

## EXECUTIVE SUMMARY

**I. PROJECT FACT SHEET**

<b>Project Name</b>	Pantukan Nickel Laterite Mining Project
<b>Project Location</b>	Barangays Pantukan and Adlay, Carrascal, Surigao del Sur
<b>Project Area</b>	3,248.0626 hectares
<b>Project Type</b>	Resource Extraction – Nickel Laterite Mining
<b>Project Capacity</b>	The product is nickel-iron ore and the production capacity is 5,000,000,000 metric tons per year.
<b>Rationale</b>	The country's economy needs a lift and mining is one among the large industries that can substantially uplift the economic condition of the country, i.e., assuming that the market is bullish, and the metal prices are high. The company is believed to contribute to the local and national economic development given the chance to do so.
<b>Project Phases:</b> <b>Pre-development</b>	This phase is dedicated mostly to activities like geological exploration, acquisition of permits and clearances from concerned national government agencies and local government units and bidding out of civil works that will be undertaken during the development stage
<b>Development Phase</b>	The development phase is preparatory to actual operations. The major activities during this phase include topographic mapping, detailed geological assessment, road construction, construction of campsite structures and support facilities, improvement of causesway, construction of siltation ponds and sabo dams, establishment of nursery, and initial site clearing.
<b>Operations Phase</b>	Included in this phase are clearing and stripping of mineable areas, stockpiling of overburden for future use, mining of soft (limonite) ore and hard (saprolite) ore, hauling of ores from minesite to stockyard, hauling of ore from stockyard to causeway, loading of ore to barges and transferring to ships. Rehabilitation of mined areas will follow suit, and this involves re-shaping of mine-out areas, the backfilling of benches by organic topsoil, conditioning of soil, planting of seedlings and nurturing of seedlings until these are fully capable of sustaining life.
<b>Abandonment Phase</b>	Environmental Protection and Enhancement Program (EPEP) will also be implemented.  The minesite will be abandoned after the laterite deposit had been exhausted, possibly after 10 years or a little more. As part of abandonment, Final Mine Rehabilitation and Decommissioning Plan (FMRDP) shall be implemented. KMI will see to it that rehabilitation had been completely done before abandonment and the newly planted seedling are taken cared of until fully matured (within 5 years as prescribed by the FMRDP).
<b>Process and technology</b>	This is a simple extraction of nickel ore and the direct shipping of the same to the intended destination. No processing will be done except to separate the hi-grade ore from the low-grade ones – sort of beneficiation process.

<b>Major waste stream</b>	Mining wastes is the major solid waste that is produced from the clearing and grubbing and mining operation. However, this is not the waste in the truest sense of the word because these are just overburdens which are used to backfill the mined-out areas and serves as substrate for biological rehabilitation.
<b>Manpower</b>	During full operations, the project will need 1,000 workers mostly assigned in the different departments of the organization and components of the operation.
<b>Project Cost</b>	P260,838,610.08
<b>Project Duration and Schedule</b>	Will start as soon as the ECC is issued and metal prices stabilize to profitable level. Development: 1 year Operation: 12 years Abandonment: 10 years
<b>Proponent Profile</b>	
<b>Name of Proponent</b>	Kafugan Mining Incorporated
<b>Address</b>	Unit 201, Summit 1 Tower, 530 Shaw Blvd., Mandaluyong City
<b>Authorized Signatory/ Representative</b>	<b>Mr. Antonio L. Co</b> President  <b>Mr. Romeo C. Say</b> Senior Assistant to the President
<b>Contact Details</b>	Telephone No.: (02) 533-5242
<b>Profile of the Preparer</b>	
<b>EIA Preparer</b>	Geo Environmental Consultancy, Inc.
<b>Consultant's Address</b>	1046 Carola St., Sampaloc, Manila
<b>Contact Person</b>	Mr. Edgardo S. David President
<b>Contact Details</b>	Telephone No.: (02) 732-3502; (02)487-5151 Mobile No.: +639209100232 Email Address:

## II. EIA PROCESS DOCUMENTATION

### EIA Team

The EIA Study was conducted by a multidisciplinary team of professional experts, headed by Mr. Edgardo S. David, President of the Geo Environmental Consultancy, Inc. The composition of the EIA Team is presented in **Table ES-1**.

**Table ES-1: EIA Team Composition**

<b>EIA Team</b>	<b>Areas of Expertise</b>	<b>EIA Registration No.</b>
Edgardo S. David, MSc	Geology, Environmental Science	IPCO-215
Raul R. Buñao, MSc	Terrestrial Ecology	IPCO-192
Benjamin R. Cuevas		IPCO-072
Romell Seronay, PhD	Freshwater and Marine Ecology	-
Benjamin S. Francisco		IPCO-038
Socelyn D. Dalida, ChE	Pedology, Water Quality and Air Quality	-
Felixerto H. Roquia, PhD	Social Development and Safeguards, Anthropology	IPCO-028
Reynaldo S. Tejada	Air Module	IPCO-036

From Kafugan Mining Incorporated (KMI), the project management was spearheaded by Mr. Antonio L. Co, President, Mr. Romeo C. Say, Senior Assistant to the President and Matilde J. Fernando, Assistant to the President.

