

**SOUTH FRASER PERIMETER ROAD PROJECT
SCHEDULE 5: OMR AND END OF TERM**

**APPENDIX A
OPERATION AND MAINTENANCE SPECIFICATION**

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1 INTRODUCTION

1.1 Specification Format

A standardized format has been adopted for the specifications set out in this Appendix:

- (a) Objective
- (b) Performance Measures
- (c) Specific Requirements – mandatory items of work that are required to be delivered or are an exception to a stated service.
- (d) Notes – supplementary information and cross-references to applicable specifications and Reference Documents.

1.2 Application of Specifications

Whenever more than one specification or more than one part of a specification applies to a particular Concession Highway location, condition, circumstance or activity, the Concessionaire must comply with each and every applicable specification or part thereof.

Where work is noted in the specific requirements to be in accordance with a particular specification, this is recognised as being one method available to achieve the requirements of this specification. It does not imply the only possibility or remove any responsibility of the Concessionaire to achieve the output requirements.

1.3 Materials

Materials must be:

- (a) in accordance with DBSS; or
- (b) in accordance with the Recognized Products List; or
- (c) otherwise as accepted in writing by the Province's Representative.

2 SCOPE

This Appendix defines the required condition and response times related to the provision of the Operation, the Maintenance and associated reporting requirements. The requirements set out in this Appendix reflect the minimum expectations of users of the Concession Highway on day-to-day standards and response time performance criteria. Operational Performance Measures include either or both Condition Measures and Response Measures.

3 KEY PERFORMANCE MEASURES

3.1 General

The Concessionaire is required to develop and implement a performance reporting system acceptable to the Province that will provide the information to enable review of Concessionaire performance in terms of the full suite of measures described in the contract documentation. This

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database system must be able to store monthly data relating to the measures at a level that enables calculation of monthly, year to date and contract to date measures.

Data to populate the system will come from the Province's monthly auditing of the Concessionaire, operational records and internal audits incorporated within the Concessionaire's Quality Management System. It is expected that data fields within the reporting system would include as a minimum, details on the audits performed, targets and results for each KPM category and individual measures.

The development of the performance reporting system is subject to review by the Province within the Term, and the Concessionaire shall make changes within the overall performance of the contract. Provision and management of the performance reporting system will be included within the system as well.

3.2 Key Performance Measures

Key Performance Measures provide the ability to monitor higher level trends in Concessionaire Operation and Maintenance performance. Selected Key Performance Measures (KPMs) have been grouped under the following key delivery areas:

- (a) operational communications;
- (b) safety;
- (c) asset service;
- (d) winter service;
- (e) corridor management;
- (f) Emergency Response; and
- (g) Project relationships.

The Concessionaire is required to forecast the results of KPMs detailed in Table 3.2 and report monthly achievement.

The individual Performance Measures selected for the KPMs include both Condition Measures and Response Measures for the Operation and Maintenance activities. Table 3.2 identifies the minimum required KPMs for the Operation and Maintenance.

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Table 3.2 : Key Performance Measures (KPMs)			
Delivery Areas	Key Performance Measures (KPMs)	Measure Reference (OPM)	Weighting %
a) Operational Communications	1. Highway Condition Reports	PO5.1.2c	15
	2. Report adverse or extreme road surface conditions	PO5.1.2d	
	3. Recording Non-Availability Events	PO5.1.2i	
	4. Customer Satisfaction Rating	PO5.4.2a	
	5. Respond to correspondence	PO5.4.2d	
b) Safety	6. Surface Maintenance – Removal of Debris	PO6.6.2d	20
	7. Line Marking Maintenance – minimum retro-reflectivity	PO10.3.2b	
	8. Structure Maintenance - Temporary repair of Decks	PO11.2.2a	
	9. Safety Management – Remedy hazards	PO16.1.2f	
c) Asset Service	10. Surface Maintenance - Correct pavement deficiency	PO6.1.2d	20
	11. Bridge and Structure Maintenance - Repair, clean and restore	PO11.1.2a	
d) Winter Service	12. Highway Snow Removal- accumulations	PO8.1.2a	15
	13. Winter Abrasive and Chemical Snow and Ice Control– deploy resources	PO8.2.2a	
	14. Winter Abrasive and Chemical Snow and Ice Control– Restore traction	PO8.2.2c	
e) Corridor Management	15. Highway Inspections – respond to reports	PO13.1.2b	15
	16. Highway Patrols	PO13.2.2a	
	17. Corridor appearance – Litter	PO9.2.2a	
f) Emergency Response	18. Implement Traffic Control	PO12.2.2e	10
	19. Flood Control and Washout Response	PO12.4.2f	
	20. Mud, Earth and Rock Slide Response - Repair damage	PO12.5.2g	
	21. Structure Damage Response	PO12.7.2c	
	22. Incident Response	PO12.3.2i	
g) Project Relationships	23. Project Integration	PO5.3.2a	5
	24. Project Representation	PO5.3.2b	
			100

- Notes: (a) The individual KPMs in each delivery area are to have the same weighting.
(b) In general each KPM will be measured in the form of [Number of complying events/ Number of events occurring in the month].
E.g. Safety Management – Remedy hazards = [Number of Safety hazards remedied/ Number of Safety hazards identified in the month]

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4 DOCUMENTATION REQUIREMENTS

4.1 Objective

The provision of reports and records to the Province's Representative is an essential requirement of this Agreement to ensure that the Province can continue to perform its appointed governance duties, and to enable the Province to provide for future needs of the Concession Highway and road users.

4.2 Plans and Reports

Table 4.2 summarizes the plans and reporting requirements, including deliverables and due dates, set out in this Appendix. The other Appendices to this Schedule contain additional reporting requirements.

Performance Measure	Deliverable Name	Specification Reference	Due Date	Review "RP" or Consent "CP" Procedure
PO4.1a	Operation and Maintenance Plan (First Submission)	4.3	Submitted 60 days prior to Eastern Segment Required Substantial Completion Date	CP
PO4.1b	Operation and Maintenance Plan (Updates)	4.3	June 1st annually	RP
PO4.1c	OMR Monthly Reports	4.4	By 10th of each month	RP
PO4.1d	Wildlife Collision Report	4.5	By 10th of each month	N/A
PO4.1e	Traffic Accident Fatality Report	4.6	Within 24 hours of the accident	RP
PO4.1f	Traffic Crash Reports	4.7	Within 24 hours of the accident	RP
PO4.1g	Traffic Count Data	4.8	By 10th of each month	RP
PO4.1h	Asset Inventory Data	4.9	December 30th annually	RP
PO4.1i	Network Status Videos	4.10	Each 5 years anniversary of Effective Date, plus within one month of end of Project Term or Termination Date	RP
PO5.1.2c	Highway Condition Reports	5.1	As per Section 5.1 of this Appendix	N/A
PO5.4.2b	Customer Care Plan	5.4	June 1st annually	RP
PO5.4.2c	Customer Satisfaction Survey	5.4	June 1st of each year or as otherwise specified	RP
PO4.1j	Salt Management Plan	8.4	June 1st annually	RP
PO4.1k	Salt Usage Report	8.5	June 1st of each year or as otherwise specified	RP
PO4.1l	Grass Area and Plantation Area Classification	9.5	Within six months after the Western Segment Substantial Completion Date	RP

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Table 4.2 Schedule of Plans, Reports and Data (Response Time Measures)				
Performance Measure	Deliverable Name	Specification Reference	Due Date	Review “RP” or Consent “CP” Procedure
PO4.1m	Routine pruning Schedule	9.5	June 1st annually	RP
PO10.10.2a	Traffic monitoring equipment count and vehicle classification accuracy reports	10.10	June 1st annually	RP
PO12.1.2a	Emergency Response Plan	12.1	June 1st of year 1	CP
			Reissue when amendments are made	RP
PO12.1.2b	Staff contact information	12.1	March 31 annually	N/A
PO12.2.2d	Incident Reports	12.2	As required	N/A
PO12.2.2f	Chargeable Maintenance Cost Report	12.2	Within 1 week of an Incident	N/A
PO12.9.1a	Post-Earthquake Inspection Guide	12.9	Submitted 180 days from the Effective Date	RP
PO12.9.2b	Structures Condition Reporting after natural event	12.9	Within 7 days of a significant natural event	RP
PO15.2.1a	Seismograph Instrumentation User Manuals	15.2	Within one month of the installation of each Accelerograph	RP
PO16.1.2e	Safety Management and Intervention Plan	16.1	June 1st of year 1, reissue when amendments are made	RP

The documents above that are indicated to be subjected to the Consent Procedure or the Review Procedure shall be submitted to the Province’s Representative in accordance with the Consent Procedure or the Review Procedure, as the case may be, pursuant to Schedule 2 [Representatives, Review Procedure and Consent Procedure]. All other documents shall be submitted to the Province’s Representative.

4.3 Operation and Maintenance Plan

The objective of the Operation and Maintenance Plan (OMP) is to provide the Province with a plan that demonstrates contract compliance with respect to performance obligations. It should clearly describe the Concessionaire’s understanding and detailed approach to delivering all aspects of the Operation and the Maintenance for the entire Concession Highway relative to the specified Performance Measures.

Overall responsibility of the OMP resides with the Concessionaire and it is critical that its production be coordinated with all parties engaged by the Concessionaire to deliver the Operation and the Maintenance to ensure that it encompasses the complete scope of the Operation and the Maintenance to be delivered by the Concessionaire under this Agreement. The Concessionaire will deliver an Operation and Maintenance Plan which includes as a minimum processes and procedures to:

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- (a) ensure compliance with the Project Requirements and all other requirements of this Agreement, including the OMR Requirements;
- (b) prepare and deliver complete and comprehensive documentation and Records;
- (c) identify processes for management review of the Operation and Maintenance Plan;
- (d) identify, plan and prioritize all of the work activities required to perform the Maintenance and correct deficiencies;
- (e) document the sequence and interaction of all processes; and
- (f) detail procedures for service delivery.

The OMP and all updates shall be delivered as required in Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] of this Appendix, and shall specifically describe the procedures and work methods for all aspects of delivery of the Operation and the Maintenance services for the entire Concession Highway as defined within this Schedule and shall include at a minimum:

- (a) Introduction of the service activities and the manner in which they are to be carried out.
- (b) The relationship to the Asset Management Plan developed under Appendix B [Asset Preservation Specification] to this Schedule.
- (c) Work Method Statements.

Work Method Statements describe the Concessionaire's process of delivery for each activity defined in this operation and maintenance specification.

The following information shall be provided for each Work Method Statement:

- Output objective including standards;
- Fundamental process steps identified and described including requirements for reporting, communications, environmental, site safety, Traffic Control, and quality;
- Functional relationships between each process step defined;
- Resources;
- References to applicable codes, standards, guides, and manuals;
- Documented evidence that all applicable technical leaders have approved the Work Method Statement signifying a collaborative and coordinated approach to the development of the overall delivery process;
- Release date.

The processes and procedures included in the Operation and Maintenance Plan shall conform to, but are not limited to, the following service delivery requirements:

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- the Project Requirements and all other requirements of this Agreement, including the OMR Requirements;
- work identification and planning;
- stakeholder communication;
- environmental compliance;
- site safety; and
- Emergency Response.

The Operation and Maintenance Plan shall also include a work identification program which includes the processes to identify, prioritize, plan, schedule, manage, record and monitor completion of the Operation and Maintenance.

4.4 OMR Monthly Report

The OMR Monthly Report provides the Province with a status of the Concessionaire's Operation and Maintenance activities each month.

The OMR Monthly Report shall be delivered as required in Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] to this Appendix, and shall include at a minimum, the following content:

- Updated maintenance and rehabilitation program for the next rolling 12 month period showing all major activities completed and planned (including resurfacing, Bridge rehabilitation and Debris pond cleaning);
- Status of audit Reports;
- Copies of all relevant newspaper clippings where both positive and negative commentary on the Concession Highway is noted;
- Summary of key events that occurred during the month and planned tasks for the next month; and
- Results of monthly Key Performance Measures (KPM) assessment, as outlined in Table 3.2 [Key Performance Measures (KPMs)] of this Appendix, and comparison to previous 12 months results.
- Monthly and Contract Year to date summaries of Maintenance services, including scheduled and performed Maintenance services allocated among the work activity classifications and identified as to work location (highway # and km reference); and
- Delivery of the quality work plan, the work accomplishments report and a summary of the Concessionaire's quality audits and dispositions.

4.5 Wildlife Collision Report

The Concessionaire shall prepare and submit to the Province's Representative a "Wildlife Collision Report" on Ministry Form#H0107 providing a monthly summary of Wildlife collision incidents and indicating the date, time, location, nearby advisory signage, animal type and number killed and otherwise complying with the Province's Wildlife Accident Reporting System.

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4.6 Traffic Accident Fatality Report

The Concessionaire shall prepare and submit to the Province's Representative a "Traffic Accident Fatality Report" on Ministry Form#H0208 within 24 hours of an accident on the Concession Highway resulting in a fatality.

4.7 Traffic Crash Reports

The purpose of a Traffic Crash Report is to provide the Province with sufficient information to understand the nature of the traffic crash incident within 24 hours of the crash occurring.

A Traffic Crash Report is required for all:

- (a) Fatal crashes.
- (b) Crashes where there is a possibility or allegation of Concessionaire initiated actions being associated with the crash, or where there is a possibility or allegation that the road condition was a major contributing factor.
- (c) Serious crashes for which the Province requests a Report.

The Traffic Crash Report shall be delivered to the Province's Representative as required in Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] to this Appendix, and shall include at a minimum, the following content:

- Author name and contact details;
- Date, time, location and description of the traffic crash incident;
- Weather conditions at time of traffic crash incident;
- Condition of road surface and traffic facilities;
- Photos showing relevant features;
- Crash history at the site;
- Damage caused to the asset;
- Possible causes if known;
- Suggested improvements;
- Timing and nature of next programmed works at the site (including resurfacing);
- Copy of any police Reports on the traffic crash incident if applicable;
- Traffic Control requirements; and
- Impact on road availability including extent and timing.

This Report is expected to be nominally two pages in length, with additional information appended by staple. The Report can be considered a briefing memo, as opposed to a Report and therefore does not require any formal covers, title pages or the like, but must have a clear document reference.

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4.8 Traffic Count Data

Traffic count information collected by the Concessionaire needs to be incorporated into the Province traffic count database. All traffic count data, supplied to the Province, shall be delivered as required in Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] of this Appendix, and shall be in electronic format compatible with the latest version of the traffic count database.

4.9 Asset Inventory Data

The electronic asset inventory records of the Province need to be kept accurate and up to date. Asset inventory is required to be collected and input into the most current applicable Province corporate asset inventory system. These requirements are detailed below:

Asset Group	Provincial System (at 2009)	Data Delivery Requirements
Pavements – Including Travelled Lanes, Shoulders, medians, rest area parking and other areas specified to be treated to adjacent highway standard	<ul style="list-style-type: none"> • RPMS is the corporate information system for pavement condition information. • CHRIS is the corporate information system that stores data such as pavement surface type & Shoulder widths. 	<ul style="list-style-type: none"> • All data inventory collection and reporting on an annual basis in accordance with Table 4.2 of this Appendix • Electronic inventory data is to be delivered in a format suitable for electronic importing directly into the relevant provincial corporate system.
Structures – Bridges, Major Retaining Walls, Major Culverts and Tunnels and Major Sign Structures (culverts greater than 3.0m and retaining walls with greater than 2.0m max height and with a wall face slope greater than 45 degrees.)	<ul style="list-style-type: none"> • BMIS is the corporate information system for Structures. • ‘EFORMS’ is a series of electronic inventory spreadsheets including field assisting functionality to facilitate the data collection. These can be made available for the Concessionaire to control and use. 	<ul style="list-style-type: none"> • Concessionaire shall input inventory data into BMIS. • Concessionaire is to allow for future requirement to provide electronic inventory data in a format suitable for importing into the provincial corporate system. • Clearance, location and general Structure configuration (General arrangement) information is required prior to commissioning the Structure for public use.

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Asset Group	Provincial System (at 2009)	Data Delivery Requirements
<p>Other Structures – Retaining walls (less than 2.0m high), minor culverts and noise barriers</p> <p>Other Drainage Appliances – including curb and gutter, catch basins, flumes and manholes.</p> <p>Signs – including all regulatory, warning, guide, informational, advisory, construction and maintenance and route markers, but excluding electronically controlled messages/displays.</p> <p>Other Highway Furniture – including fences, gates, guardrail and reflectors, and lineal safety features.</p> <p>Pavement Marking – including longitudinal, transverse and intersection markings as well as Thermoplastic and HRPM</p>	<ul style="list-style-type: none"> • CHRIS is the corporate information system for all other inventory. 	<ul style="list-style-type: none"> • All data inventory update collection and reporting on an annual basis in accordance with Table 4.2 of this Appendix. • Electronic inventory data is to be delivered in a format suitable for electronic importing directly into the relevant provincial corporate system.
<p>Electrical Components – including street lighting, traffic signals and control boxes</p>	<ul style="list-style-type: none"> • Data not currently contained in any formal Province management system. • Likely to become a component requirement of CHRIS or other similar system in the future. 	<ul style="list-style-type: none"> • Concessionaire is required to supply a spreadsheet of electrical inventory in a logical format and subsequent annual updates as required in accordance with Table 2.1.2 of this Appendix. • Concessionaire is to make allowance for future requirement to provide electronic inventory data in a format suitable for electronic importing directly into the relevant provincial corporate system

Notes: RPMS - Roadway Pavement Management System
 BMIS - Bridge Management Information System
 CHRIS – Corporate Highway & Resource Information System

Inventory data collected shall be in the format prescribed in the applicable Province manual for the relevant provincial system. The existing editions of these manuals are available through the Data Room or on the Province website.

The actual extent of data fields requiring populating, particularly for asset inventory being entered into CHRIS, will be by agreement between the Concessionaire and the Province. It is most likely this will be less than the number of fields currently shown as being necessary.

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4.10 Network Status Videos

Network status videos to document the condition of the network are to be no more than one month old at the time of delivery to the Province's Representative and be a compatible format with Province corporate systems.

4.11 Record (As Built) Drawings

The Concessionaire is responsible for the production of record (as-built) drawings including all shop fabrication drawings. The production of the drawings will generally take the form of the design drawings with addendums showing changes.

The Province will provide to the Concessionaire reference numbers that are to be assigned to structural drawings to facilitate integration into the Province archiving and retrieval system.

The Concessionaire is responsible for delivering to the Province's Representative, in accordance with the Design and Certification Procedure and signed by a Professional Engineer where applicable:

- a) a full list of all record drawings, complete with drawing title and reference number;
- b) two (2) sets of the record drawings on 35 mm microfilm (complete with reference number);
- c) an Adobe Acrobat (or approved similar) compatible electronic file of the record drawings; and
- d) a full size paper copy of the record drawings.

In addition, the Concessionaire shall supply to the Province's Representative a Project Completion Report, compiling all technical design information and other relevant documentation. The final scope of information required for this report will be agreed with the Province's Representative.

5 OPERATIONAL COMMUNICATIONS

5.1 Highway Condition Reporting

5.1.1 *Objective*

To communicate Concession Highway conditions to Relevant Authorities, the Police and the Province.

5.1.2 *Performance Measures*

Condition

PO5.1.2a

Liaise with all relevant emergency service providers and provide assistance and provide all key personnel contact information.

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PO5.1.2b Provide a toll-free telephone service for Concession Highway condition reporting.

Response

PO5.1.2c Prepare and deliver an updated Concession Highway condition Report to the Province's Representative at 5:00 a.m., 6:00 a.m. and 4:00 p.m. daily from October 1 to April 30 and at 7:00 a.m. and 3:00 p.m. daily from May 1 to September 30.

PO5.1.2d Report immediately, upon detection or notification to the Concessionaire, to the Province's Representative any adverse or extreme road surface conditions and changes in weather conditions affecting visibility and/or driving conditions or as specified by the Province's Representative.

PO5.1.2e Prepare and release immediately, upon approval by the Province's Representative, travel advisories as necessary to inform users of the Concession Highway of conditions identified in PO5.1.2d above.

PO5.1.2f Report immediately, upon detection or notification to the Concessionaire, to the Province's Representative, through the District Manager of Transportation, all Motor Vehicle crash fatalities and other significant Incidents on the Concession Highway.

PO5.1.2g Communicate to the Province's Representative, no later than 3:00 p.m. on the day preceding the commencement of the maintenance activity, any plans for maintenance activities which require Full Closures, Lane Closures or other Concession Highway traffic delays.

PO5.1.2h Report to the Province's Representative recommendations for changes to the Province's driver information display Signs, as defined in Technical Circular T-16/06.

PO5.1.2i The Concessionaire shall implement a system to measure accurately and record all Non-Availability Events occurring on the Concession Highway. The Concessionaire shall maintain in electronic format a log recording the start/end times and relevant details for all such Non-Availability Events, which shall be a form which can be audited by the Province for conformity.

5.1.3 Specific Requirements

- (a) Observe and record weather / road conditions and prepare and submit Concession Highway condition Reports electronically using internet technology and in a format prescribed by the Province and DriveBC.
- (b) Publish names and telephone numbers of key Concessionaire personnel in a manner accessible for Police and other Relevant Authorities.

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- (c) Communicate with appropriate Relevant Authorities and Police when conditions on the Concession Highway require the involvement of those Relevant Authorities and/or the Police.
- (d) The toll-free telephone service must at a minimum be attended by sufficient personnel 24 hours per day, 7 days a week to respond to reports of and requests Concession Highway conditions; and potential or existing Concession Highway hazards; to receive and record complaints or other comments or concerns from Relevant Authorities, the Police and the Province.

5.1.4 Notes

The Concession Highway condition Report shall include surface conditions; weather, visibility, maintenance activities, load restrictions, travel advice, Full Closures, Lane Closures and other Concession Highway traffic delays and the reason such closures and delays.

5.2 Stakeholder Communication

5.2.1 Objective

To communicate effectively and efficiently with Stakeholders

5.2.2 Specific Requirements

The Concessionaire must as a minimum:

- (a) respond in a timely and appropriate manner to public complaints and requests;
- (b) consult with local stakeholders including local industries (forestry, mining, oil and gas), the Police, Relevant Authorities, key commuters, transit authorities and school buses in order to take their needs into consideration when planning the delivery of services;
- (c) ensure optimum and proactive delivery of services to local stakeholders whenever possible;
- (d) prepare and releases traffic advisories approved by the Province's Representative, when Full Closures and/or Lane Closures occur or when weather conditions are unsafe or have the potential to become unsafe for users of the Concession Highway; and
- (e) publish names and telephone numbers of key Concessionaire personnel for Police, emergency response services and other appropriate Relevant Authorities.

