

HARDROCK PROJECT CONCEPTUAL SPILL PREVENTION AND RESPONSE PLAN



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1.0 Introduction and Environmental Management and Monitoring Plan Overview

Greenstone Gold Mines (GGM) is committed to minimizing environmental effects through the implementation of mitigation measures, monitoring and adaptive management for the Hardrock Project (the Project) within Environment Management and Monitoring Plans (EMMPs) for construction and operation. Through the EMMPs, the Project's environmental risks and opportunities are addressed in a comprehensive, systematic, planned and documented manner to meet the following objectives:

- The Project is carried out in compliance with existing legislation, consistent with Federal and Provincial guidelines, best practices and GGM corporate policies;
- Measures to mitigate environmental effects are documented;
- Benefits from the Project are enhanced; and
- Reporting is structured to inform adaptive management and continual improvement.

The EMMPs guide environmental management for the Project and are progressively developed as the Project moves through the EIS/EA, permitting, and construction, and updated based on continual improvement during operations through adaptive management.

EMMP development begins during the EIS/EA stage with the preparation of Conceptual Environmental Management Plans. These EMMPs are broad in their level of detail, commitment-based and focused on the construction and operation phases of the Project. They include input received from consultation during the Draft EIS/EA stage. The closure phase is addressed in the Conceptual Closure Plan. The level of detail in the EMMPs advance as the Project moves through more detailed engineering and planning and as permit/regulatory requirements are available.

1.1 Environmental Management and Monitoring Plans

The Project's Environmental Management System, includes a comprehensive set of management and monitoring plans collectively referred to as Environmental Management and Monitoring Plans (EMMPs). The EMMPs outline environmental protection measures to mitigate potential environmental effects.

The EMMPs include:

- Water Management and Monitoring Plan;
- Conceptual Waste Rock Management Plan;
- Conceptual Emergency Response Plan;
- Conceptual Waste Management Plan;
- Conceptual Erosion and Sediment Control Plan;
- Conceptual Greenhouse Gas Management and Monitoring Plan;
- Conceptual Air Quality Management and Monitoring Plan;

- Conceptual Spill Prevention and Response Plan;
- Conceptual Soil Management Plan;
- Conceptual Noise and Vibration Management and Monitoring Plan;
- Conceptual Explosives and Blasting Management Plan;
- Conceptual Aquatic Management and Monitoring Plan;
- Conceptual Biodiversity Management and Monitoring Plan; and
- Conceptual Archaeology and Heritage Resource Management Plan.

These Plans are considered “living” documents and will be updated as needed in support of environmental management activities during future permitting, development and operation phases.

2.0 PROJECT SUMMARY

Mining of the Hardrock deposit has been designed as an open pit. The process plant will operate 365 days per year with a Life of Mine (LOM) of approximately 15 years. The mill throughput ranges from 24,000 tonnes per day (tpd) for approximately the first two years of operation (i.e., Mill Phase 1), increasing to 30,000 tpd for the balance of operation (i.e., Mill Phase 2). The overall Project development schedule will consist of the following main phases, during which various Project activities will be completed:

- Construction: Years -3 to -1 with early ore stockpiling commencing after the first year of construction.
- Operation: Years 1 to 15, with the first year representing a partial year as the Project transitions from construction to operation.
- Closure:
 - Active Closure: Years 16 to 20, corresponding to the period when primary decommissioning and rehabilitation activities are carried out.
 - Post-Closure: Years 21 to 36, corresponding to a semi-passive period when the Project is monitored and the open pit is allowed to fill with water creating a pit lake.

The key components of the Project are as follows:

- open pit
- waste rock storage areas (WRSAs) (designated as WRSA A, WRSA B, WRSA C and WRSA D)
- topsoil and overburden storage areas
- ore stockpile
- crushing plants and mill feed ore storage area
- process plant
- tailings management facility (TMF)
- water management facilities for contact water including collection ditches and ponds

- power plant and associated infrastructure
- liquefied natural gas plant
- explosives facility
- buildings and supporting infrastructure
- water supply and associated infrastructure
- sewage treatment plant
- effluent treatment plant
- lighting and security
- site roads and parking areas
- watercourse crossings and habitat compensation/offsets
- Goldfield Creek diversion
- onsite pipelines
- fuel and hazardous materials
- aggregate sources
- temporary camp

Project activities include the relocation of existing infrastructure currently located within the PDA, including a portion of Highway 11, a Ministry of Transportation (MTO) Patrol Yard, and Hydro One Networks Inc. (Hydro One) facilities.

3.0 MANAGEMENT AND MONITORING PLAN PURPOSE

3.1 Purpose

The goal of this Conceptual Spill Prevention and Contingency Plan is to provide the Hardrock Project with guidance in the development of spill prevention, contingency planning and reporting practices for the timely and effective response to spills of pollutants during the Project construction and operations phases in order to ensure the safety of the environment and Project infrastructure.

The plan has been developed in accordance with permitting or other regulatory instruments for the Project, and is in a format similar to recent plans that have been successfully submitted and implemented for mining projects in Ontario.

A *spill* is a discharge of a hazardous material that is:

- Uncontrolled released into the natural environment; and
- from or out of a structure, vehicle or other container.

Typical materials covered under this Plan and used at the Project include (but are not limited to):

- petroleum products (e.g., fuels such as diesel and gasoline, lubricants such as automotive oil, cutting oil, gear oil, hydraulic oil, or other petroleum-based or synthetic oil where the concentration of oil is greater than 3% by weight);
- dangerous goods/materials (e.g., solvents such as acetone, cyanide, explosive materials));
- process reclaim water and tailings;
- contact and seepage water collection system;
- historical tailings and contaminated soil (excavation and transport);
- sewage and effluent treatment plant feed; and
- compressed gas (e.g. propane, natural gas).

