

<b>MINING (AMENDMENT) REGULATIONS 2005</b>	<b>ENVIRONMENTAL MANAEMENT CODES OF PRACTICE Sand and Loam Mining (Rev. 0)</b>	<b>GUYANA GEOLOGY AND MINES COMMISSION</b>
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# **Mining Environmental Management CODES OF PRACTICE**

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## **Sand and Loam Mining**

**Guyana Geology and Mines Commission**  
Brickdam, Georgetown, Guyana

**August 2010**

**Rev – 0**

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## 1.0 Introduction

This Code of Practice for **Sand and Loam Mining** operations which are subject to medium scale mining permits covering areas of 25 hectares (60 acres) and less, and small scale mining claim licenses granted by the GGMC . It is intended to provide environmental management guidance and promote the application of related best management practices. It is not a design manual<sup>1</sup>.

### 1.1 Regulatory Authority/Mandate

The Mining (Amendment) Regulations 2005<sup>2</sup> were promulgated in 2004. Regulation 248 of the Mining (Amendment) Regulations 2005 stipulated that the Guyana Geology and Mines Commission (GGMC) prepare Codes of Practice for incorporation into the final Regulations.

The Codes of Practice were intended to provide critical environmental management guidance to the Mining Industry. The importance of the codes was even more enhanced by the development of the Low Carbon Development Strategy.

The following ten (10) provisions of the Codes of Practice for Environmental Management were indentified:

- Use of Mercury
- Tailings Management
- Contingency and Emergency Response Plans
- Mine Effluents
- Mine Reclamation and Closure Plans
- Mine Waste Management and Disposal
- Environmental Effects Monitoring Program
- Quarrying
- Sand and Loam Mining
- Use of Small Dams for Tailing and Water Management

The Sand and Loam Code of Practice is administered by the GGMC; GGMC will periodically report on compliance with the Code of Practice to the Environmental Protection Agency (EPA). *(Notwithstanding this, the EPA has reserved the right to monitor and regulate the said mining properties and operations under the provisions of the Environmental Protection Act).*

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<sup>1</sup> This document is **NOT** a design manual. Users of this document shall assume full responsibility for the design of facilities and for any action taken as a result of the information contained in this document.

<sup>2</sup> The Mining Regulations, made under the Mining Act (1989), was amended by the Mining (Amendment) Regulations 2005: Collectively they address all the important aspects of mining environmental management.

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## **1.2 Justification for the Sand and Loam Mining Code of Practice**

Sand and loam mining is an important sector in the mining and construction industries. It has also been the least regulated part of the mining industry. The source of these materials and their universal use places the sand and loam mining operations within sphere of, and adjacent to, many communities.

There is also the need for reclamation and closure of the pits created by the removal of sand and loam.

The requisite trucking and hauling of the materials on public roads and highways, and rivers, increases the potential environmental and socio-economic impact of this industry.

This Code of Practice necessarily addresses the above concerns by providing environmental management guidance thus ensuring best management practices within the industry.

This Code of Practice for Sand and Loam Mining is based on sound management practices and on principles and approaches from various sources.

## **1.3 Administration of Codes and Responsibilities of Owners and Workers**

The best strategy for sustainable environmental management in quarrying is co-regulation by the various stakeholders including the GGMC, the EPA, Sand and Loam Mine Operators, and the Mining Industry.

GGMC's mandate or role as defined by the Mining Act 1989 and the Mining (Amendment) Regulations 2005 is to develop, administer and enforce the mining regulations. Specific responsibilities include:

- Development and upgrading of the codes
- Consultations with the stakeholders in the mining industry including mining organizations and miners.
- Public education, orientation and training
- Enforcement of the mining regulations
- Compliance Monitoring and enforcement of the Mining (Amendment) Regulations 2005
- Compliance coordination of this Code of Practice and the Environmental Protection Act with the EPA.

The prime responsibility for the implementation of, and compliance with, the Mining (Amendment) Regulations 2005, and the application of sound environmental management practices rests with the Mine Owners and operators. Specifically, with the respect to Sand and Loam Mining, the Licensees/Permittee/Mine Owners and Operators must:

- Manage their operations in order to achieve compliance with the provisions of the Mining regulations
- Provide their employees with required training and orientation in the applicable regulations and statutes, including:
  - Mining regulations, and the related codes and guidelines
  - Environmental management
  - Contingency and Emergency Response Plans Code of Practice
  - The Mine Reclamation and closure Code of Practice
  - Occupational health and safety

Both the Mine Owners and Operators are liable for any and all breaches under this Code of Practice.

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## 2.0 Glossary of Terms

Abandoned site	An area formerly used for mining and mineral processing, where closure is incomplete and for which a titleholder still exists.
Ambient Noise:	The pervasive noise associated with a given environment, being usually a composite of sounds from sources both near and distant normally experienced in an area. Ambient noise is measured as dB (A) over a set period of time.
Artisanal mine	A small, medium or even large-scale, informal, legal or illegal mining operation that uses rudimentary processes to extract gold from either primary or secondary ore bodies.
Best practice	The best way of doing things. The objective of best practices is to prevent or (when that is not possible) minimize risks to human health, as well as adverse environmental, social and economic impacts.
Buffer areas	Means land on either bank of rivers or watercourses from the low watermark of the bank to 20 meters (20 m) inland, and extending from the mouth of the river or navigable watercourse to its source; or any area within 30 meters (30 m) of a public road; or 100 meters (100 m) of approved residences, commercial/industrial developments; or 1 kilometer (1 km) of an approved nature reserve or park.  A buffer zone is a transitional area between areas of predominantly different activities or land uses.
Code of practice	Means the Environmental Code of Practice for the operation of mines that is published by the Commission and which shall be read as part of the Mining (Amendment) Regulations 2005.  (A collection of rules and ethical principles related to a specific field of activity. A code of practice describes procedures and sets out standards considered to be best practices in the said field of activity. The code may be voluntary or mandatory).
Co-Regulation	The mechanism whereby a Community legislative act entrusts the attainment of the objectives defined by the legislative authority to parties which are recognized in the field (such as economic operators, the social partners, non-governmental organizations, or related industry associations).
Decibel (symbol dB)	A unit used to measure the power of a sound signal relative to some reference level. As a measure of sound intensity, a zero-decibel reference is stipulated to be the lowest level audible to the human ear
Developer	The applicant for an environmental authorization for a project under the Environmental Protection Act No. 20 of 1989.

