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Re: RTNMC_Gotok Limestone Quarry Project 2022 AEPEP

From : MGB-MIMAROPA <mines_4b@yahoo.com> Wed, Dec 01, 2021 08:35 AM
Subject : Re: RTNMC_Gotok Limestone Quarry Project 2022 AEPEP
To : RTNMO "Christinne Q. Blanco
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On Monday, November 29, 2021, 03:35:09 PM GMT+8, RTNMO "Christinne Q. Blanco
<christinne.blanco@rtn.nickelasia.com> wrote:

Dear Sir and Mesdames,

We are pleased to submit to you, the google link of the 2022 AEPEP of Rio Tuba Nickel Mining Corporation - Gotok Limestone Quarry Project (RTNMC-GLQP).

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We hope that you find the document in order. Kindly acknowledge receipt of this email.

Thank you and always keep safe.

Warmest Regards,

Christinne Blanco
Environmental Compliance Officer
Rio Tuba Nickel Mining Corporation

2022 Annual
Environmental Protection and Enhancement Program
Rio Tuba Nickel Mining Corporation
Gotok Limestone Quarry Project
MPSA No. 213-2005-IVB
Barangays Rio Tuba, Sandoval and Iwahig, Bataraza, Palawan



Photo: Gotok Limestone Quarry Area

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2022 ANNUAL ENVIRONMENTAL PROTECTION AND ENHANCEMENT PROGRAM

1.0. Executive Summary

The Gotok Limestone Quarry Project is owned and managed by Rio Tuba Nickel Mining Corporation. It started its operation in June 2005. It produces limestone materials for both Greymont Philippines Inc., (GPI) and Coral Bay Nickel Corporation (CBNC). The limestone products are used as neutralizing agent at the Hydrometallurgical Processing Plant (HPP) of Coral Bay Nickel Corporation (CBNC)

The quarry is covered by Mineral Processing and Sharing Agreement (MPSA) 213-2005-IVB while the Crushing Plant and Magazine Area is covered under MPSA No. 114-98-IVB. The operation of the project is under ECC-CO-1801-0001 that specifies the facilities and allowable activities of the limestone project, specifically the 13 hectare quarry area with an allowable annual extraction rate of 725,000 WMT, crushing plant with 250 TPH capacity, 0.5 hectare magazine area and 6.80 km haul road.

The presence of Gotok Limestone Quarry Project has supported the successful establishment of two processing plants in the Municipality of Bataraza. Providing the community numerous benefits in the form of increased economic revenue, increase availability of local employment, continuous implementation of Social Development and Management Program and Corporate Social Responsibility Programs. Currently, the project employs 90% of its manpower locally (within the municipality), while 67% of its total manpower is from the projects host communities of Barangays Rio Tuba, Sandoval and Iwahig.

Its dedication and truthfulness have been recognized by the Philippine Extractive Industries Transparency Initiative (PH-EITI) when awarded the project first place in “Excellence in Reporting Award” for non-metallic mines category, for having “the best and most comprehensive data, and posted the least discrepancy after the reporting and reconciliation process of PH-EITI.” While its commitment to environmental stewardship has led to its PMIEASC Titanium Achievement Award, Quarry Operation Category.

2.0. Company Background

Name(s) and Contact Details of the Contractor/Permit Holder/Permittee

Name: Rio Tuba Nickel Mining Corporation

Main Office: 29th Floor NAC Tower
32nd Street, Bonifacio Global City
Taguig City 1634

Project Site Office: Rio Tuba Mine Complex
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5306 Palawan

Telephone No.: 02-798-7622
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Email Address: minesite@rtn.nickelasia.com

Name(s) and Contact Details of the person/s authorized to act/represent the company/operator and consultant) if applicable

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3.0. Introduction

Gotok Limestone Quarry Operation (RTNMC-GLQP) is owned and managed by Rio Tuba Nickel Mining Corporation (RTNMC), the first ever ASEAN Mineral Awardee in Responsible Mineral Development, and a subsidiary of Nickel Asia Corporation. The project has two main components, a Limestone Crushing Plant located in Barangay Rio Tuba and a Limestone Quarry located in Barangays Iwahig and Sandoval, overall, the project's operation is within the bounds of the Municipality of Bataraza, Province of Palawan.

RTNMC-Gotok Limestone Quarry Project currently supplies the limestone requirement of Coral Bay Nickel Corporation (CBNC) and Greymont Philippines Inc. (GPI) , formerly Unichamp Minerals Philippines Inc., (UMPI), situated within Rio Tuba Export Processing Zone (RTEPZ). The project supplies limestone to CBNC, a Hydrometallurgical Processing Plant (HPP) that refines raw limonitic nickel ore into an intermediate downstream product of mixed sulfide, as well as crushed limestone to Greymont Philippines Inc., for its production of lime slurry. As part of the mitigating measures of the HPP, CBNC adds crushed limestone from RTNMC-GLQP and lime slurry from GPI to its wastewater and tailings to increase from a pH 6 to pH 8 to 8.5.

The projects operation started on April 2005, operating under an 84.50-hectare Mineral Processing and Sharing Agreement (MPSA-213-2005-IV), initially it was covered by an Environmental Compliance Certificate (ECC No. 0201-021-313) issued in June 2002 for a Hydrometallurgical Processing Plant (HPP). The certificate covers both the Limestone Quarry Project of RTNMC and HPP of Coral Bay Nickel Corporation (CBNC). With the project covering two companies, a Deed of Assignment was immediately drafted, signed by the respective corporation's presidents and submitted to the Environmental Management Bureau in December 2002 in order to clearly delineate the responsibility of both corporations in upholding the conditions of the ECC.

Overtime, as the project developed and progressed, its operation also evolved. With these developments, the need for a separate and exclusive ECC for the Limestone Operation arise, which was approved on June 2019 when ECC-1801-0001 was granted solely for the operation of Gotok Limestone Quarry Project (GLQP) which covers all its pertinent operation including:

Quarry Operation – 13 hectares quarry area, quarry stockpile area, topsoil stockpile area, silt collector sumps and access roads.

Crushing Plant Operation – 250 TPH crushing plant, crushed limestone shed, crusher feed area, crushed limestone stockpile area, access road, and water settling/recycling ponds.

Haul Road – 6.80 km road connecting the quarry and crushing plant areas.

Magazine Area – 0.5 ha located within MPSA 114-98-IV

4.0. Project Description

4.1. Project Details

4.1.1 Project Location

The Gotok Limestone Quarry operation of RTNMC is within its 84.5-ha MPSA bounded by the coordinates shown in Table 1. The MPSA of RTNMC is located within the boundaries of two (2) barangays namely: Iwahig and Sandoval, Municipality of Bataraza.

RTNMC is only allowed to quarry 13.0 ha out of the 84.5-ha MPSA as indicated in its ECC. The geographical coordinates of the 13.0-ha allowable is provided in Table 2. On the other hand, crushing plant is located in the minesite area of RTNMC inside the RTEPZ. It is also within the boundary of Barangay Rio Tuba in the Municipality of Bataraza. Table 3 shows the coordinates of the crushing plant area.

Location map and vicinity map are provided as Figures 4 and 5, respectively.

Table 1. PRS 92' Geographic Coordinates of MPSA No. 213-2005-IVB

Corner	Latitude	Longitude
1	8°35'50"N	117°27'45"E
2	8°36'20"N	117°27'45"E
3	8°36'20"N	117°28'15"E
4	8°35'50"N	117°28'15"E

Table 2. Geographical coordinates of 13.0-ha Quarry Limestone quarry area

Corner	Latitude	Longitude
Phase 1		
1	8°36'4.29"N	117°27'48.26"E
2	8°36'4.26"N	117°27'52.05"E
3	8°36'3.21"N	117°27'50.74"E
4	8°35'59.78"N	117°27'50.41"E
5	8°35'58.50"N	117°27'49.56"E
6	8°35'57.59"N	117°27'47.81"E
7	8°35'57.90"N	117°27'46.45"E
8	8°35'58.92"N	117°27'45.32"E
9	8°36'0.93"N	117°27'45.54"E
Phase 2		
1	8°36'17.50"N	117°27'47.30"E
2	8°36'20.00"N	117°27'48.00"E
3	8°36'20.00"N	117°27'52.76"E
4	8°36'18.44"N	117°27'54.16"E
5	8°36'16.66"N	117°27'54.32"E
6	8°36'15.06"N	117°27'54.47"E
7	8°36'13.27"N	117°27'54.92"E

8	8°36'12.11"N	117°27'56.52"E
9	8°36'10.27"N	117°27'58.32"E
10	8°36'08.09"N	117°27'56.93"E
11	8°36'08.70"N	117°27'54.06"E
12	8°36'06.12"N	117°27'53.32"E
13	8°36'06.25"N	117°27'47.86"E
14	8°36'13.10"N	117°27'46.40"E
15	8°36'15.00"N	117°27'46.01"E

Table 3. Geographical coordinates of the crushing plant area located inside the RTEPZ

Corner	Latitude	Longitude
1	8°33'33.61"N	117°25'36.36"E
2	8°33'30.34"N	117°25'36.36"E
3	8°33'30.34"N	117°25'34.93"E
4	8°33'27.44"N	117°25'34.93"E
5	8°33'27.44"N	117°25'32.14"E
6	8°33'29.00"N	117°25'32.14"E
7	8°33'29.00"N	117°25'31.27"E
8	8°33'30.23"N	117°25'31.27"E
9	8°33'30.23"N	117°25'29.65"E
10	8°33'31.98"N	117°25'29.65"E
11	8°33'31.98"N	117°25'31.13"E
12	8°33'32.64"N	117°25'32.22"E
13	8°33'32.64"N	117°25'32.95"E
14	8°33'33.61"N	117°25'32.95"E

4.1.2 Estimated Project Cost

a. Estimated Capital Cost

Present estimate on the total project cost of the Gotok limestone quarry operation stands at P353.738 million broken down as follows:

Item	Amount in '000 Pesos
1. Quarry Development	14,006
2. Crushing Plant	339,732
TOTAL PROJECT COST	353,738

Table 4. Estimated Capital Cost

b. Estimated total operating cost for the entire period of the project

An estimated direct mining cost of PhP727.873 million will be incurred until the finished of the project wherein in consistency with the environmental management framework of RTNMC; an estimated PhP36.224 million will be spent for environmental protection and enhancement program.

c. Mining and milling cost

LIMESTONE OPERATIONS	PhP
Dump Truck	32,778,383
Wheel Excavator	8,568,958
Wheel Loader	20,271,418
Bulldozer	5,213,286
Limestone Crushing Plant	38,887,304
Track Excavator	6,099,000
TOTAL LIMESTONE	111,818,349

Table 5. Mining and Milling Cost

4.1.3 Types of Mineral and Ores

Ore Classification	% CaCO ₃	Diameter
High Grade	≥94%	40mm to 80mm
Low Grade	<94%	≥25mm

Table 6. Ore Classification

4.1.4. Mining Method/s

The Gotok limestone quarry project has been in operation for the last seventeen 17 years since the start of the quarrying operations in June 2005. The total area affected is thirteen hectares (13has) with the highest initial elevation of 90masl to final elevation of 25masl. The pit design is shown Figure 2. The current operation is within the 13.0 ha allowable area of the 84.5-ha MPSA of RTNMC. Area utilization of the entire 84.5 ha MPSA aside from the quarry area has remaining 70.45 ha unutilized area; sink holes and their prescribed buffer zones that are excluded from any development. The unutilized area in the MPSA is the intended for future development.

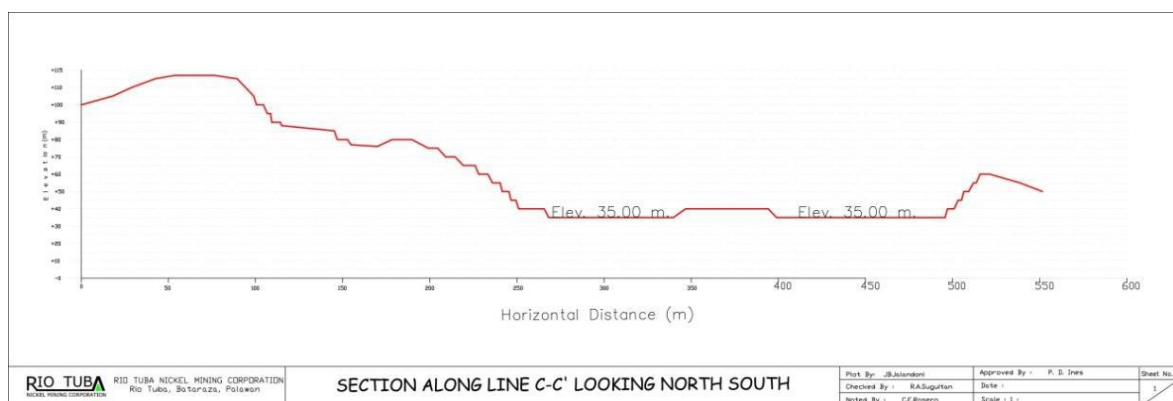


Figure 1. Cross section of the current quarry

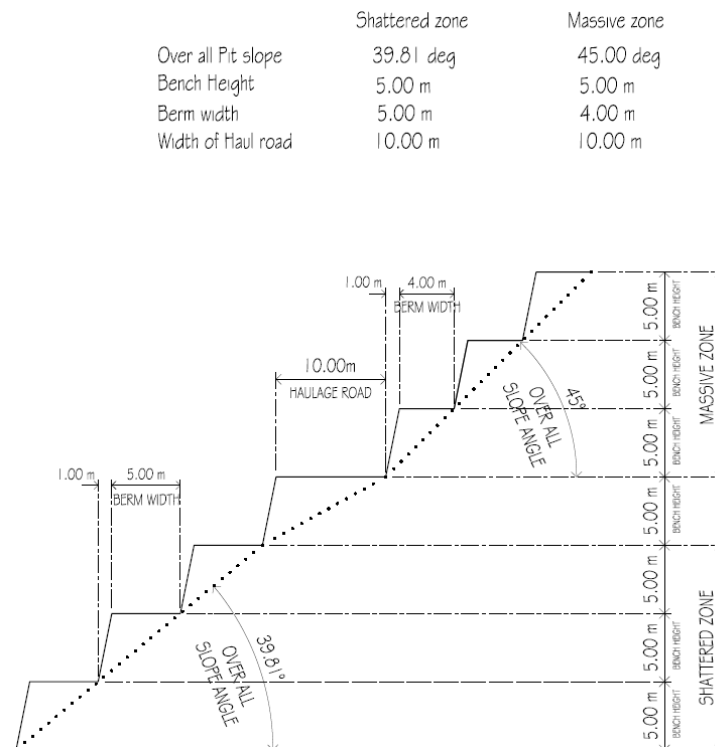


Figure 2. Pit Design

The waste materials that will be generated are expected to be minimal in volume considering that only the top soil will be treated as waste. And, most of this topsoil will be utilized as top layering materials for rehabilitation/revegetation of mined out quarry benches. The overburden is maintained in designated zones for rehabilitation use which is estimated to be more or less at 200,000 WMT.

Meanwhile, the modified crushing plant has a different configuration compared to the old plant. One component of the modified crushing plant is the water washing spray system, which will result in an additional water requirement for the project. The modified plant can produce both 0-30 mm and 30-80 mm.

The current hauling route shall be used continuously for the proposed expansion. The hauling of the increased production shall be accomplished by increasing the number of dump trucks and the operating hours to 11 hours per day on the average. The volume of traffic will increase to 17 dump trucks traversing the hauling route every hour.

The existing quarry production produces approximately 372,000 WMT annually. Figure 03. shows that for the proposed operation, a 725,000 WMT annual limestone production will produce a topsoil/overburden of 7,492 WMT.

The extracted limestone from the quarry site is transported to the crushing plant for size reduction before hauling to CBNC while the removed topsoil/overburden will be stockpiled at the designated site pending availability of mined-out area for rehabilitation.

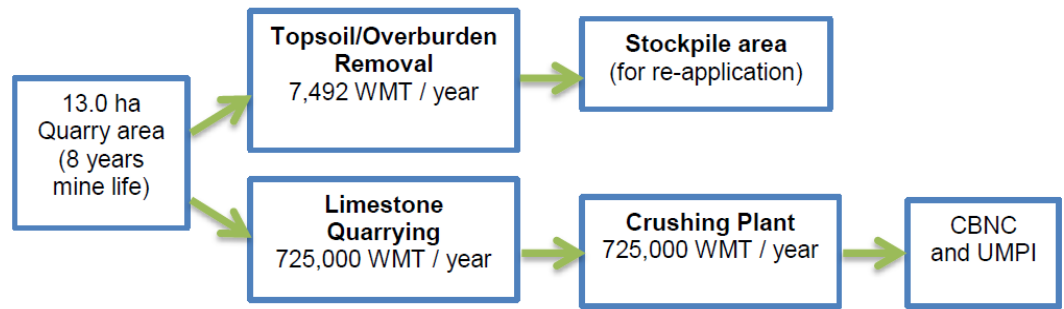


Figure 3. Material Balance for the Gotok limestone quarry project

4.1.5. Estimated Production

The Quarrying and Crushing operations will be performed in two phases annually: The Dry Season Phase, which is from December to May, and the Wet Season Phase, which is from June to November. Active quarry area is shown in Figure 06 Active Quarry Area.

Quarrying	Period (WMT/sem.)	Monthly (WMT/mo.)
Dry Season	271,000	45,167
Wet Season	237,000	39,500

Table 7. Estimated Quarry Production

Crushing	Period (WMT/sem.)	Monthly (WMT/mo.)
Dry Season	226,500	37,750
Wet Season	223,500	37,250

Table 8. Estimated Crushing Production

Annual Total/Average	Period (WMT/sem.)	Monthly (WMT/mo.)
Dry Season	254,000	42,333
Wet Season	225,000	37,500

Table 9. Estimated Annual/Average production

4.1.6. Mill/Processing Plant

The crushing plant has a capacity of 250 TPH with auxiliary facilities like - crushed limestone shed, crusher feed area, crushed limestone stockpile area, access road, and water settling/recycling ponds.

4.1.7. Proposed Mine Life

Table 10 provides information on yearly production schedule until the end of the project in 2023.

Mine Life	Quarry Volume		
	In-Situ (WMT)	Stockpiles (WMT)	Total (WMT)

