - Fiberglass reinforced plastic (FRP) tanks:
 - .1 The tank size, fittings and accessories shall be as shown on the drawings.
 - .2 Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
 - .3 Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
 - .4 Tank shall be vented to atmospheric pressure.
 - .5 Tank shall be capable of handling liquids with specific gravity up to 1.1
 - .6 Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.

3. Loading Conditions - Tank shall meet the following design criteria:

- .1 Internal Load - Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor.
- .2 Surface Loads - Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
- .3 External Hydrostatic Pressure - Tank shall be designed for 3 m of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.

4. Onsite Wastewater Storage Applications:

- .1 Governing Standards, as applicable:
 2. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
 3. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 4. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
 5. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.
- .2 Tank Design: Single-Wall vessel as specified and shown on the Drawings.
- .3 Tank Accessories - Onsite Wastewater Storage Applications:
 1. Tank Anchoring:
 - .1 Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).
 - .2 Galvanized turnbuckles shall be supplied by the tank manufacturer.
 - .3 Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.
 2. Access Openings:
 - .1 All access openings shall have a diameter of 30 inches (762 mm), complete with riser, lid and necessary hardware. As noted on the drawings
 3. Attached Access Risers:
 - .1 Attached access risers shall be PVC or FRP as supplied by tank manufacturer.
 - .2 Attached access risers shall be a 30 inches (762 mm) diameter
 - .3 Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.
 4. Piping and Fittings:
 - .1 Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.
 - .2 PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.

- .3 All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.
- .4 Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.
- 5. Manway Openings:
 - .1 The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.
 - .2 Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.
- 6. Ladders:
 - .1 Ladders shall be the standard FRP ladder as supplied by tank manufacturer.
- 7. Baffles and Partitions:
 - .1 Baffles and Partitions shall be capable of withstanding hydrostatic loads occurring when one compartment is empty and the remaining compartment(s) is full.

Part 3 Execution

3.1 INSTALLATION

- 1. Place bedding and surround material in unfrozen condition.
- 2. Do excavation and backfilling in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling and as shown on the design drawings.
- 3. Install tank, bedding material and all connections and appurtenances to manufacturers specifications
- 4. Manufacturers specifications and procedures for tank testing during installation are to be adhered to. In particular, a pressure test during field installations should be carried out as outlined in the installation manual from supplier for fibre glass underground storage tanks (or an approved equivalent testing requirements by other manufacturers if an alternate equivalent potable water tank is proposed and approved).
- 5. Tank shall be tested according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

END OF SECTION

33 21 00.01 ELECTRICAL AND CONTROL SYSTEMS**Part 1 General****1.1 SECTION INCLUDES**

- .1 Materials and installation for raw water well pump and treated water sump pumps and control systems.

1.2 RELATED SECTIONS

- .1 Potable Water Storage Tank - Section 33 11 18

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Pump and control system shall be paid under **“Unit Price Item 12a – Pump and Control System”** for the supply and install of the Treated water pump and control system including all of the following:
 - .1 Pump: The pump shall be Grundfos 45S20-5 c/w compatible control system or approved equivalent.
 - .2 Control system: compatible control system, proposed by contractor and subject to shop drawing review and approval by the engineer.
 - .3 Local Pump Disconnect: Lockable 120/240v pump disconnect (suitable for 20amps), installed on a wooden post (as shown on the design drawings), compliant with Canadian electrical codes and that is NEMA 3R certified.
 - .4 Payment for the above items to include all work and materials incidental to work, for which separate payment is not provided elsewhere.
- .2 Water treatment system electrical inside the maintenance building will be paid for by lump sum under **“Unit Price Item 12b – Water Treatment System Electrical - Interior”** for the supply and install of the pump and control system electrical components including but not limited to the following:
 - .1 Pump starter cabinets
 - .2 Control panel
 - .3 Alarm beacons with manual reset
 - .4 Instrumentation (including all fittings, control wire, conduit, connections and operators for all control instrumentation including the flow meter, chemical meter pump, ultrasonic level sensor, pressure sensor and all associated controls, power supplies and appurtenances.
 - .5 All related power supplies, power receptacles, conduit, wiring, control wiring and associated appurtenances.
 - .6 Coordination with outdoor works to ensure a complete and operational system.
 - .7 Payment for the above items to include all work and materials incidental to work, for which separate payment is not provided elsewhere.

