Chapter 9:
Follow-up and Monitoring Programs

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9.0 FOLLOW-UP AND MONITORING PROGRAMS

The objective of the Monitoring Program is to assess whether proper measures and controls are in place and are being properly implemented for environmental protection and human health and safety.

Environmental Assessment (EA) is a planning tool that attempts to predict adverse environmental effects and identify mitigation measures to avoid them or minimize them if avoidance is not possible. As there is a degree of uncertainty about potential effects and the ability of mitigation measures to address those effects, a follow-up program is used to verify the accuracy of the effects assessment and to determine the effectiveness of mitigation measures. The goal of a monitoring program is to ensure that appropriate measures and controls are in place to decrease the potential for adverse environmental degradation during construction, maintenance and operation of projects and to provide clearly defined action plans and emergency response procedures to account for human health and environmental safety. Follow-up and monitoring programs also ensure that a project is proceeding in accordance with conditions as stipulated in regulatory permits and authorizations.

Manitoba Infrastructure (MI) is responsible for the construction and maintenance of highways in the Province of Manitoba including the recently constructed Project 1 - All-Season Road from Berens River First Nation to Bloodvein First Nation. This has provided MI with extensive knowledge regarding the effectiveness of mitigation measures and the planning and implementation of follow-up and monitoring programs. This knowledge has been and will continue to be applied for the proposed Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation (the Project).

9.1 Follow-up Program

MI will implement a follow-up program to verify the accuracy of the EA and to determine the effectiveness of the mitigation measures. The objectives of the follow-up program are as follows.

- Verify predictions of environmental effects identified in the EA.
- Determine the effectiveness of mitigation measures in order to modify or implement new measures where required.
- Support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects.
- Provide information on environmental effects and mitigation measures that can be used to improve and/or support future EAs including Cumulative Effects Assessments (CEA).
- Support environmental management systems used to manage the environmental effects of projects.

Follow-up monitoring programs targeting Valued Components (VCs) will be implemented, where and when appropriate, to demonstrate the accuracy of the predicted Project effects and mitigation on VCs where uncertainty exists. Mitigation measures identified in **Chapter 6** will be implemented and the

effectiveness will be verified through inspection and monitoring. Based on the effects assessment and as noted in **Chapter 8, Section 8.2**, a strategic plan for monitoring the aquatic and terrestrial environments will be developed in association with local liaison committees and appropriate federal and provincial departments to meet MI's commitments and regulatory requirements. The monitoring programs will be outlined in an Aquatic Environment Monitoring Plan and a Terrestrial Environment Monitoring Plan. Monitoring plans will be developed as part of the Construction Phase Environmental Management Plan (CPEMP) **(Chapter 8, Section 8.2)**. The communication mechanisms with local Indigenous communities, stakeholders and regulatory authorities are outlined in **Section 9.4**.

9.1.1 Inspection

Inspection is the organized and routine examination or evaluation of a construction project or activity. Inspection results will be compared to pre-defined requirements and/or standards to determine whether an activity conforms to these. Environmental inspection will provide an essential function in environmental protection and implementation of mitigation measures. The follow-up program will include a comprehensive and integrated inspection program to facilitate effective implementation of environmental protection measures and compliance with regulatory approvals.

Inspectors will visit work sites and inspect for compliance with license and permit(s) terms and conditions and adherence to the Environmental Protection Specifications (ES 130s) and the Environmental Protection Procedures (EPs) described in **Chapter 8**. Environmental inspectors will interact with contractors and MI Project Manager (ex: pre-construction meeting, daily discussions). Inspection activities will be recorded daily with non-compliance reported to MI and the contractor. Inspection activities will be documented and inspection documents will be submitted to the MI Project Manager and Construction Supervisor. Monthly summary reports will also be submitted to the MI Project Manager and senior management. MI will report results to regulatory authorities and will notify regulatory authorities of emergency situations.