2021	154,535	245,465	400,000
2022	0	300,000	300,000
2023	0	300,000	300,000
TOTAL	1454,535	845,465	1,000,000

Table 10. Mine Life

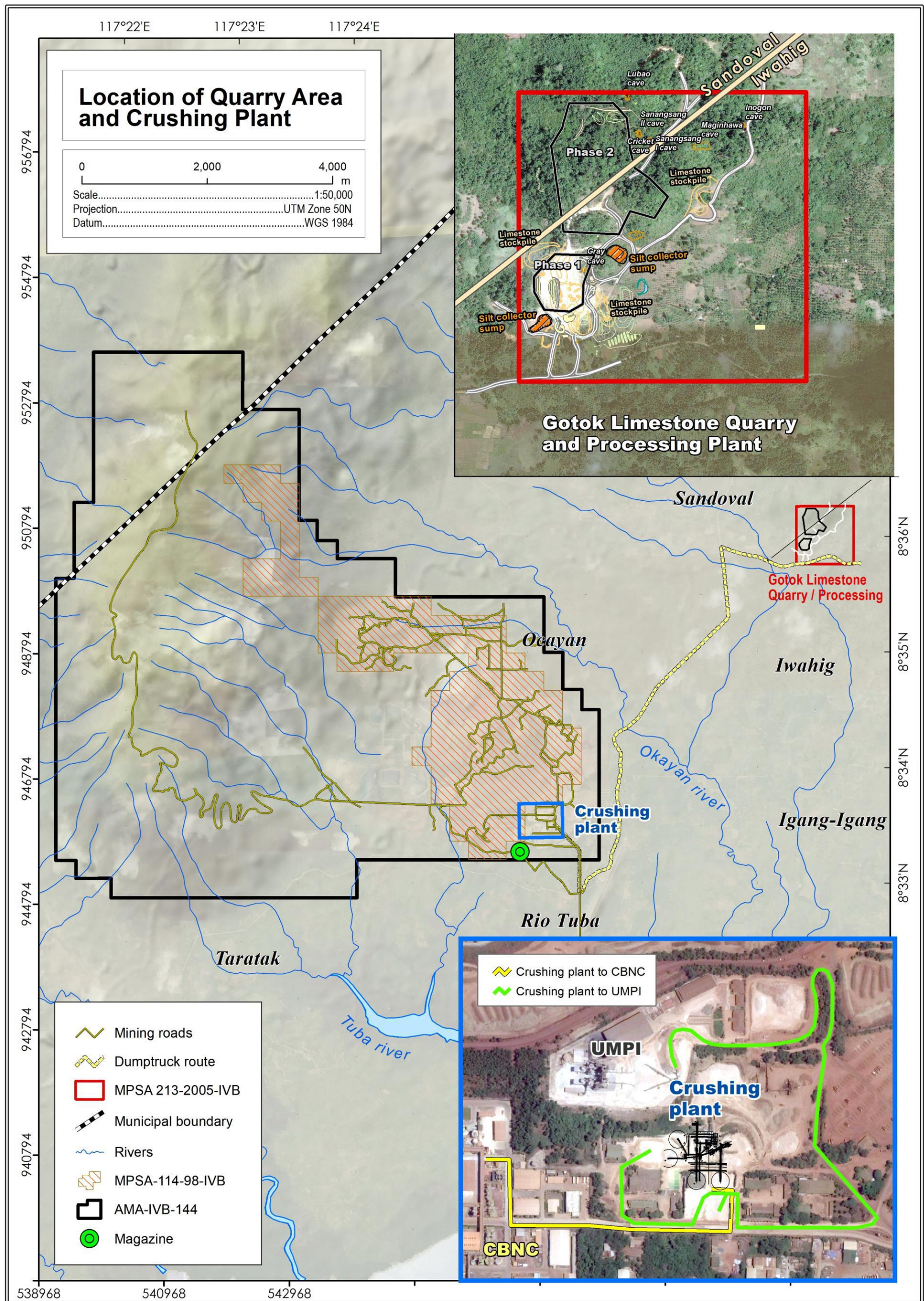


Figure 4. Location of quarry and crushing plant

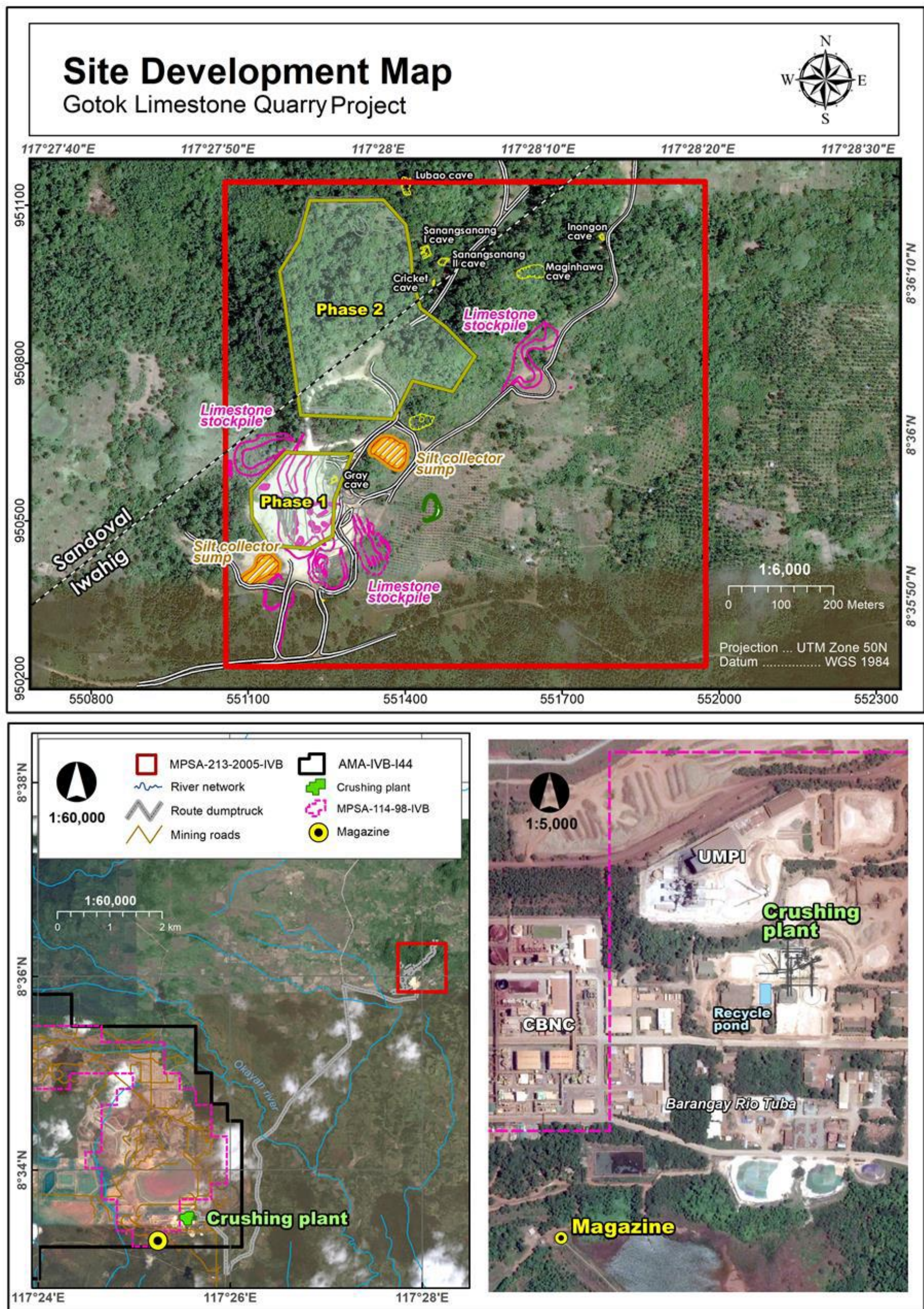


Figure 5. Site Development Map

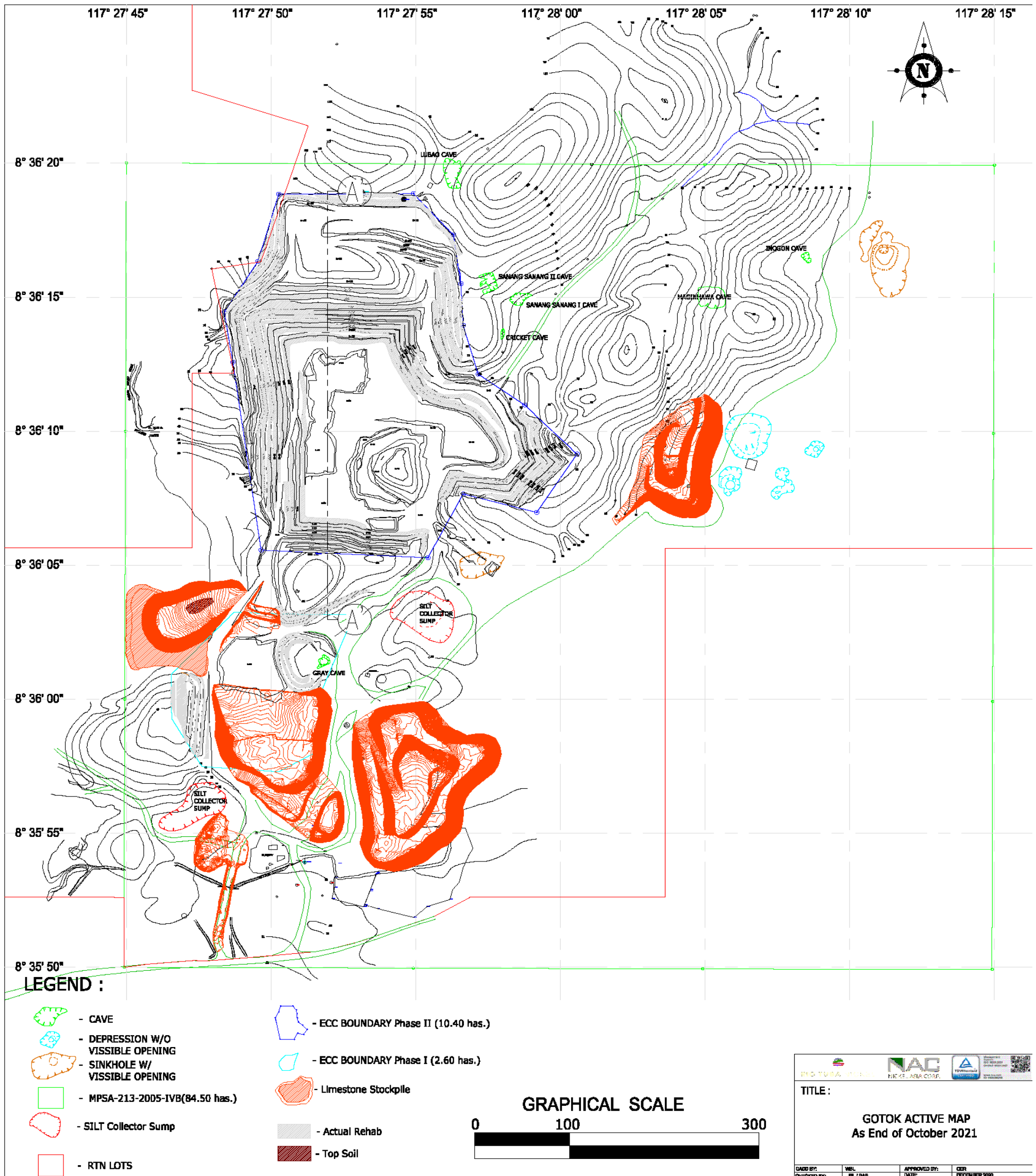


Figure 6. Gotok Quarry Active Map

4.2. Mineral Reserves/Resources

4.2.1. Reserves (MT in each category)

Table 11 provides information on the mineable reserves until the end of the project in 2021.

Bench (masl)	Limestone Reserve (In-situ) as of end of Dec. 2020								
	CaCO ₃ ≥ 90.0%		CaCO ₃ ≥ 80% <90%		CaCO ₃ <80%		No Assay	Total/Average	
	WMT	% CaCO ₃	WMT	% CaCO ₃	WMT	% CaCO ₃	WMT	WMT	% CaCO ₃
90	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-
25	4,680	91.34	14,041	87.33	4,680	65.30	-	23,402	83.73
20	53,497	94.94	82,319	83.27	54,876	76.06	-	190,689	84.47
TOTAL	636,539	93.09	94,629	87.33	31,543	65.30	12,812	248,503	82.57

Table 11. Movable Reserve

4.2.3. Average Grade of Ore (each mineral commodity)

The limestone quarried at the site is hauled to Limestone Crushing Plant to produce products such as:

Ore Classification	% CaCO ₃	Diameter
High Grade	≥94%	40mm to 80mm
Low Grade	<94%	≥25mm

Table 06. Ore Classification

4.2.4. Cut-off Grade (cost per ton)

Gotok quarry would give a conservative recovery of only 80% of the ore resource. This is to account for the presence of a low-grade intrusion of low-grade claystone as well as erosion. With a historically observed recovery of 85%, an 80% recovery rate is conservative.

4.2.5. Potential for additional resource and reserve

The Gotok limestone hill has more than enough limestone deposit to meet the requirement of the HPP and GPI plants. Movable reserves may be increased by simply expanding the proposed quarry.

4.3. Access/Transportation

4.3.1 Road (preference and alternates)

The site office is at the RTNMC Mine Complex located in Barangay Rio Tuba and is accessible connected by 250 kilometers paved road from Puerto Princesa City. It can be reached within 4-6 hours travel using a private car or through public utility vehicles.

4.3.2. Air access (origin and destination points)

The project site is accessible from Manila via direct and private plane which will take an hour flight. Another access is via commercial flight from Manila to Puerto Princesa City and takes another one-hour flight via the company-owned single engine airplane from Puerto Princesa to Barangay Rio Tuba.

4.3.3 Shipping (preferred port facilities, alternates)

Another route to access the site is by ship from Manila, Puerto Princesa, or Brooke's Point that will take 48-hours, 18-hours, and 2-hours commercial boat ride, respectively.

4.4. Power Supply

4.4.1. Requirements

The quarry itself does not require electric power since all quarrying equipment is engine self-driven. The crushing facilities is the source of the project's electric requirement.

4.4.2. Source of power supply

The crushing plant's power requirement is supplied by the 22MW coal-fired power generator operated by the Coral Bay Nickel Corporation.

Alternatively, diesel generators are used.

4.5. Equipment to be used

4.5.1. Mining

Diesel Power Equipment	MAKE / MODEL	QUANTITY
PRODUCTION EQUIPMENT		
Dump Trucks	VOLVO/FM 64R, 6x4	21 units
Wheel Loader	VOLVO L-150F	10 units (8)
Track Excavator	VOLVO EC460B	2 units
TX Breaker	KOM PC200	2 units
Bulldozer	KOM/D85EX-15	2 units
DRILLS		
Air Track Drill Machine*	Furukawa 200/Soosan SD-7000/JUNJIN	3 units
OTHER EQUIPMENT		
Fuel Lorry	VOLVO FM 64R	1 unit

Maintenance Truck	ISUZU NPR 22	1 unit
Road Grader	VOLVO G930	1 unit
Truck Trailer	VOLVO FM 64R	1 unit
Air Compressor*	HINO 100	1 unit

Table 12. List of Diesel-Powered Equipment

4.5.2. Milling/Processing

EQUIPMENT	MAKE / MODEL	QUANTITY
SCREENING/CRUSHING PLANT		
Jaw Crusher	700 mm x 50 mm, 95 mm discharge	1 unit
Roll Crusher	Kurimoto 3624 Double Roll Crusher	1 unit
Vibrating Screen	Triple Deck with 75 mm opening	2 units
	NFS 1230, 1200 mm x 3000 mm single deck	1 unit
	1200 mm x 3650 mm w/ 25 mm opening, single deck	1 unit
Cone Crusher	TC1000T, Terex Jacques	1 unit
Jaw Crusher	JW-42 Terex Jacques	1 unit
Apron Feeder		1 unit
Scalping Divergator	AE 1412	1 unit
Vibrating Screen	Double Deck Horizontal Screen	1 unit
	Triple Deck 6' x 16'	1 unit
Water Washing Spray System		2 units
Slurry Desander System		1 unit

Table 13. List of Crushing Plant Equipment

4.5.3. Others

Meanwhile, the following are other related service facilities which are available at the RTN mine:

- Assay laboratory
- Mechanical/motor pool/repair shop
- Electrical shop
- Carpentry shop
- Fuel storage facility
- Townsite (housing, school, hospital, recreation facilities, etc.)
- Domestic water supply facility
- Explosive magazine

4.6. Workforce Information

4.6.1. Total operational workforce

The current total manpower pool of RTNMC and its contractor for the Gotok quarry operation is shown in table 14. RTNMC does not require specific gender in hiring an employee for as long as the applicant/worker is able to perform the job nor has high qualification for the offered

position; he/she can be accepted. The existing pool of manpower employed in the quarry is specifically assigned and responsible in the quarry operation including its MEPEO, PCO, Safety Engineer, Safety Officer and Community Relation Officer.

Workforce	Male	Female	Total
Management	3	1	4
Environment	2	1	3
Safety	1	1	2
Community Relations	-	1	1
Operation	93		93
Sub-total	99	4	103
Contractors	31	0	31
Sub-total	31	0	31
GRAND TOTAL:	130	4	134

Table 14. Manpower Breakdown

4.6.2. Organizational Set-Up Including MEPEO

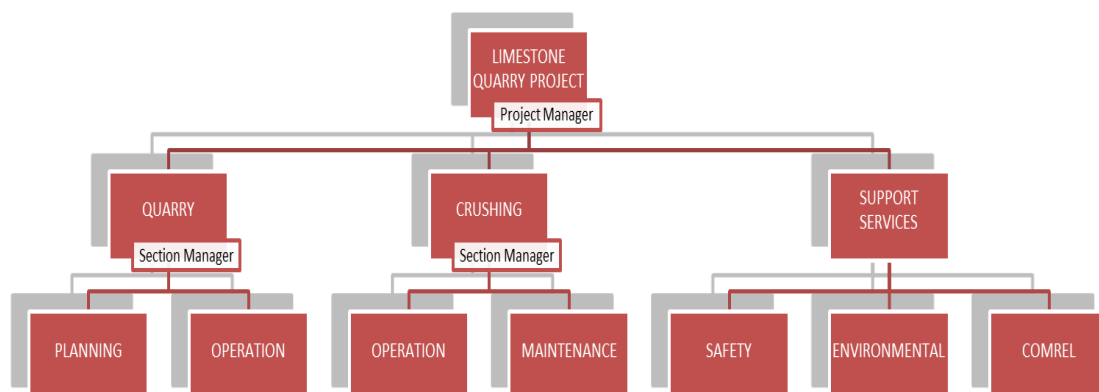


Figure 7. Table of Organization

The MEPEO is incorporated in the RTNMC's organizational structure consistent with the provision of Section 173 of DENR Administrative Order 96-40 (Revised Implementing Rules and Regulations of Republic Act No. 7942, Philippine Mining Act of 1995). The MEPEO mainly functions to ensure compliance with the requirements of environmental laws and proper performance, operation, and maintenance of environmental programs and facilities.

4.6.3. Housing options (camp, new town, neighboring communities)

The established townsite consists primarily of housing units, hospital, school, recreational facilities, among others.

4.7. Development/Utilization Schedule

Project Development

Prior to actual quarrying operation, the project has undergone development to prepare the area for actual mining/quarrying operation. During the development stage, the following activities were undertaken:

- Road widening and backfilling of existing road connecting the Gotok limestone area and the national road
- Access road construction leading to the quarry site
- Initial quarry site clearing
- Silt collector sump construction
- Drainage control

Quarrying Operation

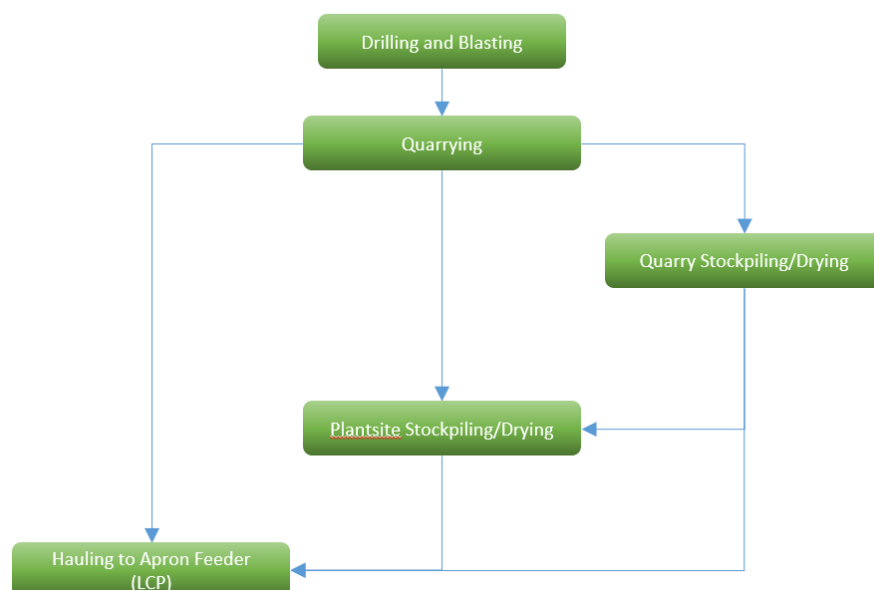


Figure 8. Gotok Quarry Operation Process

- **Drilling/Blasting Operation**

Massive limestone deposit requires drilling and blasting operations to produce the required fragmentation of <50 cm size products. These shall be fed to the jaw crusher with a discharge setting – 115mm.

Drilling

Conventional drilling requires a TH-CD 650 hydraulic crawler machine equipped with a compressor. Drill hole diameter is 3 inches or 76 millimeters. Full length of 2 drill rods is 6.5 meter with 3.5 initial rod plus 3 meter connecting rod. A total of 5.5 meters depth per hole, is applied, with 0.5 as subgrade to prevent hard toes for a 5-meter bench. Drilling in rows is 2x2.5 meters in staggered pattern.

Blasting

This involves the charging of a 6-meter drill hole consisting of a primer (using a 1 kg. 50-mm dynamite), a column charge, drill sludge, and clay for stemming. To produce 60,000 dry metric tons (DMT) per month of production, it requires 1,333 holes at 45 tonnes per hole using a 0.3 to 0.4 kilograms/m³ as powder factor. Blasting operation could be set or scheduled once a week when normal operation is attained. On a weekly basis, there is a 5 to 6 days drilling and two-day blasting.

Secondary blasting is employed for oversize material using a normal pneumatic conventional drill machine and a 25-mm dynamite for secondary blasting.

- **Edge Dumping/Stockpiling/Dozing**

After blasting, the broken material will be loaded and truck-dumped into a 20-meter steep high bank within the quarry area. This will effect material segregation as the clayey material will form a natural slope along the bank while the rock will roll down and settle beyond the natural slope.

- **Loading and Transportation**

The material from the quarry will be loaded from the bench face to a 20-MT dump truck by a TX-loader, while the stockpiled materials will be loaded using a wheel loader. The material will be hauled and directly dumped to the Apron feeder or temporarily stockpiled at a stockyard which is adjacent to the RTNMC crushing plant.

- **Waste Dumpsite**

The waste materials that are generated are minimal in volume since only the topsoil is treated as waste. Most of the topsoil will be utilized as top layering materials for rehabilitation/revegetation of mined-out quarry benches. Designated waste dumpsites for temporary storage pending availability of fully mined-out areas for rehabilitation/revegetation are being maintained. Topsoil will be stockpiled within the eastern portion of the quarry area. Reshaping of the stockpile to prevent erosion will be undertaken. The reshaping will be done in a manner that the slope is gentle and then the stockpile will be planted with grass cover and other vegetation.

- **Progressive Quarry Rehabilitation**

Progressive quarry rehabilitation will be undertaken as soon as the quarry benches have reached their final quarry/pit limit. The schedule of rehabilitation will more or less follow the quarrying stages, i.e. Phase 1 first, then Phase 2, and so on.

Crushing Operation

- **Regulated Feeding of Material**

The material will be fed to a receiving hopper/Apron feeder using a wheel loader or directly dump from the dump truck and carry the stones into the crushing chamber. Regulated Feed is important especially in the Jaw Crusher. A regulated flow of in feed material will enable the jaw crusher to crush most efficiently.

- **First Stage Crushing Process**

Removal of the material that is smaller than the closed side setting (CSS) of the Jaw Crushing is done with the use of divergator. This size segregation happened with the static screen designed to provide a rough 75mm separation. Then the Terex JW 42 Jaw Crusher is selected as the 1st Stage Crusher. A Jaw Crusher is able to take the max infeed size of 500mm. With a CSS of 100mm, it is able to run up to a maximum capacity of 195 TPH.

The jaw crusher is required to reduce the size of the infeed, so that that it can fit into the Cone Crusher. In this instance, the jaw crusher produces the least amounts of fines, as compared to other types of crusher.

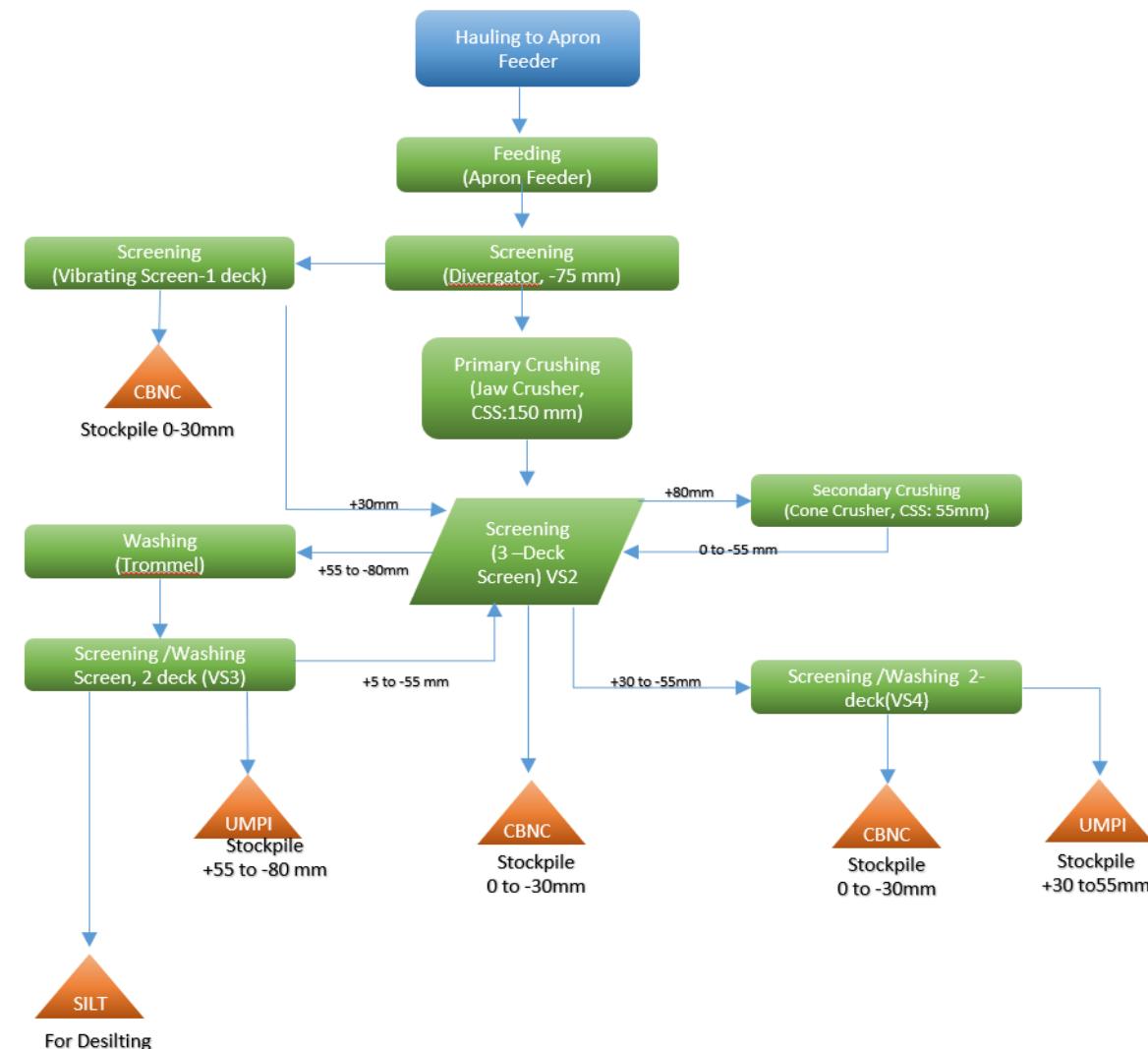


Figure 9. Crushing Plant Operation Process

- **Metal Detection and Tramp Metal Removal**

A permanent magnet is placed after the Jaw Crusher, in Belt conveyor BC4. This helps to remove any unwanted metals from entering the flow, and damaging the equipment. As a further precaution a metal detector placed after the permanent magnet. Any detection of metal, will send an alarm to the electrical control room, and stop the equipment from operating, to prevent any further damage.

- **Second Stage Crushing Process**

The Terex® TC1000 Cone Crusher is the 2nd stage crusher. A Cone Crusher provides an excellent reduction and product cubicity for the production of high-quality aggregate. This reduces the material from the 1st stage process, to produce the following product sizes: 0-20mm and 50-90mm, with the production with the least amount of fines.

- **Sizing Screen (1st Stage)**

The 6' x 16' Inclined vibrating screen is used to segregate products of different sizes. The high frequency vibrating screen breaks down the surface tension between particles. Also, the high level of RPMs contributes to increasing the stratification of material so they separate at the following sizes:

>90mm

25-90mm

0-25mm

Washing Process (50-90mm)

- **Horizontal Washing Screen**

The Horizontal Washing Screen works on the same principle as the Inclined Vibrating Screens. The only difference is that it is mounted on a horizontal position to enable the material flow to move slower and provide longer retention time in the screen that for better segregation and washing. Spray bars with special spray nozzles are installed on the screen, which spray water jets at high pressures to wash the stones, especially the 50-90mm stones.

- **Desander**

As part of environmental control, the wash water from the Scrubbing Barrel and Horizontal Washing Screen will be pumped in to the Desander unit.

Desanders are solid control equipment with a hydrocyclone that separate sand and silt from the wash water. The Desander is installed on top of the mud tank following the vibrating screen. The Desander removes the fine solids from the wash water which cannot be removed by the horizontal screen shakers. The solids diameter for desander to be separated would be 45~74µm. This helps to reduce greatly the fines that are disposed into the silt trap. What comes out from the desander will only be silt, which will be sent to the silt trap for further segregation before disposal back into the environment.

- **Spray Nozzles**

In an effort to reduce the amount of fresh water used in the plant, we have installed special nozzles. These nozzles are specially designed to work at high pressures, but with low volumes of water. The high-pressure water jet from the nozzles will remove any loose dirt from the surface of the stones.

- **Recycling of Quarry Waste (-75mm)**

The scrubbing barrel is fed with fresh water, and the stones are rotated freely in the washing drum. This creates an attrition effect, which causes the stones to “rub” against each other. The drum is operated at a low rpm 27-35rpm, to reduce wear and breakage of the stones. The material that comes out from the scrubbing barrel is clean and free of mud. The mud is dissolved into the water which is sent to the desander for further processing.

- Final Product Crusher

The existing KURIMOTO double roll crusher is used to reduce the material 25-50mm to the desired product size of 0-25mm. The double roll crusher is set at 25mm gap setting to achieve this.

5.0. Baseline and/or Current Information

5.1. Land Resources

- Land Use/Land Cover and legal land classification

Four landcover/vegetation types were identified and mapped within the MPSA. The landuse/vegetation types are as follows: Forest; Shrubland; Coconut and Fruit trees; and Bare area. Forest is the dominant vegetation of the hilly area in the northern and middle parts of the MPSA. Forest tree species are: Molave (*Vitex parviflora*), Shorea sp., Antipolo (*Artocarpus blancoi*), Amugis (*Koordersiodendron pinnatum*), Malamanga, Malacafe, Binunga (*Macaranga tanarius*), Bago (*Gnetum gnemon*) and Kamias (*Averrhoa bilimbi*). The Shrubland exists in the Tree Cutting Permit area and on the sideslope of the hill in the mid-eastern part of the MPSA. Two small patches of shrubland exist adjacent to the Bare area and Coconut plantations in the southern part of the MPSA. Shrub/plant species are: Binunga (*M. tanarius*), Hagimit (*Ficus minahassae*), Samburagot and Comote-camotehan (vine).

