



Serving
GOVERNMENT,
Serving
CANADIANS.

SPECIFICATION

Solicitation No.: EP209-200063

Project No.: R.095522.00F

Waterton Lakes National Park

Waterton Lakes, Alberta

Hazard Tree Assessment and

Abatement, Signs and

Guardrail Replacement

April 2019

SPECIFICATIONS		
Section Number	Section Title	No. of Pages
DIVISION 00 – Procurement and Contracting Requirements		
00 01 10	Table of Contents	2
DIVISION 01 – General Requirements		
01 11 00	Summary of Work	4
01 14 00	Work Restrictions	5
01 27 00	Measurement and Payment	5
01 31 00	Project Management and Coordination	3
01 31 19	Project Meetings	2
01 32 16.19	Construction Progress Schedule	3
01 33 00	Submittal Procedures	4
01 35 00.06	Special Procedures for Traffic Control	3
01 35 29.06	Health and Safety Requirements	3
01 35 43	Environmental Procedures	8
01 45 00	Quality Control	4
01 52 00	Construction Facilities	3
01 56 00	Temporary Barriers and Enclosures	1
01 61 00	Common Product Requirements	3
01 74 00	Cleaning	2
01 74 19	Waste Management and Disposal	5
01 77 00	Closeout Procedures	2
01 78 00	Closeout Submittals	3
DIVISION 02 – Existing Conditions		
02 41 13	Selective Site Demolition	6
DIVISION 10 - Specialties		
10 14 00	Signage	4
DIVISION 31 - Earthworks		
31 05 16	Aggregates for Earthwork	3
31 11 00	Clearing and Grubbing	4
31 23 33.01	Excavating, Trenching and Backfilling	6
DIVISION 32 – Exterior Improvements		
32 17 23	Pavement Markings	3
DIVISION 34 - Transportation		
34 71 13.21	Vehicle Guide Posts	4
34 71 13.25	Vehicle W-Beam Guide Rail	5
CONTRACT DRAWINGS		
Drawing Number	Sheet Title	No. of Pages
C-00	Cover Page	1
C-01	Site Plan Km 0.00 To Km 3.90	1
C-02	Site Plan Km 3.90 To Km 7.56	1
C-03	Site Plan Km 7.56 To Km 11.40	1
C-04	Site Plan Km 11.40 To Km 14.07	1
C-05	Signs Inventory	1
C-06	Guardrails Inventory	1
C-07	Typical Details	1

STANDARD DRAWINGS		
Drawing Number	Drawing Title	No. of Pages
454.1003.005	Precast Concrete Curb Type “A”	1
TEB 3.02	W-Beam Guardrail Hardware Rail Detail	1
TEB 3.51	Guide Post Delineation for Guardrail	1
TEB 3.09	Strong Post W Beam Blocked Out Guardrail	1
	SKT Installation Manual	22
APPENDIX		
	Parks Canada EIA Requirement Checklist	
	Waterton Lakes National Park – General Project Best Management Practices.	
	Waterton Lakes National Park – WLNP General Project Best Management Practices - Supplementary Mitigations	
1	Basic Impact Analysis	TBD

END OF SECTION

Part 1 General

1.1 PROJECT LOCATION

- .1 The project is located on Redrock Parkway, Akamina Parkway and Blakiston viewing platform trails within Waterton Lakes National Park at the south-west corner of Alberta. The limit of work includes:
- Redrock Parkway and existing roadside features located on its sides.
 - Damaged and hazardous trees at the discretion of the Departmental Representative.

1.2 SCOPE OF WORK

- .1 The scope of work for this Contract comprises:
- Removal of damaged traffic signs, delineation markers, w-beam guardrails with wooden posts and end treatments.
 - Installation of new traffic signs, pavement marking, delineation markers, w-beam guardrails with steel strong posts, and crashworthy end treatments.
 - Removal of damaged and hazardous trees.

1.3 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.4 WORK BY OTHERS

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

1.5 WORK SEQUENCE

- .1 Construct Work as defined in section 01 14 00 – Work Restrictions to accommodate Owner's continued use of premises during construction and public access.
- .2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.
- .3 Maintain fire access/control throughout the duration of the Work.
- .1 Submit detailed Project Schedule in accordance with Section 01 32 16.19 – Construction Progress Schedule.

1.6 PROJECT MILESTONES

- .1 Refer to section 01 14 00 – Work Restrictions.

1.7 CONTRACTOR USE OF PREMISES

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

1.8 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute Work with no interference or disturbance to existing facilities, owner, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of Work.

1.9 OWNER FURNISHED ITEMS

- .1 Contractor Responsibilities include, but not limited to:
 - .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.

1.10 EXISTING SERVICES

- .1 The Contractor shall perform utility locates, survey, hydrovac and provide copies to Departmental Representative prior to undertaking any Work.
- .2 The Contractor shall obtain permission from Departmental Representative and utility companies prior to intended interruption of services.
- .3 Where unknown services are encountered, immediately advise Department Representative and confirm findings in writing.

1.11 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .1 Contract Drawings, marked up with as-built information.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Environmental Protection Plan.
 - .11 Traffic Accommodation Strategy.
 - .12 Quality Management Plan.
 - .13 Health and Safety Plan and Other Safety Related Documents.
 - .14 Other documents as specified.
 - .15 Restricted Activity Permits.

1.12 SURVEY RESPONSIBILITIES

- .1 The Contractor is responsible for all surveying required to construct the Work to the lines and grades shown on the Drawings. Survey Work must be tied to the nearest Alberta Survey Control Monument or temporary benchmarks established by the Department Representative. Elevations shown on the Drawings are geodetic.
- .2 The Contractor is responsible for quantity survey measurements for progress payment application. The progress payments quantities will be reviewed and remeasured at the discretion of the Departmental Representative. The measurements taken by the Departmental Representative will be used for payment.
- .3 The Contractor will complete as-built survey of all Works for Record Drawings and provide the results to the Departmental Representative prior to issuing the certificate of completion.

1.13 TRAFFIC ACCOMMODATION STRATEGY (TAS)

- .1 The Contractor must prepare a traffic accommodation strategy for the project. The TAS must detail temporary construction signage and detours for public use of the park area during the construction work.
- .2 No signs or advertisements, other than regulatory and warning signs, are permitted on site.
- .3 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall be diamond grade and shall conform to CAN3-Z321.
- .4 Maintain approved signs and notices in good condition for duration of project; and dispose of off-site on completion of project or earlier if directed by the Departmental Representative.
- .5 Signage shall be coordinated with other Contractors.
- .6 The site is to remain open to public throughout the construction periods at the discretion of the Departmental Representative.
- .7 The Contractor shall maintain access for the existing viewpoints, picnic areas, campgrounds, trails and parking lots for the public during the construction work with full time flaggers used for traffic control, at the discretion of the Departmental Representative. Alternative traffic control measures may be considered for work that occurs when the road is not open to the public.
- .8 The Contractor shall maintain at least half of the existing carriageway width for Redrock Parkway accessible for through traffic during the construction work.

1.14 NATIONAL PARK REGULATIONS

- .1 Contractor and all sub-contractors shall ensure that all work is performed in accordance with ordinances, laws, rules and regulations set out in the National Parks Act.
- .2 Contractor and all sub-contractors shall obtain business licenses from Parks Canada Administration Office prior to commencement of work.
- .3 Contractor and all sub-contractors shall comply with all laws and government regulations applicable to work under this contract.
- .4 Contractor is responsible to ensure all sub-contractors comply with the National Park Regulations

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

- .1 Construction shall commence within two weeks of award.
- .2 The installation of the guardrails shall be complete within 4 weeks of award and the signage shall be complete within 6 weeks after award.
- .3 The site is to remain open to public throughout the construction periods. Visitor vehicles will be permitted to access the roadways at all times during construction, at the discretion of the superintendent. Guard rails must be installed prior to the signage upgrades starting from the beginning of the road. The contractor is responsible for temporary signage and traffic control throughout construction, with all costs being incidental to the contract.
- .4 The Contractor shall maintain access for the existing viewpoints, picnic areas, campgrounds, trails and parking lots for the public at all times.
- .5 The Contractor shall maintain at least half of the existing carriageway width for Redrock Parkway accessible for through traffic during the construction work.
- .6 The Contractor shall provide a schedule to the Departmental Representative indicating the Winter demobilization and remobilization periods. The Contractor is responsible for any damage to site works during the winter shutdown period.
- .7 Construction operations shall be conducted to cause minimal inconvenience to the public and to adjoining portions of the property. Contractor will be responsible for repairing any damage incurred to any portion of their access to the site, at the Contractor's cost.
- .8 Active rock scaling will be occurring between KM 8 and KM 9 and is expected to be completed by July 15, 2019. Spotters will be required to pass this area and the work must be coordinated with the scalers to avoid conflict between activities. The W beam installation in this area will be deferred until scaling is complete, if required.
- .9 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.2 USE OF THE SITE AND FACILITIES

- .1 The Work Sites specified in the Contract shall only be used for the purposes of the Work.
- .2 The Work Site will be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .3 The Contractor will not be permitted to set up a camp in the National Parks. PCA regulations prohibit anyone working within the Park from using public campground facilities.
- .4 Contractor shall maintain adequate drainage at the Work Site.

- .5 The Contractor is responsible for the snow removal within the project boundaries during the construction periods. The Contractor shall maintain operational and safe site access to the public.
- .6 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary and at their cost for the performance and inspection of the Work.
- .7 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and Section 01 35 43 - Environmental Procedures. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .8 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at their expense.
- .9 Pets shall not be brought to or maintained at the construction site.

1.3 WORKING TIMES

- .1 Work in WLNP is permitted between the following hours during 2019:
 - .1 Monday-Sunday: 7 am – 7 pm for signage installation
 - .2 Guardrail installation is permitted to occur 24 hr per day 7 days per week in order to meet the milestones, if required.
- .2 No construction will be allowed during the long weekends; “no work” periods as follows:
 - .1 Victoria Day 2019 Friday, May 17th to Monday May 21nd
 - .2 Canada Day 2019 Friday June 28th to Tuesday July 2nd
 - .3 August Long 2019 Friday August 2nd to Tuesday August 6th
 - .4 Labour Day 2019 Friday August 30th to Tuesday September 3rd
 - .5 Thanksgiving Day 2019 Friday October 11th to Tuesday October 15th
 - .6 Remembrance Day 2019 Friday November 8th to Monday November 12th
 - .7 Christmas 2019 December 23, 2019 to January 2, 2020
 - .8 Easter 2020 April 10, 2020 to April 13, 2020

1.4 UTILITIES

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

keep the Departmental Representative informed of all communications with the Utility companies and authorities.

- .3 The Contractor shall notify the Departmental Representative and the Utility companies at least fourteen (14) days in advance of any activities which may interfere with the operation of such Utilities.
- .4 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .5 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall, in consultation with Utility owner(s), protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .6 The Contractor shall immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected; and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.5 SURVEY OF EXISTING CONDITIONS

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

1.6 PROTECTION OF PERSONS AND PROPERTY

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

1.7 USE OF PUBLIC AREAS

- .1 Off-road construction equipment will not be allowed outside the project limit of work, material loading areas, or alternate sites as designated and approved by the Departmental Representative.
- .2 Signs, guardrails, asphalt, granular, embankment and excavation materials may be hauled on existing highway, but this shall be by standard highway trucks not exceeding legal highway load limits unless accepted in writing by the Departmental Representative.
- .3 Flag persons shall be provided as required for staff, visitor and worker safety, with all costs incidental to the contract. Traffic control alternatives will be considered during road closure periods.
- .4 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. Access and egress locations for the site shall have rig matting if work is to be completed during wet periods. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner that will prevent dropping of materials or debris on the roadways and, where contents may otherwise be blown off during transit, such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to the Owner. Heavy equipment work shall not be done during saturated ground conditions, as directed by the Departmental Representative. All activities shall be in accordance with

Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.

1.8 SUBMITTALS

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

1.9 SUPERVISORY PERSONNEL

- .1 When requesting a Preconstruction Meeting, in accordance with Section 01 31 00 - Project Management and Coordination, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 At a minimum, the following personnel shall be included in the list:
 - .1 Contractor Manager
 - .2 Project Superintendent;
 - .3 Safety Representative;
 - .4 Traffic Control Representative;
- .3 The above personnel shall perform the following duties:
 - .1 Contractor Manager with full authority, as agent of the Contractor, to act on behalf of and legally bind the Contractor in connection with the Work and the Contract. The Contractor may, at its discretion, appoint one person as both Contractor Manager and Project Superintendent.
 - .2 The Project Superintendent shall be employed full time with full authority to supervise the Work, who shall be directly available to the Department Representative during all active periods of Work. Either they or their designated deputy shall be present on the Work Site each and every workday that Work is being performed, from the start of Work to Total Performance of the Work.
 - .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during their absence.
 - .4 The Safety Representative shall possess a minimum of 2 years' construction safety supervisory experience. Their duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.
 - .5 The Quality Control Representative shall be responsible for the development, implementation and execution of the Quality Management Plan and shall be the single point of contact for all quality related queries.
 - .6 The Traffic Control Representative shall be responsible for the development, implementation and execution of the Traffic Management Plan and shall be the single point of contact for all traffic control related queries.
 - .7 The Environmental Representative shall be responsible for the development, implementation and execution of the Environmental Protection Plan and shall be the single point of contact for all environmental related queries.

1.10 WASTE DISPOSAL

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

1.11 WORK STOPPAGE

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

END OF SECTION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

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

Part 2 Products

NOT USED

Part 3 Execution

This section prescribes the measurement and payment for items of Work described in the combined price table. The measurement and payment clauses shall be read in conjunction with the various items of work listed in the lump sum and unit rate price table.

3.1 GENERAL REQUIREMENTS

.1 Mobilization and Demobilization

This item is not a unit rate and is to be included in the lump sum amount. This is an incomplete summary for items to be included in the lump sum amount. Payment for this item shall be compensation in full for costs of mobilization; permits; moving personnel, equipment, fencing, safety measures, and materials to the site; setting up temporary facilities including temporary traffic control devices/equipment; public notices; storage of materials; all survey work, all preparation for performing the work; full demobilization of the above; site clean-up; site restoration; and costs associated with the warranty period.

Payment: To be included in the Lump Sum Amount

Measurement: 50% of the lump sum will be included in the first progress payment Certificate; 50% of the lump sum will be paid on or after the certificate of substantial completion has been issued, at the discretion of the Departmental Representative; Mobilization/ demobilization will only be paid for once, regardless of the number of times the Contractor

mobilizes and demobilizes, due to any condition or circumstance.

3.2 DEMOLITION

.1 Remove and Dispose Existing Signs – One Post

Payment for this item shall be compensation in full for the supply of all equipment, material and labour required to remove, dismantle, sort and dispose of signs as directed by the Departmental Representative, including but not limited to removal, loading, hauling, sorting, dismantling, safeguarding, storing, transporting, disposal, tipping fees, backfilling, importing fill, compacting, shaping, associated cleanup, rehabilitation of disturbed area to match immediate surrounding terrain, and all items incidental to complete the work. Signs and posts may contain hazardous materials, such as pressure treated lumber or lead paint.

Payment: Unit price bid for each sign.

Measurement: Each.

.2 Remove and Dispose Existing Signs – Two Posts

Payment for this item shall be compensation in full for the supply of all equipment, material and labour required to remove, and dispose signs as directed by the Departmental Representative, including but not limited to removal, loading, hauling, sorting, dismantling, safeguarding, transporting, disposal, tipping fees, backfilling, importing fill, compacting, shaping, associated cleanup, rehabilitation of disturbed area to match immediate surrounding terrain, and all items incidental to complete the work. Signs and posts may contain hazardous materials, such as pressure treated lumber or lead paint.

Payment: Unit price bid for each sign.

Measurement: Each.

.3 Remove and Replace Concrete Parking Curb

Payment for this item shall be compensation in full for the supply of all equipment, material and labour required including removal, hauling and disposing of concrete curb, supply and installation of new concrete curb, removal and disposal of any debris; loading, hauling, handling, safeguarding, transporting, cleaning; and all labour, equipment and materials required to complete the work; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit price bid for each curb.

Measurement: Each.

.4 Remove and Dispose Existing W-Beam Guardrails

Payment for this item shall be compensation in full for the supply of all equipment, material and labour required including, but not limited to, saw cut of adjacent asphalt and/or concrete, removal, hauling, dismantling and disposing of w-beam guardrails, pressure treated posts, steel posts, bases, end treatments, and all hardware associated with the guardrails, removal and

disposal of any debris; backfilling with compacted native material, rehabilitation of disturbed area to match immediate surrounding terrain, loading,

hauling, handling, safeguarding, transporting, cleaning; and all labour, equipment and materials required to complete the work; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per linear meter.

Measurement: Field measured along w-beam guardrail.

.5 Hazard Tree Assessment and Abatement Crew

Payment for this item shall be compensation in full for all equipment, materials, labour for a crew of 2 certified tree fallers actively abating hazard trees for 10 hrs per day, one project manager, one site supervisor, two spotters and one Forest Technician. The price shall include hazard tree assessment (Parks and Recreation Module certification required) and abatement, all support staff, site supervision, project management, silviculture / debris removal prescriptions, mapping, volume estimates, daily photo records, labour, fuel, lodging, meals, accommodations, living out allowance, overtime, equipment, bucking, cutting stumps flush with ground, de-limbing, topping, relocating trees outside of clear zone, flagging, trucks, snowmobiles, satellite phones, mapping, Registered Professional Forester and all other support and supervision requirements. All labour, materials, accommodations, disbursements, and equipment required to complete the work are incidental to completing the work for which payment is not specified elsewhere. All work must be pre-approved, via email, by the departmental representative prior to completing any hazard tree assessment and abatement work. Hazard tree assessment and abatement crew mobilization is considered incidental to the unit rate. ALL WORK MUST BE PRE APPROVED ON A CASE BY CASE BASIS.

Payment: Unit Price bid per day.

Measurement: Pre- approved working days.

.6 Wildlife Surveys

Payment for this item shall be compensation in full for all materials, labour, accommodations, travel and incidentals required to complete bird and/or bat surveys. Payment shall be based on an 8 hour day, onsite completing surveys. No payment will be paid for time in excess of 8 hr per day or travel time. Bird surveys must be completed by a qualified professional with a level of experience acceptable to the Parks Canada Environmental Officer. A bird survey, nest or roost search should be undertaken before the construction activities within 7 days of active tree falling to ensure no nesting birds are located in the area. Should a nest be encountered, the area should be clearly staked or flagged and a 50 m buffer established around the nest to avoid disturbance of the area. A report and mapping of all identified nests and roosts shall be considered incidental to the unit price per day. ALL WORK MUST BE PRE APPROVED ON A CASE BY CASE BASIS.

Payment: Unit Price bid per day.

Measurement: Working days.

3.3 TRAFFIC CONTROL & ROADSIDE FEATURES

.1 Supply Traffic Signs, Aluminum

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

Payment: Unit rate payment per square meter.

Measurement: Field Measured area.

.2 Supply Traffic Signs with Reflective Sheeting, Aluminum

Payment for this item shall be compensation in full for the supply of permanent traffic signage with reflective sheeting; submission of sign proof for review and acceptance; all labour, equipment and materials required to complete the work; transporting, placing, hauling, clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit rate payment per square meter.

Measurement: Field Measured area.

.3 Install Traffic Signs

Payment for this item shall be compensation in full for the installation of permanent traffic signage; submission of sign proof for review and acceptance; all labour, equipment and materials required to complete the work, placing, hauling, clean up; and any other incidental work for which payment is not specified elsewhere. Supply and installation of hardware shall be considered incidental to the unit rate.

Payment: Unit price bid for each sign.

Measurement: Each.

.4 Supply and Install Wooden Posts (100 mm x 150 mm) for Signs

Payment for this item shall be compensation in full for the supply and installation of grade 2 or better clear Cedar wooden posts (100 mm x 150 mm) and preparation work; loading, hauling, handling, safeguarding, transporting, mounting hardware, surface restoration; all labour, equipment and materials required to complete the work; erosion and sediment control, backfilling with compacted imported Type 1 (25 mm minus) crushed gravel material, rehabilitation of disturbed area to match immediate surrounding terrain, clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit price bid for each post.

Measurement: Each.

.5 Supply and Install Steel Posts for Signs

Payment for this item shall be compensation in full for the supply and installation of permanent steel posts and preparation work; loading, hauling, handling, safeguarding, transporting, mounting hardware, surface restoration; all labour, equipment and materials required to complete the work; erosion and sediment control, backfilling with compacted type 1 imported (25 mm minus) crushed gravel material, rehabilitation of disturbed area to match immediate surrounding terrain, clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit price bid for each post.

Measurement: Each.

.6 Supply and Install Line Painting – Centreline Directional Dividing (100 mm yellow)

Payment for this item shall be compensation in full for all labour, equipment and materials required to supply and complete 100 mm wide line painting, including inspecting the areas to be painted, sweeping and cleaning of surfaces, supplying of paint and glass beads, completing temporary markings, traffic accommodation, painting to the specified locations and colours, clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit Price bid per linear kilometer.

Measurement: Field measured along pavement marking line.

.7 Supply and Install Flexible Guide Posts (Delineators)

Payment for this item shall be compensation in full for the supply and installation of guide posts and reflectors, removal of damaged guide posts, loading, hauling, handling, safeguarding, transporting, surface restoration; all labour, equipment and materials required to complete the work; erosion and sediment control, backfilling with compacted native material, rehabilitation of disturbed area to match immediate surrounding terrain, clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit price bid for each post.

Measurement: Each.

.8 Supply and Install Strong Post W-Beam Guardrails (with Deep Steel Post)

Payment for this item shall be compensation in full for the supply and installation of permanent strong post w-beam guardrails, deep steel posts, steel spacer blocks, reflectors; loading, hauling, handling, drilling, auguring, hydro-vacing, safeguarding, transporting and preparation work; mounting hardware, splicing, reinforcement, surface restoration; all labour, equipment and materials required to complete the work; erosion and sediment control, excavation, backfilling with compacted Type 1 material, tamping. The unit rate shall include the cost of supplying, loading, hauling, placing, moisture conditioning, installing, and compacting type 1 gravel, as required to grade the shoulder between the post and the edge of pavement to achieve a maximum 10 H:1 V slope between the edge of pavement and post.

Payment: Unit Price bid per linear meter.

Measurement: Field measured along w-beam guardrail.

.9 Supply and Install Impact Attenuator

Payment for this item shall be compensation in full for the supply and installation of permanent Impact Attenuator (SKT System) including w-beam guardrail, soil plate and lower post, universal anchor bracket with shoulder bolt, hardware, deep steel posts, SKT impact head; loading, hauling, handling, safeguarding, transporting and preparation work; mounting hardware, surface restoration; all labour, equipment and materials required to complete the work; erosion and sediment control, excavation, backfilling with compacted type 1 material, grading work, compaction, rehabilitation of disturbed area to match immediate surrounding terrain, clean up; and any other incidental work for which payment is not specified elsewhere.

Payment: Unit price bid for each End Treatment / Impact Attenuator System

Measurement: Each.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 COORDINATION

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

1.3 PROJECT MEETINGS

- .1 During the course of the Work, the Contractor shall attend weekly construction meetings as scheduled, chaired, and documented by the Departmental Representative.
- .2 The agenda will include progress to date, payment, scheduling, risk, quality, environmental, and safety management items as well as any other reasonably requested by the parties.
- .3 Bi-weekly meetings will either be held in the local PCA Field Unit offices, or onsite, as notified by the Departmental Representative.
- .4 The Contractor will attend or otherwise ensure the attendance of their staff, subcontractors, Departmental Representatives, suppliers, or other key parties all other meetings identified in the Contract or reasonably requested by the Departmental Representative in an effort to resolve specific issues as they may arise.
- .5 Meetings will be called and chaired by the Departmental Representative. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .6 As described in Section 01 35 43 – Environmental Procedures, an environmental briefing for all staff will take place before beginning work at the site.

1.4 CONSTRUCTION ORGANIZATION AND START-UP

- .1 Within seven (7) days after award of Contract, request a Preconstruction meeting of Contract Representatives to discuss and resolve administrative procedures and responsibilities. Meeting shall be chaired by the Departmental representative who will prepare the minutes of the meeting.
- .2 Senior representatives of the Owner, Departmental Representative, Contractor, major subcontractors, field inspectors and supervisors are to be in attendance.
- .3 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 16 – Construction Progress Schedules.
 - .3 Schedule of submittals in accordance with Section 01 33 00 – Submittal Procedures.

- .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
- .5 Site safety and security in accordance with Sections 01 14 00 – Work Restrictions, 01 35 29 – Health and Safety Requirements, 01 52 00 – Construction Facilities and 01 35 43 – Environmental Procedures.
- .6 Quality Control in accordance with Section 01 45 00 – Quality Control.
- .7 Proposed changes, change orders, procedures, approvals required, mark-p percentages permitted, time extensions, overtime, and administrative requirements.
- .8 Owner-furnished materials.
- .9 Monthly progress claims, administrative procedures, photographs, and holdbacks.
- .10 Closeout procedures and submittals in accordance with Sections 01 77 00 –
- .11 Closeout Procedures and 01 78 00 – Closeout Submittals. Insurances and transcript of policies.
- .12 Other business.
- .4 Comply with Departmental Representative's allocation of mobilization areas of site, for field offices and sheds, and for access, traffic, and parking facilities.
- .5 Prior to commencing construction, the Contractor will schedule an on-site meeting with the Environmental Surveillance Officer (ESO) to review EIA mitigations. A minimum of 7 days notice will be required for this meeting.
- .6 During construction, coordinate use of site and facilities through Departmental Representative's procedures for intra-project communications: submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts.
- .7 Comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
- .8 Coordinate field Departmental Representative and layout work with the Departmental Representative.

1.5 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings if part of tender
 - .2 Specifications
 - .3 Addenda
 - .4 Reviewed Shop Drawings and mix designs
 - .5 Change Orders
 - .6 Other modifications to Contract
 - .7 Traffic Management Plan
 - .8 Safety Plan
 - .9 WHMIS
 - .10 Environmental Protection Plan

- .11 Quality Control Plan and field test reports
- .12 Copy of accepted Work schedule and most recent updated schedule
- .13 Labour conditions and wage schedules
- .14 Equipment rate schedule and applicable versions of the relevant rate guides
- .15 Applicable current editions of municipal regulations and by-laws

1.6 SUBMITTAL SCHEDULE

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare a schedule of the required submissions and the date the submissions will be made. Include columns for Actual Date of Submission, Review Comments Received, Final Submission and Final Acceptance Received. Provide this schedule to the Departmental Representative in Excel format.
- .3 Submittals will be reviewed within 10 business days of submission. Incomplete submissions will be rejected and must be resubmitted.

1.7 PROJECT SCHEDULES

- .1 In accordance with Section 01 32 16.19 - Construction Progress Schedules.

1.8 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit requests for payment for review, and for transmittal to Departmental Representative.

1.9 CLOSEOUT PROCEDURES

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

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

1.2 PRECONSTRUCTION MEETING

- .1 Within ten (10) days after award of Contract, the Departmental Representative will request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Representatives from Parks Canada Agency, Contractor, major Subcontractors and Departmental Representative will be in attendance.
- .3 The Departmental Representative will establish time and location of meeting and notify parties concerned minimum five days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work in accordance with 01 32 16.19.
 - .3 Schedule of submission of Shop Drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences.
 - .5 Health and safety requirements.
 - .6 Traffic Accommodation Strategy.
 - .7 Environmental Protection Plan.
 - .8 Quality Management.
 - .9 Delivery schedule of specified equipment.
 - .10 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, administrative requirements.

- .11 Owner provided products.
- .12 Record Drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .13 Monthly progress claims, administrative procedures, photographs, hold backs.
- .14 Appointment of inspection and testing agencies or firms.
- .15 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work.
- .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 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.
- .5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Verify field measurements and affected adjacent Work are co-ordinated.
- .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .8 Keep one reviewed copy of each submission on site.

1.2 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 The shop drawings shall be stamped and signed by a Professional Engineer registered in the Province of Alberta, Canada.
- .3 Allow ten (10) days for Departmental Representative's review of each submission.
- .4 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.
- .5 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.
- .6 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .7 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 Capacities.
 - .2 Performance characteristics.
 - .3 Standards.
 - .4 Relationship to adjacent work.
- .8 After Departmental Representative's review, distribute copies.
- .9 Submit PDF 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.
- .10 Supplement standard information to provide details applicable to project.
- .11 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.
- .12 The review of shop drawings by the Department Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Department Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpeg, standard resolution.
- .2 Georeferenced photographs of work underway each day during construction as well as photos of all personnel and equipment onsite each day must be taken, date stamped, labeled and submitted to the DR each day.
- .3 Photographs will also be included in the weekly progress reports.

- .4 Photographs to be submitted on CD. All photographs to be labelled with meaningful titles as part of closeout package.

1.4 REQUIRED CONTRACTOR SUBMITTALS

.1 Pre-Mobilization Submittals

- .1 Submit the following plans and programs to the Departmental Representative for review prior to mobilization to the project site.
 - .1 Construction schedule for all Work in accordance with Section 01 32 16.19 – Construction Progress Schedule.
 - .2 Construction Staging Plan.
 - .3 Environmental Protection Plan in accordance with Section 01 35 43 – Environmental Procedures.
 - .4 Traffic Accommodation Strategy in accordance with the requirements identified in Section 01 11 00 – Summary of Work.
 - .5 Quality Management Plan in accordance with Section 01 45 00 – Quality Control.
 - .6 Health and Safety Plan in accordance with Section 01 35 29.06 – Health and Safety Requirements.
 - .7 Submit site-specific Health and Safety Plan within fourteen (14) days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operations found in the Work Plan.
 - .8 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and the authority having jurisdiction weekly.
 - .9 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .10 Submit copies of incident and accident reports.
 - .11 Submit WHMIS Material Safety Data Sheets (MSDS) to the Departmental Representative.
 - .12 The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor after receipt of plan. Revise plan as appropriate and resubmit plan to the Departmental Representative after receipt of comments from the Departmental Representative.
 - .14 On site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

- .4 Construction Phase Submittals
 - .1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis.
 - .2 Quality Control Inspection Reports – The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control Inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.
 - .3 Manufacturers product data, specifications, and certification for traffic signs and posts.
 - .4 Manufacturers product data, specifications, and certification for guardrails, posts, end treatments and impact attenuators.
 - .5 Manufacturers product data, specifications, and certification for flexible guide posts (delineators).
 - .6 Shop drawings for the construction work including but not limited to the traffic signs and posts, flexible guide posts (delineators) and guardrails, posts, end treatments and impact attenuators.
- .5 Project Completion Submittals
 - .1 Record Documents in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Quality Assurance/Quality Control Records.
 - .3 Photo CD.
 - .4 Operating and Maintenance manuals.
 - .5 Warranty Management Plan in accordance with Section 01 78 00 – Closeout Submittals.

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 MEASUREMENT PROCEDURES

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

1.2 GENERAL

- .1 The Contractor shall develop and implement a Traffic Accommodation Strategy (TAS) prior to commencement of the Work in accordance with the requirements of the current edition of the Alberta Transportation Standard – Traffic Accommodation in Work Zones, except where specified otherwise.
- .2 The Contractor shall submit the TAS to the Departmental Representative for review within five days of Contract award and prior to commencement of any work. The Departmental Representative shall provide review comments to the Contractor within ten (10) days. If revisions to the TAS are requested, the Contractor shall resubmit the TAS to the Departmental Representative within two days of receipt of comments.
- .3 During execution of the Work, the Contractor will be required to update the TAS if dictated by changes in site or working conditions, or if requested by the Departmental Representative.
- .4 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs, temporary pavement markings, other safety measures and provide staff to ensure safe passage of all traffic from commencement of site work to date of acceptance by the Departmental Representative.
- .5 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial.
- .6 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.
- .7 The contractor shall provide full time traffic control when construction occurs when the roadway is open.
- .8 Rockfall spotters will also be required when working between chainage 8 KM and 9 KM.

1.3 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on existing travelled way:
 - .1 Place equipment in a position presenting a minimum of interference and hazard to traveling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
 - .4 Do not close any lanes of road without approval of Departmental Representative.

- .5 Keep travelled way clean and of sufficient width to accommodate at least one 3.5 m wide lane for traffic.
- .6 The traffic control measures will be monitored by the Departmental Representative, who may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts.

1.4 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the current edition of the Alberta Transportation Standard – Traffic Accommodation in Work Zones.
- .3 Place signs and other devices in locations recommended in the current edition of the Alberta Transportation Standard – Traffic Accommodation in Work Zones.
- .4 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to existing conditions.

1.5 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped as specified in the current edition of the Alberta Transportation Standard – Traffic Accommodation in Work Zones, for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute two-way, single lane traffic through the construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .4 For emergency protection when other traffic control devices are not readily available.
 - .5 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .6 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

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 MEASUREMENT PROCEDURES

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

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulation
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Alberta
 - .1 Occupational Health and Safety Act, R.S.A. - 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 seven days after award of contract 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 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly, including minutes of safety toolbox meetings.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets to Departmental Representative.
- .7 Submit an Emergency Response Plan to address any unforeseen or peculiar safety related factors, hazards or conditions during the performance of work. Advise the Departmental Representative immediately verbally and in writing if the Contractor identifies hazardous conditions.
- .8 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within three days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within two days after receipt of comments from Departmental Representative.
- .9 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.
- .10 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.

- .11 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
 - .1 Emergencies: In the event of emergency call 911
 - .2 All other inquiries: Parks Canada Switch Board (403) 859-2224.

1.4 FILING OF NOTICE

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

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

1.7 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.

1.8 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.

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with the latest version of the Occupational Health and Safety Act, General Safety Regulation, and Code, Alberta
- .2 Comply with R.S.Q., c. S-2.1, an Act respecting Health and Safety, and c. S-2.1, r.4 Safety Code for the Construction Industry.
- .3 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

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

1.11 HEALTH AND SAFETY CO-ORDINATOR

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

1.12 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.

1.13 CORRECTION OF NON-COMPLIANCE

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

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

1.2 NATIONAL PARK REGULATIONS

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

1.3 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

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

1.4 RELICS AND ANTIQUITIES

- .1 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction, and wait for written instructions before proceeding with Work in this area.
- .2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on the site shall remain the property of Parks Canada. Protect such articles and request directives from Departmental Representative.

- .3 Provide forty-eight (48) hours notice Departmental Representative prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Departmental Representative.

1.5 WILDLIFE

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

1.6 FIRE PROTECTION AND CONTROL

- .1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic firefighting equipment – e.g., three (3) shovels, two (2) pulaskis, and two (2) 20 litre backpack pumps shall be maintained at the construction site at a location known and easily accessible to all the Contractor's staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contacting the Waterton fire duty officer. Fire prevention care is to be with the Fire Index.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.
- .6 Deliberately lighting of fires or burning of waste materials is strictly prohibited.

1.7 SITE ACCESS AND PARKING

- .1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access and facilities at the work sites and within the work limits, including day-to-day entry/egress and plans for delivery and approach for large dimension materials will be anticipated and described. The access plan shall describe worker transportation to and from the construction site, and parking of workers' private vehicles. Specific details of any vehicles to transport workers to site or site equipment to be used on the trails are to be provided.
- .2 Restrict vehicle movements to work limits.

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

1.8 EROSION AND SEDIMENT CONTROL (ESC) PLAN

- .1 The Contractor must prepare an ESC plan for the project to be included in the Environmental Protection Plan. The plan must detail temporary and permanent environmental control measures that the Contractor will undertake to comply with all applicable legislation, regulations and approvals during the course of their construction. The plan should address the following items:
 - .1 Pre-Construction Actions:
 - .1 Prepare and submit for review by Departmental Representative the "Environmental Protection Plan"
 - .2 Construction Considerations:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent wilderness, properties and walkways.
 - .2 Clearing and excavation must start only after installing the sediment and runoff measures which has been reviewed and accepted by the Departmental Representative. Only areas required for immediate construction activity and as approved by the Departmental Representative may be cleared. Additional control measures must be installed as excavation advances.
 - .3 Stockpiles must be approved by Departmental Representative. They must be stabilized against erosion immediately following stockpiling operations. Runoff from the stockpile areas must be contained to prevent contamination of drainage systems.
 - .4 Sediment and debris must be prevented from reaching waterways.
 - .5 Dust control measures must be implemented to prevent wind transport of dust from disturbed soil surfaces.
 - .6 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

- .3 Post-Construction Activities:
 - .1 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
 - .2 All accumulated sediment and debris must be removed as required after construction activities are complete.
 - .3 Stockpile, storage and laydown areas must be cleaned and restored to pre-construction condition.
- .4 The ESC Plan must include natural area protection measures for natural areas impacted by the project.

1.9 DRAINAGE

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

1.10 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
- .4 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .5 Minimize stripping of topsoil and vegetation.
- .6 Restrict tree removal to areas designated by Departmental Representative.
- .7 Where absolutely necessary to work adjacent to existing trees and shrubs, Contractor shall exercise all possible care to avoid injury to vegetation. Where roots or limbs over 25 mm in diameter and bark are damaged during operations, rim damaged portion and immediately inform Departmental Representative for inspection and approval.
- .8 Permits are required from Park Warden Service if a tree is to be removed. Contact Warden Office at (403) 859-5140. Municipal Officer may also give permission for a dead tree to be removed without the consent of Park Warden Service.
- .10 All works shall be undertaken in a manner that prevents the introduction or minimizes the spread of invasive alien species and noxious weeds.

1.11 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment in accordance with local authorities' emission requirements.
- .3 Spills or releases of hazardous materials or deleterious substances that may cause damage to the environment or human health shall be immediately reported to Departmental Representative and, if required, to the Provincial authority.

- .4 The Contractor shall take all reasonable measures to contain all spills. The Contractor shall contain, collect and dispose of spilled products at their expense.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .6 All equipment must be properly maintained, in sound mechanical condition and free of any fuel, oil, and hydraulic fluid or coolant leaks. All equipment must be inspected by the ESO at the park gate prior to entering the park
- .7 Equipment must be free of external grease, loose dirt or oil and the machinery must be pressure washed prior to arriving on site.
- .8 All machinery must be equipped with emergency spill kits large enough to contain 110% of any possible spills or leaks of oil, fuel, hydraulic fluid or coolant during the project.
- .9 The operators of the equipment must be familiar with how to properly use the spill kits in the event of an emergency.
- .10 Fuel, oils, lubricants, chemicals, and any potentially hazardous material must not be dispelled into the environment.
- .11 Machinery and vehicles must keep to roads, trails, or designated temporary workspaces and turnaround points. The Departmental Representative will identify approved off-road workspaces.
- .12 Rutting and/or compaction of ground surfaces should be avoided as much as possible by keeping to designated work areas and away from wet locations.
- .13 All areas with rutting damage or noticeable compaction from heavy equipment must be re-graded and back-filled if necessary.
- .14 Any holes or depressions caused by site preparation or construction will be back-filled and compacted to an appropriate degree.