9.1.2 Monitoring

Monitoring is the continued observation, measurement or assessment of environmental conditions at and surrounding a construction site or resulting from a construction activity. Monitoring activities will include the following.

- Environmental monitoring to verify the accuracy of the predictions made and the effectiveness of the mitigation measures.
- Compliance monitoring to verify whether a practice or procedure meets licence/authorization/permit or legislated requirements.

Monitoring can determine if environmental effects occur as predicted, if residual effects remain within acceptable/regulatory limits, that criteria or objectives are not exceeded and that mitigation measures are effective. Monitoring allows for adaptive management where the results indicate further environmental protection is required. The specific mitigation measures that will be implemented to reduce or avoid adverse effects to VCs (physical, aquatic, terrestrial, Species at Risk, Indigenous people

and human environments) are outlined in the Assessment of Environmental Effects Before Application of Proposed Mitigation Measures (**Chapter 6, Appendix 6-4)** and described in **Chapter 6, Section 6.4**.

An environmental monitoring program will be developed that addresses all phases of the Project. The monitoring program will allow for adaptive management if monitoring results demonstrate a need for additional environmental protection or enhancement. Monitoring plans will describe parameters to be monitored, methods to be used, roles, responsibilities and reporting requirements.

Appropriate follow-up and environmental monitoring plans for the aquatic and terrestrial environments will be developed in the future through discussion with Manitoba Sustainable Development and local Indigenous communities. The monitoring plans will be shared with community liaison committees and appropriate federal and provincial authorities for their review and comment. Additional monitoring or adjustments to the plans will be made in consideration of the responses received. The communication mechanisms with local Indigenous communities, stakeholders and regulatory authorities are outlined in **Section 9.4**.

9.2 Management Structure

In the event of the observation of non-compliance with legal and/or environmental requirements or contractor obligations to environmental protection, MI will have intervention mechanisms in place in the form of a clearly-defined management structure for reporting, decision-making, correction of non-compliance and monitoring of corrective actions. MI's Environmental Management Plan (EMP), as described in **Chapter 8**, is the tool that will provide the means to confirm that environmental protection activities are being implemented as required. Monitoring, reporting and management decision-making are integral to the various levels and elements of MI's EMP that is modeled after the Environmental Management System produced by the International Organization for Standardization Standard 14001 (**Chapter 8, Figure 8-3**).

The monitoring program will be administered by MI directly and third-party contract administrators, if employed. If outside contract administrators are required, the responsibilities of MI and others will be identified in the Contract Administrator Agreements and described in the Construction Phase EMP. MI Environmental Services Section and Water Management & Structures Division staff will serve as a quality control (service/product oriented) and assurance (process oriented) through audit function for environmental aspects. Inspections will be used to check for compliance with environmental protection requirements outlined in the contract documents.

MI's inspectors will oversee the construction activities of the tendered contracts and monitor for compliance with the construction specifications and regulatory requirements. MI will have an onsite inspector on the work site at all times that work is being undertaken to check that the environmental protection measures are constructed, implemented and maintained (ex: silt fences, sediment barriers) in accordance with contract documents. Environmental inspections will be conducted by civil technologists and other construction inspectors with oversight and periodic inspections by environmental inspectors.

Onsite inspectors will have the authority to issue a stop work order and/or order other additional environmental protection measures deemed necessary to provide environmental protection. Examples of when a stop work order may be issued include, but are not limited to, uncovering human remains or archaeological resources or in the event of a spill. In the event of non-compliance, environmental concerns will be brought to the attention of the Project Manager who will address them with the contractor.