The Coconut plantations with Fruit trees such as Rambutan (*Nephelium lappaceum*), Cashew (*Anacardium occidentale*), Bignay (*Antidesma bunius*), Jackfruit (*Artocarpus heterophylla*), Guava (*Psidium guajava*), Banana (*Musa sapientum*) with Pineapple exist in the southern part of the MPSA. The Bare areas are the actively being quarried area in the middle part of the Tree Cutting Permit area and the area being used as stockpile area of the limestone stones and boulders in the southern part of the MPSA.

- Geological and Soil Reserves

Geology - The oldest rocks underlying the Gotok Quarry are the well bedded sandstone, shale/siltstone and mudstone of the Panas Formation. These rocks underlie the northeast, west, and south sides of the Gotok limestone area. The sandstone is light brown to gray, thinly bedded and highly indurated, while the shale and siltstone are brown to dark gray, thinly bedded and friable

Soil Type - The soil type in the project area is Bolinao clay and the two (2) soil mapping units are the Bolinao clay 0-8% slopes and Bolinao clay >18% slopes. Bolinao clay developed from the weathering of limestone. The Bolinao clay >18% slopes occur on the hilly area on the northern and middle part of the MPSA, particularly the area with the tree cutting permit. Bolinao clay 0 – 8% slopes occur on the infilled valley in the northeast and the flat to almost flat terrain in the southeastern part of the MPSA. Bolinao clay >18% slopes, as represented by observations 1 and

2, is a well-drained shallow (20 – 40 cm depth) soil. Soil reaction is mildly to moderately alkaline (pH 7.55 – 8.14). Nitrogen is medium to high (0.46 – 0.94%). Organic matter and K are very high with 9.17 – 12.8% and 1.35 – 1.67% cmol/kg, respectively. Phosphorous is low to medium (10.31 – 11.16 mg/kg). CEC is high to very high with 36.81 – 44.2 cmol/kg.

Erosion Susceptibility - The Soil Erosion Susceptibility Map (Figure 14) displays the result of erosion susceptibility ratings. The Forest, Coconut plantations and Shrubland on Bolinao clay with slopes of 0 – 8% are with —slight susceptibility to erosion II. The Bare area on Bolinao clay with 0 – 8% slope is with —moderate susceptibility to erosion II. The Forest and Shrubland on Bolinao clay with >18% slopes are with —moderate susceptibility to erosion II. The bare area on Bolinao clay with >18% slope is with —high susceptibility to erosion II.

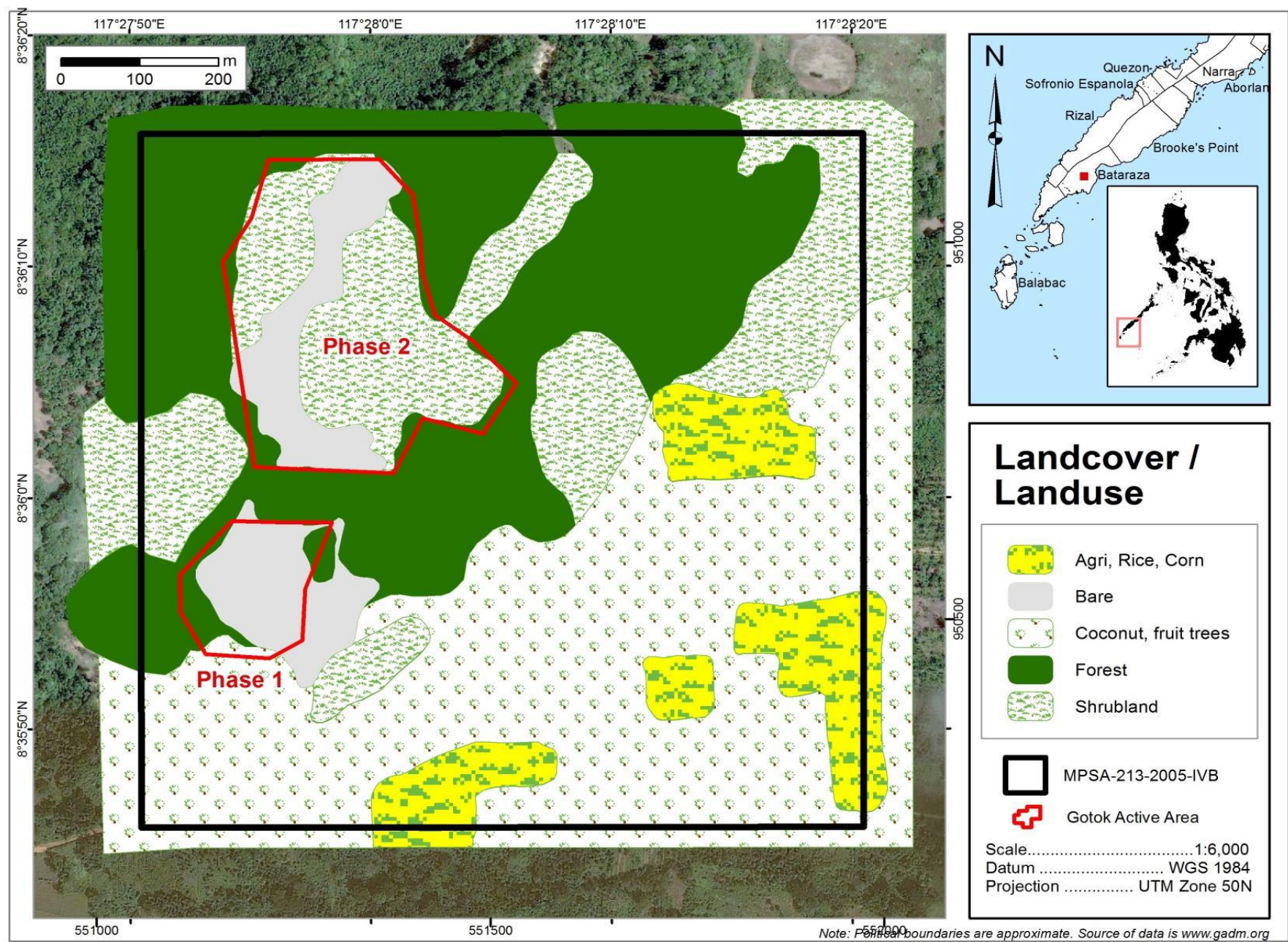


Figure 10. Land Cover/ Land Use Map

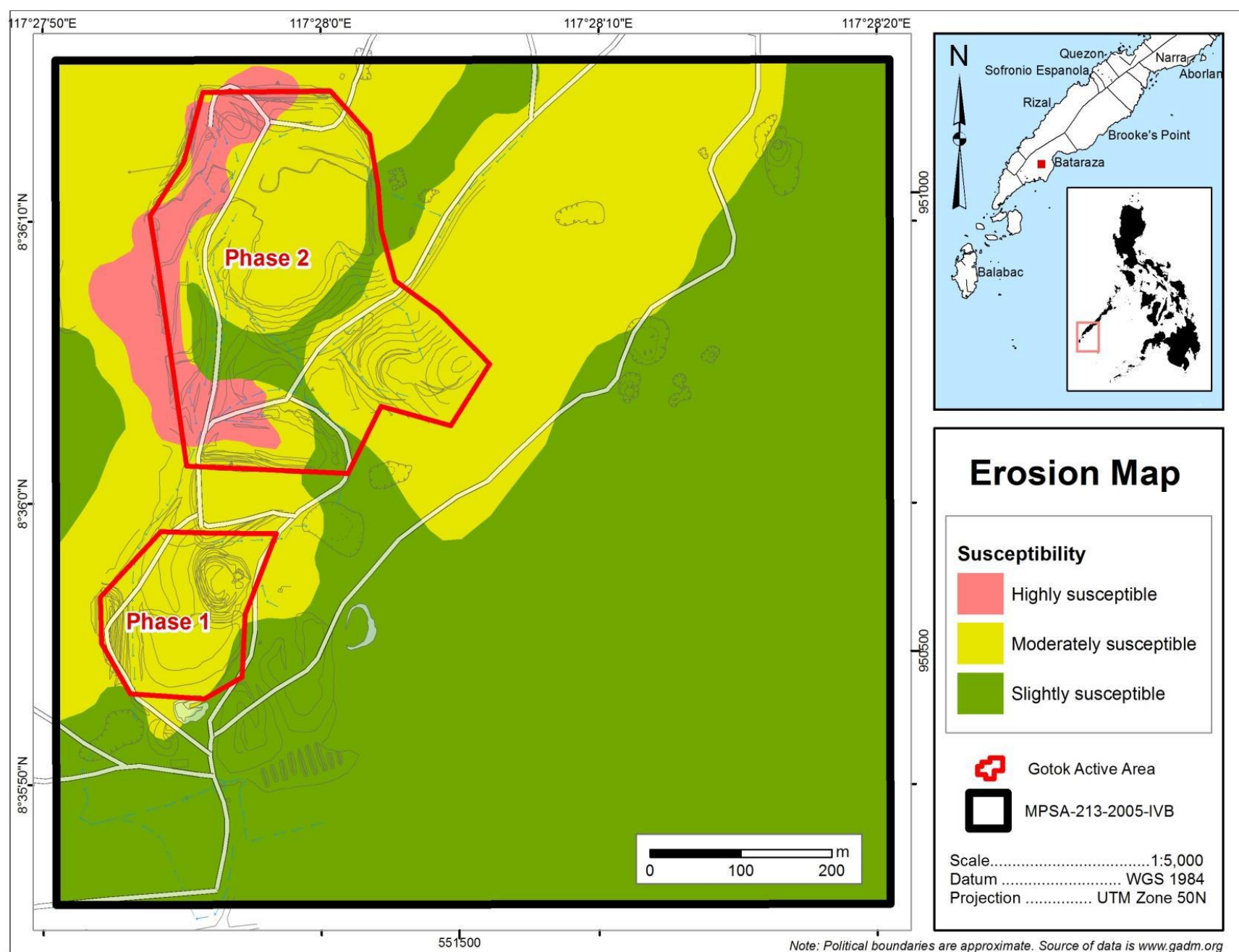


Figure 11. Erosion Map

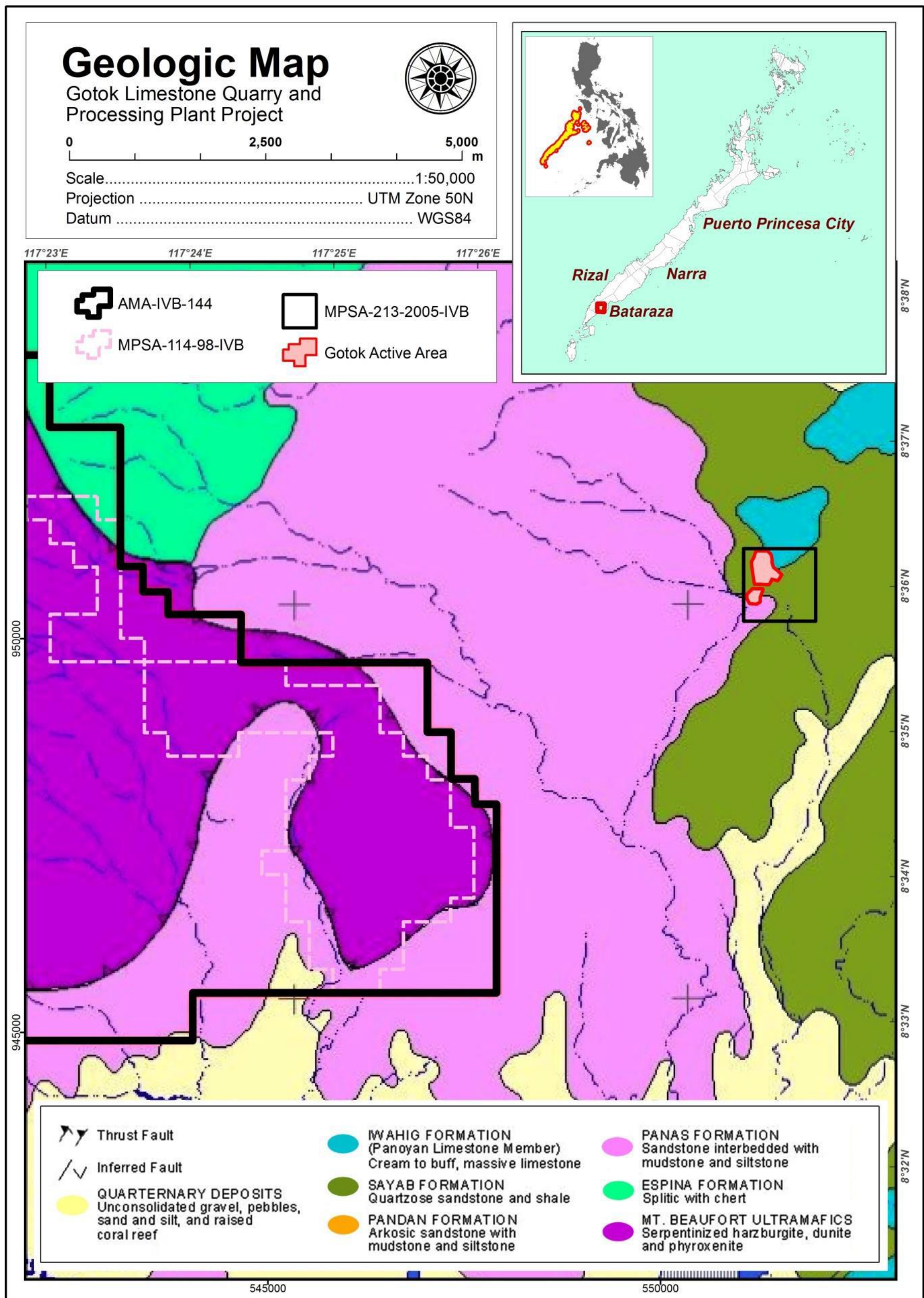


Figure 12 Geologic Map

5.2. Water Resource and Quality

- Hydrology

Climate - The southeastern section of Palawan including Bataraza Municipality where the Gotok Limestone project lies experiences a Type III climate based on the Modified Coronas Climate Classification Scheme of the Philippine Atmospheric, Geophysical, Astronomical Services Administration (PAGASA, 1992). A long rainy season that does not have a pronounced maximum rain period and a short dry season lasting only 1 to 3 months distinguishes this climate type.

Rainfall - RTNMC has three (3) rainfall stations in Rio Tuba that have been in operation since the early eighties. These stations are located at the Guintalunan, Mangingidong and Piersite areas in Bgy. Rio Tuba, Bataraza. The Guintalunan and Mangingidong stations are closest to the Gotok Hill and almost equally represent the amount of rainfall that falls on the catchment areas covering Gotok Hill based on the Thiessen Polygon Method. Table 15 lists the average monthly and annual rainfall in the Gotok area as derived from the rainfall averages from these two (2) stations in the last 20 years. Table 15 reveals that the area receives an average rainfall of 2,503 mm per year. The rainy season begins at April and lasts up to January with the average monthly rainfall exceeding 140 mm and peaking at 340 mm in October. February and March constitute the dry season with the average monthly rainfall averaging 70 mm.

Period	Rainfall (mm)
January	161.9
February	64.9
March	74.2
April	142.4
May	207.4
June	293.1
July	264.6
August	271.4
September	317.4
October	340.0
November	198.0
December	167.8
Annual	2,503.3

Source: 1997-2013 Data of
RTNMC Guintalunan and
Mangingidong Rainfall
Stations

Table 15. Average monthly and annual rainfall

- Hydrogeology

Based on the geologic map prepared by Sto. Domingo et al. (1989), five (5) major rock units underlie the vicinity of the study area. These are from oldest to youngest to the Mt. Beaufort Ultramafics, the Espina Formation, the Panas Formation, the Iwahig Formation and the Quaternary Alluvium.

Residents of Barangays Sandoval and Iwahig used to obtain their domestic water requirements from Level 1 water sources consisting of shallow wells and springs. The wells are public and privately owned drilled wells cased with 38 to 102 mm diameter G.I. pipes. The wells reach 9.1 to 15.2 m depth and are fitted with manual jetmatic and pitcher pumps or, less commonly, electric centrifugal pumps. The wells provide clear and odorless water which total dissolved solids (TDS) content and pH within the standard limits for drinking water. The water from the wells is used for drinking, washing and bathing.

The springs on the other hand, are situated in the areas underlain by the Panoyan Limestone. They are found at low-lying areas, emerging from cavities in the limestone. The largest spring in the immediate vicinity of the quarry is the Oning Spring. It has been previously measured to discharge approximately 50 L/s of water. The spring is used as a source of water for road spraying to control dust generation along the access road to the quarry. Groundwater from higher areas preferentially flows and discharges along more permeable zones such as cavities and solution channels in the limestones. The springs yield generally clear and odorless water in which TDS content and pH are likewise within the standard limits for drinking water.

Since 2013 however, the domestic water requirements of Brgys. Sandoval and Iwahig as well as portions of Brgys. Ocayan, Igang-Igang, Sarong and Culandanum were supplied mainly by a Level II water system installed by RTNMC and CBNC. The source of the water system is the Pasi-Pasi River, which is a tributary of the Iwahig River. A dam constructed across a section of this river at the eastern slope of Bulanjao Range diverts a portion of the flow to a series of screens and settling ponds. When the water becomes clear and free of suspended particles, it is chlorinated and then distributed by gravity flow through a network of pipes along the provincial highway and barangay roads. Faucets are installed where there are clusters of houses. Because of the presence of the Level 2, some wells have been abandoned while others are still maintained for use during the times when the operation of the Level II system is temporarily suspended such as during heavy rains when the Pasi-pasi River becomes turbid. Figure 16 displays the location of the major water sources in the vicinity of the Gotok Limestone Quarry including the Pasi-Pasi River water source.

- Groundwater Flow (Vicinity of Quarry Area)

There are no springs or creeks in Gotok Quarry and its immediate vicinity. Instead, presence of several dry caves and sinkholes were observed. The absence of springs and creeks and the presence of caves and sinkholes in the immediate vicinity of Gotok Quarry indicate that the limestone in the area has a high degree of permeability such that water percolates rapidly downward through it. This is supported by the fact that surface runoff collected at the silt collector sumps during heavy rains also rapidly infiltrate into the subsurface. Groundwater therefore moves downward and outward from Gotok Quarry and the other limestone hills that cluster near the quarry. The presence of intermittent creeks to the south and north of Gotok Quarry suggests that groundwater in the northern section of the quarry moves in a general north direction while groundwater in the central and southern section of the quarry

moves southward. The intermittent creeks to the south of Gotok Quarry are tributaries of Okayan River while those located to the north of the quarry are tributaries of Iwahig River. Figure 17 displays among others the position of Section Line A'A' traversing north-south through Gotok Quarry, while Figure 13 illustrates the most probable flow direction of groundwater along Section Line A'A' based on the above hydrogeologic observations

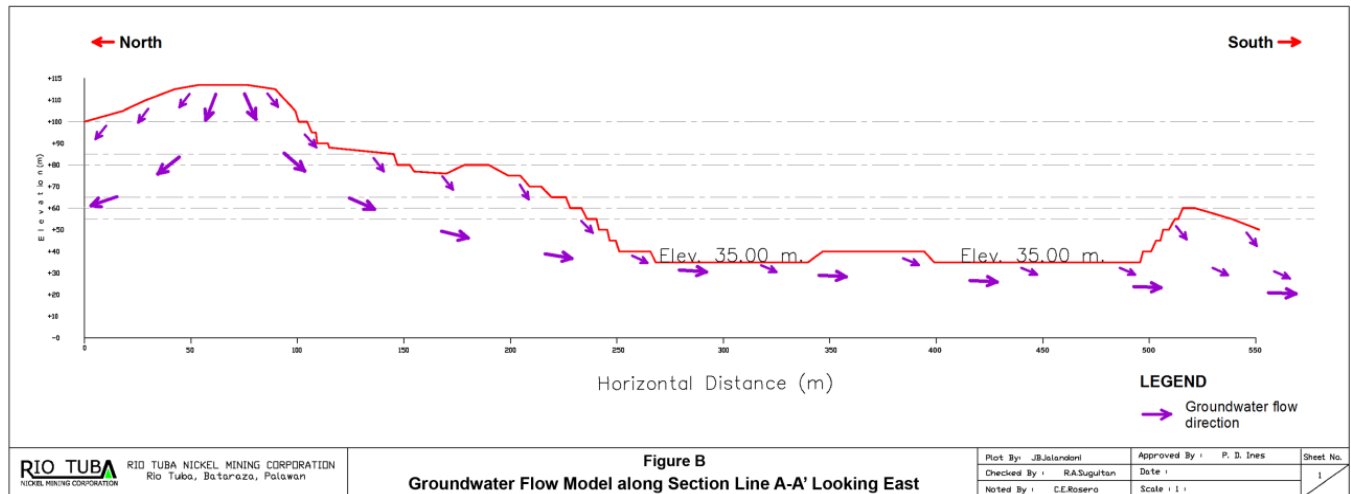


Figure 13. Most probable flow direction of groundwater

- Others

Water Quality - The DENR DAO 90-34 (DAO 90-34), “Revised Water Usage and Classification/Water Quality Criteria Amending Section Nos. 68 and 69, Chapter III of the 1978 NPCC Rules and Regulations” has been used to characterized the physico-chemical and bacteriological characteristics of surface waters. The result was also compared to the DAO 2016-08, Water Quality Guidelines and General Effluent Standards of 2016. RTNMC conducts monthly internal sampling/monitoring of the water quality in two (2) stations: Oning Spring (WQM1-Station 14) and Gotok Entry Tunnel (WQM2- Station 15). As seen in Figure 14, pH is relatively within the DAO 90-34 DAO 2016-08 standard of 6.5 to 9.0. On the other hand, Figure 15 shows that TSS is under the 80 mg/L limit except for second quarter of 2010. Exceedances of TSS may be due to rainy weather condition and the local community activities during the time of sampling. Also, as observed, TSS level at Gotok Entry tunnel is relatively higher compared to other stations due to the fact that the vicinity of the station is altered in land-use.