In the event that a spill or leak results in an emergency, the Emergency Response Plan will apply. An emergency is any unforeseen event which has the potential to:

- Cause death or injury to an individual
- Shut down business operations
- Physically damage equipment and/or the environment
- Jeopardize a company's financial viability
- Threaten a company's public image or reputation.

3.2 Performance Objectives

Objectives and targets are established to drive continuous improvement in environmental performance and are consistent with the overall strategic goals of the Project. Objectives are measurable (where possible), monitored, communicated, and updated as appropriate.

In support of GGM's overarching environmental objective (to work to prevent or mitigate any environmental impacts, meet or exceed regulatory requirements and strive to continually improve our environmental practices and performance), GGM has established the following performance objectives for the management of spill prevention and response that considers the Project's significant risks and compliance obligations:

- To prevent the inadvertent release of materials which may have a deleterious effect on the terrestrial and aquatic environment.
- To respond with appropriate measures in a timely manner to an inadvertent release.
- To provide timely notifications to key Project personnel and regulatory agencies.

4.0 SCOPE

The scope of the Conceptual Spill Prevention and Response Plan applies to the area of the Project that will undergo changes through construction and/or operation to accommodate the

advancement of Project and associated monitoring. This Plan applies to the construction and operation phases of the Project with closure phase included in the Conceptual Closure Plan.

The Conceptual Spill Prevention and Response Plan applies to individuals working for or on behalf of GGM, including employees and contractors, which have a role and/or accountability for the development, implementation and maintenance of this EMMP.

GGM will make reasonable efforts that suitably qualified (licenced where applicable) contractors are used for the transport of materials, supplies and waste materials, and that contractors have appropriate controls and management plans in place to reduce the likelihood of incidents during transport. Similarly, Project components under the management and maintenance by third parties are outside the scope of this EMMP. The scope of the Conceptual Spill Prevention and Response Plan applies to Project infrastructure and management under the care and maintenance of GGM.

5.0 PLANNING

5.1 Organizational Roles and Responsibilities

All persons working for or on behalf of GGM, including employees and contractors, have a role in the successful implementation and maintenance of the Conceptual Spill Prevention and Response Plan. Table 5-1 outlines roles and responsibilities for spill prevention and response activities:

Table 5-1. Conceptual Roles and Responsibilities

Role	Responsibility
Construction Manager (during Construction)	Supporting Environmental Manager by arranging for contractors to install and maintain spill control measures when and as required.
Mine Manager (all other Project phases)	Supporting Environmental Manager and GGM senior management by interfacing with government and non-government agencies, media and the public as required, or by providing updates to GGM senior management in order to provide appropriate communications
Site Environmental Manager	Oversight of environmental inspections and mitigation implementation. Maintaining records of environmental monitoring activities. Interfacing with government agencies and other project team managers and GGM senior management.
Environment Specialist/Environment Technician	Routine monitoring/inspections of spill prevention equipment and facilities and effectiveness of mitigation measures. Identification of spill hazards and appropriate mitigation measures. Internal (and external, as delegated by Environmental Manager) spill reporting. Coordination of spill response team.
Site Security	Control access to site and/or spill location. Notify additional personnel as required/requested.

Contractors	<p>Providing construction staff, equipment and material for spill control measures and / or clean up as requested by Construction Manager.</p> <p>Sign off and accept the responsibility for spill prevention and response through the contract management process.</p>
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5.2 Compliance Obligations

The Conceptual Spill Prevention and Contingency Plan is developed and implemented to comply with applicable legislative, regulatory, permit and other relevant obligations, outlined in the following sections.

5.2.1 Environmental Assessment Process Requirements

5.2.1.1 Provincial Terms of Reference

As described in the Approved Terms of Reference, the EA includes a variety of environmental protection and management measures to guide the planning, design, construction, operation and closure of the Project (section 4.1.4) and identification of a monitoring framework related to compliance and effects monitoring (section 8.2).

5.2.1.2 Federal Environmental Impact Statement Guidelines

The EIS Guidelines for the Hardrock Project include development and implementation of follow-up and monitoring programs (section 8.0). The follow-up program verifies the accuracy of the effects assessment and the effectiveness of the measures implemented to mitigate the adverse effects of the Project. The goal of a monitoring program is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of the Project and to provide clearly defined action plans and emergency response procedures to account for human and environmental health and safety.

5.2.1.3 Draft EIS/EA Report

Section 24 of the Draft EIS/EA includes a listing of proposed Follow-up Monitoring and Environmental Management Plans, which included a commitment to produce a Conceptual Spill Prevention and Contingency Plan. This Plan is intended to outline procedures and protocols regarding spill prevention and spill management procedures to follow in the event of a spill. The plan will include procedures for fuel and lubricant delivery, storage requirements, detailed response system in the event of a spill and routine inspections of facilities

Subsequent to the draft EIS/EA submission, comments were raised by several parties requesting additional clarification on the response measures for spills associated with pipelines for the Project, fuel and tailings management and spill prevention. Available information has been incorporated to develop this Conceptual Spills Prevention and Contingency Plan.

5.2.2 Regulatory Requirements

5.2.2.1 Federal Regulatory Requirements

Federal regulatory requirements related to this plan are outlined under the following:

- *Fisheries Act* (Fisheries and Oceans Canada);
- Metal Mining Effluent Regulations (Environment and Climate Change Canada); and
- *Transportation of Dangerous Goods Act, 1992*.

Additional guidance may be found in:

- CAN/CSA-Z731-M91 Emergency Planning for Industry (Canadian Standards Association 2002);
- Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (Canadian Council of Ministers of the Environment 2003).
- Workplace Hazardous Materials Information System 2015 (WHMIS) (Health Canada 2015); and
- Implementation Guidelines for Part 8 of the Canadian Environmental Protection Act, 1999 – Environmental Emergency Plans (Environment Canada 2004).

5.2.2.2 Provincial Regulatory Requirements

The primary Provincial instrument guiding activities under this Plan is the *Environmental Protection Act*, and associated Ontario Regulation 224/07 SPILL PREVENTION AND CONTINGENCY PLANS, administered by the Ministry of Environment and Climate Change.

6.0 SUPPORT

6.1 Competence, Training and Awareness

GGM requires that persons working under its management, including employees and contractors, have the knowledge, understanding, skills and abilities to complete work in a manner that protects the environment. The following actions will be established to provide worker competency, training and awareness:

- Training in GGM operational policies (e.g. maintaining secondary containment for fuel, etc.);
- Training in spill reporting requirements; and
- Training in appropriate spill response measures (including simulated scenarios).

GGM will make all reasonable efforts to ensure that suitably qualified (licenced where applicable) contractors are used for the transport of materials, products and wastes to or from the site, and to ensure that contractors have appropriate controls and management plans in place to reduce the likelihood of incidents during transport and, in the case of waste, disposal. Those plans will be the primary management documents in effect prior to deliveries being made at the Project, and once the contractors have taken control of shipments and left the Project.

6.2 Communication

6.2.1 Notification in the Event of a Spill

Reporting of a spill will be based on the preliminary reporting format presented in Appendix A. If a spill is determined to be a Level 2 or 3 spill as per Table 7-1, the Environmental Manager and/or General Manager may make a decision to invoke the Emergency Response Plan in lieu of the measures outlined in this Plan. The preliminary external notification list is included in Table 6-1.

Table 6-1: Preliminary Notification Contact List

SPILL RESPONSE CONTACT INFORMATION	
Site Security	TBD
Environmental Manager	TBD
Environmental Coordinator	TBD
HSE Manager	TBD
General Manager	TBD
CONTROL CENTERS	
Poison Control	1-800-268-9017
CANUTEC	613-996-6666 (Tel)
Fire Marshal's Office	Emergency 1-800-565-1842
	Provincial 416-325-3100 (Tel)
Ministry of the Environment and Climate Change (Thunder Bay District Office)	807-475-1205 1-800-268-6060 (toll-free, province-wide, 24/7)
Ministry of Natural Resources (Nipigon District Office)	807-887-5000
Ministry of Natural Resources (Geraldton Office)	807-854-1030
Ministry of Natural Resources - Fire Management Headquarters	705-272-7153 (Tel)
Ministry of Transportation	1-800-280-1465
Thunder Bay District Health Unit (Greenstone Office)	807-854-0454
POLICE SERVICE	
Ontario Provincial Police (OPP)	1-888-310-1122
ENVIRONMENTAL SPILLS/FUEL FIRES	
Ministry of the Environment Spills Action Centre	1-800-268-6060
TSSA Fuel Explosion/Fire Reporting	416-325-0364 (Tel)

7.0 IMPLEMENTATION OF MITIGATION MEASURES

7.1 General Approach

This section presents the conceptual level Spill Prevention and Contingency Plan and as the Project design and planning progresses, the Plan will be developed to outline materials and quantities to be stored on site, reporting thresholds for non-reportable spills (as per O.Reg. 675/98), sensitive receptors, and other information as required under O.Reg. 224/07.

The analysis of risk to inform the development of management measures is a standard component of spill response planning. This analysis will identify potential on-site and off-site potential spill hazards, and the type of damage that may result. In completing the analysis, it will consider regulatory requirements, high-risk/sensitive impact areas, normal and abnormal operating conditions, the toxicological, physical, and chemical properties of the substances being handled, potential impact on downwind air quality or downstream water quality, and danger to human and animal health.

Once the risks are identified, prevention, mitigation, and response measures are identified, which may include ensuring the design safety of new and existing equipment, standard operating procedures, preventive maintenance, operator training, accident investigation procedures, risk assessment for unit operations, emergency planning, and internal and external procedures to ensure that these programs are being executed as planned.

Note, if a spill occurs for a spill designated as non-reportable per Class X – nonreportable spills of O.Reg. 675/98 and it meets the conditions for being non-reportable as laid out in the documentation supporting this designation, then the spill remains as non-reportable. The spill becomes reportable if the quantity spilled exceeds the amount specified in the documentation or if the containment and clean-up are not carried out. If the spill becomes reportable for one of these reasons, then the requirements for reviewing the prevention and contingency plans take effect.

7.1.1 Spill Prevention

The preferred manner to deal with spills is first by avoidance through appropriate storage, handling, and transportation measures. The prevention of spills is achieved through actions such as:

- Facility design incorporates best management practices for spill containment including:
 - Six double-walled above ground 50,000 L diesel storage tanks, a 9,000 L liquid urea storage tank, and a 9,000 L gasoline storage tank for fueling of heavy equipment and Project vehicles. Urea is used as an additive for diesel engines to reduce nitrous oxide emissions (NOx). Fuel storage and distribution infrastructure will be constructed to current engineering standards and in accordance with federal and provincial requirements including the CCME Code of Practice for Above Ground Storage Tanks and the National Fire Code of Canada
 - A concrete pad will be constructed around vehicle fueling and transfer areas and will drain to an oil / water separator. Tanker trucks will deliver diesel fuel, gasoline, and urea to the site on an as-needed basis. Fueling of mobile vehicles will be completed within the designated fuel handling area with stationary mine equipment fueled by a fuel-dispensing truck
 - Installation of warning signs and protective barriers where there is potential for impact from vehicles
 - Secondary containment with capacity to accommodate 110% of the largest vessel in the area;
 - Individual container shut-off valves where more than one container share a distribution line

- Separate storage and sump systems for storage areas of incompatible products
- Facility design incorporates best management practices for spill/leak prevention and detection for the TMF discharge/reclaim:
 - The discharge pipeline to the TMF will be composed of three separate sections to meet varying pressure requirements. The portion of pipeline leaving the processing plant will be a 250 m buried steel pipe; along the haul road, approximately 4.6 km high-density polyethylene double walled pipeline will be installed with a wireless leak detection system; the section of the pipe on the TMF will consist of approximately 5.0 km of high-density polyethylene pipeline located along the TMF berm
 - The TMF reclaim pipeline to the process plant will be adjacent to the discharge pipeline installed with a wireless leak detection system. A release of tailings reclaim water would be captured by secondary containment either in the form a double-walled piping or a lined ditch for single-walled piping
 - A pump pressure monitoring system will trip an alarm in the event of a pipeline rupture resulting in a loss of pressure
 - A safety pond with geomembrane which will be large enough to contain 110% of the total TMF discharge pipeline volume. To drain the tailings pipeline, an appropriate drain system will be installed and the safety pond will be kept empty and rainwater will be removed whenever accumulated
- Regular inspection and maintenance of seepage/contact water collection network to have available necessary capacity and proper function of the system
- Reagents will be delivered to the site in accordance with *Transportation of Dangerous Goods Regulations* and stored onsite in secure locations. Some reagents will be delivered in bulk, while other reagents will be delivered in super bags, tote bins or drums, depending on the application. The reagent storage area includes a concrete containment area
- Storage and management of cyanide reagent will be in accordance with the recommendations and principals of the International Cyanide Management Code for the manufacture, transport, and use of cyanide in the production of gold. This is a set of best practices for environmental and occupational standards and GGM will align with the recommendations and principles of the Code
- documented operational procedures for tasks that have an identified risk, such as fuel handling, process reagents handling, explosives reagents handling, and waste management
- certification of vehicles and drivers for transportation of dangerous goods
- ensuring that vehicle cargos are adequately contained and secured
- preventative maintenance of (but not limited to) vehicles, equipment, and storage containers
- regular housekeeping and environmental audits of facilities
- fuel levels in tanks will be measured and records of deliveries and dispensing compared as part of a regular capacity audit

- compressed gas pressure for large site storage tanks will be measured and records of deliveries and dispensing compared as part of a regular capacity audit
- fuel delivery will comply with appropriate regulations, standards, and best management practices, including Transportation of Dangerous Goods Regulations;
- fuel transfer procedures will include best management steps to ensure no overtopping of tanks or spillage. In addition, inventories will be tracked regularly to check on possible losses
- a risk evaluation program for identifying vulnerabilities and management of improvements
- documented inspection schedules and procedures for dangerous goods and hazardous materials stored on site.

7.1.2 Spill Response

The Conceptual Spill Prevention and Contingency Plan sets out the basic mechanisms, organizational structures, responsibilities, and procedures to guide staff in responding to spills. For the plan to be effective, employees must be made aware of its provisions and their responsibilities under the plan.

A generalized response to spills is presented in Figure 7-1. A description of spill severity is provided in Table 7-1.

7.1.3 Spill / Leak Emergency Response

In the event of a spill, the following initial response steps will be taken:

- the safety of employees, site personnel, and the public will be ensured
- the spill material and source of the spill will be identified
- the necessary equipment and crews to stop, contain, and clean up the spill and rehabilitate the site to protect the environment will be mobilized
- if safe to do so:
 - measures will be taken to stop the spill
 - barriers will be constructed with available materials (e.g., snow, earth, or absorbent pads) to prevent the spread of material; in particular, to prevent the spill from entering a watercourse
- if the material or circumstance is unsafe, the relevant Environmental Manager and health and safety representative will be notified to initiate an Emergency Response Plan
- immediate hazards associated with the spill material or near the spill (e.g., aromatic substances, flammable material, or ignition sources) will be mitigated
- the responsible Environmental Manager and health and safety representative will be notified
- depending upon the severity of the incident, other appropriate stakeholders will be notified. These include government agencies and nearby communities or landowners.

Once notified of the event occurring, Environmental Manager (or designate) will provide direction as to the best course of action to carry out clean-up efforts and complete the appropriate reporting outlined in the Conceptual Spill Prevention and Contingency Plan. Immediate actions may include the following:

- Ensure personal safety – control life threatening emergencies that are within the employee’s capabilities if such an emergency is apparent
- Have operations personnel shut down processes that may be contributing to the spill, or stop the source of the spill if possible without endangering the responder or other personnel
- Determine the status of personnel – initiate emergency response procedures to provide appropriate medical response and eliminate life-threatening situations. Organize and initiate site evacuations if necessary
- Assess risk to personnel and environment, as well as operations
- For material that has escaped, it may be possible to reduce its potential impact (e.g., if released material is destined for a water body, it may be contained or redirected by building a small berm)
- Site personnel remain on alert until notified otherwise by the Environmental Manager, including members of the environmental team
- Stop the leak, secure and contain the spill, if possible, in accordance with guidelines
- Begin efforts to clean up the spill site and dispose of materials according to instruction from the Environment Department
- Commence planning to support and ensure necessary continuation of the response (i.e., provide: chemical or petroleum spill kit, treatment agents, necessary utilities [e.g., power, eater], protective equipment, human resources, fire-fighting or first aid equipment, maps or diagrams, heavy equipment or machinery, materials to begin clean-up, external resources or services).

The Environmental Manager (or designate) will notify the Mine Manager of the incident and provide regular updates while clean-up operations are in progress.

Table 7-1: Severity Classification of Spill Incidents

Level 1: Minor	<p>Volume is small and contained onsite.</p> <p>No risk to personnel, environment, equipment, or the public.</p> <p>Volume is less than the Ontario reportable threshold quantity.</p> <p>No release beyond the site</p> <p>Completely handled by on-site resources.</p> <p>Of no interest to the media or the public.</p>
Level 2: Moderate	<p>Volume is greater than the Ontario reportable threshold quantity.</p>

	<p>No significant public danger or environmental impact contained within site boundaries but possibly extend beyond the Project.</p> <p>Control of incident is probable</p> <p>Possible local public or media interest and outside-assisted response.</p> <p>May be beyond local, on-site emergency response resources.</p>
<p>Level 3: Major</p>	<p>Leaves site boundaries and/or remains on site with potential for: injury, fire, explosion, property damage, or impacts to environment or public safety</p> <p>Volume is greater than the Ontario reportable threshold quantity</p> <p>Support of off-site personnel or other resources required</p> <p>Significant multi-agency involvement</p> <p>High media and public interest</p>
<p>Emergency Response</p>	<p>Identified as "Emergency".</p> <p>Implementation of Conceptual Emergency Response Plan</p>

Typical cleanup techniques for major or serious spills will include the following:

- construction of berms around the spill with gravel, earth, or overburden using heavy equipment (e.g., loader, dozer, or excavator);
- excavating a sump using a backhoe, lining it with appropriate impervious lining material (e.g. tarp or poly), and diverting the spill into the sump;
- blocking culverts with plywood, poly, and/or sandbags;
- diverting spill into stormwater pond or diversion channels where it can be isolated;
- diverting spill into site drainage sump and blocking inlet and/or outlet;
- using absorbents (e.g., oil pads) for hydrocarbon spills;
- using granular absorbents where appropriate; and
- using emergency response kit.

Specific spill clean-up and disposal procedures will be developed for:

- historical tailings spill;
- tailings spill
- effluent treatment plant and sewage treatment plant spill, and contact water spill; and
- diesel, hydraulic, lube, and waste oil spill.; and
- an acetylene, argon, natural gas and propane spill.

7.1.4 Spills Near or On Water

In the event of a spill near or onto water, the following represents the general response steps to be taken:

7.1.4.1 Spills on Water

- the safety of employees, site personnel, and the public will be ensured;
- the spill material and source identified;
- the necessary equipment and crews to stop, contain, and clean up the spill and rehabilitate the site to protect the environment will be mobilized;
- if safe to do so:
 - measures will be taken to stop the flow from the source;
 - barriers will be constructed with available materials (e.g. earth (berm or trench) or absorbent pads) to prevent the spread of material, in particular, to prevent the spill from entering a watercourse;
 - Block culverts with plywood, poly, and/or sandbags;
 - On small spill, deploy hydrophobic absorbent pads on water surface. On larger spills, deploy larger absorbent socks, buoyant curtain or barriers to limit dispersal (weather and water flow conditions permitting) with a pump, or hydrophobic absorbent pads to remove spilled material inside the boomed area.

7.1.4.2 Spills on Ice and Snow

- the safety of employees, site personnel, and the public will be ensured;
- the spill material and source identified;
- the necessary equipment and crews to stop, contain, and clean up the spill and rehabilitate the site to protect the environment will be mobilized;
- if safe to do so:
 - measures will be taken to stop the flow from the source;
 - barriers will be constructed with available materials (e.g., snow, or absorbent pads) to prevent the spread of material, in particular, to prevent the spill from entering a watercourse;
 - If pooling on ice, pump, shovel and/or use absorbent pads to collect spilled material. Scrape ice and contain contaminated snow/ice into appropriate containers sealed with lids or in drums, label and secure in designated area with secondary containment.

8.0 MONITORING, EVALUATION AND REPORTING

8.1 Monitoring, Measurement, Analysis and Evaluation

The purpose of the Conceptual Spill Prevention and Contingency Plan monitoring program is to evaluate and document if it successfully achieves its performance objectives of prevention of uncontrolled release of materials to the environment. Table 8-1 outlines the conceptual monitoring program.

Table 8-1: Summary of Conceptual Spill Prevention and Contingency Plan Monitoring Activities

Monitoring Activity	Project Phase	Frequency	Season
Pipelines (visual inspection)	Operation	Daily	Year-round
TMF discharge pipeline (pressure/flow monitoring system)	Operation	24/7	Year-round
Contact Water Collection System	Construction Operation	Daily/Monthly depending on season and weather conditions	Year-round Year-round
Excavation, loading and transport (historical tailings and contaminated soil)	Construction/Operation	Daily	Year-round
Dams (visual inspection)	Construction / Operation	Daily	Year-round
Fuel and Chemical Storage Areas (visual inspection)	Construction / Operation	Monthly	Year-round

Monitoring of spill prevention and contingency planning components will be undertaken as part of routine visual inspections of the systems and Best Management Practices implemented on the site to protect the environment, and to determine whether new strategies are required. The inspections will be the responsibility of the Environmental Manager or designate. TMF and effluent/sewage treatment plant discharge quality is monitored as part of the Conceptual Water Management and Monitoring Plan.

Follow-up monitoring after a Level 2 or 3 spill may be applicable in cases where there is a possibility that impact to the environment has occurred. This could include soil and surface water sampling near the area of a spill clean-up to ground, or the implementation of a ground water monitoring program to document the environmental conditions of a Level 2 or 3 spill.

8.2 Reporting

The form and frequency of follow-up reporting will be determined as the Project progresses through EA and permitting, however, it is anticipated that those elements relevant to the

Conceptual Spill Prevention and Response Plan will be assembled into a formal summary report and provided to interested parties on an annual basis during construction and operation and during closure in years when monitoring is carried out. The reporting will be used to inform adaptive management reviews. Receiving, documenting and responding to communication from external interested parties, including complaints, will also form part of reporting under this Plan.

8.2.1 Review of Plans After a Spill

If a spill occurs that requires notification to the MOECC under Section 92 of the EPA, both the prevention portion and the contingency portion of plans will be reviewed and revised as required by the Environmental Department.

The MOECC *Guideline for Implementing Spill Prevention and Contingency Plans* (the Guideline) suggests that a review after a spill be conducted within one week of a spill. This timeline is not specified in the regulation, however GGM will endeavour to conduct the review within this timeframe so that pertinent details of the incident are not lost.

If an immediate or basic cause relates to an element described in the prevention portion of the plan (i.e., relates to equipment or process design, preventive maintenance, installation of monitoring systems, etc.), the element will be reviewed and revised as required. In addition, the Plan will be updated accordingly and the revision noted in the second page of the Plan.

Similarly, if an immediate or basic cause relates to an element described in the contingency portion of the plan (i.e., relates to response procedures, clean-up procedures, clean-up equipment and materials, notification procedures, etc.), the element will be reviewed and revised as required. In addition, the plan will be updated accordingly and the revision noted.

Although the review portion of the regulation only pertains to spills reported to the MOECC, the practice of reviewing the plans after a spill, including non-reportable ones, is a good habit to follow and will help improve the overall quality of the plan.

8.3 Continual Improvement

Adaptive management is a planned and systematic process for continuously improving environmental management practices by learning from their outcomes. Adaptive management provides the flexibility to address/accommodate new circumstances, to adjust monitoring, implement new mitigation measures or modify existing measures.

GGM will identify and correct incidents with appropriate and lasting measures aimed to prevent reoccurrence and/or similar occurrences. The Adaptive Management Framework (Figure 8-1), provides a formalized approach to:

- formally track and monitor activities;
- report and as needed investigate incidents, including non-conformance and non-compliance events;
- develop and implement corrective and preventive actions; and
- continue monitoring and update relevant EMMPs.

Corrective actions will be assigned as appropriate, including actions to prevent their reoccurrence. Corrective actions will vary according to the results of incident investigation and in consideration of other incidents related to the spill prevention and response.

GGM is committed to the continual improvement of its environmental management and performance. As part of the GGM Adaptive Management Framework, the Conceptual Spill Prevention and Response will be assessed annually to verify implementation and the continued suitability, adequacy and effectiveness of the Plan. The review will identify elements of this EMMP in need of revision, and evaluate performance against established performance objectives.

Figure 8-2 presents the overall approach to developing and advancing the EMMPs from the final EIS/EA to the construction Phase of the Project. The first stage of EMMP development begins with preparation of Conceptual Environmental Management Plans as part of the final EA/EIS. These Conceptual EMMPs are commitment-based and broad in their level of detail. The EMMPs guide environmental management for the Project and are progressively developed as the Project moves through the EA/EIS, permitting, and construction, and updated based on continual improvement during operations through adaptive management.

During the Construction and Operation Phases, a comprehensive review of the Conceptual Spill Prevention and Contingency Plan is required at least once per year. This review will be documented and certified by the Project Manager. This review consists of the following elements:

- Review the regulation (O.Reg. 224/07) for changes and incorporate required changes into the document.
- Review the overall risk assessment and prevention steps previously identified. If a previously identified spill becomes a higher risk as a result of changes, then prevention steps will be identified and reviewed for implementation. Some of the changes that could result in a change in the risk assessment include:
 - Change in quantity of material stored.
 - Change in material stored (e.g., substance is introduced or discontinued).
 - Change in storage location or conversely, a new sensitive receptor becomes located nearby (e.g., a new residence is constructed near your site).
 - Conduct an annual test of the plan.

9.0 REFERENCES

Transportation of Dangerous Goods Act, 1992.

CAN/CSA-Z731-M91 Emergency Planning for Industry (Canadian Standards Association 2002);

Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (Canadian Council of Ministers of the Environment 2003).

Workplace Hazardous Materials Information System 2015 (WHMIS) (Health Canada 2015); and

Implementation Guidelines for Part 8 of the Canadian Environmental Protection Act, 1999 – Environmental Emergency Plans (Environment Canada 2004).

Environmental Protection Act, and associated Ontario Regulation 224/07 *SPILL PREVENTION AND CONTINGENCY PLANS*, administered by the Ministry of Environment and Climate Change; (MOECC).

10.0 FIGURES

Figure 7-1: General Sequence of Events in Response to a Spill

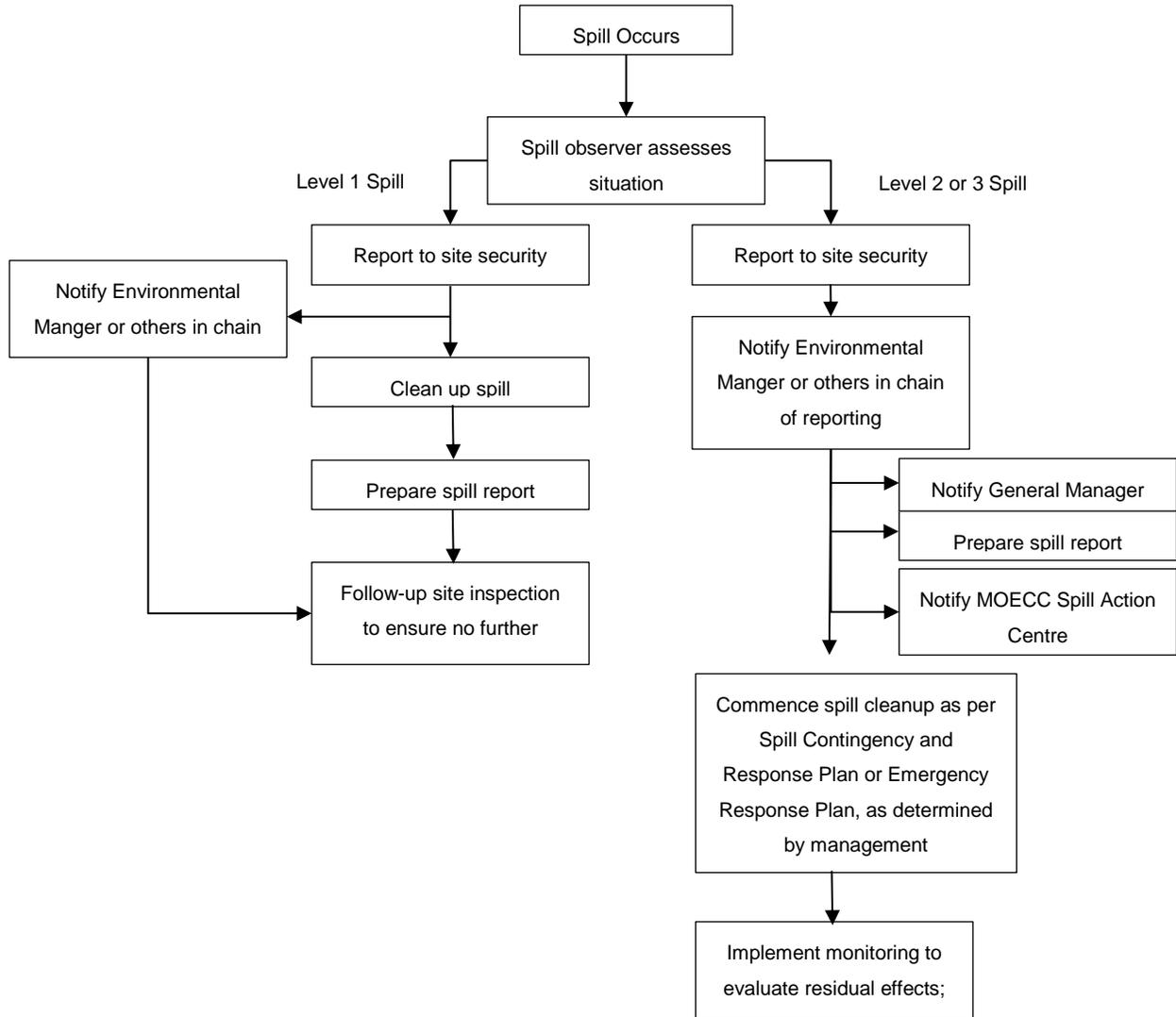


Figure 8-1: Hardrock Project Adaptive Management Framework

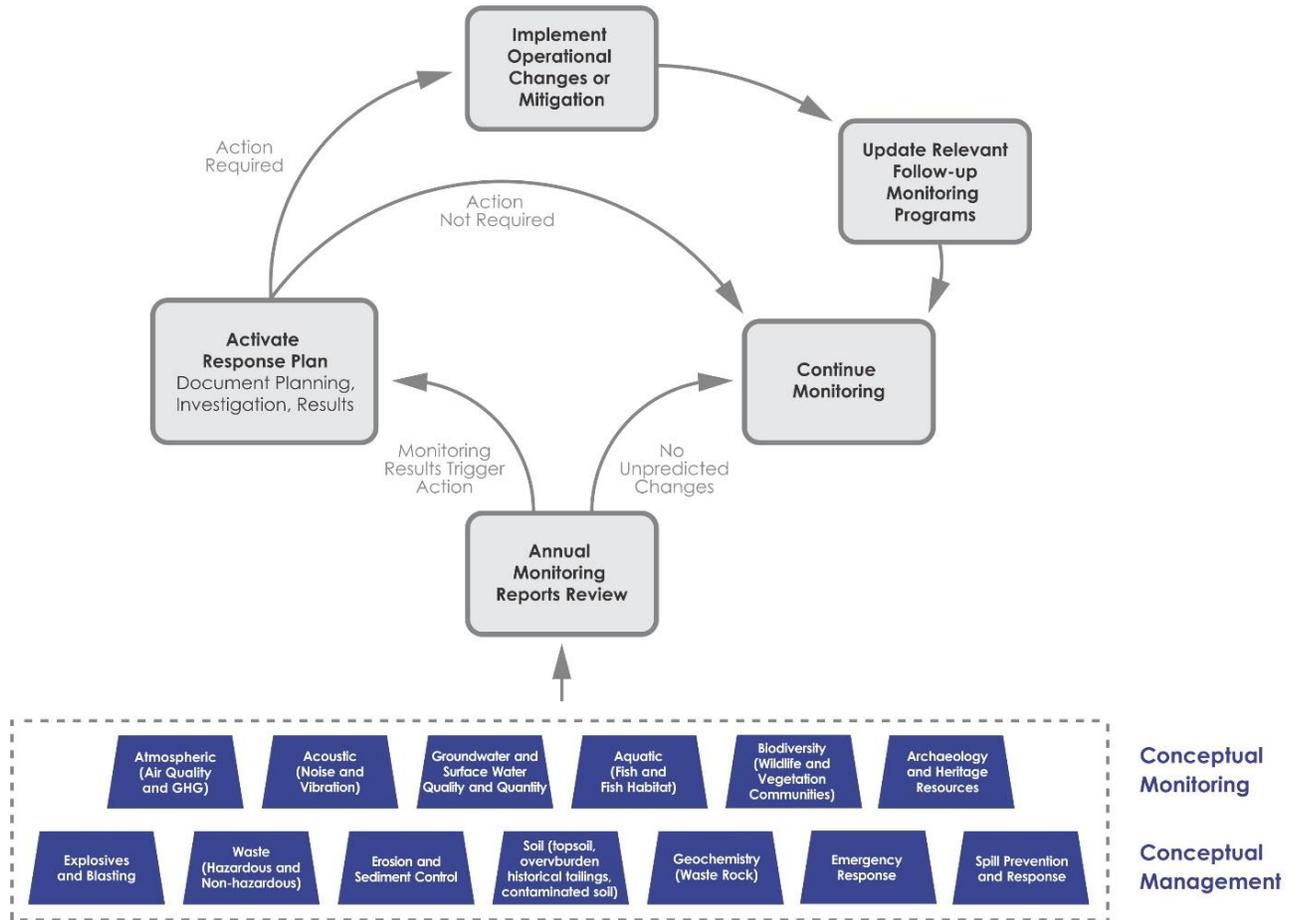
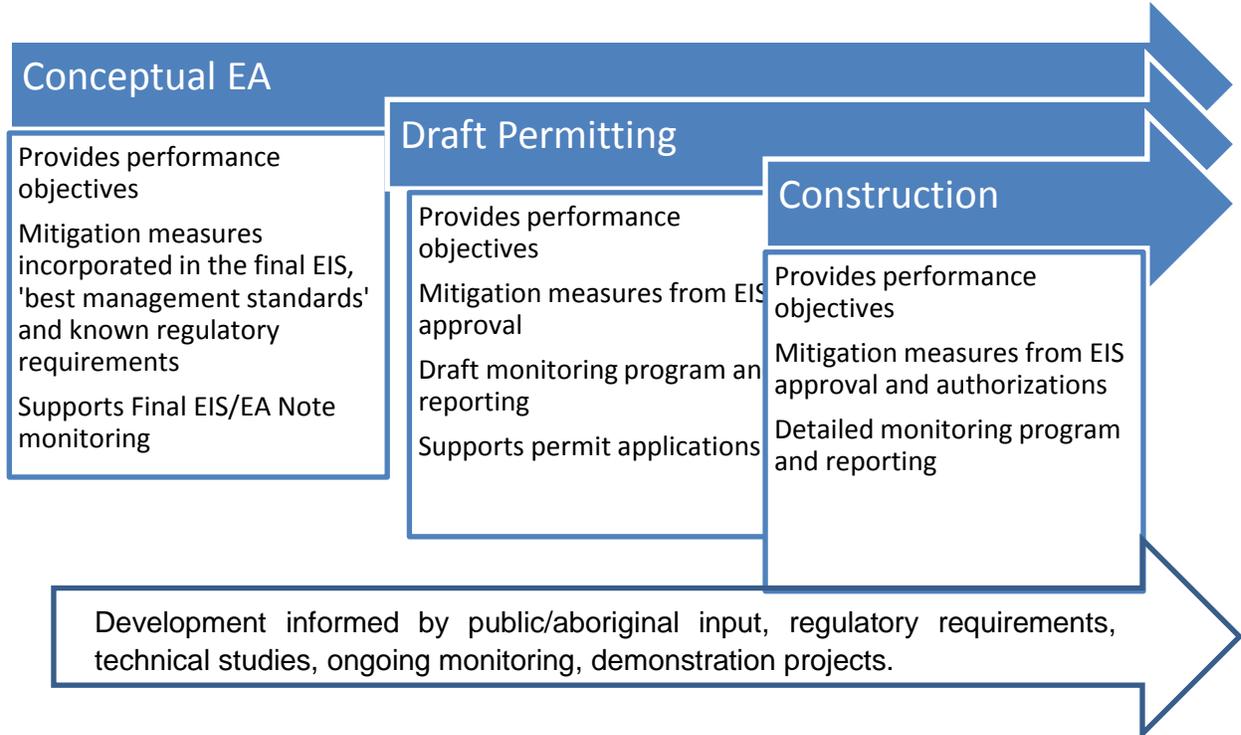


Figure 8-2: Environmental Management and Monitoring Plan Development EA to Construction



APPENDIX A CONCEPTUAL SPILL REPORTING FORM

Spill Reporting Form		Date: _____
Person reporting spill:		Telephone number:
Time of reporting:		
Persons involved or nearby:		Telephone number:
Spill location and findings:		
Material Type:		Material Quantity:
Weather conditions:		
<input type="checkbox"/> Other agencies contacted: <input type="checkbox"/> MOECC – 1-807-475-1205 <input type="checkbox"/> Others: <input type="checkbox"/>		<input type="checkbox"/> Police/Fire Dept. (911) <input type="checkbox"/> MOECC Spills Action Centre (1-800-268-6060) <input type="checkbox"/> <input type="checkbox"/>
Cause(s) and effect(s) of spill:		
Spill containment and clean up procedures initiated:		
Distance to nearest public facility, residence and First Nations community:		
Distance to nearest streams, waterbodies and/or sensitive areas:		
Agencies on the scene:		
Other comments/actions taken:		
Report completed by (include title):		

****Use reverse side for any necessary sketches of the spill****