1.4 SUBMITTALS

- .1 Shop drawings to indicate:

- .1 Pump details, components and dimensions as shown in the drawing details.
- .2 Electrical details, including proposed control system, system logic and proposed integration of control instrumentation and the control systems.
- .3 Control panel
- .4 Installation methods to be used

Part 2 Execution**2.1 INSTALLATION**

- .1 Pump
 - .1 Pump to be disinfected prior to installation, accordance with applicable standards for water well pump installation,
 - .2 Pump to be installed by qualified well professional
 - .3 Pump to be connected to pit-less adaptor, item detailed in section 32 21 00.01
- .2 Control System
 - .1 To be installed as per drawings
- .3 Local pump Disconnect
 - .1 To be installed as per drawings

END OF SECTION

33 31 13 GRAVITY MAIN PIPING**Part 1 General****1.1 DESCRIPTION**

- .1 This section specifies requirements for supplying and installing gravity main pipe from:
 - .1 From the grey water tank, connecting to the grey water disposal system

1.2 RELATED SECTIONS

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

1.3 SCHEDULING OF WORK

- .1 Contractor to schedule work to minimize interruptions to existing services.
- .2 Contractor to submit schedule of expected interruptions for approval by Departmental Representative.

1.4 MEASUREMENT PROCEDURES

- .1 100 mm PVC gravity pipe (SDR 35) supplied and installed shall be measured and paid for per lineal meter, including the cost of trench excavation, compaction and backfill as per section 31 23 33.01 under “**Unit Price Item 7a – Gravity Main piping – 100mm PVC (SDR 35)**”. All bends, tees, reducers and other appurtenances are incidental to the gravity pipe installation work. Price shall be full compensation for all work necessary for the supply and installation of gravity mains, including pipe laying, jointing and connections to and from manholes or tanks. Linear meter rate to include all work and materials incidental to work, for which separate payment is not provided elsewhere.

Part 2 Products**2.1 PIPE**

- .1 All gravity pipes to be PVC SDR 35.
- .2 Polyvinyl chloride (PVC) to ASTM D3034, CSA B182.1 and B182.2
 - Standard dimensional ratio (SDR) 35.
 - Separate gasket and integral bell system.
 - All joints to meet requirements of specification for joints for drain and sewer plastic pipes using flexible elastomeric seals (ASTM 03212).
- .3 May be any color except blue.

Part 3 Execution**3.1 PREPARATION**

- .1 Clean pipes, fittings, valves, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects. Mark and remove defective materials from site.

3.2 TRENCHING, BEDDING AND BACKFILL

- .1 Trenching, Bedding and Backfill shall be in accordance with Section 31 23 33.01.
- .2 Trench alignment and depth shall be in accordance with the drawings or as approved by the Departmental Representative.
- .3 Do not backfill trenches until installed work has been inspected and approved by the Departmental Representative.

3.3 PIPE INSTALLATION

- .1 Install pipes to manufacturer's standard instructions and specifications.
- .2 Pipe joining:
 - .1 Install gaskets as recommended by manufacturer.
 - .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 carefully before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace 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 manufacturers recommendations.
 - .10 Block pipes as directed when any work stoppage occurs, to prevent creep during down time.
 - .11 Plug lifting holes with approved prefabricated plugs set in non-shrink grout.
 - .12 Cut pipes as required for special inserts, fittings or closure pieces in a neat manner as recommended by pipe manufacturer without damaging pipe or its coating and to leave a smooth end at right angles to axis of pipe.
 - .13 Make watertight connections to manholes. Use non shrink grout when suitable gaskets are not available.
 - .14 Use prefabricated saddles, tees or approved field connections for connecting pipes to existing sewer pipes. Joint of saddle to pipe shall be structurally sound and watertight.
- .3 Acceptance
 - .1 The location of all deficient work will be recorded and the Contractor will be required to repair, relay, restore or otherwise make good, to the satisfaction of the Engineer any deficient work including the repair of alignment problems, cracked or broken pipe, deformed pipe, leaks or any other faults not conforming with these specifications or the pipe manufacturers.