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Effluent	Means any fluid including airborne particles of matter and other substances in suspension or solution in the fluid and includes mine de-watering discharges, site runoff, discharges from a tailings basin or settling pond, discharges from a processing plant or dredging operation which is released to the surface or ground water and other substances such as colloids, in solution or suspension.
End of mine life process	A process undertaken when the mining operation is about to be decommissioned.
Environment	Surroundings in which a quarry operates, including air, water, land, natural resources, flora and fauna, humans, and their interaction.
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from the quarry's environmental aspects.
Environmental Impact	The process of identifying, predicting, and evaluating potential Assessment (EIA): environmental impacts of development proposals. The results of the study are taken into account by the Regulatory Authority in determining whether the proposed development should be allowed, and under what conditions.
EPA	The Environmental Protection Agency
End of mine life process	A process undertaken when the mining operation is about to be decommissioned or safely closed down.
Guidelines	A non-binding document, usually designed to provide users with information, explanations, guidance and help with respect to a specific topic. Guidelines are a tool frequently used to enforce new regulations. Users can be either the Regulator itself or the industry.
HSE	Stands for <b>H</b> ealth, <b>S</b> afety and <b>E</b> nvironment.
Medium-scale mine	A mine for which a mining permit has been issued and from which a volume in excess of 200 m <sup>3</sup> , but less than 1 000 m <sup>3</sup> , of material, including any overburden, is excavated or processed as an aggregate in any continuous 24-hour period.
Mine	Includes any excavation, processing facility and/or related facilities for the recovery of metal, mineral or quarriable material and excludes any excavation, processing facility or related facilities that excavate or process less than 20 m <sup>3</sup> in any continuous period of twenty-four hours.
Mine closure	A whole of mine life process which typically culminates in property relinquishment. Closure includes decommissioning and rehabilitation. This term is often used interchangeably with Mine decommissioning.

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Overburden	Loose soil, sand, gravel, etc., that lies above the bedrock or above a deposit of useful materials, ores, or coal. Also called burden, capping, cover, drift, mantle, and surface, it may or may not include topsoil
Progressive reclamation	Reclamation that is carried out throughout the mine life, in day-to-day operations.
Reclamation (rehabilitation)	The return of the disturbed land to a stable, productive and self-sustaining condition, taking into account beneficial uses of the site and surrounding land.
Regulations	<p>A type of “delegated legislation” enacted by the appropriately authorized state, federal or local government agency.</p> <p>Regulations are generally very specific and are also referred to as rules, or simply administrative law. Regulations are official rules and must be followed.</p>
Relinquishment Point	<p>Point where the mining company has met agreed completion criteria to the satisfaction of the responsible authority. At this point, the site is no longer a danger to public health and safety is not a source of ongoing pollution or instability and allows a productive use of the land similar to its original use, or approved alternative beneficial use.</p> <p>A mining company has no further obligations regarding a specific property once its relinquishment has been accepted by the regulatory authorities.</p>
Residential Premises:	Any building or part of a building lawfully used as, or for the purposes of, a private residence including the curtilage of the building or, where the boundaries of the cartilage are not ascertainable, the land within a distance of 25 meters from the building.
The Stakeholders	The sum of all representative institutions of the community as well as the relevant sectorial Regulatory bodies
Stream	Any watercourse, no matter how small or large it is; Includes creeks and rivers.
Stripping	The removal of earth or non-ore rock materials in order to gain access to desired ore or mineral materials; the process of removing overburden or waste material in a surface mining operation.
Topsoil	Dark-colored, organic, well-decomposed soil material consisting of the residues of plant and animal materials together with synthesized cell substances of soil organisms and various inorganic elements.
Temporary closure	Phase following temporary cessation of operations when infrastructure remains intact and the site continues to be managed. Also called Care and Maintenance.

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Turbidity

The state, condition or quality of opaqueness, cloudiness or reduced clarity of a fluid attributable to the presence of suspended matter.



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### **3.0 Mission and Objectives**

#### **3.1 Mission Statement**

The Sand and Loam Mining Code of Practice's (the Code) mission is to:

Promote sound Sand and Loam Mining practices in Guyana in order to minimize the impacts on communities and the environment.

#### **3.2 Objectives**

- 1) Protect communities and the environment from potential adverse environmental effects caused by sand and loam mining
- 2) Foster a holistic approach to stewardship of sand and loam mining considering all stages in the mine life-cycle including, permitting, operation, reclamation and closure.
- 3) Promote the Code's use by small and medium-scale sand and loam miners.
- 4) Raise the awareness of, and educate all parties as to the importance of sound Sand and Loam Mining practices.
- 5) Promote sustainable and environmentally sound sand and loam mining and shipping practices.

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#### **4.0 Scope**

This mandatory Code of Practice applies to sand and loam mining operations. There are two designations for sand and loam mining:

- Medium scale mines governed by mining permits covering areas of 25 hectares (60 acres) and less
- Small-scale mines governed by mining claim licenses (granted by the GGMC)

Compliance with the rules, regulations and statutes is mandatory.

This Code of Practice addresses only environmental issues related to Sand and Loam Mining and does not deal with any occupational health and safety (OH&S) issues related to Sand and Loam Mining.

This Code of Practice covers all stages in the sand and loam mining life cycle, i.e., permitting, operation rehabilitation and decommissioning.