The Accountability Statements of KMI and the EIA Preparers are presented in **Annex ES-1**.

**EIA Schedule**

The EIA process started with an Environmental Compliance Certificatio (ECC) application filed with the EMB Central Office in late 2014. The application was not given due course because of the new requirements which are the final drilling exploration and feasibility study reports. While waiting for the reports to be finished, advance surveys were already done. After the reports were finished, the following activities were immediately carried out.

- a. IEC with the LGUs including the municipal and barangay officials. The officials were briefed about the project and the upcoming environmental impact assessment for the project.
- b. Public Scoping at the Multi-Purpose Gym, Barangay Pantukan, Carrascal, Surigao del Sur on February 5, 2016 at 10:00 AM. The scoping included presentation of project, initial environmental characterization, and some impacts and mitigations. Open forum followed suit and concerns on employment, dust generation, siltation, stream discoloration, proper coordination with LGUs, municipal boundaries, participation of IPs during rehabilitation, and safeguards for the water supplies of communities were raised. No opposition to the project was noted during the process.
- c. Technical scoping and preparation of the Procedural Screening Checklist on February 11, 2016 at the Conference Room, EMB Central Office, DENR Compound, Visayas Ave., Diliman, Quezon City.
- d. Secondary data gathering for the period February to March 2016 including laboratory analyses of soil, air, water fish samples. Field surveys were carried including geology, hydrology, terrestrial biology, marine biology and sociology. Random perception survey for the sociological part of the assessment was likewise done.
- e. Preparation of the draft of the Environmental Impact Statement (EIS) for at least one month.

**Table ES-2: EIA Study Schedule**

EIA Activity/Stage	Date
IEC	November 2012
Public Scoping	February 5, 2016
Technical Scoping	February 11, 2016
Data Collection/Baseline Studies	
Terrestrial Biology and Wildlife	January 2015
Geology, Hydrology and Meteorology	February-March 2016
Marine and Freshwater Biology	January 2015
Sociology, Anthropology, Community Development	January-February 2016
Perception Survey	February 5-14, 2016
EIA Study, Impact Assessment and Mitigation Plan	
EIS Report Preparation	
Report Submission to EMB	

### EIA Study Area

The EIA Study area for the proposed project covers 3,248.0626 hectares located in Barangays Pantukan and Adlay in Carrascal, Surigao del Sur. The coverage is tabulated in **Table ES-3**.

**Table ES-3: Coverage of Various Studies**

Module	Coverage
Land	MPSA area, peripheries of claim, settlement areas such Adlay and Pantukan
Water	Watersheds hosting the mining operational area mainly Benoni River watershed and Marga River watershed; streams darning the mining claim and ancillary areas like Benoni River, Marga River and Adlay River; coastal waters where rivers from the mining operational areas drain and causeway site all located within the Carrascal Bay
Air	MPSA and ancillary areas; settlement areas such as Pantukan and Adlay
People	The communities hosting the mining claims

### EIA Methodology

Following are the methods used by the different modular consultants in carrying out their primary and secondary data collection (**Table ES-4**).

**Table ES-4: EIA Methodology**

Module	Coverage
Land	Literature and maps review, confirmatory geological mapping, geomorphological mapping, limited geohazards mapping, soil sampling and analyses, land use validation, quadrat sampling for vegetation, opportunistic survey for wildlife, mist nets, trappings, transect line for bird observation, etc.
Water	Identification of drainage system on a topographic map and in the field; discharge measurements of streams using flotation method; computation of monthly streamflow using area-discharge ratio method for ungauged streams; determination of watershed area using planimeter and topo map; measurement of length of rivers using curvimeter and topo map; calculation of water balance, sampling and analyses of water; assessment of groundwater system through field surveys; determination of aquifers and their recharge areas, storage and discharge zones; manta tow technique for general observation of sea grasses and coral reefs; transect quadrat method for sea grasses; visual census for fish; digital fixed photo-transect method for coral reefs; transect plot technique for mangrove; pond net collection for macroinvertebrate; marine water sampling and analyses; marine sediment sampling and analyses.
Air	Largely secondary data gathered from existing literature, air quality sampling and analysis for PM <sub>10</sub> , NO <sub>2</sub> , and SO <sub>2</sub>
People	Literature review particularly for the socio-eco-cultural profile, IEC with LGU officials, perception survey for the affected communities, public scoping, interviews during field surveys,

The Terms of Reference for this Environmental Impact Assessment (EIA) is the Scoping and Procedural Checklist prepared by the EIA Review Committee (**Annex ES-2**). The checklist determines the scope of work to be undertaken. Following are some of the more significant issues and concerns of members of the EIARC (**Table ES-5**).

