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Part 1 General

- 1.1 Related Requirements
- 1.2 Work Covered By Contract Documents
 - .1 Work of this Contract comprises general renovation of an existing area of campground and ancillary structures, located at Protection Mountain Campground, Bow Valley Parkway, Alberta; and further identified as Protection Mountain.
- 1.3 Contract Method
 - .1 Construct Work under unit price contract.
- 1.4 Work By Others
 - .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.
 - .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.
- 1.5 Work Sequence
 - .1 Maintain fire access/control.
- 1.6 Contractor Use Of Premises
 - .1 Limit use of premises for Work, for storage, for access, to allow:
 - .1 Work by other contractors.
 - .2 Owner access for inspections, animal control, environment assessment, and staff housing.
 - .2 Co-ordinate use of premises under direction of Departmental Representative.
 - .3 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
 - .4 At completion of operations condition of existing work: equal to or better than that which existed before new work started.
- 1.7 Owner Occupancy
 - .1 Owner will occupy premises during entire construction period for execution of normal operations.
 - .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

- 1.8 Partial Owner Occupancy
 - .1 Schedule and substantially complete designated portions of Work for Owner's occupancy prior to Substantial Performance of entire Work.
 - .2 Owner will occupy designated areas for purpose of storage of furnishings and equipment.
 - .3 Execute Certificate of Substantial Performance for each Work in its entirety prior to Owner occupancy. Contractor shall allow:
 - .1 Access for Owner personnel.
 - .2 Use of parking facilities.
 - .3 Operation of HVAC and electrical systems.
 - .4 Plumbing.
 - .4 On occupancy, Owner will provide for occupied areas:
 - .1 Operation of HVAC and electrical systems.
 - .2 Maintenance.
 - .3 Security.
- 1.9 Owner Furnished Items
 - .1 Owner Responsibilities:
 - .1 Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to Contractor.
 - .2 Deliver supplier's bill of materials to Contractor.
 - .3 Arrange and pay for delivery to site in accordance with Progress Schedule.
 - .4 Inspect deliveries jointly with Contractor.
 - .5 Submit claims for transportation damage.
 - .6 Arrange for replacement of damaged, defective or missing items.
 - .7 Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties and bonds to Contractor.
 - .2 Contractor Responsibilities:
 - .1 Designate submittals and delivery date for each product in progress schedule.
 - .2 Review shop drawings, product data, samples, and other submittals. Submit to Consultant notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - .3 Receive and unload products at site.
 - .4 Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.
 - .5 Handle products at site, including uncrating and storage.
 - .6 Protect products from damage, and from exposure to elements.
 - .7 Assemble, install, connect, adjust, and finish products.
 - .8 Provide installation inspections required by public authorities.
 - .9 Repair or replace items damaged by Contractor or subcontractor on site (under his control).

- .3 Schedule of Owner furnished items:
 - .1 Wayfinding Signage.
 - .2 Fire Rings
 - .3 Picnic Tables (Regular/ Accessible)
 - .4 Bear Locker.
 - .5 Campsite Marker Numbres
 - .6 Electrical Panel
 - .7 Garbage can (4yd)
 - .8 Garbage can (Single bag)
 - .9 Recycling can (Single bag)
- 1.10 Alterations, Additions Or Repairs To Existing Building
- 1.11 Existing Services
 - .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
 - .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian and vehicular traffic.
 - .3 Provide alternative routes for personnel, pedestrian and vehicular traffic.
 - .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
 - .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
 - .6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
 - .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
 - .8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
 - .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
 - .10 Record locations of maintained, re-routed and abandoned service lines.
 - .11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- 1.12 Documents Required
 - .1 Maintain at job site, one copy each document as follows:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

Part 2 Products

- 2.1 Not Used
- .1 Not used.

Part 3 Execution

- 3.1 Not Used
- .1 Not used.

END OF SECTION

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Part 1 General

1.1 Related Requirements

1.2 Access And Egress

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

1.3 Use Of Site And Facilities

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
 - .1 Contractor to stage work such that at least 1 washroom building is not under construction at any given time, or Contractor to provide their own sanitary facilities.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

1.4 Existing Services

- .1 Refer to Section 01 11 00 Summary of Work

1.5 Temporary Utilities

- .1 Refer to Section 01 51 00 Temporary Utilities

1.6 Special Requirements

- .1 Submit schedule in accordance with Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM) 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.
- .4 Ingress and egress of Contractor vehicles at site is limited to 4m.
- .5 Deliver materials outside of peak traffic hours 17:00 to 07:00 and 13:00 to 15:00 unless otherwise approved by Departmental Representative.

- 1.7 Security
 - .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
 - .2 Security clearances:
 - .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
 - .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
 - .3 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.
- 1.8 Building Smoking Environment
 - .1 Comply with smoking restrictions. Smoking is not permitted.

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Not Used
 - .1 Not Used.

END OF SECTION

Part 1 General

1.1 Section Includes

- .1 Measurement and payment criteria applicable to portions of the work performed under a unit price payment method.
- .2 Defect assessment and non-payment for rejected work.

1.2 Authority

- .1 The Contractor will take all measurements and compute quantities accordingly.
- .2 In the event of a discrepancy identified by the Departmental Representative, the Departmental Representative reserves the right to confirm measurement of quantities directly or through a third party surveyor.
 - .1 In the event quantities are adjusted due to mis-measurement by the Contractor, the Contractor is responsible for the costs associated with confirming the measurements.
- .3 The Contractor is responsible for providing necessary equipment, workers, and survey personnel as required.

1.3 Unit Prices

- .1 Quantities and measurements indicated in the Tender documents are for proposal and contract purposes only. Quantities and measurements supplied or placed in the work and verified by the Departmental Representative shall determine payment.
- .2 If the actual work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.
- .3 All unit price work performed without notifying the Departmental Representative to establish measurement and payment shall not be considered for payment.
- .4 The prices proposed for various items of work, unless specifically noted otherwise, shall include the supply of all labour, material and product equipment necessary to construct the work in accordance with the specifications.
- .5 The prices proposed for supply and installation shall be full compensation for supplying, hauling, installing, cleaning, testing, and placing in service together with all other work subsidiary and incidental thereto for which separate payment is not provided elsewhere.

1.4 Measurement Of Quantities

- .1 Measurement Devices:
 - .1 Weigh Scales: Inspected, tested and certified by the applicable Provincial or Federal Weights and Measures departments, within the past year.
 - .2 Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.

- .3 Metering Devices: Inspected, tested and certified by the applicable authority within the past year.
 - .2 Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes - measured by handbook weights. Welded assemblies measured by handbook or scale weight.
 - .3 Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
 - .4 Measurement by Area: Measured by square dimension using mean length and width or radius.
 - .5 Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
 - .6 Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination as appropriate, as a completed item or unit of Work.
- 1.5 Measurement And Payment - Unit Prices
 - .1 Authority for Specified Conditions: Measurement methods are delineated in the individual specification sections. In the event of conflict, the requirements of the individual specification section govern.
 - .2 Authority for Changed Conditions: Measurement methods and unit prices are determined by the Consultant.
 - .3 The Departmental Representative will take measurements and compute quantities accordingly. Provide and assist in the taking of measurements.
 - .4 If the actual Work requires a 25% or greater change in quantity than those quantities indicated, the Departmental Representative or Contractor may claim for a Contract Price adjustment.
 - .5 Unit Quantities: Quantities and measurements indicated in the Bid Form are for bid and contract purposes only. Quantities and measurements actually supplied or placed in the Work shall determine payment.
 - .6 Payment Includes: Full compensation for required labour, Products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.
- 1.6 Defect Assessment
 - .1 Replace the Work, or portions of the Work, not conforming to specified requirements.
 - .2 If, in the opinion of the Departmental Representative, it is not practical to remove and replace the Work, the Departmental Representative will direct one of the following two (2) remedies:
 - .1 The defective Work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the Departmental Representative.
 - .2 The defective Work will be partially repaired to the instructions of the Departmental Representative; the unit sum/price will be adjusted to a new sum/price at the discretion of the Departmental Representative.

- .3 The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.
 - .4 The authority of the Departmental Representative to assess the defect and identify payment adjustment is final.
- 1.7 Non-Payment For Rejected Products
- .1 Payment will not be made for any of the following:
 - .1 Products wasted or disposed of in a manner that is not acceptable.
 - .2 Products determined as unacceptable before or after placement.
 - .3 Products not completely unloaded from the transporting vehicle.
 - .4 Products placed beyond the lines and levels of the required Work.
 - .5 Products remaining on hand after completion of the Work.
 - .6 Loading, hauling, and disposing of rejected Products.

Part 2 Measurement And Payment Methods

- 2.1 Construction Start-up
- .1 Mobilization / Demolition
 - .1 Scope: Mobilization includes supplying and transporting to the site; labour, equipment, products and incidentals; providing and maintaining temporary facilities and controls, including buildings, utilities, contract identification signs, and other construction necessary for Contractor's methods carried out during performance of the Contract and which does not remain as part of the Permanent Work.
 - .2 Measurement: N/A
 - .3 Payment: Lump Sum paid in accordance with the following schedule. The total amount of such payments shall not exceed the amount bid for this item:
Payment for 50% of the Lump Sum amount for Mobilization and Demobilization will be made after the Contractor has completed 10% of the Work in Section 2.2 Construction.
Payment for the remaining 50% of the Lump Sum amount for Mobilization and Demobilization will be made after the Contractor has completed all Work associated with Section 2.2 Construction, including clean-up.
The amount bid for Mobilization and demobilization will be paid only once, regardless of the number of times the Contractor mobilizes and demobilizes.
- 2.2 Construction – Campground Loop
- .1 01 56 00 – Temporary Barriers and Enclosures
 - .1 Scope: Includes the supply of all materials and labour required to install, maintain for the duration of construction, and remove tree and septic field protection fencing as specified and as shown on Drawings.

- .2 Measurement: Field survey of linear metres of tree/septic field protection fencing installed.
- .3 Payment: Unit price per linear metre of tree/septic field protection fencing installed.
- .2 02 41 13.01 – Remove Existing Road
 - .1 Scope: Includes the supply of all materials and labour necessary to excavate and remove existing asphalt/gravel paving and base and disposal of material removed at an approved off-site facility as specified.
 - .2 Measurement: Measure removal of asphalt pavement patches, base, and sub-base materials in square metres. Include removal of waste or materials designated for alternate disposal from site.
 - .3 Payment: Unit price per square metre of roadway removed. Payment for stockpiling, disposal, alternative disposal, excavating, backfilling and restoration will be included in above removal items.
- .3 02 41 13.02 – Remove Garbage Bin
 - .1 Scope: Includes the removal and disposal of existing Garbage Bin's of various sizes as specified.
 - .2 Measurement: Count number of existing Garbage Bin's removed and disposed of regardless of size.
 - .3 Payment: Unit price per existing Garbage Bin removed and disposed of.
- .4 02 41 13.03 – Remove Recycling Bin
 - .1 Scope: Includes the removal and disposal of existing Recycling Bin's as specified.
 - .2 Measurement: Count number of existing Recycling Bin's removed and disposed of regardless of size.
 - .3 Payment: Unit price per existing Recycling Bin removed and disposed of.
- .5 02 41 13.04 – Remove Fire Rings
 - .1 Scope: Includes the removal and stockpiling of existing Fire Rings as specified.
 - .2 Measurement: Count number of existing Fire Rings removed and stockpile of.
 - .3 Payment: Count number of existing Fire Rings removed and stockpile of.
- .6 02 41 16.03 – Relocate existing Phone Booth
 - .1 Scope: Includes the supply of all materials and labour necessary to relocate (1) existing phone booth with phone line, phone line to be reconnected and tested, adjacent to existing location.
 - .2 Measurement: One (1) phone booth to be relocated and installed as specified and shown on Drawings.
 - .3 Payment: Lump sum payment for relocation of existing phone booth in accordance with Drawings. Payment shall not exceed bid amount.
- .7 10 14 00 – Signage

- .1 Scope: Includes the supply and installation of posts and owner / contractor supplied signs as specified and shown on Drawings.
 - .2 Measurement: Count number of posts and signs supplied and installed
 - .3 Payment: Unit rate payment per post and sign supplied and installed.
- .8 31 11 00.01 – Clearing and Grubbing
- .1 Scope: Includes removing all shrubs and woody debris, boulders and other obstructions interfering with the Work, as specified and as shown on the Drawings. Includes disposal of material removed from site at an approved off-site facility.
 - .2 Measurement: Measure clearing, grubbing, close cut clearing, and underbrush clearing in square meters. Measure clearing isolated trees and grubbing isolated tree stumps (if required) as number of isolated trees cleared and number of isolated stumps grubbed.
 - .3 Payment: Unit rate payment per square metre of cleared site area.
- .9 31 11 00.02 – Stump grinding
- .1 Scope: Includes stump grinding, and removal and delivery of all materials to the Lake Louise Waste Water Treatment Plant.
 - .2 Measurement: Measure stump grinding in square meters.
 - .3 Payment: Unit rate payment per square metre of cleared site area.
- .10 32 15 40.01 – Granular Trail
- .1 Scope: Includes the supply of all materials and labour required to excavate area to be paved, prepare subgrade, place and compact gravel base and granular trail mix, and all other associated costs for which payment is not included elsewhere. All excavation shall include removal and disposal of excavated materials at an approved facility, unless such materials are suitable and required for use as backfill onsite.
 - .2 Measurement: Measure granular topping, gravel surface, granular sub-base and subgrade in square metres for each thickness specified. Granular sub-base measure in place by cross section and calculated by average end area method of material incorporated into Work and accepted by Departmental Representative.
 - .3 Payment: Unit rate payment per square metre of granular topping and gravel surface installed.
- .11 32 15 40.02 – Granular Roadway – RV Pad
- .1 Scope: Includes the supply of all materials and labour required to excavate area to be paved, prepare subgrade, place and compact gravel base and granular mix, and all other associated costs for which payment is not included elsewhere. All excavation shall include removal and disposal of excavated materials at an approved facility, unless such materials are suitable and required for use as backfill onsite.
 - .2 Measurement: Measure granular topping, gravel surface, granular sub-base and subgrade in square metres for each thickness specified. Granular sub-base measure in place by cross section and calculated by average end area method of

- material incorporated into Work and accepted by Departmental Representative.
Field survey of square metres of geogrid (if applicable) supplied and installed.
- .3 Payment: Unit rate payment per square metre of granular topping, gravel surface, and geogrid (if applicable) installed.
- .12 32 15 40.03 – Granular Roadway – Resurfacing existing road
- .1 Scope: Includes the supply of all materials and labour required to excavate area to be paved, prepare subgrade, gravel base and granular mix, and all other associated costs for which payment is not included elsewhere. All excavation shall include removal and disposal of excavated materials at an approved facility, unless such materials are suitable and required for use as backfill onsite.
- .2 Measurement: Measure granular topping, gravel surface, granular sub-base and subgrade in square metres for each thickness specified. Granular sub-base measure in place by cross section and calculated by average end area method of material incorporated into Work and accepted by Departmental Representative. Field survey of square metres of geogrid (if applicable) supplied and installed.
- .3 Payment: Unit rate payment per square metre of granular topping, gravel surface, and geogrid (if applicable) installed.
- .13 32 15 40.04 – Granular Roadway – New Road
- .1 Scope: Includes the supply of all materials and labour required to excavate area to be paved, prepare subgrade, place and compact place and compact gravel base and granular mix, and all other associated costs for which payment is not included elsewhere. All excavation shall include removal and disposal of excavated materials at an approved facility, unless such materials are suitable and required for use as backfill onsite.
- .2 Measurement: Measure granular topping, gravel surface, granular sub-base and subgrade in square metres for each thickness specified. Granular sub-base measure in place by cross section and calculated by average end area method of material incorporated into Work and accepted by Departmental Representative. Field survey of square metres of geogrid (if applicable) supplied and installed.
- .3 Payment: Unit rate payment per square metre of granular topping, gravel surface, and geogrid (if applicable) installed.
- .14 32 37 00.01 – Fire Ring
- .1 Scope: Includes the labour and equipment required to install stockpiled PCA supplied fire rings including excavation and mounting as specified and shown on Drawings.
- .2 Measurement: One (1) fire ring to be installed per campsite.
- .3 Payment: Unit rate payment per fire ring installation
- .15 . 32 37 00.02 – Salvage Medium Boulder
- .1 Scope: Includes the supply of all materials, labour and equipment required to locate salvaged boulders onsite and place medium boulder as specified and shown on Drawings.
- .2 Measurement: Field survey of each medium boulder supplied and installed.
- .3 Payment: Unit rate payment per tonne of boulder installed.

- .16 32 37 00.03 – Parking curb with drift pins
 - .1 Scope: Includes the supply of all materials and labour required to install concrete parking curb, reinforcing, drift pins and all other associated costs for which payment is not included elsewhere.
 - .2 Measurement: Count number of concrete parking curbs installed.
 - .3 Payment: Unit rate payment per concrete parking curbs installed.
- .17 32 37 00.04 – Tent pad
 - .1 Scope: Includes the supply of all materials and labour required to install tent pads, lumber, drift pins and all other associated costs for which payment is not included elsewhere.
 - .2 Measurement: One (1) tent pad to be installed per Small RV Site.
 - .3 Payment: Unit rate payment per tent pad installation.
- .18 32 37 00.05 – Remove and Reinstall Salvaged Campsite Markers
 - .1 Scope: Includes the supply of all materials and labour required to remove and reinstall the salvaged campsite markers as specified and shown on Drawings. Contractor to dispose of excess markers.
 - .2 Measurement: One (1) salvaged campsite marker to be installed per campsite.
 - .3 Project: Unit rate payment for salvaged campsite marker installed.
- .19 32 91 19.13 – Topsoil Placement and Grading
 - .1 Scope: Includes grading of surfaces as specified and shown on Drawings, and all incidental work for which payment is not included elsewhere.
 - .2 Measurement:
 - .1 Preparation of sub-grade for placing of topsoil will be measured in square metres of area prepared.
 - .2 Measure placing and spreading and finish grading of topsoil in square metres removed from stockpile.
 - .1 Stockpiles will be measured by Departmental Representative and volume of topsoil removed calculated by average end area method.
 - .3 Payment: Unit rate payment per square metre of rough graded site area.
- .20 32 92 19.16 – Seeding
 - .1 Scope: Includes the supply of all labour, materials and equipment required to conduct hydroseeding of areas specified and shown on Drawings.
 - .2 Measurement:
 - .1 Measure hydraulic seeding in square metres for:
 - .1 Grass mixture including fertilizer.
 - .2 Areas of blending into existing vegetation will not be measured for payment.
 - .3 Measure maintenance during establishment period and warranty period of areas seeded in square metres.

Payment: Unit price bid of actual area surface measurements taken and computed by Departmental Representative.

- .21 32 93 10.01 – Trees – 1.5m Conifer (Transplanted)
 - .1 Scope: Includes the supply of all labour, materials and equipment required to excavate tree pits, prepare subgrade, and install 1.5m conifer trees as specified and shown on Drawings. All excavation shall include removal and disposal of excavated materials at an approved facility, unless such materials are suitable and required for use as backfill onsite.
 - .2 Measurement: Count number of 1.5m conifer trees supplied and installed.
 - .3 Payment: Unit rate payment per 1.5m conifer tree supplied and installed.
- .22 32 93 10.02 – Trees – 1m Conifer (Transplanted)
 - .1 Scope: Includes the supply of all labour, materials and equipment required to excavate tree pits, prepare subgrade, and install 1m conifer trees as specified and shown on Drawings. All excavation shall include removal and disposal of excavated materials at an approved facility, unless such materials are suitable and required for use as backfill onsite.
 - .2 Measurement: Count number of 1m conifer trees supplied and installed.
 - .3 Payment: Unit rate payment per 1m conifer tree supplied and installed.
- .23 32 93 10.03 – Shrubs – 2 GAL.
 - .1 Scope: Includes the supply of live plant material, as well as all labour, materials and equipment required to plant shrubs onsite as specified and as shown on Drawings.
 - .2 Measurement: Count number of container shrubs supplied and installed.
 - .3 Payment: Unit rate payment per container shrub supplied and installed.
- .24 33 11 16.01 Site Water Utility Distribution Piping
 - .1 Scope: Includes the supply of all materials and labour required to install 50mm HDPE DR 17 to a minimum depth of 1.2m, 50mm ball valve with stem and riser, 25mm curb stop with stem and riser, 25mm coupling for building connection, 50mm x 25mm tee, 25mm air relief valve c/w 50mm nipple and 2m, 900 CSP standpipe c/w LID. Includes the cost for hydrostatic pressure testing as well as disinfection, flushing, and bacteria testing, and the remove and disposal of the existing watermain where the proposed alignment is on the existing alignment.
 - .2 Measurement: Field survey of linear metre of piping installed. Count number of ball valves and curb stops with stem and riser, coupling for building connection, 50mm x 25mm tee, 25mm air valve supplied and installed. One (1) 2m, 900 CSP standpipe to be supplied and installed.
 - .3 Payment: Unit rate payment per linear metre of each size of pipe installed, per valve and valve box supplied and installed and accessories as specified and shown in Drawings.

2.3 Washroom Structure

- .1 Partial Demolition

- .1 Scope: Includes the supply of all material and labour necessary to partially demolish and remove existing washroom interiors, inclusive of all materials (fixtures, ceilings, walls, partitions, electrical, and plumbing, leaving only the existing wood framing), and disposal of material removed at an approved off-site facility. The floor material does not need to be demolished and is to be protected.
- .2 Measurement: Three (3) washrooms structure to be partially demolished, removed and disposed.
- .3 Payment: Lump sum payment for demolition, removal and disposal of washroom structure. Payment shall not exceed bid amount.
- .2 Renovation
 - .1 Scope: Includes the supply of all material and labour necessary to renovate existing washroom including:
 - .1 fixtures, drywall, bathroom partition, grab bar, waste receptacle, water closet, urinal, vanity, sink, soap dispenser, heater, wall insert commercial fan forced heater, hand dryer, stainless steel grey water sink, spigot, extractor fan components,
 - .2 concrete floor topping per Section C3027 Epoxy Floor Coatings,
 - .3 two (2) concrete ramps per washroom per Section 03 30 00 Cast in place Concrete, interior painting and exterior painting and any accessories required to provide a fully functional washroom or as specified and shown on Drawings or included elsewhere in the Specifications
 - .2 Measurement: Three (3) washroom structures to be renovated per Drawings.
 - .3 Payment: Lump sum payment for renovation of washroom structure. Payment shall not exceed bid amount.
- 2.4 Picnic Shelter
 - .1 Partial Demolition
 - .1 Scope: Includes the supply of all material and labour necessary to partially demolish and remove existing picnic shelter and disposal of material removed at an approved off-site facility includes shingles and substrate to existing wood beams, cook stove and concrete plinth, interior lead based paint (base bid-remove and disposal, and alternative-encapsulation), exterior lead based paint (base bid-remove and disposal, and alternative-encapsulation), and removal of a section of the shelter as specified and shown on Drawings.
 - .2 Measurement: Three (3) picnic shelters to be demolished per Drawings, removed and disposed.
 - .3 Payment: Lump sum payment for demolition, removal and disposal of picnic shelter. Payment shall not exceed bid amount.
 - .2 Renovation
 - .1 Scope: Includes the supply of all material and labour necessary to renovate existing picnic shelter includes standing seam roof, stainless steel prep counter, construction of partition wall, painting and accessories required and/or as specified and shown with Drawings.

- .2 Measurement: Three (3) picnic shelters to be renovated per Drawings.
- .3 Payment: Lump sum payment for renovation of picnic shelter. Payment shall not exceed bid amount.

END OF SECTION

Approved: 2010-12-31

Part 1 General

- 1.1 Related Requirements
- 1.2 References
- 1.3 Requirements
 - .1 Referenced specification Sections stipulate pertinent requirements for products and methods to achieve Work stipulated under each Alternative.
 - .2 Co-ordinate affected related Work and modify surrounding Work to integrate Work under each Alternative.
- 1.4 Award/Selection Of Alternatives
 - .1 Indicate variation of Bid Price for Alternatives described below and listed in Bid Form. Note that this form requests a 'difference' in Bid. Price by adding to or deducting from base Bid price.
 - .2 Bids will be evaluated on Base Bid price. After determination of lowest Bidder, consideration will be given to Alternatives and Bid Price adjustments.
- 1.5 Alternatives
 - .1 Alternative No. 1:
 - .1 Base Bid: Nursery grown coniferous trees specified in Section 32 93 10 Tree and Shrub Planting.
 - .2 Alternative: Transplanted coniferous trees as per Section 32 93 10 Tree and Shrub Planting.
 - .1 Harvest location as directed by Departmental Representative
 - .2 Installation location as indicated.
 - .2 Alternative No. 2:
 - .1 Base bid: No Geogrid
 - .2 Alternative: use geogrid
 - .3 Alternative No. 3
 - .1 Base bid: Hazardous materials to remove and dispose of per provincial regulations.
 - .2 Alternative: Hazardous materials to be encapsulated per provincial regulations.
- 1.6 Not Used
 - .1 Not Used.

Part 2 Execution

2.1 Not Used

.1 Not Used.

END OF SECTION

Part 1 General

1.1 Related Requirements

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under sections as follows:
 - .1 Section 31 23 33.01 –Excavating, Trenching And Backfilling
 - .2 Section 32 11 16.01 - Granular Sub-Base
 - .3 Section 32 11 23 - Aggregate Base Courses
 - .4 Section 32 15 40 - Crushed Stone Surfacing.