END OF SECTION

33 36 00 BLACK WATER STORAGE TANK**Part 1 General****1.1 SECTION INCLUDES**

- .1 Materials and installation for fibreglass Black Water (sewage) Tank and associated appurtenances.

1.2 RELATED SECTIONS

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

1.3 REFERENCES

- .1 Underground Water Tanks in Canada:
 - .1 American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 - .2 ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
 - .3 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
 - .4 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement for supply and installation of the Black Water Storage Tank shall be as a lump sum for the supply and install (transportation, storage, stripping, excavating, benching, bedding and backfilling and any manufacturer specifications and connections to the black water distribution system) under “**Unit Price Item 10 – Black Water Storage Tank**”, which will include:
 - 1. 10,000 Liter fibreglass black water tank and appurtenances.
 - 2. Installation of manhole and connections from tank to manhole, and maintenance building to manhole.
 - 3. Connection piping and related appurtenances as shown on the civil tanks detail drawings.
 - 4. Provision piping (for future use)
 - 5. 100mm PVC SDR 35 (or Sch 40, or approved equivalent) fittings, caps and long sweep bends as shown on the drawings.

1.5 DESIGN REQUIREMENTS

- .1 Tank
 - .1 Contractor to meet the design requirements as shown in the approved construction civil detail drawing for a 10,000-liter fibreglass blackwater water holding tank by as per the drawings or an approved equivalent.

- .2 Tank to be suitable for AASHTO load rating of H-20, for given cover provided (as shown on the design drawings).
- .3 Contractor to provide a shop drawing from the manufacturer for approval by the engineer to verify the tank specifications have been met prior to ordering and installation.
- .4 Tank to have suitable buoyancy mitigation, as recommended by the manufacture.
- .5 Tank to be completed with access hatches, vents, and piping, as shown on the design drawings. All access hatches, piping and other appurtenances that rise above surface must extend a minimum of 300 mm above finished ground surface (surface grading to slope away from the surface appurtenances, vents and accesses).
- .6 HVAC access hatch to be 750x750 mm (minimum) checker plate stainless steel lockable and watertight swing door.
- .2 Connection Pipe (between maintenance building and tank)
 - .1 Pipe to be 100mm PVC SDR 35 or approved equivalent.
 - .2 Suitable, sealed connections (nipples) to the blackwater tank (installed as per tank manufacture recommendations) in two locations
 - .3 Current use Inlet (100mm diameter) - 90 degrees to the length-axis of the tank at the current HVAC pump out vertical access (to ensure that solid material accumulates near the HVAC access point)
 - .4 Future use Inlet (100mm diameter) - 90 degrees to the length-axis of the tank at the current access hatch vertical access. To be capped for future use (future onsite blackwater disposal system)
 - .5 Provisional piping to be installed and capped outside of Blackwater tank, to be connected at a time of future use. Capped end to extend 300 mm (minimum) from new tank footprint.
 - .6 Provisional piping to be 100mm DR 35 PVC piping or approved equivalent.

1.6**SUBMITTALS**

- .1 Shop drawings to indicate:
 - .1 Tank details, components and dimensions as shown in the drawing details.
 - .2 Storage facilities and product handling and erection.
 - .3 Openings, sleeves, inserts and related appurtenances as shown on the drawings.
 - .4 Manufacture certified AASHTO load rating for depth of bury of tank shown on drawings
 - .5 Provisional piping for future onsite blackwater disposal system
- .2 Each drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Canada.