9.3 Compliance Monitoring Program

The environmental compliance monitoring program will monitor the application of action plans and emergency response procedures for environmental protection and human health and safety. Environmental monitoring components are included in MI contracts through ES 130s and further described in EPs described in **Chapter 8, Appendix 8.3 and Appendix 8.2**, respectively. Contractors will be responsible for the preparation and implementation of environmental protection plans, health and safety plans, emergency response plans, erosion and sediment control plans, hazardous materials management plans and the completion of and reporting on applicable monitoring programs. An adaptive management approach will be implemented whereby lessons learned and improvements identified during inspection and monitoring will be applied to continually improve subsequent environmental protection activities. MI will also monitor the application of action plans and emergency response procedures for environmental protection and human health and safety.

9.3.1 Oversight of Design and Construction Plans

The first implementation of monitoring activity occurs through oversight of design and construction plans to confirm that measures to protect the environment are incorporated. This occurs during the Project Planning and Construction Planning phases. Staff from MI's Engineering, Safety and Environment units review design iterations and drafts of contracts as they become available from engineering specialists who are contracted to design and prepare contract tenders for each road or bridge segment of the Project. Contract documents are reviewed to ensure they reflect:

- applicable comments received from the local Indigenous communities and other stakeholders
- environmental design requirements
- mitigation commitments identified in the EIS including:
    - mitigation measures to offset effects to migratory bird and wildlife species of cultural significance obtained from Environment and Climate Change Canada guidelines (Environment and Climate Change Canada 2018)
- other regulatory requirements including:
    - conditions outlined in Environment Act Licence, CEAA 2012 conditions and *Fisheries Act* Authorizations

9.3.2 Preliminary Environmental Monitoring Programs

Contractors will be required to submit their Environmental Protection Plans to the proponent for review and approval, prior to initiating work on the Project in accordance with ES 130.2 (Environmental Protection Plan) and ES 130.3 (Submittals) (**Chapter 8, Appendix 8.3**). The contractor will be responsible for drafting a Water Quality and Fish Protection Plan in accordance with ES 130.3.2.3, for the proponent's review, prior to the start of work.

9.3.3 Construction Monitoring

During construction, contractor activities will be inspected and monitored daily to verify that environmental protection requirements identified in contract specifications, the ES 130s and EPs are being met. Monitoring will also be used to observe if there are environmental effects resulting from sensitive activities (ex: in water works). Construction monitoring inspections will commence with the start of construction and be conducted as described in the Construction Phase EMP (**Chapter 8**). MI onsite inspectors will interact with contractors and MI Project Managers (ex: pre-construction meeting, inspections, other meetings). The activities will include inspections to construction and environmental mitigation measures, ensuring environmental mitigations are installed correctly and are effective during project construction and maintenance activities. Inspections will be conducted on a daily basis during construction activities, with additional inspections and monitoring for erosion and sediment control conducted during and/or immediately after significant rain events.

The contractor will be responsible for ensuring that construction proceeds as required by law and prescribed in the Acts, regulations, authorizations and permits that apply to the Project. Inspections during construction will include fuel storage containers, tank vehicles, dangerous goods and hazardous wastes storage facilities/sites for releases of fuel, dangerous goods or hazardous waste, sediment and erosion controls, clearing and grubbing debris, clean-up and litter controls. The contractor will be required to maintain records such as the dates that inspections took place, the name of the inspector, length of silt fence cleaned and, in the event of debris or deleterious substance releases, the corrective actions that were taken. Standard inspection and reporting forms to maintain a documented record of the site conditions (ex: environmental inspection checklist, daily environmental field report, environmental incident report) will be developed prior to construction as discussed in the Environmental Management Plan Framework (**Chapter 8, Appendix 8-1**).

Construction activities have the potential to introduce sediment and other deleterious substances into watercourses potentially affecting drinking water quality and human health. Potential effects of in-stream construction activities include disturbance to the streambed and bank resulting in erosion and suspension of sediment, alterations to channel hydraulics and discharge of sediment during dewatering.