**Table ES-5: Important issues raised by the EIARC members and the stakeholders**

<b>Issues</b>	<b>How EIA addressed the issue</b>
Loss of Vegetation	Actual survey of terrestrial flora and fauna. Analysis of existing vegetation maps and GIS images. Sampling of wildlife. Determination of adjacent active mining property to assess compounded effect of mining to terrestrial ecology.
Increased rate of erosion	Secondary data collection and analysis. Determination of soil type, slope, vegetative cover and relative erodability of soil. Also, delineation of areas to be directly affected by mining operation particularly ore extraction.
Siltation of rivers and coastal areas	Identification of streams that would most probably be affected by the mining operations. Determine the present status of water bodies in the locality if already affected by siltation. Secondary data collection and analysis. Review of sedimentary transport modeling made on the existing coastal body of water.
Dust generation	Identify possible sources of dusts and how these can be generated. Identify also the possible receptor of dust especially residential communities. Determine the population of age groups that are vulnerable to respiratory diseases like the young and the old groups.
Adverse effect to groundwater resource	Secondary data collection and analysis. Hydrogeological mapping with emphasis on aquifer, recharge, storage, and discharge. Investigation to determine hydraulic connection of springs to the extraction areas
Risks from geohazards	Identify geohazards present in the locality through review of literature and maps. Confirm such presence by assessing field manifestations of the geohazards. Determine the communities that are vulnerable to such risks and recommend evacuation areas to lessen the probability of occurrence any disaster.
Community participation in the SDMP	Find means to involve the community in deciding on how the budget for the SDMP is to be allocated, i.e., aside from the barangay officials. Enjoin the participation of SWO of the Municipality of Carrascal to synchronize with their activities so that the community can get the full benefits of the plan.
Hiring of local workers	The KMI shall commit to hiring the greater majority of their workers from the community of Pantukan and partly from Adlay. Indigenous people must be given equal opportunity for employment and trainings.

### **Public Participation Activities**

#### **Information, Education and Communication**

The IEC for the proposed project was conducted in November 2012.

#### **Public Scoping**

As a requirement of the EIA process, a Public Scoping was conducted by Geo Environmental Consultancy, Inc. and Kafugan Mining Incorporated at the Multi-Purpose Hall of Brgy. Pantukan, Carrascal, Surigao del Sur at 10:00 o'clock in the morning of February 5, 2016. The format of the program followed generally the guidelines of the EMB.

The Public Scoping was attended by a cross-section of the populace especially those representing groups or organizations. Invitations were sent to officials of Claver Municipal Government, Surigao del Norte; Carrascal Municipal Government, Surigao del Sur; Pantukan Barangay Officials, Adlay Barangay Officials, and Cagdianao (Claver) Barangay Officials. Invites were also sent to government agencies such as EMB Region 13, CENRO Cantilan and MGB Region 13. Likewise, some private organizations were also invited such as the religious, the youth, the farmers, and several others. A streamer announcing the activity and welcoming the stakeholders was hung in Pantukan Multi-Purpose Hall to let the people know of the upcoming scoping and consultation.

More than 200 stakeholders attended the activity including those who did not register but stayed in the sidelines during the entire proceedings. The audience was very attentive throughout the duration of the program showing heightened interest in the mining project. During the open forum, several issues and concerns were raised such as dust generation, river and coastal siltation, employment priority, IP participation in rehabilitation, geohazards, adverse effects to Benoni River, protection for the watershed of water supply source, lack of proper coordination with barangay officials, and SWO participation in SDMP.

The lists of the questions and answers as well as the pictures of the proceedings are presented in **Annex ES-3**.

### **III. EIA SUMMARY**

#### **Summary of Alternatives**

The proposed project has no other alternatives since the project is already covered with an MPSA mining permit. The only alternative here is the possibility of expansion by establishing a nickel processing plant, which at this stage is out of the question. The first reason for not considering this alternative is that, the Chinese prospects partnering with KMI has a processing plant in China and does not need a plant anymore. Second, the shipping grade of the ore is good enough to maintain an outright trading.