No guarantee is made in connection with application of the Code to prevent hazards, accidents, incidents or injuries to workers and/or members of the public at any specific sand and loam mining operation.

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## 5.0 Principles & Standard Practice

### 5.1 Introduction

Careful planning throughout the life cycle is the key to successful and sustainable (financially and environmentally) sand and loam mining. Each phase of quarrying, planning through closure, has environmental challenges. These can be overcome through compliance with the governing regulations and statutes, and best management practices.

This Code of Practice focuses on three distinct phases of Quarrying, they are:

- Permitting
- Operations
- Reclamation and Closure

The principles and standards of practice for each of these phases are reviewed subsequently.

### 5.2 Permitting

The permitting stage represents the formal engagement with the Regulatory Agencies, the GGMC and the EPA, and presentation of the application for the license to operate a quarry. The process is iterative and would involve various forms and levels of interactions, submittals, discussions and reviews

The permitting process allows the regulators, GGMC and the EPA, to ascertain if the prospective operator is aware of, has the resources to, and is prepared to, operate in an environmentally sound and sustainable manner. Award of a Sand or Loam Mining license (GGMC) is contingent on an environmental authorization from the EPA.

The process for permitting and licensing a quarry is presented in Appendix A, Sand and Loam Mining Permitting Process.

### 5.3 Operations

**Principle:** A sand and loam mine should be operated in an environmentally sound and sustainable manner. Careful planning and adherence to the regulations is the best strategy to a successful operation. The critical aspects of a successful operation are:

- Mine Planning
- Environmental Management

#### Standards of practice

##### 5.3.1 Mine Planning

**Principle:** The mine plan is the primary operational document for development and progression of a sand or loam mine. Its objective is the economical, orderly and sustainable exploitation of the resource: The plan optimizes production in conjunction with effective environmental management and best practices for occupational health and safety. The plan should reflect the projected best options for the mining sequence, the location of supporting infrastructure, stock piles, working areas, and for progressive rehabilitation.

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The implementation of the mine plan, and the development of the mine, can only proceed after GGMC's approval.

The mine plan should include some of the following:

- Property layout and Boundary
  - Site topography
  - Access Roads
  - Adjacent land use and properties
  - Buildings, support facilities
  - Wharfage, Barge loading
- Mineable Reserves
- Mining Sequence
- Initial Pit Layout
- Final Pit Layout
- Site Hydrology
- Mining Methods
  - Equipment
  - Production Rates
  - Drainage/Water Control
  - Hauling
- Environmental Management

Mine plan should be available for review by the GGMC.

### **5.3.2 Environmental Management**

**Principle:** Operate the sand or loam mine in a safe and environmentally acceptable manner in compliance with permits and regulations. Environmental management must be incorporated into every aspect the operation, from planning through closure. Each phase of the mine life-cycle has environmental challenges that can be met

#### Standards of practice

Every operation is required to prepare an environmental management plan. The plan should include the following:

- Identification of the significant impacts and the proposed mitigation measures
- Property/Site Description
- Waste Management & Disposal
- Noise Control
- Dust Control
- Access Road maintenance
- Protection of marine environment
- Cleanup Plans
- Buffer Zone
- Monitoring

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## **Operational Considerations**

### **5.3.2.1 Access and Haulage Roads**

**Principle:** Access and haulage are very important to the successful and safe operation of sand and loam mining operation. Collectively they facilitate transportation and access to the property and around the mining facility. Use of the roads for the movement of equipment, materials and excavated product can generate noise and dust.

Control of these emissions is contingent on well designed and maintained access and haulage roads.

Drainage, visibility, neighbors, dust control and noise control, gradient, type of equipment used on the road and access ramps are factors to be considered in planning phases. Access points to and from public roads must be carefully considered. They are critical both to mine operations and smooth flow of non-mine traffic.

#### **Standards of practice**

- Limit the number of access roads to the mining area
- Access strips where the mine pits joins major public should be made of concrete or asphalt to protect the road shoulder
- The junction of the access road to the sand or loam mine and public roads or highways must be maintained free of debris, and material being transported by haulage trucks.
- Haulage distances should be minimized; ramp grades should not exceed 10%.
- Keep access roads well maintained
- Maintain the drainage system along access roads to prevent flooding, erosion and sedimentation in nearby water ways.

### **5.3.2.2 Noise Reduction**

**Principle:** Noise is generated in most of the production and haulage activities in sand and loam mining. It is major pollutant in the mining environment and the basis for public concern: Every effort should be made to reduce or mitigate it.

#### **Standards of practice**

Planning for the control and mitigation of noise should be addressed in at the planning stage of the operation when most of the noise sources can be identified and managed. Noise mitigation efforts include:

- Reduction in haulage routes and use of equipment within the mine
- Use of mufflers to keep decibel levels below 85.
- Selection of low-noise equipment
- Reduce Speeds of empty hauling trucks
- Gradients on roads should not exceed 10 (ten) percent
- Set and observe maintenance schedules for equipment

Noise abatement plans must be prepared and presented for public review at the initial planning and permitting stage and whenever there are major new expansions.

### **5.3.2.3 Waste Management and Disposal**

**Principle:** Owners and operators are responsible for the management/disposal of waste found on site. Waste is generated in almost every aspect of sand and loam mining. The best strategy is to address the

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wastes at the planning stages of the operation. Every sand and loam mining operation should have a waste management and disposal plan.