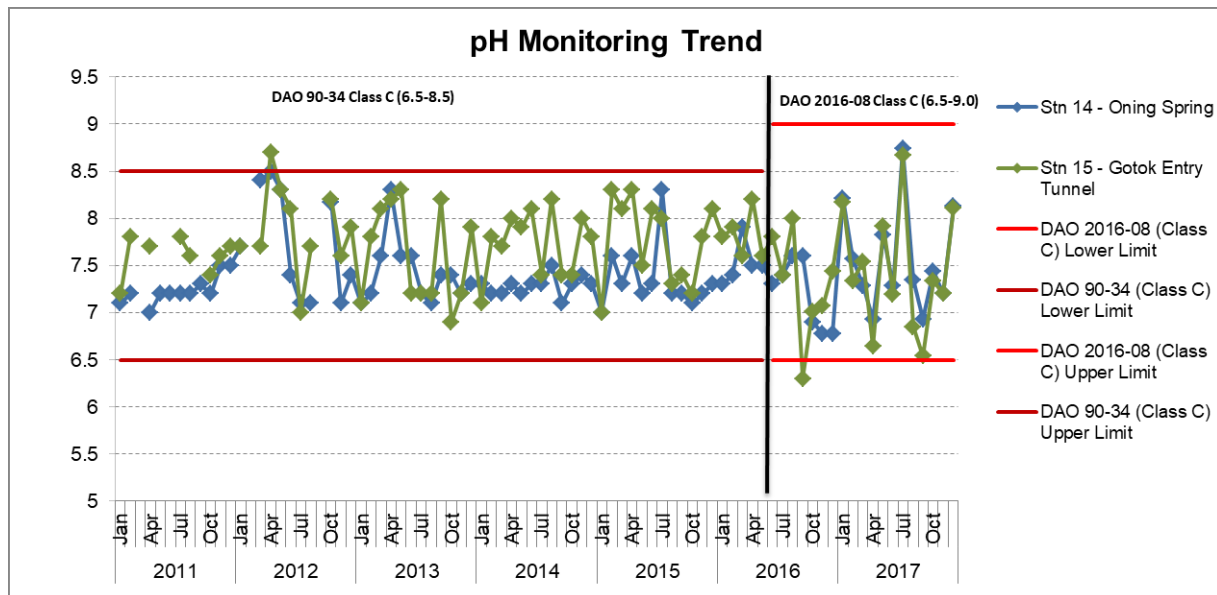


Figure 14. Water quality monitoring of pH

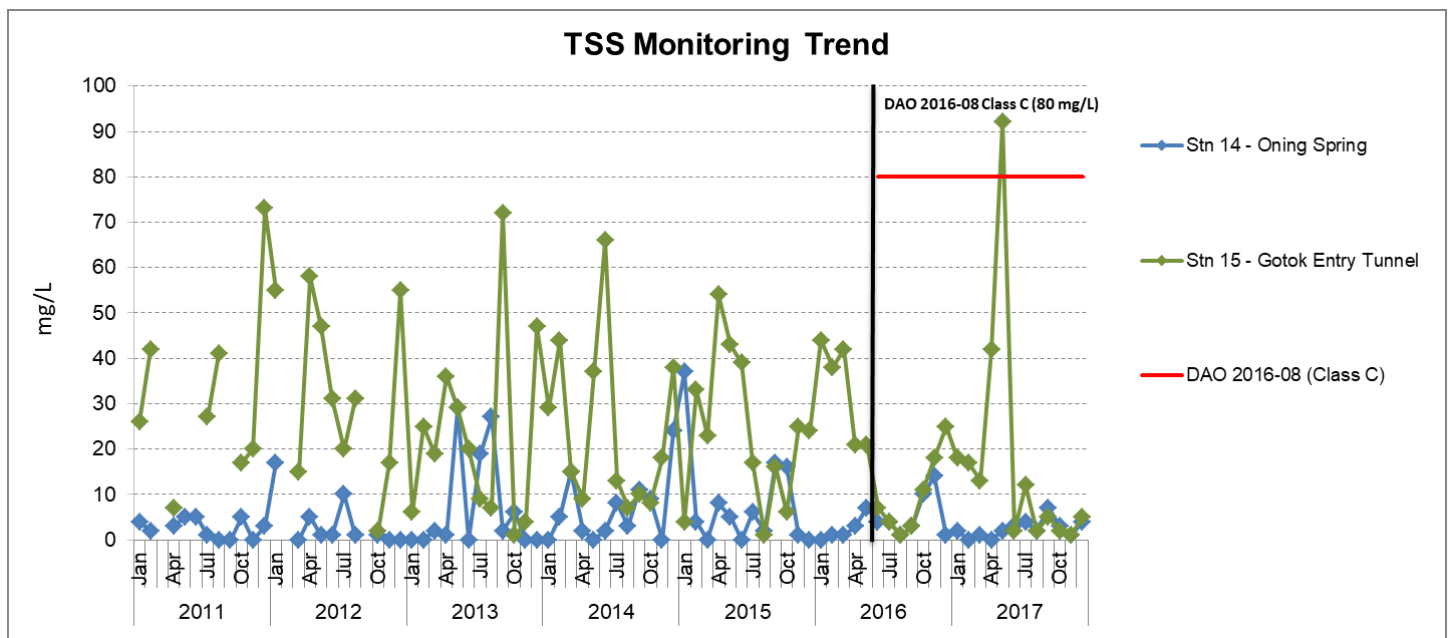


Figure 15. Water quality monitoring of TSS

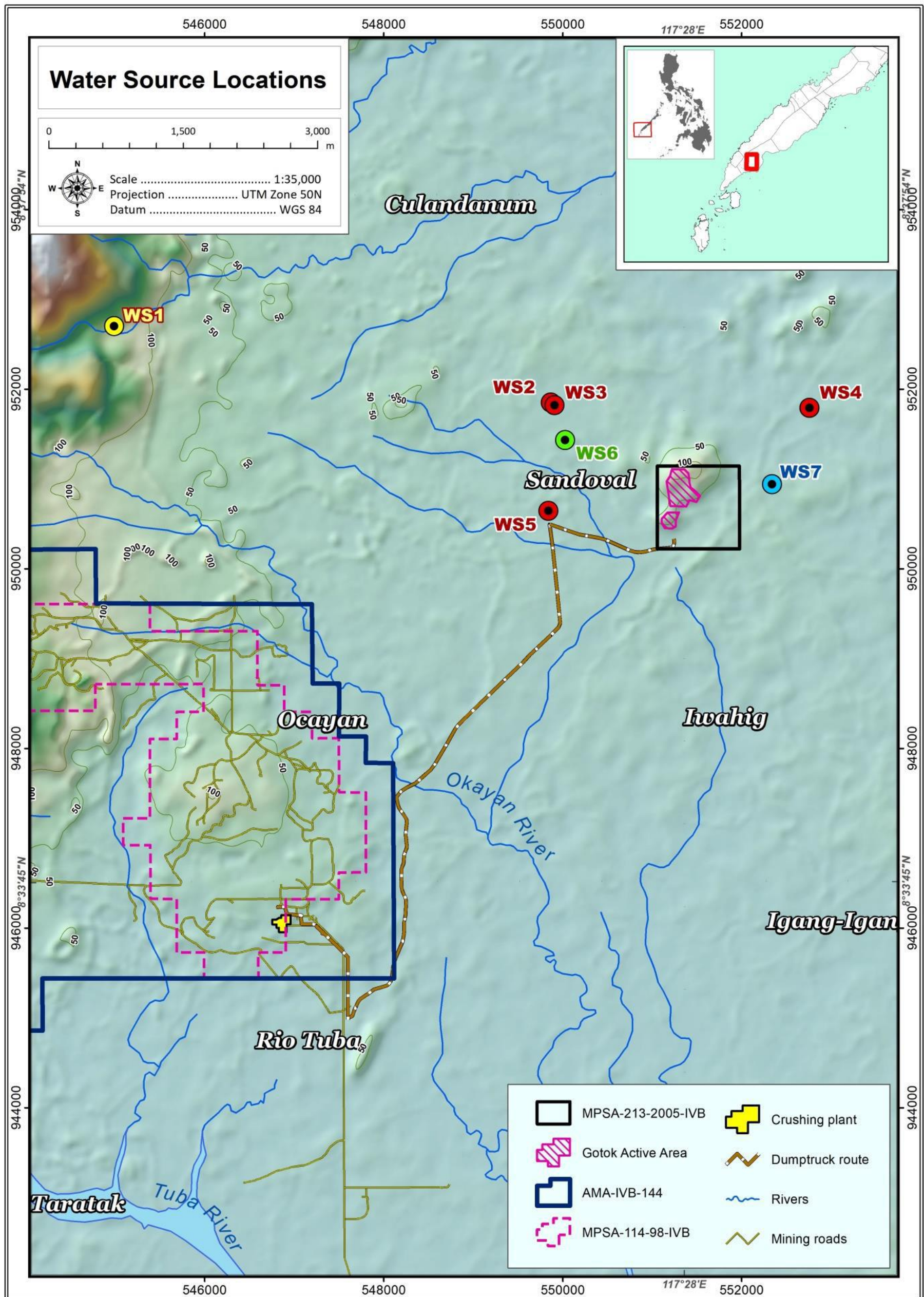


Figure 16. Water source location map

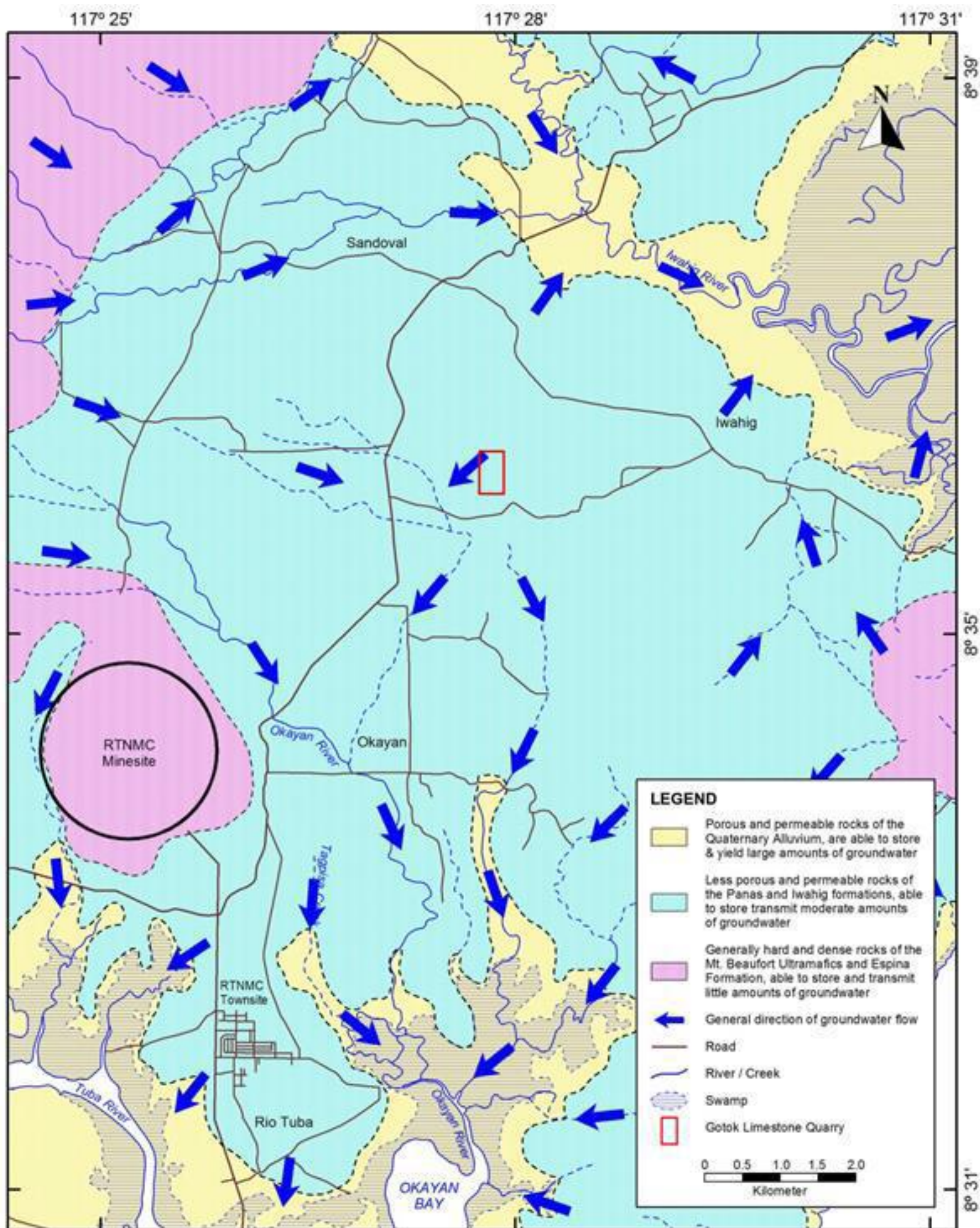


Figure 17. Hydrogeologic Map

5.3. Air Quality

- **Rainfall** - PAGASA has been measuring rainfall in Palawan since 1949. Brooke's Point Station started its operation in 1971. As recorded in all stations, the monthly minimum rainfall ranges from zero to 188 mm (as observed in Cuyo). The monthly maximum rainfall on the other hand ranges from 22 mm (as observed in Coron) to 4,632 mm (as observed in Brooke's Point). The mean monthly values vary from 3 mm to 613 mm as documented in Cuyo and Brooke's Point. Months of June to October are the wettest seasons of the year.
- **Temperature** - The mean annual temperature in the area is 27.5°C with little seasonal variation based on the data from the east coast for a 17-year period. The diurnal temperature range is typically 22.5 – 31.4°C in February and 24.5°C to 32.6°C in the month of May.
- **Wind** - During the months of July and August, the average wind speed is 1.0 m/s while in the month of January; the average wind speed is 2.3 m/s. The annual wind speed is 1.4 m/s, northeast direction
- **Air Quality** - The monitoring program of RTNMC for the Gotok Limestone Quarry project includes monthly measurement and recording of the concentration of particulates on two (2) sampling stations established near the quarry area. These two (2) stations are included in the submitted SMRs for the said project. As for the operation at the crushing plant, a station established within the admin compound facing the crushing plant was being monitored and reported in the submitted SMR for the Nickel Mining Project up until February of 2014 before it was relocated to the magazine area.

The observed particulate concentrations from 2011 to 2014 were below the 300 µg/Ncm maximum standard of DENR. Figure 18 shows that the level of concentration at the Admin Compound facing the crushing plant is higher compared to the two (2) stations located near the quarry area. The higher values may have resulted from the operation of the crushing plant as well as the nearby industrial activities. From 2015 to 2017, the results of the air quality for the two (2) stations located at the vicinity of the Gotok Quarry Area were still below maximum standard of DENR (Figure 19). For the two (2) stations within the vicinity of the quarry, the highest measurement was 236 µg/Ncm recorded in March 2015 at the Southwest Station.

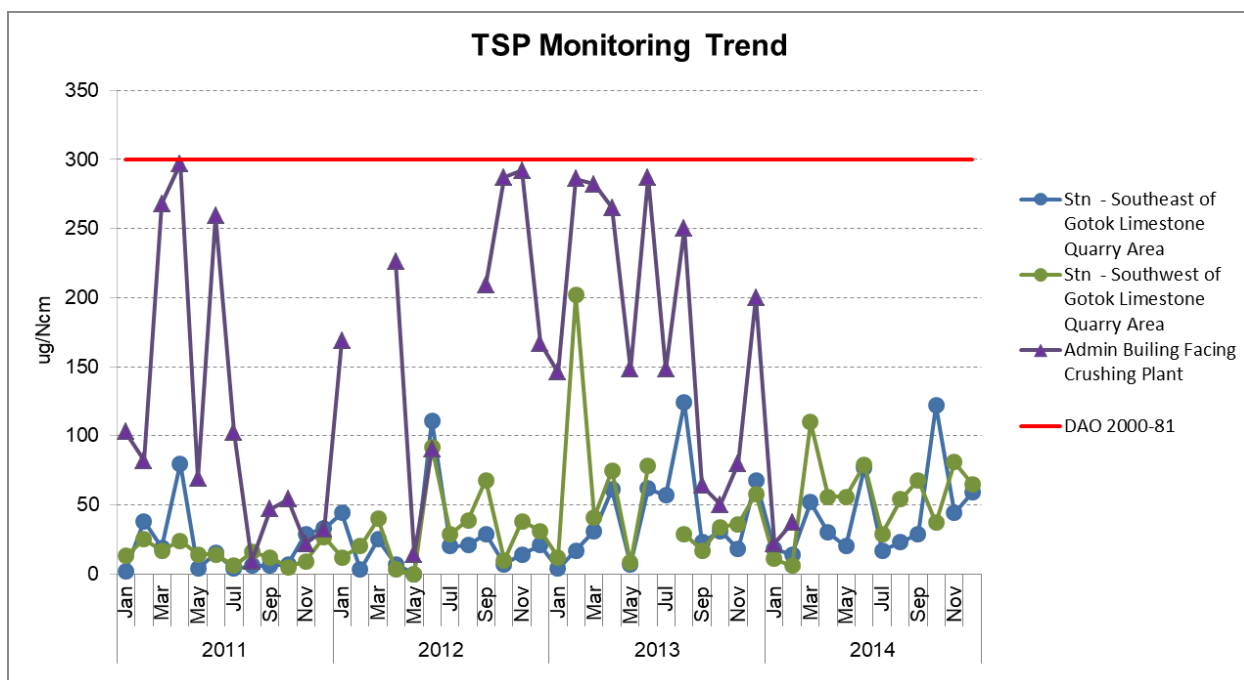


Figure 18. The trend of particulate concentration from three monitoring stations (2011-2014)

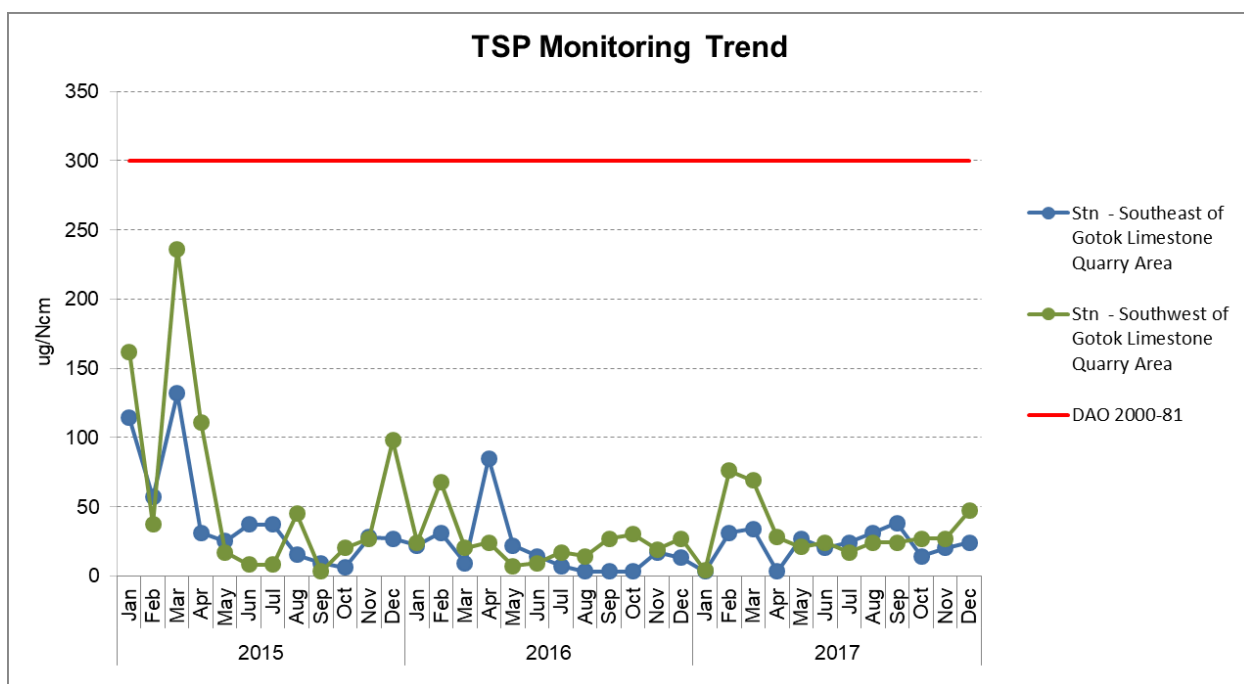


Figure 19. The trend of particulate concentration from two monitoring stations at the - Gotok Quarry area in 2015 to 2017

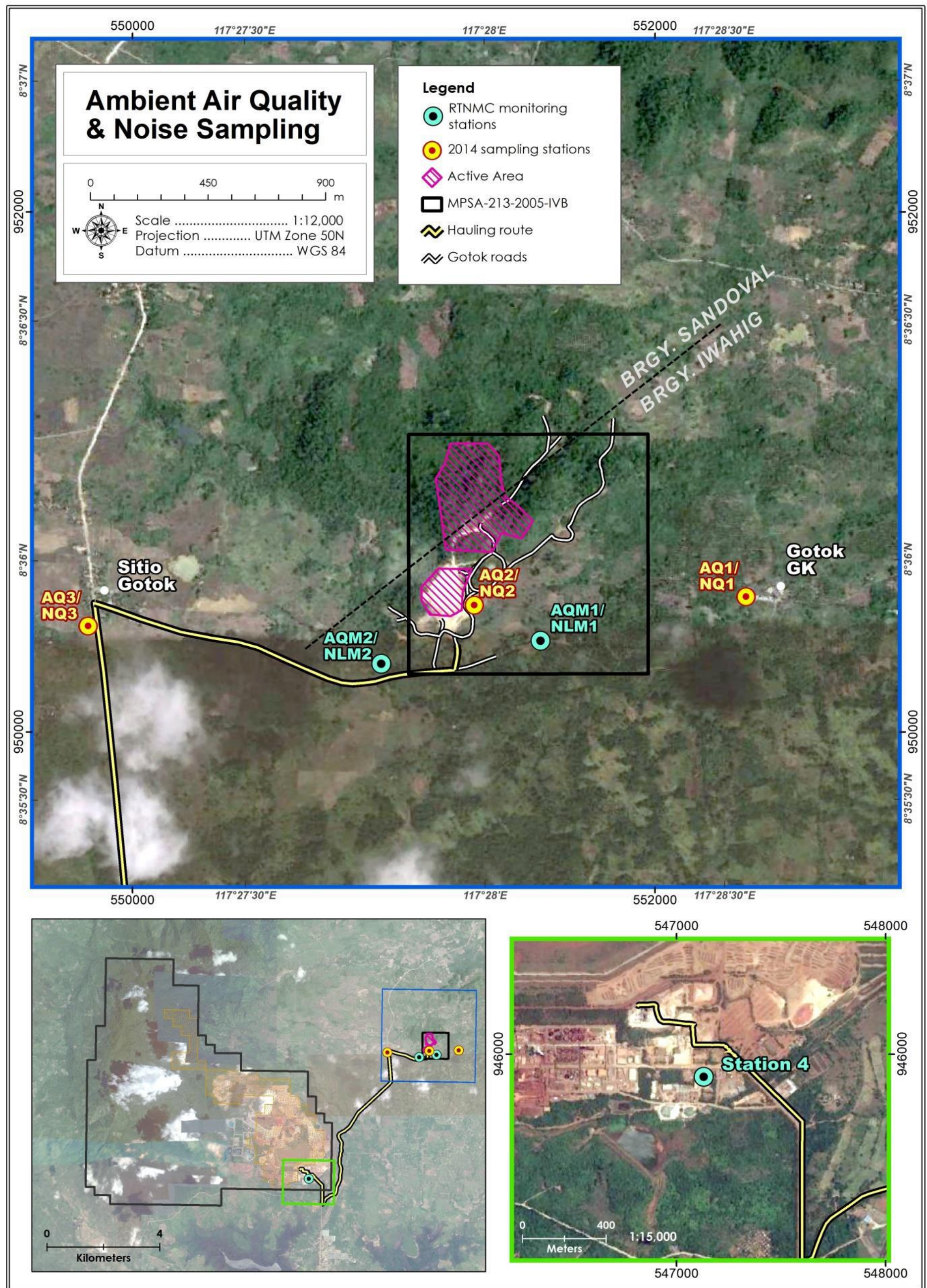


Figure 20. Sampling station map for air quality and noise level monitoring

5.4. Noise and Vibration

As seen in the table, the highest noise level for NQ1 and NQ3, both residential areas (Class A), for all time period were all above the maximum standard. The high level of noise from NQ1 may have resulted from the domestic activities coming from the households situated within the community while the proximity of the NQ3 station to the hauling road and households may have contributed in its exceedance to the limit. In the case of NQ2 (Class C), heavy equipment used during the quarry operations such as drilling, loading and hauling were the source of noise within the area.

Station	Morning (5:00am-9:00am)	Daytime (9:00am-6:00pm)	Evening (6:00pm-10:00pm)	Nighttime (10:00pm-5:00am)	Morning (5:00am-9:00am)
NQ1 (Class A)	Min	48.8	54.4	66.4	47.0
	Max	63.9	69.7	70.3	49.8
	Lowest	42 (8:16-8:20 am)	44.9 (2:31-2:35 pm)	64.4 (9:51-9:55 pm)	41.4 (4:51-4:55 am)
	Highest	93.2 (8:51-8:55 am)	90.3 (1:41-1:45 pm)	79.9 (8:41-8:45 pm)	80.0 (10:46-10:50 pm)
NQ2 (Class C)	Min	51.5	50.8	54.2	47.8
	Max	57.3	61.6	57.2	54.1
	Lowest	45.8 (8:41-8:45 am)	35.5 (5:11-5:15 pm)	41.1 (6:00-6:15 pm)	45.0 (4:26-4:30 am)
	Highest	89.0 (7:41-7:45 am)	79.6 (4:21-4:25 pm)	64.5 (6:26-6:30 pm)	70.2 (10:41-10:45 pm)
NQ3 (Class A)	Min	50.1	50.7	55.0	50.0
	Max	73.9	73.4	62.2	53.1
	Lowest	45.8 (8:31-8:35 am)	40.9 (4:51-4:55 pm)	41.7 (7:46-7:50 pm)	46.9 (3:56-4:00 am)
	Highest	89.5 (7:00-7:05 am)	88.6 (5:56-6:00 pm)	80.0 (7:46-7:50 pm)	82.2 (1:16-1:20 am)
DENR Standard (Class C)		65	70	65	70
DENR Standard (Class A)		50	55	50	45

Table 16. Results of noise level sampling

5.5. Biodiversity Resource/Information

- Terrestrial resource

In general, the vegetation of project area is a limestone forest. Although forested areas as a whole provide wildlife habitat, limestone forests have unique features that make them significant. The limestone forests in the project area occur in karst landscapes, which are underlain by limestone bedrock,

contain sinkholes, caves and springs. These communities are habitat of rare plant and animal species adapted to the soils type.

The limestone forest in the project area had both closed-canopy forest and open-canopy ecosystem. The closed-canopy forest is situated at the periphery of the active limestone quarry while the open-canopy ecosystem is located at the disturbed and steep slopes within the active limestone quarry. In a closed-canopy forest, large trees are few and apart, with the intervening spaces filled with small trees. Only 40 individuals have been recorded with diameter at breast height (dbh) greater than 30 cm. Of these 40 individuals, only five (5) species have dbh greater than 60 cm. These species are Balete (*Ficus* sp.1), Balakat (*Zizyphus talana*), Malapingan (*Trichadenia philippinensis*), Katong matsing (*Chisocheton pentandrus*) and Taluto (*Pterocymbium tinctorium*). Balete (*Ficus* sp.1) had the largest trunk in the closed-canopy forest with dbh of 184.6 cm, followed by Balakat (*Z. talana*) with dbh of 109.5 cm.

The open-canopy ecosystem is composed of pioneer and herbaceous species such as Badyang (*Alocasia* sp.1) and creeping vines such as species of *Gymnopetalum*, *Argyreia luzonensis*, *Merremia vitifolia* and *Momordica*. The pioneer tree and shrub species that inhabit the open-canopy ecosystem are Binunga (*Macaranga tanarius*), Hamindang (*M. bicolor*) and Lipang aso (*Leucosyke negrosensis*). Opportunistic plants as mentioned above have a rapid growth rate, quickly establishing themselves in this open and new environment. Binunga, Hamindang, *Argyreia luzonensis*, *M. vitifolia* and species of *Gymnopetalum* and *Momordica* are the most prominent species in the ecosystem during the early stages of ecological succession. These pioneer species took advantage of the opportunity when climax species that are more competitive in the long run are not very abundant in this early stage of ecological succession. *Binunga*, *Hamindang*, *Argyreia luzonensis*, *M. vitifolia*, and species of *Gymnopetalum* and *Momordica* have better ability to modify their growth rate, physiology, or behavior to better suit the extreme environmental conditions with which they are faced in this ecosystem.