5.3 Project Relationships

5.3.1 Objective

The inter relationships between the Project parties is paramount to the overall success of the Project. This further extends to culture, where a "no surprises" environment must exist.

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5.3.2 *Performance Measures*

PO5.3.2a Project Integration: The Concessionaire is clearly making effort to keep all parties informed on physical work progress and any Project issues that arise during each month.

PO5.3.2b Project Representation: The Concessionaire is publicly representing the Province in a positive manner.

PO5.3.2c Culture: The Concessionaire is acting in the best interests of the Project.

5.3.3 *Notes*

The Province will validate the monthly score as initially determined by the Concessionaire.

5.4 Public Relations - Customer Care

5.4.1 *Objective*

To provide high quality communications to the public, stakeholders and Relevant Authorities in a courteous, prompt, consistent and professional manner.

5.4.2 *Performance Measures*

Condition

PO5.4.2a 90% satisfaction level achieved on the annual customer satisfaction survey

Response

PO5.4.2b Develop a Customer Care Plan as required in Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] of this Appendix, and implement processes to all of its internal and external relationships for delivery of services throughout the Term.

PO5.4.2c Conduct a customer satisfaction survey that is to be undertaken by an independent certified agency with the questions / results provided to the Province annually.

PO5.4.2d Respond to the following correspondence issues within the timeframes shown.

Probability of Failure			Response Time
i)	Very High -	Injury of damage to significant public or private asset	1 hour
ii)	High -	Unlikely to result in injury, but could result in damage to property	1 day
iii)	Low -	Unlikely to result in damage to property	5 days
iv)	None -	Will not result in damage to property	10 days

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5.4.3 Specific Requirements

The annual customer survey shall be consistent with Province practices for the adjacent maintenance contract areas. Questions should be structured to obtain meaningful and relevant feedback, and should also include questions related to maintenance of the Concession Highway, including response times, levels of service, ride and winter performance.

The Customer Care Plan will as a minimum address the following issues:

- (a) Identification of external customers and their interface with the Province on Concession Highway issues;
- (b) Use of technology to facilitate communication between the customer, Concessionaire, and the Province on Concession Highway issues;
- (c) Development of and implementation of a service request system in order to provide a seamless interface with the Province, others, management of information and Customer Care;
- (d) Identification of critical Concession Highway issues and appropriate response times;
- (e) Development of procedures for capturing potentially controversial situations in order that the Province remains informed;
- (f) Customer satisfaction monitoring and reviews;
- (g) Development of corporate standards for Customer Care; and
- (h) Action plans or operational strategies to enhance Customer Care.

Implement customer care protocols that include, but are not limited to:

- (a) Telephone - including time to pick up, greeting style, use of 1800 numbers;
- (b) Voicemail - including greeting style and standard information supplied, acknowledgments and clearance times;
- (c) Email protocols and the production of an internet web site in conjunction with existing Province initiatives where necessary;
- (d) Correspondence - including the ability to respond within 10 working days, the style of language, jargon avoidance, recording and filing; and
- (e) Public counter and field contact protocols - including providing the customer with full attention, accurate information and contact recording.

Implement a Communications Register reporting system that maintains a record of all customer contact by telephone, facsimile, email, personal and written correspondence. As a minimum, the reporting system should include a description of the issue / complaint, time to acknowledge, time to meet on site if required and the time to complete action as appropriate (Note: sometimes a

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complaint may be unjustified and/or satisfaction may not be possible if provincial policies are not acceptable by the customer. In those cases, a record of the advice provided, in a courteous manner, will be recognised as completeness of the resultant action.). The communications register will be available continuously online to the Province who will track through a sample of complaints/enquiries for meeting timeliness requirements and customer satisfaction.

Promote the Concessionaire as the key contact with the public for Concession Highway related matters. The Concessionaire's contact details are to be widely advertised.

Be available to respond to customers during the hours of 8:00am to 5:00pm, Monday to Friday and maintain a 24-hour call centre facility to receive, respond and log calls.

5.4.4 Notes

Public Relations - Customer Care requires determination and/or identification of issues and responding to the customer with information on the intended response. It encompasses the following activities:

- Answering general and specific enquiries or requests for information;
- Co-ordinating with the Provincial Highways Condition Centre to provide information and display accurate and timely messages on signage systems; and
- Receiving and processing applications from the public, including but not limited to the following activities: closing a road; holding sporting, recreational or other events on the road; performing works; constructing an access onto a road; authorizing a fence encroachment; planting or removing trees; authorizing a signage installation; and co-ordinating themes and messages with other communications from the Province.

The Province will transfer all Concession-related enquires to the Concessionaire for response.

Where inaccurate or untimely messages cause safety concerns or inconvenience to motorists, steps must be immediately taken to correct the misinformation being presented. Full compliance with Section 5.1 [Highway Condition Reporting] of this Appendix is required. Note that the Concessionaire's positive coordination with the Provincial Highways Condition Centre is paramount in meeting this task.

5.5 Utilities Coordination

5.5.1 Objective

To coordinate and manage applications from Utility Suppliers requiring access to the Project Site.

5.5.2 Performance Measures

Condition

PO5.5.2a Liaise with the various Utility Suppliers to coordinate Utility Work with the Maintenance and the Rehabilitation.

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Response

PO5.5.2b Report any problems with the performance of the Utility Work within 24hrs in relation to safety matters and one week in relation to any other matter to the Province.

5.5.3 Specific Requirements

- (a) Manage and coordinate Utility Work in accordance with the Utility Policy Manual and Article 5 [Utilities] of Part 1 of Schedule 4.
- (b) Address all applications from Utility Suppliers in accordance with Article 5 [Utilities] of Part 1 of Schedule 4.
- (c) All Utility Agreements between Utility Suppliers and the Province will remain in place and therefore the terms and conditions specified will apply to the Project in full. The Concessionaire shall comply with Article 5 [Utilities] of Part 1 of Schedule 4 in respect of all matters concerning Utility relocation specifically required for the Project Work, and repairs to damage to Utilities caused by the Concessionaire.
- (d) Where Project Work impacts Utilities, the Concessionaire is required to comply with the applicable requirements of Article 5 [Utilities] of Part 1 of Schedule 4.
- (e) Utilities coordination must be conducted in accordance with the Customer Care Plan in dealings with other contractors.

5.5.4 Notes

- Utility Suppliers are entitled to install services in the Concession Highway corridor. However, the integrity of the Concession Highway must be protected, damage minimized, and the Province indemnified against any future claims of liability in accordance with Article 5 [Utilities] of Part 1 of Schedule 4.
- Issues regarding Utilities coordination, to be addressed in accordance with Article 5 [Utilities] of Part 1 of Schedule 4, are likely to include:
 - Timing of Utility installation in terms of coordinating the Utility Work with the Project Work and identification of potential conflicts with other work on the Project Site;
 - Impact of the proposed Utility Work on the Concessionaire's Performance Measures; and
 - Conditions that the Concessionaire would like to impose on the Utility Suppliers.
- The final approval of the application and associated conditions regarding Utility Work will be the responsibility of the Province in accordance with Article 5 [Utilities] of Part 1 of Schedule 4.

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- All contact initiated by Utility Suppliers will be handled in accordance with Article 5 [Utilities] of Part 1 of Schedule 4.

5.6 Development Coordination

5.6.1 *Objective*

To liaise with Third Party Contractors and other contractors to coordinate access work to development adjacent to or on the Concession Highway that may occur by the direction of the Province.

5.6.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO5.6.2a Report any problems with the performance of a Third Party Contractors and other contractor working on behalf of the Province within 24hrs in relation to safety matters and one week in relation to any other matter to the Province.

5.6.3 *Specific Requirements*

- (a) The integrity of the Concession Highway must be protected and damage minimized;
- (b) Development coordination must be conducted in accordance with the Customer Care Plan in dealings with other contractors.

5.7 Radio Communications System

5.7.1 *Objective*

To facilitate communications between the Ministry and persons undertaking road and bridge maintenance works by using the provincial radio communications system that the Ministry currently maintains in British Columbia (the “**Provider System**”) on a non-exclusive basis and on the terms and conditions of the Ministry’s standard form Provider System licence from time to time for persons undertaking such works.

5.7.2 *Specific Requirements*

The Concessionaire shall use the Provider System on a non-exclusive basis and on the terms and conditions of the Ministry’s standard form Provider System licence from time to time for persons undertaking such works.

In respect of the Provider System:

- (a) the Concessionaire shall provide its own radios for vehicles and offices and ensure that each radio is compatible with the Provider System;

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- (b) if the Ministry changes or upgrades the Provider System during the Term, the Concessionaire shall change or modify its equipment to ensure compatibility with the changed or upgraded system; and
- (c) the Ministry may revoke the Provider System licence at any time by notice to the Concessionaire if the Ministry, in its absolute and unfettered discretion, decides to discontinue the provision and maintenance of the Provider System for persons undertaking road and bridge maintenance works in British Columbia.

6 SURFACE MAINTENANCE

6.1 Highway Pavement Patching and Crack Sealing

6.1.1 *Objective*

To ensure paved Highway Surfaces on the Concession Highway (including paved Bridge Decks) are safe, smooth, stable, sealed and prevent moisture from penetrating the pavement surface.

6.1.2 *Performance Measures*

Condition

PO6.1.2a Ensure consistency with finished patches in the Travelled Lane or Shoulder, and the adjacent pavement or Shoulder.

PO6.1.2b Ensure that the edges of the patch that tie in elevation to existing pavements are feathered to an angle of no less than 30 degrees from a line perpendicular to the centreline.

PO6.1.2c Ensure that the root cause of pavement failure is determined and reasonable attempts are made to deal with the failure before commencing repairs.

Response

PO6.1.2d Complete pavement patching and crack sealing to address safety issues within the maximum times shown.

Pavement Deficiency	Severity	Summer Highway Classification				
		1 & 2	3	4	5	6 & 7
Pot-hole on Travelled Lane or inner Shoulder of curved highway sections	high	24 h	2 d	3 d	7 d	14 d
Pot-hole on outside Shoulder of curved highway sections and tangents	high	3 d	7 d	10 d	21 d	45 d
Pot-hole on right edge of divided highway in the direction of travel	high	24 h	2 d	3 d	7 d	14 d
Pot-hole on left edge of divided highway in the direction of travel	high	3 d	7 d	10 d	21 d	45 d

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Pavement Deficiency	Summer Highway Classification					
	Severity	1 & 2	3	4	5	6 & 7
Bleeding on Travelled Lane, or inside Shoulder of curved highway sections	high	24 h	2 d	3 d	7 d	14 d
Distortions presenting a safety hazard	high	24 h	2 d	3 d	7 d	14 d

Legend: h – hours and d – days

PO6.1.2e

Complete permanent pavement patching and crack sealing to correct each deficiency within the maximum response times shown.

Agreement Standard	Minimum Severity Level	Minimum Density Level	Response Time
Longitudinal Wheel Path Cracking	Single or multiple, moderate spalling, mean unsealed crack width greater than 5mm	10 percent within any 50 m length of pavement	12 months
Longitudinal Joint Cracking	Single or multiple, moderate spalling, mean unsealed crack width greater than 5mm	10 percent within any 50 m length of pavement	12 months
Pavement Edge Cracking	Single or multiple, moderate spalling, mean unsealed crack width greater than 5mm	10 percent within any 50 m length of pavement	12 months
Transverse Cracking	Single or multiple, moderate spalling, mean unsealed crack width greater than 5mm	Any	12 months
Meandering Longitudinal Cracking	Single or multiple, moderate spalling, mean unsealed crack width greater than 5mm	10 percent within any 50 m length of pavement	12 months
Alligator Cracking	Interconnected cracks forming a complete block pattern, slight spalling and no pumping	5 percent within any 50 m length of pavement	3 months
Shoving	Longitudinal displacement of a localized area of the pavement surface causing rough ride.	10 percent within any 50 m length of pavement	3 months
Bleeding	Distinctive appearance with free excess asphalt	10 percent within any 50 m length of pavement	3 months
Potholes	Pothole depth is 25 to 50 mm	Any	3 months

6.1.3 Specific Requirements

- (a) The following surfaces are also to be maintained:
- Paved bicycle and/ or pedestrian paths adjacent to Travelled Lanes are to be patched as part of the Concession Highway; and

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- Paved bicycle and/ or pedestrian paths not adjacent to Travelled Lanes are to be maintained to the same standard as the adjacent or nearest Concession Highway.
- (b) Finished patches are to be consistent with the line, grade, crossfall and compaction of the adjacent pavement.
- (c) Overlay patches are to be compacted to a minimum thickness of not less than 50 mm and at an average application rate of not less than 120 kilograms per square metre
- (d) Patch depth is to be equal to that of the distressed pavement but never less than 60mm.
- (e) The choice of treatment selection for maintenance purposes is solely at the discretion of the Concessionaire except that the following overlying principles will apply:
 - Materials and their application must be consistent with DBSS and the Recognized Products List.
 - The Asset Preservation Performance Measures (APPMs) set out in Appendix B [Asset Preservation Specification] to this Schedule must be complied with;
 - Innovation is encouraged; and
 - The optimization of the life cycle of pavements and pavement materials is encouraged but not to the detriment of road safety or the targets and Performance Measures set or established in this Agreement.

6.1.4 *Notes*

Pavement deficiencies are based on the severity rating in the Pavement Surface Condition Rating Manual.

6.2 Highway Surface Treatment

6.2.1 *Objective*

To provide safe, durable, dust-free, impermeable travelling surfaces that facilitates the safe and efficient movement of traffic; and protects the underlying Concession Infrastructure.

6.2.2 *Performance Measures*

Condition

PO6.2.2a Paved and Sealed roads are to be free of ravelling, weathering, fatigue, traction-loss or other surface deficiencies.

PO6.2.2b Gravel surfaces are to be dust-free and durable.

Response

There are no Response Measures for this specification.

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6.2.3 *Specific Requirements*

- (a) Prepare roads prior to surface treatment.
- (b) Complete any required Road Base repairs in accordance with Section 6.5 [Road Base Maintenance] of this Appendix.
- (c) Patch paved Highway Surfaces on the Concession Highway as required to provide a smooth and stable base in accordance with Section 6.1 [Highway Pavement Patching and Crack Sealing] of this Appendix.

6.3 Gravelled Surfaces

6.3.1 *Objective*

To provide a uniform, smooth gravel surface to protect users of the Concession Highway from potentially hazardous conditions and to strengthen roads

6.3.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO6.3.2a

The following deficiencies must be repaired within the maximum times shown.

Gravel Surface Deficiency	Summer Highway Classification				
	3	4	5	6	7
i) Pot-holes	2 d	2 d	3 d	6 d	15 d
ii) Surface soft and/or muddy	24 h	2 d	3 d	6 d	15 d
iii) Loss of traction	24 h	2 d	3 d	6 d	15 d
iv) Surface softening when wetted	30 d	2 m	6 m	9 m	1 y
v) Insufficient surfacing aggregate	30 d	2 m	6 m	9 m	1 y

Legend: h – hours, d – days, m – months and y-years

Shoulder Surface Deficiency	Summer Highway Classification				
	1&2	3	4	5	6&7
i) Loose or soft Shoulders	14 d	30 d	45 d	3 m	6 m
ii) Loss of line, and grade, cross fall	3 m	6 m	9 m	1 y	1 y

Legend: h – hours, d – days, m – months and y-years

6.3.3 *Specific Requirements*

- (d) Where the Road Base to be gravelled is unstable, the area must first be repaired in accordance with Section 6.5 [Road Base Maintenance] of this Appendix.
- (e) Gravel is to be applied to dirt and gravel highways to ensure a smooth condition with sufficient gravel depth to restore Super elevation proper crown, along with any required strengthening.

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6.4 Highway Shoulder Maintenance

6.4.1 *Objective*

To provide a smooth and safe stopping area with free-flowing drainage off the Travelled Lanes and through the Road Base.

6.4.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO6.4.2a

The following deficiencies must be repaired within the maximum times shown.

Shoulder Surface Deficiency	Summer Highway Classification				
	1&2	3	4	5	6&7
i) Pavement edge drop-off 5 cm or more in depth on the inside edge of curving highways	24 h	24 h	3 d	7 d	14 d
ii) Pavement edge drop-off 5 cm or more in depth other than a) above	3 d	3 d	6 d	14 d	14 d
iii) Settled and eroded sections more than 5 cm in depth presenting a safety hazard	3 d	3 d	6 d	14 d	14 d
iv) Loose or soft Shoulders presenting a safety hazard	3 d	3 d	6 d	14 d	14 d
v) Loss of line, grade, and crossfall presenting a safety hazard	3 d	3 d	6 d	14 d	14 d
vi) Removal of vegetation presenting a safety hazard	3 d	3 d	6 d	14 d	14 d
vii) Loss of line, grade and crossfall not presenting a safety hazard but requiring gravelling	3 m	3 m	9 m	1 y	1 y
viii) Removal of turf, sod and other vegetation	6 m	6 m	6 m	1 y	1 y

Legend: h – hours, d – days, m – months and y-years

6.4.3 *Specific Requirements*

- (a) Concession Highway Shoulders are to be safe, smooth, stable, free-draining, compacted and free of vegetation except where vegetation (that is not harmful) is effective and necessary to prevent erosion and to stabilize the Shoulders.
- (b) Concession Highway Shoulders are to be repaired and sub-surface materials placed in accordance with Section 6.5 [Road Base Maintenance] of this Appendix.
- (c) Paved and treated Shoulder tops on paved highways are to be repaired in accordance with Section 6.1 [Highway Pavement Patching and Crack Sealing] of this Appendix.
- (d) Granular or other material is to be removed from the pavement surface in accordance with Section 6.6 [Pavement Surface Cleaning and Debris Removal] of this Appendix.
- (e) Areas where there is a median, Roadside barrier or curbing between the pavement and the gravel Shoulder top are not to be graded.

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- (f) Concession Highway Shoulder Maintenance shall not be undertaken where owners of property adjacent to the Concession Highway maintain a lawn up to the edge of the pavement, provided the lawn does not impede the drainage of the Highway Surface.

6.5 Road Base Maintenance

6.5.1 *Objective*

To repair deficient areas of Road Base and install drainage where required to provide a supporting granular base structure for Highway Surfaces on the Concession Highway.

6.5.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO6.5.2a Identify the source of Road Base failure and remedy within the response times required in Section 6.1 [Highway Pavement Patching and Crack Sealing] of this Appendix.

6.5.3 *Specific Requirements*

- (a) Repairs are to be identified and carried out in order of priority as determined by the Concessionaire to enhance safety and to protect the Concession Infrastructure.
- (b) Where deemed necessary, correct failures by removing unsuitable materials, by providing free drainage from excavation and backfilling and by compacting with suitable materials.
- (c) Restore Hard Surfaced Highways in accordance with Sections 6.1 [Highway Pavement Patching and Crack Sealing], 6.2 [Highway Surface Treatment] and 11.2 [Bridge Deck Maintenance] of this Appendix.
- (d) Install Drainage Appliances in accordance with Section 7.2 [Drainage Appliance Maintenance] of this Appendix.

6.6 Pavement Surface Cleaning and Debris Removal

6.6.1 *Objective*

To protect users of the Concession Highway from potentially hazardous pavement surface conditions caused by Debris, or a build up of accumulated dirt, sand or gravel; and to ensure surface drainage is not hindered by these accumulations or Debris.

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6.6.2 Performance Measures

Condition

PO6.6.2a No accumulation adjacent to curbing or barriers shall impair the free flow of drainage paths.

Response

PO6.6.2b Hard Surfaced Highways should be cleaned in accordance with the frequencies shown.

Routes and Highway Classification	Minimum Cleaning Frequency
(i) All four lane and Urban highways	every 120 days
(ii) All other Hard Surfaced Highways	once annually

PO6.6.2c Spring surface cleaning of Hard Surfaced Highways should be completed within 1 month of the last Winter Abrasive application or when the application of Winter Abrasives is no longer anticipated.

PO6.6.2d The removal of Debris should be started within the times shown in the following table and completed as soon as reasonably possible.

Obstruction	Summer Highway Classification				
	1&2	3	4	5	6&7
a) Debris or spilled material over 1000 cc on the Travelled Lanes, sidewalks, and pedestrian and cycling facilities	60 min	60 min	3 h	5 h	24 h
b) Debris or spilled material equal to or less than 1000 cc on the Travelled Lanes, sidewalks, and pedestrian and cycling facilities	60 min	3 h	5 h	24 h	2 d
c) Dead animals on the Shoulders, sidewalks, and pedestrian and cycling facilities	60 min	3 h	5 h	24 h	2 d
d) Dead animals on the Concession Highway, excluding Travelled Lanes, Shoulders, sidewalks, and pedestrian and cycling facilities	3 h	5 h	24 h	2 d	3 d
e) Debris or spilled material more than 1000 cc on the Shoulders	5 h	24 h	2 d	3 d	7 d
f) Debris or spilled material equal to or less than 1000 cc on the Shoulders	24 h	2 d	3 d	7 d	14 d

Legend: h – hours, d – days, m – months

PO6.6.2e Hard Surfaced Highways should be cleaned within 7 days where an accumulation:

- (i) obscures line visibility, or;
- (ii) creates a visibility problem for users of the Concession Highway, or;
- (iii) creates an air quality problem that conflicts with local by-laws.

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PO6.6.2f Dirt, Debris, sand and/or gravel on paved surfaces which poses a hazard to users of the Concession Highway must be removed immediately.

6.6.3 Specific Requirements

- (a) Perform cleaning work on Debris accumulations adjacent to curbing or barriers in accordance with the Performance Measures in Section 6.7 [Curb, Island and Barrier Maintenance] of this Appendix.
- (b) Clean paved pedestrian and cycling facilities in accordance with the Performance Measures of the adjacent or nearest highway Classification as per Table in PO6.6.2b.
- (c) Establish additional patrols through the area when Debris over 1000 cc on the Travelled Lanes, Shoulders, sidewalks, and pedestrian and cycling facilities occurs more than once in a 24 hour period so that Debris is removed within the Performance Measures specified in PO6.6.2d above. Discontinue the additional patrols when the frequency of Debris over 1000 cc falling on the Travelled Lanes, Shoulders, and sidewalks is less than 2 in a 24 hour period.
- (d) If the Debris is too large for immediate removal, secure the area in accordance with Section 10.11 [Highway Traffic Control] of this Appendix.
- (e) For volumes of Debris on Travelled Lanes or Shoulders that are greater than 10 cubic metres per location, apply Section 12.5 [Mud, Earth and Rock Slide Response] of this Appendix.
- (f) Dispose of dead animals in a manner acceptable to Relevant Authorities.