1.12 CONTRACTOR'S OPERATIONS

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

1.13 START- UP AND ENVIRONMENTAL BRIEFING

- .1 All staff employed at the construction site shall attend an orientation conducted by the Contractor regarding their individual and collective responsibilities, to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Each employee, having received the environmental briefing, will be issued a certification sticker to be displayed on their helmet. Employees of other service and materials providers who attend at the site – e.g., concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.
- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

1.14 HAZARDOUS PRODUCTS AND MATERIALS

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

1.15 EQUIPMENT FUELLING AND MAINTENANCE

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

1.16 WASTE MATERIAL STORAGE AND REMOVAL

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

1.17 NOTIFICATION

- .1 Departmental Representative or ESO 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 ESO and Departmental Representative of proposed corrective action and take such action for approval by ESO.
- .1 Take action only after receipt of written approval by ESO.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 CLEANING

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

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

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

1.2 DEFINITIONS

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

1.3 QUALITY MANAGEMENT PROGRAM

- .1 The Contractor shall prepare a Quality Management Plan. The purpose of the plan shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Contractor shall submit the Quality Management Plan to the Departmental Representative for acceptance in accordance with Section 01 33 00 - Submittal Procedures. The Plan shall develop a logical system for tracking and documenting the Quality Control of the Work as well as the Contractor's internal Quality Assurance procedures to verify the compliance of the Quality Control process. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .3 All material testing required to meet specifications is Quality Control(QC) Testing to be conducted by a certified material testing Laboratory engaged and paid by contractor and is incidental to contract. DR may engage an independent material testing laboratory for random Quality Assurance(QA) testing and will pay for it.
- .4 The Contractor shall appoint qualified and experienced Quality Control and Quality Assurance Personnel, who are dedicated to quality matters and who will report regularly to the Quality Control Manager and Quality Assurance Manager as well as Contractor's management at a level which shall ensure that Quality Control and Quality Assurance requirements are not to be subordinated to manufacturing, construction or delivery. The Quality Control and Quality Assurance Personnel shall be empowered by the Contractor to resolve quality matters. Personnel involved in Quality Assurance shall be independent of the Quality Control Process.
- .5 The Quality Management Plan shall include samples of all forms to be filled in by the Quality Control and Assurance Personnel. All forms shall be signed by the Quality Control Manager and Quality Assurance Manager and submitted promptly to the Departmental Representative.
- .6 The Quality Management Plan shall include:

- .1 Distribution list, providing a list of names to whom the Plan shall be distributed.
- .2 Title page, identifying the Contract, Contractor and copy number.
- .3 Revision page, identifying the revision number and date of the Plan.
- .4 Table of Contents.
- .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature.
- .6 Details of measuring and test equipment including methods and frequency of calibration.
- .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards.
- .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items.
- .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification.
- .10 Procedures for shipping, packaging and storage of materials.
- .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works.
- .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager
- .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Quality Assurance Manager, if the Quality Assurance Manager witnesses the tests.
- .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance.
- .15 Details of the Quality Assurance Program including the Contractor's procedures to verify the compliance to the Quality Control process of on-site work and off-site work by fabricators.
- .7 The Contractor must facilitate any independent Quality Assurance checks by representatives designated by the Departmental Representative.
- .8 At completion of the Work a bound and itemized copy of all Quality Control and Quality Assurance documents and reports shall be prepared by the Contractor's Quality Control Manager and Quality Assurance Manager and submitted to the Departmental Representative.

1.4 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. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.5 ACCESS TO WORK

- .1 Allow Departmental Representative, Owner and 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 the opinion of the Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price 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.

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 MEASUREMENT PROCEDURES

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation within the work limits defined on the drawings.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work prior to the date specified for Final Completion in Section 01 11 00 - Summary of Work.

1.4 SITE STORAGE/LOADING

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

1.5 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work or normal operations of the National Park. Parking areas must be approved by Departmental Representative.
- .2 Provide and maintain adequate access to project site.

1.6 OFFICES

- .1 If required by Contractor, provide office of sufficient size to accommodate required work activities of Contractor and all Sub-Contractors.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 The Contractor is responsible for supplying and paying for power, telecommunications and water required for the execution of the Work.

1.7 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.

1.8 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.

1.9 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 is responsible for repair of damage to roads caused by construction operations. The park may impose road bans, at their discretion.
- .7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times.
- .9 Provide snow removal during period of Work.

1.10 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 The Contractor to coordinate with the Departmental Representative for the available locations for storing new or salvaged material.

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.
- .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

Part 1 General

1.1 MEASUREMENT PROCEDURES

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

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work prior to the date specified for Final Completion in Section 01 11 00 - Summary of Work.

1.3 ACCESS TO SITE

- .1 In accordance to section 01 14 00.

1.4 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, barricades, flares, temporary signage and lights as specified in the current edition of the Alberta Transportation Standard – Traffic Accommodation in Work Zones and as directed by the Departmental Representative to perform Work and protect public. The road may be open to both pedestrian or vehicular access throughout construction. Road closures will be at the sole discretion of the Field unit Superintendent. A minimum 3.5 m lane must be maintained for two way traffic at all times during construction.

1.5 FIRE ROUTES

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

1.6 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.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - 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 MEASUREMENT PROCEDURES

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

1.2 REFERENCES

- .1 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.
- .2 Conform to latest date of issue of referenced standards in effect on date of submission of tenders, except where specific date or issue is specifically noted.
- .2 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

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 All products must be new and free of defects.
- .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.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be considered in ample time to prevent delay in performance of Work.

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

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

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

1.8 QUALITY OF WORK

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

1.9 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

1.10 SETTING OUT OF WORK

- .1 Departmental Representative will supply horizontal reference control points benchmark elevations only for this project.
- .2 Contractor will set grades and layout work in detail from control points established by Departmental Representative.
- .3 Contractor shall employ competent survey staff for complete detailed layout of work.

- .4 Survey supervisor shall have experience in field survey work, including obtaining horizontal and vertical measurements, record keeping and calculation of quantities, generally associated with 3 to 5 years related experience.
- .5 Contractor will be responsible for correction of any error associated with his layout.
- .6 Contractor shall supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.
- .7 Contractor shall supply stakes and other survey markers required for laying out the work.
- .8 Cost of setting out of work will not be paid for directly but shall be considered incidental to contract unit prices tendered.

1.11 CONCEALMENT

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

1.12 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.

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .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 Clear snow and ice as required; bank/pile snow in designated areas as agreed with the Departmental Representative.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris. Laydown areas must be pre-approved by the Departmental Representative.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 19 - Waste Management and Disposal.
- .7 Dispose of waste materials and debris outside of Waterton Lakes National Park at a registered landfill or recycling facility.

Section 01 74 19 - Waste Management and Disposal.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental. Do not burn waste materials on site, unless approved by Departmental Representative.
- .5 The Upon completion of the signage and guardrails, the entire asphalt surface of the Red Rock Parkway, including the Redrock Day use area, shall be swept using a mechanical street sweeping truck. The street sweeper shall be equipped with water tanks and sprayers, which must be used to loosen particles and reduce dust.
- .6 Remove dirt and other disfiguration from exterior surfaces.
- .7 Sweep and wash clean paved areas.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - 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 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM E 1609 01, Standard Guide for Development and Implementation of a Pollution Prevention Program
- .2 Recycling Certification Institute (RCI):
 - .1 RCI Certification Construction and Demolition Materials Recycling

1.2 DEFINITIONS

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, re modeling, repair and demolition operations.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
 - .1 Solvents in paints and other coatings;
 - .2 Wood preservatives; strippers and household cleaners;
 - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
 - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- .18 Construction Waste Management Plan: A project related plan for the collection, transportation, and disposal of the waste generated at the construction site; the purpose of the plan is to ultimately reduce the amount of material being landfilled.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.

1.4 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Draft Construction Waste Management Plan (Draft CWM Plan): Submit to Consultant a preliminary analysis of anticipated site generated waste by listing a minimum of five (5) construction or demolition waste streams that have potential to generate the most volume of material indicating methods that will be used to divert construction waste from landfill and source reduction strategies; Consultant will provide commentary before development of Contractor's Construction Waste Management Plan.
- .3 Construction Waste Management Plan (CWM Plan): Submit a CWM Plan for this project prior to any waste removal from site and that includes the following information:
 - .1 Material Streams: Analysis of the proposed jobsite waste being generated, including material types and quantities forming a part of identified material streams in the Draft CWM Plan; materials removed from site destined for alternative daily cover at landfill sites and land clearing debris cannot be considered as contributing to waste diversion and will be included as a component of the total waste generated for the site.
 - .3 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into CWM Plan.

- .4 Alternative Waste Disposal: Prepare a listing of each material proposed to be salvaged, reused, recycled or composted during the course of the project, and the proposed local market for each material.
- .5 Landfill Materials: Identify materials that cannot be recycled, reused or composted and provide explanation or justification; energy will be considered as a viable alternative diversion strategy for these materials where facilities exist.
- .6 Landfill Options: The name of the landfill where trash will be disposed of; landfill materials will form a part of the total waste generated by the project.
- .7 Materials Handling Procedures: A description of the means by which any recycled waste materials will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
- .8 Transportation: A description of the means of transportation of the recyclable materials, whether materials will be site separated and self hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site, and destination of materials.

1.5 PROJECT CLOSEOUT SUBMISSIONS

- .1 Record Documentation: Submit as constructed information in accordance with Section 01 78 00 - Closeout Submittals as follows:
 - .1 Construction Waste Management Report (CWM Report): Submit a CWM Report for this project in a format acceptable to submittal requirements and that includes the following information:
 - .1 Accounting: Submit information indicating total waste produced by the project.
 - .2 Composition: Submit information indicating types of waste material and quantity of each material.
 - .3 Diversion Rate: Submit information indicating total waste diverted from landfill as a percentage of the total waste produced by the project.
 - .4 Transportation Documentation: Submit copies of transportation documents or shipping manifests indicating weights of materials, and other evidence of disposal indicating final location of waste diverted from landfill and waste sent to landfill.
 - .5 Alternative Daily Cover (ADC): Submit quantities of material that were used as ADC at landfill sites, and that form a part of the total waste generated by the project.
 - .6 Multiple Waste Hauling: Compile all information into a single CWM Report where multiple waste hauling and diversion strategies were used for the project.
 - .7 Photographs: Submit photographs of waste diversion facilities documenting location and signage describing usage of waste separation containers.

1.6 QUALITY ASSURANCE

- .1 Resources for Development of Construction Waste Management Report (CWM Report):
The following sources may be useful in developing the Draft Construction Waste Management Plan:
 - .1 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into CWM Plan.
 - .2 Waste-to-Energy Systems: Investigate local waste-to-energy incentives where systems for diverting materials from landfill for reuse or recycling are not available.
- .2 Certifications: Provide proof of the following during the course of the Work:
 - .1 Compliance Certification: Provide proof that recycling center is third party verified and is listed as a Certified Facility through the registration and certification requirements of the Recycling Certification Institute.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:
 - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
 - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 (CWM PLAN) IMPLEMENTATION

- .1 Manager: Contractor is responsible for designating an on site party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Owner, the Consultant and other site personnel as required to maintain CWM Plan.

- .3 Instruction: Provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractor's at appropriate stages of the project.
- .4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
 - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
 - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.
- .5 Progressive Documentation: Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:
 - .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Owner, Contractor and Consultant.
 - .2 Monthly waste summary shall contain the following information:
 - .1 The amount in tonnes or m³ and location of material landfilled,
 - .2 The amount in tonnes or m³ and location of materials diverted from landfill, and
 - .3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

3.2 SUBCONTRACTOR'S RESPONSIBILITY

- .1 Subcontractors shall cooperate fully with the Contractor to implement the CWM Plan.
- .2 Failure to cooperate may result in the Owner not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor's.

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

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

1.2 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's 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 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 and fully operational.
 - .4 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.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
 - .7 Final Payment:
 - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

- .1 Undertake a final cleaning of the site at project completion:
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
 - .2 All disturbed areas shall be returned to their original condition.

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 MEASUREMENT PROCEDURES

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

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with Departmental Representative, to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements.
 - .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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 One week prior to Substantial Performance of the Work, submit to the Departmental Representative, two final copies of operating and maintenance manuals in English.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 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 Text: manufacturer's printed data, or typewritten data.

- .7 Drawings: provide with reinforced punched binder tab.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, 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.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of drawings, 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 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .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 manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 The Contractor will complete as-built survey of all Works for Record Drawings and provide the results (including CAD drawings) to the Departmental Representative prior to Substantial Performance of the Work.
- .8 The acceptance of work and final inspection shall be in accordance to Section 01 77 00 – Closeout Procedures.
- .9 Provide digital photos, if requested, for site records.

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 REFERENCE STANDARDS

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 2012
 - .2 Canadian Environmental Protection Act (CEPA), 2012
 - .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 Motor Vehicle Safety Act (MVSA), 1995
 - .5 Hazardous Materials Information Review Act, 1985
- .2 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
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices

1.2 DEFINITIONS

- .1 Selective Demolition: Sequencing demolition activities to allow separation and sorting of selected site materials.
- .2 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including 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 Draft Construction Waste Management Plan (Draft CWM Plan): Detailed inventory of materials in building indicating estimated quantities of reuse, recycling and landfill, prepared in accordance with Section 01 74 19- Construction Waste Management and Disposal and as follows:
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
- .4 Waste Management Coordinator (WMC): contractor's representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .5 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19- Waste Management and Disposal.

- .6 Construction Waste Management Report (CWM Report): Written report identifying actual materials that formed CWM Plan for reduction, reuse, or recycling of materials

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Departmental Representative for the material ownership including the following:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
 - .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:
 - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
- .2 Pre-Demolition Meetings.
 - .1 Convene pre-installation meeting week before beginning work of this Section, with Departmental Representative to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work
 - .3 Coordinate with other construction sub trades
 - .4 Examine existing site conditions adjacent to demolition work, prior to start of Work
 - .5 Waste reporting requirements
 - .2 Ensure key personnel attend.
 - .3 WMC will provide verbal report on status of waste diversion activity at each meeting.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Shop Drawings:
 - .1 Submit for review and approval selective site demolition drawings, diagrams or details showing sequence of selective site demolition.
 - .2 Schedule of Selective Site Demolition Activities and indicate the following:
 - .1 Detailed sequence of selective site demolition and removal work, with starting and ending dates for each activity
 - .2 Coordination for shutoff, capping, and continuation of utility services
 - .3 Locations of temporary partitions and means of egress
 - .3 Construction Waste Management Plan (CWM Plan): Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a Professional Engineer, or approved equivalent, in accordance with requirements of Authority Having Jurisdiction, and as follows:

- .4 Inventory: Submit a list of items that have been removed and salvaged after selective site demolition is complete
 - .1 Pre demolition photographs: Submit photographs indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by selective site demolition operations.
- .5 Provide certificates from disposal facilities to Departmental Representative.
- .6 No interruption to any of the utility services is allowed.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Territorial regulations.
- .2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.6 SITE CONDITIONS

- .1 Perform work in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Environmental protection:
 - .1 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .2 Fires and burning of waste or materials is not permitted on site.
 - .3 Burying of rubbish waste materials is not permitted.
 - .4 Disposal 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, is not permitted.
 - .5 Ensure proper disposal procedures are maintained throughout the project.
- .3 Pumping of water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties, is not permitted.
- .4 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .5 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .6 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .7 Conduct selective site demolition so Owner's operations will not be disrupted:
 - .1 Provide not less than 72 hours' notice to Owner of activities that will affect operations.
- .8 The Departmental Representative assumes no responsibility for Selective Site elements being demolished:
 - .1 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - .2 Before selective site demolition, remove, protect and store salvaged items as directed by Owner

- .1 Salvage items as identified by the Departmental Representative.
- .2 Deliver to the Owner as directed.

1.7 EXISTING CONDITIONS

- .1 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
- .2 If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the Departmental Representative. Hazardous materials will be removed by Owner under a separate contract or as a change to the Work.
- .3 If material resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of demolition, stop work, take preventative measures, and notify the Departmental Representative immediately. Proceed only after receipt of written instructions have been received from the Departmental Representative.
- .4 Site elements that will be demolished are based on their condition on date that tender is accepted.

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 EXAMINATION

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.
- .2 The Departmental Representative does not guarantee that existing conditions are the same as those indicated in Project Record Documents.
- .3 Inventory and record the condition of items being removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to the Departmental Representative
- .5 Verify that hazardous materials have been remediated before proceeding with site demolition operations.

3.2 PREPARATION

- .1 Protection of in-place conditions:
 - .1 Prevent movement, settlement or damage of adjacent structures, services, paving, trees, landscaping, and adjacent grades.
 - .1 Repair damage caused by demolition as directed by the Departmental Representative.

- .2 Support affected site elements and, if safety of site element being demolished adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify the Departmental Representative.
- .3 Prevent debris from blocking surface drainage system which must remain in operation.
- .2 Utilities:
 - .1 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
 - .2 Notify affected utility companies before starting work and comply with their requirements.
 - .3 Mark location and termination of utilities.

3.3 REMOVAL AND DEMOLITION OPERATIONS

- .1 Identify designated utilities within demolition areas.
- .2 Remove items as indicated on the drawings.
- .3 Disruption of items designated to remain in place is not permitted.
- .4 When removing existing traffic sign or information sign, remove existing concrete foundation if there is any.
- .5 Salvage:
 - .1 Dismantle items containing materials for salvage and reuse, and stockpile or store at locations approved by the Departmental Representative.
- .6 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site at authorized facilities approved in Waste Reduction Workplan or as instructed by the Departmental Representative

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 the 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.

3.6 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 00- Cleaning.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 19- Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Refer to Parks Canada, Exterior Signage Standards and Guidelines – Version 1, March 2007.
- .2 Refer to Manual on Uniform Traffic Control Devices, 2009 edition.

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 signage and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta, Canada.
 - .2 Submit catalogue sheets and full size templates.
 - .3 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, mounting methods, schedule of signs.
- .4 Samples:
 - .1 Submit representative sample of each type sign, sign image and mounting method including, but not limited to: graphics, cast letters, sign box installation method, channel letters, and wall plates fixed mounting installation method.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data.

1.4 QUALITY ASSURANCE

- .1 Welding Certification in accordance with CSA W47.2.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials, off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect signs and posts 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.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 The Contractor shall supply the Consultant with certification from the Supplier that the signs conform with the Specifications and shall only purchase signs that are certified by the Supplier to meet the Specifications of the sheeting Manufacturer.
- .2 All signs supplied by the Contractor shall be clearly marked with the following information:
 - .1 Manufacturer's Name or Trade Mark
 - .2 Date of manufacture
 - .3 Type of sheeting material
- .3 The information shall be provided on a weatherproof label, or some other form of permanent marking fixed to the back of the sign near the bottom right-hand corner. The label shall be smaller than 100 mm x 100 mm in size.
- .4 Sign patterns shall conform to the Uniform Traffic Control Devices of Canada Sign Pattern Manual or to Parks Canada, Exterior Signage Standards and Guidelines.
- .5 All lettering on signs shall conform to the series Type Highway Font from the Standard Alphabet for Highway Signs, available from the Federal Highway Administration (CHTO-20), Washington, D.C., 20590, unless otherwise specified by the Uniform Traffic Control Devices of Canada Sign Pattern Manual or the Parks Canada, Exterior Signage Standards and Guidelines.
- .6 Wooden Posts:
 - .1 Posts shall be No 2 and better clear grade cedar.
 - .2 Post sizes to be supplied shall be 100 mm x 150 mm dimension lumber, in lengths varying according to the sign size and required vertical clearance as indicated in the design drawings. The top of the sign shall be 10 feet above grade.

- .3 At the discretion of the Departmental representative, all sign posts should have a field drilled breakaway feature as per standard drawing TEB-1.81.
- .7 If required, the Contractor shall supply cluster frames suitable for the installation of multiple signs of up to 1.5 m2. The frames shall be painted with rust resistant aluminum paint or a metal primer and aluminum paint suitable to the Consultant.
- .8 The Contractor shall supply all bolts and other hardware required to mount signs to posts or to frames and the frames to the posts. All bolts and hardware shall be galvanized.
- .9 The reflective sheeting supplied by the Contractor for the signs indicated in the design drawings shall meet or exceed the performance requirements specified in ASTM-D4956 for Type IX or Type XI Unmetallized Cube Corner Microprismatic Retroreflective Element Material.
- .10 Aluminum for standard signs shall be a minimum of 3 mm flat sheet tension leveled, sign grade aluminum and shall conform to the requirements of ASTM B209M, "Specification for Aluminum and Aluminum-Alloy Sheet and Plate", Alloys 6061-T6 or 5052-H38.

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 at elevations indicated.
- .3 Comply with sign manufacturer's installation instructions and approved shop drawings.
- .4 It is the Contractor's responsibility to have all sign locations checked for utilities prior to digging holes for posts. Any adjustments to the locations of signs will be subject to the approval of the Departmental Representative.
- .5 The soil at the bottom of holes shall be thoroughly compacted to provide a firm bearing. Posts shall be set vertically and backfilled with type 1 (25 mm minus well graded gravel) in 150 mm maximum lifts, compacted to 98% standard proctor. The disturbed area around installations shall be restored to the original contours. The signs shall be fixed securely to the post(s) in accordance with the standard drawings.

- .6 The contractor shall confirm the desired signage setbacks with the Departmental Representative prior to installation. All setbacks shall be in accordance with Alberta Transportation standards.
- .7 When a post is removed and replacement is not requested, the Contractor shall backfill the hole in 150 mm maximum lifts compacted to 98% proctor with type 1 (25 mm minus) fill material.
- .8 Posts with rectangular cross-sections shall be installed such that the longer dimension is orientated parallel to the direction of the highway.
- .9 The installed sign shall be clean and not bent or twisted. The reflectorized surface shall be free of scratches and marks and must be securely fastened to the post or frame.
- .10 All hardware shall be stainless steel and tightened to the torque recommended by the sign manufacturer. Nylon washers, the same diameter as the washer (25 mm diameter), shall be used for galvanic corrosion protection.
- .11 A plastic cap shall be installed in on the rear of the sign, along with a drain notch. The cap shall be held in place with a rubber o ring or silicon.
- .12 If required, the new clusters frames shall be installed perpendicular to and facing the approaching traffic lane and shall be securely fastened to the post
- .13 Existing signs designated for removal and disposal shall become the property of the Contractor.
- .14 Prior to the final acceptance of the Work, all damage or deficiencies from any cause in signs and posts installed under this Contract shall be rectified by the Contractor at his own expense.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.
 - .1 Leave signs clean.
 - .2 Remove debris from interior of sign boxes.
 - .3 Touch up damaged finishes.
- .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 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 1 sample.
 - .2 Allow continual sampling by Departmental Representative during production.
 - .3 Provide Departmental Representative with access to source and processed material for sampling.
 - .4 Supply new or clean sample bags or containers according appropriate to aggregate materials.
 - .5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

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 D 4791.
 - .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 Crushed gravel composed of naturally formed particles of stone.
 - .3 Reclaimed asphalt pavement.

2.2 SOURCE QUALITY CONTROL

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 2 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 2 weeks minimum in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 PREPARATION

- .1 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.
- .2 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .3 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.
- .4 Stockpiling:
 - .1 Stockpile aggregates on site.
 - .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 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.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – 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 00 - 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

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canada National Parks Act
- .2 Species at Risk Act
- .3 The Migratory Birds Convention Act
- .4 DRAFT Waterton Lakes National Park Management Plan for Fire Affected Trees.
- .5 Parks Canada - Waterton Lakes National Park General Best Management Practices including supplementary mitigations
- .6 Waterton Lakes national Park Best Management Practices for Watershed-Scale Danger Tree Removal.
- .7 Parks Canada EIA Requirement Checklist

1.2 DEFINITIONS

- .1 Hazard tree assessment includes the assessment of hazard trees in accordance with the Wildlife Tree Committee of British Columbia's Wildlife/Danger Tree Assessor's Parks and Recreation Sites Module. Hazard tree assessment must be completed by a person that holds a valid and current Parks and Recreation Module Hazard Tree Assessment Certificate. Assessments must take into account the current and future use as well as current and potential wind speeds.
- .2 Close-cut clearing consists cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or within 5 centimeters of existing grade and delimbing and topping the fallen timber.
- .3 Hazard tree abatement includes felling, close cutting of stumps, de-limbing, topping, bucking, relocating to 5 m or more from edge of pavement, placing logs parallel to contours, and all labour, materials, supervision, mapping support and equipment required. All hazard tree abatement must be completed by hand felling. The use of any heavy equipment outside of the prepared surfaces of the shoulders and roadway is not permitted, but may be added to the contract at the sole discretion of the departmental representative.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Samples:
 - .1 Prior to any hazard tree assessment work and prior to each mobilisation of the hazard tree crews, the contractor must submit a map showing the proposed work locations and estimated timeframe and schedule. Only time pre-approved, in writing, by the Departmental Representative will be paid under the contract.
 - .2 The contractor must submit a report, including drawings and photos, that show the locations, volumes, heights, species and recommended debris management options, completed under the seal of a Registered Professional Forester. An example report is included in this tender for reference.

1.4 QUALITY ASSURANCE

- .1 Complete work Federal and Provincial health and safety regulations.
- .2 Complete work in accordance with all documents listed in Part 1 1.1 References.
- .3 At the discretion of the Departmental Representative, an independent hazard tree assessment consultant may, or may not, be engaged to complete quality assurance inspections or provide oversight throughout the project.

1.5 STORAGE AND PROTECTION

- .1 After trees are felled, cut flush, de-limbed and topped dead trees must be moved outside 5 m or more from the edge of pavement, by hand. Trees must be felled, relocated, placed perpendicular to the slopes.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 After the hazard tree assessment and abatement, a debris management report must be completed that includes recommendations concerning debris removal, chipping and silviculture prescriptions. Chipping, yarding, processing, loading and hauling may be added to the contract as a change order, at the discretion of the Departmental Representative. An example report and mapping deliverable is included in the reference documents.

Part 2 Products

2.1 MATERIALS

- .1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Place trees perpendicular to the slope in a manner that will help prevent erosion.

3.2 PREPARATION

- .1 Inspect site and verify with Departmental Representative, the locations to be assessed. Provide maps of proposed location, crew shift scheduled and times and receive approval from the Departmental Representative, in writing, to utilize the unit rate prior to completing any work. Work not approved of in advance, in writing, will not be paid.
- .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, hazard tree assessment and abatement works.
- .4 Wildlife timing restrictions will apply. Hazard tree assessment and abatement work is not permitted to be completed between April 1, 2019 and August 30, 2019 unless approved, in writing, by the Departmental Representative on a case by case bases. Work may be permitted during this period, where required to maintain the safety of the workers.
- .5 Keep roads and walks free of dirt and debris. The roadway may be open to the public during the activities. Provide spotters and signage to ensure the safety of the public. Area closures may also be implemented during the felling activities, at the sole discretion of the superintendent.
- .6 Marking of hazard trees is not permitted. Hazard tree assessors must work ahead of the fallers and provide direction concerning trees to be removed without marking the hazard trees. Hazard trees must be cut on the same day in which they are assessed as being hazardous based on the Level of Disturbance recommended by the assessor.

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 Each hazard tree crew shall consist of Two Certified Fallers, Two Certified Hazard Tree assessors and on Registered Forest Technician. The hazard tree crews shall be supported by an offsite Registered Professional Forester and GIS Mapping Technicians.
- .2 Hazard tree assessment and abatement work must be completed in 10 day shifts, on site 10 hours per day with a minimum of 4 days off in between shifts.
- .3 The Level of Disturbance shall be bumped up to account for the construction activities and potential wind speed equivalents.
- .4 Hand felling with chainsaws is permitted. Processors, heavy equipment, excavators, loaders and other equipment is not permitted for hazard tree assessment and abatement activities, unless approved in advance, in writing by the Departmental Representative.
- .5 The assessment and abatement of hazard trees shall be completed in areas as directed in writing by the Departmental Representative. The contractor shall notify the Departmental Representative of all propose hazard tree assessment and abatement locations in writing.
- .6 All stumps from trees cut by the contractor and/or stumps cut by others located within the greater of 1.5 tree lengths or 20 m from the edge of pavement shall be cut flush.
- .7 Archaeology constraints apply and an orientation will be required. Certain areas may require assessment and abatement in frozen ground conditions.
- .8 All hazard trees shall be de-limbed, topped and placed perpendicular to the contours.
- .9 Cut off branches overhanging area cleared as directed by Departmental Representative.
- .10 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

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 No Used

3.7 UNDERBRUSH CLEARING

- .1 Not used

3.8 GRUBBING

- .1 Not Used

3.9 REMOVAL AND DISPOSAL

- .1 Not Used

3.10 FINISHED SURFACE

- .1 Not Used

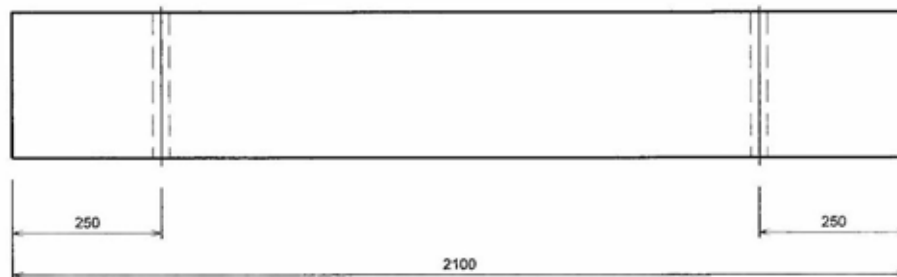
3.11 CLEANING

- .1 All Roadways and shoulders must be free of debris and deleterious material at the end of each working day.

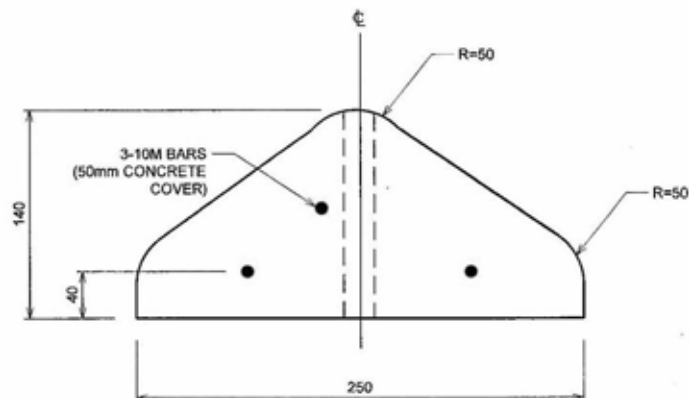
END OF SECTION



PLAN



ELEVATION

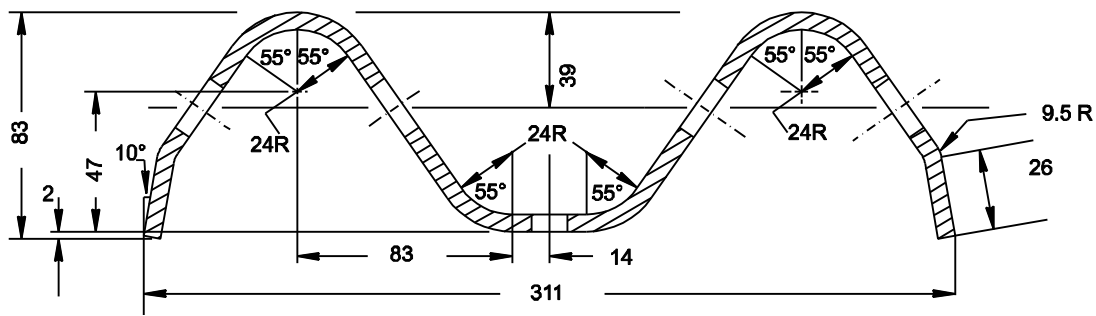


SECTION

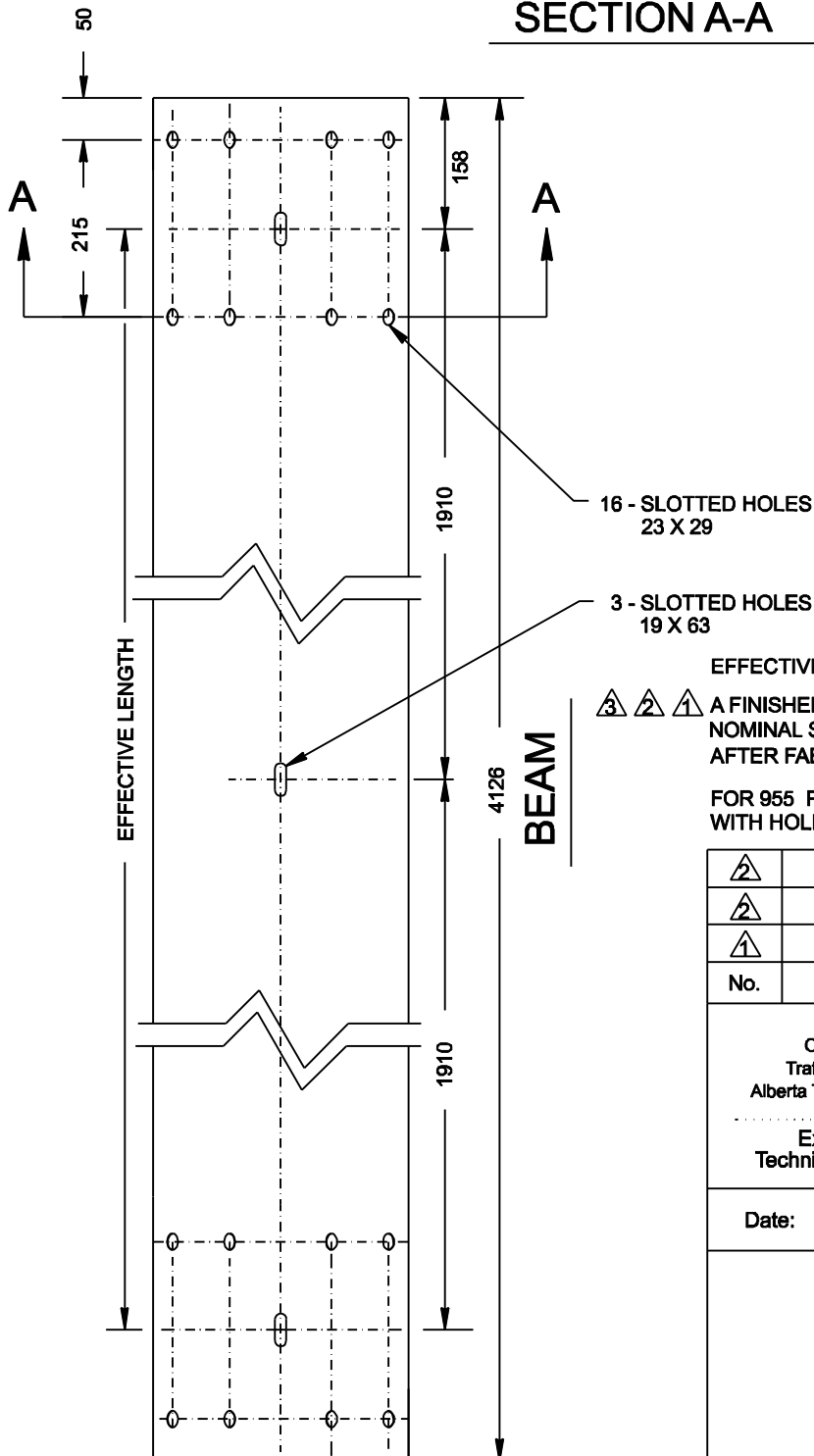
NOTES:

1. CONCRETE 24 MPa.
2. CURB TO BE SECURED BY 15mm DIAMETER ANCHORS 450mm LONG.

No. _____ Date _____		Revision _____		App'd No. _____ Date _____		Revision _____		App'd _____		
PERMIT TO PRACTICE CITY OF CALGARY Signature: <i>[Signature]</i> Date: 2015 MAR 19 PERMIT NUMBER: E-04428 The Association of Professional Engineers and Geoscientists of Alberta		PROFESSIONAL ENGINEER SEAL 2015/03/01		THE CITY OF CALGARY ROADS DIMENSIONS ARE METRES OR MILLIMETRES UNLESS OTHERWISE NOTED METRIC Z:\permanent\2014RoadSpecs_2014\Drawing Files\4541003\4541003005_V8.dgn 05-JAN-2015 09:08 ISC: UNRESTRICTED		Drawn: J.L. Date: 2014-10 Designed: EW Checked: EW Scale: NTS		PRECAST CONCRETE CURB TYPE 'A'		Figure 25 File Number 454.1003.005



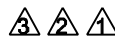
SECTION A-A



16 - SLOTTED HOLES
23 X 29

3 - SLOTTED HOLES
19 X 63

EFFECTIVE LENGTH = 3820 (12' 6")



A FINISHED THICKNESS OF RAIL TO BE 2.82 mm
NOMINAL STEEL AND HOT DIPPED GALVANIZED
AFTER FABRICATION.

FOR 955 POST SPACING, SPECIFY RAIL ELEMENT
WITH HOLES AT 955 CENTRES.

	Revised Note	B.K.	08/05/07
	Steel Thickness	B.K.	01/03/06
	Steel Thickness	B.K.	12/07/05
No.	REVISIONS	BY	DATE

Approved:
Original approved by
Traffic Operations Branch
Alberta Transportation and Utilities
Executive Director,
Technical Standards Branch

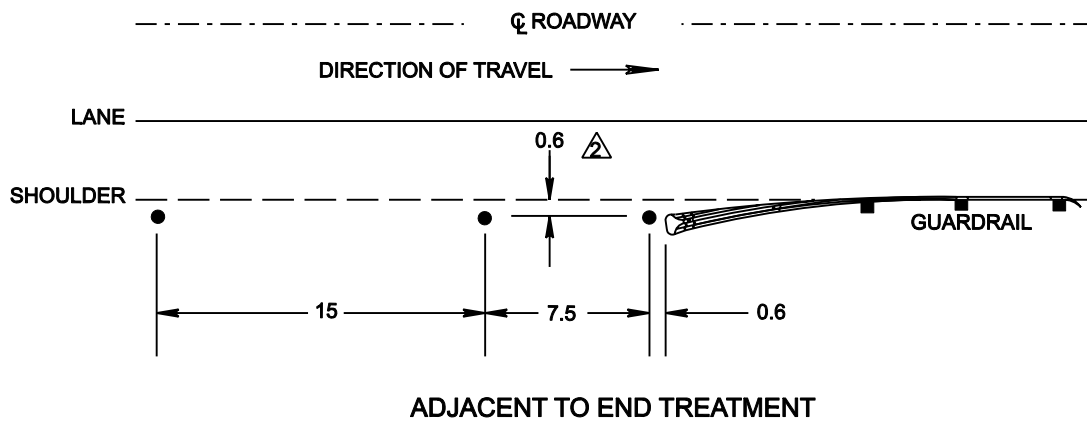
Date: NOVEMBER 11, 1992

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

W - BEAM GUARDRAIL HARDWARE RAIL DETAIL

All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.02
---------------------	--------------------	------------------	----------------------






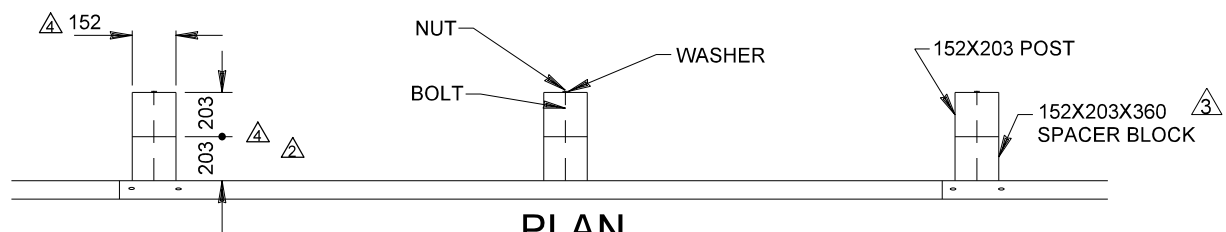
LEGEND:

- DELINEATOR GUIDEPOST

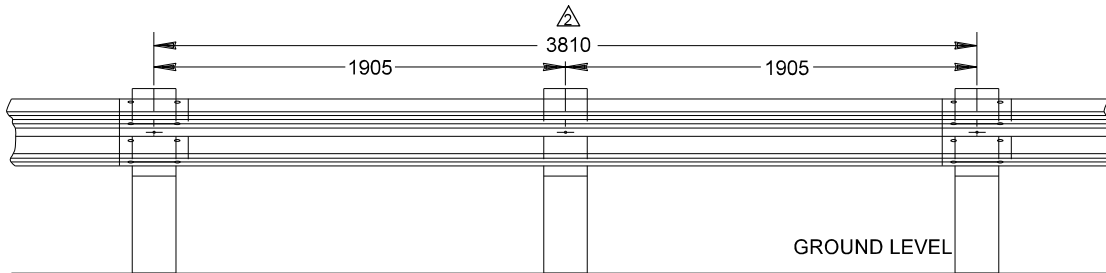
NOTE:

VARIOUS TYPES OF END TREATMENTS MAY BE USED AS PER PROJECT REQUIREMENTS.