- Birds

There are five (5) species common to all the sites, these are; *Arachnotera longirostra* (Little Spiderhunter), *Collocalia troglodytes* (Pygmy Swiftlet), *Copsychus niger* (White-vented Shama), *Dicrurus leucophaeus* (Ashy Drongo), and *Orthotomus sericeus* (Rufous-tailed Tailorbird). These birds are commonly seen in open spaces, grasslands, and in lowland forests.

- Mammals

There were three (3) species of non-volant mammals observed and recorded along the transects; *Tupaia palawanensis* (Palawan Tree Shrew), *Macaca fascicularis* (Long-tailed Macaques) and *Sundasciurus steeri* (Southern Palawan Tree Squirrel). The live traps were unsuccessful in catching any rodents. This could be an indication that food availability for this taxa is scant or nil in these sites, even in Transect 1 which was undisturbed and is adjacent to an agricultural area. *Macaca fascicularis* or the Long-Tailed Macaque and *Sundasciurus steeri* (Southern Palawan Squirrel) were observed in Transect 1

while three (3) individuals of *Tupaia palawanensis* (Palawan Tree Shrew) were observed traversing and playing in the trail dividing Transects 1 and 2.

- Herps

There were only three (3) species of reptiles recorded from the survey sites, two (2) snakes and one (1) lizard. Inugon Cave harbors the greatest number of species of herps at five (5), followed by Transect 1 and the Creek with four (4) and Maginhawa Cave with only two (2) species.

5.6. Heritage and Cultural Values

Various ethnic groups are found in Palawan. The major indigenous peoples (IPs) groups of Palawan include the Tagbanuas, Batak and Pala'wan.

The Pala'wan lives in the southern part of the province and is of particular importance to the project. Presently, there are Pala'wans living near the project site. This group of Pala'wans resides in Kulantuod area near the limestone quarry.

The Pala'wan cluster near the limestone quarry is spread out in the lowlands and is more accessible, thus, making them more vulnerable to external influences and land ownership policies. This group now retains only traces of the traditional *Pala'wan* lifestyle and social organization. It is reported that several non-governmental organization community organizers have established strong authority over them.

Records from the National Commission on Indigenous Peoples (Abo-Abo) and the Provincial Office of the Department of Environment and Natural Resources (DENR) indicate that the areas delineated for the limestone quarry is not covered by any approved certificate of Ancestral Domain Claim or Ancestral Land Claim.

5.7. Social Issues

6.0. Environmental Impacts and Mitigating Measures

6.1. Land Resources

Acceptable impacts associated during quarry development, quarry operations and mineral processing

Sources of Impact:

- Quarry Out Area

The continued operation in the quarry site will change and bring inconsistency in the land-use and the original landform, slope and subsurface geomorphology in the project area. The original sloping and rugged terrain will be transformed into crater-like formations after the quarrying operations.

- **Haul Roads**

The Gotok limestone quarry was prepared/developed prior to the scheduled commercial operation of the HPP. The quarry development activities included the following:

- Road widening of approximately 1.5 kilometers of the existing municipal feeder road from the national highway to the quarry site.
- Backfilling of the above-mentioned 1.5-km road to raise it to an elevation high enough to prevent submergence during heavy rain.
- Construction of a 400-meter access road from the municipal feeder road to the quarry site to allow equipment to be brought to the quarry site.
- Initial clearing/devegetation of the Phase 1 quarry site to expose the limestone and prepare the same for the initial quarrying activity.

Access road construction had minimal impact on geologic processes and topography since part of the access road (barangay road) has already been existing and that the same traversed generally flat to undulating terrain.

The existing barangay road was unpaved and had a width of 6 meters. Cultivated lands adjoined the barangay road. This road was widened to 8 meters to accommodate dump trucks from the quarry site.

The impact of road construction on geologic processes is increased siltation. The opening of the haul road results in additional bare areas of about 0.4 hectares. The increase in impervious or compacted surface is not expected to drastically alter surface run-off and infiltration. The area that will be affected is very insignificant compared to the available potential infiltration area.

Road construction and removal of the forest cover to access the limestone beneath are also one of the activities wherein earth moving is done. Cogon grass and some fruit trees such as mango and guavas are affected.

- **Slopes**

Potential inducement landslides can happen in the area. Liquefaction occurs in seismically active areas that are underlain by thick, saturated deposits of unconsolidated sand and silt. Since Palawan is not seismically active and there are no thick, unconsolidated sand and silt deposits in the vicinity of the project site, the area is not prone to liquefaction and subsidence. However, landslide due to heavy rains and erosion might happen.

- **Caves/Sinkholes**

The widely distributed caves and sinkholes in the MPSA are evident in the distribution of topographic depressions. The limestone is limited in both vertical and horizontal extent and that the limestones are yet limitedly affected by dissolution and thus the development of sinkholes

is yet limited. To address the potential groundwater and other environmental degradation that may use these caves and sinkholes as pathways, the company deemed it best to avoid these karst features altogether, as can be seen in the proposed quarry development plan. Exclusion of the caves/sinkholes from cutting and quarrying activities as dictated by the terms and condition of the SEP clearance for the Gotok Limestone Project.

	Caves	Latitude	Longitude
1	Gray Cave	8°36'01.211 N	117°27'52.311 E
2	Cricket Cave	8°36'14.811 N	117°27'58.911 E
3	Sanang-sanang I Cave	8°36'15.111 N	117°28'01.311 E
4	Sanang-sanang II Cave	8°36'14.911 N	117°27'58.211 E
5	Lubao Cave	8°36'19.611 N	117°27'56.211 E
6	Maginhawa Cave	8°36'13.911 N	117°28'06.211 E
7	Inogon Cave	8°36'16.511 N	117°28'16.111 E

Table 17. List of caves within the MPSA

- **All Surface Mine Building and Other Structures**

The construction of these facilities has indeed altered the surface due to site clearing and stripping. Having been in operation for some time, construction sites have been initially stabilized and on-going restoration. Proper landscaping was already made surrounding the structures.

- **Access Road and other Infrastructures**

Similarly, the construction of these facilities has temporarily altered the surface due to site clearing and stripping and/or diggings. After some time of operation, the minor impacts have already been mitigated. Existing access roads and drainage canals are well maintained.

- **Stockpiles and Dumps**

The quarry operation, which includes ground stripping, made a significant alteration to the landscape. During the continued mining operations, it is expected that sediments from exposed and denuded surfaces will contribute to surface run-off and erosion, leading to possible siltation of nearby waterbodies. Stockpiled soil and other waste materials will also be susceptible to erosion during heavy rains.

- **Plant, including Derelict Equipment**

Major plant structures only include screening and crushing plant. These structures occupy only a small area component of the whole project site and in practically flat/level ground. As such, land form changes made

were minimal. The plant area has been fully stabilized with trees occupying every open areas and drainage canals provided.

Derelict are sold to second hand equipment buyers and/or scrap buyers. Undisposed machinery and parts are temporarily stored/piled at designated areas with perimeter fence.

- **Water supply and Storage, including Settling and Treatment Ponds**
Water usage is only for drinking purposes in the quarry site therefore no significant impacts are noted. Meanwhile, the crushing plant requires an amount of 1,044 m³ for its daily operation translating to 313,200 m³ yearly requirement. With this, the crushing plant will be operated at 24 hours a day and 300 days per year. The said volume of water will be sourced from water wells and Tagpisa siltation pond. In addition, RTNMC constructed a 1,200-m³ capacity settling pond to hold the waste water discharging from the washing at the plant. Clear water is recycled back to the plant.

- **Watercourse Crossing and Diversions**
Canals were enhanced following the natural water flow. Since the area is karstic, water does not pool for longer periods. Nevertheless, diversion canals within the quarry site were constructed for the following purposes:
 - To direct water to the siltation ponds;
 - To divert drainage from flowing to nearby areas;

These have altered slightly the topography with the presence of these canals. Its impacts are considered minimal since these structures' slopes have been partly stabilized and reforested. There is a possibility of the siltation of the drainage systems within the quarry area, along the hauling route and crushing plant. Siltation and sedimentation in the downstream area of the sites will be more pronounced during rains. The resulting transport of the sediment will lead to deposition of the materials downstream, along river banks and beds, and into the sea. The impact is significant and may occur if not properly mitigated.

- **Contaminated Land**
The continued operation in the quarry site will result to loss of topsoil in the project area. This impact is unavoidable and irreversible. The rain may carry the silt in the drainage system thereby affecting the fertility and productivity of the soil around the sites. Furthermore, land contamination may occur from potential leaks and spillages of oil and grease from the equipment use in the quarry.

Mitigating Measures

- **Progressive Rehabilitation**
RTNMC-Gotok Limestone Quarry Project religiously practice and adheres to the principle of progressive mine rehabilitation in all its re-vegetation efforts wherein the areas that have been declared mined-out are immediately rehabilitated and those areas that are under-stocked

are also similarly and progressively enriched using native plants/trees species.

- **Surface Preparation**

Progressive quarry rehabilitation takes place when the final quarry/pit limit of the benches is reached. Surface preparation starts by backfilling small, depressed areas or pits with materials sourced nearby. Waste materials within the same mined-out areas will be pushed into the depressions and then leveled-off to a more favorable land configuration using bulldozers. A 30-cm topsoil will be spread all over the area after backfilling and leveling. Adequate drainage system will be provided within the reclaimed land surface.

Backfill materials used are the mudstone and/or limestone contaminated with mudstone excavated in the quarry area

- **Rehabilitation Methods**

RTNMC-Gotok Limestone Quarry Project's mine rehabilitation strategy is very simple, as soon as an area has been declared mined-out, site preparation follows such as slope stabilization, re-contouring, and soil-matting. Once an area has been prepared, mine rehabilitation immediately commences by conducting activities such as lay-outing, staking, hole digging, application of compost/organic fertilizer, transport of seedlings and planting. After planting, regular plantation maintenance will be conducted through replacement/replanting of dead seedlings, watering, ring weeding/cultivation and fertilizer/pesticide application, as needed.

Slope stabilization of the mined-out portions of the quarry site has been initiated, to comply with and in adherence to the company's commitments on the practice of progressive mine rehabilitation. As of the first semester of 2021, a composite area of 4.51 hectares has been planted using a total of 4,874 assorted endemic and indigenous forest tree species. The former utilizes a combination of Large Planting Materials (averaging 2-4 meters in height) and a regular size planting material (at least 30cm in height) which was grown and maintained at Gotok Quarry Nursery established for the purpose. Meanwhile, some portions of the mined-out area are greened temporarily since disturbance is expected once the project expansion is initiated by 2022. Hence, some bare bench walls are planted with suitable grass/plant.



Figure 21. Mine Rehabilitation Photo

- **Final Landform Design**

Final landform design for mined-out areas will be designed to conform to the original surface configuration but contoured with an elevation relatively 15 masl. The quarry areas will be rehabilitated into forestlands, industrial tree plantation, aquaculture, and/or pastureland subject to discussions and agreement with the community and the LGU/s.

- **Vegetative Cover Restoration Methods**

As practiced by RTNMC, fast growing and heat tolerant pioneer species will be used for the revegetation activities. Field planting is normally implemented during the onset of rainy season after surface preparation. Distance between plants shall be maintained at 2 m interval.

Climax species can also be used in the revegetation activities. Planting shall start three (3) years after the pioneer/reforestation species have established. Consequently, the pioneer species have already developed the necessary cover for the growth and survival of shade- loving climax species. At the periphery of the rehabilitated areas, fruit bearing trees shall be planted to become source of food for some wildlife species thriving in the area including birds.

To ensure that there is constant and sufficient supply of endemic planting materials the following method is practiced:

- **Wildling Collection**

To ensure the endemism of species propagated in the nursery and planted on rehabilitation area, wildling collection is the method utilized for seedling production. Propagation using this method takes

around 2 to 3 months incurring lesser cost compared to conventional seedling propagation methods.

– Clonal Laboratory

Established in December 2020, the Clonal Laboratory Facility was set up to ensure that endemic species that are difficult to propagate by conventional means can still be produced and utilized in rehabilitation.

– Operation of Gotok Nursery

The satellite nursery was established at Gotok Quarry in 2018, for the purpose of producing good and quality seedlings to meet the demand for healthy and vigorous planting materials for the company's rehabilitation and reforestation projects. It covers an area of 1,293.72 sq.m. and can produce at least 10,000 native species of plants and trees. It is fitted with necessary nursery facilities like processing/potting shed, seedbeds/potbeds, hardening off area and water tanks. Proper labelling of seedlings including its common and scientific names is being maintained and monthly seedling inventory is practiced. The area is also delineated with perimeter fence and berms to protect the facility from vandals and stray animals



Figure 22. Photo of Gotok Quarry Satellite Nursery

The breakdown of forest tree species used and propagated at the nursery are as follows:

SPECIES		
Alahan	Bolon	Malalangka
Alim	Bolong-eta	Malarambutan
Amugis	Bunog	Mali-mali

Angongori	Dao	Malugai
Antipolo /Tipolo	Dita-dita	Matang-hipon
Arit-arit	Duguan	Mulawin
Bakawan gubat	Dulo	Narra
Baker	Duro Manok	Nato pulahan
Balete	Hawili	Putian
Balinhasai	Kalobkob	Rain Tree
Balitbitan	Kamagong	Sahing
Banaba	Kayugayo	Sakat
Bangkal	Kesinai	Talisay
Banilad	Kupang	Talisay Gubat
Baro/Bogo	Lingo-lingo	Taluto
Basa/B.Gubat	Litsea Sp.	Tan-ag
Batino	Lunas	Tangisang bayawak
Bayok	Lupa	Tibig
Binunga	Magabuyo	Tindalo
Bobog	Malaabokado	Tinikan

Table 18. List of seedlings propagated in the nursery

- **Cave Buffer Zones**

The buffer zones are well established on the significant caves to the extent that the fragile environment of these caves is not affected by quarry operation. Caves, including their outlines, were carefully marked on RTNMC's site development maps including road networks in accessing the active quarry area (See Figure 06). Operations of heavy equipment near cave areas are regulated based on the marked buffer zone. Activities within the surface area of the cave like cutting of trees and other prohibited acts stated in Section 7 of the "National Caves and Cave Resources Management and Protection Act" are strictly implemented in the area.

- **Maintenance**

The newly rehabilitated areas will be monitored closely to ensure high survival rate of plant species. Grass cutting, watering during dry months, reapplication of fertilizer and fencing shall be conducted until the seedlings have grown. Dead seedlings shall be replaced to have a sufficient cover for the climax species.

RTNMC strictly employs the activities indicated in its Annual Environmental Protection and Enhancement Program (AEPEP).

6.2. Water Resource and Quality

Sources of Impact:

- Stockpiles (Waste Dumps/Soils and Ore)

In the production of limestone from the quarry, very limited fines are produced. During heavy rains, they are washed down the slope. The creeks draining the quarry, however, are ephemeral. It is expected that sediments from exposed and denuded surfaces will contribute to the surface run-off and erosion, leading to possible siltation of nearby waterbodies. Stockpiled soil and other waste materials will also be susceptible to erosion during heavy rains.

- Mine dewatering or pit drainage

Operation of the limestone quarry is expected to increase siltation and sedimentation in the area and the low-lying area not far from the quarry site. During the monsoon season, the disturbed earth in the road construction and the exposed hill will be susceptible to erosion. Sediments will settle in the low-lying areas and fill them up in the long run. Succession will convert this place from a wetland to a terrestrial ecosystem. The stagnant water will find its own level and flood other low-lying areas. This endless cycle is a natural event since the topography is rolling.

- Process Water

The crushing plant also uses water to wash off small particles from the crushed limestone. This process produces silted water with very fine materials and likewise consumes considerable amount of water and energy in its operation. The crushing plant produces 313,200 m³ of wastewater annually.

- Waste Disposal

The operations in the Gotok limestone quarry and crushing plant generate approximately 1,068 m³ of solid wastes consisting mainly of domestic and industrial wastes annually. These include canteen wastes, human wastes, used batteries, used drums, used oil and used oil filters. The solid waste management plan currently being implemented includes collection of domestic wastes, segregation into bio and non-biodegradable and disposal to GP-28. It is a mined-out pit with a holding capacity of 240,000 m³ which can fill-up within 20 years. Meanwhile, surface water contamination with oil and grease will likely occur from leaks and spillages.

Mitigating Measures:

- Sediments Control Dam

Two (2) silt collector sumps (SCS) were constructed at the quarry site to retain silt/sediment that may be produced during rains. These are located at the eastern and southern sides of the quarry area. The water quality of the nearby creeks will not experience any adverse impact since surface runoff from the quarry does not reach these creeks. The surface runoff is collected in the SCS and readily infiltrates into the ground. The Gotok Drainage Map is shown in Annex 5. The wastewater from the crushing area is directed to a settling pond. Overflow of the pond is discharged into the Rio Tuba River after it passes thru Upper Kinurong

and Lower Kinurong settling ponds. Rio Tuba River is the catch basin of both the industrial and domestic waste in the area.



Figure 23. Photo of silt containment pond information board



Figure 24. Photo of dredging activity

- **Freshwater/Groundwater**
The quarry activities will not involve the use of groundwater and will therefore not compete with any user of groundwater in the area. There are no wells in the vicinity of the quarry site. The water source of residents in the area is already supplied by the level II water system of RTNMC and CBNC. The project will also not compete with users of water from Ocayan and Iwahig rivers since both the quarry and crushing plant operations will not utilize the water from the said rivers.

6.3. Air Quality

Sources of Impact:

- **Dust from Quarry Activities**

The impact of quarrying operation on air quality is the increase in ambient concentrations of particulate matter (PM). This is the consequence of drilling, loading, and hauling operations. Particulate matter concentrations are due to dust re-suspension along access roads depend on the dryness of ground surface, frequency of vehicle passage and the size and speed of the hauling vehicles, windblown small particles from the crushing of limestone ore.

Quarrying also requires controlled blasting and earth movement. The quarry site and the vicinity will be impacted by dust. Adjacent areas with vegetative cover will be blanketed with a fine dust layer during the dry season. The dust will prevent the plants' capture of sunlight for photosynthesis. The dust particles will also block the plants' stomatal openings, thereby decreasing the exchange of gases crucial for its metabolism. Manifestations of physiological stress will be the dying back of tips and leaves resulting to stunted growth. Plants closest to the source of dust will be greatly affected.

Two air sampling stations were identified and maintained at the quarry site based on the nearest community area and wherein dust from the operations might be dispersed by wind. However, with the low elevation of the operation, of -10meters, dust is not expected to dispersed beyond the quarry area and its buffer zones except for the above-mentioned dust emanation from the access roads.

- **Dust from Crushing Area**

Dust emanates from crushing plant operation largely come from crusher feed hopper, jaw crusher, vibrating screens, conveyor belt system and product stockpile areas. The frequent passage of service vehicles and dump trucks in the area produces dust particulates particularly during peak hours (between 8 AM to 5 PM) of hauling limestone materials to the feeder area of the crushing plant.

Moreover, GPI is adjoining the newly installed and operational limestone crushing plant of RTNMC-Gotok Limestone Quarry Project. The cumulative effect of airborne dust of the two (2) plants may have significant effect on the ambient air quality in the area particularly during moderate to strong wind condition which prevails during southwest and northeast monsoon.

The operation of the crushing plant of the project will have an impact on air quality primarily through elevated levels of dust and to a minor extent, SO_x and NO_x where heavy equipment is being used, along access routes and haul roads and within the vicinity of the crushing plant.

- **Dust from Vehicle Movement**

Transport activities within and around the quarry area will cause the level of dust to increase. Residents along the hauling route of the dump trucks will be directly affected by the dust generated from the vehicles that move within the quarry and transport of limestones to the crushing plant.

The nearby barangay of Ocayan from where a stretch of the haulage road is located is considered also as impact area for the current operation, about five (5) dump trucks per hour traverse the hauling route which might increase anytime soon.

- Carbon Emission

RTNMC submitted the initial GHG sequestration capacity for the quarry operation. Please see Annex 4.

Mitigating Measures:

- Dust Suppression (Quarry Area)
 - Progressive rehabilitation and maintenance of the vegetation along the buffer zones.
 - Maintenance of vegetative cover along peripheries of the quarry area.
 - Water spraying along hauling road and access roads is regularly conducted wherein local residents are contracted for this activity as source of their income.
 - Two (2) street sweepers were stationed in the first one hundred meeting access highway road from the quarry wherein road water spraying is also conducted.
 - Regular road maintenance is also being conducted.
 - Lastly, implement a lower drop height during limestone loading and speed limit of service vehicles, hauling trucks and other heavy equipment.
 - Covering hauling trucks with tarpaulin or canvas to prevent the unwanted discharge of materials and dusts when plying from quarry to crushing and to delivery to CBNC & GPI.
- Dust Suppression (Crushing Plant Area)
 - Mist sprayer along the product discharge section of the conveyor belt system and the periphery of the road;
 - Tarpaulin cover for open spaces and stockpiles;
 - Cover for conveyor belt system to prevent prevailing wind or momentary gustiness from blowing dust particles from the crushed limestone;
 - Installation of windbreakers in the quarry area and the vicinity of the crushing plant to prevent the proliferation of dust particles during dry and windy days.
 - Regular watering at the peripheries and immediate vicinity of the crushing plant to sustainably suppress dust;
 - Continuous planting and maintenance of green barriers to serve as dust curtain; and
 - Lastly, implement a lower drop height during limestone loading and speed limit of service vehicles, hauling trucks and other heavy equipment.



Figure 25. Mist Sprayer

- **Carbon Emission Reduction and Sequestration**

Progressive rehabilitation and maintenance of the vegetation along the buffer zones shall be implemented to aide in the sequestration of the increased GHG emissions from the increased number of vehicles and heavy equipment. Aside from this, regular maintenance of all heavy equipment shall be practiced.

6.4. Noise and Vibration

Sources of Impact:

- **Road Vehicles, including Off-Highway Trucks**

Transport activities within and around the quarry area occurs thus the level of noise is expected to increase. Residents along the hauling route of the dump trucks will be directly affected by the noise generated from the vehicles that transport limestones from the quarry to the crushing plant.

- **Blasting Activity**

Within the quarry area, one of the sources of noise is the blasting operation, which is performed using dynamites and ANFO (Ammonium nitrate/Fuel oil) and the hole drilling operation. Blasting activities is performed once a week while hole drilling is performed in non-active benches in preparation for the next blasting operation.

- **Crushing Plant**

Crushing operation is likewise expected to raise the noise level. Noise generation from dump trucks in the hauling route of the crushing plant might and delivery area may be experienced.

- **Earth Moving Equipment**

Most of the sources of noise are the heavy equipment such as air track drills, bulldozers, payloaders, generators, compressors, hauling trucks

operating at quarry. The noise levels emitted by this equipment may be high within work areas but are expected to be within the Department of Labor and Employment's Occupational Health and Safety Standards in the residential areas outside project boundaries. Within work areas, workers exposed to high levels of noise are provided with ear muffs and plugs.

Mitigating Measures:

- **Restriction of Hours of Activity**

Job rotation of personnel is implemented wherein personnel is tasked to perform duties at the point source equipment for maximum of four (4) hours and then then another four (4) hours doing activities where noise level is permissible.

Likewise, vehicle plying the haulage route has proper scheduling of equipment operation to avoid disturbance to the nearby communities. Meanwhile, the blasting activity has specific schedule.

- **Construction of Sound Barriers**

The maintenance of existing vegetation near the quarry area is being carried out to serve as noise barrier while planting and rehabilitation works are continuous. Meanwhile, thick rubbers were installed in the conveyors to minimize noise in the limestone crushing.

- **Others**

- Provision of Personnel Protective Equipment (PPE) - All personnel assigned at the crushing plant are prescribed and issued to wear appropriate PPE such as ear muff model: 2000H with Noise Reduction Rating of 21 decibel per specification when used as directed.
- Strict adherence on the Equipment Operation and Maintenance Procedures to ensure all equipment are in good running condition thus eliminating the possibility of contributory noise cause from worn parts and mis-operation.
- Proper monitoring of noise level especially during blasting activity around the quarry area and nearby communities.

6.5. Biodiversity Resource/Information

6.5.1. Disturbance / Loss of Biodiversity

Sources of Impact:

The impacts of the Gotok Limestone Quarry to the flora biodiversity will be the removal and loss of habitat, loss of important species, and threat to the abundance, frequency and distribution of important local species.

The felling of trees and the scraping off of ground vegetation will result to the destruction of habitats including roosting and feeding sites of terrestrial fauna, both vertebrates and invertebrates. The area with MPSA for the Gotok Limestone Quarry harbors mostly residents and endemic species of birds, mammals and herps. Removing the trees and the entire vegetation will mean the destruction of roosting and feeding sites which will eventually result to the gradual loss and/or disappearance of endemic species.

The removal of the surface soil and original vegetation will most likely cause alien and invasive species of plants and animals to proliferate. Hence, during abandonment, these organisms will prevail and it is not certain if and when original flora and fauna will return.