In the case of siting the facilities such as those in the campsite and the causeway including stockpile and fuel storage, there were some alternatives considered but due to major irreversible conflicts in access, these were outright rejected. That left the Nasipit area as the only choice. There are already some causeways in the area and this situation leaves no alternative for the KMI. The selection of the Nasipit area for both campsite and causeway was however taken with special considerations for geohazards, technical, commercial, social, and environmental factors. For geohazards: ground material are not liquefiable, seismic - PGA is only 0.32 g, tsunamis would be light if there will be, shielded by island from typhoons, seas are not very rough whole year round compared, no nearby active volcanoes, flooding is not expected because the nearby drainage system is quite small, and no landslides are expected because topography is flat. For the technical side, the site is very accessible from the anywhere, fuel storage can be erected at safe distance from the camp but still highly accessible, and topography is gently sloping for the campsite promoting smooth and faster stockpiling and loading operations. For the social side, the site is far away from communities that might be affected by the operations. Lastly, the environmental impacts of the causeway operation can be mitigated adequately or can even be averted.

#### **Summary of Key Environmental Impacts and Management Plan**

An impact map is shown in the next page while a matrix of the Environmental Management Plan during development and operations stages is presented in the succeeding pages. Some impacts are temporary such as dust generation, but others are permanent like removal of vegetation. The latter can be reversed by religiously applying the rehabilitation scheme required by MGB.

**Table ES-6: Summary of Key Environmental Impacts and Management Plan**

<b>Project Phase/ Environmental Aspect</b>	<b>Environmental Component to be Affected</b>	<b>Potential Impact</b>	<b>Options for Prevention or Mitigation or Enhancement</b>
Development and Operation	Land	Loss of vegetation	Unavoidable. Progressive rehabilitation/ revegetation shall be done immediately in mined-out areas. Donation of seedlings as replacement for cut trees will be initiated.
Operation	Land	Loss of subsoil	Unavoidable and permanent since soil will be shipped out as ore. For stored top soil, keep secured from erosion.
Operation	Land	Accelerated and excessive erosion	Cover the mined out area with plant remains or mulches. Reduce angle of repose of stockpiles, protect base of stockpiles, reduce slopes of cutslopes, bench the extracted areas, distribute surface runoff, compact loosen soil, etc.
Development and Operation	Land	Habitat loss and displacement of wildlife	Allow gradual displacement by slowing down operation in fauna populated areas. Rehabilitation of mined-out areas to reconstruct destroyed habitats.
Development and Operation	Land	Generation of mining waste	Unavoidable but soil will be used eventually for rehabilitation. Proper stockpiling of top soil and plant remains.
Development and Operation	Land	Solid and hazardous waste generation	Implement 3Rs for domestic wastes at source level and establish a Material Recovery Facility. Provide separate storage area for hazardous waste and send these to DENR-accredited waste treater for treatment and final disposal.
Operation	Land	Occurrence of mass-wasting processes	To avoid occurrences of mass wasting, there should be no steep slopes in stockpiles or cutslopes, no dumping of soil in gullies, benching of working areas is a must, compaction of filled areas, and stockpiling of loose materials.
Operation	Water	Siltation of streambeds and coastal areas	Construction of a Siltation Control System to include series of sabo dams, contour holding ponds, perimeter canals, siltation ponds with flocculation cell.
Operation	Water	Extreme discoloration of river and coastal waters	Same as above. The system is expected to protect surface and coastal waters.
Operation	Water	Deterioration of water quality	Same as above. The system is expected to protect ground, surface and coastal waters.
Operation	Water	Loss of groundwater recharge areas	Implement progressive rehabilitation in mined-out areas to recover recharge zones. Limit disturbance of vegetation to the delineated extraction areas. Avoid unnecessary destruction of other areas.

Operation	Water	Damage to some marine ecosystems	Same Siltation Control System with perimeter canals and flocculation process.
Operation	Water	Modification of freshwater habitat	Erosion must be effectively controlled at source. If there are residuals, siltation control system must be implemented as recommended earlier. Discoloration must be checked using flocculants.
Operation	Air	Dust generation	Frequent wetting of hauling roads to prevent lifting of dust. Use of uniformly graded base course in road surfacing to suppress dust generation. Workers must use dust mask always to prevent inhalation.
Operation	Air	Increased amount of NO <sub>2</sub> and SO <sub>2</sub>	Engines shall always be kept in tip-top conditions. If available, use of catalytic converter is encouraged.
Operation	Air	Noise generation	Engines shall be equipped with appropriate mufflers.
Operation	People	Resource competition	KMI to provide barracks for its workers, a water supply system for the community and minesite, medical services, and others.
Operation	People	Increased in safety and health risks	Mitigating measures cited in the land module for mass wasting and air module for dust generation also apply to this module. IEC on these risks shall also be initiated by the company.
Operation	People	Non-assimilation of diverse culture	Initiate social gathering to promote interactions that would lead to harmonious relationships among peoples of different regions.
Operation	People	Proliferation of vices	The KMI shall encourage prayer meetings and sports development and competitions to divert attention of workers from the places of vices.