**TABLE 1.0 WASTE MANAGEMENT STRATEGIES**

Type of Waste	Principle	Standard of Practice
<b>Household</b>	Foster the application of waste minimization principles so as to reduce the amount of household wastes that are disposed of and ensure that sound waste disposal practices are implemented	<ul style="list-style-type: none"> <li>• Promote waste avoidance, reduction, reuse and recycling practices.</li> <li>• Compost organic waste such as food, leaves, and roots. This compost could be used for revegetating the site.</li> <li>• Bury non-recyclable and non-compostable waste in an appropriate landfill complying with corresponding national or local landfill regulations.</li> <li>• Develop and implement an awareness program on waste minimization for mine workers</li> </ul>
<b>Fuels, Lubricants and oils</b>	These represent a potentially serious threat to the environment and must be carefully managed.	<ul style="list-style-type: none"> <li>• It is an offence to drain or dispose of any matter containing tars, oil, grease or any poisonous substances directly onto the surface of the land or into a river or creek.</li> <li>• A fuel containment bond with an impervious surface must be constructed for the handling of tars, all oils (including waste oils), lubricants and fuels.</li> <li>• Waste oils must be collected and stored on site until they are ready for reuse, or disposal at approved sites or centers offsite.</li> <li>• Train employees in handling and storage, labeling, construction of containment bonds, and vehicle maintenance</li> </ul>
<b>Top Soil, and Overburden</b>	Ensure that topsoil and overburden piles are adequately located, designed, managed and reutilized for revegetation and rehabilitation works	<ul style="list-style-type: none"> <li>▪ Build separate piles for topsoil, overburden material and waste rock.</li> <li>▪ Locate topsoil, overburden and waste rock piles away from surface waters, springs, seeps and wetlands (swamps and marshes) as possible.</li> <li>▪ Locate and construct piles so that the potential of failure is minimized.</li> <li>▪ Take preventive measures to avoid water and wind erosion.</li> <li>▪ Keep topsoil biologically active to retain its value as a plant growth medium.</li> <li>• Where possible use top soil and waste rock immediately to rehabilitate disturbed sections of the quarry.</li> </ul>
<b>Hazardous Wastes</b>	Protect communities and the environment from chemicals and other hazardous substance used on site	<ul style="list-style-type: none"> <li>• Identify materials and prepare hazardous waste inventories</li> <li>• Material safety data sheets (MSDS) for chemical and hazardous materials must be kept on site</li> <li>• Describe methods for transport, storage and handling of hazardous waste.</li> <li>• Identify options for disposal and long term storage of hazardous waste.</li> <li>• Hazardous material must be packaged appropriately and disposed of at approved facilities or onsite locations.</li> <li>• When facilities are not available, operators are permitted to burn wastes, including batteries, using kerosene or similar fluids at specially set-aside or approved areas</li> <li>• Provide training on hazardous waste handling and storage for workers</li> </ul>

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### Standards of practice

The plan should address the following:

- Waste classification ( type, source, amount, disposal)
- Onsite disposal (burial) of domestic waste at depths  $\geq 1$  metre.
- Offsite disposal at landfills
- Industrial waste
- Sewage wastes (septic tanks at least 50 metres from creeks or water sources)

Waste management strategies for sand and loam mines are presented in Table 1.0, Waste Management strategies.

#### **5.3.2.4 Fuel Storage and Handling**

Principle: Fuels, lubricants and oils are hazardous materials, represent a potentially serious threat to the environment and must be carefully managed. Management includes training of employees in handling and storage, labeling, construction of containment bonds, and vehicle maintenance.

### Standards of practice

- Tars, oil, grease or any poisonous substances should not be drained into or disposed of directly onto the surface of the land or into a river or creek.
- Containment should be a major part of the containment strategy; a bond with an impervious surface must be constructed for the handling of tars, all oils (including waste oils), lubricants and fuels.
- Collect and store waste oils on site until they are ready for reuse, or disposal at approved sites or centers offsite.

#### **5.3.2.5 Dust Control**

Principle: Dust is potentially an environmental and health hazard. It must be controlled in order to minimize impacts to workers and adjacent communities. Dust is generated by many of mine-related activities, including, excavation, traffic on unpaved roads, from stockpiled materials, from uncovered haulage trucks, and from stock piles.

### Standards of practice

Effective dust control focuses on the sources of dust and generating activities. Dust control measures include the following:

- Maintenance and watering of roads
- Enforcement of lower truck speeds on site
- Covering trucks hauling materials
- Apply covers and dust suppressant strategies on barges (marine transportation)
- Watering and covering stockpiles
- Use chemical dust suppressant, as necessary
- Locate of stockpiles away from the property boundaries, water courses and sensitive areas

#### **5.3.2.6 Buffer Zones**

**Principle:** A buffer zone is a transitional area between areas of predominantly different activities or land uses. They have been used to isolate areas or protect resources such as water resources from degradation.

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The stipulated size of a buffer zone may vary even within the same industry, depending on the nature of a particular adjacent land use of resource.

#### Standards of Practice

The following are stipulated buffer zones for sand and loam mining:

- General: A non-extractable, vegetated buffer zone 150 meters wide shall be maintained from the sand and loam mines/pits and adjoining areas with different land uses unless otherwise approved by the EPA. A copy of such approval shall be filed with the GGMC.

A vegetated buffer zone 50 meters wide shall be maintained from the side of the access road to the edge of the pit

- Linden-Soesdyke Highway: A non-extractable, vegetated buffer zone, 100 meters wide (check consistency with laws for all buffers re: different land uses), must be maintained along the side of the mine/pit parallel to the Linden-Soesdyke Highway and power lines.
- A 10 metre wide vegetated buffer shall be maintained along Smart Road and along the eastern boundaries facing Madewini Creek, Linden Highway.
- Other Locations: A non-extractable, vegetated buffer zone, 100 meters wide, must be maintained along the side of the mine/pit parallel to any main public or private road and power lines.
- River, Creek or Water Source: No sand or loam mine/pit shall operate within 200 meters of these resources unless adequate protection can be demonstrated in writing and approved in writing by the EPA. A copy of such approval shall be filed with the GGMC

## **5.4 Reclamation and Closure of Sand and Loam Mining Operations**

**Principle:** Sand and loam mines should be “mined for closure”. The final mine layout and identified end-use after mining should guide all activities during operation. Closure of sand and loam mines should result in a safe, stable and sustainable environment. All mining and reclamation activities should support the proposed end-use of the property. The identified end-use is a binding commitment; the Permittee/Licensee must formally inform the GGMC of any change in the proposed end-use of the property and ensure that the resources are available to support this change.

