

Table 8-8: Environmental Effects Analysis- Aquatic Biology Environment

| VEC Feature  | Project Phase  | Potential Effect   | Effect Analysis                      |           |                   |          |           |            |            | Effect (without mitigation) | Proposed Mitigation   | Residual Effect   | Overall Significance | Monitoring/ Follow-up |
|--------------|--|--|--------------------------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|---|---|----------------------|-----------------------|
|              |  |  | Ecological Context                   | Magnitude | Geographic Extent | Duration | Frequency | Permanance | Likelihood |                             |   |   |                      |                       |
| Fish Habitat | Construction   | Habitat sedimentation due to erosion   | M                                    | M         | M                 | M        | M         | L          | L          | M                           | Isolation of in-stream working areas; erosion and sediment control (e.g. , sediment barriers such as slit fences, turbidity curtains, surface treatment and revegetation, energy dissipation methods); timing and sequencing of constuction; runoff control measures such as rip rap and silt fencing; appropriate buffer distances (100m or 10m plus 1.5 times slope gradient) | L   | NS                   | M-C                   |
|              |  | Loss of natural habitat within footprint of in-stream construction                       | M                                    | L         | L                 | H        | M         | M          | M          | M                           | Alignment refinement; bridge design; Clear-span bridges; habitat compensation. Instream construction will only occur on habitat that is plentiful and readily available to the local fish stocks; loss will be offset by compensation. Ditches/collection channels replacing fen habitats to create marginal fish habitat.  | L   | NS                   | M-C                   |
|              |  | Disturbance/destruction of fish/fish habitat resulting from deleterious substance spills | M                                    | M         | M                 | L        | L         | L          | L          | M                           | Spill prevention BMPs such as designated re-fuelling areas, re-fuelling pads, emergency spill kits, spill response plans.   | L   | NS                   | M-C                   |
|              |  | Reduced fish populations resulting from a reduction in available productive habitat      | L                                    | L         | L                 | H        | L         | M          | L          | L                           | Alignment selection/refinement; clear-span bridges; habitat compensation; construction site restoration/rehabilitation  | L   | NS                   | M-C                   |
|              | Construction and Operations  | Blockage of fish passage/migration   | L                                    | L         | M                 | M        | L         | L          | L          | L                           | Crossing design to meet DFO criteria for fish passage. DFO design criteria, providing for fish passage, will be applied to all crossings downstream of fish habitat. Routine maintenance (clean-out) of culverts  | L   | NS                   | N                     |
|              |  | Operations and Maintenance   | Habitat sedimentation due to erosion | M         | L                 | M        | H         | L          | L          | L                           | M   | Sediment control (e.g. , sediment barriers, surface treatment and revegetation; timing and sequencing) Runoff control control measures such as silt fencing, rip-rap and revegetation | L                    | NS                    |
|              | Disturbance/destruction of fish/fish habitat resulting from deleterious substance spills |  | M                                    | M         | M                 | L        | L         | L          | L          | M                           | Spill prevention/control BMPs such as designated re-fuelling areas, re-fuelling pads, emergency spill kits, spill response plans. Rehabilitation of construction staging areas, camps and areas used for fuel storage and re-fuelling during construction.  | L   | NS                   | M-O                   |