The loss of roosting, nesting and feeding sites brought about by the cutting of trees will lead to the decrease of the number of species and population of wild fauna specially those which are forest and tree dependents. Volant mammals will not be affected if the hill where Maginhawa and Inugon Caves are located will not be touched or disturbed. The creek at the western side (this is where the water flows underground), will eventually be covered with earth and soil because of erosion caused by quarrying. This will affect the habitats of amphibians (mostly frogs) in the area. The presence of *Hoplobatrachus rugulosus* in the pond in the farm beside the hill where the Maginhawa Cave poses danger to the endemic and indigenous species present in the area.

Also, once the forest cover is removed, a limited change in environmental conditions, i.e. microclimate, will occur. A localized increased exposure to solar radiation, a decrease in relative humidity, and disruption of the nutrient cycling are some of the impacts. Species sensitive to these changes will eventually die. A beneficial impact of the activity, however, is the decrease in population in mosquitoes. Removing the forest cover will expose their breeding places and thus dry them up. There will be an ensuing disruption of the mosquito's biological cycle. The adults, on the other hand, will be exposed to predators, such as insectivorous birds.

Mitigating Measures:

- Limit quarry development to what is necessary;
- Restore the quarry to forest condition or to another post-mining use (e.g. agro-forestry) that may be desired by the landowners;
- Conduct of progressive rehabilitation consistent with the rehabilitation standards;
- Balling and transplanting of important plant species of appropriate size. When the balled plants recovered in the nursery, they shall be used and transplanted in the buffer zones of the quarry area as well as in the reforestation areas.
- Propagation of ecologically important trees species that were found in the project area to promote biodiversity conservation.

6.5.2. Change in Landscape / View

Sources of Impact:

Once developed, the limestone quarry will stand out. The white to creamy color of the fresh limestone cuts will stand out against the dark background of dense vegetation. However, due to its distance from the provincial road and the absence of vantage points, the limestone quarry is not expected to impair scenic view value.

The quarry will only be visible to the public along the barangay road. From this point, it is easy to establish view corridors through the use of a buffer consisting of trees with lush foliage. As it is now, dense banana growth along the road shields the view from the barangay road.

Mitigating Measures:

Progressive rehabilitation approach will restore the quarry to forest condition or to another post-mining use (e.g. agro-forestry). The access road to the limestone quarry area will be planted with fast-growing indigenous tree species and shrubs to minimize the visual impact of the quarry.

6.6. Heritage and Cultural Values

Sources of Impact:

- Disturbance of historical, archaeological and cultural sites / resources

Various ethnic groups are found in Palawan. The major indigenous peoples (IPs) groups of Palawan include the Tagbanuas, Batak and Pala'wan.

The Pala'wan lives in the southern part of the province and is of particular importance to the project. Presently, there are Pala'wans living near the project site. This group of Pala'wans resides in Kulantuod area near the limestone quarry.

The Pala'wan cluster near the limestone quarry is spread out in the lowlands and is more accessible, thus, making them more vulnerable to external influences and land ownership policies. This group now retains only traces of the traditional *Pala'wan* lifestyle and social organization. It is reported that several non-governmental organization community organizers have established strong authority over them.

Records from the National Commission on Indigenous Peoples (Abo-Abo) and the Provincial Office of the Department of Environment and Natural Resources (DENR) indicate that the areas delineated for the limestone quarry is not covered by any approved certificate of Ancestral Domain Claim or Ancestral Land Claim.

- **Impacts on Potential Archaeological Sites**

With respect to archaeology, a detailed archaeological study has been done in the quarry site and immediate surroundings. Per the National Museum archaeologists, there are no archaeological resources in the quarry site.

An archaeological impact assessment of the limestone quarry was conducted in May 2002. The report of this assessment was used as the basis by the National Museum to certify that the Gotok limestone quarry area is devoid of archaeological artifacts

Mitigating Measures:

RTNMC continues to adopt the policy of respecting the IPs' customs and traditions. The project does not pose incursion into ancestral domains. Several Philippine legislations recognize the rights of IPs. These include the following:

- Republic Act (RA) No. 6657 or the Comprehensive Agrarian Reform Program (CARP)
- RA No. 7568 or the National Integrated Protected Areas System (NIPAS) Act
- DENR Administrative Order No. 2, Series of 1993
- Indigenous Peoples Rights Act (IPRA) of 1997

In addition, the Philippines is signatory to the International Labor Organization Convention No. 169 of 1989 concerning indigenous and tribal peoples in independent countries. The Convention states that the indigenous peoples concerned shall have the right to decide for their own priorities on the process of development as it affects their lives, beliefs, institutions and spiritual well-being, and on the lands they occupy or otherwise use, and to exercise control, to the extent possible, over their own economic, social and cultural development.

Finally, the issue on IPs and ancestral domains does not pertain to absolute or total exclusion of IP territory from development projects including industrial initiatives.

The issue is the recognition of IP rights and their ancestral territories. It is also about properly consulting potentially affected IP groups, seeking their prior and informed consent about the use of their territory and developing a mutually acceptable mechanism for equitable sharing of the benefits derived from the land and resources.

6.7. Social Issues

- **Social Development and Management Program**

The implementation of the Social Development and Management Program (SDMP) for Gotok Limestone Project began in 2005, at the time it was still incorporated in the company's Nickel Project. On 2018 SDMP implementation

for the nickel and limestone project was separated, to distinguish the accomplishment of the projects from each other.

Programs and projects under SDMP aims to create self-reliant and sustainable communities after the mine. With focus on the areas of concern enumerated below:

- Development of Host and Neighboring Communities
- Development of Mining Technology and Geosciences
- Information, Education and Communication

- Development of Host and Neighboring Communities

Goals: We aim to create significant 5% Social and Economic Progress in Partner Communities by targeting the following within the impact area after five years:

- Increase access to sufficient electric source
- Improve/increase income by 5%
- Improve self-sufficiency

Strategies:

- Embark Household Electrification Program
- Ensure delivery of quality education
- Active social and economic enterprise
- Stronger community infrastructures
- Capacity building and developing human resources
- Support to preservation of culture

- Development of Mining Technology and Geosciences

Goal: The primary goal of the development of mining technology and geosciences is to find, create or formulate new ways or techniques using geological materials or mining engineering principles to alleviate the quality of life of the host and neighboring communities of Gotok Project.

Objectives: The main objectives of the development of mining technology and geosciences is to conduct research and development projects using geological materials or mining engineering principles to achieve our ultimate goal: to improve the lives of our constituents while contributing to the advancement of mining engineering and geology.

Strategies: The Community Relations Office of Rio Tuba Nickel Mining Corporation will employ a multi-aspect approach for the Development of Mining Technology and Geosciences project. The company's employees have background in agriculture and geology which could greatly help in the studies.

- Information, Education and Communication

Goal: Our IEC will serve as an important tool in SDMP promotion for creating supportive environments and strengthening community action, in addition to playing an important role in changing behavior. The IEC intends to intensify awareness on quarry operations alongside RTNMC safety and rehabilitation programs.

Objective: Objectives on IEC were set through multiple approaches and selection of appropriate channels and media as defined/detailed in the campaign program to attain the following:

- Improved awareness
- Branding and promotion
- Advocacy
- Culture Preservation

Strategies:

- Conduct of intensive IEC
- Support to local and national events relative to culture preservation

*** For further information regarding the Annual Social Development and Management Program, please refer to the submitted ASDMP2022 to MGB-MIMAROPA

7.0. Research Proposals at the Mine

I. Title: Development of Literature Related to Mineral Development

II. Introduction

As a highly mineralized nation, the availability of literature based on local studies and existing mineral development will highly benefit the education of students studying programs related to the industry as well as professionals working in Philippine mineral development.

III. Goal and Objectives

To produce educational materials for students studying programs related to mineral development

IV. Scope and Limitation

The study will be limited to the areas of development and studies conducted/participated by the research team.

V. Timeline

	Jan-Jun	July-Sept	Oct-Dec
Preparation of contract			
Preparation of Logistics			
Publishing of materials			

VI. Budget

Schedule	Amount
Initial Payment	500,000.00
Final Payment	850,000.00
Total:	1,350,000.00

8.0. Approach and Scope of Environmental Monitoring Program

8.1. Significant Impacts

All identified environmental pollution/degradation to include, among others, the following shall be monitored:

- Deforestation/Devegetation
- Land Disturbance
- Soil Erosion
- Siltation
- Water Quality Degradation
- Air Quality Degradation

8.2. Parameter to be monitored and standards to be used

The list of parameters and standards maintained is enumerated on Table 19.

Activity	Parameter	Standard	Locations	Reference
Water Quality Monitoring	Potential of Hydrogen (pH)	6.5-9.0	Gotok Spring Oning Spring	DAO 2016-08 Criteria for Class C Waters
	Total Suspended Solids (TSS)	80	Gotok Spring Oning Spring	
Air Quality Monitoring	Total Suspended Particulates (TSP)	300	South West and Southeast of Gotok Quarry	TSP DENR Standard, (µG/Ncm)
Noise Level Monitoring	Morning (5am-9am)	50 dB	Southeast and; Southeast of Gotok Quarry	Section 78, NPCC Rules and Regulation (Category of Area: Class A)
	Daytime (9am-6pm)	55 dB	Southeast and; Southeast of Gotok Quarry	
	Evening(6pm-10pm)	50 dB	Southeast and; Southeast of Gotok Quarry	
	Night Time(10pm-5am)	45 dB	Southeast and; Southeast of Gotok Quarry	

Table 19. List of Parameters Monitored

8.3. Purpose of Monitoring

To ensure that the operation complies with relevant environmental standards, as mentioned on Table 19, monthly water quality and air quality monitoring activities is conducted.

Likewise, studies required under the Environmental Compliance Certificate is conducted as recommended by the certificate, in collaboration with third party organizations (i.e., academe, NGO, etc.,).

8.4. Monitoring Methods

Monitoring methods is enumerated on Table 20.

Activity	Monitoring Methods
Water Quality Monitoring	Water quality sampling is conducted via grab method and in-situ measurement using Horiba.
Air Quality Monitoring	Air Quality Monitoring is conducted using Staplex High Volume – Total Suspended Particulate Sampler
Noise Level Monitoring	Noise Level is measured using noise level meter

Table 20. List of Monitoring Methods

8.5. Monitoring Locations

Location of Monitoring station for water sampling is shown on Figure 16. Water quality sampling location map while stations for air and noise monitoring is shown on Figure 20. Sampling station map of air quality and noise level monitoring stations.

8.6. Monitoring Frequency

Air & Water Quality and Noise Level is conducted monthly while Biodiversity Assessment and similar studies is conducted periodically.

Table 21. Environmental Monitoring Program

Impacts	Mitigating Measures	Parameters Considered	Monitoring Methods	Monitoring Locations	Monitoring Frequency	Responsible Person	Remarks
Decrease in Biodiversity	Progressive rehabilitation and utilization of indigenous and/or endemic species	Diversity and species richness	Quadrat sampling for flora and transect monitoring for fauna	Gotok Quarry and Rehabilitation Area	Periodical	RTNMC MEPEO Officer/ PCO Third party consultant	
		Number of seedlings planted and survival rate of seedlings	Performance monitoring	Rehabilitation Areas	Quarterly	RTNMC MEPEO Officer/Forester	
		Percent accomplishment for target plantation area per annum	Conduct of survey		Semi- annual	EDS	
Decrease in topsoil	Stockpiling of topsoil for rehabilitation use	Volume of topsoil conserved and stability of stockpile	Record keeping of topsoil volume conserved	Gotok Quarry	Semi- annual	RTNMC MEPEO Officer/ PCO ESD MMT	
			Mapping of storage sites				
			Inspection of stockpiles to check for soil erosion				
Green House Gas Emissions	Progressive Rehabilitation and Mining Forest	Green House Gas	Determine contribution in terms of Greenhouse Gas Emission and rate	Rehabilitation Areas	Periodical	RTNMC MEPEO Officer/ PCO	

	Outside the MPSA		of deforestation/ reforestation				
Land Pollution	Regular emergency spill drill and provision of spill kits	Oil and grease	To determine the soil contamination with oil and grease Visual inspection of the washing areas and checking of records for vehicle maintenance	Crushing Plant and Gotok Quarry	Annual	Safety Department and PCS	
	Proper waste segregation, collection and disposal	Solid waste generated (quarry area, satellite office, crushing plant)	To determine the solid waste generation rate and recording & monitoring	Crushing Plant and Gotok Quarry	Weekly/Monthly	Crushing Plant and Quarry Operation Personnel, Camp Maintenance and PCS	
		Hazardous waste generated (quarry area, satellite office, crushing plant)	To determine the hazardous waste generation rate Inventory, storage, transport and treatment			Crushing Plant, Quarry Operation, Mechanical Department and PCS, MMT	
Air Quality	Road Watering and compliance to speed limit	PM-10, TSP (Ambient)	Ambient air monitoring for PM-10, TSP	Crushing Plant and Gotok Quarry	Monthly (Ambient)	RTNMC MEPEO Officer/ PCO	
	Installation of wind breakers, dust					MMT	

	curtain and mist spraying system						
Increase in noise level	Compliance to buffer zone area and controlled blasting operation	Sound level (db) (Ambient)	Ambient noise level monitoring	Crushing Plant and Gotok Quarry	Monthly (Ambient)	RTNMC MEPEO Officer/ PCO	
Water Pollution	Establishment and maintenance of appropriate drainage system Regular desilting of silt containment sumps (Manual and mechanical desilting)	pH and TSS (Ambient)	In-situ sampling, grab sampling and laboratory analysis Volume of desilted sediments from sediment control structures Visual inspection canals and sumps	Crushing Plant and Gotok Quarry	Monthly (Ambient)	RTNMC MEPEO Officer/ PCO MMT ESD Limestone Operation	

9.0. Total Cost of the AEPEP

RTNMC allocated an estimated PhP 18,806,035.52 for the environmental protection projects/activities in its Gotok limestone quarry. These cover haulage road watering and sweeping, road maintenance and concreting, silt collector sump maintenance, rehabilitation and reforestation new plantation and maintenance, and environmental monitoring activities. The summary and the matrix for the implementation of these projects/activities are presented in Table 21.

With a direct mining cost of PhP 111, 818, 000.00, the percentage of the total environmental-related cost to the total direct mining cost is estimated at 17%.

LIMESTONE OPERATIONS	PhP
Dump Truck	32,778,383
Wheel Excavator	8,568,958
Wheel Loader	20,271,418
Bulldozer	5,213,286
Limestone Crushing Plant	38,887,304
Track Excavator	6,099,000
TOTAL LIMESTONE	111,818,349

Table 21. Estimated Direct Mining Cost

10.0. Name and Signature of Applicant

MA. CHRISTINNE ELOISA Q. BLANCO

Pollution Control Officer (PCO)

Accreditation No.	: 2019-RIVB-02870
Date Issued	: 21 November 2019
Place Issued	: DENR-EMB MIMAROPA
TIN	: 329-231-528-000

Conform by:

RONELBERT A. SUGUITAN

OIC-Resident Mine Manager (RMM)

Mining Engineer

License No.	: 0002534
PTR No.	: 1001758
Date Issued	: January 10, 2022
Place Issued	: Bataraza, Palawan
TIN	: 177-783-495

Noted by:

MR. MARTIN ANTONIO G. ZAMORA

President

Rio Tuba Nickel Mining Corporation

11.0. Plan(s)/Map(s) of the Proposed Operations

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Annex 01. AEPEP Matrix

RTNMC's LIMESTONE QUARRY PROJECT									
2022 Annual Environmental Protection and Enhancement Program (AEPEP)									
2022 AEPEP Activities		Unit of Work Measure (UWM)	Annual Physical / Financial Target	Quarterly Physical / Financial Target				REMARKS	Location
		Unit Cost		1stQ	2ndQ	3rdQ	4thQ		
1.0 Land Resource									
1.1	Progressive Rehabilitation: Backfilling and Reforestation of Mined-Out Area	Area backfilled and reforested (hectares)	0.61	-	0.61	-	-	Rehabilitation and Reforestation; Species Planted is provided on the seedling inventory;	Gotok Quarry
		No. of seedlings planted	1,525	-	1,525	-	-		
			611,258.02	611,258.02	-	-	-		
1.2	Progressive Rehabilitation: Maintenace and Protection	No. of Patrol Works Conducted	12	3	3	3	3	Fertilizer Application and plantation maintenance (brushing, weeding and replanting); please note that only recently rehabilitated areas (1-3 years) will likely need replanting	Gotok Quarry
		Area covered (hectares)	4.4	1.1	1.1	1.1	1.1		
		No. of seedlings replanted	20	5	5	5	5		
			604,484.52	356,142.24	82,949.75	81,635.26	83,757.26		
1.3	Mining Forest Outside of MPSA: Community Partnership with Barangay Sandoval	Hectares	2	-	-	2	-	Community Partnership Barangay Sandoval; Forest Trees will be planted on the area	Barangay Sandoval: Watershed Management
		No. of seedlings planted	5,000	-	-	5000	-		
			50,000.00	-	50,000.00	-	-		
1.4	Mining Forest Outside of MPSA: Community Partnership with Community Cooperative	No of cooperative supported	1	1	1	1	1	One Project Gotok-Kulantuod Highlanders Multi-Purpose Cooperative	Sitio Kulantuod, Barangay Iwahig
		Hectares	2	2	2	2	2		
		No of programs supported	8	2	2	2	2		
			2,987,934.00	746,983.50	746,983.50	746,983.50	746,983.50		
1.5	Nursery Operation	No of nursery maintained	1	1	1	1	1	Please note that the budget on the first quarter will be used to purchase materials for seedling production (polybags, fertilizer, etc.) and actual production will start on the second quarter.	Gotok Quarry
		No. of seedlings and species produced	1,525	-	508	508	508		
			100,617.00	100,617.00	-	-	-		
1.6	Repair and Maintenance of Environmental Structures	No. of maintenance activities conducted	4	1	1	1	1	The budget will got to the purchase of materials for maintenance activities. At least one maintenance activity will be conducted per quarter	Gotok Quarry
			60,109.00	60,109.00	-	-	-		
2.0 Water Resource and Quality									
2.1	Maintenance of SP/SCSumps	No. of sumps maintained	3	3	3	3	3	Please note that amount of silt retrieved varies depending on the season.	Limestone Crushing Plant
		volume desilted (cu.m.)	6000	1500	1500	1500	1500		
			4,582,973.59	1,145,743.40	1,145,743.40	1,145,743.40	1,145,743.40		
2.2	Maintenance of Canals	No. of canals maintained	3	3	3	3	3	Please note that the volume of silt retrieved from the canal and sump of is combined.	Plant Site 3 Canal (Assay and Warehouse Canal) and Old Mechanical Canal
		length maintained (m.)	155.31	155.31	155.31	155.31	155.31		
		volume desilted (cu.m.)							
			2,784,286.64	696,071.66	696,071.66	696,071.66	696,071.66		

2.3	Water Quality Monitoring	No of monitoring activities conducted	12	3	3	3	3	Monthly Water Quality Monitoring	Station 14 - Oning Spring and Station 15 - Gotok Underground Tunnel
		no. of sampling stations	2	2	2	2	2		
		no. of parameters analyzed	2	2	2	2	2		
			62,000.00	15,500.00	15,500.00	15,500.00	15,500.00		
2.4	Solid Waste Management	No of monitoring activities conducted	12	3	3	3	3	Clean and Green Competition and Monthly Inspection (Provision of Waste Bins)	Limestone Crushing Plant and Gotok Quarry
		volume of solid wastes produced (kgs.)	480	120	120	120	120		
			114,685.00	114,685.00	-	-	-		
2.5	Hazardous Waste Management	No of waste hauling conducted	1	1	-	-	-	Average generation per quarter	Limestone Crushing Plant and Gotok Quarry
		volume of hazardous wastes produced (kgs.)	16	4	4	4	4		
			51,600.00	51,600.00	-	-	-		
2.6	Maintenance of Environmental Signages	No of signages maintained	3	3	3	3	3		Limestone Quarry and Crushing Plant
			10,000.00	10,000.00	-	-	-		
3.0 Air Quality									
3.1	Dust Control: Road Watering Activity (Haulage Road)	Number of carts maintained	3	3	3	3	3	Road watering on haulage roads is contracted to the community	Haulage Road (Municipal Road)
		Distance covered (km.)	1.5	1.5	1.5	1.5	1.5		
		cu.m of water used	5400	1500	1500	1200	1200		
			805,200.00	222,650.00	198,250.00	192,150.00	192,150.00		
3.2	Dust Control: Road Watering Activity (Quarry Road)	Distance covered (km.)	0.15	0.15	0.15	0.15	0.15	Quarry Road Watering is contracted to equipment provider	Quarry Road
		No. of trips	283	77	78	64	64		
			748,800.00	233,600.00	192,000.00	153,600.00	169,600.00		
3.3	Dust Control: Street Sweeping	Distance covered (km.)	0.25	0.25	0.25	0.25	0.25	Haulage Road Street Sweeping is contracted to the community	National Highway Junction
			164,640.00	40,880.00	39,200.00	43,680.00	40,880.00		
3.4	Air Quality Monitoring	No of monitoring activities conducted	12	3	3	3	3	Monthly Air Quality Monitoring; Budget will be utilized for purchase of materials (e.g., filters)	Southwest and Southeast of Gotok Quarry Area
		no. of monitoring stations	2	2	2	2	2		
		no. of parameters analyzed	1	1	1	1	1		
			158,200.00	158,200.00	-	-	-		
4.0 Noise and Vibration									
4.1	Noise and Vibration Level Monitoring	No. of monitoring activities conducted	12	3	3	3	3	Cost incurred will include labor cost, fuel cost, maintenance of vehicle used for monitoring and calibration of equipment.	Southwest and Southeast of Gotok Quarry Area
		no. of monitoring stations	2	2	2	2	2		
			447,395.75	160,317.10	82,036.57	118,964.60	86,077.48		

5.0 Conservation Values									
5.1	Cave Protection	No of caves protected	3	3	3	3	1	Installation of Signages	Gotok Quarry
		No. of activity reports prepared	12	3	3	3	3		
			50,000.00	50,000.00	-	-	-		
5.2	Mangrove Plantation	Number of mangrove area maintained	1	-	1	-	-	Maintenance of Mangrove Plantation in Barangay Iwahig	Barangay Iwahig
			50,000.00	-	50,000.00	-	-		
6.0 Environmental Studies									
6.1	Various Studies	No. of Studies	1	-	-	1	-	Development Literature Related to Mineral Development	Limestone MPSA
		No. of activity/progress report prepared	3	-	1	1	1		
			1,350,000.00	-	-	850,000.00	500,000.00		
7.0 Others									
7.1	General Monitoring	No of monitoring conducted	12	3	3	3	3	Conduct of regular monitoring activities	Limestone Crushing Plant and Gotok Quarry
			850,602.00	178,840.56	216,148.25	183,001.18	272,612.00		
7.2	Environmental Advocacy and Awareness	No. of activities conducted	4	1	1	1	1	Conduct of at least four (04) IEC Activities	Bataraza and online
			30,000.00	6,000.00	18,000.00	6,000.00	-		
7.3	Tranings	No. of training	1	-	1	-	-	DENRO Training	Bataraza, Palawan
			75,000.00	-	75,000.00	-	-		
7.4	PMIEA	No. of video entry prepared	1	-	-	1	-	Video Making for PMIEA (3rd Qtr); Validation (4th Qtr)	Limestone Crushing Plant and Gotok Quarry
		No. of validation activity conducted	1	-	-	-	1		
			60,000.00	-	-	55,000.00	5,000.00		
7.5	MMT Monitoring	No. of monitoring	4	1	1	1	1	4 MMT, 4 MRFC Meeting, SHES Audit, etc,	
7.6	MRFC Meetings	No. of meetings	4	1	1	1	1	4 MMT, 4 MRFC Meeting, SHES Audit, etc,	
			600,000.00	150,000.00	150,000.00	150,000.00	150,000.00		
7.7	Permitting and Compliances	No. of monitoring conducted	1	-	-	1	-	Third Party Environmental Monitoring in compliance to ECC Conditions (Research and Development); as per ECC Condition this study aims to periodically audit risks and hazards posed by the project.	Limestone Crushing Plant and Gotok Quarry
		No. of activity/progress report prepared	4	1	1	1	1		
			1,396,250.00	750,000	646,250	-	-		
GRAND TOTAL			18,806,035.52	5,859,197.48	4,404,133.14	4,438,329.60	4,104,375.31		



Republic of the Philippines
Department of Environment and Natural Resources
ENVIRONMENTAL MANAGEMENT BUREAU
DENR Compound, Visayas Avenue, Diliman Quezon City 1116
Telephone Nos.: (632) 927-1517, 928-3725; Fax No.: (632) 920-2258
Website: <http://www.emb.gov.ph>

JUN 13 2019

ECC-CO-1801-0001

Mr. Augusto C. Villaluna
Vice President for Operations
RIO TUBA NICKEL MINING CORPORATION
29th Floor NAC Tower, 32nd Street
Bonifacio Global City, Taguig City

Subject : **ENVIRONMENTAL COMPLIANCE CERTIFICATE**

Dear Mr. Villaluna:

This refers to your application for amendment of the Environmental Compliance Certificate (ECC) for the proposed **Gotok Limestone Quarry Project** located in Barangays Sandoval, Rio Tuba and Iwahig, Municipality of Bataraza, Province of Palawan.

After satisfying the requirements of the Presidential Decree No. 1586 and its implementing rules and regulations and upon recommendation of the Environmental Impact Assessment Review Committee (EIARC), the Department through EMB, has decided to grant an ECC to the above-mentioned project superseding the previously issued ECCs.