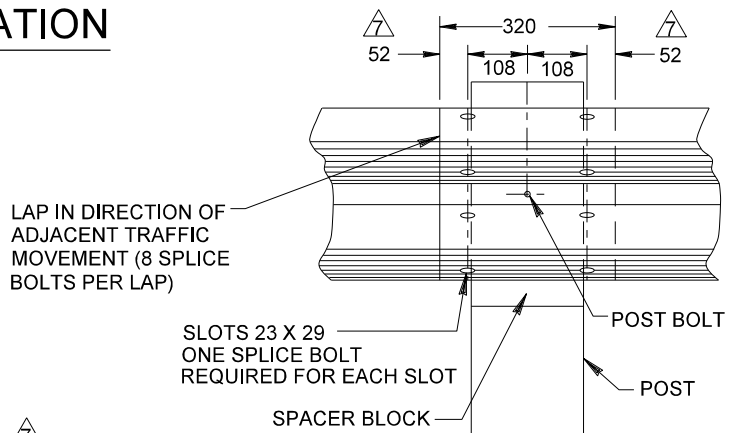
	Post Offset	B.K.	01 Nov 07
	Note added	B.K.	12/07/05
No.	REVISIONS	BY	DATE
<div>Approved: Original approved by Alberta Transportation and Utilities Traffic Operation Branch</div> <div>Executive Director, Technical Standards Branch</div>			
Date: DECEMBER 11, 1992			
<div>GUIDE POST DELINEATION FOR GUARDRAIL</div>			
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.51



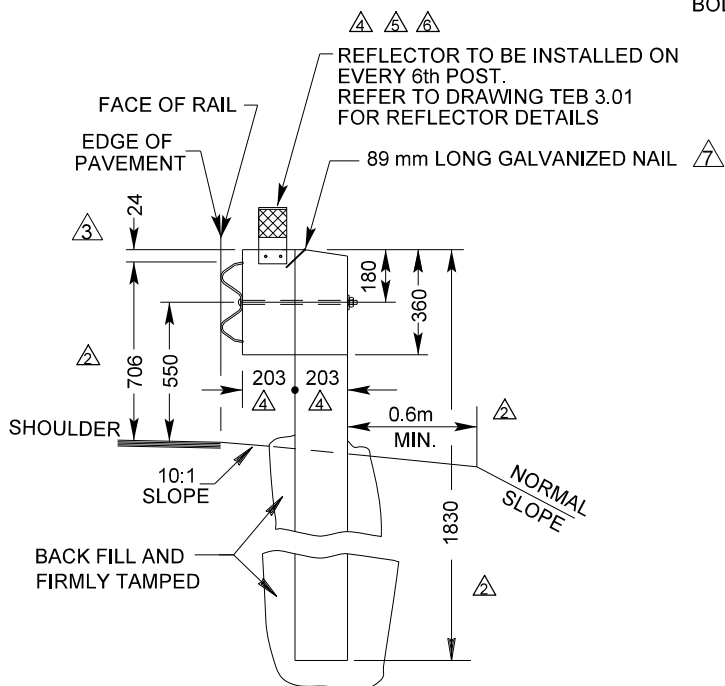
PLAN



ELEVATION



RAIL SPLICE DETAIL



POST AND SPACER DETAILS

NOTE:

1. THE STANDARD POST LENGTH FOR STRONG POST SYSTEM IS 1830mm (6'0"). OTHER POST LENGTHS MAY BE USED IF DIRECTED BY THE ENGINEER.
2. REFER TO DRAWING TEB 3.01 FOR SPACER BLOCK AND POST DETAILS
3. 89 mm LONG GALVANIZED NAIL TO PREVENT BLOCK ROTATION

All dimensions are in millimetres unless otherwise indicated.

7	Dimensions, revised. Galvanized nail and notes 2 and 3 added	HC	11 MAR 2016
6	Reflector Note Revised	PM	8 JUL 09
5	Reflector Note Revised (Include Type IX)	BK	03/23/07
4	Reflector Note and Added Post Dimensions	BK	08/11/06
3	Dimensions and Reflector Detail	BK	12/07/05
2	Notes and Dimensions	BK	12-04
1			06-95
No.	REVISIONS	BY	DATE

Approved:
Original signed by
A.D. Cherwenuk

Executive Director,
Technical Standards Branch

Date: DECEMBER 11, 1992

Alberta
Transportation

STRONG POST W-BEAM BLOCKED-OUT GUARDRAIL

Prepared
By: M.T

Checked
By: B.K

Scale:
N.T.S.

Dwg No.:
TEB 3.09

General Information For All SKT Steel Posts Designs

The SKT was crash tested to meet the requirements of NCHRP Report 350 Test Level 3 (100 km/hr) and Test Level 2 (70 km/hr). Refer to specific State DOT standards and specifications for allowable design alternatives. It is the responsibility of the installer to utilize a design approved by the State DOT and to follow all required State procedures in installing the SKT.

This SKT Installation Manual is divided into 4 sections

- General Information for all **SKT** Steel Posts Designs.
- **SKT** Design Options – This area describes the many different post options (steel and wood posts) to choose from for the SKT. (page4)
- Installing the **SKT** – This section gives a step-by-step procedure on the proper installation of the SKT system. (page 16) Refer to Figures 1 – 13 for details.
- Inspection Checklist for **SKT** Steel Post System – Use this checklist to inspect new installations or recently maintained/repaired installations. (page 21)

The Following Steel Post Options are Accepted for use with the SKT:

- All Bolted Hinged Posts (foundation tubes are not required).
- All Plug Welded Posts (foundation tubes are required at posts #1 & #2).
- Bolted Hinged Posts #1 & #2 and Plug Welded Posts #3 and beyond.
- Bolted Hinged Posts #1 & #2 and Wood CRT Posts #3 and beyond.

The Following Installation Lengths are Accepted for use with the SKT:

The Test Level 3 (100 km/hr design speed) **SKT** system is 50'-0" long.

The Test Level 2 (70 km/hr design speed) **SKT** system is 25'-0" long. This has the same components as the 50'-0" long system with the last 25'-0" eliminated.

The Test Level 3 **SKT-LITE** option may be installed 37'-6" long. This has the same components as the 50'-0" long system with the last 12'-6" eliminated. Check the State standard sheets or contract plans to see if this option is approved in your State.

General Information (continued)

The **SKT** breakaway steel posts are applicable for Test Level 3 (50'-0" long system) and Test Level 2 (25'-0" long system) design speeds. See **Figure 1** for a layout of the **SKT** steel post system.

Shown below is a comparison of the wood post and steel post **SKT** systems.

The following items remain "**unchanged**" from the "**wood**" post systems to "**steel**" post systems:

- Impact head
- All W-beam rail sections
- Cable anchor bracket
- Foundation tubes (only required with the Plug Welded Posts)
- Ground strut (same for Plug Welded Posts / different for Hinged Bolted Posts)
- Cable assembly
- Bearing plate
- Most of the hardware

The following "**items vary**" between the "**wood**" post systems to "**steel**" post systems:

- The end posts are steel rather than wood.
- The breakaway line posts are steel rather than wood.
- For the Bolted Hinged Post design, a different ground strut is used.
- The steel post systems do not use a pipe sleeve at post #1.
- The steel post systems use a routed wood block or recycled block of similar design.
- The steel post systems use a standard 1 1/4" long splice bolt for the post bolt at post #2 instead of a 10" long post bolt.
- The steel post systems use 10" long line post bolts instead of 18" long.
- The steel post systems use 1/4" hex bolts for the impact head attachment not 3/8" lag screws. (The **SKT** impact head is designed to bolt to a steel post or a wood post. See **Figure 11.**)
- The Plug Welded systems strut channel bolts are 3/4" at the tube connection not 5/8" bolts.
- The Bolted Hinged posts use a single high strength post hinge bolt at the post connection. At post #1, the bolt is 5/8" x 9". At the remaining posts, a 3/4" x 8 1/2" bolt is used.
- The steel post systems bearing plate uses a retainer/tie to prevent rotation.

Design Options

The length of the Test Level 3 **SKT** system is 50'-0" long or the system may also be installed 37'-6" long for the **SKT-LITE** option. Check State or local agency standards or contract plans for allowable options.

There are many different options available for the SKT support posts. Available designs are shown in **Table 1**.

SKT Post Design Options	Number of Wood BCT Posts	Number of Wood CRT Posts	Number of Foundation Tubes	Number of Bolted Hinged Steel Posts	Number of Plug Weld Steel Posts
All Breakaway Wood Posts	2, 4 or 8	6, 4 or 0	2, 4 or 8	-0-	-0-
All Hinged Steel Posts	-0-	-0-	-0-	6 medium 2 long	-0-
All Plug Weld Steel Posts	-0-	-0-	2	-0-	2 short 6 medium
Hinged & Plug Weld Steel Posts	-0-	-0-	-0-	2 long	6 medium
Hinged Steel & Wood Posts	-0-	6	-0-	2 long	-0-

Table 1. SKT Post Design Options (50'-0" long system)

(Refer to Wood Post SKT Manual for additional information on the Wood Post SKT System)

Post Lengths & Descriptions: (Reference to the approximate length of posts shown below is for the purpose of identifying a general length relative to the other posts. It is not an exact length.)

BCT Wood Posts are approx. 3.5 feet long and inserted in a steel foundation tube.

CRT Wood Posts are 6 feet long.

Long Hinged Steel Posts are approx 8.5 feet long and must be bolted together in the field.

Medium Hinged Steel Posts are 6 feet long and must be bolted together in the field.

Medium Plug Weld Steel Posts are 6 feet long and shipped as a welded assembly.

Short Plug Weld Steel Posts are approx 3.5 feet long and inserted in a foundation tube. They are shipped as a welded assembly.

Steel Foundation Tubes at post locations #1 & #2 may be either 6 feet long (no soil plate) or 4.5 feet or 5 feet long (with a soil plate).

NOTE: All Bolted Hinged **Steel** Posts must have the lower section installed before bolting the top section. The lower section of the Bolted Hinged steel posts should not be driven with the upper post attached.

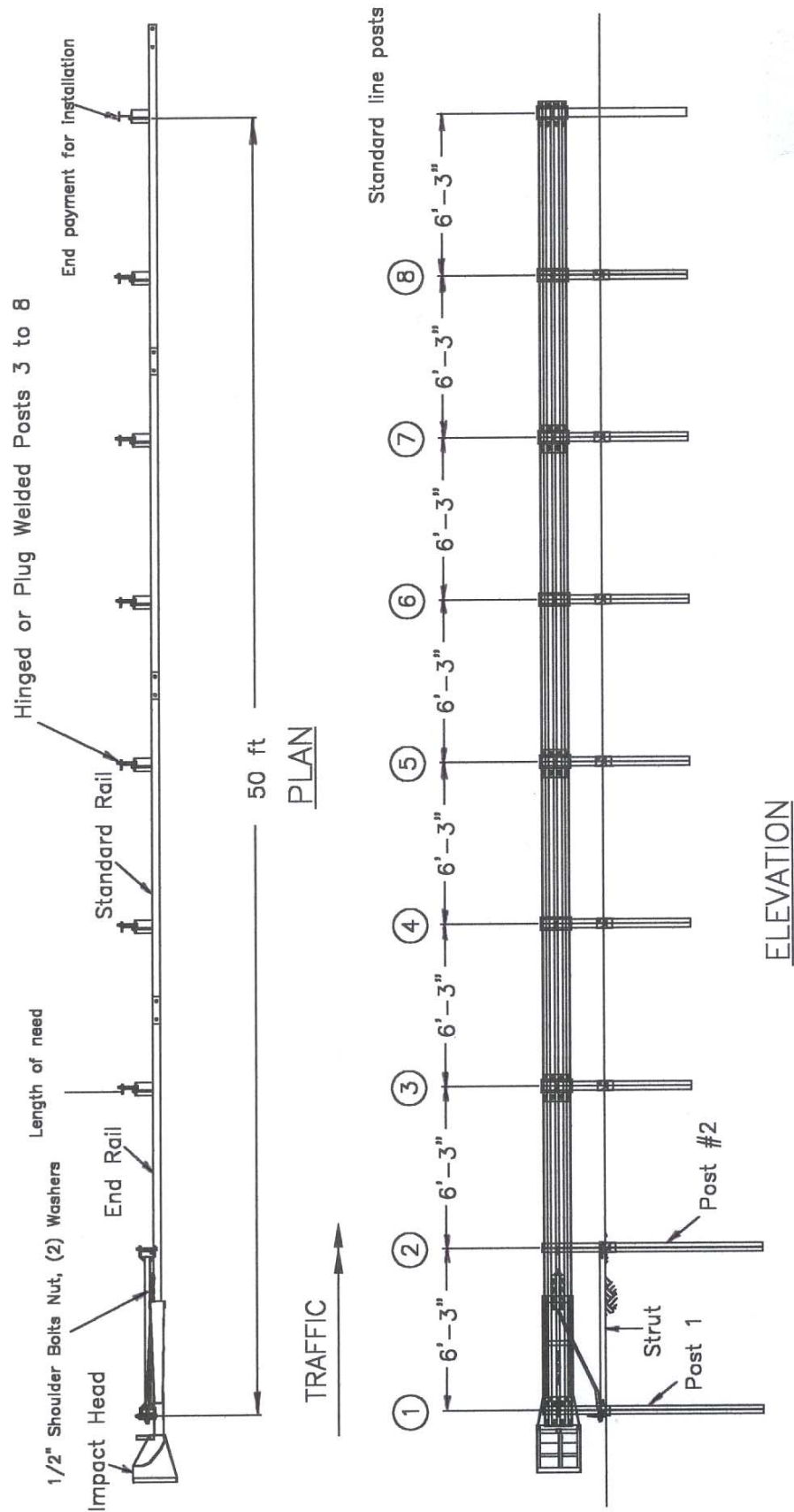


Figure 1. Plan and Elevation View of Steel Post SKT System

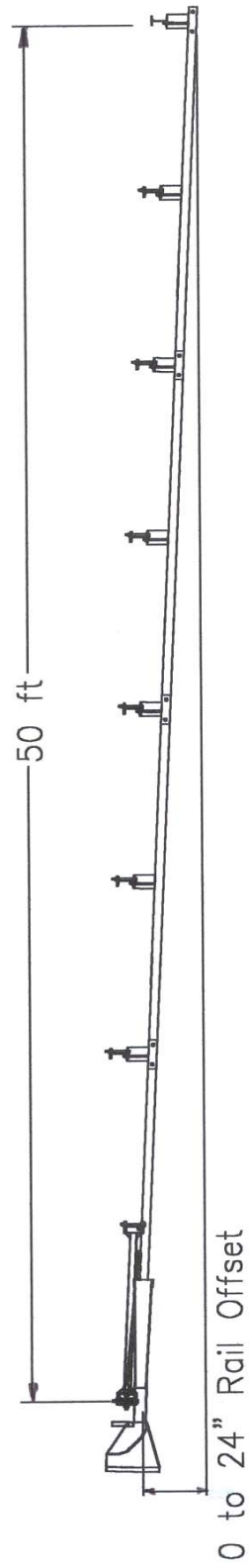


Figure 2. SKT Optional Flared Installation

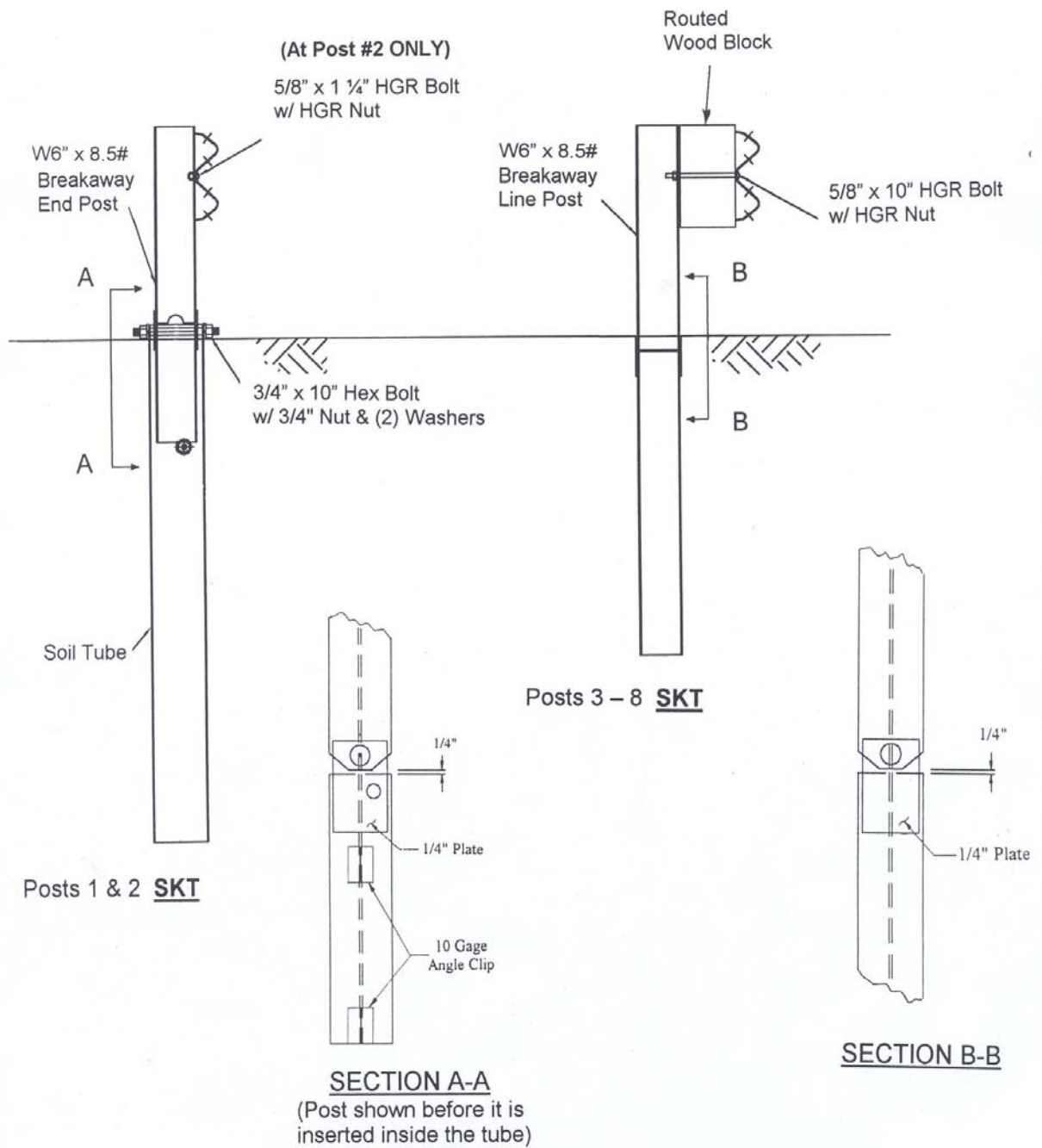


Figure 3. Section View of Plug Welded Steel End Posts and Line Posts

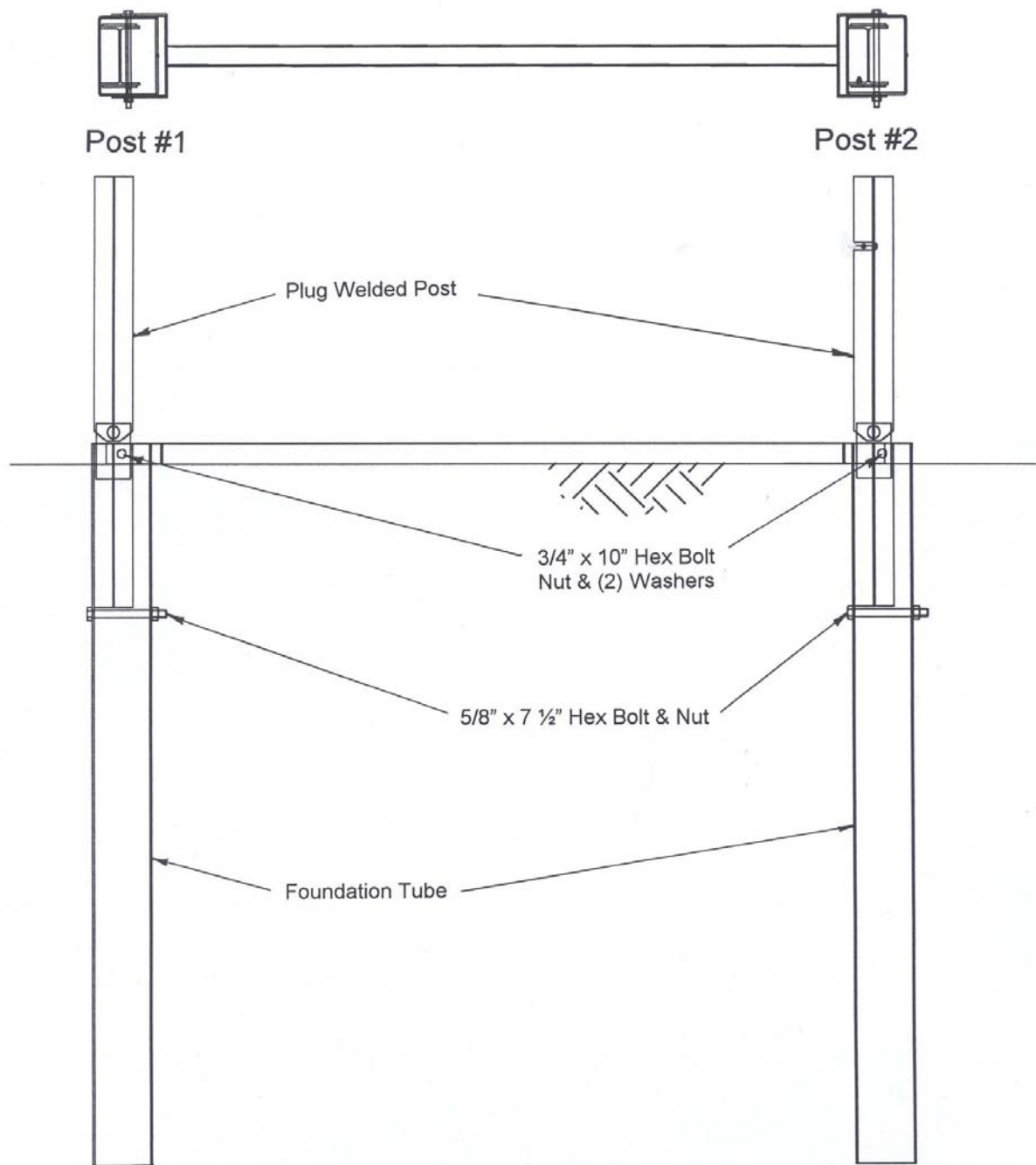


Figure 4. SKT Ground Strut Anchorage for Plug Welded Steel Post

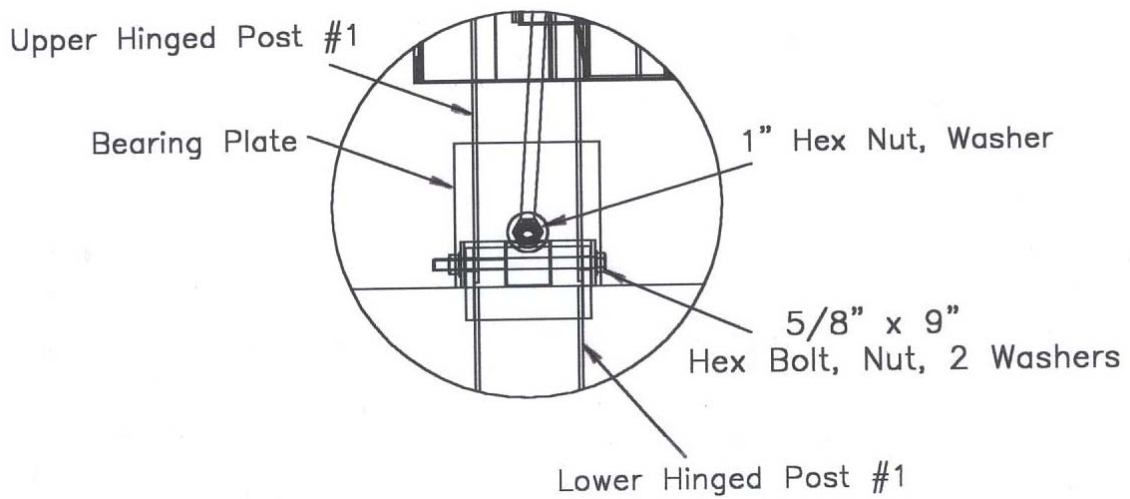
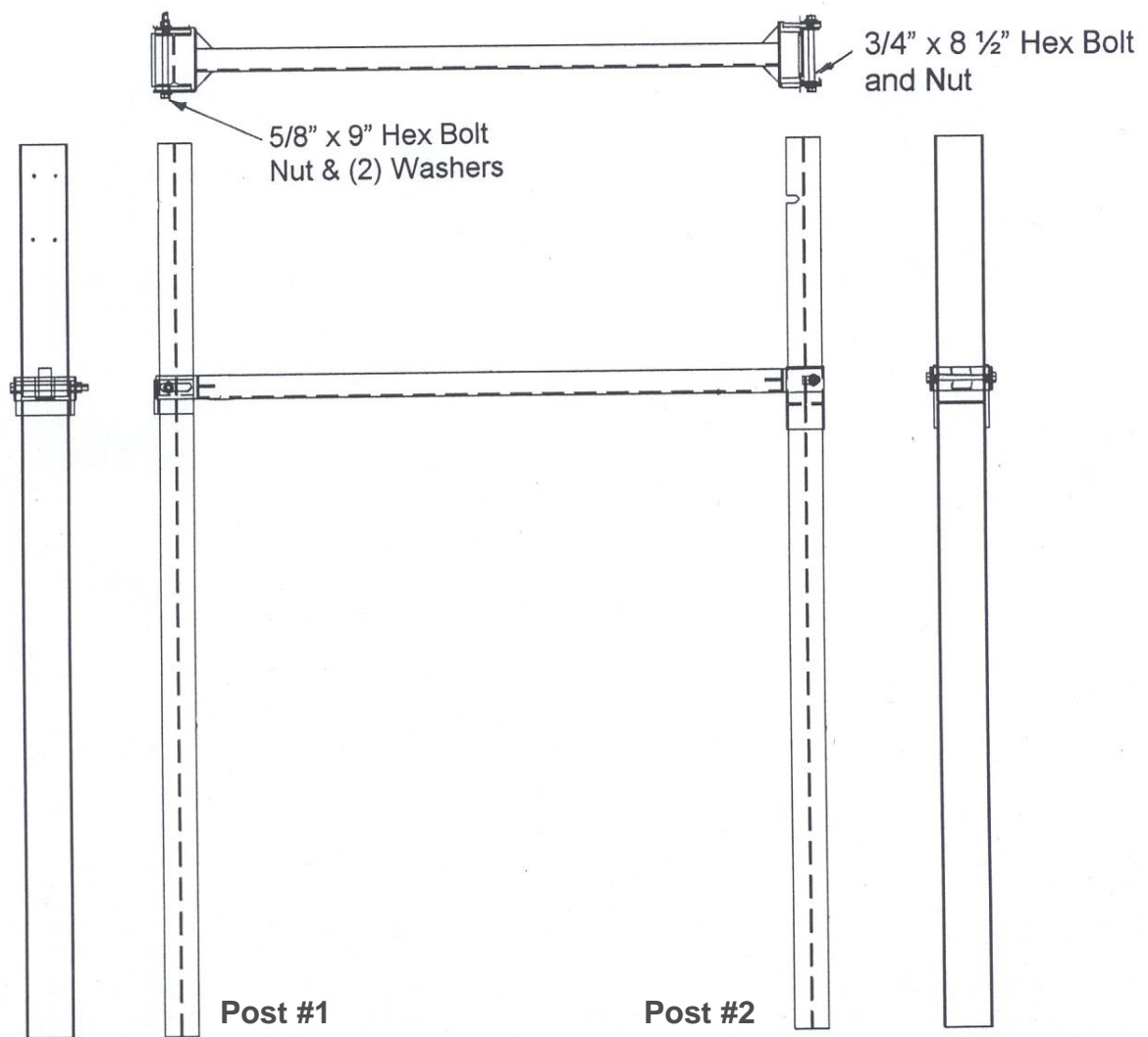
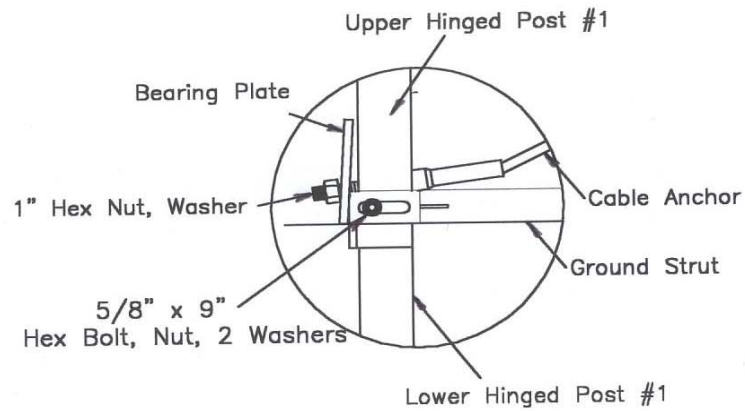
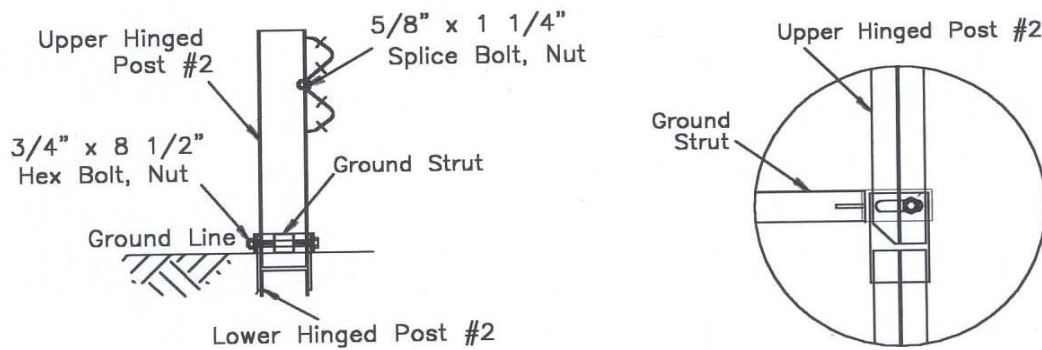


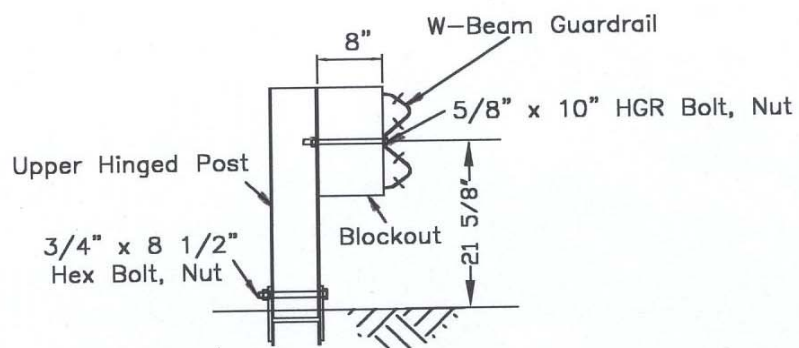
Figure 5. SKT Ground Strut Anchorage for Bolted Hinged Steel Post



Hinged Steel Post #1 Side View
(Note that retainer/tie to keep bearing plate from rotating is not shown)



Hinged Steel Post #2

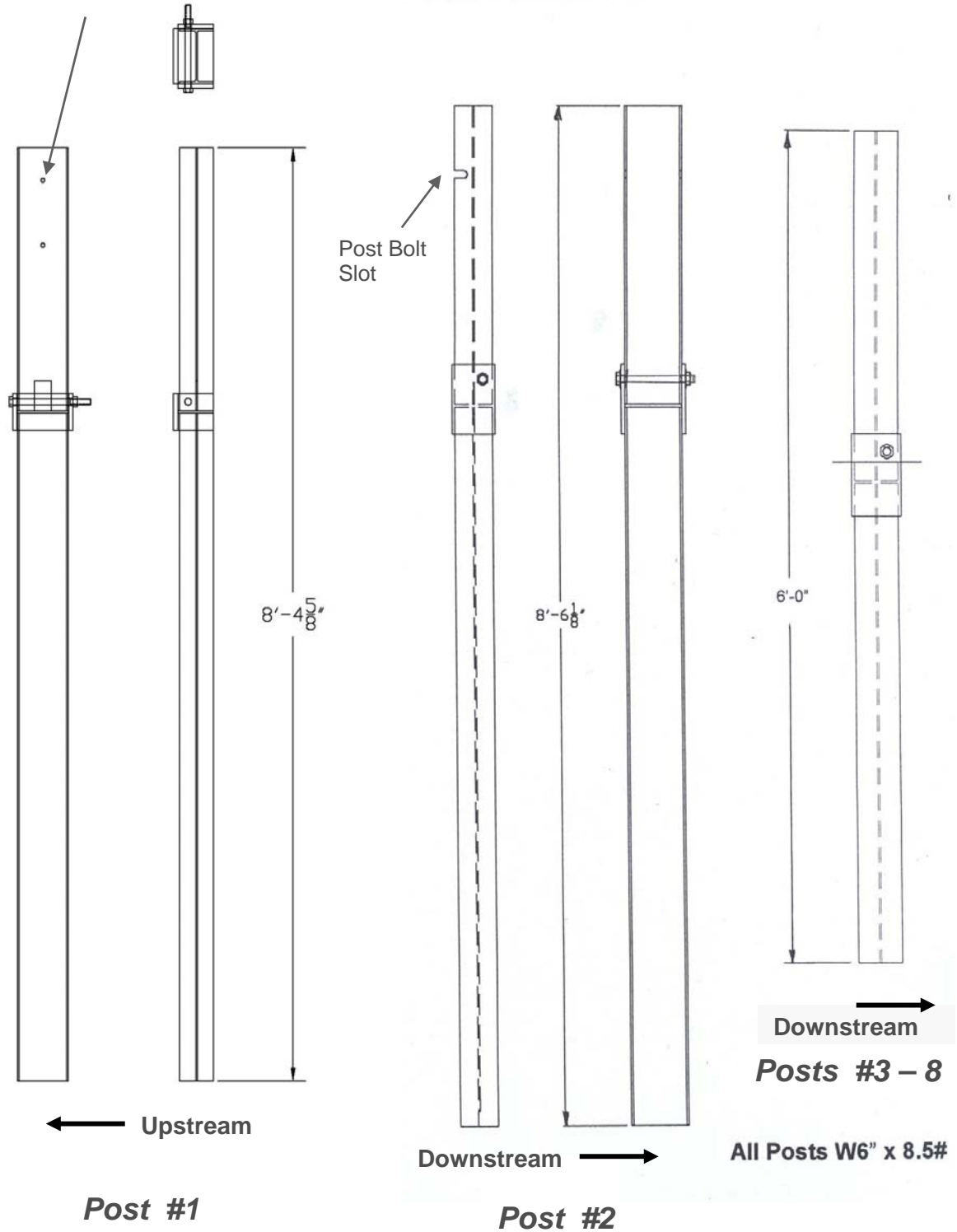


Hinged Steel Posts #3 to #8

NOTE: Be sure the 5/8" x 9" hex bolt at Hinged Post #1 is on the upstream side of the post.
Be sure the 3/4" x 8 1/2" hex bolt at Hinged Posts 2-8 is on the downstream side of the post.

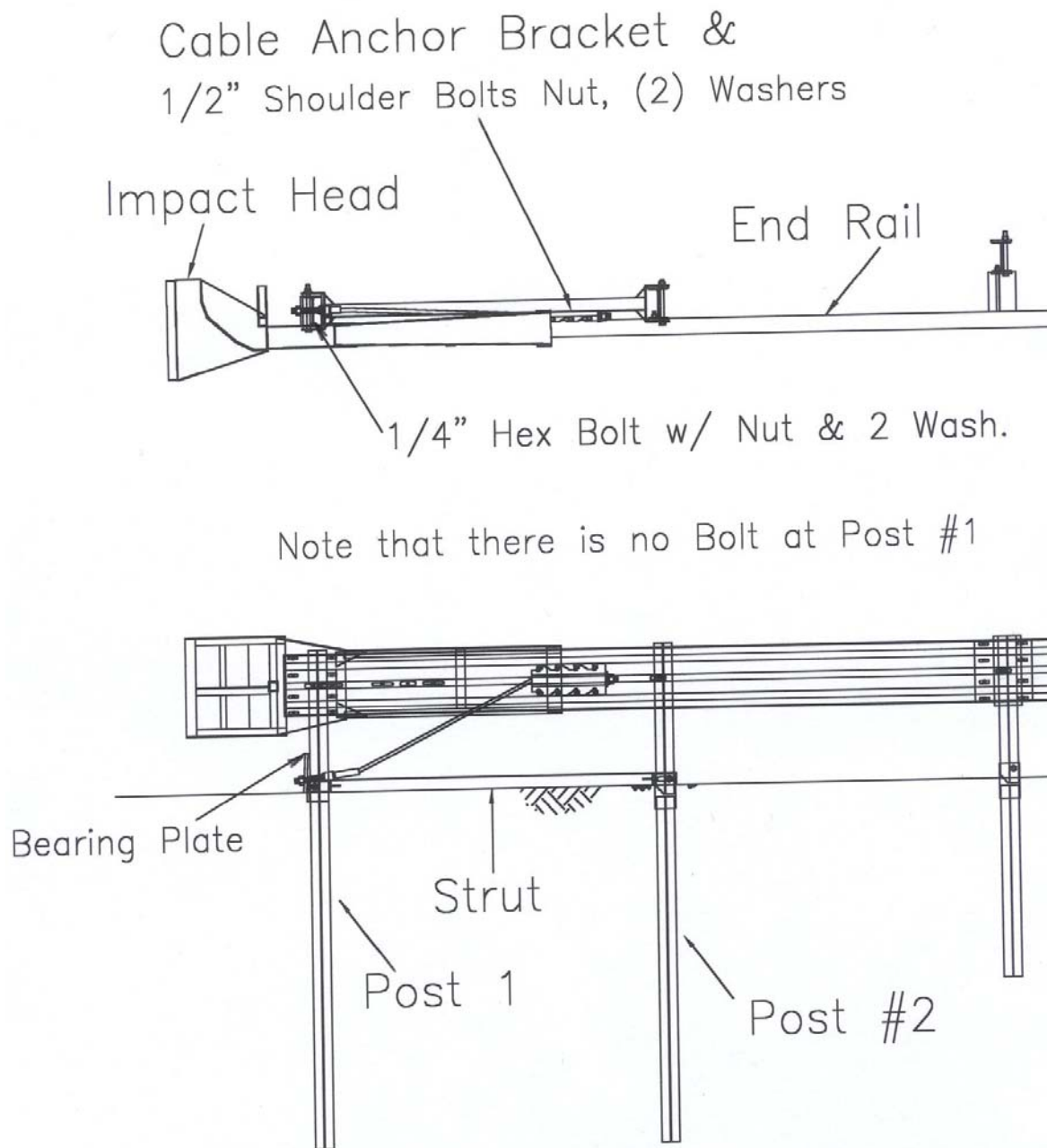
Figure 6. Section Views of Bolted Hinged Steel End Posts and Line Posts

Holes for 1/4" Bolt to Attach Impact Head at Top & Bottom



NOTE: Be sure the 5/8" x 9" hex bolt at Hinged Post #1 is on the upstream side of the post.
Be sure the 3/4" x 8 1/2" hex bolt at Hinged Posts 2-8 is on the downstream side of the post.