1.2 Appointment And Payment

- .1 Departmental Representative will appoint and pay for services of testing laboratory except follows:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor Design-Builder under supervision of Departmental Representative.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.3 Contractor's Design -Builder's Responsibilities

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work for inspection and testing.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Departmental Representative 48 hours minimum sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

Part 2 Products

2.1 Not Used
 .1 Not Used.

Part 3 Execution

3.1 Not Used
 .1 Not Used.

END OF SECTION

Part 1 General

- 1.1 Related Requirements
- 1.2 Administrative
 - .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative
 - .2 Prepare agenda for meetings.
 - .3 Distribute written notice of each meeting five days in advance of meeting date to Departmental Representative
 - .4 Provide physical space and make arrangements for meetings.
 - .5 Preside at meetings.
 - .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
 - .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance, and Departmental Representative.
 - .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- 1.3 Preconstruction Meeting
 - .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
 - .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Owner provided products.
- .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

1.4 Progress Meetings

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

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

3.1 Not Used

.1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 Related Requirements

1.2 Definitions

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

1.3 Requirements

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

- 1.4 Action And Informational Submittals
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
 - .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.
- 1.5 Project Milestones
 - .1 Project milestones form interim targets for Project Schedule.
 - .1 Interim Certificate (Substantial Completion) by September 15, 2016.
- 1.6 Master Plan
 - .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
 - .2 Departmental Representative will review and return revised schedules within 5 working days.
 - .3 Revise impractical schedule and resubmit within 5 working days.
 - .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.
- 1.7 Project Schedule
 - .1 Develop detailed Project Schedule derived from Master Plan.
 - .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Excavation.
 - .6 Backfill.
 - .7 Roadway and campsite construction
 - .8 Revegetation
 - .9 Signage
 - .10 Washrooms
 - .11 Picnic Shelters
 - .12 Supplied equipment long delivery items.
 - .13 Engineer supplied equipment required dates.

1.8 Project Schedule Reporting

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

1.9 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 approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

- 2.1 Not Used
 - .1 Not used.

Part 3 Execution

- 3.1 Not Used
 - .1 Not used.

END OF SECTION

Approved: 2009-12-31

Part 1 General

1.1 Related Requirements

1.2 References

1.3 Administrative

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

1.4 Shop Drawings And Product Data

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

- .4 Allow 14 days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit one transparency on plastic film electronic copy 6 prints of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

- .11 Submit 6 electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit 6 electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit 6 electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit 6 electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit 6 electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit 6 electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 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.
- .21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.5 Samples

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.6 Mock-Ups

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.7 Photographic Documentation

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 4 locations.
 - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: as directed by Departmental Representative.
 - .1 Upon completion of Work, as directed by Departmental Representative.

1.8 Certificates And Transcripts

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

Part 2 Products

2.1 Not Used

- .1 Not Used.

Part 3 Execution

3.1 Not Used

 .1 Not Used.

END OF SECTION

Approved: 2013-06-30

Part 1 General

1.1 Related Requirements

1.2 References

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Alberta
 - .1 Occupational Health and Safety Act, R.S.A. - Updated 2013.

1.3 Action And Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation
- .3 Submit two copies of Contractor's authorized representative's work site health and safety inspection reports to weekly, to Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 47 15 - Sustainable Requirements: Construction and Section 02 81 01 - Hazardous Materials.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five days after receipt of comments from Departmental Representative.
- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

1.4 Filing Of Notice

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

- 1.5 Safety Assessment
 - .1 Perform site specific safety hazard assessment related to project.
- 1.6 Meetings
 - .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- 1.7 Regulatory Requirements
 - .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.
- 1.8 Project/Site Conditions
 - .1 Work at site will involve contact with:
 - .1 Asbestos containing materials.
 - .2 Lead based paint.
- 1.9 General Requirements
 - .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
 - .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- 1.10 Responsibility
 - .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
 - .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.11 Compliance Requirements
 - .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg. 2013.
- 1.12 Unforeseen Hazards
 - .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.
 - .2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Safety Officer and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

- 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 Blasting
 - .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative.
- 1.16 Powder Actuated Devices
 - .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.
- 1.17 Work Stoppage
 - .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Part 2 Products

- 2.1 Not Used
 - .1 Not used.

Part 3 Execution

- 3.1 Not Used
 - .1 Not used.

END OF SECTION

Approved: 2012-06-30

Part 1 General

- 1.1 Related Requirements
 - .1 Section 01 56 00 Temporary Barriers and Enclosures
- 1.2 References
 - .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
 - .2 Reference Standards:
 - .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
 - .2 EPA General Construction Permit (GCP) 2012.
 - .3 Parks Canada Basic Impact Analysis
 - .1 All work must be conducted in accordance with the environmental mitigation measures documented in the Final Parks Canada Basic Impact Analysis for the Protection Mountain Campground Redevelopment (dated April 2016) and all associated Environmental Protection Plans for the project, as amended and approved in writing by Parks Canada.
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets as indicated and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
 - .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
 - .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
 - .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.

- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
 - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
 - .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
 - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
 - .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .13 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
 - .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
 - .15 Pesticide treatment plan to be included and updated, as required.

- 1.4 Fires
 - .1 Fires and burning of rubbish on site is not permitted.
- 1.5 Drainage
 - .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3.
 - .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
 - .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
 - .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
 - .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- 1.6 Site Clearing And Plant Protection
 - .1 Refer to Parks Canada Basic Impact Analysis for the Protection Mountain Campground Redevelopment (dated April 2016)
- 1.7 Work Adjacent To Waterways
 - .1 Refer to Parks Canada Basic Impact Analysis for the Protection Mountain Campground Redevelopment (dated April 20116)
- 1.8 Pollution Control
 - .1 Maintain temporary erosion and pollution control features installed under this Contract.
 - .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
 - .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where indicated or directed by Departmental Representative.
 - .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for all roads that Contractor uses/
- 1.9 Historical/Archaeological Control
 - .1 Refer to Parks Canada Cultural Resource Impact Analysis (CRIA) and provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures

to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.10 Notification

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Cleaning
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
 - .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 Related Requirements

1.2 References And Codes

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

1.3 Hazardous Material Discovery

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative. Refer to Section 02 82 00.01 - Asbestos Abatement - Minimum Precautions.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative. Refer to Section 02 84 00 - Polychlorinate Biphenyl Remediation.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative. Refer to Section 02 85 00.01 - Mould Remediation - Minimum Precautions 02 85 00.02 Mould Remediation - Intermediate Precautions - Intermediate Precautions 02 85 00.03 - Mould Remediation - Maximum Precautions.
- .4 Lead Based Paint: demolition of lead based paint is hazardous to health. Stop work immediately when material resembling lead based paint is encountered during demolition work. Notify Departmental Representative. Refer to Section 2 83 00.01 – Lead Based Paint Abatement - Minimum Precautions.

1.4 Building Smoking Environment

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

1.5 National Parks Act

- .1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.

Part 2 Products

2.1 Not Used

- .1 Not Used.

Part 3 Execution

3.1 Not Used

.1 Not Used.

END OF SECTION

Approved: 2006-09-30

Part 1 General

- 1.1 Related Requirements
- 1.2 References
- 1.3 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 part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.
- 1.4 Independent Inspection Agencies
 - .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
 - .2 Provide equipment required for executing inspection and testing by appointed agencies.
 - .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
 - .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.
- 1.5 Access To Work
 - .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
 - .2 Co-operate to provide reasonable facilities for such access.
- 1.6 Procedures
 - .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- 1.7 Rejected Work
- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
 - .2 Make good other Contractor's work damaged by such removals or replacements promptly.
 - .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.
- 1.8 Reports
- .1 Submit 4 copies of inspection and test reports to Departmental Representative.
 - .2 Provide copies to subcontractor of work being inspected or tested.
- 1.9 Tests And Mix Designs
- .1 Furnish test results and mix designs as requested.
 - .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.
- 1.10 Mock-Ups
- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
 - .2 Construct in locations as specified in specific Section or acceptable to Departmental Representative.
 - .3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
 - .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .5 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.
 - .6 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.11 Equipment And Systems

- .1 Submit adjustment and balancing reports for mechanical, electrical and potable water systems.

Part 2 Products

2.1 Not Used

- .1 Not Used.

Part 3 Execution

3.1 Not Used

- .1 Not Used.

END OF SECTION

Approved: 2013-06-30

Part 1 General

- 1.1 Precedence
 - .1 For Federal Government Projects, Division 01 Sections take precedence over technical specifications in other Divisions of this Project Manual.
- 1.2 Related Requirements
- 1.3 References
 - .1 CSA Group
 - .1 CAN/CSA-B45.0 Series-02(R2008), Plumbing Fixtures.
 - .2 Environmental Choice Program
 - .1 CCD-016-97(R2005), Thermal Insulation Materials.
 - .2 CCD-020-95(R2007), Gypsum Wallboard.
 - .3 CCD-029-96, Water Conserving Products.
 - .4 CCD-045-95, Sealant and Caulking Compounds.
 - .5 CCD-046-95, Adhesives.
 - .3 Green Seal Environmental Standards (GS)
 - .1 GS-03-97, Environmental Criteria for Anti-Corrosive Paints.
 - .2 GS-11-11, Standard for Paints and Coatings.
- 1.4 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures. Indicate VOC emissions, prior to installation or use:
 - .1 Adhesives.
 - .2 Caulking compounds.
 - .3 Sealants.
 - .4 Insulating materials.
 - .5 Paints.
 - .6 Floor and wall patching or levelling materials.
 - .7 Lubricants.
 - .3 Construction Schedule:
 - .1 Submit schedule of construction prior to start of work, in co-ordination with scheduling requirements, including:
 - .1 Sequence of finish applications and allowances for curing times.
 - .2 Identification of finish types. See Table A
 - .3 Schedule and duration of proposed temporary ventilation.

- .4 Delivery schedules of manufactured materials which are anticipated to off-gas in timely manner, which will allow for airing of those materials prior to their scheduled installation.
- .5 Indicate and schedule commissioning procedures and temporary usages of building mechanical systems, identifying types of filtration and schedule for filter replacement.

1.5 Hazardous Materials

- .1 Follow methods and procedures specified in Section 02 81 01 - Hazardous Materials.
- .2 Take measures to ensure chemical spills do not enter drains.
- .3 Provide proper storage and containment of herbicides and indoor pesticides.
 - .1 Design and construction of storage spaces for hazardous materials in accordance with authorities having jurisdiction.
 - .2 Include ventilation of areas, which contain potential sources of air contamination.
 - .1 Comply with standards for storage of flammable, combustible and hazardous materials, explosives, compressed gas cylinders, and reactive, corrosive and oxidizing materials.
 - .3 Storage conditions, ventilation requirements, construction materials storage areas, containers, drums and tanks, compatibility issues, and labelling: in accordance with federal and municipal guidelines supplemented as follows:
 - .1 Confine storage of chemicals and hazardous wastes to designated areas with security of access.
 - .2 Ensure access to hose bib and water for mixing concentrated chemicals.
 - .3 Include containment to prevent spills from entering drains.
 - .4 Include venting to exterior.
 - .5 Keep storage areas under negative pressure, where possible.

1.6 Site Management

- .1 Enhancing ecological value of site by prevention of soil erosion, reestablishment of vegetation, and appropriate site drainage.

1.7 Erosion And Sedimentation Control

- .1 Follow methods and procedures specified in Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Establish long-term soil stabilization program as indicated.
- .3 Develop an Erosion and Sedimentation Control Plan to control stormwater runoff and other erosion measures.
- .4 Protect stockpiled topsoil.

1.8 Reducing Site Disturbances

- .1 When building is on a previously undeveloped site comply with following requirements:

- .1 Avoid major alterations to sensitive topography, vegetation and wildlife habitat in areas indicated.
 - .2 Create traffic patterns, that cause minimum site disruptions, as per Departmental Representative's approval.
 - .2 Minimize disturbances to watershed using site water management measures to ensure that watersheds and groundwater will be preserved.
 - .3 Construct and erect erosion barriers to locations indicated and as directed by Departmental Representative.
 - .4 Take measures to avoid soil compaction.
 - .5 Re-grade in accordance with Section 31 22 13 - Rough Grading.
- 1.9 Building Envelope
- .1 Include insulation to optimize reduction of heat losses or heat gains through building envelope.
 - .2 Maintain integrity of building envelope using air barriers and vapour retarders and avoid thermal bridging to provide thermal comfort and prevent condensation.
 - .1 Air leakage through air barrier system within roof area: not to exceed 0.15 l/s*m2 @ 75 Pa.
 - .2 Air leakage through air barrier system within roof area: not to exceed 0.15 l/s*m2 @ 75 Pa.
 - .3 Air leakage through air barrier system within area of exterior walls (excluding window): not to exceed 0.30 l/s*m2 @ 75 Pa.
 - .4 Air leakage through floor: not to exceed 0.10 l/s*m2 @ 75 Pa.
 - .5 Air leakage through windows: not to exceed limits specified in AAMA/WDMA/CSA 101/I.S.2/A440.
- 1.10 General Construction Materials/Practices
- .1 Materials and Resources
 - .1 Use uncontaminated demolition materials for fill and hardcore and/or granular base.
 - .2 Incorporate reused building materials as indicated.
 - .3 Use products and services that meet criteria of EcoLogo guidelines.
 - .4 Provide list of non-endorsed products and services, provided the green labelled product or services are capable of meeting specified performance requirements.
 - .2 Construction Waste Management
 - .1 Follow recommendations and requirements of this projects construction, renovation and demolition (CRD) waste management plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
 - .2 Resource Reuse.
 - .3 Recycled Content
 - .1 Use materials with post-consumer and post-industrial recycled content.

- 1.11 Ceilings
 - .1 Utilize ceiling tiles (panels) that:
 - .1 Comply with CAN/CGSB-92.1.
 - .2 Have noise reduction coefficient (NRC) of at least 0.50 when tested on E400 mounting in accordance with CAN/CGSB-92.1.
 - .3 Contain, when calculated on 12-month rolling average:
 - .1 Over 75% recycled material by weight of finished product, if made from cellulose fibre.
 - .2 Over 35% recycled material by weight of finished product if made from glass fibre or mineral composition.
- 1.12 Paints, Stains, And Varnishes
 - .1 Use paints and coatings with VOC limits to CCD-047.
- 1.13 Sealants, Adhesives And Compounds
 - .1 Use adhesives with VOC limits to CCD-046.
 - .2 Use sealant products with VOC limits to CCD-045.
- 1.14 Lighting
 - .1 Integrate lighting controls as specified related to room occupancy, circulation space, day-lighting, and number of work stations (in office areas) using motion activated on/off controls.
 - .2 Lighting Fixtures
 - .1 Include LED lamps and luminaries with electronic ballasts. Lamps and luminaries to have following requirements:
 - .1 Fit electronic ballasts to luminaries.
 - .2 Include personal controls as indicated.
- 1.15 Plumbing Fixtures
 - .1 Water Efficiency
 - .1 Include showerheads, kitchen and bathroom faucets with low flow models aerators.
 - .2 Water Use Reduction
 - .1 Use electronic sensor faucet.
 - .2 Include low flow pressure assist toilets to CAN/CSA-B45.0, maximum 6 Litres/flush.
- 1.16 Elevators
 - .1 Supply and install high efficiency elevators.

1.17 Exterior Site

- .1 Take measures to prevent soil erosion before, during, and after construction by controlling storm-water runoff and wind erosion. Use:
 - .1 Detention ponds.
 - .2 Infiltration trench.
- .2 Landscape and Exterior Design
 - .1 Planting requirements: in accordance with Section 32 93 10 - Trees, Shrubs and Ground Cover Planting; Section 32 92 19 - Seeding.

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Not Used
 - .1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 Related Requirements

1.2 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.

1.3 Action And Informational Submittals

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

1.4 Installation And Removal

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

1.5 Dewatering

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.6 Water Supply

- .1 Drawing water directly from water courses is strictly prohibited.
- .2 Water from the onsite reservoir is gravity fed and will not provide enough flow where large volumes are required for construction purposes. However, this water is available for Contractor use where feasible.
- .3 Departmental Representative will provide supply of potable water for construction use.
 - .1 Potable supply is located at Parks Canada Agency's Lake Louise facility. Water is supplied at no cost to the Contractor.
 - .1 Contractor is responsible for costs associated with hauling and application of water for construction purposes.
 - .2 Contractor must supply a Double Check Valve Assembly (DCVA) when connecting to the Departmental Representative's facility above.
- .4 Departmental Representative will pay for utility charges at prevailing rates from Parks Canada Agency sites (campground and compound) only.

1.7 Temporary Heating And Ventilation

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
 - .4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress where necessary.
 - .5 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.
 - .6 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.
 - .7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.
- 1.8 Temporary Power And Light
- .1 Departmental Representative to provide power at each washroom building for the Contractor to utilize for construction, but cannot provide 3 phase power.
 - .2 Contractor to provide lighting.
 - .3 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
 - .4 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Departmental Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.9 Temporary Communication Facilities

- .1 Provide and pay for temporary telephone, fax, data hook up, lines, and equipment necessary for own use and use of Departmental Representative.

1.10 Fire Protection

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

Part 2 Products

2.1 Not Used

- .1 Not Used.

Part 3 Execution

3.1 Temporary Erosion And Sedimentation Control

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

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 Related Requirements

1.2 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/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003), 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 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

.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.

1.3 Action And Informational Submittals

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

1.4 Installation And Removal

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.5 Scaffolding

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, ladders and platforms.

- 1.6 Hoisting
 - .1 Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
 - .2 Hoists to be operated by qualified operator.
- 1.7 Site Storage/Loading
 - .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
 - .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.
- 1.8 Construction Parking
 - .1 Parking will be permitted on site provided it does not disrupt performance of Work.
 - .2 Provide and maintain adequate access to project site.
- 1.9 Security
 - .1 If required by Contractor provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.
- 1.10 Offices
 - .1 Provide office heated to 21 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
 - .2 Provide marked and fully stocked first-aid case in a readily available location.
 - .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- 1.11 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.
- 1.12 Sanitary Facilities
 - .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
 - .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.13 Construction Signage
 - .1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by Departmental Representative.
 - .2 Construction sign 2 x 3 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.

- .3 Indicate on sign, name of Owner, Consultant, Contractor, of design style established by Departmental Representative.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.
- .5 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.14 Protection And Maintenance Of Traffic

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

1.15 Clean-Up

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

- 2.1 Not Used
- .1 Not Used.

Part 3 Execution

- 3.1 Temporary Erosion And Sedimentation Control
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to 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.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- 3.2 Construction Access
 - .1 Provide traffic control/signage plan for construction traffic accessing to/from Highway 1A.

END OF SECTION

Approved: 2006-03-31

Part 1 General

- 1.1 Related Requirements
 - .1 Section 01 74 21 - Construction/Demolition Waste Management And Disposal
- 1.2 References
 - .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.
- 1.3 Installation And Removal
 - .1 Provide temporary controls in order to execute Work expeditiously.
 - .2 Remove from site all such work after use.
- 1.4 Hoarding
 - .1 Erect temporary site enclosure using 2.0m high steel modular fencing intended for construction hoarding. Provide minimum one lockable truck gate.
 - .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
 - .1 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Maintain fence in good repair.
- 1.5 Dust Tight Screens
 - .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
 - .2 Maintain and relocate protection until such work is complete.
- 1.6 Access To Site
 - .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- 1.7 Public Traffic Flow
 - .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.
- 1.8 Fire Routes
 - .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

- 1.9 Protection For Off-Site And Public Property
 - .1 Protect surrounding private and public property from damage during performance of Work.
 - .2 Be responsible for damage incurred.
- 1.10 Protection Of Building Finishes
 - .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
 - .2 Provide necessary screens, covers, and hoardings.
 - .3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.
 - .4 Be responsible for damage incurred due to lack of or improper protection.
- 1.11 Waste Management And Disposal
 - .1 Separate waste materials for reuse and/or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- Part 2 Products**
- 2.1 Not Used
 - .1 Not Used.
- Part 3 Execution**
- 3.1 Not Used
 - .1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 Related Requirements

1.2 References

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 Quality

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

1.4 Availability

- .1 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling And Protection

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber 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.
- .2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.7 Manufacturer's Instructions

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

1.8 Quality Of Work

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
 - .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.
- 1.9 Co-Ordination
- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- 1.10 Concealment
- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
 - .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.
- 1.11 Remedial Work
- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
 - .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.
- 1.12 Location Of Fixtures
- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
 - .2 Inform Departmental Representative of conflicting installation. Install as directed.
- 1.13 Fastenings
- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
 - .2 Prevent electrolytic action between dissimilar metals and materials.
 - .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
 - .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
 - .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
 - .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 Fastenings - Equipment

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

1.15 Protection Of Work In Progress

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

1.16 Existing Utilities

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

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Not Used
 - .1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

- 1.1 Related Requirements
- 1.2 References
- 1.3 Qualifications Of Surveyor
 - .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Departmental Representative.
- 1.4 Survey Requirements
 - .1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
 - .2 Establish lines and levels, locate and lay out, by instrumentation.
 - .3 Stake for grading, fill and topsoil placement and landscaping features.
 - .4 Stake slopes and berms.
 - .5 Establish pipe invert elevations.
 - .6 Establish floor elevations.
 - .7 Establish lines and levels for mechanical and electrical work.
- 1.5 Existing Services
 - .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
 - .2 Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.
- 1.6 Existing Septic Fields
 - .1 Before commencing work, establish location and extent of septic fields in area of Work and notify Departmental Representative of findings.
 - .1 Submit field drawings to indicate position of septic fields when required by Departmental Representative.
 - .2 Maintain and protect from all construction activities septic fields in place, and notify Departmental Representative, in writing, of any conflicts between septic field locations and parking areas, roadways, trails or any other non-vegetated improvements prior to commencing with work.
 - .1 Modify as directed by Departmental Representative.

- 1.7 Location Of Equipment And Fixtures
 - .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
 - .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
 - .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
 - .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.
- 1.8 Records
 - .1 Maintain a complete, accurate log of control and survey work as it progresses.
 - .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
 - .3 Record locations of maintained, re-routed and abandoned service lines.
- 1.9 Action And Informational Submittals
 - .1 Submit name and address of Surveyor to Departmental Representative.
 - .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- 1.10 Subsurface Conditions
 - .1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
 - .2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Not Used
 - .1 Provide a set of full size drawings on site specifically to mark it up with redlines to provide to consultant for As-Built purposes..

END OF SECTION

Approved: 2006-03-31

Part 1 General

- 1.1 Related Requirements
 - .1 Section 01 33 00 - Submittal Procedures
 - .2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal
- 1.2 Action And Informational Submittals
 - .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 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 Owner or separate contractor.
 - .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.
- 1.3 Materials
 - .1 Required for original installation.
 - .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4 Preparation
 - .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
 - .2 After uncovering, inspect conditions affecting performance of Work.
 - .3 Beginning of cutting or patching means acceptance of existing conditions.
 - .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
 - .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

- 1.5 Execution
 - .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
 - .2 Fit several parts together, to integrate with other Work.
 - .3 Uncover Work to install ill-timed Work.
 - .4 Remove and replace defective and non-conforming Work.
 - .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
 - .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
 - .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
 - .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
 - .9 Restore work with new products in accordance with requirements of Contract Documents.
 - .10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 - .11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
 - .12 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.
- 1.6 Waste Management And Disposal
 - .1 Separate waste materials for reuse and / or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Not Used
 - .1 Not Used.

END OF SECTION

Part 1 General

1.1 Related Requirements

1.2 References

1.3 Project Cleanliness

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including other than that caused by Owner.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Dispose of waste materials and debris off site.
- .6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .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. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 Final Cleaning

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors, partitions and countertops.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .16 Sweep and wash clean paved areas.
- .17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .18 Clean roofs, downspouts, and drainage systems.
- .19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

Part 2 Products

- 2.1 Not Used
- .1 Not Used.

Part 3 Execution

- 3.1 Not Used
- .1 Not Used.

END OF SECTION

Approved: 2009-06-30

Part 1 General

1.1 Related Requirements

1.2 References

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 Administrative Requirements

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

1.4 Final Cleaning

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

Part 2 Products

2.1 Not Used
 .1 Not Used.

Part 3 Execution

3.1 Not Used
 .1 Not Used.

END OF SECTION

Approved: 2009-06-30

Part 1 General

- 1.1 Related Requirements
- 1.2 References
- 1.3 Administrative Requirements
 - .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative, and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements manufacturer's installation instructions.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.
- 1.4 Action And Informational Submittals
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
 - .3 Provide evidence, if requested, for type, source and quality of products supplied.
- 1.5 Format
 - .1 Organize data as instructional manual.
 - .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
 - .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
 - .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
 - .5 Arrange content under Section numbers and sequence of Table of Contents.

- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
 - .7 Text: manufacturer's printed data, or typewritten data.
 - .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
 - .9 Contractor to provide red-line markups to Consultant.
- 1.6 Contents - Project Record Documents
- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
 - .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
 - .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
 - .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
 - .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- 1.7 As -Built Documents And Samples
- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
 - .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
 - .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
 - .5 Keep record documents and samples available for inspection by Departmental Representative.
- 1.8 Recording Information On Project Record Documents
- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative .
 - .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
 - .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
 - .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
 - .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
 - .6 Other Documents: maintain field test records, required by individual specifications sections.
 - .7 Provide digital photos for site records.
- 1.9 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.