Progressive reclamation reflects the “mine for closure” strategy and should be practiced. It offers the best strategy for successful closure. Reclamation plans should be included in the mine plans, and then verified and updated periodically through the operating life of the mine, in preparation for closure.

### **5.4.1 Progressive Reclamation and Closures**

Progressive reclamation includes stabilization, recontouring and revegetation of mined-out areas as the mine progresses. The reclamation of sections of the mine should be phased and linked to the progression of the sand or loam mine. Each reclamation phase should detail areas to be reclaimed, reclamation activities, and completion criteria.

#### **5.4.1.1 Top Soil and Overburden**

Management of topsoil is necessary for effective dust control and revegetation. The following are important considerations



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- Topsoil and Overburden should be carefully stripped and stockpiled in a clearly identified area for future use in reclamation and revegetation.
- Topsoil and overburden should not be stored within three meters of natural vegetation or mine face
- Locate topsoil Stockpiles outside of future mining area and faces
- Top soil should be kept alive by covering and allowing vegetative cover
- Implement erosion control procedures and mechanisms to protect topsoil and overburden from rainfall and wind
- Berms may be constructed to prevent erosion
- Where possible, reclamation sites immediately after excavation.

#### 5.4.1.2 Revegetation

- Revegetation must be implemented throughout the life of the mine and not only at closure
- Revegetation shall include the replacement of topsoil
- Identify source of grass and shrubs for use in revegetation during the initial mine planning
- Use of native vegetation or vegetation with demonstrated beneficial attributes to the proposed end-use for the property.

#### 5.4.1.2 Contouring of Mine Faces

Cratering is one of the negative environmental impacts associated with sand and loam mining. Recontouring after mining addresses some of the associated effects including, erosion, landslides, and occupation health and safety.

- Slopes should be recontoured at 30°, the natural angle of response of sand.
- Re-contouring should facilitate the required buffer zones ( Section ...
- Recontouring of the mine faces also facilitates re-vegetation

#### 5.3.1 Closure Plans

Closure plans must be developed in the early stages of the planning and development, and then verified and updated periodically through the operating life of the mine in preparation for closure. The closure plan should include the following:

- Operational history of the site
- Infrastructure development
- Final Closure Acceptance Criteria
- Final mine layout
- Hydrology/water management
- Impact assessment results
- Revegetation plans
- Long-term maintenance, if needed
- Dismantling and disposal of supporting infrastructure
- Potential land use upon closure
- Resources and guarantees to support the identified end-use of the property

#### 5.3.2 Communications

- The GGMC must be informed in writing twelve months in advance, of the time period over which mine/pit closure is expected, proposed change of land use after closure or temporarily cessation of operations.

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- Upon satisfactory restoration of the area(s) the mine/pit Operator or owner will be issued a formal discharge by the Commissioner of obligations to restore and the Environmental Bond shall be refunded.
- The Environmental Bond, or part thereof, will be used by the Commission to restore the environment where restoration of the said area was not done to the satisfaction of the Commissioner, provided that the Commission will not retain a third party to carry out such restoration before the Owner or Operator has been given three months from the date restoration becomes due to restore the area.

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## **6.0 Monitoring and Surveillance**

The Environmental Monitoring Plan will detail the level and type of monitoring required to address/mitigate the identified impacts specific to the sand or/loam mine.

## **7.0 Emergency Measures**

Landslides and industrial accidents are the major potential emergencies in Sand and Loam mining. Other emergencies are related to the mining environment.

The Contingency and Response Plan Code of Practice details the approach and strategies for addressing emergencies associated with the mining.

<p style="text-align: center;"><b>MINING (AMENDMENT) REGULATIONS 2005</b></p>	<p style="text-align: center;"><b>ENVIRONMENTAL MANAEMENT CODES OF PRACTICE Sand and Loam Mining (Rev. 0)</b></p>	<p style="text-align: center;"><b>GUYANA GEOLOGY AND MINES COMMISSION</b></p>
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## 8.0 References

Environmental Protection Agency, *EIA Guidelines: Volume 1: Rules and Procedures for Conducting and Reviewing EIA5*. EPA Environmental Assessment Board, 2000

Environmental Protection Agency: *Environmental Impact Assessment Guidelines Volume 3: Mining*, 2000.

GENCAP Mining (2004), Draft Codes of Practice, Mine Waste Management and Disposal Small and Medium Scale-Mines (Guyana), 2003

Guyana Geology and Mines Commission; *Draft Code of Practice, Contingency and Response Plans (Guyana)*, 2010

Guyana Geology and Mines Commission; *Draft Code of Practice, Mine Waste Management and Disposal (Guyana)*, 2010

Guyana Geology and Mines Commission; *Draft Code of Practice, Mine Reclamation and Closure Plans (Guyana)*, 2010

Guyana Geology and Mines Commission; *Draft Code of Practice, Mine Waste Management and Disposal (Guyana)*, 2010

Ripley, E.A., Redman, R.E. and Crowder, A. (1996), *Environmental Effects of Mining*. St. Lucie Press, 356 p., 1996.

Society of Mining Engineers, *Mining Reference Handbook. SME, 464 p., 2002*

Web sites

<http://xmlwords.infomine.com/xmlwords.htm> (on-line dictionary of mining terms)

<b>MINING (AMENDMENT) REGULATIONS 2005</b>	<b>ENVIRONMENTAL MANAEMENT CODES OF PRACTICE Sand and Loam Mining (Rev. 0)</b>	<b>GUYANA GEOLOGY AND MINES COMMISSION</b>
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**Appendix A: GGMC – Sand and Loam Mining Licensing/Permit Process**

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<b>MINING (AMENDMENT) REGULATIONS 2005</b>	<b>ENVIRONMENTAL MANAGEMENT CODES OF PRACTICE Sand and Loam Mining (Rev. 0)</b>	<b>GUYANA GEOLOGY AND MINES COMMISSION</b>
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### **Preplanning and Permitting**

**Principle:** Permit applications to develop and operate sand or loam mines must demonstrate the potential operator’s understanding of the governing regulations and a commitment to good environmental management practice. The permitting process allows the regulators, GGMC and the EPA, to ascertain if the prospective operator is aware of, and is prepared to operate in an environmentally sound and sustainable manner.