The primary indicator for these effects is Total Suspended Solids (TSS), with turbidity used as a surrogate for rapid onsite monitoring[1]. Water quality will be monitored during in-water works and/or other construction activities conducted near water, as appropriate. Water quality monitoring is described in EP24 (Water Quality Monitoring) (**Chapter 8, Appendix 8.2**) and will include a turbidity monitoring program to be conducted during in-stream construction activities to document the spatial extent and magnitude of potential effects.

Other sampling may be undertaken to monitor for other water quality properties that may be affected from release of deleterious substances, as appropriate. Data collected at downstream sites will be compared to upstream reference sites (ex: background conditions) to monitor the effects of construction in relation to Manitoba Water Quality Standards, Objectives and Guidelines for protection of Aquatic Life. A list of mitigation items that will be inspected prior to, during and immediately following construction at sites located at or near watercourses is provided in **Appendix 9-1**.

9.3.4 Post-Construction Monitoring

Post construction monitoring (maintenance and operation) will be conducted to verify that permanent measures are working as planned (ex: erosion control measures, revegetation, fish passage at crossing locations) and to allow implementation of adaptive measures if needed. VCs requiring post-construction monitoring will have specific follow-up and monitoring programs developed in consultation with appropriate regulatory bodies and will be based on the results of the pre-construction and construction monitoring programs, specific site situations and requirements of licences, authorizations, permits or legislation. Post-construction monitoring will be conducted for durations appropriate to the conditions being monitored.

Requirements for reclamation and closure of temporary construction facilities, borrow pits and winter roads are addressed in EP19 (Borrow Pit Decommissioning), EP22 (Temporary Site Decommissioning) and EP21 (Winter Road Closure and Reclamation Plan) (**Chapter 8, Appendix 8.2**).

MI will discuss with regulatory authorities the appropriateness of releasing reports/data to the public, as noted in **Section 9.4**, in consideration of the on-going protection of VCs. General update information on the status of monitoring studies will be provided to the local Indigenous communities and the general public in the form of Project briefs (ex: newsletters) and updates to MI's website. MI will take an adaptive management approach in providing appropriate and effective monitoring programs that address feedback received from directly affected communities.

9.4 Reporting

Results from the follow-up and monitoring programs will be provided as appropriate to community liaison and advisory committees, stakeholders, local Indigenous communities and federal and provincial

[1] TSS will be measured in the laboratory and turbidity will also be measured in situ. A relationship between TSS and turbidity will be developed to facilitate the use of more frequent in situ measurements of turbidity to estimate TSS concentrations.

authorities. The content, format, number and frequency of monitoring program reports for regulatory authorities will be determined in accordance with guidance received from regulatory authorities. If the monitoring programs identify any unforeseen environmental effects or the environmental protection measures are not performing as intended, the Manager of Environmental Services will bring such occurrences to the attention of the MI senior leadership and recommend amendments. MI, with its consultants will consider the results from the follow-up and monitoring programs and input received from community liaison committees, regulators and others in its review of the status of the environmental protection activities on an on-going basis and amend programs as necessary. As the proponent/owner of the Project, MI will make final decisions on adjustments to environmental activities.

Reporting on VCs follow-up and monitoring studies will be submitted to MI annually by consultants conducting the studies. Post-construction monitoring reports and data will be made available to regulatory authorities as required. Due to the sensitivity of the information and data contained in post-construction follow-up and monitoring reports (ex: location data of species at risk), MI will discuss with regulatory authorities the appropriateness of releasing reports/data to the public in consideration of the on-going protection of VCs.

General update information on the status of follow-up and monitoring programs will be provided to local Indigenous communities (ex:, Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation, God's Lake Narrows Northern Affairs Community) and the general public in the form of Project briefs (ex: newsletters) and updates to MI's website for the Project. MI is committed to on-going dialogue with local community members regarding the monitoring of species important to traditional use. MI will update the mitigation measures outlined in **Chapter 6, Appendix 6-4** as the Project proceeds and share it with the local Indigenous communities. MI will take an adaptive management approach in providing appropriate and effective monitoring programs that address feedback received from affected communities.