- 1.10 Equipment And Systems
 - .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
 - .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed colour coded wiring diagrams.
 - .4 Include manufacturer's printed operation and maintenance instructions.
 - .5 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .6 Additional requirements: as specified in individual specification sections.
- 1.11 Materials And Finishes
 - .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .4 Additional requirements: as specified in individual specifications sections.
- 1.12 Delivery, Storage And Handling
 - .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
 - .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
 - .3 Store components subject to damage from weather in weatherproof enclosures.
 - .4 Store paints and freezable materials in a heated and ventilated room.
 - .5 Remove and replace damaged products at own expense and for review by Departmental Representative.
- 1.13 Warranties And Bonds
 - .1 Develop warranty management plan to contain information relevant to Warranties.
 - .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
 - .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.
- .9 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include: roofs.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.
- 1.14 Warranty Tags
 - .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.
 - .2 Attach tags with copper wire and spray with waterproof silicone coating.
 - .3 Leave date of acceptance until project is accepted for occupancy.
 - .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Not Used
 - .1 Not Used.

END OF SECTION

Part 1 General

1.1 Related Requirements

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 74 21 – Construction/Demolition Waste Management Disposal.
- .3 Section 31 23 33.01 Excavating, Trenching and Backfilling.

1.2 References

.1 Definitions:

- .1 Demolition: rapid destruction of building following removal of hazardous materials.
- .2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.
- .3 Waste Audit (WA): detailed inventory of materials in building. Indicates quantities of reuse, recycling and landfill.
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .2 Indicates quantities of reuse, recycling and landfill.
- .4 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .5 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

.2 Reference Standards:

- .1 Canadian Council of Ministers of the Environment (CCME)
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.3 Administrative Requirements

.1 Site Meetings.

- .1 Convene pre-demolition meeting one week prior to beginning work of this Section in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart 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.
 - .2 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.
 - .3 Hold project meetings every week.
 - .4 Ensure key personnel attend.
 - .5 Departmental Representative will provide written notification of change of meeting schedule established upon contract award 24 hours prior to scheduled meeting.
 - .2 Scheduling: meet project time lines without compromising specified minimum rates of material diversion.
 - .1 Notify Departmental Representative in writing when unforeseen delays occur.
- 1.4 Action And Informational Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province Alberta, Canada.
 - .2 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.
 - .3 Hazardous Materials:
 - .1 Provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.
 - .4 Certificates:
 - .1 Submit certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
 - .2 Written authorization from Departmental Representative is required to deviate from facilities and receiving organizations listed in Waste Reduction Workplan.
 - .5 Sustainable Design Submittals:
 - .1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.
- 1.5 Quality Assurance
- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Federal regulations.

- 1.6 Delivery, Storage And Handling
 - .1 Store and manage hazardous materials in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Storage and Protection.
 - .1 Protect in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
 - .2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.
 - .3 Remove and store materials to be salvaged, in manner to prevent damage.
 - .4 Store and protect in accordance with requirements for maximum preservation of material.
 - .5 Handle salvaged materials as new materials.
 - .3 Develop Construction Waste Management Plan related to Work of this Section.
- 1.7 Site Conditions
 - .1 Site Environmental Requirements.
 - .1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout the project.
 - .4 Do not pump any water into watercourses, storm or sanitary sewers or onto adjacent properties.
 - .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities and as directed by Departmental Representative.
 - .6 Protect trees, plants and foliage on site and adjacent properties where indicated.

Part 2 Products

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

Part 3 Execution

3.1 Preparation

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect and Cap Mechanical Services.
 - .1 Other Underground Services: remove and dispose of as directed by Departmental Representative.

3.2 Removal Of Hazardous Wastes

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

3.3 Removal Operations

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Removal of pavements, curbs and gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
 - .2 Protect adjacent joints and load transfer devices.
- .4 Remove as many trees as required during demolition.
 - .1 Obtain written approval of Departmental Representative prior to removal of trees not designated.
- .5 Prior to tree removal the Owner reserves the right to collect trees for removal and identified by Departmental Representative to be healthy.
 - .1 Grind, chip, or shred other vegetation for mulching and composting, to be delivered to the Lake Louise Waste Water Treatment Plant.
- .6 Stockpile topsoil for final grading and landscaping:
 - .1 Provide erosion control and seeding if not immediately used.
- .7 Salvage:
 - .1 Dismantle items containing materials for salvage and stockpile salvaged materials at locations.
- .8 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site at authorized facilities approved in Waste Reduction Workplan.
 - .2 Trim disposal areas to approval of Departmental Representative.

- .9 Backfill:
 - .1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- 3.4 Stockpiling
 - .1 Label stockpiles, indicating material type and quantity.
 - .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
 - .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
 - .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
- 3.5 Removal From Site
 - .1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.
 - .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
 - .3 Transport material designated for alternate disposal using approved receiving organizations in accordance with applicable regulations.
 - .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
 - .1 Disposal Facilities: to be disposed of at approved (by others) facilities.
- 3.6 Restoration
 - .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work.
 - .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- 3.7 Cleaning
 - .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
 - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.8 Protection

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

END OF SECTION

Approved: 2010-12-31

Part 1 General

1.1 Related Requirements

- .1 Section 01 31 19 - Project Meetings.
- .2 Section 01 35 43 - Environmental Procedures
- .3 Section 01 74 21 - Construction/Demolition Waste Management Disposal

1.2 References

- .1 Definitions:
 - .1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly.
 - .2 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.
 - .3 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.
 - .4 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.
- .2 Reference Standards:
 - .1 Canadian Environmental Protection Act (CEPA)
 - .1 CCME PN 1326-2008, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
 - .2 CSA International
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
 - .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
 - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
 - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S660-08, Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids.
 - .2 ULC/ORD-C58.15-1992, Overfill Protection Devices for Flammable Liquid Storage Tanks.
 - .3 ULC/ORD-C58.19-1992, Spill Containment Devices for Underground Flammable Liquid Storage Tanks.
- .5 U.S. Environmental Protection Agency (EPA)
 - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
 - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
 - .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Administrative Requirements

- .1 Pre-Installation Meetings:
 - .1 Convene pre-installation meeting 1 week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work.
 - .3 Co-ordination with other construction subtrades.
 - .2 Ensure key personnel attend.
 - .3 WMC must provide written report on status of waste diversion activity at each meeting.
 - .4 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .2 Scheduling:
 - .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
 - .1 In event of unforeseen delay notify Departmental Representative in writing.

1.4 Action And Informational Submittals

- .1 Submit in accordance with Section 01 74 21 - Construction/Demolition Waste Management Disposal.
- .2 WMC is responsible for fulfilment of reporting requirements.
- .3 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal and indicate:

- .1 Descriptions of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.
 - .2 Schedule of selective demolition.
 - .3 Number and location of dumpsters.
 - .4 Anticipated frequency of tipping.
 - .5 Name and address of waste receiving organizations.
- .4 Submit receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
 - .1 Written authorization from Departmental Representative is required to deviate from receiving organizations listed in Waste Reduction Workplan.
- .5 Shop Drawings:
 - .1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.
 - .2 Submit demolition drawings stamped and signed by professional engineer registered or licensed in Province Alberta, Canada.
- .6 Sustainable Design Submittals:
 - .1 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with authorities having jurisdiction.
- 1.5 Quality Assurance
 - .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations.
- 1.6 Site Conditions
 - .1 Environmental protection:
 - .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Fires and burning of waste or materials is not permitted on site.
 - .4 Do not bury rubbish waste materials.
 - .5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout project.
 - .6 Do not pump water into watercourses, storm or sanitary sewers, or onto adjacent properties.
 - .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction.
 - .8 Protect trees, plants and foliage on site and adjacent properties where indicated.

- .9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.7 Existing Conditions

- .1 If material resembling spray or trowel applied asbestos or other substance listed as hazardous be encountered in course of demolition, stop work, take preventative measures, and notify Departmental Representative immediately. Proceed only after receipt of written instructions have been received from Departmental Representative.
- .2 Structures to be demolished are based on their condition on date that tender is accepted,
 - .1 Remove, protect and store salvaged items as directed by Departmental Representative. Salvage items as identified by Departmental Representative. Deliver to Departmental Representative as directed.

Part 2 Products

2.1 Equipment

- .1 Equipment and heavy machinery:
 - .1 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations and CEPA-SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
 - .2 Off-road vehicles to: EPA CFR 86.098-10 and EPA CFR 86.098-11.
- .2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 Preparation

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction and 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.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of in-place conditions:

- .1 Work in accordance with Section 01 35 43 - Environmental Procedures and Erosion and Sedimentation Control Plan.
 - .2 Prevent movement, settlement or damage of adjacent structures, trees, landscaping, adjacent grades.
 - .1 Repair damage caused by demolition as directed by Departmental Representative.
 - .3 Support affected structures and, if safety of structure being demolished adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
 - .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
- .3 Surface Preparation:
- .1 Disconnect electrical and telephone service lines entering buildings to be demolished.
 - .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
 - .2 Disconnect and cap mechanical services.
 - .1 Other underground services: remove and dispose of as directed by Departmental Representative.
 - .3 Underground storage tanks and piping: remove and dispose in accordance with as directed.
 - .4 Do not disrupt active or energized utilities designated to remain undisturbed.
 - .5 Remove rodent and vermin as required by Departmental Representative.
- 3.2 Demolition
- .1 Do demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .2 Blasting operations not permitted during demolition without permission from Departmental Representative.
 - .3 Do blasting operations in accordance with CSA S350.
 - .4 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
 - .5 Prior to start of Work remove contaminated or hazardous materials as defined by authorities having jurisdiction from site and dispose of TDGA and other applicable requirements Section 02 81 01 - Hazardous Materials. SPEC NOTE: Include removal of equipment and services, if applicable.
 - .6 Demolish structures.
 - .7 Crush concrete generated due to demolition of foundations to be disposed of.
 - .8 Demolish foundation walls and footings, and concrete floors below or on grade within areas of new construction.

- .9 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .10 At end of each day's work, leave Work in safe and stable condition.
- .11 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .12 Demolish masonry and concrete walls.
- .13 Remove structural framing.
- .14 Contain fibrous materials to minimize release of airborne fibres while being transported within facility.
- .15 Only dispose of material specified by selected alternative disposal option as directed by Departmental Representative.
 - .1 Additional disposal options to be provided by Departmental Representative on-site waste diversion representative prior to disposal.
- .16 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- .17 Remove following materials and equipment, store, protect, and leave ready for installation by other sections of Work:
 - .1 Telephone + booth.
- .18 Use natural lighting to do Work where possible.
 - .1 Shut off lighting except those required for security purposes at end of each day.

3.3 Cleaning

- .1 Develop Construction Waste Management Plan related to Work of this Section
- .2 Divert excess materials from landfill to site certified to accept that type of waste.
- .3 Designate appropriate security resources / measures to prevent vandalism, damage and theft.
- .4 Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.
- .5 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
 - .1 Label stockpiles, indicating material type and quantity.
- .6 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.
- .7 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .8 Transport material designated for alternate disposal using approved receiving organizations listed in Waste Reduction Workplan and in accordance with applicable regulations.

- .1 Written authorization from Departmental Representative is required to deviate from receiving organizations listed in Waste Reduction Workplan.
- .9 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
 - .1 Disposal facilities must be those approved of and listed in Waste Reduction Workplan.
 - .2 Written authorization from Departmental Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

END OF SECTION

Approved: 2009-12-31

Part 1 General

1.1 Related Requirements

1.2 References

.1 Definitions:

- .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.2 Reference Standards:

- .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
- .2 Department of Justice Canada (Jus)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).
 - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
 - .2 GS-36-00, Commercial Adhesives.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 National Research Council Canada Institute for Research in Construction (NRC-IRC)
 - .1 National Fire Code of Canada-2005.

.3 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

- .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
- .2 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.3 Action And Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.
- .3 Low-Emitting Materials: submit listing of adhesives and sealants, and paints and coatings used in building, comply with VOC and chemical component limits or restrictions requirements.

1.4 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
 - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
 - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
 - .5 Transfer of flammable and combustible liquids is prohibited within buildings.
 - .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
 - .7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
 - .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
 - .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

- .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
 - .6 Store hazardous materials and wastes in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
 - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
 - .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .12 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

Part 2 Products

2.1 Materials

- .1 Description:
 - .1 Bring on site only quantities hazardous material required to perform Work.
 - .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
 - .3 Sustainability Characteristics:
 - .1 Adhesives and Sealants in accordance with Section 07 92 00 - Joint Sealants
 - .1 Adhesives and Sealants to SCAQMD Rule 1168 or to GS-36.
 - .2 Primers, Paints, Coatings in accordance with manufacturer's recommendations for surface conditions and Section 09 91 23 - Interior Painting, 09 91 23.01 - Interior Re-Painting.
 - .1 Primer: maximum VOC limit to GS-11.
 - .2 Paints: maximum VOC limit to GS-11.
 - .3 Coatings: maximum VOC limit to SCAQMD Rule 1113.

Part 3 Execution

3.1 Cleaning

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

END OF SECTION

Part 1 General

1.1 Summary

- .1 Comply with requirements of this Section when performing following work:
 - .1 Removing ceiling tiles that are asbestos-containing material, if the tiles cover an area less than 7.5 square metres and are removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
 - .2 Break, cut, grind, sand, drill, scrape, vibrate or abrade non-friable asbestos containing materials using non-powered hand-held tools, and the material is wetted to control the spread of dust or fibres.
 - .3 Removing less than one square metre of drywall in which joint-filling compounds that are asbestos containing materials have been used.

1.2 Related Requirements

- .1 Section 01 31 19 – Project Meetings.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 29.06 – Health and Safety Requirements
- .4 Section 01 35 43 – Environmental Procedures
- .5 Section 01 74 21 – Construction/Demolition Waste Management Disposal

1.3 References

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 Definitions

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: water with nonionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.
- .5 Authorized Visitors: Engineers, Consultants or designated representatives, and representatives of regulatory agencies.
- .6 Competent worker: in relation to specific work, means a worker who:

- .1 Is qualified because of knowledge, training and experience to perform the work.
- .2 Is familiar with the provincial laws and with the provisions of the regulations that apply to the work.
- .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .7 Friable material: means material that:
 - .1 When dry, can be crumbled, pulverized or powdered by hand pressure, or
 - .2 is crumbled, pulverized or powdered.
- .8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.
- .10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.
- 1.5 Action And Informational Submittals
 - .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.
 - .3 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
 - .4 Submit proof of Contractor's Asbestos Liability Insurance.
 - .5 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.
 - .6 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.
 - .7 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.
- 1.6 Quality Assurance
 - .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.
 - .2 Health and Safety:

- .1 Perform construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Safety Requirements: worker protection.
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
 - .1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include suitable footwear, and to be repaired or replaced if torn.
 - .2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
 - .3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.
 - .4 Facilities for washing hands and face shall be provided by the contractor.
 - .5 Ensure workers wash hands and face when leaving Asbestos Work Area.
 - .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

1.7 Waste Management And Disposal

- .1 Separate waste materials for 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 packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for recycling and place in designated containers in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .7 Fold up metal banding, flatten and place in designated area for recycling.
- .8 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mils bags or leak proof drums. Label containers with appropriate warning labels.
- .9 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 Existing Conditions

- .1 Reports and information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project are available for inspection bound into this specification at back.
- .2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

1.9 Personnel Training

- .1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, following minimum requirements:
 - .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by a competent, qualified person.

Part 2 Products

2.1 Materials

- .1 Drop Sheets:
 - .1 Polyethylene: 0.15 mm thick.
 - .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.
- .3 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
 - .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.
 - .3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.
- .4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.
- .5 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

Part 3 Execution

3.1 Procedures

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Before beginning Work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.
 - .1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.
 - .2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
 - .3 Do not use compressed air to clean up or remove dust from any surface.
- .3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
 - .1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.
- .4 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.

- .1 Use garden reservoir type low - velocity fine - mist sprayer.
- .2 Perform Work to reduce dust creation to lowest levels practicable.
- .3 Work will be subject to visual inspection and air monitoring.
- .4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
- .5 Frequently and at regular intervals during Work and immediately on completion of work:
 - .1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and
 - .2 Drop sheets to be wetted and placed in a waste container as soon as practicable.
- .6 Cleanup:
 - .1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.
 - .2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.
 - .3 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.
 - .4 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

END OF SECTION

Approved: 2006-09-30

Part 1 General

1.1 Related Requirements

- .1 Section 03 20 00 Concrete Reinforcing
- .2 Section 03 30 00 Cast in Place Concrete
- .3 Section 07 92 00 - Joint Sealants

1.2 References

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121-M1978(R2003), Douglas Fir Plywood.
 - .4 CSA O151-04, Canadian Softwood Plywood.
 - .5 CSA O153-M1980(R2003), Poplar Plywood.
 - .6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.
 - .7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
 - .8 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
 - .9 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 Action And Informational Submittals

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

1.4 Delivery, Storage And Handling

- .1 Waste Management and Disposal:
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Divert plastic materials from landfill to a recycling facility as approved by Departmental Representative.
 - .3 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

Part 2 Products

2.1 Materials

- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series, or CSA-O153.
 - .2 Rigid insulation board: to CAN/ULC-S701.
- .2 Form ties:
 - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
- .3 Form liner:
 - .1 Plywood: high density overlay, medium density overlay Douglas Fir to CSA O121. Thickness as required to maintain tolerances.
- .4 Form release agent: non-toxic, biodegradable, low VOC.
- .5 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110s Saybolt Universal at 40 degrees C, flashpoint minimum 150 degrees C, open cup.
- .6 Falsework materials: to CSA-S269.1.
- .7 Sealant: to Section 07 92 00 - Joint Sealants.

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 Obtain Departmental Representative approval for use of earth forms framing openings not indicated on drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .8 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .9 Align form joints and make watertight.

- .1 Keep form joints to minimum.
- .10 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .11 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .12 Construct forms for architectural concrete, and place ties as directed.
 - .1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .13 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .14 Line forms for following surfaces:
 - .1 Outer face of outside walls, curbs and vertical edge of bridge sidewalk slab.
 - .2 Exposed faces of abutments, wingwalls, piers and pylons: do not stagger joints of form lining material and align joints to obtain uniform pattern.
 - .3 Secure lining taut to formwork to prevent folds.
 - .4 Pull down lining over edges of formwork panels.
 - .5 Ensure lining is new and not reused material.
 - .6 Ensure lining is dry and free of oil when concrete is poured.
 - .7 Application of form release agents on formwork surface is prohibited where drainage lining is used.
 - .8 If concrete surfaces require cleaning after form removal, use only pressurized water stream so as not to alter concrete's smooth finish.
 - .9 Cost of textile lining is included in price of concrete for corresponding portion of Work.
- .15 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 Removal And Reshoring

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 2 days for walls and sides of beams.
 - .2 7 days for beam soffits, slabs, decks and other structural members, or 2 days when replaced immediately with adequate shoring to standard specified for falsework.
 - .3 2 days for footings and abutments.
- .2 Remove formwork when concrete has reached 75 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .4 Space reshoring in each principal direction at not more than 3000 mm apart.

- .5 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Approved: 2009-12-31

Part 1 General

1.1 Related Requirements

- .1 Section 03 10 00 - Concrete Forming and Accessories
- .2 Section 03 30 00 - Cast in Place Concrete

1.2 References

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International
 - .1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .3 CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, 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 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

- .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
 - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3.
 - .1 Provide type unless otherwise indicated.
 - .4 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Departmental Representative prior to its use.
- 1.4 Quality Assurance
 - .1 Submit as described in PART 2 - SOURCE QUALITY CONTROL.
 - .1 Upon request 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 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 Substitute different size bars only if permitted in writing by Departmental Representative.
 - .2 Reinforcing steel: billet steel, grade 300, deformed bars to CSA-G30.18, unless indicated otherwise.
 - .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
 - .4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.
 - .5 Welded steel wire fabric: to ASTM A185/A185M.
 - .6 Welded deformed steel wire fabric: to ASTM A82/A82M.

- .7 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.
- .8 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m2.
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 In this case, no restriction applies to temperature of solution.
 - .4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.
 - .1 Provide product description as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .9 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .10 Mechanical splices: subject to approval of Departmental Representative.
- .11 Plain round bars: to CSA-G40.20/G40.21.
- 2.2 Fabrication
 - .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2, SP-66.
 - .1 SP-66 unless indicated otherwise.
 - .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
 - .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
 - .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- 2.3 Source Quality Control
 - .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
 - .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

Part 3 Execution

3.1 Preparation

- .1 Galvanizing to include chromate treatment.
 - .1 Duration of treatment to be 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 Field Bending

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

3.3 Placing Reinforcement

- .1 Place reinforcing steel in accordance with CSA-A23.1/A23.2.
- .2 Use plain round bars as slip dowels in concrete.
 - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
 - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.
- .5 Protect paint coated portions of bars with covering during transportation and handling.

3.4 Field Touch-Up

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.5 Cleaning

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

END OF SECTION

Approved: 2011-06-30

Part 1 General

1.1 Related Requirements

- .1 Section 03 10 00 - Concrete Forming and Accessories
- .2 Section 03 20 00 - Concrete Reinforcing

1.2 References

- .1 Abbreviations and Acronyms:
 - .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
 - .1 Type GU, GUb and GUL - General use cement.
 - .2 Type MS and MSb - Moderate sulphate-resistant cement.
 - .3 Type MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 Type HE, HEb and HEL - High early-strength cement.
 - .5 Type LH, LHb and LHL - Low heat of hydration cement.
 - .6 Type HS and HSb - High sulphate-resistant cement.
 - .2 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%.
 - .3 GGBFS - Ground, granulated blast-furnace slag.
- .2 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-07, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .5 ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .6 ASTM D624-00(2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
 - .7 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

- .8 ASTM D1752-04a(2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 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 A283-06, Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- 1.3 Administrative Requirements
 - .1 Pre-installation Meetings: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart, convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel, site supervisor, Departmental Representative attend.
 - .1 Verify project requirements.
- 1.4 Action And Informational Submittals
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 At least 4 weeks prior to beginning Work, provide Departmental Representative with concrete mix design, aggregates and admixtures proposed for use in writing for approval.
 - .3 Provide testing results for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
 - .4 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
 - .5 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.
 - .6 Provide two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
- 1.5 Quality Assurance
 - .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
 - .2 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
 - .3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.

- .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
 - .4 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.
 - 1.6 Delivery, Storage And Handling
 - .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 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.
 - .2 Deviations to be submitted for review by Departmental Representative.
- Part 2 Products**
- 2.1 Design Criteria
 - .1 Alternative 1 - Performance : to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.
 - 2.2 Performance Criteria
 - .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.
 - 2.3 Materials
 - .1 Portland Cement: to CSA A3001, Type GU.
 - .2 Blended hydraulic cement: Type GUB to CSA A3001.
 - .3 Portland-limestone cement: Type GUL to CSA A23.1.
 - .4 Water: to CSA A23.1.
 - .5 Aggregates: to CSA A23.1/A23.2.
 - .6 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

- .7 Shrinkage compensating grout: premixed compound consisting of metallic or non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
 - .1 Compressive strength: 56 MPa at 28 days.
 - .2 Net shrinkage at 28 days: maximum 2%.
 - .8 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 56 MPa at 28 days.
 - .9 Curing compound: to CSA A23.1/A23.2 , Type 1-chlorinated rubber.
 - .10 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D1751.
 - .2 Sponge rubber: to ASTM D1752, Type I, firm grade.
 - .3 Standard cork: to ASTM D1752, Type II.
 - .11 Weep hole tubes: plastic.
- 2.4 Mixes
- .1 Alternative 1 - Performance Method for specifying concrete: to meet performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity: to CSA A223.1/A23.2
 - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
 - .3 Finishability: minimal amount of bleeding.
 - .4 Set time: 4 hours maximum.
 - .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: F-2.
 - .2 Compressive strength at 28days: 30 Mpa minimum.
 - .3 Intended application: bases for site furnishings and structures.
 - .4 Aggregate size 20mm maximum
 - .5 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .6 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

Part 3 Execution

3.1 Preparation

- .1 Obtain Departmental Representative written approval before placing concrete.

- .2 Provide 24 hours minimum notice prior to placing of concrete.
 - .3 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
 - .4 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
 - .5 Pumping of concrete will not be permitted.
 - .6 Ensure reinforcement and inserts are not disturbed during concrete placement.
 - .7 Prior to placing of concrete obtain Departmental Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.
 - .8 Protect previous Work from staining.
 - .9 Clean and remove stains prior to application for concrete finishes.
 - .10 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
 - .11 Do not place load upon new concrete until authorized by Departmental Representative.
- 3.2 Installation/Application
- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
 - .2 Sleeves and inserts:
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
 - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.
 - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.
 - .5 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
 - .3 Anchor bolts:
 - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
 - .1 Formed holes: 100 mm minimum diameter.
 - .2 Drilled holes: to manufacturers' recommendations.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

- .4 Set bolts and fill holes with epoxy grout.
- .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
 - .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.
 - .2 Install weep hole tubes and drains as indicated.
- .5 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .6 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.
 - .1 Schedule:
 - .2 Formed Surfaces
 - .1 Use procedures as reviewed by Departmental Representative to remove excess bleed water. Ensure surface is not damaged.
 - .2 Smooth rubbed finish: Remove the forms while the concrete is green, patch immediately, and complete the rubbing not later than the following day. Wet the surface and rub using a carborundum or similar abrasive brick until a uniform colour and texture are produce. Do not provide cement grout other than the paste drawn from the green concrete by the rubbing process.
 - .3 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .4 Use curing compounds compatible with applied finish on concrete surfaces.
 - .5 Finish concrete floor to CSA A23.1/A23.2 Class A
 - .6 Provide magnesium float finish for interior work, or broom finish for exterior work unless otherwise indicated.
 - .7 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.
- .7 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
 - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Install joint filler.
 - .4 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

3.3 Surface Tolerance

- .1 Concrete tolerance to CSA A23.1 Straightedge Method = +/-8mm.