At the permitting stage the developer is assumed to have conducted and completed a feasibility study that would have included data gathering and evaluation, a site assessment, preliminary mining plans, layout and strategy, a preliminary environmental management plan and identification of data/information gaps.

The permitting stage represents the formal engagement with the Regulatory Agencies, the GGMC and the EPA, and presentation of the application for the license to operate sand and loam mine. The process is iterative and would involve various forms and levels of interactions, submittals, discussions and reviews. The basic sand and loam mining permitting/licensing process is illustrated in Figure 1.0, Sand and Loam Mining Permitting/Licensing Process.

### **Site Visit**

A site visit is a mandatory and necessary step in the permitting process. The applicant should facilitate one such visit with the Regulators, GGMC and the EPA. The site visit offers the Regulators and the Developer the opportunity to review the property and discuss issues and concerns pertaining to the site. The Developer should maximize this opportunity by thoroughly preparing for the site visit. The visit should be documented and focus on, among other things:

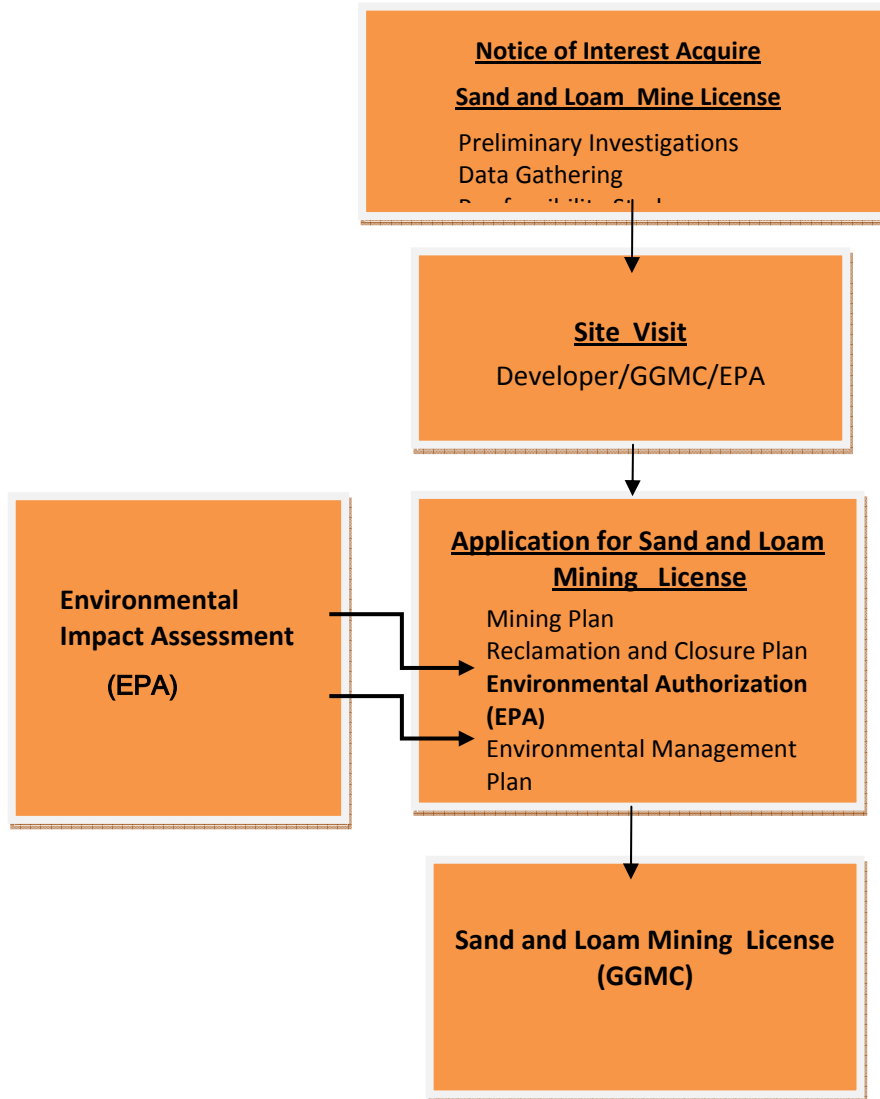
- Environmentally sensitive areas
- Rivers and creeks
- Topography
- Existing public and private roads
- Vegetation
- Sensitive areas
- Housing areas Land uses
- Adjacent sand and loam operations
- Boundary markers.

### **Application for a Sand and Loam Mining Permit**

The application for a license should follow the instructions and present enough supporting information, data and documentation to facilitate an effective review and evaluation by the GGMC. Failure to do so would likely to lead to a request for further information and thus delay consideration of the application. The application should include the some of the following:

- Project Description and Goals
- Maps and Illustrations
- Proposed Mine Plan
- Supporting infrastructure and systems
- Reclamation and Closure Plan
- An Environmental Impact Assessment ( EIA ) , specifically listing the significant impacts
- An Environmental Management Plan, that address, among other things, the mitigation measures to the significant impacts identified in the EIA

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**Figure 1 Sand and Loam Mining Licensing Process**

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**Mine Plans**

A mine plan should accompany each application for sand and loam mining permit. The mine plan is a “living document” which evolves as the operation progresses and on-the-ground experiences influences changes in approach and strategy. The mine plan must be updated annually and presented to the GGMC for approval on or before the third Monday in January of each calendar year.