1.7**WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products**2.1 TANK MATERIALS**

- .1 Supply and install all potable water tank materials to manufacturers specifications and approved construction drawings (or approved equivalent).
- .2 Tank Design - Fiberglass reinforced plastic (FRP) tanks:
 - .1 The tank size, fittings and accessories shall be as shown on the drawings.
 - .2 Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
 - .3 Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
 - .4 Tank shall be vented to atmospheric pressure.
 - .5 Tank shall be capable of handling liquids with specific gravity up to 1.1
 - .6 Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.
- .3 Loading Conditions - Tank shall meet the following design criteria:
 - .1 Internal Load - Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor.
 - .2 Surface Loads - Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
 - .3 External Hydrostatic Pressure - Tank shall be designed for 3 m of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.
- .4 Onsite Wastewater Storage Applications:
 - .1 Governing Standards, as applicable:
 - .1 ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
 - .2 American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 - .3 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
 - .4 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.
 - .2 Tank Design: Single-Wall vessel as specified and shown on the Drawings.
 - .3 Tank Accessories - Onsite Wastewater Storage Applications:
 1. Tank Anchoring:
 - .1 Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).
 - .2 Galvanized turnbuckles shall be supplied by the tank manufacturer.
 - .3 Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

2. Access Openings:
 - .1 All access openings shall have a diameter of 30 inches (762 mm), complete with riser, lid and necessary hardware.
3. Attached Access Risers:
 - .1 Attached access risers shall be PVC or FRP as supplied by tank manufacturer.
 - .2 Attached access risers shall be a 30 inches (762 mm) diameter
 - .3 Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.
4. Piping and Fittings:
 - .1 Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.
 - .2 PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.
 - .3 All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.
 - .4 Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.
5. Manway Openings:
 - .1 The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.
 - .2 Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.
6. Ladders:
 - .1 Ladders shall be the standard FRP ladder as supplied by tank manufacturer.
7. Baffles and Partitions:
 - .1 Baffles and Partitions shall be capable of withstanding hydrostatic loads occurring when one compartment is empty and the remaining compartment(s) is full.

Part 3 Execution

3.1 INSTALLATION

- .1 Place bedding and surround material in unfrozen condition.
- .2 Do excavation and backfilling in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Install tank, bedding material and all connections and appurtenances to manufacturers specifications
- .4 Manufacturers specifications and procedures for tank testing during installation are to be adhered to. In particular, a pressure test during field installations should be carried out as outlined in the installation manual from zel for fibre glass underground storage tanks (or

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an approved equivalent testing requirements by other manufacturers if an alternate equivalent black water tank is proposed and approved).

- .5 Tank shall be tested according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

END OF SECTION

33 37 00 GREY WATER TANK**Part 1 General****1.1 SECTION INCLUDES**

- .1 Materials and installation for fibreglass Grey Water Storage Tank and associated appurtenances.

1.2 RELATED SECTIONS

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

1.3 REFERENCES

- .1 Underground Water Tanks in Canada:
 - .1 American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 - .2 ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
 - .3 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
 - .4 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement for supply and installation of the Grey Water Storage Tank shall be as a lump sum for the supply and install (transportation, storage, stripping, excavating, benching, bedding and backfilling and any manufacturer specifications and connections to the black water distribution system) under “**Unit Price 11 – Grey Water Storage Tank**”, which will include:
 - 1. 15,000 Liter fibreglass grey water tank and appurtenances.
 - 2. Installation of manhole and connections from tank to manhole.
 - 3. Connection piping and related appurtenances as shown on the civil tanks detail drawings.
 - 4. Provision piping (for future use)
 - 5. Supply and installation of the two (2) weir walls (as supplied/recommended by the manufacture, to be approved by the engineer)
 - 6. Grey water biotube filter system by Orenco including any fixtures, gaskets, joints and appearances needed or as shown in the civil drawings for the grey water tank.

1.5 DESIGN REQUIREMENTS

- .1 Tank
 - .1 Contractor to meet the design requirements as shown in the approved construction civil detail drawing for a 15,000-liter fibreglass blackwater water holding tank by as per the drawings or an approved equivalent.