3.4 Cleaning

- .1 Diver unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
- .2 Provide appropriate area on job site where concrete trucks can be safely washed.
- .3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Departmental Representative.
- .4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
- .5 Prevent admixtures and additive materials from entering drinking water supplies or streams.
- .6 Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.
- .7 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION

Approved: 2010-06-30

Part 1 General

1.1 Related Requirements

1.2 References

- .1 American National Standards Institute (ANSI)
 - .1 ANSI/HPVA HP-1-10, American National Standard for Hardwood and Decorative Plywood.
 - .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Quality Standards, 1st edition, 2009.
 - .3 ASTM International
 - .1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3-M87, Hardboard.
 - .5 CSA International
 - .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O121-08, Douglas Fir Plywood.
 - .3 CSA O141-05(R2009), Softwood Lumber.
 - .4 CSA O151-09, Canadian Softwood Plywood.
 - .5 CSA O153-M1980(R2008), Poplar Plywood.
 - .6 CAN/CSA-Z809-08, Sustainable Forest Management.
 - .6 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
 - .7 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
 - .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- 1.3 Action And Informational Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for plywood, OSB, lumber, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
 - .3 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .4 Indicate materials, thicknesses, finishes and hardware.
- .3 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit duplicate 300 x 300 mm samples exterior lumber.
- .4 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
- .5 Sustainable Design Submittals:
 - .1 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants used in building, showing compliance with VOC and chemical component limits or restrictions requirements.
- 1.4 Quality Assurance
 - .1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
 - .2 Sustainable Standards Certification:
 - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.
 - .3 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
- 1.5 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood products from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 Materials

- .1 Softwood lumber: S4S or rough, to match existing, moisture content 19% or less in accordance with following standards:
 - .1 CSA O141.
 - .2 CAN/CSA-Z809 or FSC or SFI certified.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
 - .4 Machine stress-rated lumber is acceptable.
- .2 Panel Material: urea-formaldehyde free
 - .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

2.2 Accessories

- .1 Nails and staples: to CSA B111; galvanized to ASTM A123/A123M for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.
- .2 Wood screws: plain, type and size to suit application.
- .3 Splines: wood.
- .4 Adhesive and Sealants: in accordance with Section 07 92 00 - Joint Sealants.

Part 3 Execution

3.1 Examination

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

3.2 Installation

- .1 Do finish carpentry to Quality Standards of (AWMAC).
- .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 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.
- .3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

.5 Shelving:

- .1 Install shelving on ledgers.

3.4 Installation Of Trim

.1 Standing and running trim:

.1 Exterior:

- .1 Grade: Appearance Knotty.
- .2 Solid stock: Western Red Cedar species.

.2 Interior:

- .1 Grade: D and better clear.
- .2 Solid stock: Western Red Cedar species.

3.5 Installation Of Style And Rail Panelling

.1 Stile and rail panel types:

- .1 Solid wood.
- .2 Hardwood plywood.
- .3 Hardwood.

3.6 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 Protection

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by finish carpentry installation.

END OF SECTION

Approved: 2011-12-31

Part 1 General

1.1 Related Requirements

1.2 References

.1 Aluminum Association (AA)

- .1 DAF-45-R03, Designation System for Aluminum Finishes - 9th Edition.
- .2 ASM-35-October 2000, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.

.2 ASTM International

- .1 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A240/A240M-11a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .3 ASTM A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
- .5 ASTM B32-08, Standard Specification for Solder Metal.
- .6 ASTM B370-11, Standard Specification for Copper Sheet and Strip for Building Construction.
- .7 ASTM D523-89(2008), Standard Test Method for Specular Gloss.
- .8 ASTM D822-01(R2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
- .2 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
- .3 CAN/CGSB-51.32- M77, Sheathing, Membrane, Breather Type.
- .4 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.4 CSA International

- .1 CSA A123.3-05(2010), Asphalt Saturated Organic Roofing Felt.

.5 Department of Justice Canada (Jus)

- .1 Canadian Environmental Protection Act (CEPA), 1999.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

.7 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)

- .1 CCMC-2011, Registry of Product Evaluations.
 - .8 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA), 1992.
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for sheet metal roofing and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Proof of manufacturer's CCMC listing and listing number.
 - .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- 1.4 Quality Assurance
 - .1 Inspection of installation by Departmental Representative during commencement of work.
 - .2 In Situ Mock-up:
 - .1 Construct in situ mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Fabricate minimum 1000 x 3000 mm sample roofing panel using identical project materials and methods to include typical seam.
 - .3 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
 - .4 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.
 - .5 Approved mock-up may remain as part of finished Work.
- 1.5 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect sheet metal roofing from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

- .4 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 Sheet Metal Materials

- .1 Aluminum-zinc ally coated steel sheet: commercial quality, with coating, regular spangle surface, prefinish as specified in 2.2, 26 gauge minimum base metal thickness.

2.2 Prefinished Steel Sheet

- .1 Prefinished steel with factory applied polyvinylidene fluoride (Standard Perspecta 40 year finish Silicone modified paint process)..
 - .1 Westman Steel Tough Rib (26 ga. AWR 36" panel) or approved equivalent.
 - .2 Melcher's Green colour (per Westman Steel standard colour chart).

2.3 Accessories

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB-37.5.
- .3 Underlay: dry sheathing to CAN/CGSB-51.32, asphalt laminated 3.6 to 4.5 kg kraft paper, or No.15 perforated asphalt felt to CSA A123.3.
- .4 Slip sheet: reinforced sisal paper or a heavy felt kraft paper.
- .5 Sealant: Rubber gasket sealant, per manufacturer's recommendation. Tape sealants are not permitted.
- .6 Rubber-asphalt sealing compound: to CAN/CGSB-37.29.
- .7 Cleats: of same material, and temper as sheet metal:50 mm minimum wide.
 - .1 Thickness same as sheet metal being secured.
- .8 Fasteners: galvanized, concealed (only with standing seam panels).
- .9 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .10 Touch-up paint: as recommended by sheet metal roofing manufacturer.
- .11 Flashing: Westman Steel Eave #609 and Ridge Roll #580.
 - .1 Ensure chimney is fully flashed.

2.4 Fabrication

- .1 Fabricate aluminum sheet metal in accordance with AA ASM-35.
- .2 Form individual pieces in 2400 mm maximum lengths. Make allowances for expansion at joints.
- .3 Hem exposed edges on underside 12 mm, mitre and seal.

- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.
- .6 Protect metals against oxidization by backpainting with isolation coating where indicated.

Part 3 Execution

3.1 Examination

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

3.2 Installation

- .1 Use existing 19 x 184mm planks above the joists.
 - .1 Remove and replace rotting planks as per inspection.
- .2 Install 19 x 89mm strapping on top of existing planks, at 50mm on centre.
- .3 Use concealed fastenings except where approved in writing by Departmental Representative before installation.
- .4 Include underlay under sheet metal roofing.
 - .1 Secure in place and lap joints 100 mm minimum.
- .5 Apply slip sheet over asphalt felt underlay to prevent bonding between sheet metal and felt.
 - .1 Secure with anchorage and lap joints 50 mm minimum in direction of waterflow.
- .6 Install sheet metal roof panels using cleats spaced as recommended by manufacturer.
- .7 Secure cleats with 2 fasteners each and cover with cleat tabs.
- .8 Align transverse seams in adjacent panels.
- .9 Flash roof penetrations with material matching roof panels, and make watertight.
- .10 Form seams in direction of water-flow and make watertight.
- .11 Follow sheet metal manufacturer's recommendations for soldering procedures.
- .12 As work progresses, neutralize excess flux with 5% to 10% washing soda solution, and thoroughly rinse. Leave work clean and free of stains.

3.3 Standing Seam Roofing

- .1 Use aluminum 900mm mm wide by length required to make roofing with standing seams without straight run of standing seam exceeding 10 m.
- .2 Fold lower end of each pan under 20 mm.
 - .1 Slit fold 25 mm away from corner to form tab where pan turns up to make standing seam.
 - .2 Fold upper end of each pan over 50 mm.
 - .3 Hook 20 mm fold on lower end of upper pan into 50 mm fold on upper end of underlying pan.
- .3 Apply sheet metal roofing beginning at eaves. Loose lock pans to valley flashing and edge strips at eaves and gable rakes.
- .4 Finish standing seams 25 mm high on flat surfaces and 12 mm high on curved surfaces. Bend up one side edge 40 mm and other 45 mm.
 - .1 Make first fold 6 mm wide single fold and second fold 12 mm wide, providing locked portion of standing seam with 5 plies in thickness.
 - .2 Fold lower ends of seams at eaves over at 45 degrees angle.
 - .3 Terminate standing seams at ridge and hips by turning down in tapered fold.
- .5 Form valleys of sheets not exceeding 3 m in length. Lap joints 150 mm in direction of flow.
 - .1 Extend valley sheet minimum 150 mm under roofing sheets.
 - .2 At valley line, double fold valley and roofing sheets and secure with cleats spaced 450 mm on centre.

3.4 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 Protection

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by sheet metal roofing installation.

END OF SECTION

Approved: 2011-12-31

Part 1 General

- 1.1 Related Requirements
 - .1 Section 03 30 00 Cast in Place Concrete.
 - .2 Section 22 43 03 Commercial Washroom Fixtures
- 1.2 References
 - .1 ASTM International
 - .1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
 - .3 General Services Administration (GSA) - Federal Specifications (FS)
 - .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
 - .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
 - .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 2 copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
 - .3 Samples:
 - .1 Submit 2 samples of each type of material and colour.
 - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.
 - .4 Manufacturer's Instructions:
 - .1 Submit instructions to include installation instructions for each product used.
- 1.4 Closeout Submittals
- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
- 1.5 Delivery, Storage And Handling
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
 - .4 Develop Construction Waste Management Plan related to Work of this Section.
- 1.6 Site Conditions
- .1 Ambient Conditions:
 - .1 Proceed with installation of joint sealants only when:
 - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
 - .2 Joint substrates are dry.
 - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
 - .2 Joint-Width Conditions:
 - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

- .3 Joint-Substrate Conditions:
 - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 Environmental Requirements

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.

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 Urethane one part:
 - .1 Self-levelling: to CAN/CGSB-19.13, Type 1, colour to match adjacent surface
 - .1 Adjacent to buildings, sealant to match vertical surface.
- .2 Silicones one part: to CAN/CGSB-19.13.
- .3 Preformed compressible and non-compressible back-up materials:
 - .1 Polyethylene, urethane, neoprene or vinyl foam:
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.

2.3 Sealant Selection

- .1 Perimeters of exterior openings where frames meet exterior facade of building (i.e. brick, block, precast masonry): sealant type: Urethane one part.
- .2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: sealant type: Urethane one part.
- .3 Seal interior perimeters of exterior openings as detailed on drawings: sealant type: Urethane one part.
- .4 Control and expansion joints on the interior of exterior poured-in place concrete walls: sealant type: Urethane one part.
- .5 Interior control and expansion joints in floor surfaces: sealant type: Urethane one part.

- .6 Perimeter of bath fixtures e.g. sinks, tubs, urinals, stools, water closets, basins, vanities:
sealant type: Silicone.
- .7 Exposed interior control joints in drywall: sealant type: Silicone one part.
- 2.4 Joint Cleaner
 - .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant
in accordance with sealant manufacturer's written recommendations.
 - .2 Primer: in accordance with sealant manufacturer's written recommendations.

Part 3 Execution

- 3.1 Examination
 - .1 Verification of Conditions: verify that conditions of substrate previously installed under
other Sections or Contracts are acceptable for joint sealants installation in accordance
with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately
upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied
and after receipt of written approval to proceed from Departmental
Representative.
- 3.2 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.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
 - .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- 3.7 Cleaning
 - .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Clean adjacent surfaces immediately.
 - .3 Remove excess and droppings, using recommended cleaners as work progresses.
 - .4 Remove masking tape after initial set of sealant.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- 3.8 Protection
 - .1 Protect installed products and components from damage during construction.
 - .2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

Approved: 2010-06-30

Part 1 General

1.1 References

.1 Aluminum Association (AA)

.1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 ASTM International

.1 ASTM C475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.2 ASTM C514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.

.3 ASTM C557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.

.4 ASTM C840-08, Standard Specification for Application and Finishing of Gypsum Board.

.5 ASTM C954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.6 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.7 ASTM C1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.8 ASTM C1280-99, Standard Specification for Application of Gypsum Sheathing.

.9 ASTM C1177/C1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.10 ASTM C1178/C1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.11 ASTM C1396/C1396M-09a, Standard Specification for Gypsum Wallboard.

.3 Association of the Wall and Ceilings Industries International (AWCI)

.1 AWCI Levels of Gypsum Board Finish-97.

.4 Green Seal Environmental Standards (GS)

.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2007, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.6 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S102-07, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

1.2 Action And Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store gypsum board assemblies materials level in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
 - .3 Protect from weather, elements and damage from construction operations.
 - .4 Handle gypsum boards to prevent damage to edges, ends or surfaces.
 - .5 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
 - .6 Replace defective or damaged materials with new.

1.4 Ambient Conditions

- .1 Maintain temperature 10 degrees C minimum, 21 degrees C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

Part 2 Products

2.1 Materials

- .1 Water-resistant board: to ASTM C1396/C1396M regular, 16 mm thick 1220 mm wide x maximum practical length.
- .2 Metal furring runners, hangers, tie wires, inserts, anchors: to ASTM C514-04(2009e1).
- .3 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

- .4 Resilient clips: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .5 Nails: to ASTM C514.
- .6 Steel drill screws: to ASTM C1002.
- .7 Stud adhesive: to CAN/CGSB-71.25 ASTM C557.
- .8 Laminating compound: as recommended by manufacturer, asbestos-free.
- .9 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, ABS one piece length per location.
- .10 Cornice cap: 12.7 mm deep x partition width, of 1.6 mm base thickness galvanized sheet steel. Include splice plates for joints.
- .11 Shadow mould: 35 mm high, snap-on trim, of extruded rubber white colour.
- .12 Rubber mouldings: mouldings for joint treatment of vinyl-faced gypsum board, as supplied by gypsum board manufacturer.
- .13 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .14 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .15 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .16 Joint compound: to ASTM C475, asbestos-free.

2.2 Finishes

- .1 Texture finish: asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

Part 3 Execution

3.1 Examination

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

3.2 Erection

- .1 Do application and finishing of gypsum board to ASTM C840 except where specified otherwise.
- .2 Do application of gypsum sheathing to ASTM C1280.

- .3 Erect hangers and runner channels for suspended gypsum board ceilings to ASTM C840 except where specified otherwise.
- .4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .5 Install work level to tolerance of 1:1200.
- .6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles and other accessories..
- .7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
- .8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .10 Install wall furring for gypsum board wall finishes to ASTM C840, except where specified otherwise.
- .11 Furr openings and around built-in equipment, cabinets, access panels on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .13 Erect drywall resilient furring transversely across studs joists between the layers of gypsum board, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.
- .14 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.3 Application

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
- .2 Apply double layer gypsum board to woodfurring or framing using screw fasteners. Maximum spacing of screws 300 mm on centre.
 - .1 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
 - .3 Exterior Soffits and Ceilings: install exterior gypsum board perpendicular to supports; stagger end joints over supports. Install with 6 mm gap where boards abut other work.

- .4 Apply water-resistant gypsum board throughout washrooms. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads.
- .5 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .6 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .7 Install gypsum board with face side out.
- .8 Do not install damaged or damp boards.
- .9 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.4 Installation

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure using contact adhesive for full length
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Install shadow mould at gypsum board/ceiling juncture. Minimize joints; use corner pieces and splicers.
- .6 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.
- .7 Provide continuous polyethylene dust barrier behind and across control joints.
- .8 Install control joints straight and true.
- .9 Construct expansion joints at building expansion and construction joints. Provide continuous dust barrier.
- .10 Install expansion joint straight and true.
- .11 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .12 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.
- .13 Splice corners and intersections together and secure to each member with 3 screws.
- .14 Install access doors to electrical and mechanical fixtures specified in respective sections.
- .1 Rigidly secure frames to furring or framing systems.
- .15 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

- .16 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 Level 4: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
 - .17 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
 - .18 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
 - .19 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
 - .20 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
 - .21 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
 - .22 Mix joint compound slightly thinner than for joint taping.
 - .23 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
 - .24 Allow skim coat to dry completely.
 - .25 Remove ridges by light sanding or wiping with damp cloth.
- 3.5 Cleaning
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .2 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- 3.6 Protection
- .1 Protect installed products and components from damage during construction.
 - .2 Repair damage to adjacent materials caused by gypsum board assemblies installation.

END OF SECTION

Approved: 2007-12-31

Part 1 General

1.1 Related Requirements

1.2 References

.1 Environmental Protection Agency (EPA)

.1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - February 2004.

.2 Standard GPS-1-05, MPI Green Performance Standard for Painting and Coatings.

.4 National Fire Code of Canada.

.5 Society for Protective Coatings (SSPC)

.1 Systems and Specifications, SSPC Painting Manual 2005.

1.3 Quality Assurance

.1 Qualifications:

.1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work

.3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

.4 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.5 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

.6 Paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

.7 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

.8 Standard of Acceptance:

.1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.

- .2 Soffits: 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.
- 1.4 Performance Requirements
 - .1 Environmental Performance Requirements:
 - .1 Provide exterior paint products meeting MPI "Environmentally Friendly" E0 ratings based on VOC (EPA Method 24) content levels.
 - .2 Green Performance in accordance with MPI Standard GPS-1.
- 1.5 Scheduling
 - .1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
 - .2 Obtain written authorization from Departmental Representative for changes in work schedule.
 - .3 Schedule painting operations to prevent disruption of occupants in and about building.
- 1.6 Action And Informational Submittals
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
 - .3 Upon completion, submit records of products used. List products in relation to finish system and include the following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.
 - .5 Manufacturer's Material Safety Data Sheets (MSDS).
 - .4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
 - .1 13 mm plywood for finishes over wood surfaces.
 - .2 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .3 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

- .2 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.
- .3 Submit full range of available colours where colour availability is restricted.

1.7 Quality Control

- .1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 When requested by Departmental Representative or Paint Inspection Agency, prepare and paint designated surface, area, room or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 Maintenance

- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Submit one, four litre can of each type and colour of primer, stain and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

1.9 Sustainable Requirements

- .1 Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

1.10 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
 - .1 Deliver and store materials in original containers, sealed, with labels intact.
 - .2 Labels: to indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
 - .3 Remove damaged, opened and rejected materials from site.
 - .4 Provide and maintain dry, temperature controlled, secure storage.
 - .5 Observe manufacturer's recommendations for storage and handling.
 - .6 Store materials and supplies away from heat generating devices.
 - .7 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.
 - .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

- .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.
- .10 Remove paint materials from storage only in quantities required for same day use.
- .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .12 Fire Safety Requirements:
 - .1 Provide one 9 kg fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- .2 Waste Management and Disposal:
 - .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
 - .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
 - .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
 - .4 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
 - .5 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
 - .6 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by employees, individuals, or organizations for verifiable re-use or re-manufacturing.
 - .7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.11 Ambient Conditions

- .1 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .4 Relative humidity is above 85% or when dew point is less than 3 degrees C variance between air/surface temperature.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .2 Perform no painting work when maximum moisture content of substrate exceeds:
 - .1 12% for concrete and masonry (clay and concrete brick/block).
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
 - .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
 - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .2 Surface and Environmental Conditions:
 - .1 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.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
 - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
 - .5 Do not apply paint when:
 - .1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
 - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
 - .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
 - .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

- .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

Part 2 Products

2.1 Materials

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems: to be products of single manufacturer.
- .3 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
 - .1 Be water soluble.
 - .2 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
 - .3 Be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .4 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.
- .4 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .5 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .6 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61.0 degrees C or greater.
- .7 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
 - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .8 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

2.2 Colours

- .1 Departmental Representative to submit proposed Colour Schedule.

- .2 Colour schedule will be based upon selection of two base colours and two accent colours. No more than four colours will be selected for entire project and no more than three colours will be selected in each area.
- .3 Selection of colours will be from manufacturers full range of colours, or to match existing.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing And Tinting

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Departmental Representative's written permission.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .5 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.

2.4 Gloss/Sheen Ratings

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees/	Units @ 85 Degrees/
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	85	

- .2 Gloss level ratings of painted surfaces as noted on Finish Schedule.

2.5 Exterior Painting Systems

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 Examination

- .1 Exterior repainting work: inspected by Parks Canada Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency minimum of one week prior to commencement of work and provide copy of project repainting specification and Finish Schedule.
- .2 Exterior surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .3 Where assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.
- .4 Where "special" repainting or recoating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer to provide as part of work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.

3.3 Preparation

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.
- .2 Remove existing paint.
- .3 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .4 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

- .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.
 - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
 - .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
 - .5 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
 - .6 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
 - .7 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.
 - .8 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.
- 3.4 Existing Conditions
- .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 a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Departmental Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
 - .3 Maximum moisture content as follows:
 - .1 Concrete: 12%.
 - .2 Wood: 15%.
- 3.5 Protection
- .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 such 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 light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.

- .5 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .6 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.
- 3.6 Application
- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush, or roller. Conform to manufacturer's application instructions unless specified otherwise.
 - .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
 - .3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.
 - .4 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
 - .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
 - .6 Sand and dust between coats to remove visible defects.
 - .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
 - .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- 3.7 Mechanical/Electrical Equipment
- .1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, duct work and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
 - .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
 - .3 Do not paint over nameplates.
- 3.8 Field Quality Control
- .1 Inspection:

- .1 Field inspection of exterior painting operations to be carried out by Departmental Representative.
 - .2 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
 - .3 Co-operate with inspection firm and provide access to areas of work.
- .2 Manufacturer's Field Services:
 - .1 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.
- 3.9 Cleaning
 - .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- 3.10 Restoration
 - .1 Clean and re-install hardware items removed before undertaken painting operations.
 - .2 Remove protective coverings and warning signs as soon as practical after operations cease.
 - .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
 - .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
 - .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

Approved: 2005-06-30

Part 1 General

1.1 Summary

.1 Section Includes:

- .1 Material and installation of site applied paint finishes to new interior surfaces, including site painting of shop primed surfaces.

1.2 References

.1 Department of Justice Canada (Jus)

- .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33

.2 Environmental Protection Agency (EPA)

- .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

.4 Master Painters Institute (MPI)

- .1 MPI Architectural Painting Specifications Manual, 2004.

.5 National Fire Code of Canada - 1995

.6 Society for Protective Coatings (SSPC)

- .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

.7 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34 .

1.3 Quality Assurance

.1 Qualifications:

- .1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
- .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.

.2 Pre-Installation Meeting:

- .1 Convene pre-installation meeting one week prior to beginning work of this Section in accordance with Section 01 32 16.
 - .1 Verify project requirements.

- .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
 - .3 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- 1.4 Scheduling
 - .1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 48 hours in advance of proposed operations.
 - .2 Obtain written authorization from Departmental Representative for changes in work schedule.
 - .3 Schedule painting operations to prevent disruption of occupants.
- 1.5 Action And Informational Submittals
 - .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .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 (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
 - .3 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
 - .2 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- 1.6 Maintenance
 - .1 Extra Materials:
 - .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one - one litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

- 1.7 Delivery, Storage And Handling
 - .1 Packing, Shipping, Handling and Unloading:
 - .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
 - .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
 - .3 Remove damaged, opened and rejected materials from site.
 - .4 Storage and Protection:
 - .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 with temperature range 7 degrees C to 30 degrees C.
 - .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
 - .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
 - .7 Remove paint materials from storage only in quantities required for same day use.
 - .8 Fire Safety Requirements:
 - .1 Provide one fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
 - .9 Waste Management and Disposal:
 - .1 Separate waste materials for 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 packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
 - .4 Separate for recycling and place in designated containers waste in accordance with Waste Management Plan (WMP).
 - .5 Place materials defined as hazardous or toxic in designated containers.
 - .6 Handle and dispose of hazardous materials in accordance with Regional and Municipal, regulations.

- .7 Ensure emptied containers are sealed and stored safely.
- .8 Unused paint materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.
- .9 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .10 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .11 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .12 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .13 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .14 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by employees, or organizations for verifiable re-use or re-manufacturing.

1.8 Site Conditions

- .1 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless pre-approved written approval by Specifying body and product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.

- .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
 - .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of 28 days.
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
- .2 Surface and Environmental Conditions:
 - .1 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.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .3 Additional interior application requirements:
 - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
 - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

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.
- .3 Conform to latest MPI requirements for interior 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 "Approved Product" listing.
- .5 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
 - .1 Water-based.
 - .2 non-flammable.
 - .3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

- .4 Manufactured without compounds which contribute to smog in the lower atmosphere.
 - .6 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
 - .7 Flash point: 61.0 degrees C or greater for water-borne surface coatings and recycled water-borne surface coatings.
 - .8 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:
 - .1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.
 - .9 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.
 - .10 Recycled water-borne surface coatings to contain 50 % post-consumer material by volume.
 - .11 Recycled water-borne surface coatings must not contain:
 - .1 Lead in excess of 600.0 ppm weight/weight total solids.
 - .2 Mercury in excess of 50.0ppm weight/weight total product.
 - .3 Cadmium in excess of 1.0ppm weight/weight total product.
 - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
 - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.
- 2.2 Colours
- .1 Submit proposed Colour Schedule to Departmental Representative for review.
 - .2 Colour schedule will be based upon selection of two base colours and one accent colours. No more than three colours will be selected for entire project and no more than three colours will be selected in each area.
 - .3 Where specific products are available in restricted range of colours, selection based on limited range.
 - .4 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- 2.3 Mixing And Tinting
- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative for tinting of painting materials.
 - .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 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.