**Environmental Authorization**

Permits or licenses for medium or small scale sand and loams mines are contingent on an environmental authorization from the EPA.

An Environmental Impact Assessment may be required for awarding of an environmental permit; Developers must complete the requisite application and follow the stages outlined in the permitting process of the EPA (Appendix B)



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**Appendix B: Guyana Environmental Protection Agency - Environmental  
Impact Assessment Process**

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# Environmental Impact Assessment Guidelines

*Volume 3 - Mining*



Version 1  
August 2000

**Environmental Protection Agency/Environmental Assessment Board**

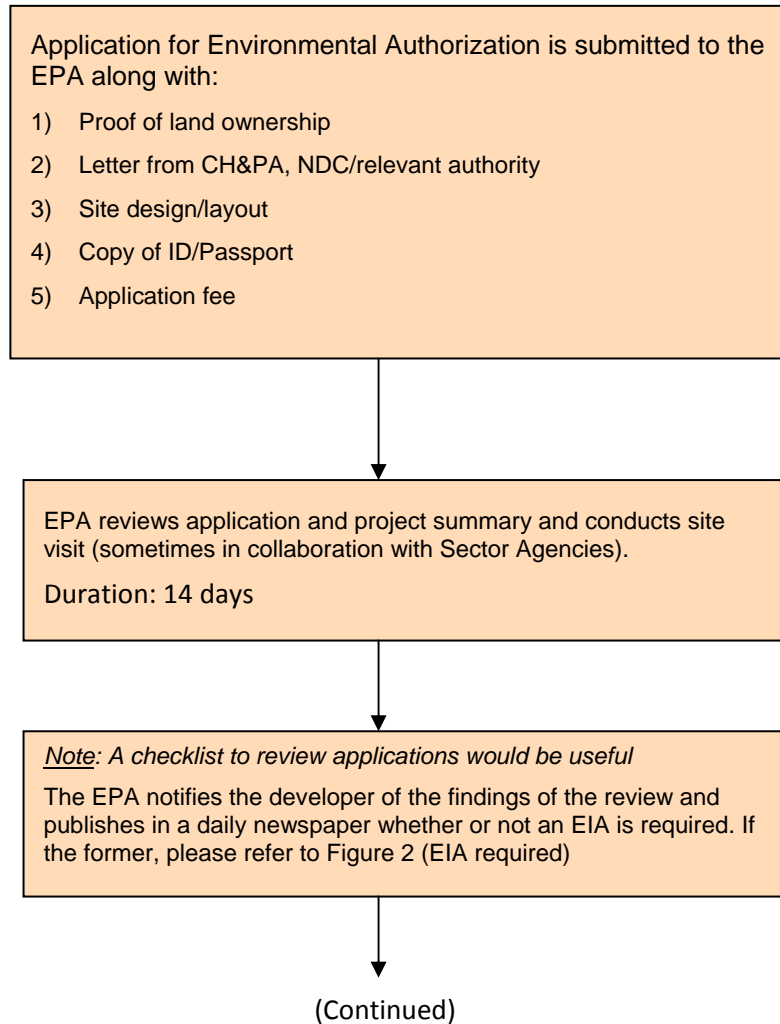
<p><b>MINING (AMENDMENT) REGULATIONS 2005</b></p>	<p><b>ENVIRONMENTAL MANAEMENT CODES OF PRACTICE Sand and Loam Mining (Rev. 0)</b></p>	<p><b>GUYANA GEOLOGY AND MINES COMMISSION</b></p>
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## Environmental Protection Agency

**Figure 1**

### Preparatory Stages in Obtaining an Environmental Permit



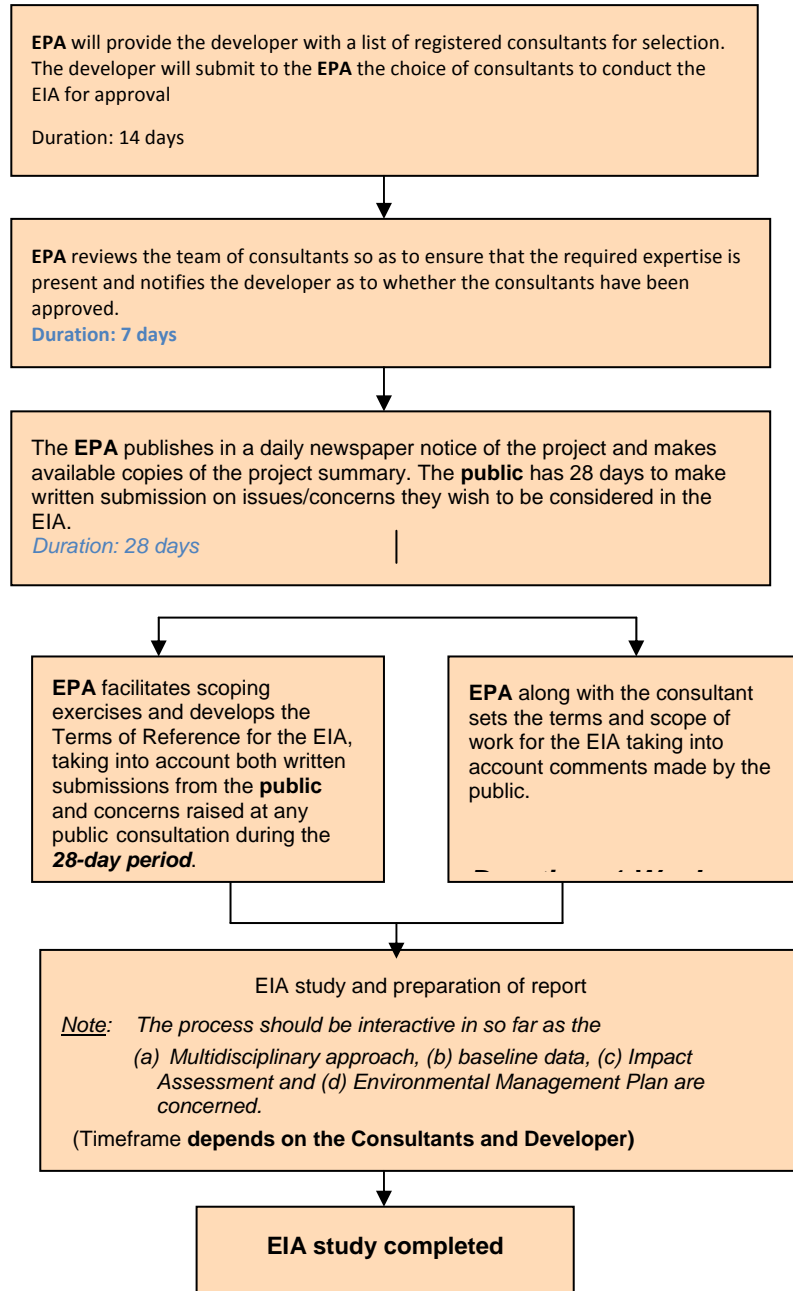
<b>MINING (AMENDMENT) REGULATIONS 2005</b>	<b>ENVIRONMENTAL MANAGEMENT CODES OF PRACTICE Sand and Loam Mining (Rev. 0)</b>	<b>GUYANA GEOLOGY AND MINES COMMISSION</b>
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## Environmental Protection Agency