Figure 7. Detail of Bolted Hinged Steel End Posts and Line Posts



NOTE: The impact head is attached to post #1. The W-Beam rail section is not attached to post #1.

Figure 8. SKT Above-Ground Details at Post Locations 1 and 2.

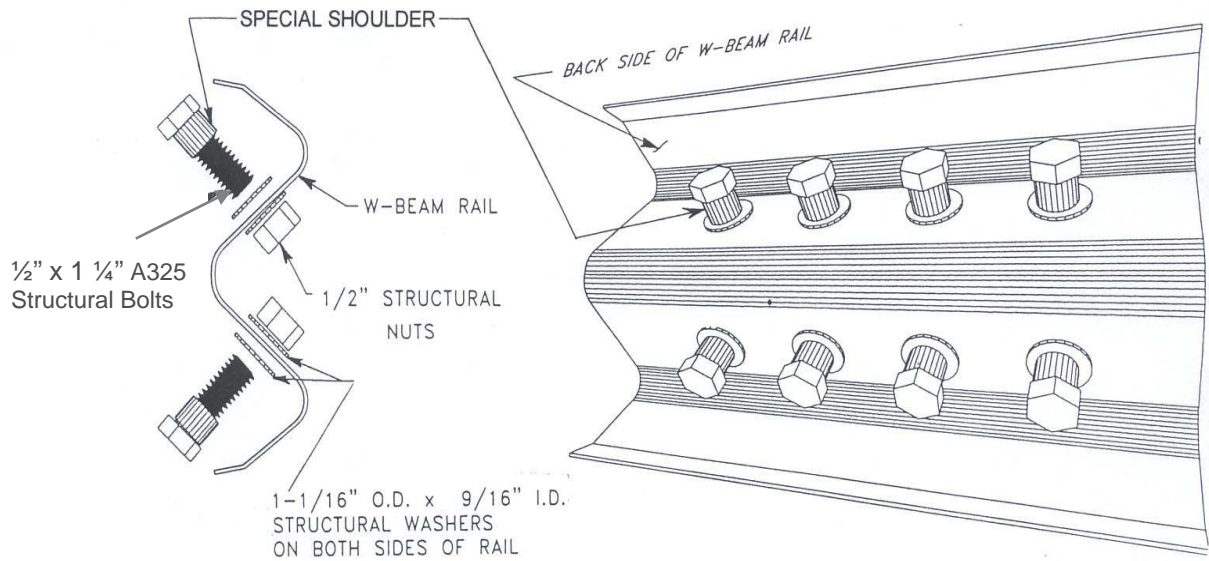
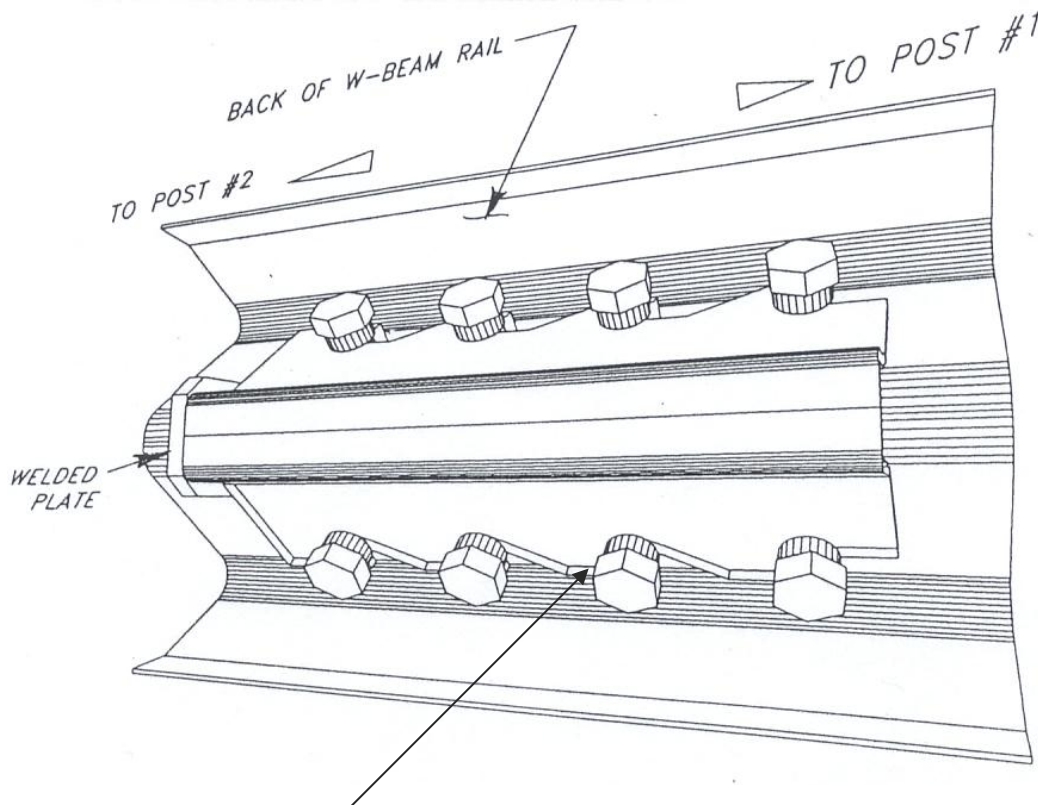


Figure 9. Installation of Cable Anchor Bracket Shoulder Bolts.



It is important that the anchor bracket be fully seated on the shoulder portion of the cable anchor bolts

Figure 10. Installation of Cable Anchor Bracket.

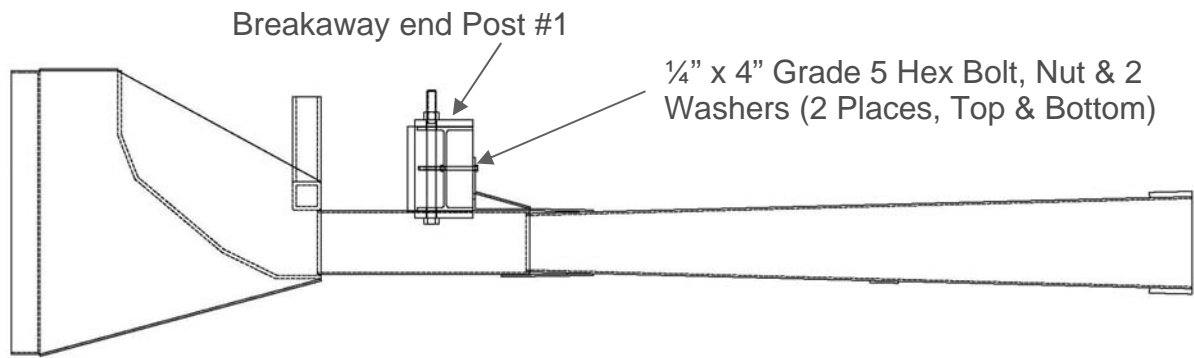
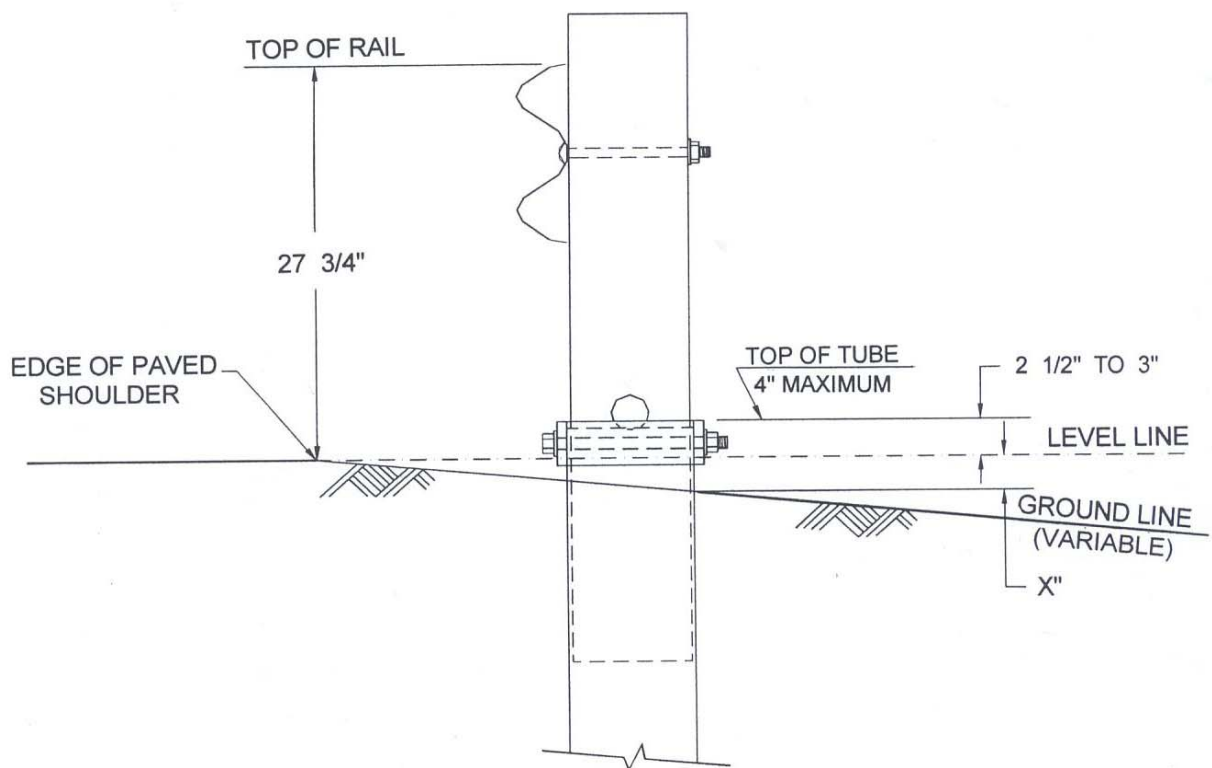
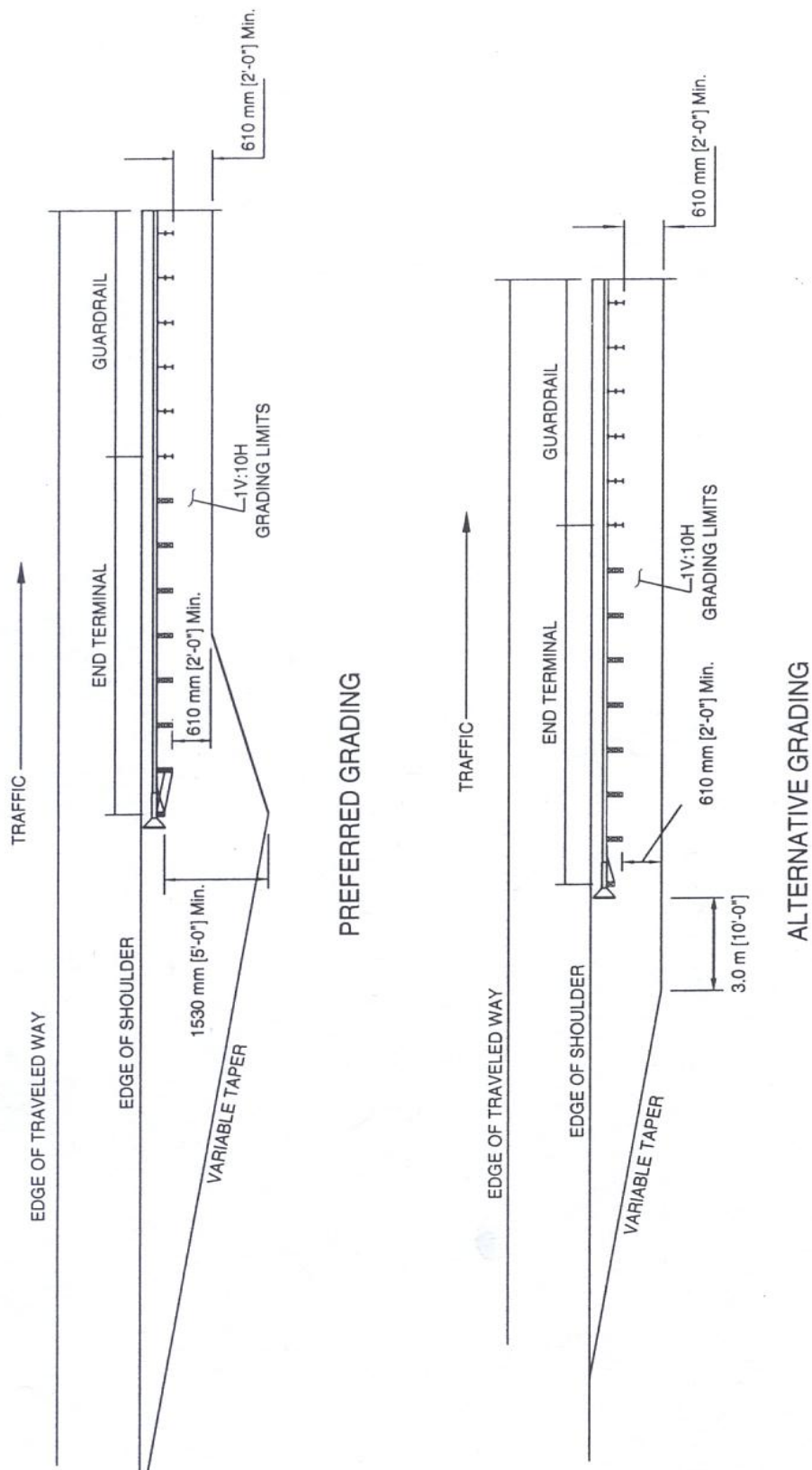


Figure 11. SKT Impact Head Connection to Steel Post



(Wood Post #2 Shown / Steel Post Requirements Similar)

Figure 12. Proper Placement of Foundation Tubes



(Reference AASHTO Roadside Design Guide)

Figure 13. Grading Recommendations for SKT

*The preferred grading layout should be used wherever practical. However, because of site limitations, when upgrading an existing terminal with a crashworthy terminal meeting NCHRP Report 350 criteria, the alternative grading layout may be used.

Installing the SKT

Materials

The length of the **SKT** is 50'-0" long for a Test Level 3 system or the system may also be installed 37'-6" long for the **SKT-LITE** option. A Test Level 2 **SKT** system is 25'-0" long. Refer to contract plans.

Site Preparation

When the guardrail is installed parallel to the edge of the shoulder, a 50:1 (or less) flare away from the roadway is recommended so the impact head will not encroach on the shoulder thereby reducing the potential for nuisance impacts. The flare is not required and may be decreased or eliminated. See **Figure 2**. Minor site grading may be necessary for installations placed beyond the edge of the shoulder to prevent the foundation tubes or the lower section of the breakaway Steel Posts from extending more than 4" above the ground. See **Figures 12 & 13**.

Tools Required

The tools required for installation of the SKT system are the same as those used to install standard highway guardrails (H.G.R.), including sockets & wrenches, a drill, and other equipment such as augers, tampers, and post pounders commonly used in driving guardrail posts.

Installation Procedures

Begin installation at the downstream end of the SKT (post location 9) to ensure that the terminal matches up with the standard downstream section of guardrail. The major steps in the installation of the SKT are as follows:

- Install steel line posts #3 through #8. The Plug Welded Posts are shop welded and arrive as a single post. (See **Figure 3**). The Hinged Bolted Posts have a top and bottom half that are bolted together in the field. (See **Figure 7**).
- Install steel end posts #1 and #2 with groundline strut. The Plug Welded Posts are inserted in a steel foundation tube. (See **Figure 4**). These posts are shop welded and arrive as a single post. (See **Figure 3**). The Hinged Bolted Posts do not use a foundation tube. (See **Figure 5**). These posts have a top and bottom half that are bolted together in the field. (See **Figure 7**).
- Install guardrail. All posts are spaced at 6'-3". (See **Figure 1**).
- Install cable anchor bracket. (See **Figures 9 & 10**).
- Install the SKT impact head. (See **Figure 11**).
- Install cable assembly.

NOTE: For *Plug Welded Steel Post* and *Wood Post* SKT options, foundation tubes must be used at Posts #1 and #2. Those tubes may be either 6'-0" long split tubes without soil plates, 6'-0" long solid tubes without soil plates, 5'-0" long tubes with soil plates, or 4'-6" long tubes with soil plates. The *Hinged Steel Post* option does not use foundation tubes. See **Table 1** for the allowable steel post and wood post options at Posts # 3 through 8.

Installing Steel Posts 3 Through 8

For the *Hinged Steel Post* option, all bolted posts must have the lower section installed before bolting the top section. The lower section of the Bolted Hinged steel posts should not be driven with the upper post attached. Bolt upper and lower posts together with a $\frac{3}{4}$ " x 8 $\frac{1}{2}$ " hex bolt and nut.

Be sure when the *Hinged Steel Posts* #3 through #8 are installed, the hinge bolt is on the downstream side of the post (opposite the impact head). See **Figures 6 & 7**.

For the *Plug Welded Steel Post* option, most times posts 3 through 8 will be 6 feet long and are shipped as a welded assembly. They can be driven just the same as a standard guardrail post.

For the *Plug Welded Steel Post* (or *Wood Post*) SKT options, 2, 4 or 8 foundation tube options are allowable. However, most times only 2 tubes are used (at post #1 & #2) for the Plug Welded Steel Post option. Do not over tighten the bolt at the top of the tube as it may cause the tube to deform.

For stiff soils, drill a pilot hole and force the post to the appropriate depth by impact or vibratory means with an approved driving head. The post may also be installed by augering and backfilling if the contractor so prefers. The initial hole must be large enough to allow adequate room for proper compaction of the soil during backfill. *Care must be taken to carefully compact the backfill to prevent settlement or lateral displacement of the post.* If rock is encountered during driving or excavation, refer to appropriate State specifications for how to proceed. Guidelines will vary from State to State.

NOTE: All of the W-Beam railing within the SKT terminal must be straight. Curving this rail is not permitted.

Installing Steel End Posts 1 and 2 with Groundline Strut

Steel posts 1 & 2 may be installed with either a Hinged Steel Post or Plug Welded Steel Post option. **Figure 8** shows the above ground details. A ground strut is required for both options but note that different struts are used in order to accommodate the 6" Hinged Post as opposed to the 8" wide foundation tube. **Figures 4 & 5** show the ground strut sections.

For the Hinged Steel Post option, all bolted posts must have the lower section installed before bolting the top section. The lower section of the Bolted Hinged steel posts should not be driven with the upper post attached.

Bolt upper and lower Post #2 together with a $\frac{3}{4}$ " x 8 $\frac{1}{2}$ " hex bolt and nut. Bolt upper and lower Post #1 together with a $\frac{5}{8}$ " x 9" hex bolt, nut and (2) washers.

For Hinged Steel Post #2, be sure when the lower segment of the post is installed, the hinge bolt is on the downstream side of the post (opposite the impact head). See **Figures 6 & 7**.

The upper Steel Post #2 has an open-ended slot for post bolt #2. Be sure the slot is on the upstream side of the post (toward the impact head). See **Figure 7**.

For Hinged Steel Post #1, be sure when the post is installed, the hinge bolt is on the upstream side of the post (toward the impact head). See **Figures 6 & 7**.

For the Plug Welded Steel Post (or Wood Post) SKT options, foundation tubes are required at post #1 & #2 locations. **Figure 12** illustrates the proper placement of the foundation tubes. The top of the foundation tubes should not project more than 4" above the ground line when measured along a 5' cord, in compliance with AASHTO specifications. Site grading may be required if the top of the foundation tubes or the lower section of the breakaway Steel Posts project more than 4" above the ground line. The finished guardrail height should be approximately 27 $\frac{3}{4}$ " above the edge of the shoulder.

Based on a level line from the edge of the paved shoulder, the top of the foundation tube should normally be 2- $\frac{1}{2}$ " to 3" above the level line. The placement of the foundation tube should be an appropriate depth below the level line in order to maintain the 27- $\frac{3}{4}$ " guardrail height from the edge of the shoulder.

If the slope drops off some distance (X") from the edge of the shoulder to the tube location, as shown in **Figure 12**, the depth of the foundation tube should be reduced by X" in order to maintain the proper guardrail height. The top of the foundation tube will project (X" + 2- $\frac{1}{2}$ ") to (X" + 3") above the ground. In order not to exceed the AASHTO 4" maximum projection above the ground, site grading will be necessary to assure that the "X" dimension is not more than 1- $\frac{1}{2}$ " to 1" respectively.

Installing Guardrail

Attach the standard W-beam guardrail sections, 12'-6" or 25'-0" long, beginning at post 9. Attach the W-beam guardrail end section to span from post 1 to 3 for the 12'-6" rail, or from post 1 to 5 for the 25'-0" rail. The rail is to be spliced with 5/8" x 1-1/4" H.G.R. bolts and 5/8" H.G.R. nuts.

For ease of installation, we recommended to have the eight 1/2" cable anchor bracket shoulder bolts and the cable anchor bracket attached to the W-beam guardrail end section prior to attaching the guardrail to the posts. See Section on "Installing Cable Anchor Bracket" for details and **Figures 9 & 10**.

The rails are to be attached to posts and blockouts at post locations 3 through 8 with 5/8" x 10" H.G.R. bolts and nuts. There is no blockout on posts 1 and 2. The rail is attached to post 2 with a 5/8" x 1 1/4" H.G.R. bolt and nut.

NOTE: A post bolt is not used at post #1.

It is recommended that the post bolt be placed through the rail at post location #5 where the rail splice occurs as that's how the system was crash tested. However, the system will still function properly if the post bolt is not attached to the rail.

Installing Cable Anchor Bracket

For ease of installation, it is recommended to have the eight 1/2" cable anchor bracket shoulder bolts and the cable anchor bracket attached to the W-beam guardrail end section prior to attaching the guardrail to the posts. If this procedure is not followed, Post #2 may interfere with attaching the bracket.

The eight 1/2" cable anchor bracket shoulder bolts are attached to the W-beam guardrail end section with two 1-1/16" OD x 9/16" ID structural washers, one on each side of the guardrail, and a 1/2" structural nut. The shoulders of the bolts should be on the backside of the guardrail, away from traffic, as shown in **Figure 9**.

For ease of installation, attach the cable anchor bracket shoulder bolts to the rail "finger tight" only. Then align the slots on the cable anchor bracket with the shoulder bolts and tap the cable anchor bracket onto the shoulder portion of the bolts using a hammer. Tighten the bolts with a wrench when the bracket is in place. The welded plate on the cable anchor bracket should be toward Post #2, as shown in **Figure 10**. Be sure the bracket is fully seated on the shoulder portion of the bolts.

Installing the SKT Impact Head

The eight cable anchor bracket shoulder bolts and the cable anchor bracket should be attached to the W-beam guardrail end section prior to attaching the SKT impact head to the first post with ¼" x 4" Grade 5 hex bolts.

Place the SKT impact head with the guide chute over the end of the W-beam guardrail. The impact head should be positioned so that the protruding tube is on the backside of the guardrail, away from traffic as shown in **Figure 8**. Slide the impact head forward until the post angle attachments on the impact head are aligned with the holes in the web of the first post as shown in **Figure 11**. Attach the impact head to the first post with two ¼" x 4" hex bolts, nut and (2) washers, one each for the top and bottom post angle attachments.

NOTE: It is recommended that the face of the impact head be delineated with an object marker that meets State specifications for better night visibility. However, the impact face object marker may not be included as part of the shipped materials for the SKT unless specifically requested in the contract plans.

Installing Cable Assembly

Place the cable assembly through the cable anchor bracket and through the base of post 1. Place the bearing plate at the base of post 1 with the 5" dimension up and 3" dimension down. See **Figures 5 & 6**. Secure the bearing plate with a retainer/tie to prevent the plate from rotating. Secure both ends of the cable assembly with a 1" hex nut and washer. While tightening the cable, use a hammer to tap the cable anchor bracket from the downstream end to ensure that it is securely interlocked with the shoulder bolts. Restrain the cable at the end being tightened with vice grips or channel lock pliers to avoid twisting the cable.

Upon completion of the installation, the cable should be taut and the cable anchor bracket should be fully seated on the shoulder portion of the cable anchor bolts.

NOTE: *It is very important that the cable anchor bracket be fully seated on the shoulder portion of the cable anchor bolts as shown in Figure 10.*

Steel Post SKT Inspection Checklist

State: _____

Date: _____

Project #: _____

Location: _____

- ☐ The rail height is in accordance with the contract plans. This is approximately 27 ¾" above the edge of the shoulder or the finished grade.
- ☐ The rail in the terminal is not curved and is not attached to the post at post location #1.
- ☐ The end rail panel has special slots and all rails are lapped in the proper direction.
- ☐ The ¾" x 8 ½" Hinge Bolt at posts #2 to #8 is on the downstream side of the post.
- ☐ The 5/8" x 9" Hinge Bolt at post location #1 is on the upstream side of the post.
- ☐ If the posts are Plug Welded, the splice plates are secure and the weld has not failed.
- ☐ At post #2, the open-ended slot for the post bolt is on the upstream side of the post.
- ☐ The guide chute of the impact head is parallel to the top of the rail and the impact head does not encroach on the shoulder (a maximum 25:1 taper is permitted to eliminate the potential for encroachment).
- ☐ The two ¼" x 4" hex bolts holding the impact head to post 1 are secured.
- ☐ The 8" x 8" bearing plate at post 1 is correctly positioned with the 5" dimension up & the 3" dimension down. The anchor cable is taut and correctly installed as shown in Figure 8. A retainer/tie has been placed over the bearing plate to prevent rotation.
- ☐ The cable anchor bracket shoulder bolts are properly attached to the W-beam guardrail and the cable anchor bracket is fully seated on the shoulder portion of the bolts.
- ☐ If the posts were augered, be sure the backfill material around the posts is compacted.
- ☐ No washers are used on the face of the rail except at the cable anchor bracket bolts.
- ☐ If used, the foundation tubes do not protrude more than 4" above the ground line (measured by the AASHTO 5' cord method). Site grading may be necessary to meet this requirement.
- ☐ The finished SKT installation is in accordance with all specific State DOT guidelines.

Additional notes:

Inspection performed by: _____

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

NOTES

[illegible]



Parks
Canada

Parcs
Canada

Parks Canada Waterton Lakes National Park General Project Best Management Practices

May 2017

Version 2.0

Canada





Parks Canada Waterton Lakes National Park General Project Best Management Practices

Recommendation & Approval – Version 2.0

Compiled and authored by: Eri Hiraga Environmental Assessment Officer, Waterton Lakes National Park, Parks Canada Agency	Date:
Recommended by: Jennifer Carpenter Environmental Assessment Coordinator, Waterton Lakes National Park, Parks Canada Agency	Date:
Recommended by: Dennis Madsen Resource Conservation Manager, Waterton Lakes National Park, Parks Canada Agency	
Approved by: <ORIGINAL SIGNED> Ifan Thomas, Superintendent, Waterton Lakes National Park / Bar U Ranch National Historic Site, Parks Canada Agency	Date:





Table of Contents

INTRODUCTION	1
SCOPE OF APPLICATION.....	2
EXCEPTIONS 2	
APPROVED GEOGRAPHIC AREA OF APPLICATION	3
ROLES AND RESPONSIBILITIES DURING CONSTRUCTION	3
<i>Project Manager (PM)</i>	<i>3</i>
<i>Project Inspector.....</i>	<i>3</i>
<i>Project Leader.....</i>	<i>3</i>
<i>Impact Assessment Officer (IAO)</i>	<i>3</i>
<i>Surveillance Officer (SO)</i>	<i>4</i>
<i>Consultants</i>	<i>4</i>
<i>Environmental Consultants.....</i>	<i>4</i>
<i>Prime Contractor.....</i>	<i>4</i>
<i>Banff Dispatch 403-762-1473</i>	<i>4</i>
ENVIRONMENTAL OVERVIEW	4
ENVIRONMENTAL SETTING.....	4
<i>Ecological Integrity.....</i>	<i>5</i>
<i>Species at Risk</i>	<i>5</i>
COMPONENTS OF THE ENVIRONMENT THAT MAY BE AFFECTED	5
MITIGATION MEASURES	7
CONTACT INFORMATION	8
1. SUPPLEMENTARY MITIGATIONS	9
2. ENVIRONMENTAL SURVEILLANCE.....	10
3. PROJECT PLANNING / DESIGN	ERROR! BOOKMARK NOT DEFINED.
4. SUBMISSIONS	10
5. ENVIRONMENTAL ALIGNMENT SHEETS.....	11
6. EROSION AND SEDIMENT CONTROL PLAN	11
7. EMERGENCY RESPONSE PLAN MODULE.....	12
8. GENERAL ACTIVITIES MITIGATIONS MODULE.....	16
9. VEGETATION REMOVAL MITIGATIONS MODULE.....	20
10. SOIL HANDLING MITIGATIONS MODULE	23
11. SOIL AND VEGETATION RESTORATION MITIGATIONS MODULE	25
12. SLOPE STABILIZATION, DRILLING AND BLASTING MITIGATIONS MODULE	ERROR! BOOKMARK NOT DEFINED.
13. ASPHALT PRODUCTION AND HANDLING MITIGATIONS MODULE	28
14. CONCRETE HANDLING MITIGATIONS MODULE	ERROR! BOOKMARK NOT DEFINED.
15. PAVING, RESURFACING, GRADING MITIGATIONS MODULE	29
16. DRAINAGE STRUCTURES MITIGATIONS MODULE.....	ERROR! BOOKMARK NOT DEFINED.
17. WORKS OVER OR IMMEDIATELY ADJACENT TO WATER	ERROR! BOOKMARK NOT DEFINED.
18. WATER WITHDRAWAL AND DEWATERING MITIGATIONS MODULE.....	ERROR! BOOKMARK NOT DEFINED.
19. BUILDINGS & STRUCTURES	ERROR! BOOKMARK NOT DEFINED.
20. GEOTECHNICAL	ERROR! BOOKMARK NOT DEFINED.
21. SERVICE LINE HDD	ERROR! BOOKMARK NOT DEFINED.
22. FIRE OPERATIONS	ERROR! BOOKMARK NOT DEFINED.
23. HELICOPTER OPERATIONS	ERROR! BOOKMARK NOT DEFINED.
REFERENCES AND SOURCE DOCUMENTS	31



Appendices

APPENDIX 1	REGULATORY GUIDANCE.....	33
APPENDIX 2	SPECIES AT RISK AND CRITICAL HABITAT	35
APPENDIX 3	RECOMMENDED SEED MIXES FOR WLNP	39
APPENDIX 4	WATERTON TOWNSITE TREE PROTECTION AND SUCCESSION IMPLEMENTATION PLAN	41
APPENDIX 5	TREES AND SHRUBS RECOMMENDED FOR WATERTON PARK TOWNSITE.....	46
APPENDIX 6	LIST OF NON-NATIVE SPECIES OF LOCAL CONCERN.....	49
APPENDIX 7	TERRESTRIAL CORRIDOR MAPPING	51
APPENDIX 8	ZONING & PLANNING AREAS	54
APPENDIX 9	LIGHTING / DARK SKY COMPLIANCE GUIDELINES.....	ERROR! BOOKMARK NOT DEFINED.
APPENDIX 10	DETAILS ON TIMING WINDOWS AND SETBACKS.....	59

Figures

FIGURE 1	SAMPLE BLASTING ARRANGEMENT	ERROR! BOOKMARK NOT DEFINED.
FIGURE 2	WATERTON LAKES NATIONAL PARK HALF-MOON HAIRSTREAK (<i>SATYRIUM SEMILUNA</i>) CRITICAL HABITAT	37
FIGURE 3	WATERTON LAKES NATIONAL PARK BOLANDER'S QUILLWORT (<i>ISOETES BOLANDER</i>) CRITICAL HABITAT.....	38
FIGURE 4	CONSTRUCTION TREE PROTECTION DETAIL.....	42
FIGURE 5	THREE TREE REPLACEMENT COMBINATIONS	44
FIGURE 6	WATERTON TOWNSITE SHOWING LOT LOCATIONS FOR POTENTIAL TREE PLANTING	45
FIGURE 7	LOWER COMPOUND – MIDDLE WATERTON LAKE CORRIDOR	53
FIGURE 8	WATERTON LAKES NATIONAL PARK OF CANADA PARK ZONING MAP	54
FIGURE 9	GRASSLAND AREAS IN WATERTON LAKES NATIONAL PARK.	56
FIGURE 10	WLNP GRIZZLY SECURE AREAS.....	58
FIGURE 11	EXAMPLES OF ACCEPTABLE / UNACCEPTABLE LIGHTING FIXTURES.	ERROR! BOOKMARK NOT DEFINED.

Tables

TABLE 1	ADAPTED ALBERTA FOREST AND PRAIRIE FIRE PROTECTION (MINISTERIAL) REGULATIONS AR 65/2017, SCHEDULE	15
TABLE 2	SPECIES AT RISK OCCURRING IN WATERTON LAKES NATIONAL PARK	35
TABLE 3	TREE REPLACEMENT OPTIONS AND SIZES AVAILABLE	44
TABLE 4	NON-NATIVE SPECIES LISTED BY THE ALBERTA WEED CONTROL ACT.....	49
TABLE 5	LIST OF NON-NATIVE SPECIES OF LOCAL CONCERN CONSIDERED INVASIVE IN NATURAL HABITATS.	50



Definitions

Sensitive Features are any areas designated by the IAO or through the EIA process as locations that require additional care and consideration for project activities. Sensitive features are defined in the supplemental mitigations section. Examples of sensitive features include but are not limited to nests, dens and roosts, locations of cultural resources, critical habitat or residences for SAR, riparian areas, fescue grasslands, wildlife corridors, rare ecotypes, areas of management concern, etc.

Abbreviations

AIA	Archaeological Impact Assessment
AOA	Archaeological Overview Assessment
BIA	Basic Impact Analysis
BMP	Best Management Practices
CABIN	Canadian Aquatic Biomonitoring Network
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRZ	Critical Root Zone
DBH	Diameter at Breast Height
DFO	Department of Fisheries and Oceans
DIA	Detailed Impact Analysis
EAS	Environmental Alignment Sheets
EI	Ecological Integrity
EIA	Environmental Impact Analysis
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
GBSA	Grizzly Bear Secure Areas
HDD	Horizontal Directional Drill
IAO	Impact Assessment Officer
IDA	International Dark-Sky Association
LED	Light-emitting diode
LEED	Leadership in Energy and Environmental Design
PCA	Parks Canada Agency
PM	Project Manager / Functional Manager of Project
RAP	Restricted Activity Permit
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
SO	Surveillance Officer
TPZ	Tree Protection Zone
UNESCO	United Nations Educational, Scientific and Cultural Organization
UV	Ultra-violet
VC	Valued Component
WLNP	Waterton Lakes National Park





Introduction

The *Waterton Lakes National Park General Project Best Management Practices* will allow an identified suite of project activities to be undertaken in such a manner that there will not be resulting significant adverse environmental effects.

The Best Management Practice (BMP) pathway is applied when there is a suite of routine, repetitive projects or activities, with well understood and predictable effects. This fulfils Parks Canada's obligations under the *Canadian Environmental Assessment Act 2012* as a manager of federal land, see the [Guide to the Parks Canada EIA Process](#). The BMP maximizes efficiency through creation of a pre-approved impact assessment for the defined suite of projects, to which standard mitigation and environmental management measures can be applied.

The *Waterton Lakes General Project Best Management Practices* can be applied in the following ways:

- Direct application: Use as is when the proposed project falls within the scope of the BMP(s) and its application will ensure there are no significant residual adverse effects.
- Application along with supplemental mitigations: Additional mitigations or slight modifications are required to ensure all potential impacts are mitigated and to provide project-specific clarifications (e.g., critical timing windows, contact information, SAR or cultural resources considerations). Supplemental mitigations are outlined in the supplemental mitigations section or by filling in check boxes in the appropriate sections of the BMP.
- Application as part of a Basic Impact Analysis (BIA) or Detailed Impact Analysis (DIA): where one or more BMPs may not address all the potential adverse effects of a proposed project, Field Units can apply the BMP(s) as part of a BIA or DIA.

The impact assessment officer (IAO) will review a proposed project and advise the functional manager of the project if and how this BMP should be applied. The IAO's advice will be based on whether the project falls within the scope of the BMP, and whether application of the mitigation measures in the BMP will adequately address potential adverse effects of the project. The IAO will also be responsible for adding any required supplemental mitigations to ensure site specific considerations are addressed.

Project Managers are responsible for ensuring all mitigation measures applicable to the project are added to the terms and conditions of any permits or contracts issued for the project.

The IAO must ensure the project, IA pathway applied and determination are recorded in the Parks Canada National Impact Assessment [Tracking System](#).

Project Managers are responsible to ensure all mitigation measures applicable to the project are added to the terms and conditions of any permits or contracts issued for the project.

These BMPs have been compiled from a number of available documents, as listed at the end of this document, and have been adapted to address the predictable effects of routine, repetitive project or activities within the Waterton Lakes Field Unit.



Scope of Application

This BMP outlines the impact analysis of repetitive and routine projects¹. Site security, worker safety and visitor safety are not included in the scope of this document. If a project involves some or all of below activities, and the initial assessment of site and project indicate “the project is unlikely to result in significant adverse environmental effects” the BMP can be applied.

Projects that this BMP would likely be applied to include:

- The proposed maintenance, repair or upgrade of an **existing** development.
- **New** projects with restricted footprints that do not include sensitive habitats.
- Proposed restoration of **new** and **existing** developments.

For projects where further EIA is warranted, this BMP may be utilized as part of the mitigation package for the analysis. Therefore, this document also presents a minimum standard to provide consultants and contractors for environmental protection measures on work sites. In these cases, additional protection measures and mitigations may be required.

Exceptions

Supplemental analysis and/or mitigations are required for the following project activities:

- New projects or developments in natural areas;
- Projects adjacent to sensitive features;
- Work that may impact aquatic or terrestrial wildlife habitat connectivity, such as new fences or culverts;
- Physical works immediately adjacent to the international boundary;
- Elongation of culverts; realigning water courses; dredging; or work below the high water mark of a fish bearing water body;
- Bridge projects needing work to occur below the High-Water Mark², with permanent; alteration to the water course, such as replacement of piers/abutments or permanent installation of structures on the bed of a water body;
- Greater than 5% increase in land use footprint (e.g. project expansion); and,
- Work which might adversely impact any potential or established Aboriginal and Treaty rights or traditional use³.

¹ For repetitive and routine projects on roadways, highways and parkways, refer to the Parks Canada National Best Management Practices - Roadway, Highway, Parkway and Related Infrastructure.

² High-water Mark is the usual or average level to which a body of water rises at its highest point and remains for a sufficient time so as to leave a mark on the land. (Fisheries and Oceans, 2015).