2.4 Gloss/Sheen Ratings

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated as noted on Finish Schedule.

2.5 Interior Painting Systems

- .1 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
 - .1 INT 5.3A - Latex Gloss level 5 finish, for high humidity environments.
- .2 Dimension lumber: columns, beams, exposed joists, underside of decking:
 - .1 INT 6.2A - Latex Gloss level 5 finish (over latex primer), for high humidity environments.
- .3 Dressed lumber: including doors, door and window frames, casings, mouldings:
 - .1 INT 6.3A - High performance architectural latex gloss level 5 finish, for high humidity environments.
- .4 Wood paneling and casework: partitions, panels, shelving, millwork:
 - .1 INT 6.4A - Latex gloss level 5 finish (over alkyd sealer) for high humidity environments.
- .5 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock type material", and textured finishes:
 - .1 INT 9.2A - Latex gloss level 5 finish (over alkyd sealer) for high humidity environments INT 9.2B - High performance architectural latex insert gloss level finish.
- .6 Acoustic panels and tiles:

.1 INT 9.3A - Latex flat finish.

2.6 Source Quality Control

- .1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.
 - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

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 sheet.

3.2 General

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 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 Maximum moisture content as follows:
 - .1 Stucco, plaster and gypsum board: 12%.
 - .2 Concrete: 12%.
 - .3 Clay and Concrete Block/Brick: 12%.
 - .4 Wood: 15%.

3.4 Preparation

- .1 Protection:

- .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 Protect passing pedestrians in and about the building.
- .2 Surface Preparation:
 - .1 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.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 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 pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .6 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.

- .7 Touch up of shop primers with primer as specified.
- .8 Do not apply paint until prepared surfaces have been accepted by Departmental Representative

3.5 Application

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush or roller. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 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.

3.6 Mechanical/Electrical Equipment

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Do not paint over nameplates.
- .4 Keep sprinkler heads free of paint.
- .5 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .6 Paint fire protection piping red.
- .7 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .8 Paint natural gas piping yellow.

- .9 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.
 - .10 Do not paint interior transformers and substation equipment.
- 3.7 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.
- 3.8 Field Quality Control
- .1 Inspection
 - .1 Inspection of interior painting operations to be carried out by Departmental Representative.
 - .2 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
 - .2 Interior surfaces requiring painting shall be inspected by Departmental Representative who shall notify General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.
 - .3 Standard of Acceptance:
 - .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 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.
 - .4 Field inspection of painting operations to be carried out by independent inspection firm as designated by Departmental Representative.
 - .5 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
 - .6 Cooperate with inspection firm and provide access to areas of work.
 - .7 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.
- 3.9 Restoration
- .1 Clean and re-install hardware items removed before undertaken painting operations.
 - .2 Remove protective coverings and warning signs as soon as practical after operations cease.
 - .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

Part 1 General

1.1 NARRATIVE

- .1 Section Includes:
 - .1 Performance specification for epoxy floor surfaces.
 - .2 For requirements where epoxy floor coating is an alternate to exposed finished concrete.
 - .3 Refer to the General Requirements and design in accordance to meet the objectives for the use and maintenance of this facility.
 - .4 Brackets where shown or left blank are provided to identify specific selections to be determined or used in the design proposal.

1.2 PERFORMANCE REQUIREMENTS

- .1 Select and install epoxy floor coating components to form complete, integral, seamless flooring system meeting the following performance characteristics:
 - .1 Compressive strength: to ASTM C579, 79.28 MPa after 7 days
 - .2 Tensile strength: to ASTM C307, 15.16 MPa
 - .3 Flexural strength: to ASTM C580, 34.47 MPa.
 - .4 Bond strength: to ASTM C882 550 psi
 - .5 Linear shrinkage: to ASTM C883, nil.
 - .6 Water absorption; to ASTM C413, 0.01] % maximum.
 - .7 Flammability: to CAN/ULC-S102.2, flame spread 49, smoked developed 304.
 - .8 Elongation: to ASTM D638, 14%.
 - .9 Coefficient of friction: to ASTM D2047, 0.6
 - .10 Abrasion resistance: to ASTM D1044, CS-17 wheel, 0.1 g maximum weight loss.
 - .11 Impact resistance: to MIL D 3134, 0.225 mm.
 - .12 Chemical resistance: no chemical attack or discolouration when tested
 - .13 Pin holing: no pin holing permitted. Pin holing to be tested using holiday test.

1.3 SUBMITTALS

- .1 Submit Shop Drawings, Samples, Product Data, WHMIS MSDS as per Procedures in General Requirements
- .2 Quality Assurance Submittals:
 - .1 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturers installation instructions.
 - .4 Manufacturers Field Services: submit copies of manufacturers field reports.

- .5 Maintenance Data: submit maintenance data for incorporation into operations and maintenance manual.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance Health and Safety Requirements
- .2 Installer Qualifications: company or person experienced in performing Work of this section with minimum five years documented experience.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Moisture: ensure substrate is within moisture limits prescribed by manufacturer.
- .2 Temperature: maintain ambient temperature
- .3 Relative humidity: maintain relative humidity in accordance with manufacturer's written instructions
- .4 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .2 Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
- .3 Waste Management and Disposal:
 - .1 Deposit packaging materials in appropriate container on site for recycling or reuse.
 - .2 Avoid using landfill waste disposal procedures when recycling facilities are available.
 - .3 Collect and separate plastic, paper packaging and corrugated cardboard.
 - .4 Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin.

1.7 WARRANTY

- .1 Project Warranty: refer to CCDC 2 for project warranty provisions.
 - .1 Warranty: five (5) years against delamination of epoxy flooring system from substrate, and other failure of system to provide complete, integral, seamless floor covering meeting specified performance requirements.

Part 2 Products

2.1 MANUFACTURER

- .1 Epoxy flooring materials from same manufacturer.

- .2 Ensure compatibility for epoxy flooring materials including primers, resins, hardening agents, finish coats and sealer coats.

2.2 MATERIALS

- .1 Materials: as required to achieve specified performance criteria; functionally compatible with adjacent materials and components.

Part 3 Execution

3.1 EXAMINATION

- .1 Site Verification of Conditions: verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.

3.2 PREPARATION

- .1 Prepare substrate surfaces in accordance with epoxy floor coating material manufacturer's instructions.

3.3 PREPARATION OF CONCRETE FLOOR SUBSTRATES

- .1 Ensure Work penetrating substrate has been completed before preparing substrate and applying coating.
- .2 Protect coated surfaces, equipment, fixtures and fittings.
- .3 Clean and prepare surfaces in accordance with manufacturer's instructions.
 - .1 Chemical cleaning: clean surfaces with detergent, trisodium phosphate or other proprietary concrete cleaner.
 - .2 Mechanical cleaning: Mechanically clean concrete surfaces using mechanical cleaning tool in accordance with manufacturer's written instructions.
 - .3 Blast Cleaning: blast clean concrete surface using sandblasting.
 - .4 Acid etching: clean concrete surface with acid to remove sufficient cement paste to provide a roughened surface.
 - .5 Flame cleaning: clean concrete floor surfaces with a multi-flame oxy-acetylene blowpipe flame cleaning machine; blowpipe speed 0.02 m/s - 0.03 m/s.

3.4 INSTALLATION

- .1 Comply with manufacturer's instructions.
- .2 Prime clean concrete subfloor as recommended by manufacturer.
- .3 Apply epoxy sub-floor filler to cracks, depressions and low spots to achieve floor level to a tolerance of 1:500; allow to cure.
- .4 Prime concrete and subfloor filler substrate surfaces as recommended by manufacturer.
- .5 Install epoxy floor coating material at the rate and to thickness required to achieve complete conformance with the specified performance requirements.

3.5 CLEANING

- .1 Repair or replace damaged installed products.
- .2 Clean installed products in accordance with manufacturer's instructions prior to Departmental Representative's acceptance.
- .3 Remove construction debris from project site and legally dispose of debris.

3.6 PROTECTION

- .1 Protection: protect installed product and finish surfaces from damage during construction.

END OF SECTION

Approved: 2014-12-31

Part 1 General

1.1 Related Requirements

1.2 References

.1 Aluminum Association (AA)

.1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 ASTM International

.1 ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM B117, Standard Practice for Operating Salt Spray (Fog) Apparatus

.3 ASTM A653/A653M-13, Standard Specification for Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.

.4 ASTM B209M; Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 31-GP-107Ma-90, Non-Inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.

.2 CGSB 41-GP-6M-1983, Sheets, Thermosetting Polyester Plastics, Glass Fibre Reinforced.

.4 CSA Group

.1 CSA W47.2-11, Certification of Companies for Fusion Welding of Aluminum.

.2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

.3 CSA W59.2-M1991(R2013), Welded Aluminum Construction.

.5 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI SSF 6-2012, Sheet Steel Facts #6, Metallic Coated Sheet Steel for Structural Building Products.

.6 Green Seal (GS)

.1 GS-11-2013, Standard for Paints and Coatings.

.2 GS-36-2013, Adhesives for Commercial Use.

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.8 Parks Canada Agency

.1 Exterior Signage Standards and Guidelines, 2007

.9 Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

- .1 MPI #76, Quick Dry Alkyd Metal Primer.
 - .2 MPI #96, Quick Dry Enamel Gloss.
 - .10 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1113-13, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for signage and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Shop Drawings:
 - .1 Submit catalogue sheets full size templates.
 - .2 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, mounting methods, schedule of signs.
 - .3 Submit drawn-to-scale details for individually fabricated lettering indicating word and letter spacing.
- 1.4 Closeout Submittals
 - .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- 1.5 Quality Assurance
 - .1 Welding Certification in accordance with CSA W47.2.
- 1.6 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

- 2.1 Materials
 - .1 Aluminum extrusions:

- .1 to Parks Canada Agency Exterior Signage Standards and Guidelines, 2007
 - .2 Sheet aluminum:
 - .1 to Parks Canada Agency Exterior Signage Standards and Guidelines, 2007
 - .3 Prefinished sheet aluminum
 - .1 to Parks Canada Agency Exterior Signage Standards and Guidelines, 2007
- 2.2 Sign Graphics
 - .1 Sign graphics: well defined, arranged for balanced appearance, and properly word and letter spaced in accordance with the Parks Canada Exterior Signage Standards and Guidelines or Alberta Infrastructure and Transportation Highway Guide and Information Sign Manual.
- 2.3 Cut-Out Letters
 - .1 Cut-out letters in accordance with the Parks Canada Exterior Signage Standards and Guidelines or Alberta Infrastructure and Transportation Highway Guide and Information Sign Manual.
- 2.4 Fabrication
 - .1 Fabricate signs in accordance with details, specifications and shop drawings.
 - .2 Build units square, true, accurate to size, free from visual or performance defects.
 - .3 Fit and securely join sections to obtain tight, closed joints.
 - .4 Allow for thermal movement without distortion of components.
 - .5 Exposed inconspicuous fasteners of same finish and colour as base material permitted where indicated Departmental Representative.
 - .6 Polish exposed edges of metal to smooth, slightly convex profile.
 - .7 Do steel welding to CSA W59.
 - .1 Finish exposed welds flush and smooth.
 - .8 Apply bituminous paint to aluminum in contact with dissimilar metals, concrete or masonry.
 - .9 Manufacturer's nameplates on sign surface permitted in non visible locations in completed work.
- 2.5 Finishes
 - .1 Finishes in accordance with the Parks Canada Exterior Signage Standards and Guidelines or Alberta Infrastructure and Transportation Highway Guide and Information Sign Manual.

Part 3 Execution

3.1 Examination

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

3.2 Installation

- .1 Manufacturer's Instructions: compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
- .2 Erect and secure signs plumb and level as directed by Departmental Representative.
- .3 Comply with sign manufacturer's installation instructions and approved shop drawings.
- .4 Mechanical attachment:
 - .1 in accordance with the Parks Canada Exterior Signage Standards and Guidelines or Alberta Infrastructure and Transportation Highway Guide and Information Sign Manual.
- .5 Adhesive attachment:
 - .1 in accordance with the Parks Canada Exterior Signage Standards and Guidelines or Alberta Infrastructure and Transportation Highway Guide and Information Sign Manual.

3.3 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.
 - .1 Leave signs clean.
 - .2 Remove debris from interior of sign boxes.
 - .3 Touch up damaged finishes.
- .3 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Approved: 2014-12-31

Part 1 General

- 1.1 Related Requirements
 - .1 Section 22 42 03 – Commercial Washroom Fixtures.
- 1.2 References
 - .1 ASTM International
 - .1 ASTM A480/A480M -14a, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting, Sheet, and Strip.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
 - .3 CSA Group
 - .1 CSA B651-12, Accessible Design for the Built Environment.
 - .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .5 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for plastic toilet compartments and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
 - .4 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
 - .5 Indicate fabrication details, plans, elevations, hardware, and installation details.
- 1.4 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:

- .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect specified materials from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 Materials

- .1 Solid plastic toilet partitions system:
 - .1 Manufacturer: Hadrian
 - .2 Model: Standard Solid Plastic Toilet Partition
 - .3 Mount: Floor to Ceiling
 - .4 Colour: 217 Canyon Granite
- .2 Solid laminated plastic panels: High-density polyethylene.
 - .1 Recycled content: 30% Post-Consumer + ½ Post-Industrial
- .3 Headrails: clear anodized, extruded aluminum.
- .4 Pilaster shoe and ceiling trim: 0.8 mm stainless steel, 75 mm high.
- .5 Attachment: stainless steel tamper proof type screws and bolts.

2.2 Components

- .1 Hinges:
 - .1 Heavy duty, non-lubricating.
 - .2 Material/finish: aluminum.
 - .3 Swing: as shown on plans, outward swing for barrier free stalls.
 - .4 Return movement: spring action cam.
 - .5 Adjustable door-open angle.
 - .6 Emergency access feature.
- .2 Latch set: surface mounted, combination latch, door-stop, keeper and bumper, stainless steel.
- .3 Wall and connecting brackets: stainless steel extrusion or casting.
- .4 Coat hook: combination hook and rubber door bumper, stainless steel.
- .5 Door pull: Barrier-free type suited for outswinging doors, stainless steel.

2.3 Fabrication

- .1 Doors, panels and screens: 25 mm thick, solid plastic laminate panels, to sizes indicated.
- .2 Pilasters: 32 mm thick, constructed same as door, to sizes indicated.
- .3 Provide formed and closed edges for doors, panels and pilasters.

- .1 Mitre and weld corners and grind smooth.
- .4 Provide internal reinforcement at areas of attached hardware and fittings.
 - .1 Temporarily mark location of reinforcement for benches grab bars.

Part 3 Execution

3.1 Examination

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

3.2 Installation

- .1 Ensure supplementary anchorage, if required, is in place.
- .2 Do work in accordance with CSA B651.

3.3 Erection

- .1 Partition erection:
 - .1 Install partitions secure, plumb and square.
 - .2 Leave 12 mm space between wall and panel or end pilaster.
 - .3 Anchor mounting brackets to masonry or concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors, to steel supports with bolts in threaded holes.
 - .4 Attach panel and pilaster to brackets with through type sleeve bolt and nut.
 - .5 Equip outswinging doors with door pulls on inside of door in accordance with CSA B651.
 - .6 Install hardware grab bars.
- .2 Floor supported and overhead braced partition erection:
 - .1 Attach pilasters to floor with pilaster supports and level, plumb, and tighten installation with levelling device.
 - .2 Secure pilaster shoes in position.
 - .3 Secure headrail to pilaster face with not less than two fasteners per face.
 - .4 Set tops of doors parallel with overhead brace when doors are in closed position.
 - .5 Secure to supplementary anchorage above ceiling finish to receive screen pilaster.

- 3.4 Cleaning
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Approved: 2013-06-30

Part 1 General

- 1.1 Related Requirements
- 1.2 Reference Standards
 - .1 Environmental Design Green Building Rating System Reference Guide.
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province, Canada.
 - .2 Indicate on drawings:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
 - .3 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
 - .4 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- 1.4 Closeout Submittals
 - .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Operation and Maintenance Data: submit operation and maintenance data for approval by Departmental Representative.
 - .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .2 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.

- .3 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .4 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
- .5 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .6 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .7 Site records:
 - .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .8 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .9 Submit copies of as-built drawings for inclusion in final TAB report.

- 1.5 Maintenance Material Submittals
 - .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Furnish spare parts as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.
 - .3 Provide one set of special tools required to service equipment as recommended by manufacturers.
 - .4 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.
- 1.6 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials in dry location 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 Not Used
 - .1 Not used.

Part 3 Execution

- 3.1 Examination
 - .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 Painting Repairs And Restoration
 - .1 Do painting in accordance with Section 09 91 23 - Interior Painting.

- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.
- 3.3 System Cleaning
 - .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.
- 3.4 Demonstration
 - .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
 - .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
 - .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
 - .4 Instruction duration time requirements as specified in appropriate sections.
 - .5 Departmental Representative will record these demonstrations on video tape for future reference.
- 3.5 Cleaning
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 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 recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- 3.6 Protection
 - .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Approved: 2014-12-31

Part 1 General

- 1.1 Related Requirements
 - .1 Section 10 21 13.19 – Plastic Toilet Compartments
- 1.2 References
 - .1 CSA Group
 - .1 CAN/CSA-B45 Series-02(R2013), Plumbing Fixtures, (Consists of B45.0, B45.1, B45.2, B45.3, B45.4, B45.5, B45.6, B45.7, B45.8 and B45.9).
 - .2 CSA B125.3-12, Plumbing Fittings.
 - .3 CSA B651-12, Accessible Design for the Built Environment.
 - .2 Green Seal (GS)
 - .1 GS-36-2013, Adhesives for Commercial Use.
 - .3 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for washroom fixtures and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Indicate fixtures and trim:
 - .1 Dimensions, construction details, roughing-in dimensions.
 - .2 Factory-set water consumption per flush at recommended pressure.
 - .3 For water closets, urinals: minimum pressure required for flushing.
- 1.4 Closeout Submittals
 - .1 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.
- 1.5 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance 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 indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 Manufactured Units

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CSA B125.3.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: as indicated.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Water closets:
 - .1 WC-1 : floor-mounted, no flush tank.
 - .1 Bowl: vitreous china, syphon jet, elongated rim, close-coupled combination, bowl and bolt caps.
 - .2 Flushometer: PERMEX® Synthetic Rubber Diaphragm with Dual Filtered Fixed Bypass, OPTIMA® EL-1500-L Self-Adaptive Infrared Sensor with Indicator Light for ultra low flush cycle: factory set to 4.8 litres/flush. Diaphragm, Stop Seat and Vacuum Breaker to be molded from PERMEX® Rubber Compound for Chloramine Resistance. Valve Body, Cover, Tailpiece and Control Stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve shall be in compliance with the applicable sections of ASSE 1037.
 - .2 WC-2 : Floor-mounted, without flush tank for handicapped.
 - .1 Top of seat to be between 400 mm and 460 mm from finished floor.
 - .2 Bowl: vitreous china, floor mounted, syphon jet, elongated rim, close-coupled, bolt caps.
 - .3 Flushometer: PERMEX® Synthetic Rubber Diaphragm with Dual Filtered Fixed Bypass, OPTIMA® EL-1500-L Self-Adaptive Infrared Sensor with Indicator Light for ultra low flush cycle: factory set to 4.8 litres/flush. Diaphragm, Stop Seat and Vacuum Breaker to be molded from PERMEX® Rubber Compound for Chloramine Resistance. Valve Body, Cover, Tailpiece and Control Stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve shall be in compliance with the applicable sections of ASSE 1037.
- .8 Electronic Water Closet Flush Valves:

- .1 Barrier-free, stainless steel, electronic, sensor proximity type, activated by infra-red.
- .2 Sensor: waterproof, with impact-resistant, anti scratch coated plastic lens, sensitivity adjustable from 100 mm to 450 mm.
- .3 Water conservation: 0-60 second maximum run time.
- .4 Controls: interchangeable receptacles for stainless steel sheathed sensor and modular plug-type solenoid connections, slow-closing commercial solenoids for 860 kPa, 85 degrees C.
- .5 Transformer:, UL and CSA listed, hardwire type, sized for up to 8 solenoids.
- .6 Equipped with manual override button.
- .9 Water Closet Seats.
 - .1 Seat: white, elongated, open front, moulded solid plastic, cover, stainless steel check hinges, stainless steel insert post.
- .10 Urinals:
 - .1 U-1 : wall-mounted, waterfree, back spud.
 - .1 Urinal: vitreous china, washout type, integral flushing rim, extended shields, integral trap, removable stainless steel strainer, back outlet.
- .11 Washroom Lavatories:
 - .1 L-1 : counter-top:
 - .1 Stainless steel vanity with integrated steel sinks, with front overflow, soap depressions, gasket, swivel clamps, semi-oval or rectangular bowl. Sink sizes: 475 x 400 mm outside, 400 x 250 mm nominal inside. Vanity sizes per drawings
 - .2 L-2: wall-hung, for handicapped.
 - .1 Vitreous china, low shelf, with integral back, contoured front, shallow front basin, front overflow, soap depressions, supply openings on 299 mm centres, concealed supports. Sizes: 675 x 500 mm.
- .12 Washroom Lavatory Electronic Trim:
 - .1 Barrier-free electronic faucet:
 - .1 Infra-red motion sensor activated by hand motion in lavatory.
 - .2 Sensor: waterproof, incorporated in body of unit, with impact-resistant plastic lens and anti-scratch coating, sensitivity adjustable from 100 mm to 450 mm.
 - .3 Water conservation: 0-60 second maximum run time.
 - .4 Controls: vandal-proof, interchangeable receptacles for stainless steel sheathed sensor and modular plug-type solenoid connections, slow-closing commercial solenoids for 860 kPa, 85 degrees C.
 - .5 Transformer: Class 2, UL and CSA listed, hard wire type, sized for up to 8 solenoids.
 - .6 Spout: Chrome plated, with integral flow control aerator rated at 8.35 l/minute at 413 kPa maximum.
 - .7 Under-counter temperatures mixing controls.

- .13 Fixture piping:
 - .1 Hot and cold water supplies to fixtures:
 - .1 Chrome plated rigid supply pipes with handwheel stop, reducers, escutcheon.
 - .2 Waste:
 - .1 Brass P trap with clean out on fixtures not having integral trap.
 - .2 Chrome plated in exposed places.

Part 3 Execution

3.1 Examination

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

3.2 Installation

- .1 Mounting heights:
 - .1 Standard: to manufacturer's recommendations, measured from finished floor.
 - .2 Wall-hung fixtures: as indicated, measured from finished floor.
 - .3 Barrier-free: to most stringent CSA B651.

3.3 Adjusting

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
 - .3 Adjust flush valves to suit actual site conditions.
 - .4 Set controls of automatic flush valves for WCs to prevent unnecessary flush cycles.
- .3 Checks:
 - .1 Water closets: flushing action.
 - .2 Aerators: operation, cleanliness.
 - .3 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:

- .1 Verify temperature settings, operation of control, limit and safety controls.

3.4 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Approved: 2013-06-30

Part 1 General

1.1 Related Requirements

1.2 References

.1 Definitions:

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

.2 Reference Standards:

.1 CSA Group

- .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
- .2 CSA C22.2
- .3 CAN/CSA-C22.3 No.1-10, Overhead Systems.
- .4 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)

- .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.3 Action And Informational Submittals

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

.2 Submit for review single line electrical diagrams under plexiglass and locate as indicated.

- .1 Electrical distribution system in main electrical room.
- .2 Electrical power generation and distribution systems in power plant rooms.

.3 Submit for review fire alarm riser diagram, plan and zoning of building under plexiglass at fire alarm control panel and annunciator.

.4 Shop drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.

- .5 Submit 2 number of copies of 600 x 600 mm minimum size drawings inspection authorities.
 - .6 If changes are required, notify Departmental Representative of these changes before they are made.
 - .5 Certificates:
 - .1 Provide CSA certified equipment.
 - .2 Where CSA certified equipment is not available, submit such equipment to inspection authorities for special approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of contract.
 - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
 - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
 - .6 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.
- 1.4 Closeout Submittals
 - .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
 - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
 - .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
 - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
 - .4 Post instructions where directed.
 - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
 - .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

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

Part 2 Products

- 2.1 Design Requirements
 - .1 Operating voltages: to CAN3-C235.
 - .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
 - .3 Language operating requirements: provide identification labels for control items in English and French.
 - .4 Use one label for both languages.
- 2.2 Materials And Equipment
 - .1 Provide material in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Material to be CSA certified. Where CSA certified material is not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .3 Factory assemble control panels and component assemblies.
 - .4 Install wiring per AC90 standards.
- 2.3 Electric Motors, Equipment And Controls
 - .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.
 - .2 Control wiring and conduit: in accordance with Provincial and Federal regulations.
- 2.4 Wiring Terminations
 - .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5 Equipment Identification

.1 Identify electrical equipment with labels as follows:

- .1 Nameplates: plastic laminate 3 mm thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

.2 Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.
- .8 Transformers: indicate capacity, primary and secondary voltages.

2.6 Wiring Identification

- .1 Identify wiring with permanent indelible identifying markings on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 Conduit And Cable Identification

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

Prime	Auxiliary	
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue

Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

Part 3 Execution

3.1 Examination

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

3.2 Installation

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

3.3 Nameplates And Labels

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

3.4 Conduit And Cable Installation

- .1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.5 Location Of Outlets

- .1 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .3 Locate light switches on latch side of doors.