- .2 Tank to be suitable for AASHTO load rating of H-20, for given cover provided (as shown on the design drawings).
- .3 Contractor to provide a shop drawing from the manufacturer for approval by the engineer to verify the tank specifications have been met prior to ordering and installation.
- .4 Tank to have suitable buoyancy mitigation, as recommended by the manufacture.
- .5 Tank to be completed with access hatches, vents, and piping, as shown on the design drawings. All access hatches, piping and other appurtenances that rise above surface must extend a minimum of 500 mm above finished ground surface (surface grading to slope away from the surface appurtenances, vents and accesses).
- .6 HVAC access hatch to be 750x750 mm (minimum) checker plate stainless steel lockable and watertight swing door.
- .2 Connection Pipe (between manhole and tank)
 - .1 Pipe to be 100mm PVC SDR 35 or approved equivalent.
 - .2 Suitable, sealed connections to the treated water tank (installed as per tank manufacture recommendations)
- .3 Internal piping and Appurtenances
 - .1 Greywater Filter Tubes (BioTube) - 4" (100mm) BioTube filter housing and associated piping, (as supplied by Orenco or approved equal). To be installed on the "inlet" weir wall, to filter grey water prior to entering the holding volume of this tank. **The filter system is to be installed such that it is easy to maintain WITHOUT future need to enter the tank.**
 - .2 Inlet Control Device (ICD) – an ICD to be installed on the "outlet" weir wall of the greywater tank, to restrict the flow from this tank to a rate which the soaker fields can accept. As noted on the drawings.

1.6 SUBMITTALS

- .1 Shop drawings to indicate:
 - .1 Tank details, components and dimensions as shown in the drawing details.
 - .2 Storage facilities and product handling and erection.
 - .3 Openings, sleeves, inserts and related appurtenances as shown on the drawings.
 - .4 Manufacture certified AASHTO load rating for depth of bury of tank shown on drawings
 - .5 Provisional piping for future onsite blackwater disposal system
- .2 Each drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Saskatchewan.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products**2.1 TANK MATERIALS**

- .1 Supply and install all potable water tank materials to manufacturers specifications and approved construction drawings (or approved equivalent).
- .2 Tank Design - Fiberglass reinforced plastic (FRP) tanks:
 - .1 The tank size, fittings and accessories shall be as shown on the drawings.
 - .2 Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
 - .3 Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
 - .4 Tank shall be vented to atmospheric pressure.
 - .5 Tank shall be capable of handling liquids with specific gravity up to 1.1
 - .6 Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.
- .3 Loading Conditions - Tank shall meet the following design criteria:
 - .1 Internal Load - Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor.
 - .2 Surface Loads - Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
 - .3 External Hydrostatic Pressure - Tank shall be designed for 7 feet (2.1 m) of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.
- .4 Onsite Wastewater Storage Applications:
 - .1 Governing Standards, as applicable:
 - .1 ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
 - .2 American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 - .3 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
 - .4 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.
 - .2 Tank Design: Single-Wall vessel as specified and shown on the Drawings.
 - .3 Tank Accessories - Onsite Wastewater Storage Applications:
 - .1 Tank Anchoring:
 - .1 Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).
 - .2 Galvanized turnbuckles shall be supplied by the tank manufacturer.
 - .3 Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

- .2 Access Openings:
 - .1 All access openings shall have a diameter of 24 inches or 30 inches (610 mm or 762 mm), complete with riser, lid and necessary hardware.
- .3 Attached Access Risers:
 - .1 Attached access risers shall be PVC or FRP as supplied by tank manufacturer.
 - .2 Attached access risers shall be a 24 inches or 30 inches (610 mm or 762 mm) diameter
 - .3 Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.
- .4 Piping and Fittings:
 - .1 Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.
 - .2 PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.
 - .3 All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.
 - .4 Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.
- .5 Manway Openings:
 - .1 The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.
 - .2 Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.
- .6 Ladders:
 - .1 Ladders shall be the standard FRP ladder as supplied by tank manufacturer.
- .7 Baffles and Partitions:
 - .1 Baffles and Partitions shall be capable of withstanding hydrostatic loads occurring when one compartment is empty and the remaining compartment(s) is full.