Table 8-8: Environmental Effects Analysis- Aquatic Biology Environment

| VEC Feature                      | Project Phase               | Potential Effect   | Effect Analysis    |           |                   |          |           |            |            | Effect (without mitigation) | Proposed Mitigation  | Residual Effect | Overall Significance | Monitoring/ Follow-up |
|----------------------------------|-----------------------------|--|--------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|--|-----------------|----------------------|-----------------------|
|                                  |                             |  | Ecological Context | Magnitude | Geographic Extent | Duration | Frequency | Permanence | Likelihood |                             |  |                 |                      |                       |
| Fish Pop'n                       | Construction and Operations | Reduced fish population due to increased fishing resulting from increased access to watercourses   | M                  | M         | M                 | H        | H         | H          | H          | L                           | Destroy and rehabilitate construction access roads and winter road access points following completion of construction.<br>Prohibit construction crews from uncontrolled (unlicensed) fishing and actions that will disturb the fishery<br>Fishery management (licensing, and policing) to minimize uncontrolled fishing<br>Restrict access to major watercourse crossings along the alignment (avoid convenient areas for parking within close proximity; slope treatment such as gabion or concrete slope protection and fencing to deter access to the water's edge) | L               | NS                   | N                     |
|                                  |                             | Reduced fish population resulting from blasting, beaver dam removal, culvert clean-out, working area isolation methods   | M                  | M         | M                 | L        | M         | L          | M          | L                           | Fish salvage; work area isolation; temporary watercourse diversion; timing and sequencing to avoid sensitive seasons   | L               | NS                   | N                     |
| Rare and Endangered Fish Species | Construction                | Potential effects to the population and/or habitat of rare species (chestnut lamprey, shortjaw cisco, lake sturgeon, big mouth buffalo, silver chub, and maple leaf mussel) resulting from construction activities (sedimentation, blasting, in-stream construction, fishing)                                      | L                  | L         | L                 | L        | L         | L          | L          | L                           | Alignment selection/refinement; bridge design; fish salvage & mussel relocation; water management controls (e.g., culvert clean-outs, timing and sequencing of maintenance activities, erosion and sediment control measures); appropriate buffer distances (100m or 10m plus 1.5 times slope gradient); and other mitigation measures to protect fish habitat, as described above   | L               | NS                   | M-C                   |
|                                  | Operations and Maintenance  | Potential effects to the population and/or habitat of rare species (chestnut lamprey, shortjaw cisco, lake sturgeon, big mouth buffalo, silver chub, and maple leaf mussel) resulting from operations and maintenance activities (sedimentation, fish destruction from culvert clean-out/beaver dam removal, etc.) | L                  | L         | L                 | H        | L         | M          | L          | L                           | Water management controls (e.g., culvert and stormwater collection pond clean-out); beaver dam maintenance; timing and sequencing of maintenance activities to avoid sensitive seasons; erosion and sediment control measures; and other mitigation measures to protect fish habitat, as described above   | L               | NS                   | N                     |

Table 8-9: Environmental Effects Analysis - Terrestrial Biology Environment

| VEC Feature | Project Phase               | Potential Effect  | Effects Analysis   |           |                   |          |           |            |            | Effect (without Mitigation) | Proposed Mitigation   | Residual Effect | Overall Significance | Monitoring/ Follow-up |
|-------------|-----------------------------|---|--------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|---|-----------------|----------------------|-----------------------|
|             |                             |   | Ecological Context | Magnitude | Geographic Extent | Duration | Frequency | Permanence | Likelihood |                             |   |                 |                      |                       |
| Caribou     | Construction                | Impacts to the caribou population as a result of increased hunting due to increased access during construction. The area of impact is restricted to the new road segments and construction access roads (excludes the upgrade of Rice River Rd) | H                  | M         | L                 | H        | L         | L          | L-M        | M-H                         | Alignment selected to avoid the major winter area for caribou located a considerable distance to the east, near Atikaki Provincial Wilderness Park.<br>On-going tagging studies will further characterize the variability of caribou movements in response to environmental factors (e.g. forest fires & habitat modification, etc)<br>Access control is the priority action in restricting unlicensed hunting.<br><br>Limit access to construction areas through blockage, signage and policing.<br>Decommission construction access roads as soon as practical.<br>Prohibit construction crews from hunting and actions that will disturb caribou         | L-M             | NS                   | M-C                   |
|             |                             | Disturbance to caribou from construction activities (noise, vibration, dust).   | H                  | M         | L                 | L        | M         | L          | L          | M                           | Alignment selected to avoid the major area of caribou population concentrations located a considerable distance to the east, near Atikaki Provincial Wilderness Park.<br>Limit construction activities such as blasting and excavation during critical calving periods (ie. May-June).  | L               | NS                   | N                     |
|             | Construction and Operations | Caribou habitat alteration as a result of removed habitat (construction) and altered habits from avoidance of operations activities.  | H                  | M         | L                 | L        | H         | H          | H          | H                           | Alignment selected to avoid the major area of caribou population concentrations located a considerable distance to the east, near Atikaki Provincial Wilderness Park.<br>Habitat along the proposed road corridor has limited use by caribou at present based on existing information.<br><br>On-going tagging studies will further characterize the variability of caribou movements in response to environmental factors and provide for adaptive management.   | L               | NS                   | M-O                   |
|             | Operations and Maintenance  | Caribou population impacts resulting from increased hunting due to increased access in summer as a result of all-season operations  | H                  | M         | M                 | H        | M         | M          | M          | H                           | Alignment selected to avoid the major area of caribou population concentrations located a considerable distance to the east, near Atikaki Provincial Wilderness Park.<br>On-going tagging studies will further characterize the variability of caribou movements in response to environmental factors.<br>Destroy and rehabilitate construction access roads and winter road access points following completion of construction.<br><br>Restrict access by physical means -- gated access to be installed on access roads required for on-going operations and maintenance.<br>Extend Chief George Barker Refuge further to input from local First Nations. | L-M             | NS                   | M-C                   |
|             |                             | Caribou population impacts due to vehicular collisions  | H                  | UN        | M                 | H        | M         | M          | L          | L                           | Alignment selected to avoid the major area of caribou population concentrations located a considerable distance to the east, near Atikaki Provincial Wilderness Park.<br>Vehicular mounted noise whistles to reduce the attraction of road to caribou.<br><br>Wildlife fences and other access control measures may be considered in areas where monitoring and follow-up identifies.   | L               | NS                   | M-O                   |
|             |                             | Caribou population impacts resulting from disturbance to caribou from vehicular noise and vibration   | H                  | M         | M                 | H        | M         | H          | L          | L                           | Alignment selected to avoid the major area of caribou population concentrations located a considerable distance to the east, near Atikaki Provincial Wilderness Park.<br>Vehicular mounted noise whistles to reduce the attraction of road to caribou.<br>Further monitoring and survey information to provide for adaptive management<br><br>Wildlife fences and other access control measures may be considered in areas where follow-up identifies.  | L               | NS                   | N                     |
|             |                             | Caribou population impacts resulting from increased predation by wolves due to increased access   | H                  | L         | L                 | M        | L         | H          | L          | M                           | Further monitoring and survey information to provide for adaptive management.<br>Expected that increased access will off-set areas previously used by wolves for caribou predation; access to areas off the road surface will be no easier than access to areas previously accessed for caribou predation.  | L               | NS                   | M-O                   |