3.6 Mounting Heights

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1400 mm.
 - .2 Wall receptacles:
 - .1 General: 300 mm.
 - .2 Above top of continuous baseboard heater: 200 mm.
 - .3 Above top of counters or counter splash backs: 175 mm.
 - .4 In mechanical rooms: 1400 mm.
 - .3 Panelboards: as required by Code or as indicated.
 - .4 Telephone and interphone outlets: 300 mm.
 - .5 Wall mounted telephone and interphone outlets: 1500 mm.
 - .6 Fire alarm stations: 1500 mm.
 - .7 Fire alarm bells: 2100 mm.
 - .8 Television outlets: 300 mm.
 - .9 Wall mounted speakers: 2100 mm.
 - .10 Clocks: 2100 mm.
 - .11 Door bell pushbuttons: 1500 mm.
- 3.7 Co-Ordination Of Protective Devices
 - .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.
- 3.8 System Startup
 - .1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.
- 3.9 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 recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Approved: 2008-12-31

Part 1 General

- 1.1 Related Requirements
- 1.2 Measurements And Payments
 - .1 Measurement Procedure.
 - .1 Measure new light fixtures supplied and installed
 - .2 Measure wall insert commercial fan forced heater per commercial fan installed.
 - .2 Payment Procedure.
 - .1 Unit rate payment per new light fixture supplied and installed.
 - .2 Unit rate payment per commercial fan supplied and installed.
 - .3 Lump sum payment for extractor fan Broan DX 90 supply and installation in accordance with schedule.
- 1.3 References
 - .1 American National Standards Institute (ANSI)
 - .1 ANSI C82.1-04, Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
 - .2 ANSI C82.4-02(R2007), Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps Multi Supply Type.
 - .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
 - .3 ASTM International Inc.
 - .1 ASTM F1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
 - .4 Canadian Standards Association (CSA International)
 - .5 ICES-005-07, Radio Frequency Lighting Devices.
 - .6 Underwriters' Laboratories of Canada (ULC)
- 1.4 Action And Informational Submittals
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.

- .3 Photometric data to include: VCP Table where applicable.
 - .3 Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures and.
- 1.5 Quality Assurance
 - .1 Provide mock-ups in accordance with Section 01 45 00 - Quality Control.
- 1.6 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
 - .3 Divert unused metal materials from landfill to metal recycling facility.
 - .4 Disposal and recycling of fluorescent lamps as per local regulations.
 - .5 Disposal of old PCB filled ballasts.

Part 2 Products

- 2.1 Lamps
 - .1 LED lamps as indicated.
- 2.2 Ballasts
 - .1 LED Driver:
 - .1 Rating: voltage as indicated, for use with LED lamps.
 - .2 Totally encased and designed for 40 degrees Celsius ambient temperature.
 - .3 Power factor: minimum 95% with 95% of rated lamp lumens.
 - .4 Input voltage range: plus or minus 20% of nominal.
 - .5 Minimum starting temperature: minus 34 degrees Celsius at 90% line voltage.
 - .6 Mounting: indoor.
- 2.3 Finishes
 - .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.
- 2.4 Optical Control Devices
 - .1 As indicated in luminaire schedule.

- 2.5 Luminaires
 - .1 As indicated in luminaire schedule.

Part 3 Execution

- 3.1 Installation
 - .1 Locate and install luminaires as indicated.
 - .2 Provide adequate support to suit ceiling system.
- 3.2 Wiring
 - .1 Connect luminaires to lighting circuits:
 - .1 Install flexible or rigid conduit for luminaires as indicated.
- 3.3 Luminaire Supports
 - .1 For suspended ceiling installations support luminaires independently of ceiling support luminaires from ceiling grid in accordance with local inspection requirements.
- 3.4 Luminaire Alignment
 - .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
 - .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.
- 3.5 Cleaning
 - .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Approved: 2012-06-30

Part 1 General

1.1 Related Requirements

- .1 Section 32 11 23 – Aggregate Base Courses
- .2 Section 32 91 19.13 – Topsoil Placement and Grading

1.2 References

- .1 ASTM International
 - .1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations (including Addendum 2007).
 - .2 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.
 - .3 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Commercial Interiors.
 - .4 LEED Canada-EB: O M-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Action And Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit samples.
 - .2 Allow continual sampling by Departmental Representative during production.
 - .3 Provide Departmental Representative with access to source and processed material for sampling.
 - .4 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being

produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.

- .5 Provide front end loader or other suitable equipment including trained operator for stockpile sampling as necessary. Move samples to storage place as directed by Departmental Representative.
- .6 Supply new or clean sample bags or containers according appropriate to aggregate materials.
- .7 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
- .8 Provide water, electric power and propane to Departmental Representative laboratory trailer at production site.

1.4 Delivery, Storage And Handling

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

Part 2 Products

2.1 Materials

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed 5 times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
 - .2 Reclaimed asphalt pavement.
 - .3 Reclaimed concrete material.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.
 - .4 Reclaimed asphalt pavement.
 - .5 Reclaimed concrete material.

2.2 Source Quality Control

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 4 weeks minimum before starting production.
- .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .3 Advise Departmental Representative 4 weeks minimum in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 Examination

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

3.2 Preparation

- .1 Topsoil stripping:
 - .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
 - .2 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush and removed from site.
 - .3 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil.
 - .4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2.5 -3 m.
 - .5 Dispose of topsoil to location as directed by Departmental Representative.
- .2 Aggregate source preparation:
 - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Departmental Representative.
 - .2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
 - .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

- .4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
- .5 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .6 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.
- .3 Processing:
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
 - .1 Use methods and equipment approved in writing by Departmental Representative.
 - .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
 - .5 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
 - .1 Use only equipment approved in writing by Departmental Representative.
 - .6 Stockpiling:
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 m for coarse aggregate and base course materials.
 - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
 - .3 Maximum 1.5 m for other materials.
 - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
 - .9 Do not cone piles or spill material over edges of piles.
 - .10 Do not use conveying stackers.

- .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.3 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 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .5 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.
- .7 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Departmental Representative.

END OF SECTION

Part 1 General

- 1.1 Related Requirements
 - .1 Section 31 14 13 – Soil Stripping and Stockpiling
- 1.2 Measurement Procedures
 - .1 Measurement Procedures.
 - .1 Measure following items in square meters within limits as indicated:
 - .1 Clearing.
 - .2 Grubbing.
 - .3 Close cut clearing.
 - .4 Underbrush clearing.
 - .2 Measure clearing isolated trees and grubbing isolated tree stumps (if required) as number of isolated trees cleared and number of isolated stumps grubbed.
 - .2 Payment Procedures.
 - .1 Unit rate payment per square metre of cleared site area.
- 1.3 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.
- 1.4 Definitions
 - .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
 - .2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
 - .3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
 - .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
 - .5 Grubbing consists of excavation and disposal of stumps and roots, and boulders and rock fragments less than 300mm diameter, to not less than specified depth below existing ground surface.
- 1.5 Action And Informational Submittals
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Samples:
 - .1 Submit manufacturer's technical data sheets of each material listed below for approval prior to delivery of materials to project site.
 - .2 Tree wound paint: one liter can with manufacturer's label.
 - .3 Herbicide: one liter can with manufacturer's label.
 - .3 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .4 Submit manufacturer's installation instructions.
- 1.6 Quality Assurance
- .1 Do construction occupational health and safety in accordance Federal and Provincial regulations.
 - .2 Safety Requirements: worker protection.
 - .1 Workers must comply with Alberta Occupational Health and Safety requirements when applying herbicide materials.
 - .2 Workers must not eat, drink or smoke while applying herbicide material.
 - .3 Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.
- 1.7 Storage And Protection
- .1 Prevent damage to culverts, trees, areas left undisturbed, natural features, existing buildings, existing pavement, utility lines, site appurtenances, water courses, and root systems of trees which are to remain.
 - .1 Repair damaged items to approval of Departmental Representative.
 - .2 Replace trees designated to remain, if damaged, as directed by Departmental Representative.
- 1.8 Waste Management And Disposal
- .1 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.
 - .1 Lumber: to be either cut up into firewood and left in log pile as directed by Departmental Representative or chipped and delivered to Lake Louise Waste Water Treatment Plant.
 - .2 Stockpile adjacent to site.

Part 2 Products

- 2.1 Materials
- .1 Bituminous based paint of standard manufacture specially formulated for tree wounds.
 - .2 Herbicide: effective for killing annual and perennial weeds, and bamboo grass, by being absorbed through roots and foliage.

- .1 Spray applied on non-crop land areas.
- .2 Type as follows:
 - .1 As approved by Departmental Representative.
- .3 Soil Material for Fill:
 - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
 - .2 Remove and store soil material for reused.

Part 3 Execution

- 3.1 Temporary Erosion And Sedimentation Control
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to 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.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- 3.2 Preparation
 - .1 Inspect site and verify with Departmental Representative, items designated to remain.
 - .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify Departmental Representative in ample time to minimize interruption of service.
 - .3 Notify utility authorities before starting clearing or grubbing.
 - .4 Keep roads and walks free of dirt and debris.
- 3.3 Application
 - .1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.
- 3.4 Clearing
 - .1 Clearing includes felling, trimming, cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within cleared areas.

- .2 Clear as indicated, by cutting at height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.
 - .3 Cut off branches overhanging area cleared as directed by Departmental Representative.
 - .4 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
 - .5 Apply herbicide in accordance with manufacturer's label to top surface of stumps designated not to be removed.
- 3.5 Close Cut Clearing
- .1 Close cut clearing to ground level.
 - .2 Cut off branches overhanging area cleared as directed by Departmental Representative.
 - .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
- 3.6 Isolated Trees
- .1 Cut off isolated trees as directed by Departmental Representative at height of not more than 300 mm above ground surface.
 - .2 Grub out isolated tree stumps.
 - .3 Prune individual trees as indicated.
 - .4 Trim trees designated to be left standing within cleared areas of dead branches 4 cm or more in diameter; and trim branches to heights as indicated.
 - .5 Cut limbs and branches to be trimmed close to bole of tree or main branches.
- 3.7 Underbrush Clearing
- .1 Clear underbrush from areas as indicated at ground level.
- 3.8 Grubbing
- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
 - .2 Grub out stumps and roots to not less than 200 mm below ground surface.
 - .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.
 - .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.
- 3.9 Removal And Disposal
- .1 Remove cleared, grubbed materials to Lake Louise Waste Water Treatment Plant.
 - .2 Boulders to be stockpiled on site as designated by Departmental Representative.
 - .3 Chip mulch and stockpile cleared and grubbed vegetative material to Lake Louise Waste Water Treatment Plant.

- .4 Remove diseased trees identified by Departmental Representative and dispose of this material to approval of Departmental Representative.
- 3.10 Finished Surface
 - .1 Leave ground surface in condition suitable for immediate grading operations stripping of topsoil to approval of Departmental Representative.
- 3.11 Cleaning
 - .1 Proceed in accordance with Section 01 74 11 - Cleaning.
 - .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

- 1.1 Related Requirements
 - .1 Section 01 74 11 - Cleaning.
- 1.2 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.

Part 2 Products

- 2.1 Not Used
 - .1 Not Used.

Part 3 Execution

- 3.1 Temporary Erosion And Sedimentation Control
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to 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.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- 3.2 Stripping Of Topsoil
 - .1 Ensure that procedures are conducted in accordance with applicable Federal and Provincial requirements.
 - .2 Remove topsoil before construction procedures commence to avoid compaction of topsoil.
 - .3 Handle topsoil only when it is dry and warm.
 - .4 Strip topsoil to depths as indicated.
 - .1 Avoid mixing topsoil with subsoil.
 - .5 Pile topsoil in berms in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2.5 - 3 m.
 - .6 Dispose of unused topsoil in location as indicated by Departmental Representative.

- .7 Protect stockpiles from contamination and compaction.
 - .8 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.
- 3.3 Preparation Of Grade
- .1 Verify that grades are correct and notify Departmental Representative if discrepancies occur do not begin work until instructed by Departmental Representative
 - .1 Grade area only when soil is dry to lessen soil compaction.
 - .2 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.
- 3.4 Placing Of Topsoil
- .1 Place topsoil only after Departmental Representative has accepted subgrade.
 - .2 Spread topsoil during dry conditions in uniform layers greater than 150mm, but not exceeding 250 mm, over unfrozen subgrade free of standing water.
 - .3 Establish traffic patterns for equipment to prevent driving on topsoil after it has been spread to avoid compaction.
 - .4 Cultivate soil following spreading procedures.
- 3.5 Cleaning
- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
 - .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

- 1.1 Related Requirements
 - .1 Section 31 14 13 Soil Stripping and Stockpiling
 - .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling
- 1.2 References
 - .1 ASTM International
 - .1 ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).
 - .2 Underwriters' Laboratories of Canada (ULC)
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.
- 1.4 Existing Conditions
 - .1 Examine Geotechnical Investigation Report which is bound into specification as an Appendix.
 - .2 Known underground and surface utility lines and buried objects are as indicated on site plan.

Part 2 Products

- 2.1 Materials
 - .1 Fill material: Type 3 Fill in accordance with of Section 31 23 33.01 - Excavating, Trenching and Backfilling.
 - .2 Excavated or graded subsoil material existing on site is suitable to use as fill for grading work if approved by Departmental Representative.

Part 3 Execution

3.1 Examination

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

3.2 Stripping Of Topsoil

- .1 Refer to Section 31 14 13 Soil Stripping and Stockpiling

3.3 Grading

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to following depths below finish grades:
 - .1 300 mm for grassed areas.
 - .2 525 mm for granular roadway.
 - .3 250mm for concrete paving.
 - .4 300mm for granular trails.
- .3 Slope rough grade away from building 1:50 minimum.
- .4 Grade ditches to depth as indicated.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm minimum before placing fill over existing ground. Recompact will fill and existing surface within 2% of optimum water content (OWC) to facilitate bonding.
- .6 Compact filled and disturbed areas to maximum dry density to ASTM D698, as follows:
 - .1 85% under landscaped areas.
 - .2 Minimum 98% under paved and walk areas.
- .7 Do not disturb soil within branch spread of trees or shrubs to remain.

3.4 Testing

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by ULC. Costs of tests will be paid by Owner in accordance with Sections 01 29 83 - Payment Procedures for Testing Laboratory Services.

3.5 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- 3.6 Protection
 - .1 Protect existing culverts, trees, natural features, buildings, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.
 - .2 Maintain access roads to prevent accumulation of construction related debris on roads.

END OF SECTION

Approved: 2006-09-30

Part 1 General

1.1 Related Requirements

- .1 Section 31 14 13 Soil Stripping and Stockpiling
- .2 Section 31 32 19.01 – Geotextiles

1.2 Measurement Procedures

- .1 Excavated materials will be measured in cubic metres in their original location.
 - .1 Unclassified excavation quantities measured will be actual volume removed within following limits:
 - .1 Width for trench excavation as indicated.
 - .2 Width for excavation for structures as indicated.
 - .3 Depth from ground elevation immediately prior to excavation, to elevation as indicated.
 - .2 Rock quantities measured will be actual volume removed within following limits:
 - .1 Width for trench excavation as indicated.
 - .2 Width for excavation for structures to be bounded by vertical planes up to 500 mm outside of and parallel to neat lines of footings as indicated.
 - .3 Depth from rock surface elevations immediately prior to excavation, to elevation as indicated.
 - .4 Where design elevation is less than 200 mm below original rock surface, depth will be considered to be 200 mm below original rock surface.
 - .5 Volume of individual boulders and rock fragments will be determined by measuring three maximum mutually perpendicular dimensions.
- .2 Backfilling to authorized excavation limits will be measured in cubic metres compacted in place for each type of material specified.
- .3 Placing and spreading of topsoil will be measured for payment in cubic metres calculated from cross sections taken in area of excavation from original location.
 - .1 If double handling of topsoil is required, (stockpiling and later placing), then quantities will be measured twice; on excavation from original location and on excavation from stockpile.
 - .1 Rates for excavating from original location and from stockpile must be provided at time of tender.

1.3 References

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

- .3 ASTM D422-63 2002, Standard Test Method for Particle-Size Analysis of Soils.
- .4 ASTM D698-00a1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
- .5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
- .6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric. Canada Green Building Council (CaGBC)
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
 - .2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .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.
- 1.4 Definitions
 - .1 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
 - .2 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
 - .3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
 - .4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
 - .5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
 - .6 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:

- .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 : Sieve sizes to CAN/CGSB-8.1.
 - .2 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
 - .7 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.
- 1.5 Action And Informational Submittals
 - .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, location plan of relocated and abandoned services, as required.
- 1.6 Quality Assurance
 - .1 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- 1.7 Waste Management And Disposal
 - .1 Divert excess materials from landfill to local facility for reuse as directed by Departmental Representative.
- 1.8 Existing Conditions
 - .1 Examine soil report available at back of specifications.
 - .2 Buried services:
 - .1 Before commencing work establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, notify applicable Departmental Representative establish location and state of use of buried utilities and structures. Departmental Representative to clearly mark such locations to prevent disturbance during Work.
 - .6 Maintain and protect from damage, if applicable, electrical, telephone and other utilities and structures encountered.

- .7 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing and/or re-routing. Costs for such Work to be paid by Departmental Representative.
- .8 Record location of maintained, re-routed and abandoned underground lines.
- .9 Confirm locations of recent excavations adjacent to area of excavation.
- .3 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, service poles, wires, and pavements which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative
 - .3 Where required for excavation, cut roots or branches in accordance with Section 32 01 90.33 - Tree and Shrub Preservation.

Part 2 Products

2.1 Materials

- .1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136. Sieve sizes to CAN/CGSB-8.2.
 - .3 Table: Type 1: Surfacing Gravel Gradation

Sieve Designation	% Passing
25 mm	100
10 mm	30-77
5 mm	15-55
1.25	0-30
0.08 mm	2-10

.4

.5 Table: Type 2: Base Course Gradation

Sieve Designation	% Passing
80 mm	100
50 mm	55-100
25 mm	38-100
16 mm	32-85
5 mm	20-65
0.315 mm	6-30
0.075 mm	2-10

- .2 Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
- .3 Geotextiles: to Section 31 32 19.01 - Geotextiles.

Part 3 Execution

- 3.1 Temporary Erosion And Sedimentation Control
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of 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.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- 3.2 Site Preparation
 - .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- 3.3 Preparation/Protection
 - .1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
 - .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
 - .5 Protect buried services that are required to remain undisturbed.
- 3.4 Stripping Of Topsoil
 - .1 Refer to Section 31 14 13 Soil Stripping and Stockpiling
- 3.5 Stockpiling
 - .1 Refer to Section 31 14 13 Soil Stripping and Stockpiling
- 3.6 Excavation
 - .1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.
 - .2 Excavate to lines, grades, elevations and dimensions as indicated.
 - .3 Remove concrete, demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.
 - .4 Excavation must not interfere with bearing capacity of adjacent foundations.
 - .5 Do not disturb soil within branch spread of trees or shrubs that are to remain.

- .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
 - .6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
 - .7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
 - .8 Restrict vehicle operations directly adjacent to open trenches.
 - .9 Dispose of surplus and unsuitable excavated material off site.
 - .10 Do not obstruct flow of surface drainage or natural watercourses.
 - .11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
 - .12 Notify Departmental Representative when bottom of excavation is reached.
 - .13 Obtain Departmental Representative approval of completed excavation.
 - .14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
 - .15 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with concrete specified for footings Type 2 fill compacted to not less than 100% of corrected Standard Proctor maximum dry density.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 95 % of corrected Standard Proctor maximum dry density.
 - .16 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
 - .17 Install geotextiles in accordance with Section 31 32 19.01 - Geotextiles.
- 3.7 Fill Types And Compaction
- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698.
 - .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95% of corrected maximum dry density.
 - .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100 % of corrected maximum dry density.
 - .3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100 %.

- 3.8 Bedding And Surround Of Underground Services
 - .1 Place and compact granular material for bedding and surround of underground services as indicated.
 - .2 Place bedding and surround material in unfrozen condition.
- 3.9 Backfilling
 - .1 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Departmental Representative has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
 - .4 Removal of concrete formwork.
 - .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
 - .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
 - .3 Do not use backfill material which is frozen or contains ice, snow or debris.
 - .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
 - .5 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 1 m.
 - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative:
 - .2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.
- 3.10 Restoration
 - .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
 - .2 Restore as indicated.

END OF SECTION

Approved: 2011-06-30

Part 1 General

1.1 References

- .1 ASTM International
 - .1 ASTM D1248-05, Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.
 - .2 ASTM D4101-10, Standard Specification for Polypropylene Injection and Extrusion Materials.
 - .3 ASTM D4218-96(R2008), Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds By the Muffle-Furnace Technique.
 - .4 ASTM D5262-07, Standard Test Method for Evaluating the Unconfined Tension Creep Behaviour of Geosynthetics.
 - .5 ASTM D6637-10, Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method.
- .2 Drexel University - Geosynthetic Research Institute (GRI)
 - .1 GRI GG2-87(R2005), Geogrid Junction Strength.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 Action And Informational Submittals

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

1.3 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 During delivery and storage, protect geogrids from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials as specified in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 Material

- .1 Geogrid: open grid polymer having biaxial orientation, free of striations, roughness, pinholes, blisters, undispersed raw materials or any sign of contamination by foreign matter.
 - .1 Product: Tensar BX1100 or approved equivalent.

- .2 Roll width: 3.0 m minimum.
- .3 Rib thickness: 0.76 mm minimum.
- .4 Aperture size:
 - .1 Machine direction: 25 mm.
 - .2 Cross machine direction: 25 mm.
- .5 Polymer: polypropylene: to ASTM D4101 with inhibitors added to resist deterioration by ultra-violet and heat exposure.
- .2 Geogrid physical properties:
 - .1 Peak tensile strength:
 - .1 Machine direction: minimum 12.4 kN/m.
 - .2 Tensile secant modulus at 2% elongation: to ASTM D6637, minimum 4.1kN/m

Part 3 Execution

3.1 Examination

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

3.2 Preparation

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

3.3 Installation

- .1 Place geogrid material by unrolling onto graded surface in manner and locations indicated and retain in position in accordance with manufacturer's written recommendations.
- .2 Place geogrid on sloping surfaces in one continuous length from toe of slope to upper extent of geogrid.

- .3 Overlap each successive strip of geogrid 600 mm over previously laid strip.
 - .4 Join successive strips of geogrid as recommended by manufacturer.
 - .5 Protect geogrid from displacement, damage or deterioration before and during placement of overlay soil layers.
 - .6 After installation, cover with overlay layer within 10 days of placement.
 - .7 Replace damaged or deteriorated geogrid to approval of Departmental Representative.
 - .8 Place and compact soil layers in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- 3.4 Cleaning
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- 3.5 Protection
- .1 Vehicular traffic not permitted directly on geogrid.

END OF SECTION

Approved: 2014-06-30

Part 1 General

1.1 Related Requirements

1.2 References

.1 Definitions:

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

.2 Reference Standards:

.1 ASTM International

- .1 ASTM A1064/A1064M-13, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 CSA Group

- .1 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.3 Department of Justice Canada (Jus)

- .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
- .2 Fertilizers Act (R.S. 1985, c. F-10).
- .3 Fertilizers Regulations (C.R.C., c. 666).
- .4 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.4 Health Canada - Pest Management Regulatory Agency (PMRA)

- .1 National Standard for Pesticide Education, Training and Certification in Canada (1995).

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

1.3 Administrative Requirements

.1 Scheduling:

- .1 Obtain approval from Departmental Representative of schedule indicating beginning of Work.

1.4 Action And Informational Submittals

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

.2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for tree and shrub preservation materials and include product characteristics, performance criteria, physical size, finish and limitations.

- 1.5 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect tree and shrub preservation materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- 1.6 Maintenance During Warranty Period
 - .1 From time of acceptance by Departmental Representative to end of warranty period, perform following maintenance operations.
 - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
 - .2 Apply pesticides in accordance with National Standard for Pesticide Education, Training and Certification in Canada, Federal, Provincial and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from Departmental Representative prior to application.
 - .3 Apply fertilizer in early spring at manufacturer's suggested rate.
 - .4 Remove dead, broken or hazardous branches from plant material.

Part 2 Products

- 2.1 Materials
 - .1 Fill:
 - .1 Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.
 - .2 Type (B): excavated soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc). Excavated material shall be approved by Departmental Representative before use as fill.
 - .2 Coarse washed stones: 35-75 mm diameter clean round hard stone.
 - .3 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded minimum particle size: 5 mm.
 - .4 Fertilizer:

- .1 To Canada Fertilizer Act and Fertilizers Regulations.
 - .2 Complete, commercial, slow release with 35% of nitrogen content in water-insoluble form.
- .5 Anti-desiccant: commercial, wax-like emulsion.
- .6 Filter Cloth:
 - .1 Type 1: 100 % non-woven needle punched polyester, 2.75 mm thick, 240 g/m2 mass.
 - .2 Type 2: biodegradable burlap.
- 2.2 Examination
 - .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for tree and shrub preservation installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 2.3 Identification And Protection
 - .1 Identify plants and limits of root systems to be preserved as approved by Departmental Representative.
 - .2 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by Departmental Representative.
 - .3 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an arborist or Canadian Certified Horticultural Technician (CCHT) as approved by Departmental Representative.
- 2.4 Root Curtain System
 - .1 Identify limits for required construction excavation as approved by Departmental Representative.
 - .2 Prior to construction excavation, dig trench minimum 500 mm wide x 1500 mm deep, along perimeter of excavation limits.
 - .3 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.
- 2.5 Lowering Grade Around Existing Tree
 - .1 Begin Work in accordance with schedule approved by Departmental Representative.
 - .2 Cut slope not less than 500 mm from tree trunk to new grade level.
 - .3 Excavate to depths as indicated. Protect from damage root zone which is to remain.
 - .4 When severing roots at excavation level, cut roots with sharp tools.