³ Parks Canada must engage in additional and separate consultations with Aboriginal groups if there is a possibility of a project adversely affecting established or potential Aboriginal or Treaty rights. This is required to fulfil federal government responsibilities in upholding the honour of the crown. If there is uncertainty regarding the need for Aboriginal consultation with respect to a project, refer the matter to Parks Canada Legal Services for advice. Guidance on consultation may be sought from the [Aboriginal Affairs Secretariat](#) and from the guidance document “[A Handbook for Parks Canada Employees on Consultation with Aboriginal Peoples](#)”.



If the project has the potential to have an adverse effect on the critical habitat of a species at risk (with endangered, threatened, or extirpated status) the project will require a separate environmental impact analysis.

If the project has the potential for **residual** adverse effects on a listed species at risk (including effects to individuals and residence of the individuals) the project will require a separate environmental impact analysis.

Note: If there is any uncertainty regarding potential adverse effects to species at risk, consult a member of the **National Office Species Conservation team**.

Approved Geographic Area of Application

This BMP is intended for use on projects completed in Waterton Lakes National Park (WLNP).

Roles and Responsibilities during Construction

The following is a select list of key roles that will be in place during the construction program⁴. The responsibilities of the key roles are not limited to those that are stated below, as this is a select list of roles most relevant to compliance with environmental commitments and regulations for projects where the proponent is the Parks Canada Agency (PCA).

Project Manager (PM)

The Project Manager is accountable to deliver the project and is responsible for managing risk, scope, time and budget. The Project manager is the Technical Authority and is the contractor's unique point of contact. The Project manager reviews and develops contract change order and supporting documents and conducts pre-construction meetings and chairs project team meetings. Note that where the proponent of a project is external to Parks Canada, a functional manager of the project within the Agency is designated.

Project Inspector

The Project Inspector reviews plans for compliance to building codes and development guidelines. The Project Inspector performs inspections on behalf of the Project manager and monitors contract compliance in consultation with procurement office. The Project Inspector is responsible for keeping daily logs.

Project Leader

The Project Leader is accountable for the overall success of the project. The Project Leader recommends approval to proceed to the construction phase and approves changes in scope, budget or schedule in consultation with Procurement Officer.

Impact Assessment Officer (IAO)

The Impact Assessment Officer is responsible for drafting and/or reviewing the EIA and ensuring that the scope of work of the environmental analysis complies with Parks Canada's responsibilities under the *Canadian Environmental Assessment Act 2012* as well as all other

⁴ The list of roles and key responsibilities have been modified from the PCA document *Construction Site Roles and Responsibilities*.



relevant regulations and guidelines. The IAO may also function as the SO for project construction.

Surveillance Officer (SO)

The Surveillance Officer is responsible for on-site surveillance of the work in accordance with the Parks Canada EIA and environmental regulations and guidelines. The SO will provide direction regarding environmental assessment / environmental infractions or emergencies through the Project Manager unless necessary. As the Parks Canada representative for environmental concerns, the SO may consult with relevant specialists to determine appropriate implementation for mitigation measures. The SO has the authority to stop work for National Parks Act violations, however, during normal operations does not give direction to the Contractor.

Consultants

Consultants recommend contract amendments, reviews and approves shop drawings and provides advice on project compliance. Consultants perform inspections on behalf of the Project Manager.

Environmental Consultants

Under the direction of the IAO, environmental consultants are responsible for producing deliverables as required for the Project, including, but not limited to: Environmental Impact Assessment, site-specific mitigation strategies, Environmental Alignment Sheets (EAS), Environmental Management Plan.

Prime Contractor

The Prime Contractor is responsible for developing a site-specific Occupational Safety and Health Management Plan. The Prime Contractor is responsible for guarding the health and safety of those working on and visiting the site through implementing occupational safety and health induction training. The Prime contractor also obtains materials and labour necessary to successfully complete the project. The Prime contractor will engage and plan the work of sub-contractors and acquire all necessary licenses and permits, provide any required EIA construction planning documents for review (see [Submissions Section](#)) and record minutes of site meetings.

Banff Dispatch 1-888-927-3367

911 provides 24-hour emergency dispatch services and will connect callers with emergency or other Parks Canada services as required (e.g., Warden/Law Enforcement Services, Duty Officers). Banff dispatch at 1-888-927-3367 can be used for 24 hour notification to Parks Canada in non-emergency situations. When calling, if unsure what services you require, request a Waterton Duty Officer.

Environmental Overview

Environmental Setting

Waterton Lakes National Park (WLNP) occupies approximately 505 km² in the southwest corner of Alberta in the southern Rocky Mountains. WLNP forms part of the Waterton-Glacier International Peace Park, and is a designated UNESCO World Heritage Site due to its significant ecological, scenic and cultural values. The park is rich in biodiversity, which includes 1001



vascular plant species, 23 fish species, 6 amphibian species, 4 reptile species, 62 mammal species and over 250 bird species.

As part of the Crown of the Continent ecosystem, WLNP makes up part of a north-south wildlife corridor including migratory bird and bat flight pathways (Lausen 2012). Five ecoregions - foothills parkland, montane, lower subalpine, upper subalpine and alpine – are represented within WLNP boundaries.

Ecological Integrity

Ecological Integrity (EI) is defined in the Canada National Parks Act as “a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes”.

The indicators used to assess EI in WLNP include: Forest, Freshwater, and Grasslands. Measures of these indicators are summarized and include: Terrestrial Birds, 5-Needled Pine – Health Transects, Area Forest Area Disturbed by Fire, Sensitive Species Secure Habitat, Multi-species Mammal Occupancy, Stream Biotic Health (CABIN), Lake Fish Index, Water Quality, Amphibian Occupancy, Stream Fish Community Index, Grassland Birds, Non-Native and Native Plants, Grassland Extent, Elk, and Grassland Area Disturbed by Fire.

Species at Risk

WLNP is host to a number of species that are Endangered, Threatened and Special Concern under Schedule 1 of the *Species at Risk Act* (SARA). Species listed as Endangered, Threatened and Special concern under COSEWIC, as well as the Alberta *Wildlife Act* are also considered in managing species at risk within WLNP. A list of species at risk and defined and proposed critical habitat within WLNP is found in the [appendices](#).

Components of the environment that may be affected

Potential effects from projects occurring within WLNP are well understood and predictable. They include:

Water Resources:

- Adverse modifications to surface drainage patterns
- Reduced water quality due to increased erosion, sedimentation, transportation of debris and contamination (i.e. from leaks and accidental spills, etc.)
- Physical alteration of aquatic habitat

Soil/Land Resources:

- Change in slopes, landforms and landscape
- Soil compaction and rutting
- Slope instability due to increased soil exposure and improper excavation and storage
- Soil contamination

Air quality:

- Decreased ambient air quality (i.e. from dust, equipment emissions, etc.)
- Increased ambient noise levels
- Temporary increased levels of CO₂ and other pollutants
- Temporary increased localized temperatures from paving and equipment operation



Vegetation:

- Damage to and/or removal of vegetation in immediate or adjacent areas
- Introduction of non-native species populations, or expansion of existing populations

Wildlife:

- Introduction of non-native species populations, or expansion of existing populations
- Wildlife sensory disturbance causing displacement/preferred habitat avoidance
- Wildlife habituation/attraction to artificial food sources
- Impeded/alterd wildlife movement
- Damage to nests/disruption of nesting animals
- Mortality from project activities
- Damage to the quality of nesting / spawning / roosting habitats

Cultural Resources:

- Adverse effects on the heritage value or character-defining elements of a cultural resource
- Impacts to archaeological resources (known or potential)

Visitor Experience / Safety

- Decreased quality of visitor experience due to temporary area closures, operation of equipment, sensory disturbance
- Potential impacts to visitor safety due to construction activities



Mitigation Measures

To use the document efficiently, keep the activity mitigation lists that apply to the project expanded and collapse the other activities by clicking on the section titles, print this as a pdf or paper document and include this section with the EIA determination record. This will reduce the overall size and scope of the mitigations to present to contractors and project managers. Supplementary mitigations specific to the project can be defined at the beginning of the mitigations section.

Choose all that apply to project. Each title is hyperlinked to the related section.

Modules

1. SUPPLEMENTARY MITIGATIONS
2. ENVIRONMENTAL SURVEILLANCE
3. PROJECT PLANNING / DESIGN
4. SUBMISSIONS
5. ENVIRONMENTAL ALIGNMENT SHEETS
6. EROSION AND SEDIMENT CONTROL PLAN
7. EMERGENCY RESPONSE PLAN MODULE
8. GENERAL ACTIVITIES MITIGATIONS MODULE
9. VEGETATION REMOVAL MITIGATIONS MODULE
10. SOIL HANDLING MITIGATIONS MODULE
11. SOIL AND VEGETATION RESTORATION MITIGATIONS MODULE
12. SLOPE STABILIZATION, DRILLING AND BLASTING MITIGATIONS MODULE
13. ASPHALT PRODUCTION AND HANDLING MITIGATIONS MODULE
14. CONCRETE HANDLING MITIGATIONS MODULE
15. PAVING, RESURFACING, GRADING MITIGATIONS MODULE
16. DRAINAGE STRUCTURES MITIGATIONS MODULE
17. WORKS OVER OR IMMEDIATELY ADJACENT TO WATER
18. WATER WITHDRAWAL AND DEWATERING MITIGATIONS MODULE
19. BUILDINGS & STRUCTURES
20. GEOTECHNICAL
21. SERVICE LINE HDD
22. FIRE OPERATIONS
23. HELICOPTER OPERATIONS



Mitigation Package

Parks Canada Waterton Lakes National Park General Project Best Management Practices

Recommendation & Approval – Version 2.0

Modified for: Red Rock Parkway Signage and Guardrail Upgrades and Hazard Tree Removal

Contact Information

Project Manager:

Mark Burke: 403-470-0855

Dale Redford: 403-470-0855

Impact Assessment Office:

Elizabeth Vincer: 403-632-6681

Parks Canada Emergency Dispatch:

Banff Dispatch: 1-888-927-3367

First Contact Authority (for SPILLS):

First Contact Authority: 780-422-4505

OR 1-800-222-6514

24-hour Emergency Dispatch*:

Police, Fire, Ambulance: 9-1-1

* In an Emergency, 9-1-1 operators can also notify Banff Dispatch.



1. Supplementary Mitigations

Include any supplemental, or site-specific mitigations

Cultural Resources

Once the method of signage and guardrail installation is determined, the scope must be reviewed by the Parks Canada Archaeologist to determine if archaeological monitoring is required. All hazard tree removal in known archaeological sites must be approved by the Parks Canada Archaeologist.

Natural Resources

The following supplemental mitigation measures are to be implemented during the Project to prevent and minimize potential adverse impacts to Little Brown Myotis (*Myotis lucifugus*), a SARA-listed Endangered bat species, Olive-sided Flycatcher, a SARA-listed Threatened species, and to all bird species protected under the *Migratory Birds Convention Act*.

The general bat activity window for the Project is April 1 to August 31 as per **Appendix 9**.

The breeding bird window for the project is April 8 to August 24, as per the regional nesting period for Bird Nesting Zone B3.

Pre-Construction Bird and Bat Surveys

If vegetation removal cannot be scheduled outside of the regional bird nesting window (April 8 to August 24), then a pre-construction bird nest survey is required prior to tree removal. The survey must be completed by a Qualified Environmental Professional (QEP). The results of the survey must be provided to the Environmental Assessment Officer prior to vegetation removal. The time between the survey and the vegetation removal must be no greater than 7 calendar days, and may be shorter upon the discretion of the QEP.

If tree removal cannot be scheduled outside of the breeding bat window (April 1 to August 31), then pre-construction bat roost surveys must be conducted by a Qualified Biologist. The WLNP pre-construction bat roost survey protocol will be provided to the Contractor's Qualified Biologist as required.

Construction and Tree Removal adjacent to Watercourses

Any sign and guardrail construction immediately adjacent to watercourses and wetland habitats must strictly adhere to mitigation measures in Module 6: Erosion and Sediment Control.

Tree Removal in Waterton Townsite

Any hazard tree removal in the Townsite will required the preparation of a Succession Plan (see Appendix 4) to compensate for the removed trees.

Borrow Pits

If local materials are to be used, all borrow areas must be identified prior to construction and approved for use by a Parks Canada Environmental Assessment Officer.

Materials imported from external sources must be pits inspected and approved by Parks Canada to prevent import of invasive plants. Materials may be rejected or additional mitigations may be required from quarries with weed infestations. Additional mitigations include:

- Presence of an environmental monitor during loading of materials
- Washing of vehicles and equipment
- Rejection of materials that cannot be washed (e.g., gravel, soil, sand)



2. Environmental Surveillance

- 2.1. All projects are subject to environmental surveillance by the SO to ensure that mitigation measures as outlined through the EIA process are implemented during all phases of construction, including clearing, grading, construction, cleanup, and restoration.
- 2.2. The SO will report deficiencies to the PM and summarize site visit observations in a surveillance report. The surveillance report will be filed into a database to supplement information for restoration activities in the future.
- 2.3. The Prime Contractor is responsible for keeping the SO informed of project activities and will notify the SO prior to the following activities:
 - Vegetation clearing and soil stripping < 30 m from sensitive features;
 - Activities in and < 30 m from water;
 - Species at risk mitigation measures;
 - Rare plant mitigation measures; and
 - As otherwise outlined in the project EIA.

3. Submissions

- 3.1. Check box of attachments / plans required prior to the start of construction.

Attachments / Plans	Required	Responsible Party	Reviewer and Submission Deadline
Environmental Alignment Sheets	<input checked="" type="checkbox"/>	Hazard Tree Removal Contractor	Environmental Alignment Sheets showing the location of sensitive features such as watercourses, archaeological sites, Species at Risk habitat, etc. must be prepared and submitted to the Environmental Assessment Officer and Archaeologist prior to work starting.
Erosion and Sediment Control Plan	<input checked="" type="checkbox"/>	Signs and Guardrail Contractor	Must be approved by the EA Officer prior to construction.
ERP (Emergency Response Plan)	<input checked="" type="checkbox"/>	Signs and Guardrail Contractor	Must be approved by the EA Officer prior to construction.
Spill Response Plan	<input checked="" type="checkbox"/>	Signs and Guardrail Contractor	Must be approved by the EA Officer prior to construction.
Fire Contingency Plan	<input checked="" type="checkbox"/>	Hazard Tree Removal Contractor	Must be approved by the EA Officer prior to work starting.
Avalanche Safety Plan	<input type="checkbox"/>		
Site-specific Mitigation Details	<input checked="" type="checkbox"/>	Hazard Tree Removal Contractor	Pre-removal Survey methodology for birds and bats must be approved by the EA Officer. The Parks Canada Archaeologist must approve any tree removal plans within a known archaeological site.
Restoration Plan	<input type="checkbox"/>		



4. Environmental Alignment Sheets

- 4.1. Environmental Alignment Sheets (EAS) are maps of the project area that clearly outline environmental and cultural sensitivities relative to the designated work area. They assist the PM, SO and contractor in the scheduling, planning, and execution of Project works.

5. Erosion and Sediment Control Plan

- 5.1. An Erosion and Sediment Control Plan (ESCP) will be prepared that covers all construction and restoration periods.
- 5.2. The requirements for an erosion and sediment control plan can be scaled to the scope and associated risks of the project, as determined by the IAO or SO.
- 5.3. The Erosion and Sediment Management Plan will be developed by a qualified professional and is subject to approval of the IAO.

Timing of Works

- 5.4. Schedule work to avoid extreme wet, windy and rainy periods that may increase erosion and sedimentation.
- 5.5. Avoid soil disturbing activities during periods with saturated soils, periods of runoff, high rainfall intensity, high winds, or wet snow. Temporarily stop work when wet ground conditions contribute to erosion and sediment transport.

General Mitigations

- 5.6. Erosion control measures that prevent sediment transport into any waterway, water body or wetland shall be implemented by the contractor.
- 5.7. Identify high risk areas or components of the project including areas with fine-grained soils, sandy deposits, slopes, shallow soils, or adjacent to sensitive features (e.g., riparian areas).
- 5.8. Identify sources of potential runoff (e.g., ditches, slopes) from within the construction site or from upslope areas. Construct and maintain structures to deflect sources of runoff from entering areas of exposed soils (e.g., diversion ditches, vegetative filter strips).
- 5.9. Acquire necessary erosion and sediment control equipment (i.e., landscaping fabric, sediment fences, coir rolls etc.) and install prior to risk of sediment transport.
- 5.10. Minimize slope lengths and angles, promote surface roughness on slopes, and avoid designs and construction practices that result in smooth, uniform slopes. Incorporate texture and organics into the cover of slopes to reduce soil erodibility.
- 5.11. Plan project activities to minimize soil handling.
- 5.12. Limit equipment movement over exposed soils.
- 5.13. Avoid activities that contribute to soil compaction and use practices that roughen and decompact soils to promote infiltration.
- 5.14. Ensure all activities are conducted at least 30 m from waterbodies wherever possible.
- 5.15. Minimize extent of vegetation cover removal and grubbing. Clearly mark construction boundaries to prevent accidental damage to vegetation.
- 5.16. Where vegetation cannot be retained, apply soil covers to erodible areas (granular materials, mulches, tackifier, tarps). Note that tarp covers may not be suitable at most locations in WLNP where high winds are common.



- 5.17. Minimize the length of time soils are exposed and complete work in one area before commencing work in another area.
- 5.18. If vegetation clearing is scheduled early due to timing windows, grubbing should be delayed until just prior to construction activities, in order to maintain soil stability.
- 5.19. Initiate replanting of disturbed areas immediately after construction is completed.
- 5.20. Ensure all erosion and sediment control devices are weed free. Straw and hay based erosion control is not permitted.
- 5.21. Avoid use of coconut matting due to ungulate hoof entrapment.
- 5.22. Maintain and repair all erosion and sediment control structures in a timely manner. If the design of the control measures is not functioning effectively they are to be repaired.
- 5.23. The site will be secured against erosion during any periods of construction inactivity or shutdown.
- 5.24. Install all erosion and sediment control devices according to Typical Drawings included in ESCP. Typical Drawings must be on site and available at the request of the SO.

Minimum Requirements

- 5.25. The minimum requirements of an erosion and sediment control plan include consideration of:
 - Project design and spatial concept of environmental sensitivities (e.g. watercourses, wetlands, steep slopes etc.);
 - Erosion prevention procedures (e.g., project schedule, minimization of work area, site management, ground cover measures);
 - Sediment control measures (e.g. sediment fences, check dams, sediment traps, etc.) including specifications and Typical Drawings of sediment control structures;
 - Detailed plans for instream works including site isolation measures and project timelines;
 - Water management plans including site control, equipment necessary and proposed dewatering locations;
 - Locations of erosion and sediment control measure application;
 - Monitoring of prevention and control measures and corrective actions (e.g., repairs).
 - Removal of non-biodegradable materials once site is stabilized.

6. Emergency Response Plan Module

- 6.1. The general emergency contact for WLNP is 9-1-1.

Spill Response Plan

- 6.2. The Prime Contractor is responsible for ensuring that a Spill Response Plan is developed prior to start of work and the plan is subject to approval of the IAO.
- 6.3. The Prime Contractor is responsible for ensuring that spill kits sufficient to contain and clean up 110% of the site's largest possible fuel / chemical spill must be retained on site at each location of potential spills (sites where equipment is working).
- 6.4. The Prime Contractor is responsible for ensuring that all crew members and sub-consultants on site receive a briefing about the Spill Response Plan and are aware of the location and use of spill kits and containment devices.



General Mitigations

- 6.5. Avoid work in high risk areas, particularly in areas of high water table, steep slopes or in close proximity to streams.
- 6.6. Have spill containment equipment on-hand and ensure that all personnel are aware of their location and trained in their use.
- 6.7. Absorbent booms must be immediately available on site during works in and near water.
- 6.8. Ensure all construction equipment is free of leaks from oil, fuel or hydraulic fuels. See [General Activities](#) module for the requirements for equipment inspection by the SO prior to entry to WLNP.
- 6.9. The crossing of any waterbody (including wetlands) by construction equipment, or the use of such equipment within waterbodies is strictly prohibited unless prior approval has been confirmed from the SO.
- 6.10. Designate refuelling areas at least 100 m away from any water body. Refuelling activities should not be conducted where run-off could carry contaminants into drainage pathways (including storm sewers).
- 6.11. Hazardous or toxic products shall be stored no closer than 100 metres from streams, wetlands, water bodies or waterways.
- 6.12. Equipment will be fuelled on hardened surfaces wherever possible.
- 6.13. Spill kits shall be provided at re-fuelling, lubrication, and repair locations.
- 6.14. Dispose of contaminated materials at provincially certified disposal sites outside of WLNP. No treatment of contaminated soils (e.g., bioremediation) is allowed in WLNP. All applicable documentation demonstrating proper disposal will be provided to Parks Canada.
- 6.15. If potentially hazardous materials (e.g. cement-based products, sealants or paints) are used on site ensure raw material, mixed compounds and wash water are not released to any watercourse or soils. Secondary containment measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks are required.
- 6.16. All gas generators and water pumps require secondary containment. Electric pumps are preferred.
- 6.17. Follow all applicable regulations and codes for the management and handling of hazardous waste.
- 6.18. The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Prime Contractor. The site will be inspected by the SO to ensure completion to the expected standard and to the satisfaction of Parks Canada.
- 6.19. Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- 6.20. The SO shall be notified immediately of any spill. In the event of a major spill, Banff Dispatch (403-762-1473) shall be notified immediately along with the First Contact Authority (1-800-222-6514).

A major spill is defined below:



Material	Immediate Notification Requirements	Written Spill Report Requirements
Any deleterious substance that enters a water body of any type (e.g., stream, lake, wetland, drainage, sewer) or poses a threat to human safety (e.g., slippery road, explosive hazard, poisonous gas).	Any Quantity, notify the SO and Banff Dispatch.	Required; Major Spill
Any substance that is hazardous or toxic to the environment including but not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement, sand blasting agents, paint, solvents and hydrocarbons (e.g., fuel, grease, hydraulic fluid).	<100 L, immediately notify the SO. > 100 L, immediately notify the SO and Banff Dispatch.	At the discretion of the SO. Major Spill if not contained. Required; Major Spill

Minimum Requirements

6.21. The Spill Response Plan must at minimum, include the following information:

- List of products and materials that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement, sand blasting agents, paint, solvents and hydrocarbons.
- required equipment on site and location of spill kits;
- spill prevention procedures (i.e., containment and storage of materials, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products in accordance with all applicable federal and provincial legislation);
- fuelling procedures, fuel storage;
- spill response (i.e., containment, clean-up, disposal of contaminated materials, etc.);
- spill reporting procedure; and
- up-to-date emergency response contact list including contact information for reporting spills.

Spill Reporting Requirements

6.22. Immediate spill reports are verbal notifications and must include all available information. Follow-up written spill reports must include the following:

- Prime Contractor Name
- Name and Contact Number
- Location and time the spill occurred
- Type and quantity of the substance spilled
- Cause of the spill
- Size of area the spill spread to
- Was the spill in water or on land
- Does the spill have potential to enter a water body
- Detail of immediate action taken to control the spill
- Additional actions required or ongoing to control the spill
- Any restoration required at the spill site
- Names of PCA representatives that were present at the spill site



Fire Contingency Plan

- 6.23. An emergency fire contingency plan is required for projects where risk of fire exists (e.g. for operations on dry grassland habitats) as requested by the IAO in consultation with the Fire Management Officer.
- 6.24. Fires or burning of waste materials is not permitted.
- 6.25. The Prime Contractor is responsible for ensuring that all crew members and sub-consultants on site receive a briefing about the Fire Contingency Plan and are aware of the location of emergency equipment, such as fire extinguishers.
- 6.26. Where an emergency fire contingency plan has been requested, the prime contractor should provide, at minimum the required equipment as defined in the Schedule of the *Alberta Forest and Prairie Protection (Ministerial) Regulation*.
- 6.27. The fire contingency plan must at minimum contain the following information:
 - required equipment on site;
 - fire prevention procedures;
 - initial response;
 - fire reporting procedure; and
 - up-to-date emergency response contact list.

Table 1 Adapted Alberta Forest and Prairie Fire Protection (Ministerial) Regulations AR 65/2017, Schedule

Required Equipment for Fire Control	People Employed at the Site of Operations									
	1	2	3	4	5	6-10	11-20	21-30	31-40	41+
Shovels	1	1	2	2	3	5	10	15	20	Same as 31-40 plus increase as required by SO in consultation with the Parks Canada Fire Management Officer.
Back pack with pump	1	1	1	2	3	5	10	15	20	
Axe or Pulaski	1	1	1	1	2	5	10	15	20	
Fire pump	0	0	0	0	0	0	0	1	1	
Fire hose (metres)	0	0	0	0	0	0	0	450 m	450 m	
Power saw	0	0	0	0	0	0	0	1	1	

Avalanche Safety Plan

- 6.28. Before work commences in a workplace where there is or may be a risk from an avalanche to a person working in the workplace, an avalanche risk assessment must be completed.
- 6.29. If an avalanche risk assessment identifies an avalanche risk zone, no work may be conducted in the avalanche risk zone at any time when snow conditions have the potential to create an avalanche unless an avalanche safety plan has been developed and implemented.
- 6.30. If the avalanche safety plan is drafted by the Prime Contractor, it must be approved by Parks Canada Avalanche Forecasters.
- 6.31. In some situations the Prime Contractor may be permitted to work under the Parks Canada Avalanche Safety Plan provided that this has been communicated to the WLNP Visitor Safety Technician and acknowledged in writing.



- 6.32. The Prime Contractor is responsible for ensuring and documenting that all crew members and sub-consultants have the required certification and training for work in avalanche terrain, as outlined in the Avalanche Safety Plan.

7. General Activities Mitigations Module

Construction activities involve the use of laydown/staging areas, equipment operations, storage and handling of hazardous materials. Potential adverse effects include: alteration of vegetation, erosion and sedimentation, constriction for wildlife movements and introduction/spread of non-native vegetation.

- 7.1. All employees must attend an environmental briefing with a SO before beginning work at the site to review and explain the mitigations that are conditions of the project approvals. Employees must attend this briefing before beginning their work at this site.
- 7.2. All equipment and vehicles will be made available for inspection by the SO on arrival to WLNP. The Prime Contractor will give 48 hours' notice and schedule equipment inspection with the SO. Water trucks require a written restricted activity permit from the SO to enter the Park. The permit is received at initial inspection.

Construction Timing / Visitor Experience

- 7.3. Confine construction activities to hours set below, and if possible to periods of low visitation in order to reduce sensory disturbance to wildlife and visitors.
- 7.4. Time activities to minimize vehicle conflicts on access roads (*i.e.*, where possible, schedule activities so that equipment operations does not disrupt traffic flow; result in wildlife collisions).
- 7.5. All Parks Canada designated speed limits apply to construction vehicles. Additional speed restrictions may be required to protect wildlife and visitor safety.

	Required	Location(s)	Notes
Additional Speed Limits	<input type="checkbox"/>		
Work Hour Restriction	<input type="checkbox"/>		
Designated Truck Routes	<input type="checkbox"/>		

Timing Windows

- 7.6. Timing windows to reduce erosion, maintain compliance with the *Migratory Birds Convention Act*, *Fisheries Act*, *Species at Risk Act* and may be part of best practices to reduce erosion and environmental effects. See detailed mitigations for timing windows under [Erosion and Sediment Control](#), [Vegetation Removal](#) and [Buildings](#) modules where these activities are part of project works. A summary of these restrictions is made below.

Consideration	Applicable	Restricted Window	Notes
Migratory Bird General Breeding Period	<input type="checkbox"/>	April 1 to August 31	
Bat Maternity Roost Activity Period	<input type="checkbox"/>	April 1 to August 31	



Consideration	Applicable	Restricted Window	Notes
Bat General Activity Period	<input type="checkbox"/>	April 1 to October 31	
Amphibian Calling Window	<input type="checkbox"/>	April 15 to June 15	
Bull Trout Restricted Work Periods	<input type="checkbox"/>	August 31 to August 15	
Other Fish Species Restricted Work Periods	<input type="checkbox"/>	Consult IAO	
Grassland Dormancy	<input type="checkbox"/>	October 1 to February 28	
Additional Timing Considerations (e.g., weed seed set, soil protection)	<input type="checkbox"/>	Dry late summer and fall conditions	

Work Site Conditions/Staging/Laydown

- 7.7. Minimize vegetation-clearing activities and ground disturbance by staging on existing hardened areas wherever possible.
- 7.8. Delineate the work zone; clearly mark the limits to active construction, sensitive features and the access and egress locations.
- 7.9. The Prime Contractor is responsible for security and safety of the work site.
- 7.10. Strong winds are a regular occurrence in WLNP. Prevent materials from blowing off of work site.
- 7.11. If contamination is found, cease work immediately and if necessary, implement Emergency Response Plan.

Wildlife Observations and Encounters

- 7.12. Notify the SO immediately of any dens, litters, nests, carcasses (road kills or other), wildlife encounters, or carnivore (bears, wolves or cougars) observations on or around the worksite.
- 7.13. If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area to the surrounding habitat and away from areas of potential conflict.
- 7.14. If potentially dangerous wildlife (e.g., bear, cougar, wolf, deer, sheep) persistently enter the work area or display aggressive behaviour, the contractor will immediately stop work, notify 9-1-1 or Banff Dispatch (403-762-1473), and safely evacuate the area.
- 7.15. Contractor will make bear spray, bear spray training, and wildlife awareness training mandatory to all workers on site.
- 7.16. Secure all materials that might attract wildlife (e.g. petroleum products, human food, recyclable food and drink containers and garbage).
- 7.17. No feeding, baiting or luring of any wildlife (including bears, small mammals, birds); do not approach or harass wildlife in any way. Notify the SO immediately if wildlife obtain garbage or human food. If wildlife get into attractants that have been intentionally or accidentally left out, individuals or the contractor could be charged under the *Canada National Parks Act Regulations*.



Equipment Operations & Fuelling

- 7.18. Equipment movements and workers' private vehicles shall be restricted to the designated footprint of the construction area.
- 7.19. Protective measures, including using appropriately sized equipment, or protective access matting must be employed if entry into wet areas is required.
- 7.20. Due to the importance of fescue grassland within WLNP, vehicles must not be driven onto any open grassland areas unless it has been designated by the SO as a parking area prior to construction activities.
- 7.21. Machinery must arrive on site in a clean and dry condition and be maintained free of fluid leaks, vegetative material (*i.e.*, invasive species, noxious weeds) and soils from off-site. All construction equipment from outside WLNP will be washed prior to arrival to minimize the risk of introducing weeds or aquatic invasive species. Additional weed-cleaning stations may be designated by the SO depending on project activities and locations (see table below).

	Required	Location(s)	Notes
Are additional weed cleaning stations required?	<input type="checkbox"/>		

- 7.22. Inspect equipment daily for fluid/fuel leaks and maintain equipment in good working order.
- 7.23. Equipment fuelling and maintenance sites will be identified by the Contractor and approved by the SO. Fuelling should occur on hardened areas > 100 m from streams, wetlands, waterbodies or watercourses. Fuelling personnel shall maintain presence at and provide immediate attention to the fuelling operation.
- 7.24. Mobile fuel containers (e.g., slip tanks) shall remain in the service vehicle at all times.
- 7.25. Operate machinery on land above the high water mark, on ice, or in another manner that minimizes disturbance to the banks and bed of any water body.
- 7.26. Limit machinery crossing (fording) a stream or watercourse to a one-time event (*i.e.*, over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure in compliance with the *Fisheries Act*.
- 7.27. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
- 7.28. Use temporary crossing structures or other practices to cross streams or water bodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds.
- 7.29. Equipment that will work adjacent to or within a stream or watercourse should be free of external grease, oil or other fluids, excessive mud, dirt and vegetation before entering the work area.

Small Equipment

- 7.30. All small equipment (e.g., chainsaws, mowers, etc.) should be kept in good working condition and free of oil and fuel leaks.
- 7.31. Where possible, chain oil should be vegetable-based.



- 7.32. Fuelling of chainsaws will take place outside of riparian areas and sensitive features.

Site Clean Up/Waste Disposal

- 7.33. Clean tools and equipment at an appropriate off-site facility to prevent the release of wash water that may contain deleterious substances.
- 7.34. Sweep up loose material or debris. Any material that may pose a risk of contamination to soils, surface water or groundwater should be disposed of appropriately off-site.
- 7.35. No construction waste (sawdust, soil, vegetation, debris, pumped water, hydrocarbon, chemicals, cement, asphalt, etc.) shall be allowed to enter an aquatic habitat or be deposited on undisturbed lands unless the said lands are part of the project works and approved for temporary waste storage.
- 7.36. Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in WLNP. These wastes shall be contained and removed in a timely and approved manner and disposed at an appropriate waste landfill site located outside WLNP.
- 7.37. Construction waste storage containers, shall be emptied when 90% full. Waste containers will have lids, be wildlife proof if containing attractants, and waste loads shall be covered while being transported.
- 7.38. Sanitary facilities, such as a portable container toilet, shall be provided and maintained in a clean condition. Sanitary facilities must be in good condition, and located away from sensitive resources including water bodies.
- 7.39. Camping and other recreational activities at the work site by contractors is not permitted without prior approval from the IAO and the Project Manager. These activities, if deemed appropriate, are conditional upon specific mitigations that address risks to wildlife, safety and any other additional environmental effects.

Air Quality Mitigations

- 7.40. Diesel equipment used on the project shall be fuelled with low sulfur diesel fuels and shall conform to local emission requirements.
- 7.41. Minimize idling of engines at all times.
- 7.42. Schedule dust generating activities during periods with lower wind speeds.
- 7.43. Ensure fine materials being transported are covered and protected.

Cultural Resources

- 7.44. All work in WLNP is subject to the accidental finds clause whereby on finding any unexpected Cultural Resources, workers shall stop work in the immediate area and notify the SO. Parks Canada's Terrestrial Archaeology section will provide advice and assessment of significance and determine requirements to mitigate the chance find. Examples of archaeological artefacts encountered in WLNP include buried bison bones, stone tools, and above ground cairns.
- 7.45. Where deep excavation is planned within the townsite, notify the Parks Canada Terrestrial Archaeology section to coordinate a site visit to look at the subsurface deposits with buried soils whenever possible.
- 7.46. If applicable, follow additional mitigations outlined in the Cultural Resources Impact Assessment.



	Required	Location(s)	Notes
Are additional mitigations for cultural resources required?	<input type="checkbox"/>		

8. Vegetation Removal Mitigations Module

Project activities that may alter or remove vegetation include mowing, brushing, and landscape maintenance activities, non-native species management, fire hazard reduction and prescribed burn operations and pre-construction site clearing. Grubbing (stump and root removal) may be required to prepare the ground surface for other activities.

Wildlife Timing Windows

All vegetation, including grassland, has the potential to provide habitat for wildlife. Applicable timing windows for individual project vegetation removal is listed under the [General Activities Mitigations Module](#).

- 8.1. The regional bird/songbird nesting period in WLNP is **April 1 to August 31**. Avoid all vegetation removal during this time. If vegetation removal is scheduled to occur within this period, the SO may complete pre-work surveys for nesting migratory birds. See [appendices](#) for regulatory guidance and detail on the MBCA and SARA.
 - Nesting surveys must be completed within 7 days of project activities.
 - There is a **risk of delays** to project activities due to the presence of nesting migratory birds.
 - If a nest is found during the pre-work surveys, the vegetated area will be left intact with a suitable sized protected buffer until the young have left the nest and vicinity. Size of buffer is species dependent, to be determined by the SO in consultation with federal regulatory guidance.
- 8.2. Vegetation clearing can negatively impact bats in spring and summer. The timing windows for avoidance of vegetation removal activities in WLNP is April 1 to August 31 for vegetation likely to support roosting bats. If vegetation removal is scheduled to occur within this period, the SO may complete pre-work surveys for bat roosts.
 - Roosting surveys must be completed within 7 days of project activities.
 - There is a **risk of delays** to project activities due to the presence of bat roosts.
 - If a potential bat roost is located, a site-specific mitigation strategy must be developed dependent on the type of roost and species present, to be determined by the SO in consultation with federal regulatory guidance.
- 8.3. Vegetation removal can negatively impact amphibians and reptiles, especially during breeding, transformation and important movement periods within and close to wetlands.
 - If vegetation removal is to occur within 300 m from a confirmed or potential amphibian breeding wetland, or within 500 m from a confirmed SAR amphibian



breeding wetland, additional impact analysis may be required and site-specific mitigations developed.

- If vegetation removal is scheduled to occur during non-frozen conditions, the SO may complete an amphibian and reptile ground search immediately prior to equipment activities.
- If ground disturbance activities are scheduled to occur in frozen conditions, amphibian exclusion fencing may be required in the preceding fall season at the discretion of the SO.

Other Timing Considerations

- 8.4. Where ground disturbance accompanies vegetation removal, time activities to minimize soil handling, soil compaction, and erosion potential. Avoid extreme dry windy and wet conditions.
- 8.5. In areas with weed infestations, reduce weed spread through vegetation removal prior to seed set.

Vegetation Removal Mitigations

- 8.6. If previously unidentified sensitive features are found during construction, immediately stop work and notify the SO (e.g., raptor nest).
- 8.7. Vegetation removal should be limited to the minimum area required for safe operations during construction or to meet the objectives of the clearing activities (i.e., fire breaks, sight lines etc.).
- 8.8. Minimize full removal and retain vegetation when possible to reduce erosion.
- 8.9. Retain 30 metre vegetated buffer around sensitive features; where disturbance is unavoidable < 30 metres, a restoration plan is required and the SO must be on site during disturbance activities.
- 8.10. Do not deposit debris in water bodies.
- 8.11. Limbing must be completed using the appropriate equipment to minimize damage to the tree (i.e., using a hoe bucket to limb trees is not appropriate as it can cause the bark to tear and can make the remaining tree vulnerable to diseases and rot).

Tree removal

- 8.12. Safety of workers and the public is the first priority for all tree removal operations. In consultation with the SO, felling of snags or hazard trees outside the designated work area may be permitted, where required for safety of fellers.
- 8.13. Unless approved by the SO due to site-specific limitations be felled away from sensitive features, such as watercourses, wetlands, riparian zones, or ecological features.
- 8.14. Ensure tree limbs/stumps are flush cut as close to the ground or stem as possible.
- 8.15. Fallers should assess each tree individually for critical wildlife features such as nests or cavities. Notify the SO if unexpected features are identified.
- 8.16. Mechanical falling can be used where it is determined that machines will cause minimal site degradation, due to suitable soil conditions, or on a site that is to be developed for future access or facilities.
- 8.17. Mechanical falling may be preferable on sites with numerous hazard trees to be retained for their habitat values, or where mechanical falling equipment can be used



to minimise soil disturbance and better direct fallen trees away from environmentally sensitive areas.

- 8.18. Logs and other salvage materials are to be conveyed to and placed at a storage site without spread of debris or damage to other standing trees or landscape resources outside the marked clearing or storage limits. They shall not be skidded through wetlands, waterways or water bodies.
- 8.19. During the grubbing component, stumps, roots, imbedded logs and other non-soil debris shall be pulled and shaken free of loose soil and rocks before transport.
- 8.20. Where possible, preserve identified wildlife trees by limbing or topping if they are not assessed as hazard trees.