Table 8-9: Environmental Effects Analysis - Terrestrial Biology Environment

| VEC Feature   | Project Phase               | Potential Effect  | Effects Analysis   |           |                   |          |           |            |            | Effect (without Mitigation)  | Proposed Mitigation   | Residual Effect | Overall Significance | Monitoring/ Follow-up |
|---|-----------------------------|---|--------------------|-----------|-------------------|----------|-----------|------------|------------|--|---|-----------------|----------------------|-----------------------|
|   |                             |   | Ecological Context | Magnitude | Geographic Extent | Duration | Frequency | Permanence | Likelihood |  |   |                 |                      |                       |
| Moose   | Construction                | Disturbance to moose from construction activities (noise, dust).  | L                  | L         | L                 | L        | H         | L          | L          | M  | Construction activities will deter moose from using the local area of the road. Clearing the ROW during construction will also cause moose to avoid the area. This avoidance will last only as long as the disturbance is in place. Moose will rapidly return to the local area once construction disturbance ceases.<br><br>Limit construction activities such as blasting and excavation during calving periods (ie. May-June).                               | L               | NS                   | N                     |
|   |                             | Impacts to the moose population as a result of increased hunting due to increased access during construction. The area of impact is restricted to the new road segments and construction access roads (excludes the upgrade of Rice River Rd) | H                  | M         | L                 | H        | L         | L          | L-M        | M-H  | Access control is the priority action in restricting unlicensed hunting.<br><br>Limit access to construction areas through blockage, signage and policing.<br>Decommission construction access roads as soon as practical.<br>Prohibit construction crews from hunting and actions that will disturb moose  | L-M             | NS                   | M-C                   |
|   | Construction and Operations | Moose habitat alteration as a result of removed habitat (construction) and altered habits from avoidance of operations activities.  | L                  | L         | L                 | M        | H         | H          | H          | M  | Right of way clearing will remove habitat for moose that is considered minor in comparison to the amount of habitat available on the east side of Lake Winnipeg. Alternate habitat areas are available away from the immediate road corridor.<br>Rehabilitation of unused portion of former winter road ROW. Abandonment of the current winter road will result in new habitat suitable for moose<br>Monitoring and surveys to provide for adaptive management. | L               | NS                   | N                     |
|   | Operations and Maintenance  | Moose population impacts resulting from increased hunting due to increased access in summer as a result of all-season operations  | H                  | M         | M                 | H        | M         | M          | M          | H  | Destroy and rehabilitate construction access roads and winter road access points following completion of construction.<br><br>Restrict access by physical means -- gated access to be installed on access roads required for on-going operations and maintenance.<br>Further monitoring and survey information to provide for adaptive management.<br>Extend Chief George Barker Refuge further to input from local First Nations.                              | L-M             | NS                   | M-C                   |
|   |                             | Moose population impacts resulting from disturbance by vehicular noise and vibration  | H                  | M         | M                 | H        | M         | H          | L          | L  | Vehicular mounted noise whistles to reduce the attraction of road to moose.<br>Further research on summer moose dispersal will help to better define effects.<br><br>Wildlife fences and other access control measures may be considered in areas where monitoring and follow-up identifies.  | L               | NS                   | N                     |
|   |                             | Moose population impacts due to vehicular collisions  | H                  | UN        | M                 | H        | M         | M          | L          | L  | Vehicular mounted noise whistles to reduce the attraction of road to moose<br><br>Wildlife fences and other access control measures may be considered in areas where follow-up identifies.  | L               | NS                   | M-O                   |
| Moose population impacts resulting from increased predation by wolves due to increased access |                             | H   | L                  | L         | M                 | L        | H         | L          | M          | Further monitoring and survey information to provide for adaptive management.<br>Expected that increased access will off-set areas previously used by wolves for moose predation; access to areas off the road surface will be no easier than access to areas previously accessed for moose predation. | L   | NS              | M-O                  |                       |
| Other wildlife (furbearers, reptiles, amphibians and avian)                                   | Construction                | Disturbance to wildlife from construction activities (noise, dust).   | L                  | L         | L                 | L        | L         | L          | M          | M  | Furbearers and other mammals will avoid areas of disturbance during construction. ROW clearing and blasting activities should be minimized or avoided during nesting, denning and calving periods (May and June).<br>All clearing should take place in winter to avoid nest abandonment   | L               | NS                   | N                     |