With the issuance of the ECC, you are expected to fully implement the measures presented in the Environmental Performance Report and Management Plan (EPRMP) intended to protect and mitigate the project's adverse impacts on community health, welfare and the environment. Likewise, environmental considerations shall be incorporated in all phases and aspects of the project.

This Certificate does not create any right nor shall be used as an authorization to implement the project, you may proceed with the implementation only after securing all the necessary and relevant permits from other pertinent Government Agencies. This Office shall be monitoring the project periodically to ensure strict compliance with the stipulations cited in the attached ECC.

Please be guided accordingly.

Very truly yours,

By the Authority of the Secretary:

ENGR. METODIO U. TURBELLA
Director



cc: EMB MIMAROPA
MGB Central Office
DENR MIMAROPA
MGB MIMAROPA

BMB
FMB
DOLE-BWC MIMAROPA
DOH MIMAROPA

NCIP
PCSD
LGU – Province of Palawan
LGU – Municipality of Bataraza



ENVIRONMENTAL COMPLIANCE CERTIFICATE
(Issued under Presidential Decree No. 1586)

ECC-CO-1801-0001

THIS IS TO CERTIFY THAT THE PROPONENT, **Rio Tuba Nickel Mining Corporation**, as represented by its Vice President for Operations, Mr. Augusto C. Villaluna, is granted this Environmental Compliance Certificate (ECC) for the **Gotok Limestone Quarry Project** located in Barangays Sandoval, Rio Tuba and Iwahig, Municipality of Bataraza, Province of Palawan by the Department of Environment and Natural Resources (DENR) through the Environmental Management Bureau (EMB).

SUBJECT to the conditions and restrictions set out herein labeled as Annexes A and B. This Certificate shall supersede the following ECCs:

1. ECC Ref. Code 0201-021-313 issued on 10 July 2002; and
2. ECC Ref. Code 0701-002-3721 issued on 01 February 2007.

This Certificate is issued with the following details:

PROJECT DESCRIPTION	
This Certificate shall cover the limestone quarry operation with an annual extraction rate of 725,000 WMT within the Mineral Production Sharing Agreement (MPSA) No. 213-2005-IVB and crushing operation within the MPSA No. 114-98-IV. The total project area to include its crushing facilities and common facilities with Coral Bay Nickel Corporation is 51.10 hectares bounded by the coordinates delineated in the EPRMP.	
The project shall have the following components:	
Quarry Operation	13 ha quarry area, quarry stockpile area, top soil stockpile area, sill collector sumps and access roads
Crushing Plant Operation	250 TPH crushing plant, crushed limestone shed, crusher feed area, crushed limestone stockpile area, access road, and water settling/recycling ponds
Haul road	6.80 km road connecting the quarry and crushing plant areas
Magazine Area	0.5 ha located within MPSA 114-98-IV

This Certificate is issued in compliance with the requirements of Presidential Decree No. 1586, and its Implementing Rules and Regulations. Non-compliance with any of the provisions of this Certificate shall be a sufficient cause for its

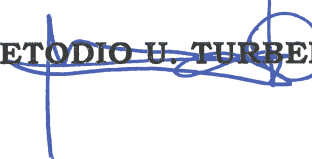
cancellation and/or imposition of a fine in an amount not to exceed Fifty Thousand Pesos (₱50,000.00) for every violation thereof without prejudice to imposition of fines and penalties under other environmental laws. The EMB, however, is not precluded from reevaluating and correcting any deficiencies or errors that may be found after issuance hereof.

Issued at DENR, Quezon City, Philippines, this _____.

Recommending Approval:

Approved by the Authority of the Secretary:


ENGR. ESPERANZA A. SAJUL
Chief, EIAM Division



ENGR. METODIO U. TURBELLA
Director



STATEMENT OF ACCOUNTABILITY

I, **Augusto C. Villaluna, Vice President for Operations**, representing **Rio Tuba Nickel Mining Corporation** with office address located in **29th Floor NAC Tower, 32nd Street, Bonifacio Global City, Taguig City**, take full responsibility in complying with all conditions in this Environmental Compliance Certificate (ECC).





Signature
TIN 110 - 703 - 740

Subscribed and sworn to before me this 9th of July, 2019, the above-named affiant taking oath presenting Pp.#: EC 57239365 issued on Oct. 17, 2015 at DFA Manila.

Notary Public

Doc. No. 316
Page No. 65
Book No. 1
Series of 2019


CHRISTINE JOANNE F. DE CLARO-NAVARRO
Appointment No. 95 (2018-2019)
Notary Public for and in the City of Taguig
Until December 31, 2019
Roll No. 55216
PTR No. A 4285551 / 16 January 2019 / Taguig City
IBP Life Member Roll No. 018905 / OR No. 032319 / 05 Feb 2018
MCLE Compliance No. VI-0019624, until 14 April 2022
28F NAC Tower, 32nd St., BGC, Taguig City

I. CONDITIONS

ENVIRONMENTAL MANAGEMENT

All commitments, appropriate mitigating/enhancement measures and monitoring requirements contained in the Environmental Performance Report and Management Plan (EPRMP), particularly in the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP), as approved by the EMB, shall be instituted to minimize any adverse impact of the Project to the environment throughout its implementation, including the following:

1. The proponent shall continue to observe appropriate quarrying and vegetative restoration practices, land use, soil and water management, which shall include but not limited to the following:
 - a. Proper stockpiling and disposal of materials generated from the quarry site, silt materials scooped-out from the settling ponds, and other solid waste in permanent, stabilized areas away from any water body and drainage systems, as well as maintained in safe and non-polluting conditions;
 - b. Strictly effect stabilization and erosion control of all side slopes of the roads and nearby gullies, creeks and rivers affecting impact areas, as well as those of siltation ponds;
 - c. Use the recovered topsoil for re-soiling or as soil cover on waste dumps and other disturbed areas for rehabilitation and revegetation. Temporary stockpiles shall be properly maintained and managed; and
 - d. Provision of necessary storm drainage and diversion canals, culverts, and other flood control measures to adequately receive and channel the silt-laden runoff away from natural receiving bodies of water.
2. Continue implementation of an effective Information, Education and Communication (IEC) Program to inform and educate all stakeholders, especially its contractors, workers, and local residents about the following:
 - a. Mitigating measures embodied in its EPRMP, the conditions stipulated in this Certificate and the environmental and human safety features of the project for greater awareness, understanding and sustained acceptance of the project;
 - b. Disaster risk reduction management measures and climate change related issues/concerns; and
 - c. Schedule of blasting operations and safety protocols.

Submit a report of IEC implementation to the EMB Central Office and EMB MIMAROPA as part of the semi-annual Compliance Monitoring Report (CMR);

3. Continue implementation of Social Development and Management Plan with indigenous people (IP) and non-IP as well as other existing agreements with the affected communities.

4. Maintain a reforestation and carbon sink program using endemic/ indigenous species to offset greenhouse gas (GHG) emissions of the project in line with the DENR's thrust for GHG emissions reduction programs and National Greening Program. The program shall be submitted to EMB Central Office and EMB MIMAROPA thirty (30) days upon receipt of this Certificate;
5. Maintain and further enhance the 40 meters wide buffer zone measured landward along the river system/ stream banks' high water line and along the entire periphery of the project;
6. Implementation of cave management program exclusive and limited to the project area which will include buffer zone maintenance and protection of caves from blasting activities;
7. Controlled blasting operation shall be implemented to minimize ground vibration, air blast and potentially dangerous flyrocks. Sirens shall be sounded before and after blasting to announce start and end of blasting activity. Blasting activity should be undertaken during day time only;

GENERAL CONDITIONS

8. The proponent shall comply with the environmental management and protection requirements of the pertinent provisions of the Philippine Mining Act of 1995 (RA No. 7942) and its Revised Implementing Rules and Regulations (DAO No. 2010-21), Harmonization of the Implementation of the Philippine Environmental Impact Statement System and the Philippine Mining Act of 1995 (DAO No. 2015-02) and Guidelines on Public Participation under the Philippine Environmental Impact Statement System (DAO No. 2017-15).
9. The proponent shall ensure that its contractors and sub-contractors strictly comply with the relevant conditions of this Certificate;
10. Submission of a CMR through EMB Central Office Online (CMR-Online) System together with report on SDMP;

II. RESTRICTIONS

11. No activities shall be undertaken other than what were stipulated in the final EPRMP.
12. In case of transfer of ownership of this project, these same conditions and restrictions shall apply and the transferee shall be required to secure an amendment of this ECC with the EMB Central Office within fifteen (15) days from the transfer of ownership.

O.R. No. : 8082545
 Date : 01/10/2018
 Processing Fee : Php 5,010.00

Environmental Compliance Certificate
 Gotok Limestone Quarry Project
 Rio Tuba Nickel Mining Corporation



PROJECT ASSESSMENT PLANNING TOOL

For the assistance of the Proponent and the Government agencies concerned in the management of the Project and for better coordination in mitigation of the impacts of the Project on its surrounding areas and the environment, the following have been recommended by the this Office to the parties and authorities concerned for appropriate action.

RECOMMENDATIONS TO CONCERNED GOVERNMENT AGENCIES	RESPONSIBLE AGENCY
1. Proponent shall comply with the following: a. Sanitation Code of the Philippines b. Building Code of the Philippines c. Ecological Solid Waste Management Act	LGUs concerned
2. Labor Code of the Philippines and occupational health and safety standards for mining activities.	DOLE-BWC/DENR-MGB
3. Tree cutting permit	DENR Regional Office
4. Water Rights Permit	NWRB
ENVIRONMENTAL PLANNING RECOMMENDATIONS	
5. Preference for employment shall be given to qualified local residents. Adequate public information on jobs available for local residents in the affected areas shall be provided;	
6. The proponent to conduct Biodiversity Monitoring System/Program as well as analysis in coordination with the DENR and PCSD;	
7. An independent third party shall be commissioned to undertake an environmental audit and submit a report every three (3) years. The result of third party environmental audit, including auditing of risks and hazards of the Project, shall be submitted to EMB Central Office; and	
8. A continuing study on the effects of the project on health of workers and affected residents shall be conducted every five (5) years. The results of the study shall be submitted to the Department of Health (DOH).	

For dissemination and proper action of the agencies concerned.


ENGR. ESPERANZA A. SAJUL
Chief, EIAM Division


ENGR. METODIO U. TURBELLA
Director



RIO TUBA NICKEL

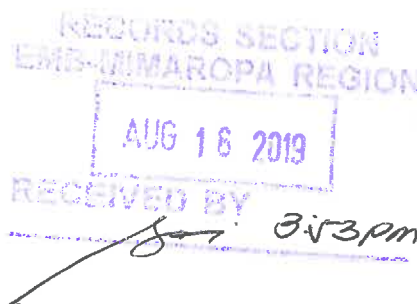


Management
System
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018
Certificate No.: 2000
ID: 3105080000



16 August 2019

DIRECTOR METODIO U. TURBELLA
Environmental Management Bureau - Central Office
North Avenue, Diliman, Quezon City



THRU: REGIONAL DIRECTOR MICHAEL DRAKE P. MATIAS
Environmental Management Bureau Region IV-B
1515 DENR Building, Roxas Boulevard
Ermita, Manila

Subject: Gotok Limestone Quarry Project – Initial GHG Emissions Reduction Assessment

Dear Director Turbella:

In compliance with the stipulations of Gotok Limestone Quarry Project ECC-CO-1801-0001 which states that the company should, *"Maintain a reforestation and carbon sink program using endemic/indigenous species to offset greenhouse gas (GHG) emissions for the project in line with DENR's thrust for GHG emissions reduction programs and National Greening Program. The program shall be submitted to EMB Central Office and EMB MIMAROPA thirty (30) days upon receipt of this certificate,"* submitting the attached Report for your consideration.

We hope that you find the documents in order.

Thank you and best regards.

Very truly yours,


CYNTHIA E. ROSERO
OIC, Resident Mine Manager

RECORDS SECTION
EMB-MIMAROPA REGION

AUG 16 2019

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RTN

INITIAL GHG EMISSIONS REDUCTION ASSESSMENT



GOTOK LIMESTONE QUARRY PROJECT

NAC
NICKEL ASIA CORP.

AUG 16 2019

RECEIVED BY

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**RONNIE G. FALOGME¹, JOVENCIO B. CATADMAN JR.¹, CRISBELLE F. UBOGAN²,
JAKE B. MAMUNGAY², MA. CHRISTINNE ELOISA Q. BLANCO²,
MARY KRIS V. PEDIGAN²**

¹*Rio Tuba Nickel Mining Corporation, Mine Environmental Protection and Enhancement Department- Mine Rehabilitation and Reforestation Unit*

²*Rio Tuba Nickel Mining Corporation, Mine Environmental Protection and Enhancement Department- Pollution Control Section*

Keywords: Rio Tuba Nickel Mining Corporation; carbon stock; carbon sequestration

Abbreviation: RTNMC - Rio Tuba Nickel Mining Corporation; GQPL – Gotok Limestone Quarry Project; ODW – total oven dry weight; TFW – total fresh weight; SFW – sample fresh weight; SODW – sample oven-dry weight; C – carbon; RA – Republic Act; IPCC – Intergovernmental Panel on Climate Change; MPSA – Mineral Production Sharing Agreement

ABSTRACT:

The activity was aimed to estimate above-and-below-ground carbon stock in the rehabilitation and forested areas within and outside of the Rio Tuba Nickel Mining Corporation-Gotok Limestone Quarry Project (MPSA 213-2005-IVB). A systematic sampling method was used to identify the sampling points using maps provided by the company's Engineering Department. A detailed algometric equation embedded in default species sequence card was used to estimate the biomass and carbon sequestered by trees, understorey and litter fall. The GLQP has a total area of 129.33 hectares divided as undisturbed within the MPSA (71.54 ha), undisturbed outside the MPSA (54.27 ha) and rehabilitation areas (3.52 ha). The results of the activity showed that the area has a carbon stock of 8,169.23 tons, while its sequestration capacity at any given time is 29,956.57 tons. Compared this with CY 2018 recorded CO₂ emission of 12,002.23 tons, the GLQP is a carbon sink.

SIGNIFICANCE

Global warming is now considered one of the most serious environmental problems brought about by excessive emissions and accumulations of greenhouse gases (GHG) in the atmosphere with carbon dioxide being the most detrimental. But mitigation can still be done from several sources. Terrestrial ecosystems like forests have the ability to sequester carbon in the atmosphere and use it for their growth and food production via the process of photosynthesis (Andulan et al., 2017).

Carbon sequestration is defined as the process of increasing the carbon content of a carbon pool other than the atmosphere (Intergovernmental Panel on Climate Change [IPCC], 2000). Projected climate change resulting from the increase in atmospheric carbon dioxide (CO₂) has given rise to various strategies designed to store additional carbon in terrestrial ecosystems (IPCC 1991, 2000).

Mining is an industry dependent on fossil fuels, which generate the energy needed to operate a mine. To combat these carbon emissions, some countries have enacted regulations requiring emission credits ("Molycorp, inc.," 2010).

In RTNMC, the potential of progressive rehabilitation for rebalancing the carbon equation have been recognized. The 100 percent compliance of the company in the implementation of environmental compliance certificate (ECC) condition/s especially in progressive reforestation program is a big factor in carbon reduction initiative.

16 August 2019

REGIONAL DIRECTOR ATTY. MICHAEL DRAKE P. MATIAS

Environmental Management Bureau Region IV-B
1515 DENR Building, Roxas Boulevard
Ermita, Manila

Subject: **Gotok Limestone Quarry Project – Initial GHG Emissions Reduction Assessment**

Dear Regional Director Matias:

In compliance with the stipulations of Gotok Limestone Quarry Project ECC-CO-1801-0001 which states that the company should, *“Maintain a reforestation and carbon sink program using endemic/indigenous species to offset greenhouse gas (GHG) emissions for the project in line with DENR’s thrust for GHG emissions reduction programs and National Greening Program. The program shall be submitted to EMB Central Office and EMB MIMAROPA thirty (30) days upon receipt of this certificate,”* submitting the attached Report for your consideration.

We hope that you find the documents in order.

Thank you and best regards.

Very truly yours,



CYNTHIA E. ROSERO
OIC, Resident Mine Manager



16 August 2019

DIRECTOR METODIO U. TURBELLA
Environmental Management Bureau - Central Office
North Avenue, Diliman, Quezon City

Subject: **Gotok Limestone Quarry Project – Initial GHG Emissions Reduction Assessment**


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Very truly yours,



CYNTHIA E. ROSERO
OIC, Resident Mine Manager

INITIAL GHG EMISSION REDUCTION ASSESSMENT

**RIO TUBA NICKEL MINING CORPORATION
GOTOK LIMESTONE QUARRY PROJECT**

**RONNIE G. FALOGME¹, JOVENCIO B. CATADMAN JR.¹, CRISBELLE F. UBOGAN²,
JAKE B. MAMUNGAY², MA. CHRISTINNE ELOISA Q. BLANCO²,
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Mining is an industry dependent on fossil fuels, which generate the energy needed to operate a mine. To combat these carbon emissions, some countries have enacted regulations requiring emission credits ("Molycorp, inc.," 2010).

In RTNMC, the potential of progressive rehabilitation for rebalancing the carbon equation have been recognized. The 100 percent compliance of the company in the implementation of environmental compliance certificate (ECC) condition/s especially in progressive reforestation program is a big factor in carbon reduction initiative.

Thus, the objective of this study is to estimate the carbon sequestration potential of Gotok Limestone Quarry Project Area of RTNMC to carry potential carbon offsetting.

GENERAL OBJECTIVES:

1. To quantify company greenhouse gas emission particularly coming from deforestation activities.
2. To determine the carbon stock and sink of the company.
3. To determine the net greenhouse gas emissions of the company.
4. To determine the eligible activities to offset the carbon balance of the company

REVIEW OF LITERATURE:

There is a worldwide concern over the evidences of global warming trends. CO₂ emissions are one of the primary contributors to the increase in greenhouses gases levels. The CO₂ concentration in atmosphere increase from 280 ppm at the beginning of industrial revolution to 368 ppm by the year 2000 and is projected to increase to 540 ppm by 2100 (Houghton et al. 1996). As per IPCC estimates, the predicted range of global warming by 2100 lies between 1.4 to 5.8°C (Houghton et al, 2001; Gera, et al, 2003).

According the United Nations Framework Convention on Climate Change report (1994), climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. The term sometimes is used to refer specifically to climate change caused by human activity, as opposed to changes in climate that may have resulted as part of Earth's natural processes. In this sense, especially in the context of environmental policy. The term climate change has become synonymous with anthropogenic global warming.

In the context of climate variation, anthropogenic factors are human activities which affect the climate. The scientific consensus on climate change is “that climate is changing and that these changes are in large part caused by human activities (NRC, 2010) and “it is largely irreversible” (Solomon et al. 2009).

The alarming context of its irreversibility with grave consequences into the weather patterns, biodiversity losses, disruptions into livelihood and economic processes, etc. all pointing to a doomsday scenario has led to a number of global initiatives such as the 1992 Earth Summit in Rio de Janeiro, Brazil; the 1997 Kyoto Protocol in Kyoto, Japan; and, the 2015 COP 21 in Paris, France.

Particularly, the Kyoto Protocol is an international treaty which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits State Parties to reduce greenhouse gas emissions, based on the premise that (a) global warming exists and (b) human-made CO₂ emissions have caused it (Wikipedia).

In 2015 COP 21 also known as the 2015 Paris Climate Conference and signed by 195 UN member countries, will, for the first time in over 20 years of UN negotiations, aim to achieve a legally binding and universal agreement on climate with the aim of keeping global warming below 2°C.

In the Philippines, which is an archipelagic country where agriculture plays a vital role in providing around 30% of the employment and 10% of the country's total gross domestic product in 2013.

Recent natural disasters significantly affected crops and livestock resulted to severe loss in agricultural production including human lives. Climate change worsens the economic situation and food security among others of the people. Hence, there is a critical and urgent need to develop climate-smart technologies available and accessible to the farmers through creation of an enabling institutional environment (NEDA, 2015).

The lack of baseline information about how businesses in the Philippines are responding to climate change prompted Pricewaterhouse Coopers Financial Advisors, Inc. to conduct the Climate Change and Sustainability Survey in 2011

Lasco, et al (2001) states that in a natural forest in Leyte, about 51% of carbon was stored in the biomass and 49% was found in the soil. Lugo and Brown, 1992 and Moura-Costa 1996) agreed the findings with the data reported in the literature where the soil was found to store at least 30% of total forest carbon or as much as the biomass. These values indicated the important role of the soils in storing carbon and the need to conserve soil organic matter as one possible strategy in enhancing carbon storage. Lasco et al (2001c) confirmed that soil organic matter can be conserved by applying soil management practices such as minimum tillage and adoption of soil erosion control measures.

Sales et al (2011) has reported that the total C storage capacity of a 15-year old *Gmelina arborea* plantation was estimated at 64MgC/ha while a 25-year-old *Swietenia macrophylla* plantation was estimated at 159 MgC/ha. The average sequestration rate of both species was 5 MgC/ha which is lower in the average rate of most tree plantation in the Philippines.

In a similar study, Tagupa et al (2010) has estimated the CO₂ sequestered and stored in both plantation forests and natural dipterocarp forests in JRMSU, Zamboanga Del Norte. Results revealed that standard – sized trees have better CO₂ sequestration potential than the sapling and pole – sized ones. These trees have the biggest merchantable height, trunk diameter and wood density. Among the species considered, *Gmelina* had the highest amount of CO₂ sequestered and stored in stem followed by *Mangium*, Rubber and Mahogany at standard size. In addition, regression analysis indicated that the rate of CO₂ sequestered and stored on trees are related to the growth characteristics as trunk diameter (DBH) and total height, but not with wood density. Moreover, the forest stands of JRMSU – Tampilisan Campus reservation has a total sequestration capacity of 88.17 kT CO₂.

MATERIALS AND METHODS:

The activity area is located at So. Gotok, Barangays Sandoval and Iwahig, Municipality of Bataraza, Province of Palawan. It is within the geographical coordinates 8°35'50" to 8°36'20" north latitude and 117°27'45" to 117°28'15" east longitude. (Refer to Annex 1 for project location map)

The activity was based on field data collection facilitated by physical measurements and data collection on field and gravimetrical data analysis at the laboratory. The data gathering and analysis activities were conducted on August 11-14.

A systematic sampling method was used for the identification of sampling plots in the area.

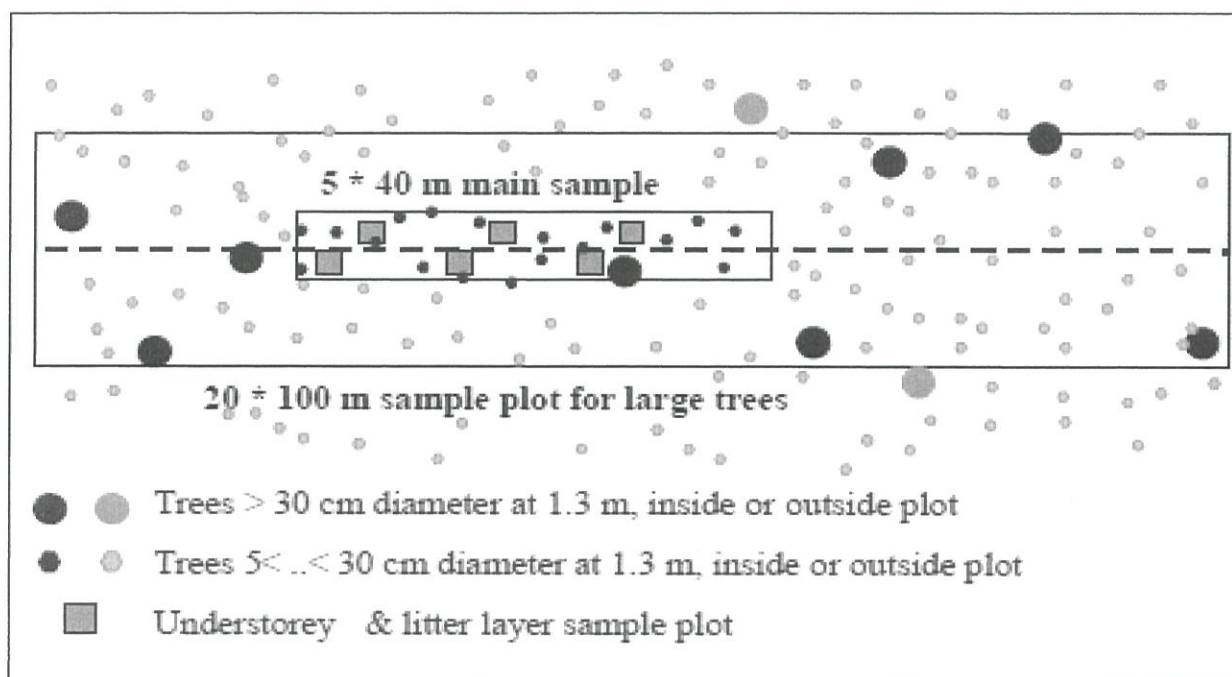


Figure 1. Sampling Plot Design

Plot Number	Plot Size	Type of Vegetation
1	20 x 100	Undisturbed
2	20 x 100	Undisturbed
3	5 x 40	Rehabilitation (2014)
4	5 x 40	Rehabilitation (2015)
5	5 x 40	Rehabilitation (2016)

Table 1. Plot Characteristics of the Samples Taken

Two (2) 20m x 100m plots was established and all trees measuring ≥ 30 cm DBH were recorded. A total of (8) quadrats for understory and (8) quadrats for litter collection were considered. Likewise, three (3) 5 x 40 plots was established and all trees within the sample plot measuring 5cm-30 cm DBH was recorded. A total of twelve (12) quadrats for understory and twelve (12) quadrats for litter cover were considered for this.