- .5 Cultivate excavated surface manually to 15 mm depth.
 - .6 Prepare homogeneous soil mixture consisting by volume of:
 - .1 60% excavated soil cleaned of roots, plant matter, stones, debris.
 - .2 25% coarse, clean sterile sand.
 - .3 15% organic matter.
 - .4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m3.
 - .7 Place soil mixture over area of excavation to finished grade level. Compact to 85% Standard Proctor Density.
 - .8 Water entire root zone to optimum soil moisture level.
 - .9 Install surface cover of seeding in accordance with Section 32 92 19.16 - Hydraulic Seeding.
- 2.6 Pruning
- .1 Prune crown to compensate for root loss while maintaining general form and character of plant.
- 2.7 Cleaning
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Approved: 2011-06-30

Part 1 General

1.1 Related Requirements

- .1 Section 32 11 23 – Aggregate Base Courses
- .2 Section 32 15 40 – Crushed Stone Surfacing.

1.2 References

- .1 ASTM International
 - .1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
 - .5 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .6 ASTM D1557-09, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .7 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .8 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Action And Informational Submittals

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

1.4 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.

- .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 Materials

- .1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:

- .1 Crushed, pit run or screened stone, gravel or sand.
.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3 Table

Sieve Designation	% Passing			
100 mm	-	-	-	-
75 mm	100	100	100	-
50 mm	-	-	-	100
37.5 mm	-	-	-	-
25 mm	55-100	-	-	60-100
19 mm	-	-	-	-
12.5 mm	-	-	-	38-70
9.5 mm	-	-	-	-
4.75 mm	25-100	25-85	-	22-55
2.00 mm	15-80	-	-	13-42
0.425 mm	4-50	5-30	0-30	5-28
0.180 mm	-	-	-	-
0.075 mm	0-8	0-10	0-8	2-10

- .4 Other properties as follows:
- .1 Liquid Limit: to ASTM D4318, Maximum 25.
.2 Plasticity Index: to ASTM D4318, Maximum 6.
.3 Los Angeles degradation: to ASTM C131.
.1 Maximum loss by mass: 40 50 %.
.4 Particles smaller than 0.02 mm: to ASTM D422, Maximum 3%.
.5 Soaked CBR: to ASTM D1883, Minimum 40 when compacted to 100% of ASTM D1557.

Part 3 Execution

3.1 Examination

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Preparation

.1 Temporary Erosion and Sedimentation Control:

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

3.3 Placing

- .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.
- .5 Begin spreading sub-base material on crown line or high side of one-way slope.
- .6 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .8 Place material to full width in uniform layers not exceeding 275 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .10 Remove and replace portion of layer in which material has become segregated during spreading.

3.4 Compaction

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Departmental Representative before use.
- .3 Equipped with device that records hours of actual work, not motor running hours.

- .4 Compact to density of not less than 98%.
 - .5 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
 - .6 Apply water as necessary during compaction to obtain specified density.
 - .7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
 - .8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- 3.5 Cleaning
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- 3.6 Site Tolerances
- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.
- 3.7 Protection
- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

END OF SECTION

Approved: 2011-06-30

Part 1 General

1.1 Related Requirements

1.2 References

.1 ASTM International

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

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 U.S. Environmental Protection Agency (EPA) / Office of Water

- .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Action And Informational Submittals

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

.1 Sustainable Design Submittals:

- .1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

1.4 Delivery, Storage And Handling

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

.2 Storage and Handling Requirements:

- .1 Stockpile minimum 50% of total aggregate required prior to beginning operation.

- .2 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .1 Stockpile as directed by Departmental Representative in location to minimize environmental impacts to adjacent landscaping.
- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 Materials

- .1 Granular base:
 - .1 Crushed stone or gravel.
 - .2 Gradations to be within limits specified when tested to ASTM C136. Sieve sizes to CAN/CGSB-8.1.
 - .3 Table: Type 1: Base Course Gradation

Sieve Designation	% Passing
80	100
50	55-100
25	38-100
16	32-85
5	20-65
.315	6-30
.08	2-10

- .1 Other properties as follows:
 - .1 LA Abrasion Loss: Max 45%
 - .2 % Fracture by weight: Min. 20%
 - .3 Plasticity Index: Max. 8

Part 3 Execution

3.1 Preparation

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

3.2 Placement And Installation

- .1 Place granular base after sub-base surface is inspected and approved in writing by Departmental Representative.
- .2 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Begin spreading base material on crown line or on high side of one-way slope.
 - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
 - .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
 - .1 Ensure compaction equipment is capable of obtaining required material densities.
 - .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Departmental Representative before use.
 - .3 Equipped with device that records hours of actual work, not motor running hours.
- .4 Compacting:
 - .1 Compact to density not less than 98% maximum dry density to ASTM D698.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 Site Tolerances

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.4 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 as indicated below:
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Divert unused granular material from landfill to local quarry approved by Departmental Representative.
- 3.5 Protection
- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

Approved: 2009-12-31

Part 1 General

- 1.1 Related Requirements
 - .1 Section 32 11 16.01 – Granular Sub-Base
 - .2 Section 32 11 23 – Aggregate Base Courses
- 1.2 References
 - .1 ASTM International
 - .1 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM C117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM D4318-05, Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
 - .4 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³).
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- 1.3 Administrative Requirements
 - .1 Access: allow access to building at all times.
 - .2 Scheduling: co-ordinate paving schedule to minimize interference with normal use of premises.
- 1.4 Action And Informational Submittals
 - .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- 1.5 Delivery, Storage And Handling
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Store crushed stone as and where directed by Departmental Representative.

Part 2 Products

- 2.1 Materials
 - .1 Granular Sub-Base
 - .1 Not required

- .2 Granular base:
 - .1 In accordance with Section 31 11 23 - Aggregate Base

- .3 Granular topping - pedestrian:
 - .1 Screenings: hard, durable, crushed stone particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
 - .2 Gradations: within limits specified when tested to ASTM C136.

Sieve Designation	% Passing
9.5 mm	100
4.75 mm	50-100
2.00 mm	30-65
0.425 mm	10-30
0.075 mm	5-10

- .4 Granular topping - vehicular:
 - .1 Gradations: within limits specified when tested to ASTM C136.

Sieve Designation	% Passing
25	100
10	30-77
5	15-55
1.25	0-30
0.08	0-12

- .2 Other properties as follows:
 - .1 LA Abrasion Loss: Max 45%
 - .2 % Fracture by weight: Min. 40%
 - .3 Plasticity Index: Max. 8

Part 3 Execution

- 3.1 Subgrade
 - .1 Ensure subgrade preparation conforms to levels and compaction required, to allow for installation of granular base.
- 3.2 Granular Base
 - .1 Granular base material thickness: as indicated.
 - .2 Spread and compact granular base material in uniform layers not exceeding 100 mm compacted thickness.
 - .3 Compact to a density of not less than 100 % Standard Density in accordance with ASTM D698.
- 3.3 Granular Topping
 - .1 Place granular topping to compacted thickness as indicated.
 - .2 Place material in uniform layers not to exceed 50 mm compacted thickness.
 - .1 Compact layer to 100 % Standard Density in accordance with ASTM D698.

3.4 Field Quality Control

- .1 Inspection and testing of crushed stone paving: carried out by designated testing laboratory.
- .2 Costs of tests: paid by Departmental Representative.

3.5 Cleaning

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

3.6 Protection

- .1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property.
 - .1 Repair damages incurred.
- .2 Provide access to building at all times. Co-ordinate paving schedule to minimize interference with normal use of premises.

END OF SECTION

Approved: 2011-06-30

Part 1 General

1.1 Related Requirements

1.2 References

.1 ASTM International

- .1 ASTM A53/A53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- .2 ASTM A121-07, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
- .3 ASTM D5116-10, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.2 CSA International

- .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA G42-1964(R1998), Galvanized (Zinc-Coated) Steel Farm-Field Wire Fencing.
- .3 CAN/CSA O80 Series-08, Wood Preservation.

.3 The Master Painters Institute (MPI)

- .1 Architectural Painting Specification Manual - current edition.

.4 U.S. Environmental Protection Agency (EPA) / Office of Water

- .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Action And Informational Submittals

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

.2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for gates, posts, and paint and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 Delivery, Storage And Handling

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

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect fence and gates from damage.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 Materials

- .1 Gates:
 - .1 Frame: as indicated
 - .2 Steel chain: as indicated, galvanized
 - .3 Size: as indicated.
 - .4 Joints: as indicated.
- .2 Timber components: No. 2 and better structural grade, rough cedar.
- .3 Paint: to MPI EXT 6.2C, colour Parks Canada brown, as directed by Departmental Representative.

Part 3 Execution

3.1 Examination

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

3.2 Preparation

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to 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.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
 - .2 Grading:
 - .1 Level ground along fence line in order to ensure that bottom wire of fence between posts can be maintained at not more than 150 mm above ground.
- 3.3 Erection
 - .1 Erect along lines as indicated.
 - .2 Installation of posts:
 - .1 Space intermediate posts at 5 m.
 - .2 Space corner, end and gate posts 3 m from adjacent post.
 - .3 Locate and erect gate posts as indicated.
 - .4 Install posts true to line and plumb with 1.5 m of post projecting above ground.
 - .3 Wood posts:
 - .1 Excavate post holes to dimensions indicated by methods approved by Departmental Representative.
 - .2 Slant of post tops to be perpendicular to fence line and facing outward.
 - .3 Install cleats for anchoring at corner, gate, end and anchor posts.
 - .4 Embed in concrete as indicated.
 - .5 Backfill around posts and compact to same density as surrounding ground. Dispose of surplus material as directed by Departmental Representative.
 - .6 Install braces at end, corner and gate posts as indicated. Join braces into posts and spike securely.
 - .7 Erect wires and stretch to have uniform tension. Splice wires with standard wire splices
 - .8 Painting of posts:
 - .1 Apply 2 coats of paint in accordance with manufacturer's written instructions.
 - .1 Allow initial coat to dry before applying second coat.
 - .2 Apply paint only when relative humidity is below 85% and ambient temperature is greater than 5 degrees C.
- 3.4 Installation Of Gates
 - .1 Install gates in locations as indicated.
 - .2 Install gates to prevent over-stress on gate posts when gates are open.
 - .1 Install on level ground with ground clearance of 100 mm maximum.
 - .3 Locate anchor pipe for drop bolt, and install pipe flush with grade surface.
- 3.5 Cleaning
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Clean and trim areas disturbed by operations. Dispose of surplus material and replace damaged landscape vegetation as directed by Departmental Representative.
- .3 Touch Up:
 - .1 Clean damaged painted wood surfaces with wire brush removing loose and cracked coatings.
 - .1 Apply two coats of same paint to damaged areas in accordance with Section 09 91 13 - Exterior Painting.
 - .2 Clean damaged galvanized surfaces with wire brush removing loose and cracked coatings.
 - .1 Apply 2 coats of organic zinc-rich coating.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

- 1.1 Related Requirements
- 1.2 References
- 1.3 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4 Delivery, Storage And Handling
 - .1 Supply and delivery provided by Departmental Representative.
 - .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect furnishings from nicks, scratches, and blemishes.
 - .3 Replace damaged materials with new.

Part 2 Products

- 2.1 Boulder salvaged on site
 - .1 Includes the supply of all materials and labour required to install boulders, install per manufacturer instructions.
- 2.2 Wheel Stop
 - .1 Includes the supply of all materials and labour required to install wheel stop, install as per manufacturer instructions.
- 2.3 Fire Ring
 - .1 Supplied by Departmental Representative, install as per manufacturer instructions.

Part 3 Execution

- 3.1 Examination
 - .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for exterior site furnishing installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Preparation

- .1 Locate and protect utility lines.
- .2 Notify and acquire written acknowledgment from utility authorities before beginning installation Work

3.3 Installation

- .1 Assemble furnishings in accordance with manufacturer's written recommendations.
- .2 Install furnishing as indicated.
- .3 Touch-up damaged finishes to approval of Departmental Representative.

3.4 Cleaning

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

3.5 Protection

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by site furnishings installation.

END OF SECTION

Approved: 2006-09-30

Part 1 General

- 1.1 Material Supplied By Departmental Representative / Dcc Representative/ Consultant
 - .1 Departmental Representative will supply topsoil previously stockpiled on job site.
- 1.2 Related Requirements
 - .1 Section 31 14 13 Soil Stripping and Stockpiling
 - .2 Section 31 22 13 Rough Grading
- 1.3 Measurement Procedures
 - .1 Measurement Procedures.
 - .1 Preparation of sub-grade for placing of topsoil will be measured in square metres of area prepared.
 - .2 Topsoil stripping
 - .1 Section 31 14 13 Soil Stripping and Stockpiling.
 - .3 Measure placing and spreading and finish grading of topsoil in cubic metres removed from stockpile.
 - .1 Stockpiles will be measured by Departmental Representative and volume of topsoil removed calculated by average end area method.
 - .2 Payment Procedures.
 - .1 Unit rate payment per square metre of rough graded site area.
- 1.4 References
 - .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
 - .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-2005, Guidelines for Compost Quality.
 - .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- 1.5 Quality Assurance
 - .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

- 2.1 Topsoil
 - .1 Use stockpiled topsoil from stripping.

Part 3 Execution

- 3.1 Temporary Erosion And Sedimentation Control
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to 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.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- 3.2 Stripping Of Topsoil
 - .1 Section 31 14 13 Soil Stripping and Stockpiling
- 3.3 Preparation Of Existing Grade
 - .1 Section 31 22 13 Rough Grading
 - .2 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.
- 3.4 Placing And Spreading Of Topsoil/Planting Soil
 - .1 Place topsoil after Departmental Representative has accepted subgrade.
 - .2 Spread topsoil in uniform layers not exceeding 150 mm.
 - .3 For sodded areas keep topsoil 15 mm below finished grade.
 - .4 Spread topsoil to following minimum depths after settlement.
 - .1 150 mm for seeded areas.
 - .2 150 mm for sodded areas.
 - .3 500 mm for shrub beds.
 - .4 In the event of surplus unused topsoil, spread as directed by Departmental Representative
 - .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
- 3.5 Finish Grading
 - .1 Grade to eliminate rough spots and low areas and ensure positive drainage.

- .1 Prepare loose friable bed by means of cultivation and subsequent raking.
 - .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.
- 3.6 Acceptance
 - .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.
- 3.7 Surplus Material
 - .1 Dispose of materials except topsoil not required where directed by Departmental Representative.
- 3.8 Cleaning
 - .1 Proceed in accordance with Section 01 74 11 - Cleaning.
 - .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Approved: 2011-06-30

Part 1 General

- 1.1 Related Requirements
- 1.2 Measurement And Payment
- 1.3 Administrative Requirements
 - .1 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 19 - Project Meetings.
 - .2 Scheduling:
 - .1 Schedule hydraulic seeding to coincide with preparation of soil surface.
 - .2 Schedule hydraulic seeding using grass mixtures and mixtures containing legumes between dates recommended by Departmental Representative.
- 1.4 Action And Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.
 - .2 Submit inoculant technical data sheet, which clearly states recommended application rate for legumes in seed mix.
 - .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
 - .3 Submit in writing 5 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.
 - .4 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - .5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- 1.5 Quality Assurance
 - .1 Qualifications:
 - .1 Landscape Contractor: to be a Member in Good Standing of Landscape Alberta Nursery Trades Association.
 - .2 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.

- .3 Landscape Maintenance Supervisor: Landscape Industry Certified Technician with Turf Maintenance designation.

1.6 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
 - .2 Inoculant containers to be tagged with expiry date.
- .3 Storage and Handling Requirements:
 - .1 Store fertilizer in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.7 Warranty

- .1 For seeding, 12 months warranty period is extended to 2 full growing seasons.
- .2 Contractor hereby warrants that seeding will remain free of defects in accordance with General Conditions GC 12.3, but for 2 full growing seasons.
- .3 End-of-warranty inspection will be conducted by Departmental Representative.

Part 2 Products

2.1 Materials

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
 - .1 Grass mixture: "Certified", "Canada No. 2 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .1 Mixture composition:
 - .1 30% Hairy Wild Rye - *Elymus innovatus*
 - .2 30% Junegrass - *Koeleria macrantha*
 - .3 20% Sandberg's Bluegrass - *Poa secunda*
 - .4 10% Streambank Wheatgrass - *Agropyron riparian*
 - .5 6% Tufted Wheatgrass - *Elymus macrourus*
 - .6 2% Canada Reedgrass - *Calamagrostis canadensis*
 - .7 2% American Vetch - *Vicia americana*
- .2 Inoculant:
 - .1 Rhizobia species as recommended by seed supplier for vetch.
 - .2 Application rate as recommended by seed supplier.

- .3 Hydromulch: 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: (Profile Cocoflex or equivalent)
 - .1 Made from green dyed wood fibers (52%), coconut fibers (21%), man-made biodegradable fibers (7%).
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 1500%.
 - .5 Biodegradability: 100%
 - .6 Functional Longevity: Up to 24 months
 - .7 Wet bond strength: 7 lb / ft
 - .2 Tackifier:
 - .1 Hydrocolloidal Based Polysaccharide Tackifier and Guar Gum.
 - .2 Crosslinked biopolymers and water absorbents (10%)
 - .3 Water: free of impurities that would inhibit germination and growth.
 - .4 Fertilizer:
 - .1 To Canada "Fertilizers Act" and Regulations.
 - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.

Part 3 Execution

- 3.1 Cleaning
 - .1 Ensure equipment is clean of all seed prior to arrival on site.
- 3.2 Examination
 - .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for hydraulic seeding in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.3 Installers
 - .1 Use installers members in Good Standing of Landscape Alberta Nursery Trades Association.
 - .2 Installer shall be approved by product manufacturer, have access to the manufacturer's required equipment, and trained in the proper application of the product.

3.4 Protection Of Existing Conditions

- .1 Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.
- .2 Immediately remove any material sprayed where not intended as directed by Departmental Representative.

3.5 Preparation Of Surfaces

- .1 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .2 Fine grade areas to be seeded free of humps and hollows.
 - .1 Ensure areas are free of deleterious and refuse materials.
- .3 Cultivated areas identified as requiring cultivation to depth of 25 mm.
- .4 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .5 Obtain Departmental Representative's approval of grade and topsoil depth before starting to seed.

3.6 Preparation Of Slurry

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

3.7 Slurry Application

- .1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.
- .2 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
 - .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
 - .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .3 Hydromulch slurry mixture applied per hectare.
 - .1 Seed: grass mixture: 15 kg.
 - .2 Type 1 Mulch mixture: 4500 kg
 - .1 Adjust application rate based on slope gradient, as recommended by manufacturer.

- .4 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.
- .5 Blend application 500 mm into adjacent grass areas or sodded areas to form uniform surfaces.
- .6 Re-apply where application is not uniform.
- .7 Remove slurry from items and areas not designated to be sprayed.
- 3.8 Cleaning
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.
- 3.9 Protection
 - .1 Protect seeded areas from trespass until plants are established.
 - .2 Remove protection devices as directed by Departmental Representative.
- 3.10 Maintenance During Establishment Period
 - .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
 - .2 Perform following operations from time of seed application until acceptance by Departmental Representative.
 - .3 Grass Mixture:
 - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Mow grass to 150 mm whenever it reaches height of 300 mm. Remove clippings which will smother grass as directed by Departmental Representative.
 - .3 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
 - .1 If chemical means are used, comply with Section 31 31 19.13 - Chemical Vegetation Control.
 - .4 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
- 3.11 Acceptance
 - .1 Seeded areas will be accepted by Departmental Representative provided that:

- .1 Plants are uniformly established. Seeded areas are free of rutted, eroded, bare or dead spots.
 - .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.
- 3.12 Maintenance During Warranty Period
 - .1 Perform following operations from time of acceptance until end of warranty period:
 - .1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.
 - .2 Mow areas seeded, remove clippings that will smother grassed areas, as directed by Departmental Representative, and in accordance with following schedule:

Seed Mixture	Frequency	Requirements for Cutting	Height of Cut
Grasses	As required	300mm	150mm

END OF SECTION

Part 1 General

1.1 Related Requirements

1.2 References

.1 Reference Standards:

- .1 Agriculture and Agri-Food Canada (AAFC).
 - .1 Plant Hardiness Zones in Canada-2000.
- .2 Canadian Nursery Landscape Association (CNLA)
 - .1 Canadian Standards for Nursery Stock-2006.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .5 Revegetation Plan for Protection Mountain Campground in Banff National Park
 - .1 Avens Consulting -2014

1.3 Administrative Requirements

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

1.4 Action And Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for trees, shrubs, ground cover, fertilizer, and mulch and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 Quality Assurance

- .1 Qualifications:

- .1 Landscape Contractor: to be a Member in Good Standing of Landscape Alberta Nursery Trades Association.
- .2 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.
- .3 Landscape Maintenance Supervisor: Landscape Industry Certified Technician with Ornamental Maintenance designation.

1.6 Delivery, Storage And Handling

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

1.7 Warranty

- .1 For plant material as itemized on plant list the 12 months warranty period is extended to 24 months.
- .2 Contractor hereby warrants that plant material as itemized on plant list will remain free of defects, but for 1 full growing season, providing adequate maintenance has been provided.

- .3 End-of-warranty inspection will be conducted by Departmental Representative.
- .4 Departmental Representative reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

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 in accordance with Plant Hardiness Zones in Canada.
 - .1 Genetics sourced from an ecoregion similar to the project site, as approved by the Departmental Representative.
 - .2 Grown in an ecoregion similar to the project site, as approved by the Departmental Representative.
 - .2 Plant material must be planted in zone specified as appropriate for its species.
 - .3 Plant material in location appropriate for its species.
- .2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- .3 Trees: with straight trunks, well and characteristically branched for species.
- .4 Bare root stock, nursery grown, in dormant stage, not balled and burlapped or container grown.
- .5 Collected stock: maximum 40 mm in caliper, with well developed crowns and characteristically branched; no more than 40% of overall height may be free of branches.
 - .1 During collection, ensure 10% maximum seed crop (or plants) are collected from healthy population of many individuals, and from several plants of same species.
 - .2 Leave remainder for natural dispersal and as food for dependent organisms.

2.2 Water

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

2.3 Stakes

- .1 Wood, pointed one end, 38 x 38 x 2300 mm.

2.4 Wire Tightener

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

2.5 Guying Wire

- .1 Type 1: steel, 3 mm wire.

- .2 Type 2: 1.5 mm diameter multi-wire steel cable.
- .3 Type 3: 3 mm diameter multi-wire steel cable.
- 2.6 Clamps
 - .1 U-bolt: galvanized, 13 mm diameter, c/w curved retaining bar and hex nuts.
 - .2 Crimp type.
- 2.7 Anchors
 - .1 Wood:
 - .1 Type 1: 38 x 38 x 460 mm.
 - .2 Type 2: 38 x 67 x 600 mm.
 - .2 Drive-in type.
 - .1 Type 1: 13 mm diameter x 75 mm long.
 - .2 Type 2: 18 mm diameter x 120 mm long.
 - .3 Screw-in type:
 - .1 Type 1: 100 mm diameter steel disc.
- 2.8 Guying Collar
 - .1 Tube: plastic, 13 mm diameter, nylon reinforced.
- 2.9 Trunk Protection
 - .1 Wire mesh: galvanized, electrically welded 1.4 mm wire with 25 x 25 mm mesh and fastener.
 - .2 Plastic: perforated spiralled strip.
 - .3 Burlap: clean 2.5 kg/m² minimum mass and 150 mm minimum wide, and twine fastener.
 - .4 Tar impregnated crepe paper and twine fastener.
- 2.10 Fertilizer
 - .1 Synthetic commercial type as recommended by manufacturer.
- 2.11 Anti-Desiccant
 - .1 Wax-like emulsion.
- 2.12 Flagging Tape
 - .1 Fluorescent, orange colour.
- 2.13 Source Quality Control
 - .1 Obtain approval from Departmental Representative of plant material prior to planting.
 - .2 Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal, Provincial or Territorial regulations.

Part 3 Execution

3.1 Examination

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

3.2 Pre-Planting Preparation

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

3.3 Excavation And Preparation Of Planting Beds

- .1 Establishment of sub-grade for planting beds in accordance with Section 31 22 13 - Rough Grading.
- .2 Preparation of planting beds in accordance with Section 32 91 19.13 - Topsoil Placement and Grading.
- .3 For individual planting holes:
 - .1 Stake out location and obtain approval from Departmental Representative prior to excavating.
 - .2 Excavate to depth and width as indicated.

- .3 Remove subsoil, rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.
- .4 Scarify sides of planting hole.
- .5 Remove water which enters excavations prior to planting. Notify Departmental Representative if water source is ground water.

3.4 Planting

- .1 For bare root stock, place 50 mm backfill soil in bottom of hole.
 - .1 Plant trees and shrubs with roots placed straight out in hole.
- .2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball.
 - .1 Do not pull burlap or rope from under root ball.
- .3 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.
- .4 Plant vertically in locations as indicated.
 - .1 Orient plant material to give best appearance in relation to structure, roads and walks.
- .5 For trees and shrubs:
 - .1 Backfill soil in 150 mm lifts.
 - .1 Tamp each lift to eliminate air pockets.
 - .2 When two thirds of depth of planting pit has been backfilled, fill remaining space with water.
 - .3 After water has penetrated into soil, backfill to finish grade.
 - .2 Form watering saucer as indicated.
- .6 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.
- .7 Water plant material thoroughly.
- .8 After soil settlement has occurred, fill with soil to finish grade.