Table 8-9: Environmental Effects Analysis - Terrestrial Biology Environment

| VEC Feature             | Project Phase               | Potential Effect  | Effects Analysis   |           |                   |          |           |            |            | Effect (without Mitigation) | Proposed Mitigation  | Residual Effect | Overall Significance | Monitoring/ Follow-up |
|-------------------------|-----------------------------|---|--------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|--|-----------------|----------------------|-----------------------|
|                         |                             |   | Ecological Context | Magnitude | Geographic Extent | Duration | Frequency | Permanence | Likelihood |                             |  |                 |                      |                       |
|                         |                             | Impacts to wildlife populations as a result of increased hunting due to increased access during construction. The area of impact is restricted to the new road segments and construction access roads (excludes the upgrade of Rice River Rd) | H                  | M         | L                 | H        | L         | L          | L-M        | M-H                         | Access control is the priority action in restricting unlicensed hunting.<br><br>Limit access to construction areas through blockage, signage and policing.<br>Decommission construction access roads as soon as practical.<br>Prohibit construction crews from hunting and actions that will disturb wildlife  | L-M             | NS                   | N                     |
|                         | Construction and Operations | Wildlife habitat alteration as a result of removed habitat (construction) and altered habits from avoidance of operations activities.   | L                  | L         | L                 | M        | H         | H          | H          | M                           | Right of way clearing will remove wildlife habitat that is considered minor in comparison to the amount of habitat available on the east side of Lake Winnipeg. Alternate habitat areas would be available away from the immediate road corridor.<br>Rehabilitation of unused portion of former winter road ROW. Abandonment of the current winter road will result in new wildlife habitat  | L               | NS                   | N                     |
|                         | Operations and Maintenance  | Wildlife population impacts resulting from increased hunting due to increased access in summer as a result of all-season operations   | H                  | M         | M                 | H        | M         | M          | M          | H                           | Destroy and rehabilitate construction access roads and winter road access points following completion of construction.<br><br>Restrict access by physical means -- gated access to be installed on access roads required for on-going operations and maintenance.<br><br>Extend Chief George Barker Refuge further to input from local First Nations.  | L-M             | NS                   | N                     |
|                         |                             | Wildlife population impacts resulting from disturbance by vehicular noise and vibration   | H                  | M         | M                 | H        | M         | H          | L          | L                           | Vehicular mounted noise whistles to reduce the attraction of road to moose.<br><br>Wildlife fences and other access control measures may be considered in areas where follow-up identifies.  | L               | NS                   | N                     |
|                         |                             | Wildlife population impacts due to vehicular collisions   | H                  | UN        | M                 | H        | M         | M          | L          | L                           | Vehicular mounted noise whistles to reduce the attraction of road to wildlife<br><br>Wildlife fences and other access control measures may be considered in areas where monitoring and follow-up identifies.   | L               | NS                   | N                     |
|                         |                             | Wildlife population impacts resulting from increased predation by wolves due to increased access  | H                  | L         | L                 | M        | L         | H          | L          | L                           | Destroy and rehabilitate construction access roads following completion of construction.<br><br>Restrict access by physical means -- gated access to be installed on access roads required for on-going operations and maintenance.<br><br>Expected that increased access will off-set areas previously used by wolves for wildlife predation; access to areas off the road surface will be no easier than access to areas previously accessed for wildlife predation. | L               | NS                   | N                     |
| <b>Forest Resources</b> | Construction                | Reduced forest cover resulting from clearing  | M                  | M         | M                 | M        | H         | L          | H          | L                           | Experience in other boreal area roads suggests that little change occurs in the plant community adjacent to a road.<br><br>Rehabilitate abandoned winter road and construction access roads.<br>Abandonment/rehabilitation of the winter road ROW will eventually add forest and understory species back into the region.  | L               | NS                   | M-C                   |