6.6.4 Notes

Cleaning of Hard Surfaced Highways includes removing accumulations of dirt, sand and/or gravel from the Travelled Lanes, centrelines, Shoulders, curbs, intersections, traffic islands and along medians and/or Roadside barriers to provide a safe, clean, free-draining condition.

6.7 Curb, Island and Barrier Maintenance

6.7.1 Objective

To provide a safe operating environment for users of the Concession Highway and to allow for adequate drainage associated with curbs, traffic islands, Roadside and median barriers, anti-glare screens, reflectors and impact attenuators.

6.7.2 Performance Measures

Condition

There are no Condition Measures for this specification.

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Response

- PO6.7.2a** Concrete barrier with damage in excess of 900 square centimetres or where there is structural damage including cracking and/or breakage are to be replaced within 3 days.
- PO6.7.2b** Repair of concrete barriers with damage of less than 900 square centimetres of surface area is to be started within 3 days and completed as soon as reasonably possible.
- PO6.7.2c** All drainage holes are to be cleaned once annually to ensure the free passage of water and:
- (i) when a blockage is causing a situation that is potentially hazardous to users of the Concession Highway, affected drainage holes are to be cleared of Debris immediately; or
 - (ii) when a blockage is causing Ponding outside the Travelled Lanes, affected drainage holes of Debris are to be cleaned within 12 hours.
- PO6.7.2d** Realignment of rails, curbs and concrete barriers as required to restore the designed alignment are to be completed within 3 days.
- PO6.7.2e** All wood components are to be treated or painted every 2 years or within 9 months where wood is exposed or paint is cracked.
- PO6.7.2f** End sections of concrete barriers are to be painted once each year.
- PO6.7.2g** Undertake maintenance of areas chipped or scarred by snowplows, other equipment or vandalism within 90 days.
- PO6.7.2h** All wood and steel components are to be repaired or replaced as required within 6 months.
- PO6.7.2i** Asphalt, rock-paved or bricked traffic island surfaces that are broken or Pot-holed are to be restored to a smooth, stable condition within 15 days.
- PO6.7.2j** Impact attenuators, supports or fasteners that are damaged, destroyed and missing are to be replaced within 3 days.
- PO6.7.2k** Anti-glare screen components that are damaged, destroyed and missing are to be replaced within 7 days.
- PO6.7.2l** Cracked and broken curbs are to be repaired or replaced as required to provide a smooth, sound and interconnected curb within 15 days.

6.7.3 Specific Requirements

- (a) Barrier repairs are to be completed using material of the same type and quality as the existing installation, or by using an epoxy repair product approved in writing by the Province's Representative.

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- (b) Damaged or missing concrete barrier reflectors are to be replaced in accordance with Section 10.2 [Sign System Maintenance] of this Appendix.
- (c) Wood components are to be painted or treated to protect them from the elements, with the same material as on the existing components.
- (d) Wood and steel components are to be repaired or replaced if posts are rotted, broken, settled or damaged and/or if steel rail is bent, rusted or damaged.
- (e) Construct new asphalt and/or concrete curbs as required.
- (f) Install new barriers as required to enhance the safety of users of the Concession Highway.
- (g) End sections of concrete barriers are to be painted with the same material as on the existing component.

7 DRAINAGE MAINTENANCE

7.1 Ditch and Watercourse Maintenance

7.1.1 Objective

To provide safe, unobstructed drainage for all Highway Surface runoff, natural Roadside runoff and ditches; and to create collection areas for Debris and ice and snow.

7.1.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

PO7.1.2a Ensure cross section, grade and capacity of drains and watercourses as originally designed and constructed within the maximum times shown.

	Summer Highway Classification				
	1&2	3	4	5	6&7
During high water flow as defined by the Province	60 min	90 min	2 h	3 h	4 h
At other times	2 m	3 m	4 m	6 m	6 m

Legend: min – minutes, h – hours, d – days, m – months

7.1.3 Specific Requirements

- (a) Off-takes and drainage easements are to be clean to allow efficient drainage of the Concession Highway.
- (b) Ensure flow by removing snow and ice from ditches and restoring flow in frozen Drainage Structures.

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- (c) Notify the Province’s Representative of any obstructions to water flow which threaten the integrity of the Concession Highway; and remove obstructions preventing the free flow of water, including obstructions which may be upstream from the Concession Highway, adjacent to the Concession Highway or immediately downstream.
- (d) Restore and/or correct the cross section, capacity and grade of ditches and watercourses by removing Debris, Debris dams and sloughs from ditches and watercourses and repairing damage to embankments and backslopes caused by erosion.
- (e) Restore ditch elevations below the bottom elevation of the sub-base to ensure free drainage of the Concession Highway.
- (f) Widen and deepen ditches at culvert entrance locations, other drainage appliance or Structure locations, to provide a collection area and prevent the culvert or other drainage appliance or Structures from becoming obstructed.
- (g) When correcting the ditch profile, re-set or replace Drainage Appliances in accordance with Section 7.2 [Drainage Appliance Maintenance] of this Appendix.
- (h) Shoulder widths are not to be reduced or undermined during the provision of the services
- (i) Ensure Infrastructure protection by constructing new ditches or reconstructed ditches as required.

7.2 Drainage Appliance Maintenance

7.2.1 *Objective*

To ensure that Highway Surfaces are safe and efficiently drained; and water is efficiently channelled, contained and/or carried to ditches and watercourses; to prevent any erosion of the Concession Highway and/or adjacent properties; and to ensure that Drainage Appliances will accommodate peak runoff.

7.2.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO7.2.2a

Remove any obstruction, repair or start (and complete as soon as practicably possible given the conditions) to replace Drainage Appliances within the maximum times shown.

	Summer Highway Classification				
	1&2	3	4	5	6&7
During high water flow as defined by the Province	2 h	4 h	8 h	16 h	32 h
At other times	3 m	4 m	6 m	6 m	6 m

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Legend: m - months, h – hours

PO7.2.2b Remove any obstruction and repair or replace any damaged drainage appliance experiencing reduction in water flow capacity of 50 percent or more, or where there is a history of drainage problems as identified by the Province's Representative, within seven days.

7.2.3 Specific Requirements

- (a) All Concession Highway Drainage Appliances, trash racks and related hardware are to be maintained in working condition.
- (b) Drainage Appliances are to be free of Debris, Winter Abrasive, and sedimentation.
- (c) Drainage Appliances that are missing or worn, bent, broken, folded, disconnected, unravelled or damaged are to be repaired, or replaced if repair is not practicable.
- (d) Biofiltration systems are to be maintained where applicable.
- (e) Damaged asphalt curbs, flumes and spillways are to be replaced if patching is not practicable, in accordance with Section 6.7 [Curb, Island and Barrier Maintenance] of this Appendix.
- (f) Rip-rap is to be placed to fill scour and erosion of Foundation material to prevent future erosion at the inlet and/or outlet of the drainage appliance as approved in writing by the Province's Representative and in accordance with Section 7.3 [Shore, Bank and Watercourse Maintenance] of this Appendix.

7.3 Shore, Bank and Watercourse Maintenance

7.3.1 Objective

To prevent or repair scour and erosion damage to the Concession Highway and its Structures at banks and shores of watercourses.

7.3.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

PO7.3.2a Prepare areas to receive rip-rap and place rip-rap where there has been or there is potential for scour and erosion of natural or man-made shores and their banks within 2 hours, after determining that it is safe to proceed with the work. If the Concessionaire's assessment indicates that the work cannot safely commence within 2 hours, the Concessionaire must notify the Province's Representative and must commence work immediately when the Province's Representative notifies the Concessionaire it is safe to do so.

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PO7.3.2b Maintenance repairs to shores, banks and watercourses are to be completed within 5 days of the elimination of the obstruction.

PO7.3.2c Upstream obstructions and Debris are to be removed annually.

7.3.3 Specific Requirements

- (a) All obstructions, beaver dams and Debris that threaten to break open and cause excessive channel flow or Debris flows with resultant damage to the Concession Highway and its Structures are to be removed; including all trees leaning toward the watercourse and threatening to fall into the water.
- (b) Inspect the Concession Highway and Structures during periods of heavy rainfall or rapid melting, to ensure watercourses are contained and shores and banks are not being scoured or eroded, in accordance with Section 13.2 [Highway Patrol] of this Appendix.
- (c) Immediately, when a shore or bank is being eroded, a watercourse is not contained or there is a likelihood it will not be contained, initiate Traffic Control necessary to protect users of the Concession Highway and initiate highway closure procedures, if necessary, in accordance with Section 13.2 [Highway Patrol] of this Appendix.
- (d) Provide for adequate catchment areas for future material and Debris containment; and dispose of all removed Debris.
- (e) Rip-rap is to be of (Class) 50 kg or greater, sufficient to withstand a water flow representing a Flood.

7.4 Engineered Wetland and Water Quality Pond Maintenance

7.4.1 Objective

To maintain engineered wetlands and water quality ponds to allow settling of suspended sediments from road runoff, and filtering of road runoff prior to discharge downstream.

7.4.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

There are no Response Measures for this specification.

7.4.3 Specific Requirements

- (a) No sedimentation buildup.
- (b) Drainage Appliances are to be cleaned, including removing Debris from inlets and outlets and repaired, including worn, bent, broken or damaged appliances.

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- (c) Wetlands and quality ponds are to function as designed e.g. achieve the designed level of sediment removal.
- (d) Sediment removal and disposal shall be in accordance with the operational and management manual prepared for the completed wetlands.
- (e) Replace any missing appliances and/or any worn, bent, broken, or damaged Appliances, or install new Drainage Appliances as directed, in accordance with Section 7.2 [Drainage Appliance Maintenance] of this Appendix.
- (f) Place rip-rap where necessary to prevent erosion, in accordance with Section 7.3 [Shore, Bank and Watercourse Maintenance] of this Appendix.

8 WINTER OPERATION AND MAINTENANCE

8.1 Highway Snow Removal

8.1.1 *Objective*

To remove loose snow, slush and compact snow; to protect users of the Concession Highway from situations that are hazardous; to ensure the safe and efficient movement of traffic; and to ensure that the Concessionaire utilizes and deploys those resources that are required to comply with this Section, in a manner which anticipates and responds in advance of a snowfall.

8.1.2 *Performance Measures*

Condition

PO8.1.2a

Ensure that depth of snow accumulations on the full width of the Travelled Lanes are below the maximum allowable accumulations as shown in Table 8.1.2 at all times.

Table 8.1.2 Maximum Allowable Accumulations

Winter Highway Classification	Maximum Allowable Accumulation		
	One Lane Each Direction	Second Lanes	All Other Lanes
A	4.0 cm	8.0 cm	12.0 cm
B	6.0 cm	10.0 cm	16.0 cm
C	10.0 cm	n/a	20.0 cm
D	15.0 cm	n/a	n/a
E	25.0 cm	n/a	n/a

PO8.1.2b

If extended periods of extreme cold make it impossible for the Concessionaire to comply with PO8.1.2e, the Concessionaire must remedy unsafe conditions including but not limited to Roughness and Slippery surfaces.

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PO8.1.2c Keep rest areas, pullouts, parking areas, the Inspection Station, and other areas designated by the Province’s Representative free of slush and compacted snow with the same priority as a highway of the next lower Class from the adjacent highway and designated chain-up areas with the same priority as the adjacent highway.

Response

PO8.1.2d Complete removal of loose snow and slush from Highway Surfaces on all Travelled Lanes on Winter Class A, B, and C highways within 2 days of the end of the last measurable snowfall. Class D highways shall be plowed within 2 days once the accumulation exceeds 5 cm.

PO8.1.2e Remove compacted snow from all Travelled Lanes with paved Highway Surfaces within the times shown, from the end of the last measurable snowfall and the completion of loose snow removal operations on the Travelled Lanes.

Winter Highway Classification			
A	B	C	D
2 d	3 d	7 d	21 d

Legend: d = days

PO8.1.2f Push snow and ice beyond the Shoulder edge within the times shown from the end of the last measurable snowfall.

Winter Highway Classification			
A	B	C	D
4 d	6 d	10 d	24 d

Legend: d = days

PO8.1.2g In addition to the above, on Class A and B highways, at all Superelevated curves and other locations where the Shoulder edge is higher than the Travelled Lanes, the Concessionaire must push snow and ice beyond the Shoulder edge within two days of the end of the last measurable snowfall to prevent snowmelt drainage onto the Travelled Lanes. When Guardrail prevents the complete removal of the snow from the Shoulder edge, the Concessionaire must deal with any resulting condition that is hazardous.

PO8.1.2h In addition to the maximum allowable accumulations set out in Table 8.1.2, removal of slush and or broken compact snow from the Travelled Lanes that is hazardous must be completed within the following timeframes:

Winter Highway Classification			
A	B	C	D
90 min	2 hours	4 hours	n/a

Legend: min = minutes and h = hours

8.1.3 Specific Requirements

- (a) When snowfall is forecast, proactively:

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- increase snow and weather observations, monitoring and reviewing current weather station information;
 - extrapolate from observations and broader weather forecasts to anticipate local road conditions;
 - increase patrols as outlined in Section 13.2 [Highway Patrol] of this Appendix;
 - notify and deploy resources in advance, which are sufficient to respond to anticipated snowfall; and
 - communicate internally and externally of actions to be taken.
- (b) In response to unforeseen snowfall:
- notify/deploy resources; and
 - commence removal of snow and slush in accordance with the time frames outlined above.
- (c) Keep Shoulders clear in areas of high pedestrian use, in consultation with local stakeholders.
- (d) Plow Overpass and interchanges without depositing snow on the underlying Concession Highway or railways.

8.1.4 Notes

In allocating resources, appropriate attention must be given to key geographic areas (e.g.: mountain passes, higher elevations, known frequent snowfall and/or blowing snow areas) and areas known to be impacted first by deposits of snowfall and slush prior to the occurrence of the anticipated snowfall to ensure that snow and slush removal will commence early in severely impacted areas.

Ensure optimum proactive service to local stakeholders including but not limited to, local industries (forestry, mining, oil and gas), the Police, Relevant Authorities, commuters and school buses. The routes used by these stakeholders must receive priority service, in the allocation of resources to their road Classifications, and specific to their individual needs.

8.2 Winter Abrasive and Chemical Snow and Ice Control

8.2.1 Objective

To facilitate the safe and efficient movement of traffic on the Concession Highway in winter conditions through the use of Winter Abrasives and chemical snow and ice control applications, and to ensure that the Concessionaire utilizes and deploys resources in a manner which anticipates and responds in advance of a Weather Event.

8.2.2 Performance Measures

Condition

There are no Condition Measures for this specification.

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Response

PO8.2.2a Deploy resources to appropriate locations at least 60 minutes in advance of a forecasted Weather Event.

PO8.2.2b In extended periods of extreme cold, remedy hazardous conditions immediately.

PO8.2.2c Restore traction within the response times, as specified in the following table:

Condition	Location	Winter Highway Classification			
		A	B	C	D
(i) From beginning and or during snowfall	Hills over 5% gradient (one lane each direction)	60 min	90 min	2 h	4 h
	Curves under 60 kilometres per hour	60 min	90 min	2 h	4 h
	School zones & intersections	90 min	2 h	3 h	6 h
	Other locations	2 h	3 h	4 h	8 h
(ii) Freezing rain	All locations	2 h	3 h	5 h	6 h
(iii) Black Ice	All locations	2 h	3 h	5 h	6 h
(iv) After snowfall	All hills (all lanes)	5 h	8 h	24 h	48 h
	All curves	5 h	8 h	24 h	48 h
	All other locations	24 h	36 h	3 d	As required
(v) When Slippery surfaces are encountered during patrol	All locations	IA	IA	IA	IA

Legend: min = minutes, h – hours, d- days, IA – immediate application

PO8.2.2d Compact snow or ice remaining on paved Highway Surfaces, after snowfalls have ended, and snow removal operations on the Travelled Lanes have been completed, is to be removed within the times specified in the following table:

Winter Highway Classification			
A	B	C	D
2 d	3 d	7 d	21 d

Legend: d- days

8.2.3 *Specific Requirements*

- (a) Minimize the development of Slippery surface conditions on the Concession Highway and facilitate the removal of snow, compact snow and ice by application of Winter Abrasives and/or chemicals, as appropriate for the location.
- (b) Deploy resources to appropriately prioritized locations within the highway Classifications, such as mountain passes, higher elevation areas, areas known for the formation of Black Ice, crash sites, Bridge Decks and locations known to have the potential to be hazardous and at locations indicated by the road and weather condition forecast.

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- (c) Monitor road temperatures and condition forecasts through available forecast and information systems and patrols as necessary to support the appropriate pre-Weather Event deployment of resources.
- (d) Acquire and utilize Road Temperature and Condition (RTC) Forecasts to determine if a Weather Event could develop; and, in advance of a forecasted Weather Event, respond by pre-treating the Highway Surface with Winter Abrasives or anti-icing chemicals, as appropriate for the location.
- (e) Utilize data from available forecast and information systems and patrols to monitor existing and developing conditions in order to better time the application of Winter Abrasives or chemicals, as appropriate for the location, in advance of a Weather Event.
- (f) Utilize Road Weather Information Systems (RWIS) data, if available, to determine if previous chemical application residuals are sufficient to maintain pre-Weather Event surface traction when a Weather Event is forecast, and to determine if applications of additional anti-icing or De-icing Chemicals are required to maintain surface traction.
- (g) Utilize other methodologies that may be available, such as thermal mapping, in conjunction with RTC forecasts and other road and weather forecast services, to better identify the locations and areas that may develop hazardous surface conditions as a result of a Weather Event.
- (h) Notify and deploy resources in advance of a Weather Event as required in order that the application of Winter Abrasives, anti-icing and De-icing Chemicals can commence prior to, and during the anticipated weather and surface conditions.
- (i) Use materials in accordance with the maximum allowable particle size for Winter Abrasives and the mean gradation limits when tested according to ASTM C136 and ASTM C117, and as shown on the following table:

	Winter Highway Classification		
	Class A & B	All Class C and Class D paved only	All Class D gravel highways
(i) Maximum particle size	12.5 mm	16 mm	19 mm
(ii) Metric screen size			
19 mm	N/A	N/A	100
16 mm	N/A	100	N/A
12.5 mm	100	N/A	N/A
9.5 mm	N/A	80-100	80-100
4.75 mm	50-95	50-95	50-95
2.36 mm	30-80	30-80	30-80
0-0.600 mm	10-50	10-50	10-50
0-0.300 mm	0-25	0-25	0-25
0-0.075 mm	0-6	0-6	0-6

Note: The figures shown in ii) of the table above represent the percent of material which passes through that particular screen size.

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8.2.4 *Notes*

The Salt Management Plan to be prepared in accordance with Section 8.4 [Salt Management Plan] of this Appendix is an important aspect of the Concessionaire's Winter Maintenance operation for implementing best salt management practices to protect the environment from the negative impacts of road salts. The plan can be prepared as a stand-alone document or incorporated as part of the Operation and Maintenance Plan.

8.3 Roadside Snow and Ice Control

8.3.1 *Objective*

To protect the Concession Highway from drifting snow and falling Debris, snow and ice; and maintain the Roadside free of accumulated snow and ice that may be hazardous for users of the Concession Highway and/or properties; or threaten the functional integrity of the Concession Highway.

8.3.2 *Performance Measures*

Condition

PO8.3.2a Where snowfall accumulations exceed one metre in depth, the Concessionaire must form trenches behind the snow fences to catch blowing snow.

PO8.3.2b Ensure traction has been restored by Winter Abrasive application on sidewalks and pedestrian and cycling facilities having grades over 5 percent.

PO8.3.2c Ensure a minimum of 75% of the sidewalk width on Bridge Structures is clear of snow and ice; and in areas constricted by the Structure to one metre or less in width, ensure the sidewalk is clear full width.

PO8.3.2d No potentially hazardous snow and ice on Overhead Structures.

PO8.3.2e No accumulations of snow and ice to exceed 30 cm in depth from the top of Roadside, median barriers or Bridge railings.

Response

PO8.3.2f Complete the clearing of snow and ice on the Concession Highway, and restore traction on pedestrian facilities, commencing from the time snow removal on adjacent highways is completed, within the times shown on the following table:

	Winter Highway Classification				
	A	B	C	D	E
(i) Bridge sidewalks	24 h	24 h	24 h	3 d	n/a
(ii) Pedestrian Overpasses or Underpasses	24 h	24 h	24 h	n/a	n/a
(iii) Sidewalks, pedestrian and cycling facilities, and sidewalk approaches to Structures, information kiosks and other tourist information facilities	36 h	36 h	36 h	3 d	n/a

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	Winter Highway Classification				
	A	B	C	D	E
(iv) Intersections, medians, Railway Crossings and Railway Crossing Approaches	2 d	3 d	8 d	12 d	20 d
(v) Roadside and median barriers	2 d	3 d	8 d	12 d	20 d
(vi) Sight Distance obstructions	3 d	5 d	8 d	12 d	20 d

Legend: h – hours, d- days

PO8.3.2g

Start removing snow from ditches and/or restoring flow in Drainage Structures, commencing from the time the deficiency was detected by or reported to the Concessionaire, within the times shown in the table below:

	Winter Highway Classification			
	A & B	C	D	E
(i) Remove snow from ditches and/ or restore flow in Drainage Structures	4 h	24 h	3 d	n/a

Legend: h – hours, d- days

PO8.3.2h

Complete construction or maintenance of snow berms and snow fences as follows:

- i) prior to the first annual snowfall for snow fences;
- ii) once sufficient snow has fallen for snow berms; and
- iii) prior to snowfall depths exceeding 1 metre for the construction of trenches behind snow fences.

PO8.3.2i

Snow and ice accumulating on rock faces, tunnel walls, Bridges and all other overhead features must be removed within 8 hours;

PO8.3.2j

Snow and ice must be removed from cattleguards within 8 hours; and

PO8.3.2k

Vertical clearances to overhead Utilities reduced by snow plowing operations must be restored within 3 days after completion of the snow plowing operation.

8.3.3 Specific Requirements

- (a) Remove snow and ice encroaching, overhanging or otherwise accumulating above the Travelled Lanes and Shoulder tops.
- (b) Provide storage requirements for continuing Winter Maintenance operations.
- (c) Remove snow and ice to facilitate drainage.
- (d) Obtain permission for snow fence or snow berm erection from private landowners when necessary.
- (e) Snow and ice removal from all overhead Structure (such as but not limited to Bridges and pedestrian Overpasses) shall be completed in a manner that will not endanger vehicles, pedestrians, property, railways or other facilities below and where snow removal is restricted, remove snow from the Structure and dispose of in an appropriate location.