Disposal of Vegetation Debris

- 8.21. Where practicable, as much of the coarse woody debris and organic matter from the tree removal should remain on the site and used in restoration. The quantity and distribution of slash remaining must not impede wildlife movement, choke out native vegetation, create a significant fire hazard or cause an excessive nutrient flush.
- 8.22. All debris that is not being disposed of on-site must be removed as soon as possible from the project footprint, by transporting off-site for disposal.
- 8.23. If temporary storage is required, store debris on already disturbed areas to minimize footprint of disturbance.
- 8.24. All vegetation containing non-native species will be bagged and removed off site to disposal facility.
- 8.25. On approval of the SO, vegetation debris may be taken to the WLNP burn pile at the upper government compound provided all materials are transported, placed and sorted according to current WLNP requirements.
- 8.26. If removal is not feasible a chipper may be used for less than 50 boles per hectare. Chip depth is to be a maximum of 5 cm (2 inches), spread over area no greater of 5m x 5m per hectare so as to not cover underlying vegetation, prevent new native seedlings from sprouting, and cause soil/seed bank sterilization. Spreading of chips may extend beyond these parameters with approval by the SO.
- 8.27. Firewood must be salvaged and bucked and stacked at the government compound.
 - Firewood Tree: one that has a minimum diameter off 15 cm outside bark at stump height (30 cm) and a usable length of 4.88 m to a 10 cm diameter (inside bark).
 - Fire Piece: One that is 2.44 m (plus 5 cm trim allowance) or longer, with a 10 cm (inside bark) small end, where rot content or form does not render it unusable.

Pile Burning (PCA Prescribed Burn Operations)

- 8.28. No burning of materials is permitted by non-PCA contractors.
- 8.29. Piles will be made where trees are felled, piles will be 1.2-1.8 (4 to 6 feet) in diameter and no more than 1.2 m (4 feet) high (approximately 1 to 3 trees per pile) or as outlined in an approved Burn Plan.
- 8.30. Piles are to be located so that they do not scorch surrounding live trees and measures must be in place to ensure that fires do not spread (i.e., conduct burning on snow or on mineral soil).
- 8.31. Piles will be left until fall for burning to allow for curing of green fuels.
- 8.32. Provincial regulations for air quality must be met.



- 8.33. Where fire fuel loading is not a concern, vegetation debris of limited amounts will be dragged in the forest to mimic natural tree fall. Materials will not be dragged through wetlands or other sensitive features.

Herbicide Use

- 8.34. A Field Unit Integrated Pest Management Plan (IPMP) must be completed and approved prior to the use of herbicides to ensure the most effective and least harmful substances are properly used.

9. Soil Handling Mitigations Module

To successfully complete restoration of disturbed areas, and protect areas from erosion, proper soil handling and backfilling procedures must be followed. Post excavation and stripping soil and vegetation restoration mitigations should be applied. See Section 10 of this BMP for [Soil and Vegetation Restoration](#).

- 9.1. All soil handling activities require consideration of erosion and sediment control. [See ESCP Section](#).

Soil Stripping

- 9.2. No stripping shall occur outside of the delineated work area or within 1 metre of the drip line of existing forest.
- 9.3. Stripping close to any watercourse, water body or wetland shall employ methods to ensure materials are not pushed, do not fall or erode into the water or wetlands.
- 9.4. Soil must be stripped in accordance with the [ESCP](#). Key components for soil stripping are:
- Minimize soil movement and handling at all times.
 - Strip topsoil under dry conditions, whenever possible.
 - In the event of a work program shutdown during inclement weather (e.g. winter conditions unfavourable for construction, heavy rain events, construction delays, etc.) contingency planning for bared soils or excavated material stockpiles is required.

Topsoil Salvage

- 9.5. Salvage topsoil at all excavation sites for restoration purposes.
- 9.6. Prevent loss of topsoil through wind or water erosion.
- 9.7. Usually the upper 15 cm of soil, below the sod layer if present, is considered topsoil, where topsoil depths exceed 15 cm then salvage the entire depth of topsoil.
- 9.8. Where depths exceed 15 cm, salvage the upper 15 cm of topsoil separately from the remaining, where the seedbank is filled with desirable native seed material.
- 9.9. The SO may designate separate storage of topsoil zones whereby forest soils are stored separately from grassland soils and weed contaminated soils are separated from clean topsoil.

Fescue Grassland

- 9.10. Fescue grasslands are sensitive features and work in or adjacent to them requires additional impact analysis.



- 9.11. Fescue grassland will be marked and staked by the SO prior to initial construction activities.
 - To prevent the transfer of weeds, all equipment will be cleaned of organic material prior to work within fescue grassland. A weed cleaning station between work areas within WLNP may be necessary. See [weed cleaning section](#).
- 9.12. In fescue grassland, remove fescue sod, retaining as much of the root mass as possible (can be greater than 30 cm) and in pieces as large as possible, while maintaining manageability for replacement (usually approximately 1 x 1 m).
- 9.13. Where sod cannot be maintained intact, attempt to retain as large and intact sod pieces as possible in primary lift through minimal soil handling, appropriate equipment, and experienced equipment operators.
- 9.14. Sod must be stored upright.
- 9.15. All fescue sod salvaged will be stored in such a manner as to permit its re-use during the restoration phase of the project.
- 9.16. Place salvaged sod in a weed free area for storage designated by the SO, in low profile windrows with the appropriate erosion control for rain and windy conditions.

Excavation

- 9.17. All trenches or ditches left unattended overnight must be fenced or covered to prevent wildlife entrapment or provide appropriate egress for wildlife.
- 9.18. Workers must inspect trench for trapped wildlife prior to backfilling. If trench has been left open for > 24 hours, SO must be notified and time allowed for the SO to complete additional inspection for trapped wildlife such as salamanders.
- 9.19. Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation.
- 9.20. Special precautions may have to be taken during excavation in the vicinity of intermittent or active drainage channels.
- 9.21. Minimize changes to the ground surface that affects its infiltration and runoff characteristics and maintain/re-establish effective surface drainage on completion of the project.
- 9.22. Backfill and compact excavations as soon as possible. Optimize degree of compaction to minimize erosion and allow for re-vegetation.
- 9.23. To limit over compaction, use equipment which minimizes surface disturbance including low ground pressure tracks/tires, blade shoes and brush rake attachments.
- 9.24. All excavations will remain free of water (see [dewatering mitigations](#)).

Excavated Material Storage

- 9.25. Allow space for separate storage of topsoil and spoil; where space is available, separate stored topsoil from spoil by at least 1 m. Use appropriate material (e.g., geo-textile) to separate soil components where space is limited.
- 9.26. Topsoil from separate ecotypes or areas of the project may not be mixed without approval of the SO (i.e., grassland soils must be kept separate from forested soils).
- 9.27. Topsoil may be stored on hardened surfaces, geo-textile material, in topsoil storage containers or directly on undisturbed vegetation. If storage occurs on vegetation, material recovery by hand may be required.



- 9.28. Topsoil should be stockpiled on the uphill side of the disturbance on sloped terrain and away from any grades, subsoils, spoil material, construction activity and day to day operations.
- 9.29. Construct barricades to prevent losses on steep terrain ($>18^\circ$, 3:1).

Excess Materials and Waste (Overburden Removal)

- 9.30. Remove excess excavated material from site where it cannot be used for the final grading of the area. Site specific arrangements must be made for disposal locations and procedures of overburden.
- 9.31. Surplus excavated material may be used to fill depressions around the project site providing topsoil is stripped before filling, with approval from SO.

10. Soil and Vegetation Restoration Mitigations Module

Almost all projects activities included in this BMP will require some ecological restoration- *the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed*. The restoration plan can be a simple application of the following mitigations and can be at the site or both at the site and in concert with another site designated to offset the permanent impact of a project. A restoration plan is required for all projects but the scale and scope can be adapted to that required by the project (i.e., BMPs, site restoration plan, etc.). Restoration works can often be considered projects in and of themselves. Soil and vegetation restoration must apply the principles of effective, efficient and engaging solutions.

Restoration Plan

- 10.1. Develop restoration plan as part of the project scoping and specifications prior to project approvals.
- 10.2. Ensure that the appropriate restoration materials are available as needed immediately following construction activities.
- 10.3. The restoration plan will be subject to the approval of the IAO, who will be responsible for consulting with the Park Vegetation Ecologist.
- 10.4. The restoration plan should the following minimum information
 - Site description;
 - Site-specific restoration goals and objectives;
 - Schedule of clean-up activities;
 - Timing of restoration activities;
 - Restoration Standards; and
 - Follow-up Protocols (i.e., supplemental seeding, native transplants, weed control, etc.)

Timing Windows

- 10.5. Complete initial seeding as soon as possible.
- 10.6. Supplemental planting should be timed for the species and location. Seeding in the fall allows for full scarification of the seed over the winter. Consider using seed that requires shorter scarification times for spring and summer applications. Transplants may do best in the spring and summer and can require watering or other maintenance.
- 10.7. Time weed control measures to prevent seed propagation.



Topsoil Replacement

- 10.8. Implement restoration plan for the disturbed area immediately following completion of construction.
- 10.9. Minimize soil movement and handling to protect existing native seed bank.
- 10.10. Replace topsoil to all areas immediately following fine grading.
- 10.11. Do not compact topsoil.
- 10.12. Backfilling should allow settling to prevent depressions however, long term roach piles on linear disturbances should be minimal.
- 10.13. Where insufficient topsoil is available, the SO may approve moving soil from different projects or areas of WLNP. Imported soil may be used as a last resort and must be from a supplier that has been inspected and approved by the Park Vegetation Ecologist. Methods of improving vegetation succession using locally sourced, weed and contaminant free materials are preferred.
- 10.14. Slopes to be seeded should be no steeper than 2 horizontal to 1 vertical (2:1) and covered with a minimum of 5 cm (2 inch) of topsoil. Finish grading should always follow top soil placement. Maintain structure (i.e., rocks, roots, woody debris) in topsoil.
- 10.15. Where remaining soils are unstable due to steepness or soil characteristics, immediate installation of sod or other erosion control is required.
- 10.16. Methods of bioengineering such as terracing, willow staking, live pole drain systems should be assessed as solutions where soils are steeper or remain unstable.

Fescue Grassland

- 10.17. Sod must be used in restoration as soon as practicable following fine grading.
- 10.18. Depending on original topsoil depth, secondary salvage topsoil may be returned prior to sod placement
- 10.19. Sod will be placed in locations that will receive no further disturbance.
- 10.20. Once returned, do not compact or move equipment over sod. Do not harrow or pulverise sod.
- 10.21. Do not attempt to level or flatten sod. Sod should be uneven and retain vegetation and landscape structure.
- 10.22. Use topsoil from local site to fill cracks between pieces of sod.
- 10.23. To return structure, additional nursery stock of shrubby species may be required.

Soil Amendments

Fertilizer Application

- 10.24. Avoid use of fertilizer to limit non-native vegetation growth and allow for local species to use available nutrients.
- 10.25. If needed use locally sourced mycorrhizae compost teas to improve vegetative success, as approved by WLNP vegetation ecologist.

Topsoil substitute

- 10.26. Apply an organic cellulose only amendment as a soil substitute if restoration standards are not being met within the defined time frame.
- 10.27. Determine the type of organic amendment based on the site-specific requirements (e.g., peat moss, compost) at the discretion of WLNP vegetation ecologist.



Seedbed Preparation

- 10.28. The seedbed will be scarified by hand or, with the approval of the SO, by machine on large areas (i.e., roadbeds) where it is accessible and appropriate.
- 10.29. The seedbed will be scarified if seeding takes place more than 7 days after final grading or if there has been a rainfall between final grading and the seeding date.
- 10.30. The cleats of a tracked vehicle or a harrow device will be used, where possible, to prepare an adequate seedbed with seedling safe-sites (microsites) substantially free of soil crusts.
- 10.31. Align cleat marks at right angles on slopes to trap seed and sediment and reduce erosion.

Species Selection

- 10.32. When selecting species and varieties:
 - Use species of local native plant communities.
 - Avoid use of cultivars.
 - Species viability in proposed environment and climatic conditions.
 - Capability to effectively control erosion, where required.
 - Adaptation to the variable site conditions of undulating topography.
 - Consider palatability of some species to herbivores and avoid growing attractants in areas of increased risk to wildlife and visitors.
 - Variable life expectancy to produce variable, delayed die-out of seeded species and replacement with indigenous native plants.

Seed Mix Selection

- 10.33. A prescriptive seed mix appropriate for the project area will be provided by Parks Canada. If an appropriate seed mix is not available, the SO will contact the Park Vegetation Ecologist to determine an appropriate mix for the Project.
- 10.34. Percentage of individual species within mixes are approximate and may vary depending on seed availability. A number of native species that are available only in limited quantities commercially have been included in the seed mixes. These seed mixes are to be used conditional on availability of individual species; modifications/replacements are allowed, subject to approval by the WLNP Vegetation Ecologist.
- 10.35. Prior to seed purchase, certificates of seed analysis will be provided to the Vegetation Ecologist for approval.
 - Do **NOT** purchase seed until written approval is obtained.
 - Certificates of Analysis must include both the common and include the scientific name following the CANADENSYS nomenclature system; indicate if the seed is a cultivar, ecovar, or wild native; geographic origin (seed source); date of collection; method of seed storage; germination, viability and vigour; and indicate all other species occurring including agronomic, weed, and native species; and date of the analysis. The contact information for the Seed Supplier will be included.
- 10.36. All seed is subject to testing by PCA prior to use.



Seeding

- 10.37. Use only seed purchased after written approval is obtained.
- 10.38. Seed and stabilize (e.g. mulch/tackifier) bare areas as soon as possible after disturbance, preferably as soon as a significant area is graded and finished and before the next rain event. If there is a risk of seedling mortality as a result of fall frost stabilize until appropriate growing conditions exist.
- 10.39. In previously disturbed lawn areas of the Waterton Community, consider using sod in high traffic areas or places that need extra erosion control.
- 10.40. Use temporary seeding when outside the seeding dates for permanent vegetation.
- 10.41. Apply a seed mixture which is appropriate for the climate, soil, and drainage conditions of the site.
- 10.42. Apply seed at a rate appropriate to the seed mixture, seeding method and existing vegetation conditions.
- 10.43. Conduct broadcast seeding under calm wind conditions. Hydro-seeding is acceptable where access is available.
- 10.44. Do not increase the seeding rate to compensate for poor seedbed conditions.
- 10.45. Monitor temporary erosion control measures to prevent seed loss.
- 10.46. Supplemental seeding may be required in subsequent years.

Alternatives to Seeding

- 10.47. Use topsoil seed bank in small areas when there is no risk of erosion or competition from invasive species (i.e., natural regeneration).
- 10.48. Use native transplants in areas where conventional seeding applications are not applicable or where slope stability is an issue.
- 10.49. Use native transplants to provide additional diversity and structure to supplement seeding.
- 10.50. Use conventional forestry planting methods for container grown transplants, see [website](#) for guidance.

11. Asphalt Production and Handling Mitigations Module

Asphalt is a common building material for transportation infrastructure. Its production requires the use of gravel, water, and petroleum products, and associated project activities include transportation, storage and handling of these materials. Installation of asphalt plants is common within the larger parks where gravel extraction is undertaken.

Timing of Works

- 11.1. Asphalt works are preferably undertaken during periods of dry weather as this allows easier control of contaminated runoff and sediment.
- 11.2. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.



Gravel Crushing and Washing

- 11.3. Where possible within engineering constraints, asphalt materials should be recycled to reduce the need for new gravel.
- 11.4. Gravel will be obtained from an approved operational borrow pit only. For gravel obtained from a borrow pit within a protected heritage place or borrow pit, gravel extraction within the footprint of the disturbed area of the approved operational borrow pit is permitted.
- 11.5. Gravel will not be crushed within 30 meters of any water body.
- 11.6. If water for cleaning is extracted from a watercourse, refer to [water withdrawal section](#) of this BMP.
- 11.7. If gravel requires washing, the water used will not be returned directly to any watercourse.
- 11.8. Water free from chemical contaminants will be discharged into ground where further erosion and runoff into surface water is prevented. Discharging into well vegetated ground surface, at a rate which prevents erosion can often provide increased absorption and reduction of sediment load.
- 11.9. Contaminated water must be treated to meet CCME guidelines or transported outside of WLNP for disposal at an approved facility.
- 11.10. For waste removed from WLNP a detailed receipt of delivery to an approved facility will be provided to the SO.

Oiling of Truck Boxes

Trucks for hauling asphalt mixture shall have tight, clean, smooth metal beds that have been sprayed with a minimum amount of thin fuel oil to prevent the mixture from adhering and causing waste asphalt.

- 11.11. Truck boxes may be oiled only when absolutely necessary.
- 11.12. Oiling will take place in a bermed area, consisting of a plastic underlay with 15 centimetres overlay of clean gravel. Oil contaminated gravel will be hand collected (so as to prevent tearing of the plastic) from the bermed area daily, and put through the asphalt plant.
- 11.13. Vehicle covers shall be securely fastened.

Disposal and Clean Up of Other Waste Products

- 11.14. To ensure regular clean-up of waste asphalt and petroleum spills, a defined clean up schedule will be established during the preconstruction meeting.
- 11.15. Leaks will be collected in drip-trays, the collected material will either be removed from WLNP, or recycled back through the Asphalt Plant. For any material removed outside WLNP to an approved facility, a detailed receipt will be provided to the ESO.
- 11.16. Used oil, filters, grease cartridges, oil cans and other waste products of plant servicing will be collected and disposed of at the nearest industrial waste facility.

12. Paving, Resurfacing, Grading Mitigations Module

Surface management activities are undertaken to ensure public safety on PCA surfaces by maintaining clean, level, and unbroken road surface conditions through activities such as pavement cleaning, patching, application of surface treatments, and pavement crack sealing.



Grading is used to address drainage issues, vegetation encroachment, potholes and rough surfaces.

Timing of Works

- 12.1. Works are preferably undertaken during periods of dry weather (e.g., summer) as this allows easier control of contaminated runoff and sediment.
- 12.2. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.

Grading

- 12.3. During grade construction conducted close to any watercourse, water body or wetland ensure materials are not pushed, fall or are eroded into the water or wetlands.
- 12.4. No grade building shall occur outside of the delineated work area or within 1 metre of the drip line of existing forest. Any material inadvertently falling outside the work limits will be removed promptly in a manner that does not damage trees or vegetation.
- 12.5. Materials shall be placed at storage sites or on the grade without spillage outside the work limits. Any material inadvertently falling outside the work limits will be removed promptly in a manner that does not damage trees or vegetation.
- 12.6. Retain a 30 metre vegetated buffer around water bodies or install runoff management structures.
- 12.7. If possible, grade roads early in the spring before vegetation develops seed heads or late in season after vegetation has set seed and is dormant to minimize non-native vegetation propagation.
- 12.8. Ensure gravel or road bed material is free of weeds and comes from an approved operational gravel source free of other contaminants.

Paving and Resurfacing

- 12.9. Minimize changes to the surface that could affect infiltration and runoff characteristics and maintain effective surface drainage to limit direct runoff into surface waters.
- 12.10. Minimize application of seal coats in wet conditions. Attempt to apply only to dry surfaces and not prior to (within 24 hrs.) or during rainfall. If unforeseen rain arrives ensure runoff from recently seal coated surfaces are prevented from entering surface waters.
- 12.11. For asphalt handling and management see the [Asphalt Mitigation Module](#) of the BMP.

Pavement Marking and Barrier and Guardrail Reinstatement

- 12.12. Minimize changes to the surface that could affect infiltration and runoff characteristics and maintain effective surface drainage to limit direct runoff into surface water. Pavement marking shall be undertaken pursuant to standard methods applied in National Parks for control of paint products, both in transport and handling. The Contractor shall present a description of methods to be employed for



transporting and controlling paint and hazardous products, application of paint, cleaning of equipment, containment and disposal of waste paint and cleaning products, etc. to the satisfaction of the SO.

- 12.13. Where concrete barriers or guard rails are temporarily removed, for highway improvements, temporary glow posts shall be installed, at 20.0 m intervals on straight sections and at 10.0 m intervals on curves and shall remain in place until permanent barrier system has been installed.

References and Source Documents

- Axys Environmental Consulting Ltd. and David Walker & Associates. 1998. Best Available Methods for Common Leaseholder Activities. 2013. Prepared January 1998 and updated March 2013 for Line Leaseholders Working Group, Jasper National Park.
- British Columbia Ministry of Transportation and Infrastructure. 2010. Environmental best practices for highway maintenance activities 2nd ed. Government of British Columbia.
- British Columbia Ministry of Forests and Environment Lands and Parks. 2000. Provincial Wildlife Tree Policy and Management Recommendations. Government of British Columbia.
- Coordinated Technology Implementation Program. 2011. Current and Innovative Solutions to Roadside Revegetation Using Native Plants. Federal Highway Administration U.S. Department of Transportation.
http://www.nativevegetation.org/pdf/B1422_Roadside_revegetation_Report_complete.pdf
- Dane, C. 1978 Culvert Guidelines: Recommendations for the Design and Installation of Culverts in British Columbia to Avoid Conflict with Anadromous Fish. Fisheries and Marine Service Technical Report No.811. Department of Fisheries and Environment. Government of Canada.
- Dick, Robert. 2008. Guidelines for Outdoor Lighting in Dark Sky Preserves. Royal Astronomical Society of Canada
- Dick, Robert. 2014. Report on Current Lighting within Waterton Lakes National Park, Specifically the Town Site of Waterton. Report presented to Parks Canada.
- Environmental Protection Agency Office of Water. 2000. A Guideline for Maintenance and Service of Unpaved Roads. Choctawhatchee, Pea and Yellow Rivers Watershed Management Authority.
http://water.epa.gov/polwaste/nps/urban/upload/2003_07_03_NPS_unpavedroads_ch5.pdf
- Fisheries and Oceans Canada. Measures to Avoid Harm. Accessed February 2015. <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html>
- Fisheries and Oceans Canada. Self-Assessment Criteria. Accessed February 2015. <http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>
- Federal Highway Administration. 2011. Clear Zones and Roadside Terrain. United States Department of Transportation. http://safety.fhwa.dot.gov/roadway_dept/clear_zones/cmc_clearzones/
- Gregoire, P. 2015. Environment Canada. Personal Communication of recommended setbacks from species at risk for high disturbance activities on 21 November 2015.
- Government of British Columbia. 1996. Water Act and Water Regulation. Crown Publications, Queens Printer.
- Lausen, C. 2012. Waterton Lakes National Park Bat Survey. Birchdale Ecological Ltd. Kaslo, B.C.



- Parks Canada. 2007. Parks Canada Omnibus Environmental Protection Plan Mitigation Measures. Government of Canada.
- Parks Canada. 2007. Parks Canada Best Management Practices for Fire Management Operations. Government of Canada.
- Parks Canada. 2008. Guidelines and Specifications for Outdoor Lighting at Parks Canada. Real Property and Ecological Integrity Branches of Parks Canada.
- Parks Canada. 2008b. Waterton Lakes National Park of Canada: State of the Park Report. Government of Canada.
- Parks Canada. 2011. Waterton Lakes National Park of Canada Road Maintenance Guidelines. Government of Canada.
- Parks Canada. 2012. Minor Repairs to Transportation Infrastructure in Atlantic Canada National Parks Replacement Class Screening Report. Government of Canada.
- Parks Canada. 2012. Replacement Class Screening Report for Routine In-Water Works Projects Along the Rideau Canal and the Trent-Severn Waterway.
- Parks Canada. 2015. Parks Canada National Best Management Practices for Roadway, Highway, Parkway and Related Infrastructure. Government of Canada.
- Parks Canada. 2013. Flood 2013 Rehabilitation. Government of Canada
- Parks Canada. 2013. Best Management Practice for Roadside Vegetation Maintenance at Point Pelee National Park. Government of Canada.
- Parks Canada. 2013 Assessment of Highway Nighttime Paving. Jasper National Park, Government of Canada.
- Parks Canada. 2013. Best Management Practice for Routine Vegetation Trimming and Clearing Pukaskwa National Park. Government of Canada.
- Parks Canada. 2014. Highway Service Centre Engineering's Environmental Procedures. Jasper National Park, Government of Canada.
- Parks Canada. 2015. Parks Canada Directive on Impact Assessment. Government of Canada.
- Parks Canada. 2015. Basic Impact Analysis Rock Slope Remediation. Kootenay National Park, B.C. Government of Canada.
- Parks Canada. 2015. Memo: Managing Risk of Invasive Mussels through Fire Operations. Government of Canada.
- Parks Canada. 2016. Information Centre on Ecosystems (ICE) System. Government of Canada.
- Parks Canada. No Date. Jasper Mitigation Manual. Government of Canada.
- Transport Canada. 2008. Replacement Class Screening Report for Minor Transportation Repairs. June 2008. TC Contract # 8080-07-0061.
- United Nations Food and Agriculture Organization. 1998 Manual for the Planning, Design and Construction of Forest Roads in Steep Terrain.
<http://www.fao.org/docrep/w8297e/w8297e00.htm>



Appendix 1 Regulatory Guidance

Jurisdictions

While all projects on lands managed by Parks Canada must adhere to Federal law and regulation, it is considered best practice to refer to local community, regional, provincial regulation and best practices where federal guidance is silent and/or attempt to meet those targets if it can reduce the overall impact of the project.

Some of the project activities reviewed have potential environmental impacts that are addressed by various provincial, federal and territorial acts and regulations. All activities must meet current environmental law and regulations in their design and construction. The following is a brief description of some of the key federal acts and regulations. Further review, understanding and application of other federal, provincial and territorial environmental laws are part of a rigorous approach to project planning and execution.

Canada National Parks Act and Regulations-Parks Canada

All work inside National Parks and Protected Areas must be performed in accordance with the laws and regulations set out in the *Canada National Parks Act* and Regulations. This includes the requirement for most activities described to only be done under a permit such as: business licence for contractor, disturbance of natural objects, travel in restricted areas, special events or use of disposal sites.

Fisheries Act - Fisheries and Oceans Canada

If a project is to be conducted near water, it is the proponent's responsibility to ensure they avoid causing **serious harm to fish** in compliance with the **Fisheries Act**. The **advice in on the Fisheries and Oceans website** will help a proponent avoid causing harm and comply with the Act.

If the water body in the project area has fish or is connected to waters at any time that have fish the project must meet the **self-assessment criteria on the Fisheries and Oceans website**, if not a project review can be made by Fisheries and Oceans Canada to assess whether the project requires authorization or authorization can be requested directly. Given the level of detail required for a review and/or authorization request the EIA officer may need to consider a more involved EIA pathway in those circumstances.

Migratory Bird Convention Act – Environment Canada

The purpose of this Act is to implement the Convention by protecting and conserving migratory birds - as populations and individual birds - and their nests. Section 6 - prohibits the disturbance, destruction, or taking of a nest, egg, or nest shelter of a migratory bird.

In Canada, the general nesting period may start as early as mid-March and may extend until end of August. This is a general nesting period that covers most federally protected migratory bird species. This period varies regionally across Canada mainly due to differences in species assemblages, climate, elevation and habitat type. Generally, the nesting period is delayed in more northerly latitudes, corresponding to vegetation development and food availability. (Environment Canada, 2014). To help with determining regionally relevant periods where nesting is likely to occur, Environment Canada is publishing estimated regional nesting periods within large geographical areas across Canada referred as "nesting zones". These periods are



estimated for each zone and consider the time of first egg-laying until the young have naturally left the vicinity of the nest. Field Units may wish to refine this section and add their known local nesting periods.

Species at Risk Act

If a species listed under the *Species at Risk Act* (SARA) is found within the project area, any potential adverse effects from the proposed project to the individuals of the species, their residences and/or their critical habitat must be understood. Species at risk considerations require specific expertise, due to additional legal requirements under the SARA and CEAA 2012. If the projects or activities to be addressed by the BMP could affect a listed species or its critical habitat, the EIA officer may need to consider a more involved EIA pathway in those circumstances.



Appendix 2 Species at Risk and Critical Habitat

Table 2 Species at Risk Occurring in Waterton Lakes National Park

Species	SARA status	COSEWIC	Provincial Status
Vascular Plants			
Bolander's Quillwort	Threatened	--	--
Limber Pine	--	Endangered	Endangered
Whitebark Pine*	Endangered	--	Endangered
Arthropods			
Half-moon Hairstreak*	Endangered	--	--
Western Bumble Bee	--	Threatened (southern subspecies)	--
Amphibians			
Long-toed Salamander	--	Not at risk	Special Concern
Northern Leopard Frog	Special Concern (Western Boreal/Prairie Populations)		Threatened
Western Tiger Salamander	--	Special Concern (Prairie/Boreal Population)	--
Western Toad	Special Concern (Calling and/or Non-calling populations)	--	--
Reptiles			
Western painted turtle (note that status depends on population definition)	Special Concern	--	--
Birds			
Band-tailed Pigeon	Special Concern	--	--
Bank Swallow	--	Threatened	--
Barn Swallow	--	Threatened	--
Barred Owl	--	Not assessed	Special Concern
Black Swift	--	Endangered	--
Bobolink	--	Threatened	--
Canada Warbler*	Threatened	--	--
Chestnut-collared Longspur*	Threatened	--	--
Common Nighthawk*	Threatened	--	--
Ferruginous Hawk*	Threatened	--	Endangered
Harlequin Duck	--	Not assessed (western population)	Special Concern
Horned Grebe	--	Special Concern	--
Lewis's Woodpecker*	Threatened	--	--
Loggerhead Shrike	Threatened	--	Special Concern
Long-billed Curlew	Special Concern	--	Special Concern
Olive-sided Flycatcher*	Threatened	--	--
Peregrine Falcon	Special Concern	--	Threatened
Prairie Falcon	--	Not assessed	Special Concern
Red-headed Woodpecker*	Threatened	--	--
Rusty Blackbird	Special Concern	--	--
Short-eared Owl	Special Concern	--	--
Sprague's Pipit	Threatened	--	Special Concern
Trumpeter Swan	--	Not at Risk	Special Concern
Western Grebe	--	Special Concern	Threatened
Western Screech-Owl*	Endangered	--	--
White-winged Scoter	--	Not assessed	Special Concern
Whooping Crane	Endangered	--	--
Fish			
Westslope Cutthroat Trout	Threatened	--	Threatened



WLNP General Project Best Management Practices Appendix 2 Species at Risk and Critical Habitat

Species	SARA status	COSEWIC	Provincial Status
Bull Trout	--	Threatened (Saskatchewan-Nelson Population)	Threatened
Pygmy Whitefish	--	Special Concern (Waterton Population)	Threatened
Mammals			
American Badger	--	Special Concern	Data Deficient
Grizzly Bear	--	Special Concern (Western Population)	Threatened
Little Brown Myotis*	Endangered	--	Data Deficient
Plains Bison	--	Threatened	--
Western Small-footed Myotis	--	Not assessed	Special Concern
Wolverine	--	Special Concern (Western Population)	Data Deficient

*species with no published recovery strategy

Defined critical habitat exists for Bolander's Quillwort and Half-moon Hairstreak.

Contact the Impact Assessment Office for more information, including information regarding other habitats important for species at risk, as well as species at risk without defined critical habitat maps to date.

Additional information on Species at Risk is included in the Multi-species Action Plan.

Parks Canada Agency. 2017. Multi-species Action Plan for Waterton Lakes National Park of Canada and Bar U Ranch National Historic Site of Canada [Proposed]. Species at Risk Act Action Plan Series. Parks Canada Agency, Ottawa. iv + 30 pp. [G:\Resource Conservation\Species at risk\Action Planning 2013-2016\WLNP BURNHS Action Plan](#)

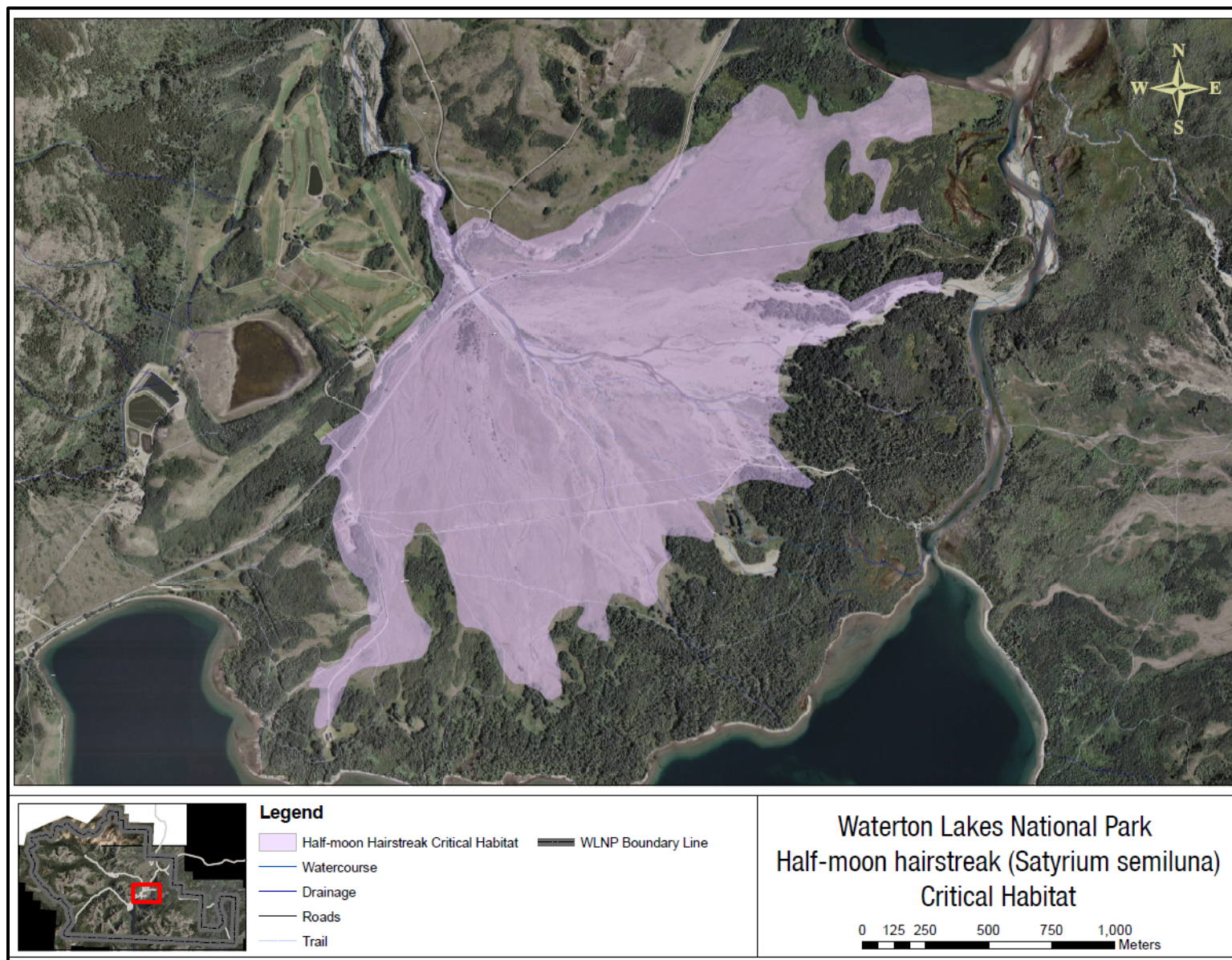


Figure 1 Waterton Lakes National Park Half-moon Hairstreak (*Satyrus semiluna*) Critical Habitat

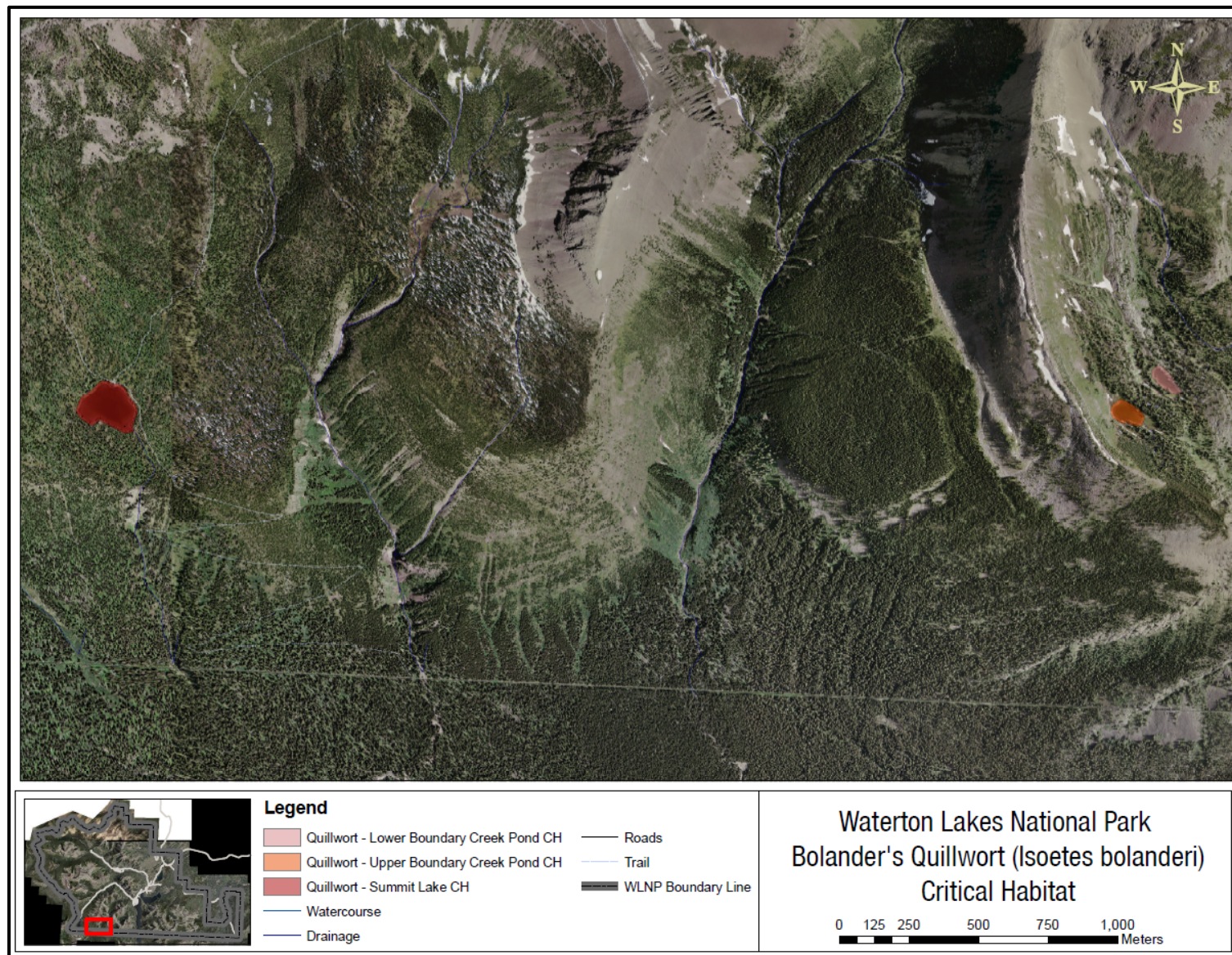


Figure 2 Waterton Lakes National Park Bolander's Quillwort (*Isoetes bolanderi*) Critical Habitat



Appendix 3 Recommended Seed Mixes for WLNP

All commercial seed lots will have Certificates of Analysis for weed and undesirable species content and germination tests for each lot of each species in the mix.

Prior to seed purchase, certificates of seed analysis will be provided to the Vegetation Ecologist for approval.

Do NOT purchase seed until written approval for individual lots is obtained.

Certificates of Analysis must include both the common and scientific name following the CANADENSYS nomenclature system; indicate if the seed is a cultivar, ecovar, or wild native; geographic origin (seed source); date of collection; method of seed storage; germination, viability and vigour; and indicate all other species occurring including agronomic, weed, and native species; and date of the analysis. The contact information for the Seed Supplier will be included.