Table 8-9: Environmental Effects Analysis - Terrestrial Biology Environment

| VEC Feature                 | Project Phase               | Potential Effect   | Effects Analysis   |           |                   |          |           |            |            | Effect (without Mitigation) | Proposed Mitigation   | Residual Effect | Overall Significance | Monitoring/ Follow-up |
|-----------------------------|-----------------------------|--|--------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|---|-----------------|----------------------|-----------------------|
|                             |                             |  | Ecological Context | Magnitude | Geographic Extent | Duration | Frequency | Permanence | Likelihood |                             |   |                 |                      |                       |
|                             | Construction and Operations | Introduction of invasive species during construction and operations  | M                  | M         | M                 | M        | H         | L          | L          | L                           | High frequency of wildfires have resulted in native species adapting to colonizing burned areas.<br><br>Invasive weeds will be at a disadvantage in competition with highly adapted native species.<br>Revegetate with native species<br>Do not import growing medium that may contain invasives. Reuse local growing medium.   | L               | NS                   | M-O                   |
|                             |                             | Increase in wildfires resulting from increased human activity along the ROW  | M                  | M         | M                 | M        | H         | L          | L          | L                           | Increased fire frequency in the study area would be met with increased diligence in the detection and fighting of fire in this region.<br><br>Wildfires are a natural feature of the boreal forest in, and east of, the project area.<br><br>None required, mitigation for boreal forest part of existing measures.   | L               | NS                   | M-O                   |
| Rare and Endangered Species | Construction                | Potential effects to the population and/or habitat of rare or endangered species (woodland caribou) resulting from construction activities (blasting and general construction activities). | L                  | L         | L                 | L        | L         | L          | L          | L                           | The selection of the route alignment was located well west of areas of highest caribou concentration (calving and wintering areas). Quarry blasting and other construction activities will be suspended during the spring months (May-June) when caribou calving occurs.  | L               | NS                   | M-C                   |
|                             | Operations and Maintenance  | Potential effects to the population and/or habitat of rare or endangered species (woodland caribou) resulting from operations and maintenance.   | H                  | M         | L                 | H        | L         | L          | L-M        | M-H                         | Alignment selected to avoid the major winter area for caribou located a considerable distance to the east, near Atikaki Provincial Wilderness Park.<br>On-going tagging studies will further characterize the variability of caribou movements in response to environmental factors (e.g. forest fires & habitat modification, etc). Access control is the priority action in restricting unlicensed hunting. Limit access to construction areas through blockage, signage and policing. Decommission construction access roads as soon as practical. Prohibit construction crews from hunting and actions that will disturb caribou. | L-M             | NS                   | M-C                   |

S: Significant adverse environmental effect  
 ME: Minor adverse effect / Mitigable effect (Not significant)  
 NS: Not significant adverse environmental effect

M: Monitoring required  
 F: Follow-up required  
 NA: Not required or not applicable

Table 8-10: Environmental Effects Analysis - Socioeconomic Environment

| VEC Feature                 | Project Phase               | Potential Effect  | Effect Significance |           |                   |          |           |            |            | Effect (without Mitigation) | Proposed Mitigation   | Residual Effect | Overall Significance | Monitoring/ Follow-Up |
|-----------------------------|-----------------------------|---|---------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|---|-----------------|----------------------|-----------------------|
|                             |                             |   | Ecological Context  | Magnitude | Geographic Extent | Duration | Frequency | Premanance | Likelihood |                             |   |                 |                      |                       |
| Human Health and Well-being | Construction                | Potential displacement of medicinal plants utilized by community members for therapeutic or healing purposes.             | L                   | L         | L                 | H        | H         | H          | M          | L                           | Minimize cleared ROW footprint  | L               | NS                   | N                     |
|                             |                             | Potential displacement of berry plants utilized by community members as food supply.                                      | L                   | L         | L                 | H        | H         | H          | M          | L                           | Minimize cleared ROW footprint  | L               | NS                   | N                     |
|                             | Construction and Operations | Potential reduction in food supply due to effects of construction and operations on moose.                                | M                   | L         | L                 | H        | H         | H          | H          | M                           | Minimize extent of Right Of Way clearing; implement Best Management Practices for noise and dust control. Limit blasting and grading during critical time periods for calving (ie. May-June); limit access to construction access roads and segments of the winter road not incorporated into the ASR alignment using barriers during construction; close and rehabilitate construction access roads and unused segments of the winter road following completion of construction; restrict construction workers from hunting; issue noise whistles to road users to reduce vehicle-moose collisions; Employ community wildlife officers to monitor moose hunting.   | L               | NS                   | M-C; M-O              |
|                             |                             | Potential reduction in food supply due to effects of construction and operations on caribou.                              | L                   | L         | L                 | H        | H         | H          | H          | M                           | Minimize extent of Right Of Way clearing; implement Best Management Practices for noise and dust control. Limit blasting and grading during critical time periods for calving (ie. May-June); limit access to construction access roads and segments of the winter road not incorporated into the ASR alignment using barriers during construction; close and rehabilitate construction access roads and unused segments of the winter road following completion of construction; restrict construction workers from hunting; issue noise whistles to road users to reduce vehicle-caribou collisions; Employ community wildlife officers to monitor caribou hunting.   | L               | MS                   | M-C;M-O               |
|                             |                             | Potential reduction in food supply due to effects of construction and operations on fish.                                 | L                   | L         | L                 | M        | H         | H          | H          | M                           | Erosion and sediment controls (e.g. , sediment barriers such as slit fences, turbidity curtains, surface treatment and revegetation, energy dissipation methods); Destroy and rehabilitate construction access roads, construction staging areas and winter road access points following completion of construction.<br>Prohibit construction crews from uncontrolled (unlicensed) fishing and actions that will disturb the fishery<br>Fishery management (licensing, and policing) to minimize uncontrolled fishing<br>Restrict access to major watercourse crossings along the alignment (avoid convenient areas for parking within close proximity; slope treatment such as gabion or concrete slope protection and fencing to deter access to the water's edge);<br>Spill prevention/control BMPs such as designated re-fuelling areas, re-fuelling pads, emergency spill kits, spill response plans | L               | NS                   | M-C;M-O               |
|                             |                             | Potential reduction in food supply due to effects of construction and operations on small game, birds and other wildlife. | L                   | L         | L                 | M        | M         | H          | M          | M                           | Minimize extent of Right Of Way clearing; implement Best Management Practices for noise and dust control. Conduct clearing activities in winter to avoid effects to nesting birds (e.g., nest abandonment). Restrict clearing and blasting activities during sensitive nesting period (May and June). Limit access to construction access roads and segments of the winter road not incorporated into the ASR alignment using barriers during construction; restrict construction workers from hunting; close and rehabilitate construction access roads and unused segments of the winter road following completion of construction; issue noise whistles to road users to reduce vehicle-moose collisions; Employ community wildlife officers to monitor bird and small game hunting.   | L               | NS                   | N                     |
|                             |                             | Potential reduction in food supply due to effects of construction and operations on berry plants                          | L                   | L         | L                 | M        | M         | M          | H          | L                           | Destroy and rehabilitate construction access roads, construction staging areas and winter road access points following completion of construction. Limit access to construction access roads and segments of the winter road not incorporated into the ASR alignment using barriers during construction.<br>Prohibit construction crews from uncontrolled harvesting of berries<br>Apply dust suppressants (water in warm months; calcium chloride in winter months) on exposed surfaces at construction sites and quarries .   | L               | NS                   | N                     |

Table 8-10: Environmental Effects Analysis - Socioeconomic Environment

| VEC Feature | Project Phase              | Potential Effect   | Effect Significance |           |                   |          |           |            | Effect (without Mitigation) | Proposed Mitigation | Residual Effect  | Overall Significance | Monitoring/ Follow-Up |            |
|-------------|----------------------------|--|---------------------|-----------|-------------------|----------|-----------|------------|-----------------------------|---------------------|--|----------------------|-----------------------|------------|
|             |                            |  | Ecological Context  | Magnitude | Geographic Extent | Duration | Frequency | Permanence |                             |                     |  |                      |                       | Likelihood |
|             |                            | Potential effects to the quality of community water supply as a result of surface and/or ground water contamination. | L                   | L         | L                 | L        | L         | L          | L                           | L                   | Treat water used for human consumption. Erosion and sediment controls (e.g. , sediment barriers such as slit fences, turbidity curtains, surface treatment and revegetation, energy dissipation methods); Spill prevention/control BMPs such as designated re-fuelling areas, re-fuelling pads, emergency spill kits, spill response plans. Rehabilitation of construction staging areas, camps and areas used for fuel storage and re-fuelling during construction.   | L                    | NS                    | N          |
|             |                            | Potential effects to the supply of community water as a result of changes to surface and/or ground water levels.     | L                   | L         | L                 | L        | L         | L          | L                           | L                   | Close and rehabilitate quarries to allow rebound of groundwater levels. Design bridges and culverts to convey 1:100 year storm to prevent flooding; routine maintenance of ASR stormwater management/drainage system   | L                    | NS                    | N          |
|             |                            | Potential health effects resulting from increased noise and dust levels in the community.                            | L                   | L         | L                 | L        | L         | L          | L                           | L                   | Apply dust suppressants (water in warm months; calcium chloride in winter months) on exposed surfaces at construction sites and quarries within close proximity to communities/settlement areas. Limit equipment and operation and blasting to daytime hours when working close to communities/settlement areas. Noise and dust generation sources are largely located far from communities/settlement areas.  | L                    | NS                    | N          |
|             |                            | Potential disturbance to community activities as a result of increased noise and dust levels.                        | L                   | L         | L                 | L        | L         | L          | L                           | L                   | Apply dust suppressants (water in warm months; calcium chloride in winter months) on exposed surfaces at construction sites and quarries within close proximity to communities/settlement areas. Limit equipment and operation and blasting to daytime hours when working close to communities/settlement areas. Noise and dust generation sources are largely located far from communities/settlement areas.  | L                    | NS                    | N          |
|             | Operations and Maintenance | Potential health effects resulting from increased dust levels to drivers.  | L                   | M         | L                 | H        | H         | M          | H                           | M                   | Apply dust suppressants (water in warm months; calcium chloride in winter months) on exposed surfaces at construction sites and quarries within close proximity to communities/settlement areas.   | L                    | NS                    | N          |
|             |                            | Potential increase in traffic related injuries due to increase in vehicle traffic volumes.                           | L                   | M         | L                 | H        | M         | H          | H                           | M                   | Posted speed; regular maintenance of the roadway (including snow and ice clearing); speed monitoring by RCMP; regular patrols by RCMP and/or other road safety contractors; community workshops on road safety, licensing and enforcement of highway traffic laws.   | L                    | NS                    | M-O        |
|             | Construction               | Potential reduction in recreation/tourism opportunities as a result of reduced water course navigability.            | L                   | L         | L                 | L        | L         | L          | L                           | L                   | All watercourse crossings will be subject to the provisions of the Navigable Waters Protection Act (NAPA). All crossings that are to be constructed over waterways determined as navigable by Transport Canada will be designed in accordance with the provisions of the NWPA and specific direction by Transport Canada. Culvert and bridge crossings will be designed in accordance with AASHTO – LRF Bridge Design Specifications (Latest Edition) as required by MIT.  | L                    | NS                    | N          |
|             | Operations and Maintenance | Potential reduction in hunting, fishing and trapping opportunities for local community members.                      | L                   | L         | L                 | L        | H         | L          | L                           | L                   | It is expected that the development of the ASR will create new opportunities for hunting, fishing, and trapping within the study area which were previously inaccessible. Mitigation measures to ensure opportunities are shared by both tourist outfitters and community members include providing access to both water and land that are first approved by local communities to ensure that traditional lands are utilized in an appropriate manner; ensure monitoring of non-aboriginal fishers and hunters by wildlife officers and local RCMP. Close and remediate construction access roads following construction to limit access of non-aboriginal fishers and hunters onto traditional lands. | L                    | NS                    | M-O        |
|             |                            | Potential reduction in trapping income for local trappers as a result of ASR noise and dust and ROW clearing.        | M                   | M         | H                 | H        | H         | H          | L                           | M-H                 | Variety of potential mitigation measures for (proven) lost income to registered trappers.  | L                    | NS                    | M-O        |



Table 8-10: Environmental Effects Analysis - Socioeconomic Environment

| VEC Feature   | Project Phase | Potential Effect   | Effect Significance |           |                   |          |           |            |            | Effect (without Mitigation) | Proposed Mitigation  | Residual Effect | Overall Significance | Monitoring/ Follow-Up |
|---------------|---------------|--|---------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|--|-----------------|----------------------|-----------------------|
|               |               |  | Ecological Context  | Magnitude | Geographic Extent | Duration | Frequency | Premanance | Likelihood |                             |  |                 |                      |                       |
| Local Economy |               | Potential reduction in income and employment in commercial fishing industry as a result of ASR construction and operations.                        | N/A                 | M         | M                 | H        | H         | P          | H          | L                           | No mitigation required. The ASR may increase access to markets for commercial fishers, providing an alternate mode of transportation to the current barge system.  | L               | NS                   | N                     |
|               |               | Potential for changes to income and employment in commercial forestry operations as a result of increased access to previously inaccessible areas. | M-H                 | H         | H                 | H        | H         | R          | H          | M-H                         | Potential for increased access to commercial forests, creating employment and income opportunities. Regulate new commercialforestry activitythrough the Forest Cutting License (FML) process. Destroy and rehabilitate construction access roads, construction staging areas and winter road access points following completion of construction. Limit access to construction access roads and segments of the winter road not incorporated into the ASR alignment using barriers during construction. Ensure local RCMP patrols areas along the ROW where unlicensed forestry activities could occur. | L               | NS                   | N                     |
|               |               | Potential for changes to income and employment in the commercial wild rice harvesting industry as a result of ASR construction and operations.     | L                   | L         | L                 | L        | L         | R          | UN         | L                           | No mitigation required as ASR will not access areas known to be historically used for wild rice harvest  | L               | NS                   | N                     |

Table 8-11: Environmental Effects Analysis - Cultural Environment

| VEC Feature              | Project Phase              | Potential Effect  | Effect Analysis    |           |                   |          |           |            |            | Effect (without Mitigation) | Proposed Mitigation   | Residual Effect | Overall Significance | Monitoring/ Follow-up |
|--------------------------|----------------------------|---|--------------------|-----------|-------------------|----------|-----------|------------|------------|-----------------------------|---|-----------------|----------------------|-----------------------|
|                          |                            |   | Ecological Context | Magnitude | Geographic Extent | Duration | Frequency | Permanence | Likelihood |                             |   |                 |                      |                       |
| Heritage Features        | Construction               | Removal of heritage resources during ROW clearing and development                   | L                  | L         | L                 | L        | L         | L          | L          | L                           | Field assessment of the preferred route to be conducted by qualified archaeologists to allow development and implementation of site-specific mitigation plans prior to development. | L               | NS                   | M-C                   |
|                          | Operations and Maintenance | Disturbance to heritage resources as a result of increased access                   | L                  | L         | L                 | M        | H         | M          | L          | L                           |   | L               | L                    | NS                    |
| Archaeo-logical Features | Construction               | Removal of archaeological resources or features during ROW clearing and development | L                  | L         | L                 | L        | L         | H          | L          | L                           | Field assessment of the preferred route to be conducted by qualified archaeologists to allow development and implementation of site-specific mitigation plans prior to development. | L               | NS                   | M-C                   |
|                          | Operations and Maintenance | Disturbance to archaeological resources or features as a result of increased access | L                  | L         | L                 | L        | L         | H          | L          | L                           |   | L               | L                    | NS                    |