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- (f) Protect users of the Concession Highway from accumulations of snow and ice such as on overhead Signs, Bridges, and rock faces that have historically affected the Travelled Lanes, or in locations identified by the Province's Representative.
- (g) Winter Abrasives must be in accordance with Section 8.2 [Winter Abrasive and Chemical Snow and Ice Control] of this Appendix.

8.3.4 Notes

Mitigate environmental effects due to the storage and use of de-icing and anti-icing agents. Compliance with operational requirements specified in present and future provincial and federal laws is required.

Where a Sight Distance obstruction occurs at an intersection of highways of different Classifications, use the performance timeframe as established in this Appendix for the highway that is designated at the higher Classification.

8.4 Salt Management Plan

The Salt Management Plan should at a minimum be based on the framework as described in the TAC Salt Management Guide (as required by the Road Salt Code of Practice) and support the following principles:

- safety;
- environmental protection;
- continual improvement;
- fiscal responsibility;
- efficient transportation system;
- accountability;
- measurable progress;
- agency based;
- communication; and
- knowledgeable and skilled workforce.

The plan should be results orientated and fully endorsed by the Concessionaire management team and communicated to their Winter Maintenance operators. The plan should include as a minimum the following:

- salt management policy and objectives;
- situational analysis;
- documentation;
- proposed approaches;
- training;

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- monitoring, record keeping, reporting and analysis; and
- management review.

The plan will include processes to ensure compliance with all Environmental Laws including obtaining all necessary Permits in connection with the services. This includes, but is not limited to using best practices as described in the TAC Salt Management Guide, as required by the Road Salt Code of Practice.

8.5 Salt Usage Report

The Salt Usage Report must provide details on the use of sand, salt and salt substitutes that meets the requirements specified by Environment Canada and the Province's Representative for environmental monitoring and reporting.

9 ROADSIDE OPERATION AND MAINTENANCE

9.1 Roadside Vegetation Control

9.1.1 *Objective*

To control vegetation along the road corridor, including trees, brush, weeds and grass in order to ensure visibility and increased safety for users of the Concession Highway, to control the spread of Noxious Weeds; to ensure effective drainage is not compromised; and to reduce possible fire hazards.

9.1.2 *Performance Measures*

Condition

- PO9.1.2a** Ensure vegetation beyond the Shoulder edge does not:
- i) cause Sight Distance obstructions on curves, intersections of highways, accesses; Railway Crossings and Railway Crossing Approaches;
 - ii) obscure the visibility of Signs, delineators, animal reflectors, other Roadside features or for users of the Concession Highway; and
 - iii) impede drainage.
- PO9.1.2b** Noxious Weeds shall be treated, without the use of herbicides, prior to the development of seed.
- PO9.1.2c** The grass shall not exceed 25 cm along Class 1-5 highway Shoulders, to a width of 1.8 metres beyond the Shoulder edge.
- PO9.1.2d** The grass shall not exceed 25 cm at other Shoulder locations, to a width as determined by the Province's Representative.

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PO9.1.2e The grass shall not exceed 25 cm at rest areas and pedestrian and cycling facilities, within 1.8 metres of pathways, picnic table areas, buildings and other rest area facilities, the Concession Highway and parking areas.

PO9.1.2f There are to be no overhanging limbs within the Concession Highway that are at an elevation of between 0 and 8 meters above the Travelled Lanes as follows:

- i) within 3 meters of the Shoulder edge on Class 1 to 3 highways; and,
- ii) within 2 meters of the Shoulder edge on Class 4 to 7 highways.

PO9.1.2g Control trees and brush when maximum height of the trees and brush above the elevation of the Travelled Lane is reached as specified in the table below.

Summer Highway Classification	Vegetation zone distance from the Shoulder edge where vegetation control is required	Vegetation control is required when trees and brush exceed this height within vegetation zone
Medians and interchanges	1.5 to 15.0 metres	2.0 metres
Class 1 - 6 highways	0.0 to 1.8 metres	0.5 metres
Class 1-3 highways	1.8 to 7.0 metres	3.0 metres
Class 4-6 highways	1.8 to 5.0 metres	4.0 metres
Class 7 highways and pedestrian and cycling facilities	0.0 to 1.8 metres	4.0 metres

PO9.1.2h There shall be no vegetation control cuttings that represent a hazard, obstruct drainage or create a nuisance.

PO9.1.2i There shall be no vegetation within a 5 meter perimeter of Bridges and other Structures to facilitate inspections and maintenance.

PO9.1.2j On public highways designated as scenic highways under Part 4, Division 4 of the *Transportation Act* (British Columbia), brush to the fence line where fences have been erected by the landowner through private property or to the brush line from previous brushing.

PO9.1.2k There shall be no Danger Trees and vegetation on private land that are restricting Sight Distance. The Concessionaire shall firstly secure permission from the landowner, or if unable to secure permission in a timely manner, notify the Province's Representative immediately and perform vegetation control as directed by the Province's Representative.

Response

PO9.1.2l Eliminate Danger Trees within the Project Site that threaten the safety of the travelling public, or that threaten the infrastructure within 7 days.

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9.1.3 *Specific Requirements*

- (a) Control vegetation from the Shoulder edge to the edge of the pavement in accordance with Section 6.4 [Highway Shoulder Maintenance] of this Appendix.
- (b) Mow to the lowest possible height given the terrain, using an industry standard mower.
- (c) Control vegetation as necessary to reduce winter icing problems.
- (d) Remove and control vegetation that obstructs drainage in accordance with Section 7.1 [Ditch and Watercourse Maintenance] of this Appendix.
- (e) As per PO9.1.2j, where fences or previous brushing lines do not exist, the Concessionaire must obtain permission of the landowners to proceed with the maintenance work. Where permission is denied, the Concessionaire must advise the Province's Representative.
- (f) As per PO9.1.2j, only where a highway designated as a scenic highway under Part 4, Division 4 of the *Transportation Act* (British Columbia) passes through properties where the status of the Concession Highway is the subject of litigation, where the Province's Representative determines that the status is questionable, or where it runs through Federal Government lands, is the highway right-of-way considered to be limited to the working surface. In disputed cases, the Concessionaire must take adequate steps to ensure public safety in regard to travel on the Concession Highway before leaving the location.

9.1.4 *Notes*

The Concessionaire is not required to:

- control vegetation beyond the ditch backslope in provincial parks unless such vegetation is hazardous or has potential to become hazardous for users of the Concession Highway or as otherwise directed by the Province's Representative;
- remove standing timber except Danger Trees; and
- remove vegetation, except for Danger Trees, on ground elevations where the elevation is more than 3 metres above or below the Travelled Lane elevation.

All mowing (Shoulder area and rest area) must be reported in Shoulder swath kilometres (ssk); 1 ssk is equal to one swath 1.8 metres wide by 1000 metres long; 1 hectare equals 5.5 ssk.

9.2 Litter Collection and Graffiti Removal

9.2.1 *Objective*

To keep the Concession Highway and associated facilities clean and tidy for public users by the safe and efficient collection and disposal of litter, both loose and in receptacles, and the treating of graffiti.

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9.2.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO9.2.2a

Litter from the Concession Highway that is visible from the Travelled Lanes (including pedestrian and cycling facilities) shall be collected in compliance with the minimum litter collection frequencies specified in the following table:

Summer Highway Classification	Minimum Frequency
Highways with traffic volumes over 50,000 vehicles per day	every 7 d
Other Urban highways	every 21 d
Other Class 1 highways (including pedestrian and cycling facilities)	every 30 d
Other Class 2 highways and designated routes to garbage disposal sites	Every 60 d
Other Class 3 highways	Every 90 d
All other highways	Every 6 m

Legend: d- days, m-months

PO9.2.2b

Graffiti shall be removed or covered within the times listed in the following table:

Summer Highway Classification				
1&2	3	4	5	6&7
3 d	6 d	9 d	15 d	30 d

Legend: d- days

PO9.2.2c

Litter receptacles at rest areas, pullouts and at the Inspection Station shall be emptied every three days or when they become full, whichever occurs first; and pick up and remove all litter in and around rest areas, pullouts and at the Inspection Station at the same time as litter receptacles are emptied.

9.2.3 *Specific Requirements*

- (a) Graffiti on natural features and Concession Highway inventory should be removed or covered to return the marked surface to the original condition if possible: If the graffiti material cannot be removed, apply covering paint of an appropriate colour in a manner to minimize the aesthetic impacts of the repair and in accordance with the paint manufacturer's specifications.
- (b) Report vehicles or equipment abandoned on the Concession Highway to the applicable Police.

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9.3 Rest Area And Roadside Facility Maintenance

9.3.1 *Objective*

To provide safe, clean and sanitary toilet and picnic facilities for users of the Concession Highway through regular inspection, maintenance, cleaning and undertaking of all and any necessary repairs. This includes fixtures and fittings, buildings, adjacent walkways and access roads and parking lots.

9.3.2 *Performance Measures*

Condition

There are no Condition Measures for this specification

Response

PO9.3.2a Any failure of heating, water supply or sewer system at a rest area or Roadside facilities is to be repaired within two hours.

PO9.3.2b Repair any structural components such as broken doors, broken or missing roof vents or roof leaks within 2 hours, and immediately respond to any major repairs, and complete within 14 days.

PO9.3.2c Maintenance on the facilities shall be undertaken within the minimum frequencies indicated in the following table:

Facilities Maintenance	Class A Rest Areas	
	Oct. 15 to March 31 each year (inclusive)	April 1 to Oct. 14 of each year (inclusive)
i) Plumbing fixtures including exterior surfaces of Structures to be cleaned and Disinfected.	Daily	Daily
ii) Check or inspect Structures for damaged, missing or faulty components and complete repairs or replacement	Daily	Daily
iii) Ensure that all heating apparatuses are in working order and that thermostats are set properly	Daily	Daily or more often if required
iv) Toiletry receptacles to be cleaned and restocked.	As required	As required
v) Floors including wall bases, drains and traps to be cleaned and disinfected	3 times per week	Daily
vi) Interior surfaces of partitions, seats, walls including the enamel surfaces, piping and toilet seat hinges to be cleaned	3 times per week	3 times per week
vii) All cobwebs from inside and outside of buildings to be cleared	Daily	Daily or more often if required
viii) Marks and graffiti to be removed from walls	Daily	Daily or more often if required
ix) Remove litter in the area surrounding the building and sweep walkways and remove weeds	Daily	Daily or more often if required

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Facilities Maintenance	Class A Rest Areas	
	Oct. 15 to March 31 each year (inclusive)	April 1 to Oct. 14 of each year (inclusive)
x) Empty and recharge chemical toilets, pump out pit toilets, and maintain a clean, sanitary and odour-free facility	Daily	Daily or more often if required
xi) Remove snow from the outer entrance doors; remove drifting or tracked-in snow in the vestibule areas and clear snow and ice off abutting concrete pads under the drip line of the building roofs; apply salt or other chemicals to ensure paths are kept in a safe condition free from ice and snow	Daily	Daily or more often if required
xii) Interior walls, ceilings and light fixtures to be cleaned and/or washed to maintain sanitary conditions	Weekly	Weekly or more often if required
xiii) Charge pit toilets with a commercial enzyme	Monthly	Weekly
xiv) Maintain composting toilets in accordance with the operating manual for that particular composting toilet	Monthly	Weekly
xv) Monitor sewage level of disposal systems and ensure proper functioning	Bi-monthly	Monthly
xvi) Concrete terrazzo picnic table tops to be cleaned.	Bi-monthly	Weekly
xvii) Prepare concrete terrazzo table tops and apply a minimum of one coat of terrazzo sealer; sand down to base wood and varnish picnic table seats	Yearly	Yearly

PO9.3.2d

For Class B and C rest areas, the Concessionaire must perform maintenance described in above table Sections i), iii), iv), xi) and xii) twice weekly during October 15 through March 31 of each year, three times per week during April 1 through October 14 of each year, and all other maintenance in accordance with the frequencies specified for Class A rest areas. The Concessionaire must maintain appliances located at other Roadside facilities at the same frequencies as indicated for a Class C rest area. Some rest areas, as determined by the Province's Representative, may be closed over the winter months or during other specified periods in which case these maintenance requirements are suspended during the closure.

9.3.3 Specific Requirements

- (a) Ensure the frequency of inspections and testing satisfy all requirements of the *Drinking Water Protection Regulation* under the *Drinking Water Protection Act* (British Columbia) and advise the Province's Representative of any issues arising from water testing along with test results.
- (b) Install interior winter vent covers before first snowfall (or before October 15 of each year at the latest) and remove the covers April 1 of each year at the latest;
- (c) Maintain rest area access roads and parking lots in accordance with all specifications for roads of one Classification lower than the adjacent Concession Highway.

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- (d) Report acts of vandalism and misuse of a rest area or Roadside facility to the Police and the Province's Representative.
- (e) Remove or cover rest area and Roadside facility advance and directional signing and board over or lock entrance doors for those facilities that are closed during the winter in accordance with the requirements for each particular facility.

9.4 Roadside Fence Maintenance

9.4.1 *Objective*

To prevent Wildlife, Livestock and pedestrians from entering onto the Concession Highway and restore the functionality of Specialty Fences.

9.4.2 *Performance Measures*

Condition

PO9.4.2a If Wildlife or Livestock is present on the Concession Highway, provide initial Traffic Control in accordance with Section 10.11 [Highway Traffic Control] of this Appendix until Police or Livestock owners arrive at the scene.

Response

PO9.4.2b Start repairs within 1 hour of detection of defect to fences along the Concession Highway where Livestock is loose or has the potential to get loose where the damage is the result of one of the following:

- i) Motor Vehicle crashes;
- ii) acts of vandalism;
- iii) fallen trees from the Concession Highway;
- iv) slides, fire, Flood; or
- v) other natural occurrences.

PO9.4.2c Start repairs within 24 hours to fences along the Concession Highway where no Livestock is loose or has the potential to get loose where the damage is the result of one of the following:

- i) Motor Vehicle crashes;
- ii) acts of vandalism;
- iii) fallen trees from the Concession Highway;
- iv) slides, fire, Flood; or
- v) other natural occurrences.

PO9.4.2d Complete repairs to all fences along the Concession Highway within 7 days.

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PO9.4.2e Commence repairs to Specialty Fences, when the repair is of a safety-related nature, within 1 hour and complete repairs within 7 days

9.4.3 *Specific Requirements*

- (a) The Concessionaire is required to make permanent repairs to or construct new Specialty Fences to restore their functionality and repair all fences consistent with the existing type of fence or as approved in writing by the Province's Representative.

9.5 Landscape Maintenance

9.5.1 *Objective*

To provide aesthetically pleasing areas of grass and plantations, through the appropriate level of landscaping maintenance.

9.5.2 *Landscaping Classes*

All Grass Areas and Plantation Areas will be identified and classified by the Concessionaire to one of the following definitions. A report listing the areas and classifications shall be prepared and submitted to the Province as required in Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] of this Appendix.

Grass Area

Class 1 Grass: Fine Grass Areas maintained between 4 and 8 cm in height (e.g. “lawn” designation).

Class 2 Grass: Coarser grade Grass Areas maintained between 10 and 20 cm in height (e.g. “rough grass” designation).

Plantation Area

Class 1 Plantation: A landscaped area that is establishing, and requires a greater amount of care to infill and/or achieve its intended purpose.

Class 2 Plantation: An established landscape area that has reached maturity and generally requires a lesser amount of maintenance, and/or a specific type of maintenance, to sustain its intended purpose.

Class 3 Plantation: A naturalized landscape, or Wildlife refuge area, adjacent to Class 1 or Class 2 Plantations that requires minimal maintenance, except for reasons of safety and Noxious Weed control.

9.5.3 *Performance Measures*

The Concessionaire shall maintain healthy, high quality grass as follows.

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Condition

Class 1 Grass Maintenance

PO9.5.3a Grass will be kept between a minimum height of 4 cm and a maximum height of 8 cm. To maintain a good appearance, individual areas will not be left partially mowed at the end of a day and no visible grass clippings will remain on the grass surface after mowing is completed.

PO9.5.3b Grass will be cleanly edged and trimmed where it adjoins curbs and permanent fixtures. Trimming will be completed with each mowing. Edging will be carried out with a blade edger once each year by June 1st.

PO9.5.3c Core type aeration to a depth of 100 mm will be carried out each spring.

PO9.5.3d No damaged or worn out Grass Areas shall exist.

Class 2 Grass Maintenance

PO9.5.3e Grass will be kept between a minimum height of 10 cm and a maximum height of 20 cm and no visible grass clippings will remain on the grass surface after mowing is completed.

PO9.5.3f Trim grass where it adjoins curbs and permanent fixtures when overhanging length exceeds 100mm.

Class 1 Plantation Maintenance

PO9.5.3g Weeds present in individual Plantation Areas, and in the cultivated base of individual trees within Grass Areas, will not exceed 5% of the total area at any time.

PO9.5.3h Maintain edging for the perimeter of beds within Plantation Areas and the cultivated base of individual trees within Grass Areas at all times, except where the plants themselves form a natural defined edge.

PO9.5.3i All salvageable trees and/ or shrubs dislodged by wind, Traffic Crashes, and vandalism will be reinstated to original condition.

PO9.5.3j Bark mulch will be replenished annually to provide a minimum settled depth of 5 cm.

PO9.5.3k No refuse, including litter, all uprooted weeds, pruning, grass clippings, raked leaves or Debris from cultivation will remain within any Plantation Area or Grass Area at the end of the day's operation.

PO9.5.3l Sidewalks and road surfaces will be kept clean of soil Debris and bark mulch.

PO9.5.3m Where irrigation systems are present, such Plantation Area will be irrigated to a minimum penetration of 100 mm once per week.

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Class 2 Mature Plantation Maintenance

- PO9.5.3n** No weed growth above the surface of the vegetative layer.
- PO9.5.3o** Where the outside edge is defined by plant material, prevent expansion beyond the original.
- PO9.5.3p** Visible formed edging in the ground will be maintained as for Class 1 Plantations.
- PO9.5.3q** Use pest control for emergencies only.

Class 3 Naturalized Plantation Maintenance

- PO9.5.3r** Weed control - No Noxious Weeds and other undesirable vegetation to exists longer than one week following detection.
- PO9.5.3s** Litter and Debris clean up - No visible litter and Debris to exists longer than one week following detection.

Response

- PO9.5.3t** Broken irrigation lines to be repaired within three hours of being aware of the defect.
- PO9.5.3u** Complete all other maintenance requirements, in accordance with the specifications included in Section 9.5.4 [Specific Requirements] of this Appendix, within 24 hours of detection of the deficiency.

9.5.4 *Specific Requirements*

- (a) Grass Areas will be treated with slow release sulphur polymer coated fertilizer and lime, in accordance with recommendations provided through annual soil testing carried out in the spring by the Concessionaire.
- (b) Defined Grass Areas which are adjacent to Plantation Areas, but which are not designated as Class 1 Grass, will be mowed to a Class 2 Grass standard.
- (c) The Concessionaire shall ensure that mowing is done in such a manner as to not leave wheel depressions or other damage to the Grass Areas.
- (d) Plantation beds, trees and plants will be healthy and tidy.
- (e) Replacement planting will be in accordance with DBSS and damaged or dead plant material will be replaced with specimens of similar type and of a size as agreed with the Province.
- (f) Plantation beds and individual trees will be fertilized by slow release spike or tablet formulations developed for this purpose, and applied in accordance with manufacturer's recommendations.

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- (g) All plants in Concession Highway Plantation Areas and rest areas will be pruned in accordance with the Concessionaire's developed routine pruning schedule (see Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] of this Schedule).
- (h) Pruning is to be performed in accordance with the originally intended plant form and function, which includes maximization of ground cover conditions, screening effect, and specimen planting, as applicable. Prune plants for health and intended function.
- (i) Herbicides will not be used for weed control at any time.
- (j) Control of insect pests and diseases will be undertaken by the Concessionaire as required, and is responsible for recognition, diagnosis, and timely control of insect pests and diseases. This will involve the use of preventative measures, such as the application of dormant oil sprays together with regular weekly monitoring for problems that arise and require immediate attention.
- (k) The Concessionaire shall hold a valid pesticide license and all chemical applications for the control of insects, pests, and diseases will be performed in accordance with the *Integrated Pest Management Act* (British Columbia) and Regulations thereunder and will be as approved in writing by the Province.
- (l) The Concessionaire shall not apply chemical spray in a manner that results in chemical spray drift and encroachment of the chemical into non-target areas. The Concessionaire is liable for all damages resulting from improper chemical usage.
- (m) Irrigation rates will be adjusted up or down if so directed by the Province and will be done in accordance with local watering restrictions. Sprinkler adjustments will be made, as required, to retain the irrigation design spray patterns.
- (n) Irrigation systems will be pressurized in April of each year and will be winterized in October of each year, or as otherwise directed by the Province.
- (o) Component repairs, including springs and nozzles, will be made, as required, and with original manufacturers' equipment brand and part numbers. Other irrigation system repairs will be made at the direction of the Province.
- (p) Active irrigation systems and water systems, such as wells and water pumps will be kept in good working order at all times.
- (q) Irrigation systems maintenance and repair will be in accordance with the Landscape Irrigation Standards and DBSS.
- (r) Back-flow preventors on site will be tested once each year by an individual certified as an active cross connection control specialist-1 by the BC Section of the American Water Works Association.
- (s) The Concessionaire shall supply and use all required materials including, but not limited to:

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- Pesticides, including insecticides and fungicides, in formulations suited to site-specific problems;
- Fertilizers in the following blends:
For Class 1 Grass sulphur polymer coated formulation, as required for local conditions and in accordance with manufacturer's recommendations; and
For Class 1 Plantations slow release tablet or spike type formulations, in accordance with manufacturer's recommendations.
- Plant material will conform to the Nursery Stock Standards.
- Grass seed, Class 1 (Lawn), Canada #1 grade, in a blend recommended by a local nursery supplier, for the specific purpose required, and for the area being planted, or as specified in original planting contract;
- Bark mulch, horticultural grade, medium grind, fir and/or hemlock bark mulch;
- Lime, agricultural grade, ground dolomite lime of size "60 minus";
- Irrigation system components, such as irrigation heads, controllers, valves, and regular replacement items (e.g. nozzles and sprinklers). All replacement items will be of the original manufacturer's brand or an equivalent model as approved by the Province; and
- Water.

9.5.5 *Notes*

Mowing, edging, trimming, and aeration for Class 1 Grass Maintenance applies to all irrigated and non-irrigated Grass Areas designated or referred to as Class 1 Grass.

9.6 Geotechnical Monitoring

9.6.1 *Objective*

To monitor and respond to issues along the Concession Highway on behalf of the Province

9.6.2 *Specific Requirements*

- (a) Mitigate and monitor any impact of any activities on ground and slope stability;
- (b) Modify the activities to minimize ground stability impacts; and
- (c) Resolve any claims arising from ground stability impacts associated with, or resulting from activities or other events relating to the Concession Highway.

9.7 Access Control Operation

9.7.1 *Objective*

To monitor and coordinate access control operations along the Concession Highway on behalf of the Province

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9.7.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO9.7.2a Monitor access onto the secondary side road roads by 6-monthly inspections. During these inspections, unauthorized/illegal accesses are to be recorded and the access constructor/owner then contacted within 2 weeks and advised of any provincial policies regarding unauthorized access. Appropriate steps are to be taken (e.g. if safety is compromised by presence of the access then notice to the owner to close the access. If safety is not a factor but the presence of the access contravenes applicable provincial policy then advice can be provided to the owner on the process to apply for permission to retain the access).

9.7.3 *Notes*

Access onto any controlled access highway is restricted to the designated access points. Therefore the Concessionaire cannot permit any access contravening that status. However, permission to allow access onto the Concession Highway secondary roads may be considered. Any such applications received are to be dealt with under the Communications Plan and decisions must comply with the Guide to Rural Subdivision Approvals.

10 TRAFFIC OPERATION AND MAINTENANCE

10.1 Traffic Signs Systems

10.1.1 *Objective*

To ensure that Signs are maintained to a high standard.

10.1.2 *Performance Measures*

PO10.1.2a There is not more than 1 missing or damaged or dirty or discoloured Sign within any continuous 5km section.

PO10.1.2b There is not more than 1 Sign, not visible at night from a distance of 160m, with head lights on dipped beam within any continuous 5km section.

PO10.1.2c There are not more than 5 incorrectly aligned Signs within any continuous 5km section.

PO10.1.2d Any Sign which does not meet the minimum reflectivity level specified in Table 10.1.2 must be replaced within 14 days.

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Table 10.1.2 : Minimum Maintained Retroreflectivity Levels					
Sign Colour	Criteria	Sheeting Type (ASTM D4956)			
		III	VII	VIII	IX
White on Red	See (1)	35//7	35//7	35//7	35//7
Black on Orange or Yellow	See (2)	50	50	50	50
	See (3)	75	75	75	75
Black on White	-----	50	50	50	50
White on Green	Overhead	*//15	*//25	250//25	250//25
	Shoulder	120//15	120//15	120//15	120//15

Notes:

Levels in table represent legend retroreflectivity // background retroreflectivity (for positive contrast Signs). Units are cd/lx/m² measured at an observation angle of 0.2 and an entrance angle of -4.0

(1) Minimum Contrast Ratio $\geq 3:1$ (white retroreflectivity \div retroreflectivity)

(2) For text Signs measuring 120 cm or more and all bold symbol Signs

(3) For text Signs measuring less than 120 cm and all fine symbol Signs

* Sheeting type shall not be used.

10.1.3 Specific Requirements

- (a) Signs and associated equipment operate in accordance with their intended design and performance.
- (b) Identification markers are provided, correctly located, visible, clean and legible.

10.2 Sign System Maintenance

10.2.1 Objective

To regulate and facilitate the safe and orderly movement of traffic by use of a signage system that is in good working order, clean and visible, unambiguous and complete and safely installed.

10.2.2 Performance Measures

Condition

PO10.2.2a

Sign Systems that are knocked or blown down are to be reset.

PO10.2.2b

Illegal or unauthorized Signs or Sign Systems on the Concession Highway are to be treated in accordance with Section 214 of the *Motor Vehicle Act* (British Columbia).

PO10.2.2c

Ensure all Sign face overlays, Signs and Sign Systems, including posts and battens, post mounted delineators, reflectors and other delineators are fully compliant with the specified materials clauses below.

Response

PO10.2.2d

Use the following table to establish the maximum time within which the Concessionaire must complete the cleaning, resetting, repair, and/or relocation of Sign Systems, reflectors and post mounted delineators:

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Type of Sign marking (In accordance with Standard Highway Sign Specifications)	Summer Highway Classification		
	1&2	3&4	5,6&7
(i) Regulatory and warning	24 h	24 h	24 h
(ii) School and pedestrian	24 h	2 d	3 d
(iii) Delineators and post mounted delineators	24 h	2 d	3 d
(iv) Parking and stopping	24 h	2 d	3 d
(v) Guardrail reflectors	7d	7 d	7 d
(vi) Animal reflectors	24 h	2 d	N/a
(vii) Direction (guide)	2 d	3 d	7 d
(viii) Information	2 d	3 d	7 d
(ix) Service and attraction	2 d	3 d	7 d
(x) All other Signs and surface reflectors	7 d	7 d	7 d

Legend: h - hours, d - days

PO10.2.2e In addition to PO10.2.2d, make temporary repairs to any regulatory or warning Sign that is determined to be a Damaged Sign as described in the specific requirements below or if any stop or yield Sign is missing; and initiate installation of temporary signage or provide Traffic Control in accordance with Section 10.11 [Highway Traffic Control] of this Appendix immediately.

PO10.2.2f Sign Systems and post mounted delineators required to be removed and reinstalled due to policy changes or to seasonal requirements or changing needs or conditions, at those locations determined by the Province's Representative; shall be relocated within 7 days of defect identification.

PO10.2.2g Regulatory, warning or school and pedestrian Sign face overlays, Signs and/or Sign Systems shall be replaced or installed within 24 hours of defect identification.

PO10.2.2h Guide or information Sign face overlays, Signs and/or Sign Systems are to be:

- i) ordered within 24 hours of receiving direction from the Province's Representative; and
- ii) install new or replacement Signs within 24 hours of delivery.

PO10.2.2i Delineators and all other Sign face overlays, Signs and/or Sign Systems shall be installed within 7 days of any major defect identification.

PO10.2.2j Replace, touch up or re-paint all Sign and flexible delineator posts when the surface is discoloured or damaged and re-paint all wood posts a minimum of once every three years.

10.2.3 Specific Requirements

- (a) Signs shall not be mounted on poles or Structures without the prior approval of the Province's Representative and/or the owner of the poles or Structures.
- (b) Keep all Sign Systems and post mounted delineators clean, legible, adequately reflectorized, erect and correctly located in accordance with the Standard Highway Sign

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Specifications and the Sign Pattern Manual, or as otherwise specified by the Province's Representative.

- (c) Additional details regarding Sign System material requirements are as follows:
- Sign face overlays, Signs and Sign Systems must be as specified in the Standard Highway Sign Specifications and the Sign Pattern Manual.
 - Metal posts and battens are made of perforated, galvanized steel square tubing or of other material as approved in writing by the Province's Representative.
 - All wooden posts and battens are pressure-treated wood surfaced four sides (S4S), with dimensions, colour and shape as specified in DBSS.
 - Flexible delineators are as specified in the Standard Highway Sign Specifications and the Sign Pattern Manual and that plastic or fibreglass delineator posts are in accordance with DBSS.
 - Oil-base, solid colour stain or oil-base exterior paint, compatible primer paint and standard paint colours are as specified in the Standard Highway Sign Specifications and the Sign Pattern Manual, with all materials meeting specifications as to quality, coverage and colour in accordance with DBSS.
 - All hardware is of non-corrosive material to avoid discolouration of Sign and delineator faces.
 - Delineator reflectors and reflective sheeting are in accordance with the Standard Highway Sign Specifications.
 - Concrete and other materials used for production and fabrication of Sign bases are in accordance with Standard Highway Sign Specifications and the Sign Pattern Manual, DBSS, or as otherwise approved in writing by the Province's Representative.
 - Post mounted delineators, animal reflectors and other materials are as approved in writing by the Province's Representative.
 - Replace reflectors with the same type, size and quality as existing and in accordance with the Standard Highway Sign Specifications and the Sign Pattern Manual.
 - Obtain prior approval from the Province's Representative for all re-ordering and design of guide Signs and special information Signs.
 - Guardrail reflectors are as specified in DBSS.
- (d) The Ministry does not currently have a comprehensive or consolidated maintenance manual for Signs. It is therefore expected that the Concessionaire shall develop an integrated process to accomplish an effective Sign maintenance program. The Concessionaire must base its Sign maintenance program on the contents of the TRB Sign Maintenance Manual or other sources as approved by the Province's Representative.
- (e) The Ministry's policy for highway Signs is described as follows:

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- Poorly maintained Signs and other Sign Systems reduce highway safety and spoil the appearance of an otherwise well maintained highway. To be respected by users of the Concession Highway and to be useful and effective, Sign Systems must be correctly used and correctly placed.
 - Effective Signing requires:
 - selection of the correct Sign System for a particular situation;
 - correct location of the Sign System; and
 - ongoing maintenance to ensure that the Sign and its post(s) are in good condition.
 - In order to meet the requirements of the Standard Highway Sign Specifications and the Sign Pattern Manual, the Concessionaire must engage in practices that ensure that all Signs and other Sign Systems are correctly placed, clearly display the necessary messages to ensure the safe and orderly movement of traffic, and meet other safety, aesthetic and economic benefits. This requires that the Concessionaire carry out its obligations in accordance with this Appendix in a manner that minimizes the overall deterioration of Signs and other Sign Systems.
- (f) The following is a description of “Sign Deterioration” for the purposes of this Appendix:
- Each Sign face will be kept visible and legible under both day and night-time conditions. It should be noted that all Signs will gradually deteriorate to a point where the Signs must be Refurbished or replaced. The retro-reflective sheeting of Signs deteriorates from the effects of sunlight, weather, airborne particles, and air pollution. Dirt from road spray, snow and ice removal from the roadway, and air pollution may collect on the Sign sheeting, and, if unchecked, will severely affect the night-time visibility of the Sign; and
 - A Sign face is considered to have lost its retro-reflectivity for night time display when the area of limited retro-reflectivity or blotchy reflectiveness exceeds 25% of the Sign face area. A Sign face is also considered to have lost its retro-reflectivity when the reduced retro-reflectivity overrides the ability of the Sign text, colour, or legend to be effectively presented to users of the Concession Highway or other intended audience.
- (g) A Sign is considered to be a “Damaged Sign” for the purposes of this Appendix, when:
- the Sign is not flat (planar) and properly oriented to the travelling public or other intended audience;
 - either 10 square cm or 1% (whichever is greater) of the Sign face area is damaged, dented, vandalized or otherwise not as new; or
 - the intended message to users of the Concession Highway or other intended audience is unclear or confusing.

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10.3 Pavement Marking

10.3.1 *Objective*

To facilitate the safe and orderly movement of traffic by the use of clearly visible, unambiguous and correct line marking to assist users of the Concession Highway.

10.3.2 *Performance Measures*

Condition

PO10.3.2a When viewed dry or wet in the daytime, Pavement Markings shall be readily visible for a forward distance of 150 metres, or as far forward as possible until obstructed by the road geometry if less than 150 metres.

PO10.3.2b Ensure the night time retro-reflectivity of a longitudinal marking or any other marking under dry conditions must exceed:

Yellow Markings	White Markings
150 millicandela•m ⁻² •lux ⁻¹	200 millicandela•m ⁻² •lux ⁻¹

PO10.3.2c Ensure the night time retro-reflectivity of a thermoplastic longitudinal marking or any other thermoplastic marking under dry conditions must exceed:

Yellow Markings	White Markings
100 millicandela•m ⁻² •lux ⁻¹	180 millicandela•m ⁻² •lux ⁻¹

PO10.3.2d There shall be no longitudinal markings where the length of defective longitudinal marking within a 300m segment exceeds:

- i) 36m continuous or 25% of total on any 300m lane length on curves and barrier lines; and tangent sections less than 300m, or
- ii) 75m continuous or 50% of total on any 300m or greater lane length on tangents.

PO10.3.2e Maintain well-defined Pavement Marking line edges which are free of lateral deviations greater than 10mm from the proposed location alignment as specified in the Manual of Standard Traffic Signs and Pavement Markings or as directed by the Province's Representative.

PO10.3.2f There shall be no transverse markings or other Pavement Markings where the marking has lost its meaning or more than 25% of the marking is defective, or the marking is missing a contiguous area equal to or greater than 500cm².

PO10.3.2g Ensure Pavement Marking lines respect the following parameters:

100mm Specified Line Width	
Dimensional Tolerances	-5mm to +10mm
200mm Specified Line Width	
Dimensional Tolerances	-10mm to +10mm

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PO10.3.2h Ensure Pavement Marking direction dividing, lane dividing or continuity lines do not exceed a maximum dimensional length deviation of +/- 100 mm from existing lengths of line.

PO10.3.2i Keep spacing between painted direction dividing, lane dividing or continuity lines within a maximum length deviation of +/- 100 mm from existing lengths of space.

PO10.3.2j Pavement Markings are not placed within 300 mm of roadway markers.

PO10.3.2k Comply with U.S. Federal specification 595b White 17886 for the colour of white Pavement Markings.

PO10.3.2l Comply with the tolerances outlined in the table below, using a CIELAB colour scale (595b yellow 33538), for the colour of yellow Pavement Markings. CIELAB is defined in ASTM D2244.

Yellow Traffic Paint Colour

	L	a	b
Standard	78.94	7.76	71.93
Maximum	80.94	10.76	77.93
Minimum	76.94	6.26	70.43

Note: Readings taken with Minolta CR-231 or CR-221 colour meter.

PO10.3.2m Apply thermoplastic material at a minimum finished thickness of 3 mm and a maximum finished thickness of 5 mm.

PO10.3.2n Ensure that all Pavement Markings have a skid resistance of greater than 45 British Pendulum Number (BPN) units at any temperature.

PO10.3.2o Ensure Pavement Markings applied with thermoplastic materials have a minimum durability of 2 years from the time of application.

PO10.3.2p Pavement Markings shall be not less than the photographic reference standard of 92% as per ASTM D913.

Response

PO10.3.2q Repair Pavement Markings within 3 months of discovering non-compliance with any of the above Condition Measures.

PO10.3.2r Testing is to be undertaken as a minimum twice annually, once after April 15 and again before September 15 to ensure compliance with the outcomes specified and is to be conducted in accordance with the applicable ASTM standards and the Manual of Standard Traffic Signs and Pavement Markings.

PO10.3.2s Test initial applications of Pavement Markings or re-application of Pavement Markings within 30 days of application.

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10.3.3 Specific Requirements

- (a) Pavement Markings lines are to be straight or of uniform curvature and conform with the tangents, curves, and transitions as specified in the Manual of Standard Traffic Signs and Pavement Markings or as directed by the Province's Representative.
- (b) Paint lane lines, continuity lines and edges lines on tangent section of constant width, straight and parallel to each other to maintain their correct offset from the edge of the pavement and from one another.
- (c) Pavement Markings shall be placed to delineate changes in the number of lanes, variations in roadway width or adjustments in lane width are straight and true.
- (d) Paint Pavement Markings placed on curves to accurately follow the change in direction prescribed by the roadway. Transition from adjacent tangent sections shall occur smoothly and at a constant rate over the specified distance.
- (e) Ensure Pavement Markings always maintain the specified lane width.
- (f) Ensure Pavement Markings have a sufficiently thick cross-section throughout their entire length to completely cover the intended area being marked.
- (g) Apply Pavement Marking for the full length of all ramps, gores and traffic islands where sufficient lane widths exist.
- (h) Ensure Pavement Markings are free of splatter, excessive overspray or other defects and that overspray on roadway markers is avoided.
- (i) Remove all thermoplastic materials that are not bound to the pavement before new thermoplastic materials are applied for repair or replacement.

10.4 Temporary Line Marking and Eradication

10.4.1 Objective

To facilitate the safe and orderly movement of traffic by the use of clearly visible, unambiguous and correct temporary line marking, as and when required to assist users of the Concession Highway.

10.4.2 Performance Measures

Condition

PO10.4.2a No line markings which are superfluous or obsolete or as directed by the Province's Representative shall be retained.

PO10.4.2b The surface must not be damaged as a result of any grinding or other eradication technique used to remove temporary line markings.

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PO10.4.2c All pavement marking materials residue shall be removed and disposed of in a manner acceptable to Relevant Authorities.

Response

PO10.4.2d Place temporary line markings immediately as required to delineate traffic lanes between the centreline, lane lines and turning lanes at locations where the absence of or deficiencies in pavement markings are potentially hazardous.

PO10.4.2e When temporary line markings are required as a consequence of the Concessionaire's provision of Maintenance services, place temporary line markings and eradicate temporary and permanent line markings within 3 hours of completing such Maintenance services.

PO10.4.2f Ensure that temporary line markings bond to the surface and will last for up to 1 month or until the permanent markings are applied.

10.4.3 Specific Requirements

- (a) All temporary line markings are to be in accordance with the Manual of Standard Traffic Signs and Pavement Markings.

10.5 Raised Pavement Markers

10.5.1 Objective

To maintain and replace raised pavement markers, including all reflectorized raised pavement markers.

10.5.2 Performance Measures

Condition

PO10.5.2a There are not more than two consecutive dysfunctional or missing raised pavement markers and not more than six in total within any continuous 1km length. A raised pavement marker is non-compliant if it is not clearly visible at night when viewed from the centre of the lane with headlights on full beam or 80m when headlights are on dipped beam.

PO10.5.2b Site uniformity is maintained by ensuring that replacement road reflectors have equivalent physical and performance characteristics as adjacent raised pavement markers.

PO10.5.2c Reflectors meet the requirements of the Manual of Standard Traffic Signs and Pavement Markings and are listed on Recognized Product List.

PO10.5.2d Raised Pavement Markers are to be surface mounted and not placed in a slot in the pavement nor in snow plowable housings.

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10.6 Post Mounted Delineators

10.6.1 *Objective*

To maintain and replace post mounted delineators.

10.6.2 *Performance Measures*

PO10.6.2a The Concessionaire shall supply and install post mounted delineators on open Shoulder sections.

PO10.6.2b Reflectors with ASTM Type 9 sheeting shall be used.

10.7 Reflectors on Barriers

10.7.1 *Objective*

To maintain and replace reflectors on barriers.

10.7.2 *Performance Measures*

Condition

PO10.7.2a Reflectors shall be mounted on top of barriers and only reflectors designed for top mounting shall be used.

PO10.7.2b Spacing for reflectors is 12.5 m on median barrier, and 25.0 m on Roadside barrier.

10.8 Electrical Systems Maintenance

10.8.1 *Objective*

To manage the serviceability and maintenance aspects of the Electrical Systems consistent with the standards and service levels as delivered to the provincial network and to maintain the electrical system assets to achieve the desired levels of service and limit the extent of asset consumption over the Term.

10.8.2 *Performance Measures*

Condition and Response

PO10.8.2a Roadway, Sidewalk and Bike Lane Lighting - comply with the measures, minimum condition, and response times as set out in the Electrical Maintenance Specification, which include but are not limited to, E-310, E-700 and E-800. The additional services outlined in these specifications will be considered routine Maintenance services and are required to be complied with by the Concessionaire.

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- PO10.8.2b** Traffic Controllers and Signals - comply with the measures, minimum condition, and response times as set out in the Electrical Maintenance Specification, which include but are not limited to, E-110, E-120, E-130, E-700, E-710 and E-800. The additional services outlined in these specifications will be considered routine Maintenance services and are required to be complied with by the Concessionaire.
- PO10.8.2c** Traffic engineering checklists and signal timing sheets for any proposed changes to the signals at any intersection shall be developed in accordance with the Electrical and Traffic Engineering Manual and submitted to the Province's Representative pursuant to the Consent Procedure prior to any alteration being made.
- PO10.8.2d** Ornamental Lighting - comply with the measures, minimum condition, and response times as set out in the Electrical Maintenance Specification, which include but are not limited to, E-350, E-700 and E-800. The additional services outlined in these specifications will be considered routine Maintenance services and are required to be complied with by the Concessionaire.
- PO10.8.2e** Highmast Lighting - comply with the measures, minimum condition, and response times as set out in the Electrical Maintenance Specification, which include but are not limited to, E-320, E-700 and E-800. The additional services outlined in these specifications will be considered routine Maintenance services and are required to be complied with by the Concessionaire.
- PO10.8.2f** Support Structures - comply with the measures, minimum condition, and response times as set out in this Schedule, including, but not limited to Structure cleaning, steel and aluminium Structure maintenance and Bridge and Structure inspection. The Concessionaire is also required to comply with the measures, minimum condition, and response times as set out in the Electrical Maintenance Specification, which include but are not limited to, E-700 and E-800.
- PO10.8.2g** Lightning Protection - comply with any operating instructions and maintenance specifications as directed in CAN/CSA-B72-M87.
- PO10.8.2h** Maintain Uninterruptable Power Supply (UPS) - Repair or replace uninterruptible power supplies and their components, including batteries, in conformance with manufacturers' recommendations. Batteries shall be replaced when their charge falls below 80% of their rated capacity;

10.8.3 Specific Requirements

- (a) Maintenance and Asset Management of the Electrical Systems are to be related to the Concessionaire's Quality Management System.
- (b) All materials must comply with the Electrical and Signing Materials Standards and the Recognized Products List. Individual specifications may provide additional information with respect to the materials that can be used by the Concessionaire.

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- (c) After opening of the SFPR to general traffic, the Concessionaire shall review the traffic signal operations at all intersections within provincial jurisdiction one week, one month, six months and annually thereafter. Updated signal timing sheets and supporting analysis shall be submitted to the Province's Representative in accordance with the Consent Procedure whenever signal timings are to be adjusted.

10.9 Power Distribution

10.9.1 *Objective*

To ensure a continuous supply of electrical power from BC Hydro.

10.9.2 *Specific Requirements*

- (a) Coordinate all required services;
- (b) Provide a list of electrical loads as required; and
- (c) The Concessionaire is responsible for all costs to supply electricity to facilities located within the Concession Highway in accordance with Article 5 [Utilities] of Part 1 of Schedule 4.

10.10 Traffic Monitoring Equipment

10.10.1 *Objective*

To ensure the continuous operation of traffic monitoring equipment that is used to collect accurate traffic data throughout the Concession Highway corridor. The Province must be able to retrieve the traffic count data electronically and in a format compatible with the Province's corporate Traffic Data Management Program, , both during the Term and thereafter, with a 12 month retention period.

10.10.2 *Performance Measures*

Condition

PO10.10.2a

An annual audit program shall be developed in order to perform manual verification of the effectiveness and accuracy of the traffic monitoring equipment. The Concessionaire shall develop annual maintenance checks based on recommendations from the OEM supplier of the chosen technology. Inspection documentation employed by the Province will be made available to the Concessionaire for reference purposes.

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Measure	Description	Deliverable	Compliance
PO10.10.2b	Count	Count all vehicles correctly	95%
PO10.10.2c	Length	Classify vehicles into the Province's vehicle length binning system	95%
PO10.10.2d	Speed	Classify vehicles into the Province's vehicle speed binning system	95%
PO10.10.2e	Classification	Classify vehicles into Province's vehicle axle binning system	95%

PO10.10.2f Count accuracy shall be determined through independent manual vehicle counts funded by the Concessionaire. These counts shall be accumulated and reported annually on April 1st.

PO10.10.2g Vehicle classification accuracy shall be determined by an independent agent, funded by the Concessionaire, by comparing the video images of a statistically significant number of samples of vehicles with the vehicle classification identified for that vehicle. The vehicle accuracy shall be measured annually and reported April 1st.

Response

PO10.10.2h Equipment malfunction may be independently identified by the Province during data retrieval and data management processes. The Concessionaire shall, within three (3) months of the Effective Date, establish communication protocols with the Province to facilitate timely and appropriate maintenance by the Concessionaire.

PO10.10.2i The Concessionaire is required to comply with the measures, minimum condition, and response times as set out in the Electrical Maintenance Specification, including E-420, E-700 and E-800. The additional services outlined in these specifications will be considered routine Maintenance services and are required to be complied with by the Concessionaire.

10.10.3 Specific Requirements

- (a) The Concessionaire is responsible for all installation, operational and maintenance costs associated with the Concession Highway's traffic monitoring equipment.

10.11 Highway Traffic Control

10.11.1 Objective

To keep the Concession Highway safe; and to minimize delays for, and advise users of the Concession Highway of the duration and cause of delays.

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10.11.2 Performance Measures

Condition

- PO10.11.2a** Perform the following in connection with Traffic Control for working personnel and equipment as required during the performance of the Maintenance services; and notwithstanding the Traffic Control Manual:
- i) whenever Full Closures or Lane Closures reduce a two-way road to a single lane, a Traffic Control person must be used to control traffic whenever traffic volume exceeds 100 vehicles per hour, counted in both directions; and
 - ii) in connection with continuously slow-moving operations, use a shadow vehicle as described in the Traffic Control Manual and associated Traffic Control devices on all Class 1-3 highways, except where the use of a shadow vehicle would be hazardous because of poor alignment, gradient or other Sight Distance obstruction, then the Concessionaire must use Traffic Control persons and/or other Traffic Control procedures.

Response

- PO10.11.2b** The Concessionaire must perform Traffic Control immediately, for the following situations:
- i) in response to all situations on the Concession Highway that are potentially hazardous or request a closure of the Concession Highway, as appropriate; and
 - ii) complete closures of the Concession Highway.
- PO10.11.2c** Where traffic flow is restricted due to the operations of the Concessionaire and the delay exceeds 30 minutes, adjust the operations or terminate work until the traffic volume eases.

10.11.3 Specific Requirements

- (a) Obtain the prior written approval of the Province's Representative for any temporary Traffic Control and portable lane control signals. Monitor traffic flows and adjust the timing to ensure optimum traffic flow and safety.
- (b) The design and timing of temporary signals must also receive prior written approval of the Province's Representative and must comply with the relevant provisions of the *Motor Vehicle Act* (British Columbia) and of the Regulations pursuant thereto.
- (c) Utilize the Traffic Control Manual as the primary reference for the placement and use of Traffic Control devices and for Traffic Control procedures, and use in conjunction with other Sign manuals.

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10.12 Overload Permitting

10.12.1 *Objective*

To provide engineering calculations to the Province for the purpose of assessing overload permit applications on the Concession Highway.

10.12.2 *Specific Requirements*

Prepare engineering calculations at the request of the Province so it can assess overload permit applications for vehicles wishing to use the Concession Highway. Calculations to include details on methodology, timelines, and processes.

11 BRIDGE AND STRUCTURE MAINTENANCE

11.1 Highway Structures Maintenance

11.1.1 *Objective*

To provide a safe environment for users of the Concession Highway and to maximize the functional life of the Concession Highway Structures by way of regular and efficient inspection, maintenance, rehabilitation, repair, cleaning and replacement.

11.1.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO11.1.2a

Repair, clean and restore to a fully functional condition, any damaged or deteriorated Concession Highway Structures within the maximum times shown.

Maintenance Requirement	Summer Highway Classification				
	1&2	3	4	5	6&7
a) Debris on sidewalks, pedestrian and cycling facilities, stairways and Underpass floors	24 h	24 h	2 d	2 d	2 d
b) Any malfunction to arrestor beds	24 h	24 h	2 d	2 d	2 d
c) Damaged, destroyed or missing components of dragnet vehicle arresting barriers	3 d	3 d	3 d	3 d	3 d
d) Broken, bent or damaged cattleguards	24 h	2 d	3 d	5 d	10 d
e) Mismatched grades on cattleguard crossings	24 h	2 d	3 d	5 d	10 d
f) Repair of cattleguards and cleaning to a minimum 45cm depth	15 d	15 d	30 d	30 d	30 d
g) Lights out in pedestrian Underpasses	2 d	4 d	6 d	10 d	20 d
h) Walls requiring patching or support	10 d	20 d	30 d	50 d	100 d
i) Sand accumulations on sidewalks, stairways, sidewalks, pedestrian and cycling facilities, and Underpass floors	30 d	2 m	3 m	5 m	10 m

Legend: h – hours, d – days, m – months

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11.1.3 Specific Requirements

- (a) Underpass walls are to be maintained in a uniformly-painted condition using paint materials of an appropriate colour in a manner to minimize the aesthetic impacts of the repair and in accordance with the paint manufacturer's specifications.
- (b) Arrestor beds are to be maintained in accordance with the Province's written instructions as may be amended from time to time for the particular structure or installation.
- (c) Concrete highway Structures are to be maintained in accordance with Section 11.9 [Concrete Structure Maintenance] of this Appendix.
- (d) Steel and aluminum Structures are to be maintained in accordance with Section 11.10 [Steel and Aluminum Structure Maintenance] of this Appendix.
- (e) Bridge pilings and trash racks are to be maintained in accordance with Section 11.11 [Bridge Piling and Trash Rack Maintenance] of this Appendix.
- (f) Retaining structures are to be maintained in accordance with Section 11.12 [Retaining Structure Maintenance] of this Appendix.
- (g) Corrugated steel highway Structures are to be maintained in accordance with Section 11.13 [Multiplate Structure Maintenance] of this Appendix.
- (h) Asphalt components of highway Structures are to be maintained in accordance with Section 6.1 [Highway Pavement Patching and Crack Sealing] of this Appendix.

11.2 Bridge Deck Maintenance

11.2.1 Objective

To provide safe, uniform, smooth, stable and durable surfaces on Bridge Decks and to maximize the functional life of the Structure.

11.2.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

PO11.2.2a Complete the temporary repair of the following deficiencies within the maximum times shown.

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Deck Deficiency	Summer Highway Classification			
	1&2	3&4	5,6 &7	8
a) Pot-holes in concrete and asphalt Decks - Travelled Lane - Remainder of Deck	4 h 2 d	6 h 3 d	24 h 5 d	16 d 30 d
b) Loose sections, broken welds on steel Decks - Travelled Lane - Remainder of Deck	4 h 2 d	6 h 3 d	24 h 5 d	16 d 30 d
c) Welding, repair, and tightening of steel Deck systems	7 d	15 d	2 m	6 m
d) Membrane deficiencies	2 d	7 d	2 m	6 m

Legend: h – hours, d – days, m – months

PO11.2.2b

Permanent repairs to deteriorated concrete and asphalt Bridge Deck systems are to be completed within 6 months.

11.2.3 Specific Requirements

- (a) Ensure the Bridge Deck Systems meet the following condition requirements:
- i) smooth and safe Wearing Surface;
 - ii) repaired area is not to be restricted to visibly deteriorated area;
 - iii) concrete Deck repairs are to be sound, durable and well bonded to the prepared surface;
 - iv) concrete patch finish is to be tined or broomed;
 - v) concrete Bridge Deck cracks Sealed to a minimum depth of 6 mm;
 - vi) patch or crack repair is to match existing Deck profile; and
 - vii) Bridge Deck Systems are to be securely fastened or bonded to the support Structure.
- (b) Complete permanent repairs to the Bridge Deck systems in accordance with this Appendix and the manufacturer's specifications, including but not limited to concrete restoration and concrete crack sealing.
- (c) Repair or replace asphalt Wearing Surfaces in accordance with Section 6.1 [Highway Pavement Patching and Crack Sealing] of this Appendix. Where the intent of the overlay is to provide a waterproofing layer, a pre-fabricated membrane must be applied first.

11.3 Bridge and Structure Cleaning

11.3.1 Objective

To preserve the Bridges and Structures; and to remove dirt, Debris, and deleterious materials that are potentially hazardous for users of the Concession Highway and to maximize the functional life of the Structure.

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11.3.2 *Performance Measures*

Condition

PO11.3.2a Railings and truss members are to be cleaned to a minimum height of 3m above the Deck surface.

Response

PO11.3.2b All surfaces (horizontal and vertical) on Bridges, Structures and associated components are to be cleaned annually.

PO11.3.2c Complete the cleaning to the following Bridge Decks and sidewalks/cycleways in order to remove dirt, Debris, and deleterious materials that are potentially hazardous for users of the Concession Highway within the maximum times shown.

Deck and Sidewalk Locations		Time To Complete
(i)	Fraser River crossings	30d
(ii)	Urban freeways except as described in (i)	90d
(iii)	Urban highways except as described in (i) and (ii)	6m
(iv)	All other highways	1y

PO11.3.2d Structures must be immediately cleaned when conditions are of an urgent nature such as, but not limited to, storms, Debris accumulation and/or crashes.

PO11.3.2e Clean and remove foreign objects from any surfaces where free drainage of the surface is impaired or where they cause moisture retention on surfaces, within 14 days.

11.3.3 *Specific Requirements*

- (a) Structure surface cleaning shall be completed in the spring of each year when reasonable assessment indicates no further Winter Abrasives or chemicals will be applied and within the earliest allowable environmental window, as specified by the appropriate Environmental Authorities, or by June 30th of each year, whichever comes first.
- (b) The Concessionaire must not perform Bridge and Structure cleaning when air temperatures are 0 degrees Celsius or less, or when such air temperatures are anticipated within 24 hours.

11.4 Bridge Drain and Flume Maintenance

11.4.1 *Objective*

To provide effective drainage that carries water away as quickly as possible from Bridge Decks, Superstructures, Substructures and Foundations to prevent damage.

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11.4.2 Performance Measures

Condition

PO11.4.2a There shall be no clogged catchment areas.

PO11.4.2b Ensure flumes can carry water from drain pipes down fill slopes and away from Bridge abutment fills and wing walls.

Response

PO11.4.2c Any clogged drains, catchbasins, steel grill or drain pipe that causes Ponding on Bridge Decks shall be cleaned and unplugged within one hour.

PO11.4.2d Any grills, drains, catchbasins, drain pipes or flumes that are plugged, but do not cause Ponding on Bridge Decks shall be unplugged within 14 days.

PO11.4.2e Complete repair, replacement or anchoring of damaged, missing or loose grills, drains, catchbasins, drain pipes or flumes within 14 days or immediately if they are potentially hazardous.

11.4.3 Specific Requirements

- (a) Inspect grills, drains, catchbasins, drain pipes and flumes monthly, or more frequently if required, to identify drainage problems in areas that historically have frequently plugged drains.

11.5 Bridge Joint Maintenance

11.5.1 Objective

To provide a safe, smooth and stable condition for users of the Concession Highway and to maximize the functional life of the Bridge.

11.5.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

PO11.5.2a Commence maintenance, repairs, or full or sectional replacement to Bridge joints, Bridge joint armour and joint anchor bolts that are potentially hazardous immediately.

PO11.5.2b Complete all maintenance, repairs, or full or sectional replacement to Bridge joints, Bridge joint armour and joint anchor bolts which have the potential to reduce the functional life of the Structure and accelerate the deterioration of

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elements such as Superstructure, Substructure, Bearings, Bearing seats or ballast walls; from the time of defect identification within the following times.

Bridge Joints, Bridge Joint Armours and Joint Anchor Bolts		Summer Highway Classification				
		1&2	3	4	5	6&7
a)	Repair damaged Bridge joint components	2 m	90 d	6 m	6 m	6 m
b)	Repair concrete and armour	4 m	6 m	6 m	6 m	6 m

Legend: d – days, m – months

PO11.5.2c

Complete the replacement of Bridge joint seals within the maximum times shown.

Bridge Joint Seal Replacement	Summer Highway Classification	
	1 & 2	3,4,5,6,7 & 8
	4 m	6 m

Legend: m – months

11.5.3 Specific Requirements

- Bridge joints that are mis-aligned, cracked, worn, shrivelled, leaking, separated from joint walls or abraded are to be repaired or re-sealed or replaced.
- Joint anchor bolts that are damaged, rusted, loose or missing are to be tightened, repaired or replaced as appropriate.
- Armour that is bent, gouged, loose, separated or missing from the concrete Deck is to be tightened, repaired or replaced as appropriate.
- Steel finger joints and sliding plate joints that are loose, cracked, have broken welds or have missing components are to be tightened, repaired or replaced as appropriate.

11.5.4 Notes

The Concessionaire must refer to this Appendix, the manufacturer's specifications, or the Bridge Structural Engineer's design, as applicable.

11.6 Bridge Bearing Maintenance

11.6.1 Objective

To ensure that Superstructure loads are properly transmitted and distributed to the Substructure and that the Superstructure is free to undergo necessary movement without developing damaging stresses that may limit the functional life of the Bridge or affect safety.

11.6.2 Performance Measures

Condition

PO11.6.2a

There shall be no Bearings and/or associated components that are potentially hazardous or have deteriorated to the condition where maintenance and repair

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will not restore the original design function of the particular Bearing, as determined by the Bridge Structural Engineer.

Response

PO11.6.2b Immediately start repairs on Bearings that are potentially hazardous, as determined by the Bridge Structural Engineer and complete within a time frame that is appropriate to the nature and urgency of the repair as determined by the Bridge Structural Engineer.

PO11.6.2c Complete re-aligning and repairing Bearings, repairing or replacing anchor bolts and re-grouting concrete pads and Bearing areas within 6 months.

PO11.6.2d Lubricate Bearings once annually or in accordance with the manufacturer's recommendation.

11.6.3 Specific Requirements

- (a) Clean, lubricate, re-align, re-grout and repair Bearings in accordance with the manufacturer's specifications or original design specifications.
- (b) Maintain and clean all Bearings and associated components that are rusty, mis-aligned, or are covered with Winter Abrasives, dirt or Debris.
- (c) Repair or replace all pads that are damaged, crushed, cracked, split, bulging or torn.
- (d) Repair or replace anchor bolts and pins that are damaged or missing.
- (e) Repair or replace concrete pads and Bearing areas that are cracked or spalled.
- (f) Replacement Bearings and associated components shall be as originally designed or as designed by the Bridge Structural Engineer; and shall be installed using an installation and jacking procedure approved in writing by the Bridge Structural Engineer. The procedure is to be prepared by a Professional Engineer retained by the Concessionaire.

11.7 Bailey and Acrow Bridge Maintenance

11.7.1 Objective

To ensure the safety of users of the Concession Highway and to maintain the structural integrity and a sufficient load-carrying capacity for the intended use.

11.7.2 Performance Measures

Condition

There are no Condition Measures for this specification.

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Response

- PO11.7.2a** Notify the Province's Representative immediately of any incidents of damage and report any indications of potential risk of structural failure in order that a Bridge Structural Engineer may conduct an assessment.
- PO11.7.2b** If the Bridge Structural Engineer determines that there is a risk of structural failure under loading, immediately notify the Province's Representative and take the following actions:
- i) restrict allowable loading of the Bridge;
 - ii) close the Bridge to all vehicular traffic; or
 - iii) close the Bridge to all use,
- and initiate and make repairs immediately.
- PO11.7.2c** Subject to PO11.7.2b, within 48 hours, repair or replace any deficient components.
- PO11.7.2d** In addition to PO11.7.2c, where any component is damaged or deteriorated, but still allows the Bridge to remain structurally sound without a reduction in the load-carrying capacity and to remain safe for users of the Concession Highway, as determined by a Bridge Structural Engineer, the components must be repaired or replaced by the Concessionaire within two months.
- PO11.7.2e** Sway braces, transom clamps, end posts, panel pins or bolts shall be repaired, replaced and/or tightened in accordance with the manufacturer's specifications within one day.
- PO11.7.2f** Any damaged, missing or loose bolts or pins shall be replaced or tightened in accordance with the manufacturer's specifications within two hours.
- PO11.7.2g** Sway braces, transom clamps, and bolts shall be tightened annually in accordance with the manufacturer's specifications.

11.7.3 Specific Requirements

- (a) Provide panels of the same steel section and steel grade as the panels on the existing bailey or acrow Bridge. If an existing bailey Bridge contains panels of differing steel section and/or steel grade, then replacement panels must be at least equal to the strength of the damaged panel as indicated on the attached list of "Bailey Panel Types".
- (b) Ensure bailey BB1 "I" section panels and American BB1 channel section panels are not used as a replacement component in any assembled Structure.
- (c) Perform welding repairs only with the prior approval of a Bridge Structural Engineer.

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11.7.4 Notes

Acceptable bailey panel types are contained in the table below.

No.	Bailey/Acrow Panel Type Details
(i)	<ul style="list-style-type: none"> • Bailey (BB1) with “I” – section verticals and diagonals. • Production pre-war to approximately 1979? by two manufacturers. • Earliest panels have smaller 6” x 6” mid-panel gusset plates vs. more common 9” x 9” plates. Post 1970 panels have reinforcements at sway brace slots to improve fatigue resistance. Some panels TSBB1 circa 1970 had built-in transom clamps. • Strength: <ul style="list-style-type: none"> - steel grade 50C yield 51.5 ksi - allowable single-storey shear 33.6 kips
(ii)	<ul style="list-style-type: none"> • Bailey (BB1) Wartime AMERICAN Panels • These panels have channel-section verticals and diagonals. Steel members may have “U.S. Steel” rolling stamps or “Carnegie U.S.A.” • The chord channels are 4” x 1 3/4”, which are different than all other bailey panels which have 4” x 2” chord channels. • Strength data is unavailable. They are assumed to be as strong as the “I” section panels.
(iii)	<ul style="list-style-type: none"> • Bailey MJBB1 Super Panel • Circa 1966 • Chords 4” x 2” channel • Diagonals/verticals 3” x 1 1/2” channel • Strength: <ul style="list-style-type: none"> - steel grade 50C yield 51.5 ksi - allowable single-storey shear 45 kips <p>Note: The “super” does not designate high strength steel; it merely designates that it is not a “I” section panel.</p>
(iv)	<ul style="list-style-type: none"> • Bailey MJBB1001 Superlife Panels • Circa 1970 • Same as MJBB1 but with improved fatigue details. • Strength: <ul style="list-style-type: none"> - steel grade 50C yield 51.5 ksi - allowable single-storey shear 45 kips
(v)	<ul style="list-style-type: none"> • Bailey TSBB475 - Shear Panels • 1970 to 1976? • Bailey TSBB1 - Low strength • Circa 1979 • Tubular verticals and diagonals; otherwise same as BB1 • Strength: <ul style="list-style-type: none"> - steel grade 50C yield 51.5 ksi - Allowable single-storey shear 54 kips
(vi)	<ul style="list-style-type: none"> • Bailey TSBB1 High strength • After 1980 or 1982 • Identical to low-strength model - only way to distinguish is if panels/chords were marked or if a paper trail exists • Strength: <ul style="list-style-type: none"> - steel grade 55C yield 65 ksi - Allowable single-storey shear 54 kips
(vii)	<ul style="list-style-type: none"> • Compact Bailey • These panels come in standard and high shear strength models. Transoms are located adjacent to verticals. No rakers are used. Chord reinforcing comes in light and heavy sizes and need not be placed on all truss lines. • Strength: <ul style="list-style-type: none"> - steel grade 55C yield 65 ksi - Allowable single-storey shear 50 kips standard

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No.	Bailey/Acrow Panel Type Details
(viii)	<ul style="list-style-type: none"> • Acrow Series 100 or 300 • These panels are unique. Transoms are located 2 per bay inside the diamonds. Rakers are used. Panel height is traditional 5 feet. • Strength: <ul style="list-style-type: none"> - steel grade 55C yield 65 ksi - Allowable single-storey shear 56 kips
(ix)	<ul style="list-style-type: none"> • Acrow Series 700 • Similar to series 100 except panel height is 7.5 feet • Chord reinforcing comes in light and heavy sizes and need not be placed on all truss lines. As of December 1994, no series 700 exists in Province stock.
(x)	<ul style="list-style-type: none"> • Universal Bridging • Similar to Compact Bailey except panel height is 8 feet. No Province stock as of December 1994.

Notes: BB - Bailey Bridging, TS - "Thomas Storey Ltd.", MJ - "Mabey & Johnson Ltd."

11.8 Minor Painting of Bridge Structures

11.8.1 *Objective*

To prevent corrosion in steel components of Bridge Structures, and to present a neat and tidy appearance by maintaining previously coated surfaces or applying new coated surfaces to Bridge Structures and associated components.

11.8.2 *Performance Measures*

Condition

PO11.8.2a Prepare and coat all surfaces of Bridge Structures and steel rail systems to a minimum level consistent with DBSS, where the coating system is deteriorated, broken or damaged and the steel is corroding and rust is apparent.

Response

There are no Response Measures for this specification.

11.8.3 *Specific Requirements*

The Concessionaire must use the same type and quality of material as on the existing Structure or an alternate material as proposed by the Concessionaire and acceptable to the Province's Representative.

11.9 Concrete Structure Maintenance

11.9.1 *Objective*

To restore and maintain the integrity and durability of concrete Structures; to ensure the safety of users of the Concession Highway; and to maximize the functional life of the Structures.

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11.9.2 Performance Measures

Condition

PO11.9.2a Tolerances or deviations of concrete are not to exceed the following limits:

- | | | |
|------|------------------------------------|---------|
| i) | Deck surface | ±3mm |
| ii) | Patches on other surfaces | ± 5 mm |
| iii) | Cross-Sectional dimensions | ± 25 mm |
| iv) | Cover to reinforcing steel minimum | 50 mm |

Response

PO11.9.2b Notify the Province's Representative immediately of any potentially hazardous deterioration or damage to the concrete Structure.

PO11.9.2c If the Bridge Structural Engineer determines that there is a risk of structural failure under loading, immediately notify the Province's Representative and take the following actions:

- i) restrict allowable loading on the Structure;
- ii) close the Structure to all vehicular traffic; or
- iii) close the Structure to all use,

and start repairs immediately as instructed by the Bridge Structural Engineer. Repairs are to be completed within three months, or within a time frame that is appropriate to the nature and urgency of the repair as determined by the Bridge Structural Engineer.