CHAPTER 9 APPENDICES

Appendix 9-1:
Mitigation Inspections at Watercourse Crossings

Mitigation Inspections	Construction Stage		
	Pre-Construction	Construction	Post-Construction
Deleterious Substances Storage, Spill Prevention and Removal			
▪ Spill clean-up kits are present on site.	✓	✓	
▪ Storage and waste containers, including fuel, are located a minimum of 100 m from the high water mark.	✓	✓	
▪ Storage and waste containers are intact/sealed and clearly labeled.	✓	✓	
▪ Waste containers are of sufficient volume for materials requiring disposal.	✓	✓	
▪ Secondary containment is present where necessary and functioning as intended.	✓	✓	
▪ Hazardous waste is being removed from the site regularly.		✓	
▪ Spills/leaks are cleaned up.		✓	✓
▪ All waste (hazardous and non-hazardous) has been removed from site.			✓
Construction and Maintenance Equipment, Machinery and Materials			
▪ Designated vehicle/equipment maintenance and wash down areas are located a minimum of 100 m from the high water mark.	✓	✓	
▪ Designated vehicle/equipment fuelling areas are located a minimum of 100 m from the high water mark.	✓	✓	
▪ Construction vehicles and equipment are clean and free of leaks.	✓	✓	
▪ Equipment and vehicles are being maintained and refuelled a minimum of 100 m from the high water mark.	✓	✓	
▪ All construction equipment and materials have been removed.			✓
▪ All temporary stream crossings or diversions have been removed.			✓
Erosion and Sediment Control			
▪ Appropriate erosion and sediment control measures are in place.	✓		
▪ Erosion and sediment control materials are on site and available for immediate use (ex: silt fencing, erosion control blanket, straw wattle, geotextile).	✓		
▪ Erosion is not occurring (ex: washouts, rilling, slumping).		✓	✓
▪ Water quality downstream matches upstream (turbidity) (ex: sediment plume visible in nearby watercourses, site runoff is visibly turbid).		✓	✓
▪ Existing drainage is adequately managing site run off (ex: runoff is directed away from surfaces that are susceptible to erosion).		✓	✓
▪ Stockpiled materials (ex: overburden, soil piles) are stored a minimum of 100 m from the high water mark and adequately protected.		✓	✓
▪ Erosion and sediment control measures have been properly installed.		✓	✓
▪ Erosion and sediment control measures are adequately maintained and functioning as intended (ex: no excessive sediment accumulation behind silt fencing/check dams, interceptor/diversion ditches intact with no visible signs of channel erosion).		✓	✓

Mitigation Inspections	Construction Stage		
	Pre-Construction	Construction	Post-Construction
Sensitive Areas			
▪ Construction limits and/or any sensitive areas are clearly marked (ex: soft floodplains, unstable banks).	✓	✓	✓
▪ Clearing limits are clearly marked prior to vegetation removal near watercourses.	✓		
▪ Riparian clearing is conducted within the designated area with no vegetation damage or removal outside clearing limits.		✓	✓
Working In/Near Watercourses			
▪ Heavy equipment remains above the high water mark.		✓	
▪ During in-stream works, downstream flows are maintained at all times.		✓	
▪ Pump intakes used in fish bearing waters are screened.		✓	
▪ Pumps are discharged onto a non-erodible surface, such as geotextile or rock apron.		✓	
▪ Work is taking place in accordance with appropriate timing windows for the protection of fish and fish habitat as per regulatory guidelines and/or approvals.		✓	
Remediation			
▪ Disturbed areas and slopes adequately restored and stabilized (ex: rip rap, seeding, plantings).			✓
▪ Crossing sites are physically stable with no visible signs of channel or bank erosion or slumping.			✓
▪ Vegetation in seeded/planted areas is established and growing.			✓