Percentage of individual species within mixes are approximate and may vary depending on seed availability. A number of native species that are available only in limited quantities commercially have been included in the seed mixes. These seed mixes are to be used as possible conditional on availability of individual species; modifications/replacements are allowed, subject to approval by the WLNP Vegetation Ecologist.

Native seed mixes will be seeded within the appropriate areas of WLNP (*i.e.*, open fescue prairie, open deciduous forests with or without a mesic area modifier, etc.).

Inclusion of a clean cover crop (e.g., awned wheatgrass), to combat invasive plant problems may be considered.

Below is an **example** seed mix. Consult with Vegetation Ecologist for ALL projects, regardless of size, for a site specific and project appropriate mix.

Seed Mix	Species	Species % by Seed Weight
Open Fescue Grassland Mix Rate = 40 kg/ha	Foothills rough fescue (<i>Festuca campestris</i>)	40
	Idaho fescue (<i>Festuca idahoensis</i>)	20
	Parry Oatgrass (<i>Danthonia parryi</i>)	10
	Bluebunch wheatgrass (<i>Agropyron spicatum</i>)	10
	June grass (<i>Koeleria macrantha</i>)	7
	Alkaline bluegrass (<i>Poa juncifolia</i>)	3
	Rocky Mountain fescue (<i>Festuca saximontana</i>)	3
	Sticky Purple Geranium (<i>Geranium viscosissimum</i>)	3
	Early Yellow Locoweed (<i>Oxytropis sericea</i>)	3
	Yarrow (<i>Achillea millefolium</i>)	1
Aspen / Shrub Community Mix Rate = 40 kg/ha	Smooth wild rye (<i>Elymus glaucus</i>) ¹	25
	Bluebunch wheatgrass (<i>Agropyron spicatum</i>) ¹	20
	Foothills rough fescue (<i>Festuca campestris</i>) ¹	20
	Idaho fescue (<i>Festuca idahoensis</i>) ¹	15
	Mountain Brome (<i>Bromus carinatus</i>) ^{1&2}	10
	Marsh Reed Grass (<i>Calamagrostis canadensis</i>)	40
	Tufted hair grass (<i>Deschampsia caespitosa</i>) ²	40



WLNP General Project Best Management Practices
Appendix 3 Recommended Seed Mixes for WLNP

Seed Mix	Species	Species % by Seed Weight
¹ species for dry open stands	Sticky Purple Geranium (<i>Geranium viscosissimum</i>)	2
	Northern bedstraw (<i>Galium boreale</i>)	2
² species for wet or closed stands	Meadow Rue (<i>Thalictrum occidentale</i>)	2
	American vetch (<i>Vicia americana</i>)	2
	wild strawberry (<i>Fragaria virginiana</i>)	2



Appendix 4 Waterton Townsite Tree Protection and Succession Implementation Plan

The following Implementation Guideline has been created to function as a standalone document from the Waterton Townsite Grounds Vegetation Plan with content derived from the Waterton Townsite Grounds Vegetation Plan. This Appendix will function as a general guideline for proper construction practices while working in and around trees.

PROPER TREE PROTECTION PRACTICE

When constructing within approximately 6 m of an existing tree, it will be necessary to have Proper Tree Protection Practices in place. The following recommendations will assist in the prevention of unintentional tree damage.

Tree protection measures should be required for any retained public trees within the proposed limits of disturbance and within the 6 m setback from the limits of disturbance. Trees identified for retention and incorporation into the landscape plan should not be removed, damaged, or destroyed without prior written authorization from Parks Canada. Of note, the term “tree” refers to all parts of the tree including the roots.

The site specific specifications for tree protection should be outlined in the recommended Landscape Restoration Plan.

Tree Protection Measures

In order to mitigate potential damages and stress to existing publicly owned trees, tree protection measures should be in effect prior to the commencement of construction activities and should remain in effect until construction is completed. Protective barrier fencing should be installed to protect publicly owned trees located within 6 m of the limits of disturbance and for all publicly owned trees that are to be retained within the limits of disturbance. The area contained within the barrier fencing should be considered the Tree Protection Zone (TPZ).

Tree Protection Zone (TPZ)

Tree Protection Zones are limited to the Waterton Townsite and should include a 4.0 m distance from the trunk (where possible) and to a height of 1.2 m. The protective barrier fencing should be constructed of steel construction fencing or 2 x 4 wood framing skirted with fencing. The TPZ distance is to be measured from the base of the tree trunk outward beyond the drip line and Critical Root Zone (CRZ) where possible. The CRZ is the portion of tree roots requiring protection from damage in order to maintain the health and stability of a tree. One method of calculating the CRZ is that every 2.5 cm of DBH is 30 cm of CRZ radius. All supports and bracing for the protective barrier fencing should be located outside the TPZ. All supports and bracing should be placed to reduce damage to roots. The protective barrier fencing should remain standing and in good condition until construction of the project is completed. Signs identifying the TPZ should be located on the protective barrier fencing.



WLNP General Project Best Management Practices

Appendix 4 Waterton Townsite Tree Protection and Succession Implementation Plan

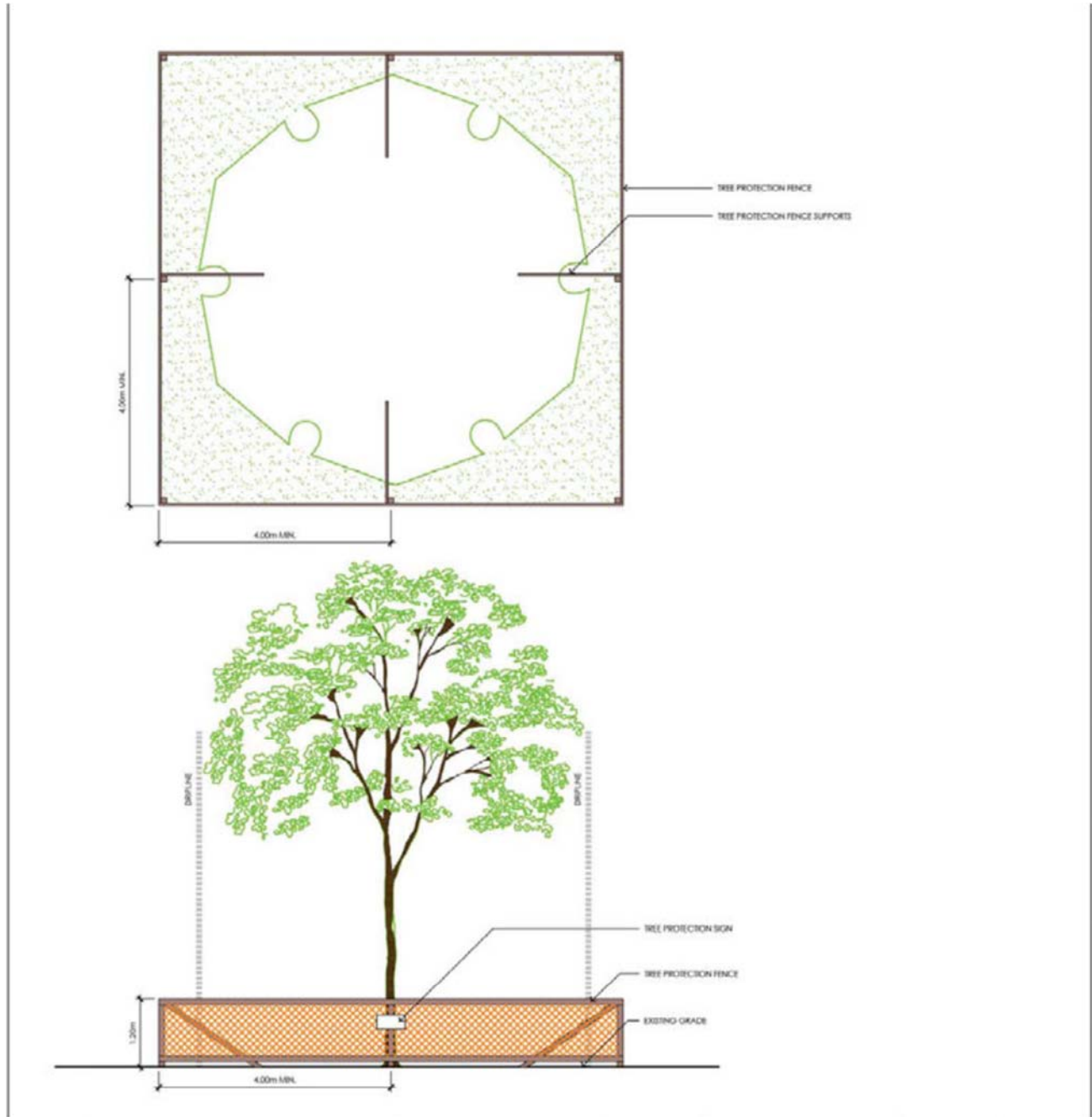


Figure 3 Construction Tree Protection Detail

0 300 600 metres
100,000 (at original document size of 8.5x11)



Project location
Waterton, AB

Client/Project
Parks Canada
Townsite Grounds Vegetation
Management Plan

Figure No.
5.0
Title

Tree Protection Detail

Notes

1. Concept Only. This drawing is an artistic representation of designs prepared by Stantec Consulting Ltd. It is conceptual in nature and subject to change.
2. Copyright Reserved.

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



The following should be adhered to during the construction process:

- No alteration or disturbance of the grade should occur within the TPZ;
- No equipment or construction materials should be stored within the TPZ;
- No soil, construction waste, or debris should be stored within the TPZ;
- No disposal of liquids should occur within the TPZ; and
- No vehicle, equipment, or pedestrian access through the TPZ, unless expressly permitted for the maintenance of the trees within the area.

The condition of trees within TPZs should be monitored throughout construction. A scheduled watering and monitoring program should be implemented for all trees within TPZ. Regular monitoring of the trees should occur during construction to reduce the potential that the trees are damaged by construction practices and to detect any signs of decline. Any damage or suspected damage to the trees should be rehabilitated or restored in accordance with acceptable industry standards. Trees within the TPZ should be maintained for a period of one year after construction completion. Monitoring should continue during this period to check on the continued health of the trees.

Where excavation is required within the root zone, root pruning should be completed by qualified personnel and should ensure clean cuts to facilitate wound closure. The roots should be covered with topsoil after the pruning cut has been made.

TREE REMOVAL

Throughout the Townsite, there may be trees that require removal. Reasons for tree removal may include:

- Trees restricting with desired development plan;
- Trees causing a risk or hazard post construction; and/or
- Trees causing a risk due to health and potential to cause damage.

In the event that a tree requires removal, a Succession Plan has been created to assist Landscape Architects or Designers with a planting scheme to replace the tree with appropriate vegetation.

SUCCESSION PLAN FOR TREE REPLACEMENT

The principals for the Succession Plan include replacing all non-native tree species with a 3:1 replacement ratio based on canopy cover. The replacement of trees includes using native trees of different sizes (Table 3 [H-1]). Over time, this will allow the public and green areas within the Townsite to be composed of trees of different size, age and species diversity, reflecting the natural surroundings.

The strategy recommended for this Succession Plan is to use trees of different sizes. Available sizes and appropriate tree species are outlined in Table 3 (H-1). The ratio of basket trees and potted trees was determined by estimating the amount of canopy cover needed to replace what is removed. The ratio of choosing deciduous trees or coniferous trees should be approximately 1:2 to 1:2.5 ratios as it will better emanate the surrounding landscape. The combinations of deciduous to coniferous species may vary from what is displayed in Figure H-1. The following combinations of trees should be used to guide planting for succession. Any removed trees should be replaced using the following combinations:



WLNP General Project Best Management Practices

Appendix 4 Waterton Townsite Tree Protection and Succession Implementation Plan

- Combination #1 one tree removed and replaced with three basket trees of different sizes;
- Combination #2 one tree removed and replaced with two basket trees of different sizes and three potted trees of different sizes; or
- Combination #3 one tree removed and replaced with one basket tree and eight potted trees using as much variety in size as available.

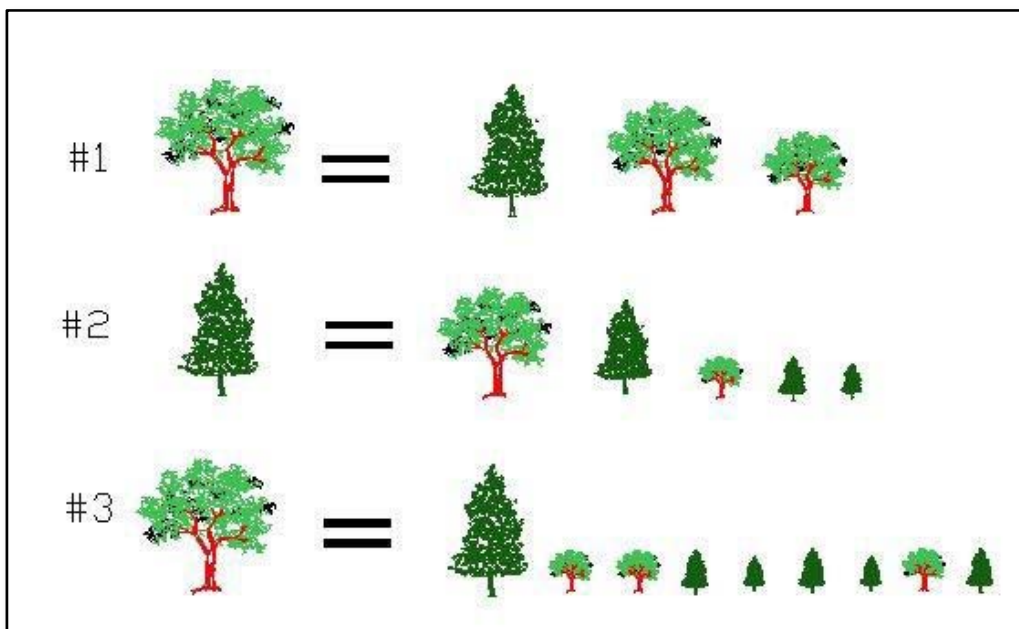


Figure 4 Three Tree Replacement Combinations

* Deciduous and coniferous species are subject to change within the above combination schemes.

Table 3 Tree Replacement Options and Sizes Available

Common Name	Scientific Name	Available size options in baskets	Available size options in pots	Fire resistant/ low palatability	Appropriate Townsite landscape zones
white spruce	<i>Picea glauca</i>	125cm, 150cm, 200cm, 250cm, 300cm, 350cm, 400cm, 450cm,	#1, #5	Low palatability	Zone 1, 2, 3
Douglas fir	<i>Pseudotsuga menziesii</i>	125cm, 150cm, 200cm, 250cm,	#1, #5	Fire resistant	Zone 1, 3
trembling aspen	<i>Populus tremuloides</i>	40mm, 50mm, 60mm, 70mm, 80mm, 90mm, 100mm	#5, #7, #10, #15	Fire resistant	Zone 1, 2, 3, 4, 5
balsam poplar	<i>Populus balsamifera</i>	50mm, 60mm, 70mm, 80mm	#7	Fire resistant and low palatability	Zone 1, 2, 3, 4, 5



WLNP General Project Best Management Practices

Appendix 4 Waterton Townsite Tree Protection and Succession Implementation Plan

Common Name	Scientific Name	Available size options in baskets	Available size options in pots	Fire resistant/ low palatability	Appropriate Townsite landscape zones
<p>NOTE:</p> <p>Zone 5 is located along Cameron Creek (in the Townsite), following the creek south to the shoreline and north along the shoreline; it then curves around the Marina stopping at the tip of Emerald Bay. When replacement planting within Zone 5 between Waterton Avenue and the shoreline special consideration for planting choices will be needed. The shoreline area has a high flooding risk requiring more flood-resistant species selection. When planting in the flood plain species such as willows and river birch should be used. An Erosion and Sediment Control Plan should also be considered before planting in these locations to ensure the long-term sustainability of the plantings.</p>					

Tree Replacement Locations

Within the Waterton Townsite there are multiple locations that are suitable for tree replacement in accordance with the Successional Plan. It is recommended to plant new trees in any green space that will sustain healthy trees. Contractors are recommended to begin planting within Lot A, B, C, D and the Waterton Campground. Below is a map that shows the locations of the Lots that will be refurbished over time (Figure 6).



Figure 5 Waterton Townsite showing lot locations for potential tree planting



Appendix 5 Trees and Shrubs Recommended for Waterton Park Townsite

The following is a condensed list of native tree and shrub species which are recommended for planting in the Waterton Townsite area. Species of trees and shrubs native to the Waterton area are the preferred species to be used when planting and should be sourced locally to prevent the introduction of non-native varieties. Where possible species have been selected to minimize the attraction to wildlife (bears, deer, elk) and have reduced fire risk potential. Species not found on this list must be approved by the Park Ecologist (Vegetation) or representative prior to planting.

TREES

Coniferous

Douglas fir (*Pseudotsuga menziesii*) – medium browse; medium fire

- Growing to 10 metres or more with a massive trunk and dense, spreading branches. Occurs at low elevations on dry exposed slopes and ridges.
- A primary species on disturbed sites, it occupies a variety of habitats from moist to very dry soils
- Adaptable to most sites; therefore good survival rate
- Good windthrow resistance; good shade tree
- Plant well away from eaves troughs (high needle cast)

White Spruce (*Picea glauca*) – Low browse; high fire

- Often somewhat bluish-green with a dense crown, up to 15 metres in height.
- Best on a moist site; needs a great deal of water, especially after transplanting
- Good shade tree; wind and shade tolerant.
- Colorado Spruce is not a desirable alternative; it's non-native

Lodgepole Pine (*Pinus contorta*) – low browse; high fire

- Occurs on a wide variety of soils, at low to middle elevations
- Young trees are intolerant of shade and grow best on dry exposed sites

Deciduous:

Trembling aspen (*Populus tremuloides*) – high browse; very low fire

- Rather small and more or less rounded leaves
- Mature trees form groves from root suckers.
- Require a moderately moist site
- NOTE – lots of hybrid and cultivar species available – these must not be used.

Balsam Poplar (*Populus balsamifera*) – high browse; very low fire

- Tall tree growing best along creek-beds and lakeshores (requires a moist site)
 - Long, wide leaf-blades
 - Sticky seed scales can be a nuisance; roots can surface

Paper Birch (*Betula papyrifera*) – low browse; very low fire



- A slender, long-branched tree – 10-25 m tall, mature bark mostly white; peeling
- Moist upland sites; shade intolerant
- Can withstand moderate drought once established

Water Birch (*Betula occidentalis*) – low browse; very low fire

- Smaller tree - <10m; dark-reddish brown bark that does not peel.
- Good early successional species in moist areas

SHRUBS:

Mountain Maple (*Acer glabrum*) – medium browse; very-low fire

- A red-stemmed shrub growing to a few metres tall. Typical "maple leaf" shaped leaf blades
- Will grow on rocky sites

Shrubby Cinquefoil (*Potentilla fruticosa*) – low browse; low fire

- A coarse shrub of grasslands and open places, decorated June to September with numerous small, yellow, rose-like flowers.
- NOTE – lots of hybrid and cultivar species available – these must not be used.

Red Osier Dogwood (*Cornus stolonifera*) - high browse; low fire

- Willow-like shrub with distinct red bark and small greenish-white flowers; 1 to 3 metres tall
- grows best in damp, somewhat sheltered places

Wolf Willow (*Elaeagnus commutata*) – medium browse; low fire

- Leaves silvery in colour; exhibits small yellow aromatic flowers in June/July
- Forms small groves in seepage areas
- NOTE – lots of hybrid and cultivar species available – these must not be used.

Snowberry (*Symphoricarpos albus*) – medium browse; low fire

- Common in a variety of habitats
- Small bell-shaped flowers June to August

Buffalo-berry (*Shepherdia canadensis*) – medium browse; low fire

- PLANT MALE SHRUBS ONLY
- Spreading shrub to 3m tall

Common Wild Rose (*Rosa woodsii*) – medium browse; low fire

- Exhibits bright pink flowers in June and July
- Open woods and thickets, some tolerance to sandy areas

Prickly Rose (*Rosa acicularis*) – high browse; low fire

- Branching shrub, up to 1.5 metres high
- Open woods and moist thickets

Tree Standards:



WLNP General Project Best Management Practices

Appendix 5 Trees and Shrubs Recommended for Waterton Park Townsite

- In cases of tree replacement, the three replacement trees should be as large as available, with a 15 gallon root size and at least ¾" trunk size. If 15 gallon native trees are not available, on approval of the Parks Canada Surveillance Officer (SO), four 10 gallon trees may be planted instead.
- All trees must be guaranteed for one year (one growing season).
- Trees shall be inspected immediately after initial planting and during the growing season by a designated Parks Canada SO. After the growing season, the SO will determine final acceptance of the tree.
- Any planted tree that is dead or, in the opinion of the SO, is in an unhealthy or unsightly condition, and/or has lost its natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or other causes prior to final acceptance, shall be replaced in the next planting season. There shall be a growing season guarantee on trees commencing after the final inspection of the permitted planting.
- Where dead trees are identified, the dead material shall be removed within four (4) weeks of notification. When necessary, approved soil and grass seed shall be added to the pit to reclaim the site and eliminate potential tripping hazards at the time of removal.

General Tips:

- Select the right tree for the site. It is important to match your planting site and its conditions with a tree species' shade, moisture, and soil preferences.
- Plants should be put in the ground in autumn or spring and fenced immediately to prevent animal damage.
- Frequent watering is necessary for the weeks following transplantation or first growing season, and if possible up to the first frost.
- It is advisable to screen young plants from wind over the winter.
- Avoid planting dense clusters of shrubs; this helps limit cover for large animals such as cougars and reduces fire hazards.
- Even "fire resistant" vegetation will burn if the plant's moisture content is low.
- To prevent the spread of non-native species and reduce the appeal of the townsite for animals such as deer and bear, please avoid planting the following:
 - Saskatoon (*Amelanchier alnifolia*) - berries attract bears
 - Chokecherry (*Prunus virginiana*) - cherries can attract bears
 - Pincherry (*Prunus pennsylvanica*) – cherries can attract bears



Appendix 6 List of Non-Native Species of Local Concern

Contact the Impact Assessment Office for more information about potential site specific non-native species of concern.

Table 4 Non-native Species Listed by the *Alberta Weed Control Act*

Common Name	Scientific Name
<i>Prohibited Noxious</i>	
autumn olive	<i>Elaeagnus umbellata</i> Thunb.
balsam, Himalayan	<i>Impatiens glandulifera</i> Royle
barberry, common	<i>Berberis vulgaris</i> L.
bartsia, red	<i>Odontites vernus</i> (Bellardi) Dumort
buckthorn, common	<i>Rhamnus cathartica</i> L.
cinquefoil, sulphur	<i>Potentilla recta</i> L.
crupina, common	<i>Crupina vulgaris</i> Pers. ex Cass.
dyer's woad	<i>Isatis tinctoria</i> L.
Eurasian water milfoil	<i>Myriophyllum spicatum</i> L.
flowering rush	<i>Butomus umbellatus</i> L.
garlic mustard	<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande
goatgrass, jointed	<i>Aegilops cylindrica</i> Host
hawkweed, meadow	<i>Hieracium caespitosum</i> Dumort.
hawkweed, mouse-ear	<i>Hieracium pilosella</i> L.
hawkweed, orange	<i>Hieracium aurantiacum</i> L.
hoary alyssum	<i>Berteroa incana</i> (L.) DC.
hogweed, giant	<i>Heracleum mantegazzianum</i> Sommier & Levier
iris, pale yellow	<i>Iris pseudacorus</i> L.
knapweed, bighead	<i>Centaurea macrocephala</i> Puschk. ex Willd.
knapweed, black	<i>Centaurea nigra</i> L.
knapweed, brown	<i>Centaurea jacea</i> L.
knapweed, diffuse	<i>Centaurea diffusa</i> Lam.
knapweed, hybrid	<i>Centaurea</i> × <i>psammogena</i> Gáyer
knapweed, meadow	<i>Centaurea</i> × <i>moncktonii</i> C. E. Britton
knapweed, Russian	<i>Rhaponticum repens</i> (L.) Hidalgo
knapweed, spotted	<i>Centaurea stoebe</i> L. ssp. <i>Micranthos</i> (Gugler) Hayek
knapweed, squarrose	<i>Centaurea virgata</i> Lam. ssp. <i>squarrosa</i> (Willd.) Gugler
knotweed, giant	<i>Fallopia sachalinensis</i> (F. Schmidt Petrop.) Ronse Decr.
knotweed, hybrid Japanese	<i>Fallopia</i> × <i>bohemica</i> (Chrtek & Chrtková) J. P. Bailey
knotweed, Japanese	<i>Fallopia japonica</i> (Houtt.) Ronse Decr.
loosestrife, purple	<i>Lythrum salicaria</i> L.
medusahead	<i>Taeniatherum caput-medusae</i> (L.) Nevski
nutsedge, yellow	<i>Cyperus esculentus</i> L.
puncturevine	<i>Tribulus terrestris</i> L.
ragwort, tansy	<i>Jacobaea vulgaris</i> Gaertn.
rush skeletonweed	<i>Chondrilla juncea</i> L.
saltcedar	<i>Tamarix ramosissima</i> Ledeb.
saltlover	<i>Halogeton glomeratus</i> (M. Bieb.) C.A. Mey.
St John's-wort, common	<i>Hypericum perforatum</i> L.
starthistle, yellow	<i>Centaurea solstitialis</i> L.
tamarisk, Chinese	<i>Tamarix chinensis</i> Lour.
tamarisk, smallflower	<i>Tamarix parviflora</i> DC.



WLNP General Project Best Management Practices
Appendix 6 List of Non-Native Species of Local Concern

Common Name	Scientific Name
thistle, marsh	<i>Cirsium palustre</i> (L.) Scop.
thistle, nodding	<i>Carduus nutans</i> L.
thistle, plumeless	<i>Carduus acanthoides</i> L.
Noxious	
baby's-breath, common	<i>Gypsophila paniculata</i> L.
bellflower, creeping	<i>Campanula rapunculoides</i> L.
bindweed, field	<i>Convolvulus arvensis</i> L.
blueweed	<i>Echium vulgare</i> L.
brome, downy	<i>Bromus tectorum</i> L.
brome, Japanese	<i>Bromus japonicus</i> Thunb.
burdock, great	<i>Arctium lappa</i> L.
burdock, lesser	<i>Arctium minus</i> (Hill) Bernh.
burdock, woolly	<i>Arctium tomentosum</i> Mill.
buttercup, tall	<i>Ranunculus acris</i> L.
chamomile, scentless	<i>Tripleurospermum inodorum</i> (L.) Sch. Bip.
clematis, yellow	<i>Clematis tangutica</i> (Maxim.) Korsh.
cockle, white	<i>Silene latifolia</i> Poir. ssp. <i>alba</i> (Miller) Greuter & Burdet
daisy, oxeye	<i>Leucanthemum vulgare</i> Lam.
dame's rocket	<i>Hesperis matronalis</i> L.
henbane, black	<i>Hyoscyamus niger</i> L.
hoary cress, globe-podded	<i>Lepidium appelianum</i> Al-Shehbaz
hoary cress, heart-podded	<i>Lepidium draba</i> L.
hoary cress, lens-podded	<i>Lepidium chalepense</i> L.
hound's-tongue	<i>Cynoglossum officinale</i> L.
mullein, common	<i>Verbascum thapsus</i> L.
pepper-grass, broad-leaved	<i>Lepidium latifolium</i> L.
scabious, field	<i>Knautia arvensis</i> (L.) Coult.
sow thistle, perennial	<i>Sonchus arvensis</i> L.
spurge, leafy	<i>Euphorbia esula</i> L.
tansy, common	<i>Tanacetum vulgare</i> L.
thistle, Canada	<i>Cirsium arvense</i> (L.) Scop.
toadflax, Dalmatian	<i>Linaria dalmatica</i> (L.) Mill.
toadflax, yellow	<i>Linaria vulgaris</i> Mill.

Table 5 List of non-native species of local concern considered invasive in natural habitats.

Common Name	Scientific Name



Appendix 7 Terrestrial Corridor Mapping

WLNP is in the process of identifying key corridor locations. For EIA purposes, corridors will be identified as (1) constricted, (2) priority, or (3) caution. Information and analysis is currently incomplete, however as it becomes available, can be added to this BMP. Consult with park ecologists for up-to-date information on terrestrial corridor mapping.

Area: Constricted

Identifies important wildlife movement areas that are already known to be significantly constricted by people and infrastructure and natural features and project design should aim to reduce constriction pressure.

- *i.e.*, Prince of Wales hill, corridor around area near emerald bay behind the superintendents house, area above Cameron Falls, Visitor Reception Centre, lower Government Compound, etc.

Area: Priority

Identifies important wildlife movement areas that are not currently known to be constricted by humans but constricted by human or landscape features and project design should proceed cautiously, reducing constriction pressure where possible.

- *i.e.*, the Dardanelles, west interface of Waterton Townsite, etc.

Area: Caution

Identifies general areas of wildlife movement where detailed, site-specific analysis should be undertaken.

- *i.e.*, Red Rock and Akamina valleys

Lower Government Compound Area – Constricted

Unrestricted wildlife movement through the Waterton Valley is vital to maintaining local and transboundary wildlife populations in the area of Waterton Lakes National Park (WLNP). This major valley is especially important because of its interface between highly productive, low-elevation grasslands and remote, montane and subalpine habitats. The valley's north-south orientation with several adjoining east-west valleys is also of value to healthy wildlife populations. It is essential for movement of wildlife populations among high quality habitats in Alberta, British Columbia, and Montana. It is also an important link between several *Grizzly Bear Secure Areas* (GBSA) within WLNP. These are areas of high value habitat, minimal human use and sufficient size to support grizzly bears.

The existing lower government compound is located within an area of naturally constricted wildlife movement between the steep slopes of Crandell Mountain and Middle Waterton Lake. This corridor (Crandell Mountain-Middle Waterton Lake corridor) is approximately 330 m wide and is the best option for wildlife to move north-south through the west side of the Waterton Valley (versus via Crandell Mountain itself).

The presence of the existing lower compound, parkway and Kootenai Brown multi-use trail further restrict wildlife movement through this natural pinch point to two narrow areas on the west side of the compound (narrowest undisturbed area approximately 30 m wide) and along



the Middle Waterton Lake shore (undisturbed area = approximately 5 m wide on average – for several weeks per year this movement area is entirely eliminated by high water). Thus, approximately 11% of the width of the Crandell Mountain-Middle Waterton Lake corridor can be considered somewhat passable to wildlife.

To move in any direction through the Crandell Mountain-Middle Waterton Lake corridor, a key point in the valley, wildlife must navigate a high traffic parkway, a day use area, several high use human trails and the government compound, as well as the natural barriers. Preliminary remote camera data indicate that the majority of wildlife use may be concentrated along the west side of the compound, however the Middle Waterton Lake shore is also a key movement corridor. It's effectiveness has been reduced in recent years by removal of trees between the lakeshore and parkway to reduce snow drifting on the parkway.

When conservative disturbance buffers that are well accepted in scientific literature are considered, they virtually eliminate the suitable area for effective wildlife movement through the narrow Crandell Mountain-Middle Waterton Lake corridor. According to recent remote wildlife camera data, several wildlife species are indeed making use of the corridor, but in conservative volumes. For some of the more sensitive species such as grizzly bear, movement through the area might be considered at the cusp of being eliminated by any further disturbance or development; less sensitive species would likely be impacted negatively as well. Current levels of wildlife movement that is taking place can potentially be maintained by not expanding development in the area and improved by restoring key portions of the existing footprint.

If the consultant has any additional questions about this corridor, we could put them directly in touch with Kim Pearson, who is leading the study of wildlife movement through this area, but she will require additional time to provide more specific information.

Additional sensory disturbance including traffic, vehicles, people, noise, lighting etc. adjacent to a wildlife movement corridor can reduce its function. To some extent, these disturbances already exist at the compound, so depending on design, may not be significant effects. Analysis should consider:

- cumulative effects of additional disturbance with other existing activities at the compound (for example, helicopters during busy fire season),
- changes in the extent, location, and pattern of sensory disturbance (for example, current activities occur primarily during office hours, and visitor pressure may potentially extend into the evening)
- loss of natural area in relation to access and egress of wildlife to the known corridor

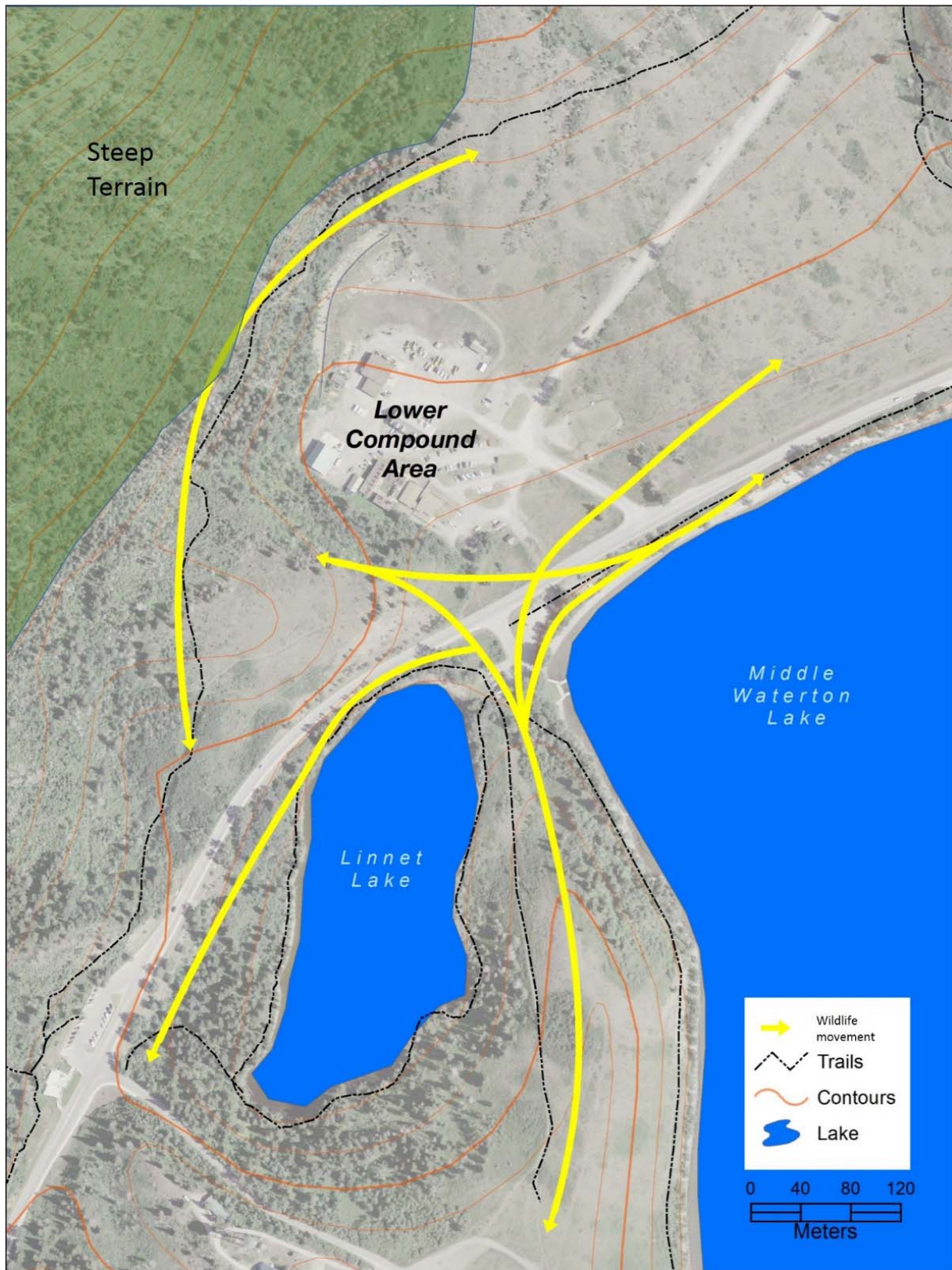


Figure 6 Lower Compound – Middle Waterton Lake Corridor



Appendix 8 Zoning & Planning Areas

Several zoning and area designations are useful in planning, understanding potential project effects and for developing and choosing appropriate mitigations. Five zones plus an Environmentally Sensitive Site (ESS) are outlined in the [Park Management Plan](#).

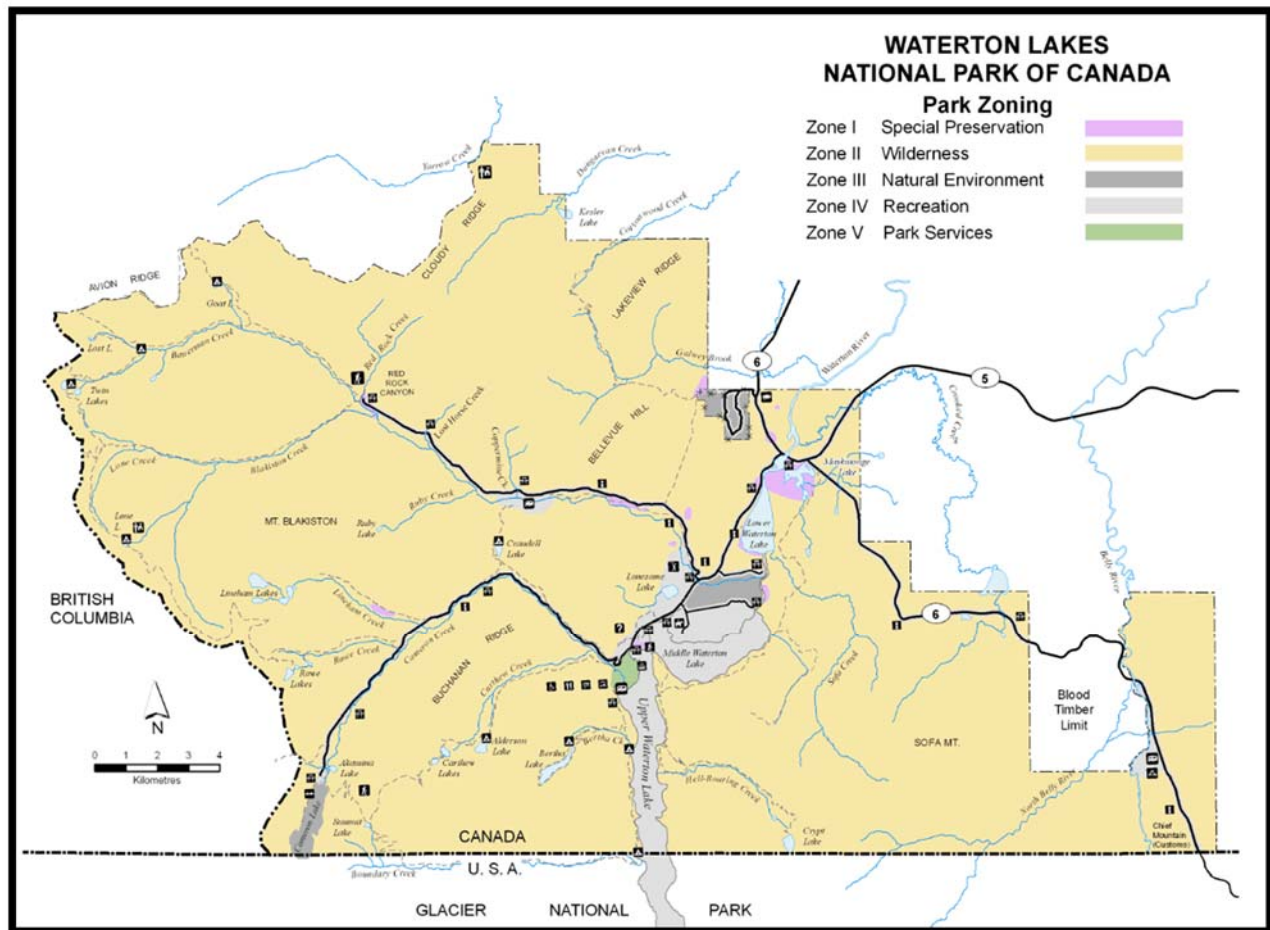


Figure 7 Waterton Lakes National Park of Canada Park Zoning Map

Zone I: Special Preservation

- Resource sensitivity is the key consideration in designating Zone I areas.
- The Maskinonge wetlands contain some of the few remaining wetlands in southwestern Alberta. This area is an important waterfowl staging and nesting area. Several rare bird species such as Trumpeter swans, Hooded mergansers and Red-necked grebes frequent the area. Two significant archaeological sites on the shores of Maskinonge Lake have been included in the Zone I designation.
- The Historic Sites and Monuments Board of Canada recommended the Lineham Discovery Well, the first oil well in Western Canada, as a national historic site on May 17, 1965. The site is marked with a plaque which commemorates the “First Oil Well in Western Canada.”