PO11.9.2d All other concrete repairs are to be completed within 6 months.

PO11.9.2e Structural cracks are to be repaired within 6 months.

11.9.3 Specific Requirements

- (a) Repairs are to be completed in a manner that ensures a sound, durable, and well-bonded patch to the prepared surface.
- (b) Remove all deteriorated concrete at the repair site.
- (c) Finish concrete surfaces to match the adjacent finished concrete surface profiles.
- (d) Remove excess epoxy to match existing surface profile.
- (e) Structural cracks are to be repaired by pressure injection of an epoxy material in accordance with the manufacturer's specifications.

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- (f) Seal non-structural cracks of concrete Wearing Surfaces in accordance with Section 11.2 [Bridge Deck Maintenance] of this Appendix.
- (g) The following concrete mixes and patching material specifications are required:

	Minimum compressive strength at 28 days	Maximum nominal size aggregate mm	Maximum Water/Cement ratio by weight	Air content %	Slump maximum mm
1. Deck and Parapet	35 MPa	20	0.42	6 (+/-1)	50
2. Abutments, Piers and Footings	30 MPa	28	0.45	5 (+/-1)	75

- (h) Patching material must achieve minimum 28 day compressive strength of 35 MPa and must be cementitious, non-shrink, non-metallic grout which may be polymer-modified.

11.9.4 Notes

- The above tolerances or deviations in PO11.9.2a are allowable only if they do not prevent the required fit of structural members.
- Materials of the same type and quality as the existing material shall be used or as referred to in Section 1.3 [Materials] of this Appendix.

11.10 Steel and Aluminum Structure Maintenance

11.10.1 Objective

To restore and maintain the integrity and durability of steel and aluminum Structures; to ensure the safety of users of the Concession Highway; and to maximize the functional life of the Structures.

11.10.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

PO11.10.2a If the Bridge Structural Engineer determines that there is a risk of structural failure under loading, immediately notify the Province's Representative and take the following actions:

- restrict allowable loading on the Structure;
- close the Structure to all vehicular traffic; or
- close the Structure to all use,

and start repairs immediately as instructed by the Bridge Structural Engineer. Repairs are to be completed within three months or within a time frame that is

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appropriate to the nature and urgency of the repair as determined by the Bridge Structural Engineer.

PO11.10.2b Complete all other steel and aluminum Structure maintenance within four months.

11.10.3 Notes

Steel and aluminum Structure maintenance includes repair and/or replacement of lost, missing, deteriorated, or corroded pins/rivets, bolts and associated components, including but not limited to, catwalks, ladders, working platforms and fall arrest systems; and replacement of deteriorated steel or aluminum members.

Materials of the same type and quality as the existing material shall be used or as referred to in Section 1.3 [Materials] of this Appendix.

11.11 Bridge Piling and Trash Rack Maintenance

11.11.1 Objective

To ensure structural strength, to prevent scour and to maintain the impact resistance of Bridge pilings.

11.11.2 Performance Measures

Condition

PO11.11.2a Deteriorated Bridge pilings and associated components where maintenance and repair will not restore the original design function of the particular piling shall be replaced, as determined by the Bridge Structural Engineer; and,

PO11.11.2b Repair damaged trash racks and replace trash racks that cannot be repaired.

Response

PO11.11.2c Notify the Province's Representative immediately and the Bridge Structural Engineer shall assess the deficiency and risk of structural failure.

PO11.11.2d If the Bridge Structural Engineer determines that there is a risk of structural failure under loading, immediately notify the Province's Representative and take the following actions:

- i) restrict allowable loading on the Bridge;
- ii) close the Bridge to all vehicular traffic; or
- iii) close the Bridge to all use,

and commence repairs of damaged Bridge pilings and associated components as required within 2 days after receiving instructions from the Bridge Structural Engineer.

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- PO11.11.2e** Complete maintenance and repairs to damaged Bridge pilings and associated components as required within 6 months.
- PO11.11.2f** Complete repairs as soon as reasonably possible where structural damage requires complete re-construction of the pile bent or Bridge Structure.
- PO11.11.2g** Complete non-emergency replacement of piles and associated components within 6 months.
- PO11.11.2h** Remove accumulated Debris as soon as access permits.

11.11.3 Specific Requirements

- (a) Splice piles only if the base of the pile is sound.
- (b) Tighten loose cables and fasteners.
- (c) Replace broken or missing cables and fasteners.
- (d) Repair or replace damaged or missing flashing and armour; and install flashing and armour where previously none was in place as directed by the Bridge Structural Engineer.
- (e) Replacement pilings and associated components shall use pile types and installation procedures prepared by a Professional Engineer retained by the Concessionaire, and acceptable to the Province's Representative.

11.12 Retaining Structure Maintenance

11.12.1 Objective

To ensure the continued safe and stable condition of all Retaining Structures and associated components and maximize functional life.

11.12.2 Performance Measures

Condition

- PO11.12.2a** Retaining Structures showing signs of continued movements are to be repaired, as recommended by a Geotechnical Engineer in consultation with a Bridge Structural Engineer and notify the Province's Representative.
- PO11.12.2b** Any portion of a Retaining Structure showing signs of deterioration, deflection, deformation or settlement; is to be repaired or reinforced.

Response

- PO11.12.2c** Notify the Province's Representative immediately of hazardous or unstable Retaining Structures.

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PO11.12.2d Commence maintenance repairs within 24 hours of becoming aware of deficiency or as directed by the Province’s Representative.

PO11.12.2e Maintain and repair Retaining Structure deficiencies within the time established in the table below.

	Summer Highway Classification			
	1&2	3	4	5, 6 & 7
Maximum Response Time	1 m	2 m	4 m	6m

Legend m - months

PO11.12.2f Accumulations of Debris behind Retaining Structures are to be cleaned out annually, or as required to ensure the Structure functions as designed.

PO11.12.2g Replace Retaining Structure Components where maintenance and repair will not restore the original function of the Structure and complete the replacement of Retaining Structure Components within six months.

11.12.3 Specific Requirements

Replace concrete Retaining Structure Components in accordance with Section 11.9 [Concrete Structure Maintenance] of this Appendix.

11.12.4 Notes

Ensure identified repairs are carried out in order of priority as determined by the Concessionaire to ensure safety and to protect the Concession Infrastructure.

11.13 Multiplate Structure Maintenance

11.13.1 Objective

To allow unimpeded flow through Multiplate Structures and to maximize the functional life of these Structures.

11.13.2 Performance Measures

Condition

PO11.13.2a Multiplate Structure Components and bank and watercourse protection that are potentially hazardous for users of the Concession Highway or adversely affect the functional life of the Structure are to be repaired and/or replaced.

PO11.13.2b The floor area of the Structure shall be protected, as instructed by the Bridge Structural Engineer.

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Response

PO11.13.2c If the Bridge Structural Engineer determines that there is a risk of structural failure under loading, immediately notify the Province's Representative and take the following actions:

- i) restrict allowable loading on the Multiplate Structure;
- ii) close the Multiplate Structure to all vehicular traffic; or
- iii) close the Multiplate Structure to all use,

and initiate and make repairs immediately. Any loose, damaged or missing bolts shall be tightened or replaced within 10 days, or as soon as conditions allow.

PO11.13.2d Subject to PO11.13.2b, repair Multiplate Structures and protect the Multiplate Structure from scour and erosion to the inlet, outlet and Foundation, within 6 months.

11.13.3 Specific Requirements

- (a) Scoured and/or eroded Foundation material at the inlet, outlet, shore, bank and watercourse shall be replaced with concrete or angular rock in accordance with Section 7.3 [Shore, Bank and Watercourse Maintenance] of this Appendix.
- (b) Concrete shall be maintained and repaired in accordance with Section 11.9 [Concrete Structure Maintenance] of this Appendix.
- (c) Asphalt surfaces shall be maintained and repaired in accordance with Section 6.1 [Highway Pavement Patching and Crack Sealing] of this Appendix.

11.14 Bridge Barrier Maintenance

11.14.1 Objective

To provide a structurally sound and safe barrier between pedestrians, vehicles and hazards and to maximize the functional life of the Bridge railing.

11.14.2 Performance Measures

Condition

PO11.14.2a Bridge barrier and rail systems and parapets or any deficiency of any Bridge railings that are potentially hazardous for users of the Concession Highway are to be maintained, repaired or replaced as required.

Response

PO11.14.2b Temporary railing is to be installed, as required, within 24 hours.

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PO11.14.2c Subject to PO11.14.2a, complete maintenance, repairs and/or replacement within 2 months.

11.14.3 Specific Requirements

- (a) Perform concrete repairs in accordance with Section 11.9 [Concrete Structure Maintenance] of this Appendix.
- (b) Maintain Bridge rail systems and parapets to original design.
- (c) Perform minor painting of Bridge rail systems in accordance with Section 11.8 [Minor Painting of Bridge Structures] of this Appendix.

11.14.4 Notes

All fasteners must be hot-dip galvanized.

11.15 Debris Control Structure Maintenance

11.15.1 Objective

To ensure the safety of users of the Concession Highway and to ensure the continued structural and functional integrity of Debris Control Structures.

11.15.2 Performance Measures

Condition

PO11.15.2a Remove any blockage or sediment from relief wells to ensure free drainage into the discharge manifold.

PO11.15.2b Dissipater panels that are damaged or worn are to be removed and replaced.

PO11.15.2c Piezometers associated with Debris Control Structures are to be maintained.

Response

PO11.15.2d Clear flume and basin areas of Debris within one month of any Debris Event; prior to a freshet, and at least once annually.

PO11.15.2e Worn or damaged grillage beams, concrete surfaces, dissipater panels, asphalt pavements, piezometers and relief wells are to be repaired or replaced as required within two months.

PO11.15.2f Relief wells to be cleaned at least once annually.

11.15.3 Specific Requirements

- (a) Maintain all paved surfaces in accordance with Section 6.1 [Highway Pavement Patching and Crack Sealing] of this Appendix.

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- (b) Maintain grillage beams and all concrete Structures in accordance with Section 11.9 [Concrete Structure Maintenance] or Section 11.10 [Steel and Aluminium Structure maintenance] of this Appendix.
- (c) Seal concrete cracks in accordance with Section 11.2 [Bridge Deck Maintenance] of this Appendix.

11.16 Differential Settlement

11.16.1 *Objective*

To monitor and respond to settlement for structures, embankments and roadways

11.16.2 *Performance Measures*

PO11.16.2a Actual foundation, embankment and roadway deformations shall be measured for the Concession Highway at 2 years, 5 years, 10 years and 20 years after the Western Segment Substantial Completion Date and at the Expiry Date. The Concessionaire shall confirm that the required service and ultimate limit states performance of Structures will not be adversely affected by the actual Foundation deformations.

PO11.16.2b Where deformations are found to adversely affect the required performance, the Concessionaire shall design and implement measures to ensure that the required performance and Design Life and Service Life of are achieved.

11.17 Scour Damage

11.17.1 *Objective*

To monitor and remediate any scour damage, erosion and channel instability around Structures.

11.17.2 *Performance Measures*

Condition

PO11.17.2a Scour protection, erosion control, and waterway stabilization measures to be maintained, repaired or replaced.

Response

PO11.17.2b The Concessionaire shall undertake detailed hydro technical inspections every 5 years to ensure the original hydrology/hydraulic analyses and design for Structures is not compromised during Term. This shall include ensuring that all Foundations are protected from scour and adjacent facilities and river banks are properly protected from scour.

PO11.17.2c The Concessionaire shall identify, design and construct all scour protection, erosion control, and waterway stabilization necessary to prevent damage to Structures, roadways or property affected.

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11.18 Cable-Stayed Bridge Monitoring, Inspection, Maintenance and Operation

11.18.1 *Objective*

To conform to the American Society of Civil Engineers (ASCE) and Post-Tensioning Institute (PTI) requirements and guidelines.

11.18.2 *Specific Requirements*

The monitoring, inspection, maintenance and operations for cable-stayed Structures shall conform to the requirements and guidelines provided in the ASCE Guidelines and the PTI Guide specification recommendations for cable stay design, testing and installation.

12 EMERGENCY OPERATION AND MAINTENANCE

12.1 Emergency Response Planning

12.1.1 *Objective*

To provide Emergency Response

12.1.2 *Performance Measures*

Condition

There are no Condition Measures in this specification.

Response

PO12.1.2a Develop and implement an Emergency Response Plan as required by Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] of this Appendix that provides the basis for how the Concessionaire responds to any and all emergencies, such as but not limited to the following:

- i) Floods;
- ii) mud, earth and rockslides;
- iii) avalanches;
- iv) extended winter storms;
- v) toxic spills;
- vi) structural damage;
- vii) Earthquakes;
- viii) forest fires; and
- ix) Traffic Crashes.

PO12.1.2b Ensure that staff contact information is available to the Province, local governments and emergency service providers by March 31 annually and that

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notification will take place that may be required to respond to any and all emergencies.

PO12.1.2c Complete all necessary paperwork and provide all necessary documentation and records (inclusive of taking photographs at Emergency Sites), as may be required by the Province or other Relevant Authorities.

12.1.3 Specific Requirements

- (a) As a minimum, the Emergency Response Plan must address the following:
- Understanding of the British Columbia Emergency Response Management System (BCERMS);
 - Understanding of the provincial Incident Command System (ICS);
 - Concessionaire's response role and responsibilities;
 - Emergency maintenance in accordance with Appendix A [Operation and Maintenance Specification] to this Schedule;
 - Responding to other provincial emergencies;
 - Process for ensuring that current and accurate staff contact information is available;
 - Response and recovery training program for staff; and
 - Documentation.
- (b) Train employees in procedures related to response/recovery and other types of emergency training as required by the Province.
- (c) Cooperate with the Province and other Relevant Authorities when responding to emergencies.

12.1.4 Notes

- The Emergency Response Plan can be prepared as a stand-alone document or incorporated as part of the Operation and Maintenance Plan.
- Recommended references include:
 - Bridge Standards and Procedures Manual;
 - Traffic Control Manual;
 - British Columbia Emergency Response Management System (BCERMS);
 - British Columbia Incident Command System (ICS); and
 - DriveBC User Manual.
- Safety of users of the Concession Highway is paramount and Emergency Response must comply with this Schedule and the Provincial Incident Command System (ICS).

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Emergency Response will receive close public attention and scrutiny and is another critical aspect of management of this Agreement.

- The Concessionaire is required to comply with the British Columbia Emergency Response Management System (BCERMS), which is a comprehensive provincial management system based upon the ICS that ensures a coordinated and organized response and recovery to all emergency incidents and disasters. It provides the framework for a standardized emergency response in British Columbia. The Concessionaire may be called upon to respond to provincial emergencies (e.g. earthquakes and forest fires).

12.2 Highway Incident and Vandalism Response

12.2.1 *Objective*

To protect users of the Concession Highway from conditions that are potentially hazardous; and to restore the movement of traffic

Concession Highway Incident and vandalism response includes Traffic Control and site management for Concession Highway Incidents, communicating and reporting to all necessary parties, and re-establishment of normal travel conditions as soon as practicable.

12.2.2 *Performance Measures*

Condition

PO12.2.2a Prepare for and respond to Incidents and vandalism on the Concession Highway in accordance with the specific requirements below.

PO12.2.2b Evacuate the area if an explosion is possible.

PO12.2.2c Ensure the safety of users of the Concession Highway in the event of a spill within rights-of-way involving Hazardous Substances in accordance with the requirements given in the specific requirements below.

Response

PO12.2.2d Document traffic Incidents attended by the Concessionaire, i.e. take photographs, diary notes, record Concession Highway conditions and locations relating to; and deliver such documents to the Province's Representative when requested, within 3 days of the date of request.

PO12.2.2e Immediately implement Traffic Control in accordance with Section 10.11 [Highway Traffic Control] of this Appendix, in response to Incidents on the Concession Highway (e.g., Motor Vehicle crashes, spills) and remain at the scene until normal traffic flow is restored.

PO12.2.2f Within one week of the Incident or act of vandalism to government property, complete the Province's Chargeable Maintenance Cost Report in accordance with Ministry Form#H0036 and send photographs of the damage.

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12.2.3 Specific Requirements

- (a) Prepare for and respond to Incidents and vandalism on the Concession Highway by:
 - securing the area as required to ensure the safety of users of the Concession Highway;
 - communicating Incidents involving Concession Highway closures to the Province's Representative in accordance with Section 5.1 [Highway Condition Reporting] of this Appendix;
 - containing spills on the Concession Highway in conjunction with and cooperation with Relevant Authorities, Police and the Province;
 - removing vehicles from the Travelled Lanes and Shoulders, as necessary (where this service is not provided by others); and
 - removing and disposing of cargo and Debris from the Travelled Lanes and Shoulders, to restore traffic flow.

- (b) Ensure the safety of users of the Concession Highway in the event of a spill within rights-of-way involving Hazardous Substances in accordance with all Environmental Laws and in accordance with the Canutec Emergency Response Guidebook by:
 - alerting the Province's Representative, Police and Provincial Emergency Program personnel, as required to identify the material and respond to the emergency, and respond as appropriate and in accordance with all applicable laws and regulations;
 - training field personnel and field supervisors in accordance with all applicable laws and regulations for Hazardous Substance material identification and risk assessment; and
 - closing and keeping the Concession Highway closed using, at minimum, Guide 111 of the Canutec Emergency Response Guidebook until the hazard and/or material is identified and appropriate actions have been determined and performed in accordance with all applicable guides, laws and regulations.

- (c) Repair damage to the Concession Highway caused by Incidents or vandalism in accordance with the appropriate specification set out in this Appendix and its Performance Measures.

- (d) In the event of damage to Province property, document all associated costs of removing vehicles, cargo and Debris from the Concession Highway.

- (e) In the event of damage to Government property, complete a Chargeable Maintenance Costs Report in accordance with Ministry Form#H0036 and forwarding that to the Province's Representative. While all costs are to be included in the claim, the reimbursement will be subject to the insurer's policy.

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12.2.4 *Notes*

Transport Canada's Response and Operations Division operates CANUTEC to provide a 24-hour Hazardous Substances reference, data bank and expert assistance service.

Establish and record information in accordance with the *Transportation of Dangerous Goods Regulation* (Canada), Part 8; 8.1- 8.3 and the *Workers Compensation Act* (British Columbia), Division 10 – 172.

12.3 Incident Response

12.3.1 *Objective*

To ensure the safe and efficient movement of traffic by the timely detection and removal of Incidents and other restrictions affecting traffic on the Concession Highway.

12.3.2 *Performance Measures*

Condition

PO12.3.2a

Monitor the Concession Highway 24 hours a day, 7 days a week to:

- i. Detect and verify Incidents in accordance with the requirements of this Schedule, including Sections 13.1 [Highway Inspections] and 13.2 [Highway Patrol] of this Appendix;
- ii. Dispatch and communicate with Concessionaire vehicles attending the Incident site;
- iii. Coordinate Incident response with emergency response agencies, E-Comm, Provincial Highways Condition Centre, MOE and others as required;
- iv. Monitor response;
- v. Record and log Incident details in the Incident management system; and
- vi. Enter Incident-related information into the Incident management system.

PO12.3.2b

Provide response and clearance of obstructions from the Concession Highway by:

- i. Removing all Debris;
- ii. Cleaning up and eliminating any hazards caused by spilled fluids from damaged or disabled vehicles;
- iii. Assisting the police and/or other Emergency Response agencies in Traffic Control or other requested assistance; and
- iv. Provide assistance to users of the Concession Highway to address non-recurring or Incident-related congestion, including but not limited to:
 - Towing or pushing vehicles stopped on the Shoulder or roadway;
 - Providing jump starts, gas, water and minor repairs/service, changing flat tires;

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- Providing transportation for stranded motorists or other users of the Concession Highway to the first available location in order to make their own arrangements for assistance when initial efforts by the responding vehicle operator to fix the problem or attempts to make cellular calls for assistance are unsuccessful.

PO12.3.2c Perform all services in accordance with the Traffic Control Manual, the *Transportation Act* (British Columbia) and the *Motor Vehicle Act* (British Columbia).

PO12.3.2d Maintain the security of the Structures and prevent users of the Concession Highway from gaining access to areas other than the Travelled Lanes or sidewalks, make note of obviously distraught people and report the location of potential suicide Incidents to the Provincial Highways Condition Centre.

Response

PO12.3.2e Provide reports on Incidents to the Province's Representative upon request within 48 hours.

PO12.3.2f Detect Incidents as quickly as possible. This response time is to be established during term and agreed with the Province.

PO12.3.2g Report all Incidents to the Provincial Highways Condition Centre within five minutes of detection.

PO12.3.2h Have an Incident response vehicle, which has the capability to effectively and efficiently manage the Incident, at the scene of an Incident according to the following criteria:

- a) When traffic volumes are equal to or exceed 1,300 vehicles per hour per lane, within fifteen minutes of detection for all Incidents within the Concession Highway
- b) When traffic volumes are less than 1,300 vehicles per hour per lane, within thirty minutes of detection for all Incidents within the Concession Highway.

PO12.3.2i Remove vehicles or other obstructions from the Travelled Lanes of the Concession Highway within ten minutes of the patrol vehicle arrival on scene, except where a Motor Vehicle crash requiring the presence of the police authorities or where the nature of the obstruction is such that it is unreasonable or impractical to remove it, and/or where traffic conditions make it physically impossible to clear it.

PO12.3.2j Report any damage to the Concession Highway to the Provincial Highways Condition Centre within 30 minutes of detection or notification to the Concessionaire.

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12.3.3 Specific Requirements

- (a) Complete a daily log book for noting all traffic disruption Incidents and their circumstances, and make that log book available to the Province upon request.
- (b) The Concessionaire must ensure that all vehicles used to attend an Incident scene are:
 - In compliance with the *Motor Vehicle Act* (British Columbia) and Regulations there under regarding towing vehicles;
 - Capable of direct communication with the Provincial Highways Condition Centre and other patrol vehicles at all times; and
 - Equipped with:
 - fire fighting equipment;
 - basic first aid equipment;
 - safety flares;
 - brooms, shovels, jumper cables, floor jack, tire wrench, basic toolkit, and other equipment as directed by the Province;
 - flashing arrow board;
 - Stop/Slow paddle;
 - Portable rollup type signs (CRASH AHEAD, RIGHT LANE CLOSED, LEFT LANE CLOSED); and
 - 20 liters of liquid absorbing compound.
 - Maintained in a clean and tidy condition at all times and the passenger area is clean and available for transport of one passenger.
- (c) The Concessionaire must ensure that all drivers/operators conduct themselves in a polite and courteous manner and are equipped with:
 - Reflectorized rain gear;
 - Rubber and leather gloves;
 - Eye protection (safety glasses);
 - Regulation safety toed boots;
 - Regulation hard hats;
 - Clean, reflectorized Type 2 orange coveralls; and
 - Name tags and logos on all apparel.
- (d) Maintain the security of the Structures and prevent users of the Concession Highway from gaining access to areas other than the Travelled Lanes or sidewalks, make note of obviously distraught people and report the location of potential suicide Incidents to the Provincial Highways Condition Centre.
- (e) Report pedestrians or cyclists on freeway portions of Highway 1 to the Provincial Highways Condition Centre.

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12.4 Flood Control and Washout Response

12.4.1 *Objective*

To safeguard users of the Concession Highway and adjacent properties; to be proactively prepared for Floods and Washouts; to prevent damage to the Concession Highways and Bridges; to restore traffic movement and to repair damage caused by Flood and Washout events.

12.4.2 *Performance Measures*

Condition

PO12.4.2a Take all actions required to control the flow of water on or adjacent to the Concession Highway and protect and repair the Concession Highway and Bridges, including placement of rip-rap in accordance with Section 7.3 [Shore, Bank and Watercourse Maintenance] of this Appendix if required.

Response

PO12.4.2b Inspect immediately, any potential for damage caused by Flooding or Washout conditions, and implement Traffic Control as necessary.

PO12.4.2c When a Flood or Washout affects the Travelled Lanes, immediately establish at least one through lane for traffic, and commence work to restore the Concession Highway.

PO12.4.2d Immediately inform the Province's Representative where Floods or Washouts result in or necessitate Concession Highway closures and provide detours where necessary.

PO12.4.2e Within 2 days of the end of a storm or other event, identify any potential for further Flooding and/or Washout.

PO12.4.2f Perform Flood control and Washout response as detailed above in accordance with the times indicated in the table below.

Washout Category	Summer Highway Classification				
	1&2	3	4	5	6&7
(i) Washouts completely cutting a highway and isolating a community	45 min	1 h	90 min	150 min	4 h
(ii) Washouts completely cutting a numbered route or main highway other than those covered by (i) above	90 min	2 h	3 h	n/a	n/a
(iii) Washouts cutting one or more lanes of a highway	4 h	6 h	9 h	15 h	24 h

Legend: h – hours, min – minutes

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12.5 Mud, Earth and Rock Slide Response

12.5.1 *Objective*

To safeguard users of the Concession Highway and adjacent properties; to restore traffic movement and to repair damage to the Concession Highway and Bridges caused by mud, earth and rock slides.

12.5.2 *Performance Measures*

Condition

PO12.5.2a At locations that are subject to slides exceeding 100 cubic metres, the Concessionaire shall engage a Geotechnical Engineer to investigate the sites and the Concessionaire must perform work in accordance with the recommendations of such Geotechnical Engineer to prevent rockfall from reaching the Shoulder top and Travelled Lanes.

PO12.5.2b Manage all known locations that are subject to annual slides of less than 100 cubic metres of mud, earth or rock.

Response

PO12.5.2c Immediately inspect any potential for damage caused by mud, earth or rock slides, and implement Traffic Control as necessary.

PO12.5.2d When a mud, earth or rock slide affects the Travelled Lanes, immediately establish at least one through lane for traffic, and commence work to remove mud, earth or rock deposits and restore the Concession Highway after being determined safe to do so.

PO12.5.2e Immediately inform the Province's Representative where slides result in Concession Highway closures and provide detours around the affected sections where necessary.

PO12.5.2f Within 2 days of the end of a storm or other event, identify any potential for further mud, earth or rockslides and notify the Province's Representative.

PO12.5.2g Commence the repair of any damage to Concession Infrastructure resulting from mud, earth and rock slide events in accordance with the appropriate specification set out in this Appendix within the response times shown, and complete the work as soon as reasonably possible.

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		Summer Highway Classification				
		1&2	3	4	5	6&7
(i)	Slides completely blocking a highway and isolating a community	45 min	1 h	90 min	150 min	4 h
(ii)	Slides completely blocking a numbered route or main highway not included in (i) above	90 min	2 h	3 h	n/a	n/a
(iii)	Slides blocking only one or more lanes and restricting traffic	4 h	6 h	9 h	15 h	24 h

Legend: h – hours, min - minutes

12.5.3 Specific Requirements

- (a) Areas suspected of being unstable and locations subject to slides shall be monitored and patrolled in accordance with Section 13.2 [Highway Patrol] of this Appendix.

12.6 Structure Damage Response

12.6.1 Objective

To ensure the safety of users of the Concession Highway, to restore all affected Structures to their original condition, and to maximize their functional life.

12.6.2 Performance Measures

Condition

PO12.6.2a Notify the Province’s Representative where the safety of users of the Concession Highway is potentially compromised and ensure that the Bridge Structural Engineer completes an inspection.

PO12.6.2b Mobilize to reinforce all critical members with temporary bracing or cables if the Bridge Structural Engineer determines that the Structure is sufficiently safe to work on.

Response

PO12.6.2c If the Bridge Structural Engineer determines that there is a risk of structural failure under loading, immediately notify the Province’s Representative and take the following actions until repairs have been completed in accordance with the recommendations of the Bridge Structural Engineer.

- i) restrict allowable loading on the Bridge;
- ii) close the Bridge to all vehicular traffic; or
- iii) close the Bridge to all use,
and construct a detour route.

PO12.6.2d Start installation of temporary barriers or rail placements within 24 hours

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12.6.3 Specific Requirements

- (a) Take photographs of the damage and complete and file the Provincial Chargeable Maintenance Costs Report as applicable.
- (b) Installation of temporary barriers or railing placements in accordance with Section 11.14 [Bridge Barrier Maintenance].

12.7 Temporary Emergency Bridge Installation

12.7.1 Objective

To replace any Bridge that has collapsed or has the potential to collapse with a temporary Structure to allow for the continued performance of the Concession Highway.

12.7.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

PO12.7.2a Immediately report to the Province's Representative any collapse or loss of any Bridge or Structure, or any damage to a Bridge or Structure which may require the installation of a temporary emergency Bridge.

PO12.7.2b Immediately, upon approval by the Province's Representative, start installation of temporary emergency Bridge in accordance with the Bridge Structural Engineer's specifications and complete the work as soon as is reasonably possible.

PO12.7.2c Schedule dismantling, and complete all dismantling and return emergency material owned by the Province to the stockpile site within 1 month of receipt of such direction from the Province's Representative.

12.7.3 Specific Requirements

- (a) Haul, load and unload material at the Emergency Site and return material owned by the Province to the stockpile site when the emergency replacement is required within the Project Site.
- (b) Identify any damaged Province components during the dismantling procedure by marking such components with fluorescent paint at the damaged section and setting these components aside for repair or disposal.
- (c) Steel Deck where it is supplied by the Province is to be installed in accordance with Section 11.2 [Bridge Deck Maintenance] of this Appendix.

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12.8 Natural Event Response

12.8.1 *Objective*

To respond, provide Traffic Control, clean-up, and repair all damage resulting from natural events.

12.8.2 *Specific Requirements*

The following responsibility matrix in Table 12.8.2 provides a summary of the Concessionaire's responsibilities:

TABLE 12.8.2 : Summary of Responsibility		
Activity	Scope of Responsibility	Description of Responsibility
Incident Response – Cleanup & Repair of Asset Damage	Highway & Adjacent Side Roads	The Concessionaire shall be responsible for removing Debris off the road (including Shoulders and Roadside benches) in accordance with Section 12.5 [Mud, Earth and Rock Slide Response] of this Schedule. The Concessionaire shall be responsible for repairing damage caused by natural events as required in accordance with, and subject to, the terms of this Agreement.
Incident Response – Protection	Highway & Adjacent Side Roads	The Concessionaire to engage a Geotechnical Engineer where either: a) Mud/ Earth/ Rock fall/ or Debris slide volumes exceed 1 m3, on the travelled Concession Highway lanes, at any site; b) Significant asset damage; c) Injury occurs; d) One or more lanes are closed by Debris; e) Settlement or other deformation in roadway or Structures; or f) Further instability is likely or there is a perception of further hazard. The Concessionaire is responsible for undertaking critical slope mitigation works, to protect the road from further impact, as recommended by a Geotechnical Engineer, immediately following the event.
Injury or Death	Highway	The Concessionaire is responsible for any litigation arising from negligence relating to the implementation of the unstable slope mitigation program and initial response to open the road following natural events.
	Adjacent Side Roads	The Province is responsible for any litigation relating to the management of slopes. The Concessionaire is responsible for initial response to open the road following natural events.

Notes

- (a) The Province may, at its discretion, supply one person to assist with the annual BC Provincial Rockfall Hazard Rating System rating inspections. This person will monitor for consistency across the province. The Concessionaire shall not rely upon the Ministry person in relation to carrying out their appointed duties.
- (b) The Province will provide an audit function to ensure general compliance with the program objectives.

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12.8.3 Minor Debris Removal Record

All instances where Debris is removed, off the road requires an activity record for the purpose of identifying areas of risk.

The Concessionaire is required to record and file all incidents of road Debris removal resulting from natural events, and include these in the OMR Monthly Report. Details include:

- Date and time;
- Author of Report;
- Highway;
- Location of the event in terms of a route position (Ministry linear referencing methods RFI & LKI) and UTM coordinates;
- Side of the road;
- Weather conditions over preceding 24 hours (rainfall and temperature); and
- Impact on road availability including the time period where the road was affected.

12.9 Seismic Event Response

12.9.1 Post-Earthquake Inspection Plan

- PO12.9.1a** The Concessionaire shall produce a written post-earthquake inspection guide detailing:
- (a) the level of detail of inspection required for each Structure following a significant seismic event;
 - (b) specific components and locations of inspection based on:
 - (i) the specific vulnerabilities of each Structure;
 - (ii) primary mode shapes;
 - (iii) seismic failure mechanism;
 - (iv) areas that are expected to show damage; and
 - (v) areas that must be free of damage;
 - (c) inspection response periods, which shall be within 48 hours of an event; and
 - (d) reporting requirements, including:
 - (i) relevant data from all the seismic instrumentation; and
 - (ii) the result of the inspections and planned remedial actions.

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12.9.2 Reacting to Significant Seismic Events

Performance Measures - Response

The Concessionaire is required to react to significant seismic events as follows:

PO12.9.2a Undertake a post earthquake inspection of Structures within 48 hours of the occurrence of a significant seismic event. The inspection shall be in accordance with the Concessionaire's post earthquake inspection guide.

PO12.9.2b Undertake Structure condition reporting within 7 days of the event and confirm that the seismic instrumentation data was fully received by the current external receivers.

13 INSPECTION

13.1 Highway Inspection

13.1.1 Objective

To develop a comprehensive knowledge of the Concession Highway; to identify deficiencies that require maintenance; and to identify conditions, not covered by the specifications set out in this Appendix, which could affect the Concession Highway.

13.1.2 Performance Measures

Condition

There are no Condition Measures for this specification.

Response

PO13.1.2a A full and comprehensive inspection of the Concession Highway and components of the Concession Highway is to be conducted annually and the results documented.

PO13.1.2b Additional inspections are to be conducted immediately in response to reports by the public, Relevant Authorities, the Police and the Province of any condition that is potentially hazardous.

PO13.1.2c Immediately report to the Province's Representative any hazardous or deficient condition that is not covered by this Agreement or this Appendix.

13.2 Highway Patrol

13.2.1 Objective

To identify conditions that are potentially hazardous; to identify conditions that could threaten the Concession Infrastructure; and attend to existing or changing conditions.

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13.2.2 *Performance Measures*

Condition

There are no Condition Measures for this specification.

Response

PO13.2.2a Patrols of the Concession Highway are to be completed in accordance with the frequencies established in the tables below for each highway Classification:

(i) Summer Highway Classification

	1 & 2	3	4	5	6 & 7
i) At all times	24 h	2 d	7 d	14 d	21 d
ii) During periods of high water flow	2 h	4 h	8 h	16 h	32 h

Legend: h – hours, d – days

(ii) Winter Highway Classification

	A	B	C	D	E
i) At all times	24 h	2 d	7 d	14 d	21 d
ii) Winter patrols (during freezing Temperatures and snowfall)	4 h	8 h	16 h	24 h	36 h

Legend: h – hours, d – days

PO13.2.2b All rockfall onto the Travelled Lanes and Shoulder tops which have occurred during the previous month are to be reported by the issuance to the Province's Representative of a "Rock Fall Report" on Ministry Form #H0207 within 7 days of the end of each month.

PO13.2.2c Take immediate and appropriate action during patrols to protect users of the Concession Highway from hazardous situations.

PO13.2.2d Report to the Province's Representative immediately, upon detection or notification, any conditions which affect the Concession Highway in performing its designed function.

13.2.3 *Specific Requirements*

- (a) During periods of high water flow as determined by the Province's Representative, give appropriate attention to areas known to be impacted first by high water flow.
- (b) When temperatures are fluctuating between freezing and thawing, increase patrols to a frequency that will allow the Concessionaire to respond to changing conditions; and, give appropriate attention to areas known to be impacted first by Weather Events.
- (c) Ensure patrol vehicles are prepared to deal with conditions, by carrying Winter Abrasive or De-Icing Chemical.
- (d) The Concessionaire may patrol using vehicles not equipped to apply chemical or abrasive if Highway Surface conditions on the Concession Highway are bare and dry and if they

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can reasonably be expected to remain so. Under no circumstances will the Concessionaire use vehicles not equipped to apply chemical or abrasive when precipitation is present, anticipated or forecast, or when freeze-thaw situations are present, anticipated or forecast, or when other Slippery conditions are present, anticipated or forecast.

13.3 Bridge and Structure Maintenance Inspection

13.3.1 *Objective*

To develop a comprehensive knowledge of the condition of all Bridges, other Structures and associated components; to identify deficiencies that require maintenance; and to identify conditions, not covered by the specifications set out in this Appendix, that could affect the safety or functionality of Bridges, other Structures and associated components. To develop an inspection program including required documentation and procedures, including inspector training and qualifications.

13.3.2 *Performance Measures*

Condition

PO13.3.2a Deficiencies and movement of Structures and their components shall be monitored and the Province's Representative notified of any hazardous or deficient conditions or potentially hazardous conditions that are not covered by this Agreement or this Appendix.

PO13.3.2b Ensure that load restriction signage is in place on all Bridges with load restrictions.

Response

PO13.3.2c Inspect Bridges, other Structures and associated components within the minimum frequencies shown.

Structure Type	Summer Highway Classification			
	1 & 2	3	4 & 5	6 & 7
(i) Bailey and acrow Bridges	14 d	21 d	2 m	3 m
(ii) Concrete and steel Bridges and other Structures	4 m	6 m	1 y	1 y
(iii) Multiplate Structures	6 m	1 y	1 y	1 y
(iv) Sign Bridges	1 y	1 y	1 y	1 y

Legend: d = days, m = months, y = year

PO13.3.2d Notwithstanding the above table, immediately inspect a Bridge or Structure with a safety or structural deficiency, and continue inspections at a frequency determined by the Bridge Structural Engineer.

PO13.3.2e Operate backup power units, compressors, and other related equipment for a minimum of one hour each month.

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13.3.3 Specific Requirements

- (a) Give special attention during inspections to Bridges with sub-standard load carrying capacity to ensure that existing capacities are maintained or improved.

14 OPERATIONAL VEHICLES STANDARDS

14.1 Vehicle and Equipment Requirements

14.1.1 Objective

To ensure visual consistency for all Concession Highway operational vehicles and equipment throughout British Columbia to allow users of the Concession Highway to easily recognize the presence of Concession Highway operations.

14.1.2 Performance Measures

Condition

- PO14.1.2a** Ensure all operational vehicles and equipment are:
- i. At least 80% yellow (Sherwin-Williams # 36889-67);
 - ii. Outfitted with a fixed amber rotating or strobe light; and
 - iii. Clearly identified as a maintenance vehicle as outlined in Annex 1 of this specification.

- PO14.1.2b** Ensure all fixed amber rotating or strobe lights have:
- i. 360° visibility;
 - ii. Visibility under all operating conditions;
 - iii. Light intensity sufficient to warn motorists under variable operating conditions;
 - iv. High intensity lamps utilized during daylight hours; and
 - v. Light duration of at least 30% of the on/off cycle.

Response

There are no Response Measures for this specification.

14.1.3 Specific Requirements

- (a) All lamps must be dimmable for night work; and
- (b) Technically improved lighting, tested and approved by the Province's Representative, may be used provided the standards outlined in this specification are not altered in a way that would affect public or operational safety.

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15 SEISMIC INSTRUMENTATION

15.1 Seismic Instrumentation

15.1.1 *Objective*

To operate and maintain a proven seismic monitoring system for the Project and respond to events. This system shall include recorders, accelerometers, transducers, gauges and software for real time monitoring of ground motions and structural responses resulting from seismic activity.

15.1.2 *Performance Measures*

Condition

PO15.1.2a

All strong motion networks are required to:

- (i) provide continuous recording with a minimum 24 hour data storage;
- (ii) provide TCP/IP ethernet communications for real-time seismic parameter reporting, with parameters including peak ground acceleration (PGA), peak ground velocity (PGV), peak displacement (PGD) and spectral intensity (SI);
- (iii) provide remote configuration and data retrieval over ethernet; and
- (iv) have integrated, uninterruptible power source (UPS) with more than 5 hours runtime without external power.

PO15.1.2b

Free-field downhole arrays are required to:

- (i) provide free-field ground readings without significant structural influence;
- (ii) provide continuous real time seismic reporting, on-line notification of recorded event and provide remote configuration and downloading over the ethernet (must be broadband, not dial-up);
- (iii) operate from uninterruptible power source (UPS) for at least 3 weeks;
- (iv) be a multi-tasking operating system that provides simultaneous data acquisition and integration; and
- (v) include peripheral equipment for internet connectivity and communications and data processing software compatible with UBC Earthquake Engineering and Pacific Geoscience Centre.

PO15.1.2c

Structural health monitoring systems are required to:

- (i) connect to and provide simultaneous data from accelerometers, transducers and gauges as required;
- (ii) have a programmable trigger level for the acquisition of operational vibrations and structural response as well as strong motion vibrations;

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- (iii) provide continuous real time seismic reporting, on-line notification of recorded event and provide remote configuration and downloading over the ethernet (must be broadband, not dial-up);
- (iv) be a multi-tasking operating system that provides simultaneous data acquisition and interrogation;
- (v) be able to operate from uninterruptible power source (UPS) for at least 3 weeks; and
- (vi) include peripheral equipment for internet connectivity and communications and data processing software compatible with UBC Earthquake Engineering.

15.1.3 Specific Requirements

The seismic monitoring system shall supply near-real-time data to four external receivers including Pacific Geoscience Centre (PGC) and University of British Columbia, Earthquake Engineering Department. Ground motion data exceeding the preset trigger level must be received by PGC in a format compatible with their strong motion network without additional signal processing.

The seismic monitoring system shall provide minimum two weeks data storage with one week of seismic data stored on a continuously renewed basis. When the trigger level is exceeded, the current week of data shall be frozen and one additional week of data shall be stored to capture after-shocks.

The Concessionaire is to test the system occasionally to ensure it is working well and also cooperate with the Province, the BC Provincial Emergency Program and the PGC in testing the entire system as required.

The location and types of seismic monitoring instruments are provided in Table 15.1.3 below:

Table 15.1.3: Location and types of seismic monitoring instruments		
Seismic Instrument Type	Quantity	Location
Strong Motion Network	6	<ul style="list-style-type: none"> ▪ 36th Avenue ▪ 72nd Street ▪ 80th Street ▪ Elevator Road ▪ 132th Street ▪ 104th Avenue
Free-field Downhole Array	2	<ul style="list-style-type: none"> ▪ Highway 17 ▪ Highway 99
Structural Health Monitoring Systems	4	<ul style="list-style-type: none"> ▪ Delta Port Way Overpass, the Sunbury Interchange, the RR Overpass under the Alex Fraser Bridge and the Tannery Road Interchange

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15.2 User Manuals and Maintenance Instructions

15.2.1 *Performance Measures*

Response

PO15.2.1a The Concessionaire is required to produce a written user's guide detailing the exact location and nature of each device, maintenance requirements and how to use the system to obtain data in real time. The user manual must be supplied in draft form to the Province's Representative pursuant to the Review Procedure within one month of installation and finalized one month later following comment from the Province.

16 SAFETY MANAGEMENT

16.1 Safety Management Requirements

16.1.1 *Objective*

To implement a strong road safety culture based on being both proactive in ensuring construction complies with current safe design standards, guidelines and policies and being reactive to existing known hazards by ensuring that higher risk sites are progressively treated.

16.1.2 *Performance Measures*

Condition

PO16.1.2a Reduce the number and severity of crashes (by applying proactive, best practice road safety engineering techniques).

PO16.1.2b Reduce the number of known road safety hazards on the Concession Highway route.

PO16.1.2c Eliminate all serious and fatal crashes where road conditions are deemed to be a contributing factor (mitigate all significant safety hazards along road sections that are reconstructed under this Agreement).

PO16.1.2d Provide appropriate Traffic Control at all maintenance sites, construction sites, planned events, and planned closures.

Response

PO16.1.2e Develop and implement a Safety Management and Intervention Plan as required in Table 4.2 [Schedule of Deliverable Reports and Records – Response Time Measures] of this Appendix.

PO16.1.2f Remedy any hazard within 24 hours of becoming aware of the deficiency and complete permanent repair within 30 days.

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16.1.3 Specific Requirements

- (a) Implement and maintain a crash database for recording and tracking crash incidents which can be used to regularly analyze the crash data to identify safety hazards.
- (b) Stay abreast of and apply technology changes and revisions to safety standards.
- (c) Produce necessary applications for funding to ICBC for safety improvement works and maintain a positive working relationship with ICBC.
- (d) Provide proactive Traffic Management at all work sites and Incidents in accordance with Sections 12.2 [Highway Incident and Vandalism Response] and 10.11 [Highway Traffic Control] of this Appendix.
- (e) The Safety Management and Intervention Plan will, as a minimum, address the following issues:
 - Understanding of compliance with respective laws, regulations and the Workers' Compensation Board requirements;
 - Applying crash data in association with inspections, to identify safety hazards, determine trends and identify improvements to reduce safety risks;
 - A register of identified hazards; and
 - Working with other stakeholders.
- (f) Respective laws, regulations and the Workers Compensations Board (WCB) requirements must be respected at all times.

16.1.4 Notes

The Safety Management and Intervention Plan provides the framework to improve the safety of the Concession Highway corridor and to ensure health and safety systems are established and implemented. It can be prepared as a stand-alone document or incorporated as part of the Operation and Maintenance Plan.