Part 3 Execution

3.1 INSTALLATION

- .1 Place bedding and surround material in unfrozen condition.
- .2 Do excavation and backfilling in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Install tank, bedding material and all connections and appurtenances to manufacturers specifications
- .4 Manufacturers specifications and procedures for tank testing during installation are to be adhered to. In particular, a pressure test during field installations should be carried out as outlined in the installation manual from zel for fibre glass underground storage tanks (or

an approved equivalent testing requirements by other manufacturers if an alternate equivalent black water tank is proposed and approved).

- .5 Tank shall be tested according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

END OF SECTION

33 38 00 WATER TREATMENT SYSTEM**Part 1 General****1.1 SECTION INCLUDES**

- .1 Materials and installation for the Water Treatment System (Process and Equipment) and associated appurtenances.

1.2 RELATED SECTIONS

- .1 Section 33 11 17 - HDPE Watermains and Valves

1.3 REFERENCES

- .1 Refer to civil drawings for references

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 The Water Treatment System Process and Equipment will be measured as a lump sum for the supply and install of all water treatment contact chambers (tank/piping), piping, equipment, fittings, valves, air release, connections and appurtenances, disinfection and commissioning of the water treatment system (as shown on the design drawings). Payment will be inclusive of all necessary work and components to construct a water treatment system that produces potable water for consumption and shall include all components noted in the civil engineering drawings and shall be made under **“Unit Price Item 13a – Water Treatment System”**.
- .2 The Supply and Install of the New well pump (located at the source well) and Control System will be as a lump sum. Payment will be made as a lump sum based on percentage complete under **“Unit Price Item 13b – Well Pump and Control System”**, which will include:
 - 1. Water well Pump: Grundfos SQE 05-140 c/w compatible control system
 - 2. Compatible flow restriction device: restricting well water flows to 0.18L/s, 10.8Lpm (to be Dole regulator valve GE part# 1407099 or approved equivalent) including a strainer of 5/64-in. (2 mm) mesh or smaller to prevent plugging.
 - 3. Local Pump Disconnect: Lockable 120/240v pump disconnect (suitable for 20amps), installed on a wooden post (as shown on the design drawings), compliant with Canadian electrical codes and that is NEMA 3R certified.
- .3 The Supply and Install of new Well Power/Control Wiring (#1 ACWU) shall be measured in linear meters installed, inclusive of product, trenching, back fill and surface rehabilitation to the engineer’s satisfaction. Payment shall be made under **“Unit Price Item 13c – Supply and Install Trenched in Electrical Wire”**.
- .4 The Supply and Install of the new Pitless Adaptor into the existing water well, including any excavation, cutting of the water well casing, repair of the water well casing and connection to the new raw water supply line will be measured as a lump sum, and shall be paid under **“Unit Price Item 13d – Pitless Adapter”** which will include:
 - .1 Pitless adaptor to be compatible with the raw water supply line.

1.5 DESIGN REQUIREMENTS

- .1 Refer to civil drawings

1.6 SUBMITTALS

- .1 Shop drawings to indicate:
 - .1 Chlorination system including injection pump and chlorination tank
 - .2 Pressure tank
 - .3 Pressure sensors
 - .4 Air Release/Vacuum valves
 - .5 Pressure reducing valve
 - .6 Drain ports, sample ports, pipe fittings and connections
- .2 Each drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Saskatchewan.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products**2.1 WATER TREATMENT SYSTEM**

- .1 Supply and install all water treatment components for the potable water system to manufacturers specifications and approved construction drawings (or approved equivalent). Refer to civil drawings for details
- .2 Supply and Install New well pump and Control System. Refer to civil drawings for details
- .3 Supply and Install of new Well Power/Control Wiring (#1 ACWU). Refer to civil and electrical drawings for details
- .4 Supply and Install new Pitiless Adaptor. Refer to civil drawings for details

Part 3 Execution**3.1 INSTALLATION**

- .1 Manufacturers specifications and procedures for installation and testing of each component and of the treatment system as a whole are to be adhered to.
- .2 A pressure test during field installations should be carried out as outlined in the Section 33 11 17 HDPE Watermains and Valves.

END OF SECTION