- There are approximately 250 known archaeological sites in Waterton Lakes National Park, dating back almost 11,000 years. Zone I designation is applied to the most significant of these sites.

Zone II: Declared Wilderness Area

- Only those activities are allowed which are required for: park administration; public safety; provision of basic user facilities including trails and rudimentary campsites; the carrying on of traditional resource harvesting activities where authorized; and in exceptional circumstances, access by air.
- For more information on DWA consult [G:\Common\Planning\Declared Wilderness Areas](#)

Zone III: Natural Environment

- Applies to areas where visitor use requires facilities that exceed the acceptable standards for Zone II.
- Motorized access is limited and controlled.
- Rigorous protection is required because of the area's ecological and aesthetic importance.

Zone IV: Recreation

- Zone IV also includes the Upper and Middle Waterton Lakes to accommodate motorized access. Note that trailer launched and motorized watercraft are no longer permitted in Upper and Middle Waterton Lakes.

Zone V: Park Services

- The [Community Plan](#) outlines the **Land Use Districts** in the Waterton Community (Environmental Reserve, Recreational Reserve, Commercial Retail, Commercial Accommodation, Institutional, Campground, Parking, Cottage)

Environmentally Sensitive Sites (ESS)

- The Park Management Plan recognizes the foothills rough fescue grasslands as an ESS in Waterton Lakes National Park. The foothills rough fescue grasslands form a narrow band that stretches along the plains and foothills from southern Alberta into Montana. The ESS is not spatially defined, however, a figure that outlines the grassland portions of WLNP is included below.

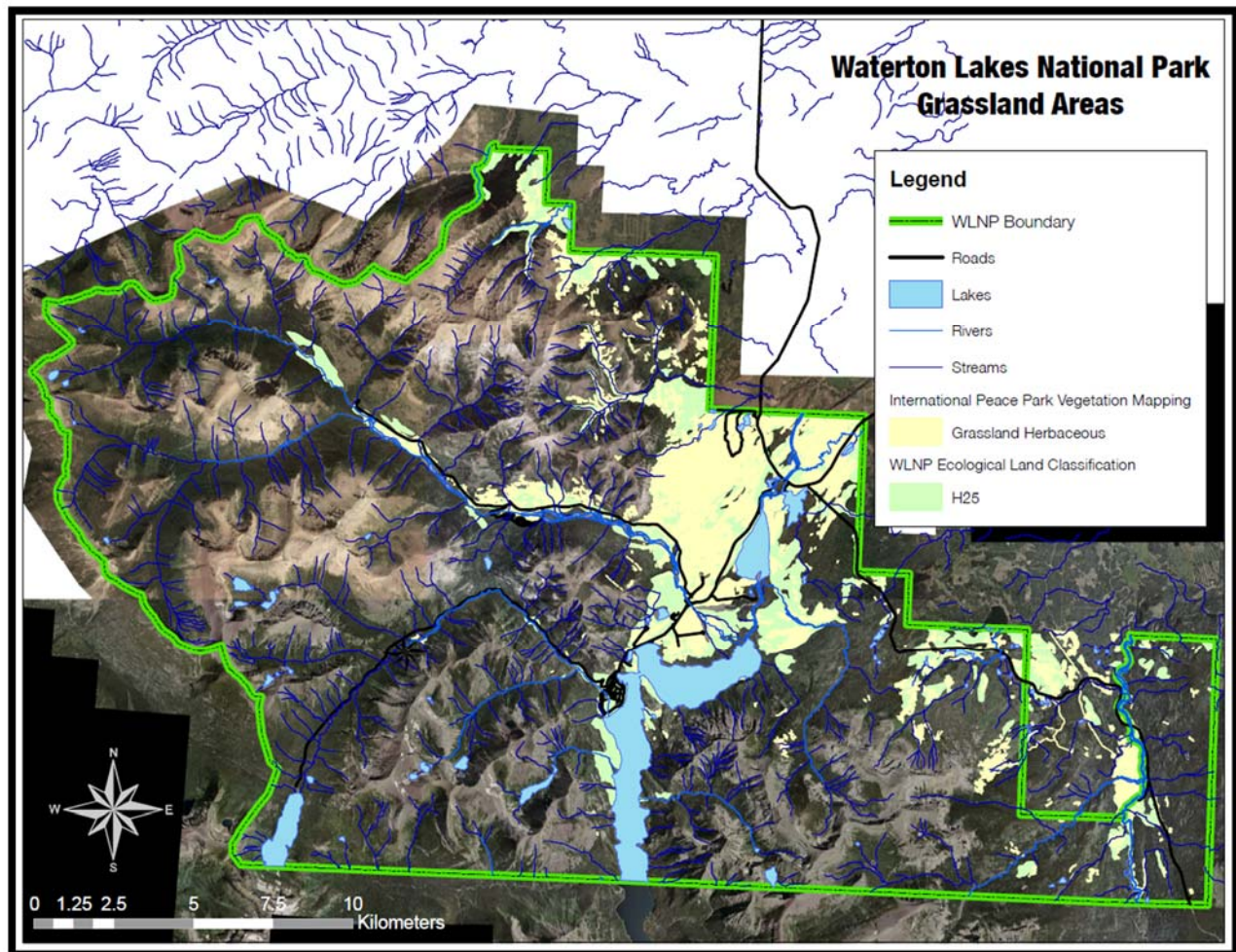


Figure 8 Grassland Areas in Waterton Lakes National Park.

Avalanche Mapping

Avalanche hazard zone mapping has been completed for the Waterton Townsite, Parks Compound, Little Prairie Day Use Area, and other key sites in WLNP. Consult with the Visitor Safety Specialist for additional information related to avalanche risks and project design.

G:\Resource Conservation\Visitor Safety\AVALANCHE\Avalanche Mapping

Planning Areas

In addition to formal zoning, the park management plan identifies several Planning Areas that may be useful in planning, understanding potential project effects and for developing and choosing appropriate mitigations. Some of the key ecological factors, seasonal closures and other considerations that may be relevant to impact analysis in each planning area is included below. (Note that information additional to the Management Plan is included.)

Survey	Notes
Waterton Valley	Seasonal closure of the fan reduces disturbance of elk during rut. Area contains critical habitat for half-moon hairstreak butterfly.



WLNP General Project Best Management Practices Appendix 8 Zoning & Planning Areas

Survey	Notes
	Dynamic natural processes occur on the alluvial Blakiston Fan. Invasive plant control is a management priority. Location of northern leopard frog re-introduction. Contains known salamander migration areas. Contains fescue grassland ESS.
Waterton Community	Efforts to include natural areas and a natural aesthetic are important goals of the Community Plan. Need to maintain and monitor wildlife corridors in and around the community. Community planning involves working to reduce human-wildlife conflict. Dark sky compliance and upgrading is on-going work. There is an important archaeological site at Emerald Bay that likely extends into the yard of the superintendent.
Blakiston Valley	Winter road closure reduces disturbance of ungulates in their winter range. Prescribed fire is an important management tool.
Belly River	Park Management Plan outlines that no new trails will be developed in Belly River Area to maintain secure habitat and a wilderness experience for visitors. Grizzly Bear secure habitat thresholds are used as part of the Ecological Integrity indicators for WLNP. Human use (e.g., trailheads, trails) can move habitat from “secure” to “unsuitable due to human use”. (See figure of secure habitat). The highway is not actively maintained in winter which functions to reduce human use in this planning area.
Cameron Valley	Contains critical habitat for Bolander’s quillwort. Parking congestion along the parkway has resulted in people parking in ditches and non-hardened areas and the refurbishment of trailheads and Cameron Lake DUA is in progress. The First Oil Well National Historic Site and several cultural resources are adjacent to the Akamina Parkway (Zone I).
Foothills	Contains foothills rough fescue environmentally sensitive site. Includes wilderness and equestrian opportunities.
*Park Waterbodies	Public use of motorboats and trailer-launched boats is no longer permitted due to risk of aquatic invasive species. An educational self-inspection of human-powered watercraft is required.

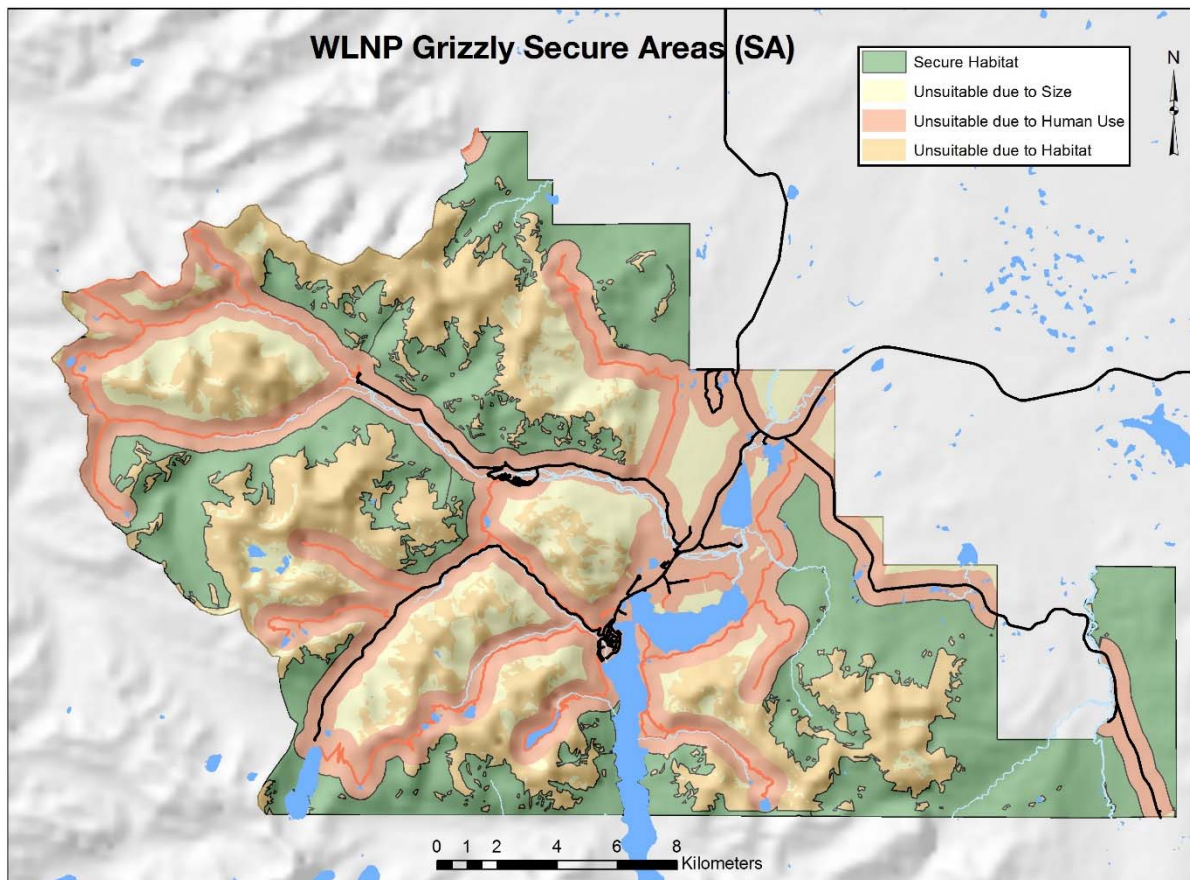


Figure 9 WLNP Grizzly Secure Areas



Appendix 9 Details on Timing Windows and Setbacks

Timing Windows

Several seasonal timing restrictions and area setbacks are regularly applied in WLNP. These are most commonly applied for activities that can disrupt plants and animals such as **vegetation removal**, but may be applicable for other activities. For individual projects, the relevant timing windows are summarized in the **General Mitigations** section. As a best practice, activities should be planned to avoid the restricted window. When activities occur within a timing window, additional mitigations or setbacks may apply.

- Migratory Bird General Breeding Period – April 1 to August 31
 - Bat Maternity Roost Activity Period – April 1 to August 31
 - Bat General Activity Period – April 1 to October 31
 - Amphibian Calling Window – April 15 to June 15
 - Bull Trout Restricted Work Periods – August 31 to August 15
 - Other Fish Species Restricted Work Periods – Consult IAO for location specific advice
 - Grassland Dormancy – October 1 to February 28
 - Additional Timing Considerations (e.g., weed seed set, soil protection) – Dry late summer and fall conditions, avoidance of wet spring
 - Wolf Natal Den – May 1 to July 15
 - Sharp-tailed Grouse Lek – March 15 to June 15
 - Critical Ungulate Winter Range* – December 1 to May 15
- *Consistent with Glacier National Park, Montana

Setback Guidance

Several jurisdictions provide setback and timing guidelines that may assist the IAO in determining the appropriate setback for an activity.

- Stepping Back from the Water Guidelines A BMP **guide** for new development near water bodies in Alberta's Settled Region.
- Saskatchewan Activity **Restriction Guidelines** for Sensitive Species.
- Petroleum Industry **Activity Guidelines** for Wildlife Species at Risk in the Prairie and Northern Region.
- Alberta Recommended **Land Use Guidelines** for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta.

Environment Canada (Gregoire 2015) provided WLNP additional setback advice for Species at Risk. Note that these setbacks are provided as general feedback and do not present site or project specific guidance.

- Baird's Sparrow (Special Concern COSEWIC) May 15 to August 31. 200m setbacks from nests.
- Barn Swallow (Threatened COSEWIC). May 1 to August 31. 100m setback from active nests.



WLNP General Project Best Management Practices
Appendix 9 Details on Timing Windows and Setbacks

- Bobolink (Threatened COSEWIC). May 1 to August 31. 200m setback from active nests.
- Canada Warbler (Threatened SARA). May 1 to July 31 300m (high disturbance) 150m (medium) 0-50m (low)
- Chestnut-collared Longspur (Threatened COSEWIC). May 1 to August 31. 200m setback from active nests.
- Chimney swift (Threatened SARA). April 1 to August 31. 100m setback from active nests.
- Common Nighthawk (Special Concern SARA) May 1 to August 31 200m (high disturbance) 100m (medium) 0-50m (low)
- Horned Grebe (Special Concern COSEWIC). April 1 to August 31. 100m setback from the high water mark of the wetland or waterbody containing a nest.
- Olive-sided Flycatcher (Threatened SARA) May 1 to August 31 300m (high disturbance) 150m (medium) 0-50m (low)
- Rusty Blackbird (Special Concern SARA) May 1 to July 31 300m (high disturbance) 150m (medium) 0-50m (low)
- American Badger (Special Concern COSEWIC) 200m from natal den.
- Monarch Butterfly (Special Concern SARA). June 1 to September 30. 30m setback from occupied host plants.



Parks
Canada

Parcs
Canada

Waterton Lakes National Park

Best Management Practices for Watershed-Scale Danger Tree Removal

March 2019

Version 1.0

Canada





**Parks Canada Waterton Lakes National Park Best Management Practices for Watershed-Scale
Danger Tree Removal**

Recommendation & Approval – Version 1.0

<p>Prepared by:</p>  <p>Jennifer Carpenter</p> <p>Environmental Assessment Coordinator, Waterton Lakes National Park / Bar U Ranch National Historic Site, Parks Canada Agency</p>	<p>Date:</p> <p>Feb 5 2019</p>
<p>Recommended by:</p>  <p>Dennis Madsen</p> <p>Resource Conservation Manager, Waterton Lakes National Park, Parks Canada Agency</p>	<p>Date:</p> <p>Feb 4/19</p>
<p>Approved by:</p>  <p>Salman Rasheed</p> <p>Superintendent, Waterton Lakes National Park / Bar U Ranch National Historic Site, Parks Canada Agency</p>	<p>Date:</p> <p>March 5, 2019</p>





Introduction

The *Best Management Practices (BMP) for Watershed-Scale Danger Tree Removal* identifies a suite of mitigation measures to address potential effects from project activities related to danger tree removal in Waterton Lakes National Park such that that no significant adverse residual environmental effects are expected.

Management Context

This BMP was prepared to support the *Waterton Lakes National Park Danger Tree Management Plan*. This Management Plan outlines the approach for how danger trees are managed in WLNP and is consistent with the Wildlife Tree Committee of British Columbia's Wildlife/Danger Tree Assessor Parks and Recreation Sites Module. The Module is a well-established standard that provides the most appropriate guidance for the types of land use, tree species and terrain that exist in WLNP.

In addition, the BMP supports routine tree removal and brush thinning as a component of fuel reduction to reduce the hazard of wildfire to infrastructure, facilities, and townsites.

Application

The BMP impact assessment pathway is applied when there is a suite of routine, repetitive projects or activities, with well understood and predictable effects. This fulfils Parks Canada's obligations under the *Canadian Environmental Assessment Act 2012* as a manager of federal land, see the [Guide to the Parks Canada EIA Process](#).

The *BMP for Danger Tree Removal* can be applied in the following ways ensure no significant adverse residual effects occur from danger tree removal activities:

- **Direct application:** Use the standard mitigation measures in the BMP when the proposed project activities are entirely within the scope of the BMP and all standard mitigation measures can be followed.
- **Application with supplemental mitigations:** Additional mitigations or minor modifications to the standard mitigations are required to provide project-specific clarifications or direction (e.g., clarify critical timing windows, Species at Risk (SAR) or cultural resource considerations).
- **Application as part of a Basic Impact Analysis (BIA) or Detailed Impact Analysis (DIA):** Where one or more BMPs may not address all of the potential adverse effects of a proposed project, the BMP(s) can be applied as part of a BIA or DIA.

If the Field Unit Superintendent or designate determines that with application of the standard mitigation measures in this BMP and any project-specific supplemental mitigations outlined in the Parks Canada EIA Requirement Checklist, *the project is unlikely to result in significant adverse environmental effects*, then the BMP impact assessment pathway may be applied to a proposed project.

Definition

For the purposes of this BMP, a danger tree is one that has been identified for intervention following the processes outlined in the *Waterton Lakes National Park Danger Tree Management Plan*.



Scope

Project activities covered under the scope of this BMP are limited to fuel reduction and danger tree removal within approximately 1 ½ tree lengths of existing Park infrastructure including roads, buildings, trails, campgrounds and Day Use Areas.

Safety of workers and the public is paramount during all operations. Site security, worker safety and visitor safety are not included in the scope of this document. The Contractor will be required to submit a Safety Plan for approval by the Project Manager prior to project initiation. If there is conflict between safety practices and the mitigation measures in this BMP, consult with the Environmental Assessment Officer to determine if this BMP is appropriate for the Project, or if review and revision of the BMP is warranted.

Exceptions

There are specific circumstances when the standard mitigations in this BMP would not apply or must be used in conjunction with additional analysis and supplemental mitigations, including the following:

- Danger tree removal in Zone I – Special Preservation or in designated Environmentally Sensitive Sites (e.g., Maskinonge Area).
- Work has potential to affect individuals, residences or critical habitat of a Species at Risk listed in Schedule 1 of the *Species at Risk Act* (SARA) (e.g., Little Brown Myotis, Half-moon Hairstreak).
- Work is proposed within a riparian zone (i.e. within 30 m of the high water mark) of any watercourse, lake, pond, river, or wetland.
- Removal of trees that are known to be infected with disease or infested with pests (e.g., Mountain pine beetle).
- Work involves the off-road use of mechanized falling methods such as harvesters and feller-bunchers or heavy machinery to move large logs or pile debris.
- Work results in a significant change in land use (e.g., new project development) or is beyond 1 and 1/2 tree lengths of existing infrastructure.
- Work involves excavation of soil.
- Work has the potential to directly impact a known cultural resource such as work is occurring in a known archaeological site or could impact an object such as a Culturally-Modified Tree. Additional analysis and consultation with the Cultural Resource Management Advisor is required.
- Work related to the maintenance of FortisAlberta infrastructure and facilities is subject to the Environmental Protection Plan for Operation and Maintenance off Electrical Power Distribution Facilities in Waterton Lakes National Park and is outside the scope of this BMP.
- Tree removal completed by leaseholders in the Waterton Townsite is managed through a Vegetation Removal Restricted Activity Permit and is outside the scope of this BMP.



- Any circumstances where the BMP does not address known environmental issues associated with the proposed work, the potential environmental impacts of the proposed work are not fully understood, or when additional review is in the public interest.

Responsibilities

The **Environmental Assessment Officer (EAO)** will review proposed danger tree removal activities and advise the proponent if the work falls within the scope of this BMP. The **EAO** will also determine whether supplemental mitigation measures are required, and will identify those in consultation with Field Unit subject matter experts. The **EAO** will provide a recommendation as to whether application of the mitigation measures in the BMP will adequately address all of the potential adverse effects of the project. The **EAO** will summarize this information in the Parks Canada EIA Requirement Checklist and present the completed BMP and EIA Checklist to the Resource Conservation Manager for review.

The **Resource Conservation Manager** will review the Parks Canada EIA Requirement Checklist and review if the BMP is a suitable EIA pathway for the scope of work outlined by the Project Manager.

Project Managers are responsible for ensuring all mitigation measures applicable to the work are added to the terms and conditions of any permits or contracts issued for the project and recommend the EIA Checklist.

The **Field Unit Superintendent (FUS)** or designate will approve the use of this BMP as the appropriate EIA pathway for the work based on the analysis provided by the EAO. The FUS or designate may determine that this BMP alone is not sufficient to make a determination of significance or may not adequately prevent significant adverse environmental effects. In these cases, the FUS will recommend an alternate EIA pathway or request additional analysis.

Potential Effects on Valued Components

Potential adverse effects from fuel reduction and danger tree management activities are well understood and predictable. Components of the environment that may be impacted are identified as Valued Components. Potential effects from danger tree removal on Valued Components are summarized in **Table 1** below.



Table 1 Potential Adverse Effects on Valued Components from Danger Tree Removal Activities

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities
Soil and Land Resources	<ul style="list-style-type: none"> • Slope instability, due to soil exposure or improper log handling. • Rutting, admixing and/or soil erosion. • Soil contamination (e.g. leaks and accidental spills).
Air Quality	<ul style="list-style-type: none"> • Decreased ambient air quality (i.e. from dust, equipment emissions, etc.). • Short-term increase of ambient noise levels.
Aquatic Resources	<ul style="list-style-type: none"> • Impacts to surface and groundwater quality (e.g., surface run-off; storm-water drainage that may occur due to erosion of bare ground; sedimentation; transportation of debris; or contamination from leaks and accidental spills) • Alteration of riparian habitat through loss of shade, leaf litter, and nutrient inputs.
Vegetation	<ul style="list-style-type: none"> • Damage or removal of non-target species or individuals. • Introduction of non-native species populations, or expansion of existing populations, particularly in ditches or areas where soil is disturbed • Changes in understory species composition including potential for choking of understory due to improper debris management. • Increased wind effect on remaining trees. • Increased fuel loading from improper debris management practices.
Wildlife	<ul style="list-style-type: none"> • Alteration of wildlife movement and foraging patterns due to short term sensory disturbance. • Medium term changes to microhabitat. • Damage to nests, dens, roosts; disruption and/or mortality of breeding animals and their young. • Increased potential for human-wildlife conflict during removal activities or resulting from proliferation of food plants after removals.
Cultural Resources	<ul style="list-style-type: none"> • Impacts to archaeological resources (known or potential).
Visitor Experience	<ul style="list-style-type: none"> • Temporary decreased quality of visitor experience due to temporary area closures, operation of equipment, traffic disruption and sensory disturbance. • Aesthetic impacts, including removal of important tree screens on roads and trails.



Standard Mitigation Measures

Mitigation measures in **Table 2** are developed to reduce potential effects on VCs from danger tree and fuel reduction management activities. Where certain mitigations are not feasible for a specific project, supplemental or modified mitigation measures will be developed in consultation with the EAO (Environmental Assessment Officer).

The following general mitigation measures will also apply to every project:

1. All potential danger trees must be assessed following the requirements of the *Waterton Lakes National Park Danger Tree Management Plan*.
2. No work is permitted outside the project boundaries unless approved by the EAO.
3. Workers are responsible for avoiding culturally and environmentally sensitive areas as identified in the supplemental mitigations.
4. Burning of felled debris is not permitted.
5. Broadcast dispersal of wood chips is not permitted.
6. Tree felling will only occur during daylight hours.
7. Tree removal within two tree lengths of power lines requires consultation with the appropriate utility company.
8. All employees must attend an environmental briefing with the EAO before beginning work at the site to review and explain the mitigations that are conditions of the project approvals. Employees must attend this briefing before beginning their work at this site. Notice of at least one business day must be given to the EAO to schedule the briefing.
9. All equipment and vehicles will be made available for inspection by the EAO on arrival to WLNP. Notice of at least one business day must be given to the EAO to schedule the inspection.
10. All contractors and sub-contractors require a valid Parks Canada business licence.
11. All contractors require a valid Restricted Activity Permit for Vegetation Removal.
12. All work must adhere to the *Canada National Parks Act* and *Regulations* and any other applicable legislation.



BMP for Watershed-Scale Danger Tree Removal

Table 2 Standard Mitigation Measures to Address Potential Adverse Effects on Valued Components from Danger Tree Removal Activities

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
Soil and Land Resources	Slope instability, due to soil exposure or improper log handling.	Where appropriate, fallers may position fallen logs to assist in stabilizing slopes and reducing potential for erosion.
		Flush-cut stumps and brush unless using stumps; leave stump and roots in place. Flush-cutting means cutting trees, stumps, or vegetative growth to within 75 mm of the ground, leaving the root structure undisturbed.
	Rutting, admixing and/or soil erosion.	Conduct tree removal when ground is frozen or firm and dry.
		Avoid ground disturbance by using low-impact harvesting methods.
		Minimize full removal and retain vegetation when possible to reduce erosion.
		Outside landscaped areas retain some whole logs on-site as coarse woody debris to provide erosion control, moisture retention and microsites for regeneration and site diversity. The goal for woody material volumes is approximately 40 m ³ /ha with coverage targets of 10-25% of the disturbed area, (50-100 trees per 100 m x 100 m area). Do not leave woody materials in piles that could pose a fire danger or leave mats of chips on site. If chipping occurs, chips must be removed and disposed of outside WLNP. During fuel reduction projects, lower woody debris objectives may be set by the Fire Management Officer and outlined in the supplemental mitigations.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Soil contamination (e.g. leaks and accidental spills).	Use biodegradable chain oils and lubricants. Perform refueling and maintenance of chainsaws over impervious mini-berms with spill pads onsite.
		If contamination is found, cease work immediately and if necessary, implement the Emergency Response Plan.
		A spill kit capable of handling 110% of the total fuels on-site must be available at worksite and all personnel trained in its use.
		In the event of a spill, implement spill response procedures immediately. Report all spills greater than 5 liters, and any spills in water to the Parks Canada EAO (or designate). Spills will be remediated to the satisfaction of Parks Canada.
Air Quality and Noise	Decreased ambient air quality (i.e. from dust, equipment emissions, etc.).	Equipment must be in good working order, free of leaks (e.g. fuel, oil and grease) and fitted with standard air emission control and spark arrestor devices prior to arrival on site.
		Minimize idling of engines at all times.
		Schedule work during periods with lower wind speeds.
	Short-term increase of ambient noise levels.	Refer to mitigation measures intended to reduce the impact of noise levels on the Wildlife and Visitor Experience valued components.
Aquatic Resources	Impacts to surface and groundwater quality (e.g., surface run-off; storm-water drainage that may occur due to erosion of bare ground; sedimentation;	In consultation with the EAO, trees should be felled to mimic natural pattern, including into and across watercourses, riparian zones and wetlands. Care must be taken to avoid unnatural debris piling or sediment release. Tree must only be felled into sensitive areas if they are to remain there.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	transportation of debris; or contamination from leaks and accidental spills).	Do not block culverts or ditches with debris and brush.
		Logs and other salvage materials shall not be skidded through wetlands, waterways or water bodies.
	Alteration of riparian habitat through loss of shade, leaf litter, and nutrient inputs.	Vehicle and equipment refueling must take place at licensed facilities (i.e., gas station), or on impervious surfaces (e.g., paved surfaces) > 100 m from waterbodies and watercourses. The refueling location should be determined in consultation with the EAO.
		Do not store fuel, lubricants, petro-gels or oils within 100 m of waterbodies and watercourses unless approved by the Parks Canada EAO due to site-specific limitations. In this case, the contractor must submit a secondary containment and a spill prevention plan.
Vegetation	Damage or removal of non-target species or individuals.	Use non-permanent markings such as temporary marking paint or biodegradable flagging tape to identify trees for removal and remove on project completion. Do not spray paint or scar trees that will not be removed.
		Minimize damage to root systems of remaining plants and trees by not stockpiling materials within drip line of retained trees and restricting vehicle and equipment access and disturbance of the area.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Introduction of non-native species populations, or expansion of existing populations, particularly in ditches or areas where soil is disturbed	In areas with known weed infestations, reduce weed spread through vegetation removal prior to seed set, typically before June 1 or by completing weed control that reduces risk of transfer (e.g., remove seed heads).
		Clean equipment (e.g., brushed off/compressed air) prior to moving it from a weed infested to a non-weed infested work area. Workers must brush soil and seeds off protective clothing and boots each workday.
		Restore disturbed areas, as soon as practical following tree removal to promote re-establishment of native vegetation, reduce erosion, and control of non-native plant species. See supplemental mitigations section for restoration requirements applicable to the scope and scale of individual projects. Note that all seeding in WLNP is subject to strict controls and requires Certificates of Analysis be provided to Parks Canada for approval. Do not purchase seed until written approval for individual lots is obtained.
	Changes in understory species composition including potential	Machinery must arrive on site in a clean and dry condition and be maintained free of fluid leaks, vegetative material (i.e., invasive species, noxious weeds) and soils from off-site. All construction equipment from outside WLNP will be washed prior to arrival to minimize the risk of introducing weeds or aquatic invasive species.
		Where possible within the objectives of removal, maintain overstory and canopy cover to reduce shrubby growth and changes in understory.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	for choking of understory due to improper debris management.	Unless approved by the EAO due to site specific limitations, retaining chippings onsite is not permitted. If chipping is approved, the chip depth is to be a maximum of 5 cm (2 inches), spread over area no greater of 5m x 5m per hectare so as to not cover underlying vegetation, prevent new native seedlings from sprouting, and cause soil/seed bank sterilization.
	Increased wind effect on remaining trees.	Retain strong rooted, long-lived wind firm trees, and tree clumps to minimize wind throw.
	Increased fuel loading from improper debris management.	See debris management requirements in the soil and land resources section.
Wildlife	Alteration of wildlife movement and foraging patterns due to short term sensory disturbance.	If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area and away from areas of potential conflict.
	Medium term changes to wildlife microhabitat.	Logs left on-site should include a wide range of sizes and lengths. Logs should lie flat on the soil surface with branches intact as long as they do not provide ladder fuels into the forest canopy.
	Damage to nests, dens, roosts; disruption and/or mortality of nesting animals and their young.	Avoid work during the following sensitive species timing windows: Breeding Birds: April 1 to August 31 Bat General Activity Period: April 1 to October 31



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
		If work cannot be rescheduled outside this time period, or an immediate safety issue requires work inside this period see supplemental mitigations section.
		If previously unidentified sensitive features are found, notify the EAO immediately (e.g., raptor nest).
		Following the guidance of the WLNP Danger Tree Management Plan, avoid unnecessary removal of high value wildlife trees. If a high value wildlife tree, the assessor must consider prescription alternatives to complete removal of the tree (see Appendix 1).
		Notify the Parks Canada Dispatch (1-888-WARDENS) of any potential wildlife conflict (e.g., aggressive behaviour, persistent intrusion), distress, entrapment or mortality. In the case of aggressive behaviour or persistent intrusion, stop work and evacuate the area.
		Contractor will make bear spray, bear spray training, and wildlife awareness training mandatory to all workers on site.
		No feeding, baiting or luring of any wildlife (including bears, small mammals, birds); do not approach or harass wildlife in any way. Notify the EAO immediately if wildlife obtain garbage or human food. If wildlife get into attractants that have been intentionally or accidentally left out, individuals or the contractor could be charged under the Canada National Parks Act Regulations.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Increased potential for human-wildlife conflict due to growth of berry shrubs in understory.	<p>Parks Canada will notify the human wildlife conflict specialist of project scope and monitor if additional vegetation management to reduce berry growth is required.</p> <p>*Parks Canada is responsible for implementation of this mitigation.</p>
Cultural Resources	Impacts to archaeological resources (known or potential).	<p>Parks Canada will consult with the CRM advisor to determine whether there are any known cultural resources and or archaeological sites within the proposed work area.</p> <p>Any additional mitigations will be identified in the supplemental mitigations section for individual projects.</p>
		<p>All work in WLNP is subject to the accidental finds clause whereby on finding any unexpected Cultural Resources or potential Cultural Resources (e.g., Telegraph Poles, culturally modified trees, bison bones), workers shall stop work in the immediate area and notify the SO. Parks Canada's Terrestrial Archaeology section will provide advice and assessment of significance and determine requirements to mitigate the chance find. Crews will be made aware of the Accidental Finds Procedure during the environmental briefing with the EAO prior to beginning work.</p>
Visitor Experience	Temporary decreased quality of visitor experience due to temporary area closures, operation of equipment and sensory disturbance.	<p>Parks Canada will consult with the Visitor Experience and External Relations Managers in advance of any anticipated access impacts to visitor facilities and if necessary for the scope of work, ensure an appropriate communications plan is developed.</p> <p>*Parks Canada is responsible for implementation of this mitigation.</p>



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Aesthetic impacts, including removal of important tree screens on roads and trails.	In areas frequented by visitors, assessors must consider aesthetics when determining prescriptions (refer to Appendix 1).
		Leave doglegs or screening at road and trail intersections. Where tree removal will result in the loss of important tree screens on roads and trails, discuss alternative options to satisfy clearing requirements with Parks Canada.



Pre-Project Checklist

The EAO will complete the following checklist for individual projects and determine if supplemental mitigations or additional analysis is required. The findings of the pre-project checklist will be included in the Parks Canada EIA Requirement Checklist.

Work Area Definitions

- ☐ The tree removal is required for safety purposes and is within 1 ½ tree lengths of existing Park infrastructure.
- ☐ The proposed location and extent of tree removal is clearly defined and outlined on figures.
- ☐ Ensure no tree removal is proposed in Zone I – Special Preservation. If so, identify supplemental mitigation measures in Section 2.0.
- ☐ If in consultation with the Vegetation Ecologist, the scope of work is such that restoration is required, include restoration requirements in the supplemental mitigations section. Module 11 of the approved *Waterton Lakes National Park General Projects Best Management Practices* provides suitable restoration standards.

Species at Risk

- ☐ There is no potential for adverse effects to a species at risk, its residence or critical habitat with application of the standard mitigation measures and any supplemental mitigations included in section 2.0.

Wildlife Features

- ☐ Consult current databases, the Human Wildlife Conflict Officer, Wildlife Biologist, and if required complete field surveys to confirm there is low potential for active wildlife features (e.g., dens, breeding sites, amphibian habitat) in the proposed work area.
- ☐ If wildlife features are potentially present, include avoidance mitigations or timing windows in the supplemental mitigations section.

Nesting Birds

- ☐ If tree removal is required between April 1 and August 31, identify areas with potential for nesting birds and breeding or roosting bats. Supplemental mitigations may apply such as those provided in the *Parks Canada National Best Management Practices for Migratory Birds*.

Aquatic Resources

- ☐ All work areas are at least 30 m from watercourses and water bodies. If there are areas <30 m from riparian zones, watercourses or water bodies, apply supplemental mitigation measures.

Vegetation

- ☐ Consult current databases and the Vegetation Ecologist regarding potential for, and known occurrence of rare plants and ecological communities, as well as known weed occurrences in the proposed project area; and if required complete field surveys to



confirm there is low potential to impact vegetation resources in the proposed work area. If rare plants, rare ecological communities or weed species are confirmed or have high potential to be present, include supplemental mitigations.

- ☐ Ensure the debris processing, removal and disposal plan for the work area is detailed and is aligned with the standard mitigation measures. Apply any site-specific prescription modifications if required to meet visitor experience, cultural resource or natural resource management objectives. See Appendix 1.0 for suggestions of site-specific prescriptions as modified from the *Draft Waterton Lakes National Park Management Plan for Trees Affected by Wildfire* (Walton, 2018).
- ☐ Consult the Fire Management Officer to determine if lower than typical debris management targets are required. Indicate targets in supplemental mitigations.

Cultural Resources

- ☐ Terrestrial archaeology has reviewed the proposed work and indicated if any supplemental mitigations or analysis such as an Archaeological Overview Assessment is required.

Supplemental Mitigations

If additional mitigations are identified by the Pre-Project Checklist, the Parks Canada Environmental Assessment Officer will complete the following table and include it in the Parks Canada EIA Requirement Checklist.

Valued Component	List additional mitigations or identify what document includes these mitigations.	Notes



Appendix 1 Site Specific Prescriptions

As identified in the mitigations, the certified assessor will recommend site-specific prescriptions where danger tree removal is to occur in areas with key objectives for visitor experience, wildlife and wildlife habitat or environmentally sensitive areas, as required. Potential prescription options may include, but are not limited to, the following table:

Management Objective	Site Specific Consideration or Constraint	Potential Prescription
Visitor Experience	Tree stumps are not part of a desired visual landscape.	<ul style="list-style-type: none"> • Cut stumps flush to ground level. • Cover stumps or dust them with ash to make them less visible. • In the front country, a stump grinder may be an option. • Position felled branches and stems with the cut end away from the trail or facility to reduce the appearance of a modified landscape. • Fell trees parallel to trails to reduce the appearance of a modified landscape.
	Non-formalized social trails have caused trail braiding.	<ul style="list-style-type: none"> • Cover trail with tree debris to prevent additional trail braiding.
Wildlife and Wildlife Habitat	Wildlife use (e.g., bat, bird, mammal, etc.) use is confirmed or suspected and tree is not an imminent threat to safety.	<ul style="list-style-type: none"> • Leave tree as is. Consider area closure or move target. Delay tree removal until the end of the timing window.
	Wildlife use (e.g., bat, bird, mammal, etc.) use is confirmed or suspected and tree is an imminent threat to safety.	<ul style="list-style-type: none"> • Confirm species and whether there is alternative nesting / roosting habitat in the vicinity. • If the species using the tree is a Species at Risk, consider an Authorization to destroy critical habitat or residence. • Modify tree if possible, including removing only the hazard item on the tree (e.g., branch or dangerous top).
Environmentally Sensitive Areas	Danger tree removal in environmental sensitive areas (e.g., within 30m of watercourses or water bodies).	<ul style="list-style-type: none"> • In areas with a possible target or imminent threat to safety, ensure trees are felled by hand and debris is not to be left within 30m of a watercourse or water body.