**Figure 2**

### Stages in Obtaining an Environmental Permit - EIA Required

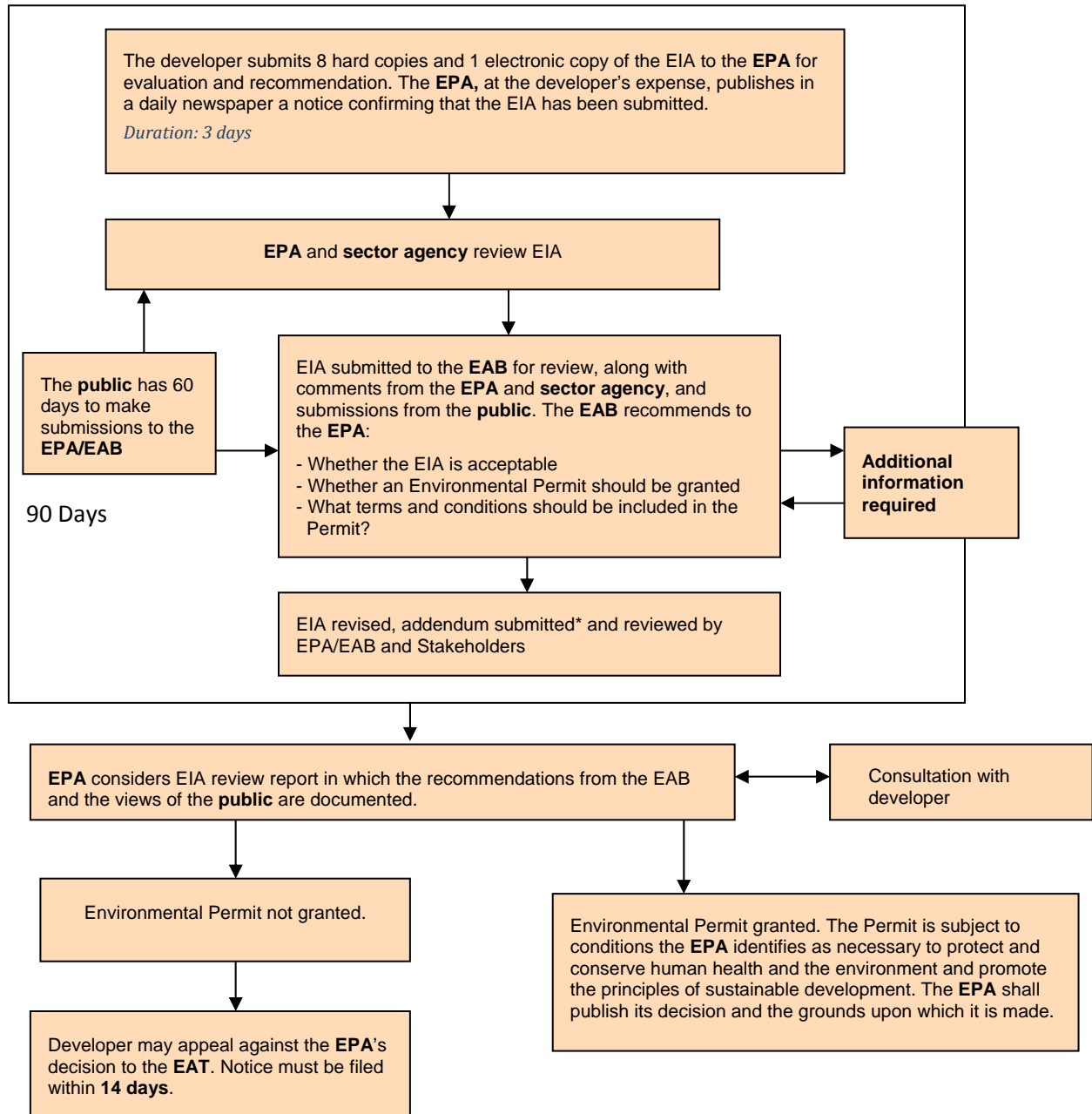


<b>MINING (AMENDMENT) REGULATIONS 2005</b>	<b>ENVIRONMENTAL MANAGEMENT CODES OF PRACTICE Sand and Loam Mining (Rev. 0)</b>	<b>GUYANA GEOLOGY AND MINES COMMISSION</b>
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**Figure 2**

**Stages in Obtaining an Environmental Permit - EIA required (cont'd)**



Depending on the significance of the information requested, the EIA may need to be re-submitted either as a revised document or as an addendum to the EIA.