3.5 Trunk Protection

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

3.6 Tree Supports

- .1 Install tree supports as indicated.
- .2 Use single stake tree support for deciduous trees less than 3 m in height and evergreens less than 2 m in height.
 - .1 Place stake on prevailing wind side and 150 mm minimum from trunk.
 - .2 Drive stake 150 mm minimum into undisturbed soil beneath roots.
 - .1 Ensure stake is secure, vertical and unsplit.

- .3 Install 150 mm long guying collar 1500 mm above grade.
 - .4 Thread Type 1 guying wire through guying collar tube.
 - .1 Twist wire to form collar and secure firmly to stake. Cut off excess wire.
 - .3 Use 3 guy wires and anchors for deciduous trees greater than 3 m in height and evergreens greater than 2 m in height.
 - .1 Use Type 2 guying wire with clamps for trees less than 75 mm in diameter and Type 3 guying wire with clamps for trees greater than 75 mm in diameter.
 - .2 Use Type 1 anchors for trees less than 75 mm in diameter and Type 2 anchors for trees greater than 75 mm in diameter.
 - .3 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens and 1/2 height for deciduous trees. Collar mounting height not to exceed 2.5 m above grade.
 - .4 Guying collars to be of sufficient length to encircle tree plus 50 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.
 - .5 Install anchors at equal intervals about tree and away from trunk so guy wire will form 45 degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.
 - .6 Attach guy wire to anchors. Tension wire and secure by multi-wraps.
 - .7 Install wire tightener ensuring that guys are secure and leave room for slight movement of tree.
 - .8 Saw tops off wooden anchors which extend in excess of 100 mm above grade or as directed by Departmental Representative.
 - .9 Install flagging tape to guys as indicated.
 - .4 After tree supports have been installed, remove broken branches with clean, sharp tools.
 - 3.7 Mulching
 - .1 Ensure soil settlement has been corrected prior to mulching.
 - .2 Spread mulch as indicated.
 - 3.8 Maintenance During Establishment Period
 - .1 Perform following maintenance operations from time of planting to acceptance by Departmental Representative.
 - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
 - .1 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
 - .2 Remove weeds during summer/fall periods.
 - .3 Replace or respread damaged, missing or disturbed mulch.
 - .4 For non-mulched areas, cultivate as required to keep top layer of soil friable.

- .5 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
- .6 Remove dead or broken branches from plant material.
- .7 Keep trunk protection and guy wires in proper repair and adjustment.
- .8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

3.9 Maintenance During Warranty Period

- .1 From time of acceptance by Departmental Representative to end of warranty period, perform following maintenance operations.
 - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
 - .2 Reform damaged watering saucers.
 - .3 Remove weeds monthly.
 - .4 Replace or respread damaged, missing or disturbed mulch.
 - .5 For non-mulched, unseeded areas, cultivate monthly to keep top layer of soil friable.
 - .6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
 - .7 Apply fertilizer in early spring as indicated by soil test.
 - .8 Remove dead, broken or hazardous branches from plant material.
 - .9 Keep trunk protection and tree supports in proper repair and adjustment.
 - .10 Remove trunk protection, tree supports and level watering saucers at end of warranty period.
 - .11 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
 - .12 Submit monthly written reports to Departmental Representative identifying:
 - .1 Maintenance work carried out.
 - .2 Development and condition of plant material.
 - .3 Preventative or corrective measures required which are outside Contractor's responsibility.

3.10 Cleaning

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

3.11 Closeout Activities

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

END OF SECTION

Approved: 2006-06-30

Part 1 General

- 1.1 Related Requirements
 - .1 Section 02 41 13 Selective Site Demolition
- 1.2 Measurement Procedures
 - .1 Included as part of work in Section 02 41 13 Selective Site Demolition
- 1.3 References
 - .1 American National Standard Institute (ANSI)
 - .1 ANSI A300 (Part 1)-2001, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (revision and re-designation of ANSI A300-1995) (includes supplements).
 - .2 ANSI A300 (Part 2)-1998, Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices - Part 2 - Fertilization.
 - .3 ANSI A300 (Part 3)- 2000, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance: Standard Practices - Part 3 - Tree Support Systems (a. Cabling, Bracing, and Guying) (supplement to ANSI A300-1995).
 - .2 Canadian Nursery Landscape Association (CNLA)
 - .3 International Society of Arboriculture (ISA)
 - .4 Ontario Ministry of Agriculture, Food and Rural Affairs
 - .1 Publication 483-2004, Pruning Ornamentals.
- 1.4 Definitions
 - .1 Crown Cleaning: consists of selective removal of one or more of following items: dead, dying or diseased branches, weak branches and water sprouts.
 - .2 Crown Thinning: consists of selective removal of branches to increase light penetration, air movement and reduce weight.
 - .3 Crown Raising: consists of removal of lower tree branches to provide clearance.
 - .4 Crown Reduction or Crown Shaping: decreases tree height and/or spread.
 - .5 Vista Pruning: is selective thinning of framework limbs or specific crown areas to improve views.
 - .6 Crown Restoration: improves structure, form and appearance of trees that have been severely headed or vandalized.
- 1.5 Quality Assurance
 - .1 Certification: provide International Society of Arboriculture or Canadian Nursery Landscape Association certification.

- .2 Field Samples: do sample pruning in manner to enable Departmental Representative to identify:
 - .1 Knowledge of target areas including branch bark ridge and branch collars.
 - .2 Technique for selection process and pruning used to establish desired form and shape for each species.
 - .3 Acceptance of Work will be determined by Departmental Representative from field sample.
 - .4 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 Place materials defined as hazardous or toxic in designated containers.
 - .2 Dispose of unused disinfectant at official hazardous material collections site approved by Departmental Representative.
 - .3 Ensure emptied containers are sealed and stored safely.
 - .4 Divert wood materials from landfill to composting as directed by Departmental Representative.
- 1.7 Tool Maintenance
- .1 Ensure that tools are clean and sharp throughout pruning operation: do not use tools that crush or tear bark.
 - .2 Disinfect tools before each tree is pruned.
 - .3 On diseased plant material disinfect tools before each cut.

Part 2 Products

- 2.1 Disinfectant
- .1 20% solution of sodium hypochlorite or 70% solution of ethyl alcohol.

Part 3 Execution

- 3.1 Application
- .1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.
- 3.2 General
- .1 Prune in accordance with ANSI A300, and as directed by Departmental Representative. Where discrepancies occur between standard and specifications, specifications govern.
 - .2 Notify immediately Departmental Representative conditions detrimental to health of plant material or operations.

- .3 Prune during plant dormant period or after leaves have matured. Avoid pruning during leaf formation, at time of leaf fall, or when seasonal temperature drops below minus 10 degrees C.
- .4 Retain natural form and shape of plant species.
- .5 Do not:
 - .1 Flush cut branches.
 - .2 Crush or tear bark.
 - .3 Cut behind branch bark ridge.
 - .4 Damage branch collars.
 - .5 Damage branches to remain.

3.3 Pruning

- .1 Around perimeter of project limit of work, existing trees shall be pruned to remove dead, dying, diseased and weak growth from plant material to provide crown raising for clearance of vehicles and pedestrians, or as directed by Departmental Representative, in order to promote healthy growth.
- .2 Remove live branches that:
 - .1 Interfere with healthy development and structural strength including branches crossed or rubbing more important branches.
 - .2 Are of weak structure including narrow crotches.
 - .3 Obstruct development of more important branches.
 - .4 Are broken.
- .3 Remove live branches to re-establish natural species form including:
 - .1 One or more developing leaders.
 - .2 Multiple growth due to previous topping.
 - .3 Branches extending outward from natural form.
 - .4 Undesirable sucker growth.
- .4 Remove loose branches, twigs and other debris lodged in tree.
- .5 Remove vines.
- .6 For branches under 50 mm in diameter:
 - .1 Locate branch bark ridge and make cuts smooth and flush with outer edge of branch collar to ensure retention of branch collar. Cut target area to bottom of branch collar at angle equal to that formed by line opposite to branch bark ridge.
 - .2 Make cuts on dead branches smooth and flush with swollen callus collar. Do not injure or remove callus collar.
 - .3 Do not cut lead branches unless directed by Departmental Representative.
- .7 For branches greater than 50 mm in diameter:
 - .1 Make first cut on lower side of branch 300 mm from trunk, one third diameter of branch.

- .2 Make second cut on upper side of branch 500 mm from trunk until branch falls off.
 - .3 Make final cut adjacent to and outside branch collar.
- .8 Ensure that trunk bark and branch collar are not damaged or torn during limb removal.
- .1 Repair areas which are damaged, or remove damaged area back to next branch collar.
- .9 Remove additional growth designated by Departmental Representative.
- 3.4 Root Girdling
 - .1 For girdling roots one-quarter size of trunk diameter or larger, V-cut girdling root one-half way through at point where root is crossing.
 - .2 Remove exposed portion of girdling root as directed by Departmental Representative after cleanly cutting root flush with grade on each side of parent root. Do not injure bark or parent root.
- 3.5 Care Of Wounds
 - .1 Shape bark around wound to oblong configuration ensuring minimal increase in wound size. Retain peninsulas of existing live bark.
- 3.6 Clean-Up
 - .1 Proceed in accordance with Section 01 74 11 - Cleaning.
 - .2 Collect and compost/recycle whenever applicable pruned material and remove from site.
 - .3 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Approved: 2012-06-30

Part 1 General

1.1 Related Requirements

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

1.2 References

- .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA B300-10, Standard for Hypochlorites.
 - .2 ANSI/AWWA B301-10, Standard for Liquid Chlorine.
 - .3 ANSI/AWWA B303-10, Standard for Sodium Chlorite.
 - .4 ANSI/AWWA C104/A21.4-08, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
 - .5 ANSI/AWWA C105/A21.5-10, Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - .6 ANSI/AWWA C111/A21.11-07, American National Standard for Rubber-Gasket Joints for Ductile-Iron and Fittings.
 - .7 ANSI/AWWA C110/A21.10-08, American National Standard for Ductile-Iron and Gray Iron Fittings for Water.
 - .8 ANSI/AWWA C150/A21.50-08, Standard for Thickness Design of Ductile-Iron Pipe.
 - .9 ANSI/AWWA C151/A21.51-09, Standard for Ductile-Iron Pipe, Centrifugally Cast.
 - .10 ANSI/AWWA C153/A21.53-11, Standard for Ductile-Iron Compact Fittings.
 - .11 ANSI/AWWA C200-05, Standard for Steel Water Pipe - 6 Inch (150 mm) and Larger.
 - .12 ANSI/AWWA C203-08, Standard for Coal Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied.
 - .13 ANSI/AWWA C205-07, Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 Inch (100 mm) and Larger - Shop Applied.
 - .14 ANSI/AWWA C206-11, Standard for Field Welding of Steel Water Pipe.
 - .15 ANSI/AWWA C207-07, Standard for Steel Pipe Flanges for Waterworks Service, 4 Inch through 144 Inch (100 mm through 3,600 mm).
 - .16 ANSI/AWWA C208-07, Standard for Dimensions for Fabricated Steel Water Pipe Fittings.
 - .17 ANSI/AWWA C300-11, Standard for Reinforced Concrete Pressure Pipe, Steel-Cylinder Type.
 - .18 ANSI/AWWA C301-07, Standard for Prestressed Concrete Pressure Pipe, Steel-Cylinder Type.
 - .19 ANSI/AWWA C303-08, Standard for Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type.

- .20 ANSI/AWWA C500-09, Standard for Metal-Seated Gate Valves for Water Supply Service.
- .21 ANSI/AWWA C504-10, Standard for Rubber-Seated Butterfly Valves.
- .22 ANSI/AWWA C600-10, Standard for Installation of Ductile-Iron Water Mains, and Their Appurtenances.
- .23 ANSI/AWWA C602-11, Standard for Cement-Mortar Lining of Water Pipelines - 4 Inch (100 mm) and Larger.
- .24 ANSI/AWWA C651-05, Standard for Disinfecting Water Mains.
- .25 ANSI/AWWA C800-05, Standard for Underground Service Line Valves and Fittings.
- .26 ANSI/AWWA C906, Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 Inch (100mm) through 63 Inch (1,600 mm), for Water Distribution and Transmission.
- .2 ASTM International
 - .1 ASTM A53/A53M-10, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
 - .2 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A307-10, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
 - .4 ASTM B88M-05(2011), Standard Specification for Seamless Copper Water Tube Metric.
 - .5 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .6 ASTM C136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .7 ASTM C478M-11, Standard Specification for Precast Reinforced Concrete Manhole Sections Metric.
 - .8 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .9 ASTM D2310-06, Standard Classification for Machine-Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe.
 - .10 ASTM D2657-07, Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.
 - .11 ASTM D2992-06, Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe and Fitting.
 - .12 ASTM D2996-01(2007)e1, Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe.
 - .13 ASTM F714-10, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
 - .14 ASTM C618-08a, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- .3 American Water Works Association (AWWA)/Manual of Practice

- .1 AWWA M9-2008, Concrete Pressure Pipe.
 - .2 AWWA M11-2004, Steel Pipe - A Guide for Design and Installation.
 - .3 AWWA M17-2006, Installation, Field Testing, and Maintenance of Fire Hydrants.
 - .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
 - .3 CAN/CGSB-34.1-94, Pipe, Asbestos Cement, Pressure.
 - .4 CGSB 41-GP-25M-77, Pipe, Polyethylene, for the Transport of Liquids.
 - .5 CSA International
 - .1 CAN/CSA-A257 Series-09, Standards for Concrete Pipe (Consists of A257.0, A257.1, A257.2, A257.3 and A257.4).
 - .2 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 CAN/CSA-B137 Series-09, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
 - .1 CAN/CSA-B137.1-09, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
 - .2 CAN/CSA-B137.3-09, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.
 - .4 CSA G30.18-09, Carbon and Steel Bars for Concrete Reinforcement.
 - .6 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .7 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S520-07, Standard for Fire Hydrants.
 - .2 CAN/ULC-S543-09, Standard for Internal-Lug, Quick Connect Couplings for Fire Hose.
- 1.3 Action And Informational Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for distribution piping materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Pipe certification to be on pipe.
 - .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
 - .4 Samples:

- .1 Inform Consultant of proposed source of bedding materials and provide access for sampling at least 4 weeks prior to commencing work.
- .2 Submit manufacturer's test data and certification that pipe materials meet requirements of this section 4 weeks minimum prior to beginning work. Include manufacturer's drawings, information and shop drawings where pertinent.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit data to produce record drawings, including directions for operating valves, list of equipment required to operate valves, details of pipe material, location of air and vacuum release valves, hydrant details.
 - .1 Include top of pipe, horizontal location of fittings and type, valves and valve boxes.
- .3 Operation and Maintenance Data: submit operation and maintenance data for pipe, valves and valve boxes for incorporation into manual.

1.5 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect water distribution piping from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.6 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions for approval and adhere to interruption schedule as approved by Consultant.
- .3 Notify Consultant minimum of 24 hours in advance of interruption in service.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Tools: provide tools as follows:
 - .1 2 service post wrenches for curb stops.

Part 2 Products

2.1 Pipe, Joints And Fittings

- .1 High density polyethylene pressure pipe:
 - .1 NPS 1/2 to NPS 6: to CAN/CSA-B137.1 type 160.
 - .2 Polyethylene to polyethylene joints: to be thermal butt fusion joined or electrofusion couplings, to ASTM F2620-13.
 - .3 Polyethylene fittings: to CAN/CSA-B137.1, for pipe sizes NPS 4 and less.

2.2 VALVES AND VALVE BOXES

- .1 Air and vacuum release valves: heavy duty combination air release valves employing direct acting kinetic principle.
 - .1 Fabricate valves of cast iron body and cover, with bronze trim, stainless steel floats with shock-proof synthetic seat suitable for 2 MPa working pressure.
 - .2 Valves to expel air at high rate during filling, at low rate during operation, and to admit air while line is being drained.
 - .3 Valve complete with surge check unit.
 - .4 Ends to be flanged to ANSI/AWWA C110/A21.10.

2.3 SERVICE CONNECTIONS

- .1 Copper tubing: to ASTM B88M type K, annealed.
- .2 Polyethylene pressure pipe:
 - .1 To CAN/CSA-B137.1, type PE, series 160.
- .3 Copper tubing joints: compression type suitable for 1 MPa working pressure.
- .4 Polyethylene pipe joints: thermal butt fusion welded or plastic insert type serrated sleeves with four stainless steel screws and band-type clamps per joint.
- .5 Brass inverted key-type curb stops: red brass to ASTM B62, compression type without drains.
 - .1 Curb stops to have adjustable bituminous coated cast iron service box with stem to suit depth of bury.
 - .2 Top of cast iron box marked "WATER"/"EAU".
- .6 Polyethylene tapping tees or multi-saddle tees: for Polyethylene pipe. Tees to be socket fused to pipe.

2.4 PIPE BEDDING AND SURROUND MATERIAL

- .1 Granular material to: Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136. Sieve sizes to CAN/CGSB-8.1.
- .2 Concrete mixes and materials required for bedding cradles, encasement, supports, thrust blocks: to Section 03 30 00 - Cast-in-Place Concrete.

- 2.5 Backfill Material
 - .1 As indicated.
- 2.6 Pipe Disinfection
 - .1 Disinfect water mains in accordance with ANSI/AWWA C651.
- Part 3 Execution
 - 3.1 Examination
 - .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for distribution piping installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.
 - .2 Contractor to have employees with qualifications to carry out fusing (either butt or electrofusion) on HDPE pipe.
 - 3.2 Preparation
 - .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Consultant.
 - .2 Remove defective materials from site as directed by Consultant.
 - 3.3 Trenching
 - .1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
 - .2 Ensure trench depth allows coverage over pipe of 1.2 m minimum from finished grade or as indicated.
 - .3 Trench alignment and depth require Consultant's approval prior to placing bedding material and pipe.
 - 3.4 Granular Bedding
 - .1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.
 - .2 Do not place material in frozen condition.
 - .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
 - .4 Shape transverse depressions in bedding as required to suit joints.
 - .5 Compact each layer full width of bed to 95% minimum of corrected maximum dry density.

- .6 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling with compacted bedding material.

3.5 Pipe Installation

- .1 Terminate building water service 1 m outside building wall opposite point of connection to main.
 - .1 Install coupling necessary for connection to building plumbing.
 - .2 If plumbing is already installed, make connection; otherwise cap or seal end of pipe and place temporary marker to locate pipe end.
- .2 Lay pipes to manufacturer's standard instructions and specifications.
 - .1 Do not use blocks except as specified.
- .3 Join pipes in accordance with manufacturer's recommendations.
- .4 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.
- .5 Lay pipes on prepared bed, true to line and grade.
 - .1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
 - .2 Take up and replace defective pipe.
 - .3 Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation greater than 10 mm in 3 m.
- .6 Face socket ends of pipe in direction of laying. For mains on grade of 2% or greater, face socket ends up-grade.
- .7 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.
- .8 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.
 - .1 Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .9 Position and join pipes with equipment and methods approved by Consultant.
- .10 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .11 Align pipes before jointing.
- .12 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
- .13 Avoid displacing gasket or contaminating with dirt or other foreign material.
 - .1 Remove disturbed or contaminated gaskets.
 - .2 Clean, lubricate and replace before jointing is attempted again.
- .14 Complete each joint before laying next length of pipe.

- .15 Minimize deflection after joint has been made.
 - .16 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
 - .17 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Consultant
 - .18 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
 - .19 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
 - .20 Do not lay pipe on frozen bedding.
 - .21 Do hydrostatic and leakage test and have results approved by Consultant before surrounding and covering joints and fittings with granular material.
 - .22 Backfill remainder of trench.
- 3.6 Valve Installation
- .1 Install valves to manufacturer's recommendations at locations as indicated.
- 3.7 SERVICE CONNECTIONS
- .1 Terminate building water service 1 m outside building wall opposite point of connection to main.
 - .1 Install coupling necessary for connection to building plumbing.
 - .2 If plumbing is already installed, make connection, otherwise cap or seal end of pipe and place temporary marker to locate pipe end.
 - .2 Do not install service connections until satisfactory completion of hydrostatic and leakage tests of water main.
 - .3 Construct service connections at right angles to water main unless otherwise directed. Locate curb stops 1 m from centreline of pipe.
 - .4 Tappings for PE pipe: PE tapping tees or multi-saddle tees.
 - .5 Employ only competent workmen equipped with suitable tools to carry out tapping of mains, cutting and flaring of pipes.
 - .6 Install single and multiple tap service connections on top half of main, between 45 degrees and 90 degrees measured from apex of pipe.
 - .7 Tap main at 2:00 o'clock or 10:00 o'clock position only; not closer to joint nor closer to adjacent service connections than recommended by manufacturer, or 1 m minimum, whichever is greater.
 - .8 In order to relieve strain on connections, install service pipe in "Goose Neck" form "laid over" into horizontal position.
 - .9 Install rigid stainless steel liners in small diameter plastic pipes with compression fittings.
 - .10 Install curb stop with corporation box on services NPS 2 or less in diameter.
 - .1 Equip larger services with gate valve and cast iron box.

- .2 Set box plumb over stop and adjust top flush with final grade elevation.
- .3 Leave curb stop valves fully closed.
- .11 Place temporary location marker at ends of plugged or capped unconnected water lines.
 - .1 Each marker to consist of 38 x 89 mm stake extending from pipe end at pipe level to 600 mm above grade.
 - .2 Paint exposed portion of stake red with designation "WATER SERVICE LINE" in black.
- 3.8 Hydrostatic And Leakage Testing
 - .1 Pressure test all HDPE pipes, couplings, joints and other appurtenances under a hydrostatic pressure in compliance with ANSI/AWWA C906 latest edition.
 - .2 Testing with compressed air is strictly forbidden.
 - .3 Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.
 - .4 Notify Consultant at least 24 hours in advance of proposed tests.
 - .1 Perform tests in presence of Consultant.
 - .5 Test pipeline in sections not exceeding 365 m in length, unless otherwise authorized by Consultant.
 - .6 Upon completion of pipe laying and after Consultant has inspected Work in place, surround and cover pipes between joints with approved granular material placed to dimensions indicated.
 - .7 Expose all mechanical joints for visual inspection during testing.
 - .8 When testing is done during freezing weather, protect hydrants, valves, joints and fittings from freezing.
 - .9 Strut and brace caps, bends, tees, and valves, to prevent movement when test pressure is applied.
 - .10 Add water gradually to bring test pressure to 100 psi.
 - .11 Allow 3 hours for initial expansion. Add additional water to maintain pressure.
 - .12 Reduce pressure by 10 psi and stop adding liquid.
 - .13 Check pressure after 1 hour. If pressure changes by less than 5% over 1 hour period, no leakage is indicated.
 - .14 Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.
 - .15 Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.
 - .16 Repeat hydrostatic test until defects have been corrected.
- 3.9 PIPE SURROUND
 - .1 Upon completion of pipe laying and after Consultant has inspected Work in place, surround and cover pipes as indicated.

- .2 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
 - .1 Do not dump material within 0.3 m of pipe.
- .3 Place layers uniformly and simultaneously on each side of pipe.
- .4 Do not place material in frozen condition.
- .5 Compact each layer from pipe invert to mid height of pipe to at least 95 % of corrected maximum dry density.
- .6 Compact each layer from mid height of pipe to underside of backfill to at least 90 % of corrected maximum dry density.

3.10 Backfill

- .1 Place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .2 Do not place backfill in frozen condition.
- .3 Compact backfill to at least 98% maximum density to ASTM D698.

3.11 FLUSHING AND DISINFECTING

- .1 Flushing and disinfecting operations: witnessed by Departmental Representative
 - .1 Notify Departmental Representative at least 4 days in advance of proposed date when disinfecting operations will begin.
- .2 Flush water mains through available outlets with a sufficient flow of potable water to produce velocity of 1.5 m/s, within pipe for minimum 10 minutes, or until foreign materials have been removed and flushed water is clear.
- .3 Flushing flows as follows:

Pipe Size NPS	Flow (L/s) Minimum
6 and below	38
8	75
10	115
12	150

- .4 Provide connections and pumps for flushing as required.
- .5 Open and close valves, hydrants and service connections to ensure thorough flushing.
- .6 When flushing has been completed to Consultant approval, introduce strong solution of chlorine as approved by Consultant into water main and ensure that it is distributed throughout entire system.
- .7 Disinfect water mains.
- .8 Rate of chlorine application to be proportional to rate of water entering pipe.
- .9 Chlorine application to be close to point of filling water main and to occur at same time.
- .10 Operate valves, hydrants and appurtenances while main contains chlorine solution.
- .11 Take water samples at hydrants and service connections, in suitable sequence, to test for chlorine residual.

- .12 After adequate chlorine residual not less than 50 ppm has been obtained leave system charged with chlorine solution for 24 hours.
 - .1 After 24 hours, take further samples to ensure that there is still not less than 10 ppm of chlorine residual remaining throughout system.
 - .2 Contractor to provide testing results from independent laboratory that demonstrates chlorine levels have reached amount specified for first 24 hours, as well as amount specified after 24 hours.
 - .1 Testing shall be accurate within 5ppm.
 - .2 Costs of testing shall be paid by contractor.
 - .13 Measure chlorine residuals at extreme end of pipe-line being tested.
 - .14 Flush line to remove chlorine solution after 24 hours. Contractor to de-chlorinate and dispose of water. Chlorine levels must be at 0PPM before discharging.
 - .15 Perform bacteriological tests on water main, after chlorine solution has been flushed out.
 - .1 Take samples daily for minimum of 2 days.
 - .2 Should contamination remain or recur during this period, repeat disinfecting procedure.
 - .3 Testing shall be performed by an independent laboratory, and paid by contractor.
- 3.12 Surface Restoration
- .1 After installing and backfilling over water mains, restore surface to original condition as directed by Consultan.
- 3.13 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 or recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION