3. AIRSTRIP AND ROAD CONSTRUCTION AND OPERATION

3.1. All-weather Road and Airstrip Infrastructure

The all-weather airstrip, along with the connecting all-weather road will be privately-owned and built entirely on Inuit-Owned Lands currently permitted by Sabina from the KIA. The airstrip extension and road will be constructed, inspected, and maintained by Sabina to support exploration activity and the 2015 Site Preparation activities at the Back River Project.

The design of the airstrip is in accordance with Transport Canada's Aerodrome Standards and Recommended Practices (Transport Canada 2005). The construction of the road follows generally accepted good engineering practices for building roads in permafrost areas of the Northwest Territories and Nunavut. The airstrip and road design is detailed in the SRK Consulting (Canada) Inc. memo "Goose Lake Airstrip Design"(SRK August 2011).

Environmental considerations have been incorporated into design and routing. Wind direction and speeds, existing terrain and ground conditions have all been considered to determine the optimal airstrip orientation. The road alignment, connecting the airstrip to the camp and airstrip to the quarries considered the existing terrain and topography to determine the optimal route for equipment movement. A key objective of the design was to minimize the Project footprint.

Additional fieldwork determined that the airstrip and road alignments did not include any archaeological sites or vegetation/wildlife species under the "Species at Risk" Act. Establishing fish and fish habitat included water quality and quantity, fish population and fish habitat studies. These data have been considered in determining the optimal alignment for the airstrip and road and the associated water crossings.

3.2. Rock Quarries

The proposed rock quarries needed to provide construction material are on Inuit-Owned Lands currently permitted by Sabina from the Kitikmeot Inuit Association (KIA). The existing Goose Quarry will continue to be operated, inspected and maintained and the proposed Umwelt Quarry will be constructed, inspected, and maintained by Sabina to support construction and operation of the all-weather airstrip and access road at the Goose Project.

Fieldwork has indicated that the underlying geology of the existing Goose Quarry area is a gabbro dyke. This material will be suitable to quarry using drill/blast methods followed by crushing and sorting to generate the material needed for construction and operation. Acid Rock Drainage/Metal Leaching (ARD/ML) potential was investigated within the quarry area, and the material has a low potential for generating acidic drainage due to the low sulphide content.

The underlying geology of the proposed Umwelt Quarry consists of folded turbiditic meta-sediments of the Beechey Lake Group, including a banded iron formation (BIF), which is the primary host for gold mineralization, and interbedded greywacke and mudstones. The upper greywacke samples representing

the proposed quarry areas are classified as non-PAG or low S material with a limited potential for ARD. Additionally, based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue. For these reasons, upper greywacke from the proposed Umwelt quarry area is considered suitable for use in construction.

Permafrost conditions exist across the Project area and environmental data collected to date indicate that the active layer is approximately 2-3 m thick, with the permafrost extending to a depth of approximately 500 m. Given the consolidated nature of the gabbro dyke, it is not anticipated that ice lenses would be encountered during quarry operations.

Environmental considerations have also been incorporated into the proposed quarry locations. Proximity of the gabbro units close to the airstrip and road corridor help to minimize transportation needs for the quarry operations, thus minimizing the overall Project footprint.

Quarry development and operations are detailed in the Quarry Management Plan.

3.3. Water Crossings

The all-weather airstrip and connecting road and associated water crossings will be privately-owned infrastructure, built entirely on Inuit-Owned Lands currently permitted by Sabina from the KIA. The airstrip extension and road will be constructed, inspected, and maintained by Sabina to support ongoing exploration activities at the Back River Project.

The airstrip and road design is detailed in the SRK Consulting (Canada) Inc. memo (SRK 2014). There are four water crossings associated with this infrastructure, as illustrated in Figure 1.

Based on Sabina's understanding of the seasonal hydrology, water quality, and the limited fisheries values within each of these streams, the current plan is to install appropriately-sized culverts in each stream during the winter construction program. Culvert type (box vs. CSP) will be determined during Sabina's procurement process. One fish-bearing crossing will be required on the airstrip access road which will require two 2.5 m culverts to be installed.

3.4. Winter Road and Ice Airstrip Infrastructure

Currently, environmental conditions determine the route selected for winter road corridors including:

- Ice of a sufficient thickness to support equipment so that pumping and using water to build up ice will be unnecessary;
- Snow thickness will be a minimum of 15 cm on land to prevent damage to soil and vegetation; and
- Weather conditions permit safe transport of equipment and materials.

Once the camps are open, the road route will be determined by means of reconnaissance trips using helicopters and/or snow machines. The road route determined will be staked to facilitate driving and to help with snow plowing. While the road is in use, any litter or contamination will be removed by Sabina

personnel and relocated to the existing camps for disposal. When the winter road corridor use ends, the corridor will be inspected for any remaining litter and contamination, cleaned, stakes are removed and snow piled/or removed at the entrance to prevent further use of the route. At break-up the road will melt.

During the summer months, the route will be inspected using a helicopter and any further reclamation work will be built into progressive reclamation for the exploration program.

Surface preparation will include verification that ice thickness will support equipment weight. It is also anticipated that movement of snow may be required in some areas to ensure a safe operating grade for the equipment and to a minimum thickness to protect underlying vegetation and soil.

Speed and road grades will be determined by safety, operational needs of the equipment, road conditions and weather/environmental conditions. The public will not have access to the corridor.

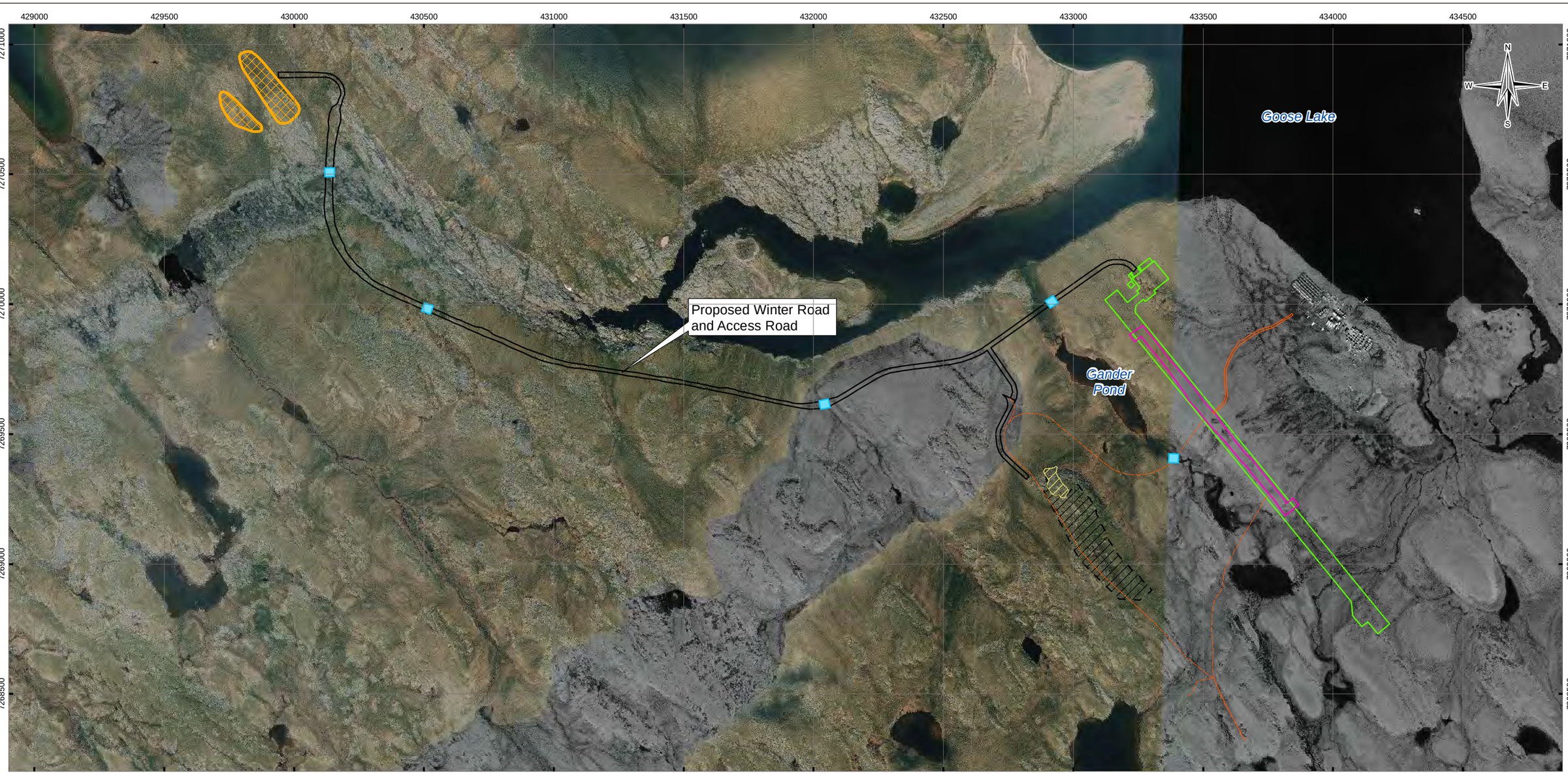
Construction and operation of the ice airstrip on Goose Lake is also dependent on environmental conditions including:

- Prevalent wind direction and speeds for safe landing/takeoff;
- Ice thickness of a sufficient thickness to support equipment and aircraft so that pumping and using water to build up will be unnecessary; and
- Weather conditions permit safe transport of equipment and materials.

Once camps are open, the priority is to determine the optimal airstrip route, using snow machines. The orientation determined is staked to facilitate snow plowing; snow is removed using equipment already on-site within the staked area to allow additional freezing and thickening of the ice. Surface preparation will include verification that ice thickness will support aircraft weight. Flooding and ice build-up methods are not used to construct ice airstrip.

Once the appropriate thickness and area is available, the airstrip is inspected by authorities and approved for use.

While the airstrip is in use, any litter or contamination is removed by Sabina personnel and relocated to the existing camps for disposal. When the ice airstrip use is completed, the area is inspected for any remaining litter and contamination, cleaned, and stakes are removed. At break-up the airstrip will melt.



LEGEND

- Proposed Access Road
- Proposed Water Crossing / Culvert Location
- Airstrip Access Road
- Winter Road
- Existing Airstrip
- Proposed Airstrip Extension
- Proposed Umwelt Quarry
- Existing Quarry
- Proposed Site Preparation Quarry

NOTES
Base data source:
Imagery from Sabina (2006/2011)
Infrastructure provided by JDS Energy and Mining Inc. (2014)

STATUS
ISSUED FOR REVIEW

SABINA BACK RIVER PROJECT, NUNAVUT

Proposed Water Crossing / Culvert Locations

PROJECTION UTM Zone 13	**DATUM** NAD83	**CLIENT** Sabina	
Scale: 1:15,000 200 100 0 200 Metres			
FILE NO. V15103033-02_Figure01_WaterCrossings.mxd			
PROJECT NO. V15103033-02	**DWN** MEZ / **CKD** SL / **APVD** AR / **REV** 0		**Figure 1**
OFFICE Tt EBA-VANC	**DATE** October 7, 2014		

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4. INSPECTIONS AND MAINTENANCE

Sabina has sole responsibility for the ongoing inspection and maintenance of all components of the airstrip and road, including the road bed, the airstrip foundation, the culverts and the quarry sites.

Sabina's Site Supervisor, or its designate, will be responsible for ongoing inspection and maintenance. The following is a summary of the procedures that will be applied.

4.1. Surface Inspection and Maintenance

Sabina recognizes that a good inspection program will lead to the early identification of areas of the airstrip and road where improvements are or may be necessary. The early resolution of any deficiencies will result in less ongoing maintenance and repair of the infrastructure.

The road and associated shoulders will be inspected bi-weekly (at a minimum) during the summer period for evidence of seasonal freeze and thaw adjacent to the toe of the road embankment. Such movements are expected and may lead to longitudinal cracking and thaw settlement especially for portions of the road founded on thaw-susceptible (ice-rich) soil. When such areas are identified, the affected area will be repaired using granular material and/or crushed rock. Sabina will maintain stockpiles of such material in the quarry areas.

The road and airstrip will be inspected for signs of accumulation of ponded water, either on the surface or along the sides. Where observed, the site supervisor will evaluate and monitor the condition to determine why water is accumulating in these areas. Based on these evaluations, the site supervisor will take remedial action where and when necessary to correct the cause of such ponding, such as grading of the surface to remove areas of ponding or the installation of additional culverts if the road is causing excessive water ponding.

The quarries will also be inspected as outlined in the Quarry Management Plan. Remedial action will be taken as soon as problems are noted. The site supervisor will conduct periodic inspections (minimum of bi-weekly) of the road to ensure that the road is maintained for safe travel of personnel, equipment and supplies. These inspections will be recorded and any deficiency recorded and followed up by corrective action.

These periodic inspections will include an inspection of the water crossings and a visual observation of the road surface to assess the status of the road foundation.

During the summer, the road surface will be maintained with gravel being spread as required and regular grading of the road. In fall, winter and spring, maintenance will be adjusted according to the weather conditions. Snow clearing along the road will be done to ensure that the road can be operated safely. The manner in which the snow is cleared will also take into account the road configuration to ensure that snow accumulation will not cause any problems during freshet or other high water conditions.

Inspection frequency will be increased during the following critical time periods:

- Just prior to spring freshet to ensure that the culverts and stream crossings are in good state to accommodate the rapid spring thaw;
- During the spring freshet to ensure that the culverts and stream crossings are not impeding spring freshet and to initiate action when and where required to prevent wash outs; and
- Immediately following heavy rainfall events to monitor water accumulation, to ensure that culverts and diversion/collection channels and ponds are passing precipitation as planned and to initiate action when and where required to prevent erosion and wash outs.

The amount of dust generated along the road and airstrip is dependent on the dryness of the surface, the number of vehicles, weight and speed, and maintenance of the driving surface. Regular grading of the road and airstrip, combined with the addition of granular material to the surface will be undertaken as necessary. This will improve road safety and also reduce dust. In areas or times identified by the site supervisor as being prone to high dust levels or areas where safe road visibility is impaired or in areas where dust deposition is impacting fish habitat and/or water quality, the site supervisor will implement further mitigation measures as appropriate. This could involve actions such as grading of the road surface, placement of new coarser topping, and/or watering of the road surface. Use of chemical dust suppressants will be only used as a last resort and only in accordance with the Environmental Guidance for Dust Suppression published by the Government of Nunavut Department of Environment (January 2002), available online at the following web site:
http://env.gov.nu.ca/sites/default/files/Guideline%20Dust%20Suppression.pdf

All Sabina employees and contractors are instructed to report any road and airstrip maintenance problems or hazardous conditions to Project Management. Regular scheduled safety meetings will incorporate discussion and reminders related to all-weather airstrip and road use, operation and maintenance.

4.2. Watercourse Crossings Inspection and Maintenance

The watercourse crossing inspection and maintenance program has three main components:

a) A regular inspection program to identify issues relating to watercourse crossings, such as structural integrity and hydraulic function;

b) An event inspection program to track the impacts of large storm events on watercourse crossings, such as structural integrity and hydraulic function; and

c) A culvert location inspection program to ensure that culverts have been installed in the most suitable location with respect to the watercourse and that culvert capacity is adequate to ensure that the culvert(s) pass the water under all hydraulic conditions. In most cases there will be multiple culverts installed at different elevations at each stream crossing to ensure that these

culverts can adequately pass normal summer flows as well as spring freshet and heavy rainfall flows.

Regular Crossing Inspection and Maintenance

During the freshet period, crossings inspections will be performed twice a week (mid-May through June) and weekly during the remainder of the ice-free period prior to fall freeze-up (July through October).

The inspection activities for each watercourse crossing will consist of:

- Visual inspection of infrastructure to identify defects, cracks or any other risks to structural integrity. Particular attention will be paid to the inlet and outlet structures of culverts.
- Visual inspection to identify sediment or other debris accumulation impeding the free flow of water through the crossings. Maintenance operations will consist of hand removal of accumulated debris and repairing damage as soon as possible.
- Visual inspection of the upstream and downstream channel to identify bed erosion or scour around the watercourse crossing. Particular attention will also be directed to potential sources of sediment transport at the crossing. Inspection results will be recorded to help track changes in conditions over time. Maintenance operations will consist of undertaking remediation of any detected problems and repairing damage as soon as possible.

Event Crossing Inspection and Maintenance

Following heavy or prolonged rainfall, each watercourse crossing will be inspected to identify potential risks to the crossing's structural integrity, debris accumulation and whether erosion and scour have occurred. Results will be recorded to help track changes in conditions over time. The remediation of any detected problem and any necessary damage repairs will be undertaken as soon as possible, under the direction of the site supervisor.

Culvert Location Inspection

Culvert crossings will be visually inspected to confirm they have been properly executed and installed. These culverts will initially be installed during low flow conditions and thus it is possible that a culvert will not be sited correctly to pass all ponded water through the road. The intent is to check for such conditions during the first snow melt and after rain so that adjustments can be made accordingly.

Additional culverts will be installed, if necessary, should the inspection indicate that the culverts were installed in a location that does not optimally route water flows.

4.3. Snow Clearing

The Goose Property experiences snow drifts due to the strong winter winds. As much snow as possible will be cleared to the downwind side of the road and airstrip to limit the re-deposition of this snow on cleared areas. Routine spring snow management will include the removal of snow that accumulates at

culverts so that water at freshet can move freely through the culverts and waterway. In the case of culverts, snow will be removed from both ends but not from the inside.

4.4. Accidents and Malfunctions

Despite the preventative and mitigation measures taken, should any spill incident arise as a result of human error or unforeseen circumstances, the response procedures outlined in the Spill Contingency and Emergency Response Plan will be implemented.

Emergency Response

As a private road the responsibility for response to any emergency or accident lies solely with Sabina. It will be Sabina personnel that respond and deal with any emergencies that occur on the road and airstrip. Sabina has people on site trained in emergency response (firefighting, first aid, spill response). As and where appropriate, Sabina will request assistance from other parties in the area (e.g. Xstrata Zinc and Sabina George camp). Sabina does not anticipate that emergency response will result in any demand on local public service providers in Kugluktuk or Cambridge Bay (e.g. fire, police, ambulance, medical, maintenance). In most circumstances the emergency response will be handled directly by Sabina personnel.

Sabina's emphasis will be on prevention with on-going awareness, training and on-going safety measures while at the same time keeping resources close at hand to respond to emergencies at the Project in a timely manner.

Sabina is fully responsible for the design, construction and maintenance of the road and airstrip for private use. Sabina will ensure its vehicles and equipment are in good working order and train its employees on airstrip/road safety (including use of helmets, seatbelts, speed limits, and improving visibility using reflective clothing and vehicle lights) and emergency response (first aid, firefighting, emergency response). Emergency response also incorporates nursing/medical staff available at Goose camp.

5. ENVIRONMENTAL MANAGEMENT

5.1. Wildlife

Wildlife may occasionally be observed on or immediately along the side of the all-weather airstrip and connecting road. Caribou and other wildlife will have the right-of-way at all times. In case of problems (e.g. groups of caribou), the Project management and environmental personnel on site will manage the situation. The Project personnel will be notified by radio if any wildlife are observed on the road according to current communication procedures.

The following protocol will be implemented on the road and airstrip for the protection of wildlife:

- Vehicular traffic speeds on the access road will be limited to 50 km/hr.
- Prior to aircraft landing on the airstrip, a visual inspection will be conducted to identify the presence of any wildlife. If possible, the wildlife will be escorted off the airstrip; the flight crew will be notified by radio that such action is taking place and that they are not to land until it has been completed. If the wildlife cannot be escorted from the airstrip within a reasonable length of time, the flight crew will be instructed to divert to the George airstrip or to return to Yellowknife at the pilot's discretion.
- Where small to moderate aggregations of caribou (i.e., 1-50 animals) are observed within 100 m of the road, travel speeds will be reduced to 30 km/hr.
- Where large aggregations of caribou (i.e., 50 or more) are observed within 100 m of the road, at the discretion of the site supervisor, vehicle movements may be suspended until the animals have moved away from the road.
- If caribou are on the airstrip, at the discretion of the site supervisor, aircraft movement may be suspended and the aircraft diverted to George camp or back to Yellowknife until the animals have moved away from the area.
- Caribou and all wildlife will be given right-of-way on the road. Vehicles must stop until the animals are off the road.
- Locations of large aggregations of animals must be reported to the site supervisor who will inform all potentially affected employees and the environmental representative.
- All incidents between vehicles and wildlife must be reported to the Project Management/Environmental Department whether they are:
    - near-miss;
    - collision with injury to the wildlife; or

- accidental death.

- Each incident will be investigated by the site supervisor and the environment department and measures taken to avoid re-occurrence. Disciplinary measures will be taken against any employee if the investigation concludes that the accident is the result of negligence.

- In the case of the accidental death of an animal, the Project Manager/Environmental Department will contact the GN Conservation Officer, KIA Senior Lands Manager and the HTO office in Kugluktuk and Cambridge Bay. The carcass will be removed from the road and incinerated to avoid attracting scavengers such as Arctic Fox, Wolves, Grizzly Bear, and/or Wolverine.

5.2. Water

General Runoff

The general runoff from the all-weather road and airstrip surfaces may contain suspended solids due to erosion of ground surfaces, or oils and grease from heavy equipment. General runoff will meet the discharge criteria presented in Table 5.2.1.

Table 5.2.1. Site Runoff Discharge Criteria

Parameter	Maximum Average Concentration (mg/L)	Grab Sample Maximum Concentration (mg/L)
TSS (Construction)	50	100
TSS (Operations)	15	30
Oil and Grease	No visible sheen	No visible sheen
pH	Between 6.0 and 9.5	Between 6.0 and 9.5

Contact water associated with the construction and operation of transportation corridors will be managed as described in the Waste Management Plan.

Quarries

A Quarry Management Plan has been developed to outline procedures for operating the quarries, as well as environmental protection measures and monitoring plans, including water quality criteria for runoff associated with the quarries.

Water Crossings

Sabina recognizes that a good inspection program will lead to the early identification of areas of the airstrip and road where improvements are necessary. The early resolution of any deficiencies will result in less ongoing maintenance and repair of the infrastructure. Monitoring of transportation corridors and associated water crossings will be conducted as described in Section 4.

6. MONITORING PROGRAM

6.1. Wildlife

Wildlife monitoring will be incorporated into current wildlife tracking in accordance with the terms and conditions of existing land use permits. This includes a log of sightings that detail wildlife observed, estimate of numbers and nearest kilometre marker along the road. The data will be aggregated and made available on-site during inspections.

6.2. Water Quality

Water crossings at culverts are the best locations for monitoring water quality. Water in these locations would have a greater probability of being in contact with any construction material, dust and spilled material. These locations provide access to upstream and downstream sections of the waterway and historic data are available as they have been reported in baseline monitoring to date.

There could also be drainage from the quarry areas. When there is noticeable flow out of a quarry, likely during spring melt, a water sample will be collected before this water is permitted to enter a receiving waterbody. Standing water, unless it is to be discharged to the environment, will not be collected as it poses little risk to the receiving environment.

Water samples will be collected on a monthly basis over the open water period, late June to September inclusive. The parameters to be collected are similar to current terms and conditions of the water licence and include:

- Physical parameters – field pH and water temperature, lab pH, conductivity, major anions and cations, turbidity, TSS; and
- Total and Dissolved metals.

The results will be compiled in camp, made available during inspection and included in the NWB annual report.

7. REVIEW OF THE TRANSPORTATION MANAGEMENT PLAN

The activities and costing of transportation management activities will be reviewed internally on an annual basis relative to the long-term exploration strategy for the Project and operational needs.