In sampling of understory, all vegetation < 5 cm DBH were harvested in four 1m x 1m quadrat. The litter fall that includes leaves, barks, twigs and other brown materials were also collected in the same quadrat of understory in two randomly chosen and opposite 0.5m x 0.5m quadrats.

Sample of understorey and litter were subjected to fresh weight measurement in the field using field balance. Field data such as fresh sample (gm^2) and composite sub sample (300g) for subsequent oven/sun drying were obtained. The average of the four samples for understorey and litter were computed for quadrat replicate.

**Biomass of understorey/
herbaceous**

$$\text{ODWt} = \text{TFW} - \frac{(\text{TFW} * (\text{SFW} - \text{SODW}))}{\text{SFW}}$$

where,
 ODW = total oven dry weight
 TFW = total fresh weight
 SFW = sample fresh weight
 SODW = sample oven-dry weight

Figure 3. Computation for Biomass of Understorey

Biomass of litter

$$\text{ODWt} = \text{TFW} - \frac{(\text{TFW} * (\text{SFW} - \text{SODW}))}{\text{SFW}}$$

where,
 ODW = total oven dry weight
 TFW = total fresh weight
 SFW = sample fresh weight
 SODW = sample oven-dry weight

Figure 3. Computation for Biomass of Litter

$$\text{C in tree biomass} = \text{Biomass} \times \% \text{Carbon in tree}$$

Figure 4. Computation of C in Tree Biomass

The total carbon for tree, understorey and litter were also computed and analyzed.

About 237 individuals of 35 species of trees were measured in the sampling plots of identified carbon reservoir areas. A detailed algometric equation embedded in default species sequence card was used to estimate the biomass, carbon stock and carbon sequestered by trees.

Table below shows sample computation to determine the estimated CO₂ sequestered and rate.

CO2 SEQ-SPECIES CARD						
Species Name	Sample Coefficient	Diameter (Inches)	Height (ft)	Inch ²	Green weight Above Around (lbs)	
Sample Species	0.28	10	25	100	700	
	Green weight above ground	Green weight (roots included)		The root system weighs about 20% as much as the above-ground weight of the tree. Therefore, to determine the total green weight of the tree, multiply the above-ground weight of the tree is 120%.		
	700	840		Determine the root system		
	Green weight (roots included)	Dry weight (lbs)		This is based on an extension publication from the University of Nebraska. This publication has a table with average weights for one cord of wood for different temperate tree species. Taking all species in the table into account, the average tree is 72.5% dry matter and 27.5% Moisture.		
	840	609		Determine the dry weight of the tree		
	Dry weight (lbs)	Carbon (lbs)		The average carbon content is generally 50% of the tree's total volume. Therefore, to determine the weight of carbon in the tree, multiply the dry weight of the tree by 50%.		
	609	304.5		Determine the weight of carbon in the tree		
	Carbon (lbs)	CO2 Sequestered (lbs)		<u>Atomic Weight of Carbon</u>	<u>Atomic Weight of Oxygen</u>	<u>Weight of CO2</u>
	304.5	1115.3835		12.001115	15.9994	43.9999
	CO2 Sequestered (lbs)	Rate of CO2 Sequestered lbs per year		Therefore, to determine the weight of carbon dioxide sequestered in the tree, multiply the weight of carbon in the tree by: 3.6663		
	1115.3835	111.53835		Determine the weight of carbon dioxide sequestered in the tree		
Source https://www.broward.org/NaturalResources/ClimateChange/Documents/Calculating%20CO2%20Sequestration%20by%20Trees.pdf						

Table 1. CO₂ Computation Sequence Card

RESULTS AND DISCUSSION

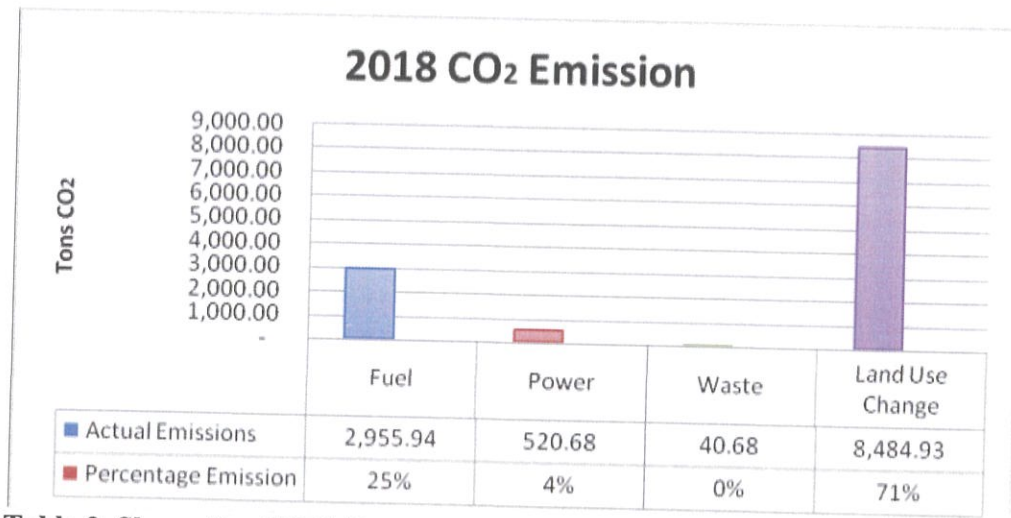


Table 2. Shows the CY 2018 emissions of the quarry.

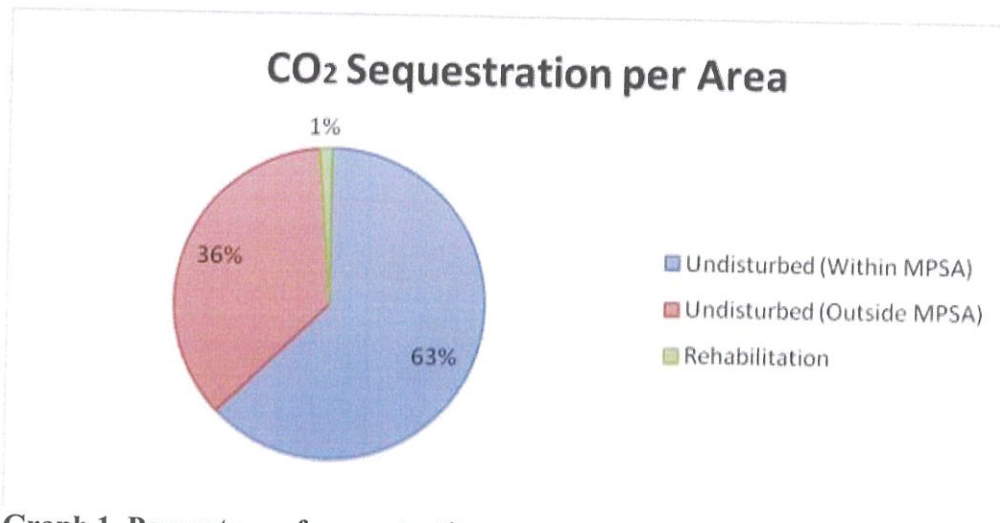
Four CO₂ emission source is identified for GLQP namely fuel, power, waste and land use. For CY 2018 the highest emission is from land use change (71%), followed by fuel consumption (25%), power (4%) and waste as the least CO₂ emitter at 0%.

To determine the sequestration capacity of GLQP and its corresponding carbon stock, three different sample areas were identified for the activity, classified as:

- Undisturbed (within the MPSA)** - areas within the MPSA that has not been quarried yet;
- Undisturbed (outside the MPSA)** - areas outside the MPSA but are privately owned by the company; and
- Rehabilitated** - mined out areas rehabilitated by the company.

The total area covered by the activity is 129.33 has, of this 71.54 has is undisturbed within the MPSA, 54.27has is undisturbed outside the MPSA and 3.52 has is from the rehabilitation areas planted between 2014-2016 (Refer to Annex 2).

The area with the most carbon stock is the undisturbed area within the MPSA (5,125.92 tons) followed by the undisturbed area outside of the MPSA (2,939.29 tons) and rehabilitation areas recorded the least carbon stock (104.02 tons). This signifies that there are more number of mature trees within the undisturbed areas compared to that of the rehabilitation area.



Graph 1. Percentage of sequestration per area

Of the three areas sampled, undisturbed area within the MPSA recorded the highest CO₂ sequestration capacity at 63%, followed closely by undisturbed areas outside the MPSA with 36% sequestration capacity. The close sequestration capacity of the undisturbed areas can be attributed to the similarity of the trees in terms of age and size as observed during the sampling activities.

While CO₂ sequestration capacity in rehabilitation areas is the lowest at only 1% which is attributed to its age and tree size. Rehabilitation areas are relatively young with an average of four (4) years, thus carbon sequestered in the area is low.

It was observed also that more plants/trees were inventoried on rehabilitation areas than the undisturbed areas because required sample size is more conservative in the rehabilitation plots (5m x 20m); compared to undisturbed areas where plot size is bigger (20m x 100m) and sampling intensity is higher.

CONCLUSION

Results showed that the Gotok Limestone Quarry Area is a carbon sink and can sequester the carbon emissions of the quarry operations through its rehabilitation areas and the natural forest stand within and outside of its MPSA, making the operation a carbon sink.

Further, findings showed that most of the carbon currently sequestered is stored in the undisturbed areas both within and outside of the MPSA. Eventually, older forest stand decreases its carbon sequestration capacity over time compared to that of rehabilitation areas, as the growth of a tree is linear with its sequestration capabilities-when tree reaches its peak, its carbon sequestration abilities plateaus simultaneous with its growth.

Finally, rehabilitation areas have considerable sequestration potential when properly protected and maintained which will in the long run sequester significant amounts of CO₂.

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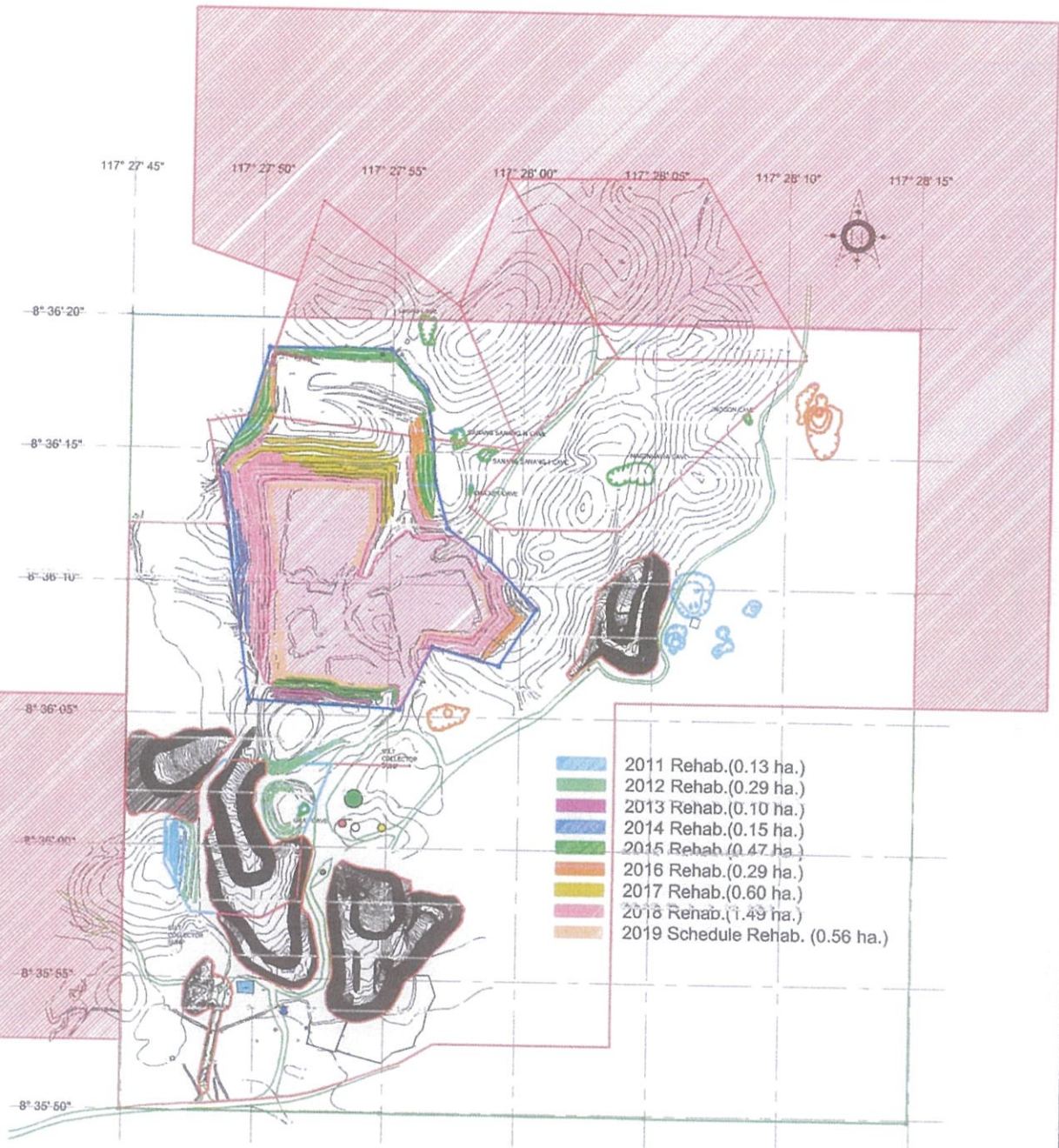
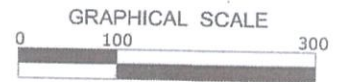
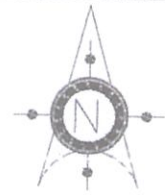
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ANNEX 1. GOTOK QUARRY MAP

(Location Map)



LEGEND :

- | | | |
|--------------------------------------|--|-----------------------------------|
| - MPSA-213-2005-IVB (84.54 has.) | - Limestone Stockpile (6.48 has.) | - Conex Repair Shop (38.47 sq.m.) |
| - Active Area (4.53 has) | - SILT Collector Sump (0.52 ha.) | - Guard House (4.0 sq.m.) |
| - ECC BOUNDARY Phase II (10.40 has.) | - Nursery (1,293.72 sq.m.) | - SCAA (2,406.00 sq.m.) |
| - ECC BOUNDARY Phase I (2.60 has.) | - Field Office / Lookout (52.56 sq.m.) | - ROAD (1.95 has.) |
| - RTN Lots Outside MPSA (54.27 has) | | |

TITLE :	
Gotok Quarry Map	
CADD BY: JWS CHECKED BY: JSL / RAS	APPROVED BY: CER SCALE:

ANNEX 2. Summary of Carbon Stock Assessment

SUMMARY OF THE CARBON STOCK ASSESSMENT @ GOTOK AREA

Location	Undisturbed (Within MPSA)	Areas			Rehabilitation	Total
		Undisturbed	(Outside MPSA)			
Total Land Area (Hectares)	71.54	54.27			3.52	129.33
Description						
Sample Plot	20m x 100 m	5m x 20m	20m x 100 m	5m x 20m	5m x 20m	
Total C Stored/Sample Plot	0.34	2.83	0.38	2.13	1.77	
Blow Up Factor (BUF)	2.5	25	2.5	25	16.67	
Total C Stock per Hectare	0.86	70.79	0.94	53.22	29.55	
Total C Stock per Area (tons)	71.65		54.16		29.55	155.36
Total C Stored per Total Land Area (tons)	5125.92		2939.29		104.02	8169.23
C to CO2 Ration	3.667		3.667		3.667	
Total CO2 Sequestration/Land Area (tons)	18796.74		10778.38		381.46	29956.57

Inventory team:

RONNIE G. FALLOME

Forester/Team Leader

MA. CHRISTINNE ELOISA Q. BLANCO

ECO/Member

CRISBELE F. UBOGAN

ECO/Member

JAKE B. MAMUNGAY

ECO/Member

JOVENCIO B. CATABAMAN, JR.

FT/Member

MARY KRIS PEDIGAN

ECO/Member

PHOTO DOCUMENTATION



Baseline Establishment



Measuring the trees in Gotok Quarry.



Measuring the trees in Gotok Quarry.



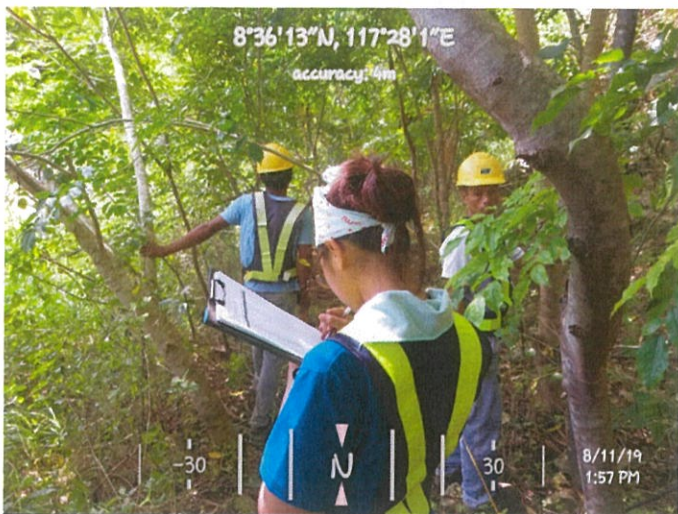
Listing the species of trees and its measurements in Gotok Quarry.



Quadrant (1mx1m) for understorey and liter cover in Gotok Quarry.



Understorey and liter cover collection.



Listing the species of trees and its measurements in Gotok Quarry.



Photo-op of the group after measuring the trees and collection of understory and litter cover in Gotok.



Oven drying of sample litter cover



Weighing of litter cover after oven drying

MPP-PL on Gold

Annex G

MINERAL PRODUCTION SHARING AGREEMENTNo. 213 - 2005 - IVB ✓

This **MINERAL PRODUCTION SHARING AGREEMENT** is made and entered into in Quezon City, Philippines, this _____ day of APR 28 2005 by and between:

THE REPUBLIC OF THE PHILIPPINES, herein referred to as the **GOVERNMENT**, represented in this act by the Secretary of the Department of Environment and Natural Resources, with offices at the Department of Environment and Natural Resources Building, Visayas Avenue, Diliman, Quezon City

and

RIO TUBA NICKEL MINING CORPORATION, a corporation duly organized and existing under the laws of the Republic of the Philippines, herein referred to as the **CONTRACTOR**, with office at 2nd Floor Solid Mills Bldg., Dela Rosa St., Legaspi Village, Makati City, and represented in this act by its President, **MANUEL B. ZAMORA, JR.**, as authorized by its Board of Directors (please refer to ANNEX "A")

WITNESSETH:

WHEREAS, the 1987 Constitution of the Republic of the Philippines provides in Article XII, Section 2 thereof that all lands of the public domain, waters, minerals, coal, petroleum and other natural resources are owned by the State and that their exploration, development and utilization shall be under the full control and supervision of the State;

WHEREAS, the Constitution further provides that the State may directly undertake such activities, or it may enter into a Co-Production, Joint Venture, or Mineral Production Sharing Agreement with Filipino citizens, or cooperatives, partnerships, corporations or associations at least sixty per centum of whose capitalization is owned by such citizens;

WHEREAS, pursuant to Republic Act No. 7942, otherwise known as "The Philippine Mining Act of 1995," which took effect on 09 April 1995, the Secretary of the Department of Environment and Natural Resources is authorized to enter into Mineral Production Sharing Agreements in furtherance of the objectives of the Government and the Constitution to bolster the national economy through sustainable and systematic development and utilization of mineral lands;



WHEREAS, the Government desires to avail itself of the financial resources, technical competence and skill, which the Contractor is capable of applying to the mining operations of the project contemplated herein;

WHEREAS, the Contractor desires to join and assist the Government in the development and utilization for commercial purposes of certain limestone and other associated mineral deposits existing in the Contract Area (as herein defined);

WHEREAS, the Contractor has access to all the financing, technical competence, technology and environmental management skills required to promptly and effectively carry out the objectives of this Agreement;

NOW, THEREFORE, for and in consideration of the foregoing premises, the mutual covenants, terms and conditions hereinafter set forth, it is hereby stipulated and agreed as follows:

SECTION I

SCOPE

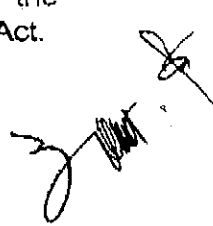
- 1.1. This Agreement is a Mineral Production Sharing Agreement entered into pursuant to the provisions of the Act and its implementing rules and regulations. The primary purpose of this Agreement is to provide for the development and commercial utilization of limestone and other associated mineral deposits existing within the Contract Area, with all necessary services, technology and financing to be furnished or arranged by the Contractor in accordance with the provisions of this Agreement. The Contractor shall not, by virtue of this Agreement, acquire any title over the Contract/Mining Area without prejudice to the acquisition by the Contractor of the land/surface rights through any mode of acquisition provided for by law.
- 1.2. The Contractor shall undertake and execute, for and on behalf of the Government, sustainable mining operations in accordance with the provisions of this Agreement, and is hereby constituted and appointed, for the purpose of this Agreement, as the exclusive entity to conduct mining operations in the Contract Area.
- 1.3. During the term of this Agreement, the total value of production and sale of minerals derived from the mining operations contemplated herein shall be accounted for and divided between the Government and the Contractor in accordance with Section VI hereof.

SECTION II

DEFINITIONS

As used in this Agreement, the following words and terms, whether singular or plural, shall have the following respective meaning:

- 2.1. Act refers to Republic Act No. 7942, otherwise known as the "Philippine Mining Act of 1995."
- 2.2. Agreement means this Mineral Production Sharing Agreement.
- 2.3. Associated Minerals mean other ores/minerals, which occur together with the principal ore/mineral.
- 2.4. Bangko Sentral means Bangko Sentral ng Pilipinas.
- 2.5. Budget means an estimate of expenditures to be made by Contractor in mining operations contemplated hereunder to accomplish the Work Program for each particular period.
- 2.6. Bureau means Mines and Geosciences Bureau.
- 2.7. Calendar Year or Year means a period of twelve (12) consecutive months starting with the first day of January and ending on December 31, while "Calendar Quarter" means a period of three consecutive months with the first calendar quarter starting with the first day of January.
- 2.8. Commercial Production means the production of sufficient quantity of minerals to sustain economic viability of mining operations reckoned from the date of commercial operation as declared by the Contractor or as stated in the feasibility study, whichever comes first.
- 2.9. Constitution or Philippine Constitution means the 1987 Constitution of the Republic of the Philippines adopted by the Constitutional Convention of 1986 on October 15, 1986 and ratified by the People of the Republic of the Philippines on February 2, 1987.
- 2.10. Contract Area means the area onshore or offshore delineated under the Mineral Production Sharing Agreement subject to the relinquishment obligations of the Contractor and properly defined by latitude and longitude or bearing and distance.
- 2.11. Contract Year means a period of twelve (12) consecutive months counted from the Effective Date of this Agreement or from the anniversary of such Effective Date.
- 2.12. Contractor means Rio Tuba Nickel Mining Corporation or its assignee or assignees of interest under this Agreement: Provided, That the assignment of any of such interest is accomplished pursuant to the pertinent provisions of the implementing rules and regulations of the Act.



- 2.13. Declaration of Mining Feasibility means a document proclaiming the presence of minerals in a specific site, which are recoverable by socially acceptable, environmentally safe and economically sound methods specified in the Mine Development Plan.
- 2.14. Department or DENR means the Department of Environment and Natural Resources.
- 2.15. Director means the Director of Mines and Geosciences Bureau.
- 2.16. Effective Date means the date of execution of this Agreement by the Contractor and by the Secretary on behalf of the Government.
- 2.17. Environment means all facets of man's surroundings: physical, ecological, aesthetic, cultural, economic, historic, institutional and social.
- 2.18. Exploration means searching or prospecting for mineral resources by geological, geophysical and geochemical surveys, remote sensing, test pitting, trenching, drilling, shaft sinking, tunneling or any other means for the purpose of determining the existence, extent, quality and quantity of mineral resources and the feasibility of mining them for profit.
- 2.19. Force Majeure means acts or circumstances beyond the reasonable control of the Contractor including, but not limited to war, rebellion, insurrection, riots, civil disturbances, blockade, sabotage, embargo, strike, lockout, any dispute with surface owners and other labor disputes, epidemics, earthquake, storm, flood or other adverse weather conditions, explosion, fire, adverse action by the Government or by any of its instrumentality or subdivision thereof, act of God or any public enemy and any cause as herein described over which the affected party has no reasonable control.
- 2.20. Foreign Exchange means any currency other than the currency of the Republic of the Philippines acceptable to the Government and the Contractor.
- 2.21. Government means the Government of the Republic of the Philippines or any of its agencies and instrumentalities.
- 2.22. Gross Output means the actual market value of the minerals or mineral products from each mine or mineral land operated as a separate entity, without any deduction for mining, processing, refining, transporting, handling, marketing or any other expenses: Provided, That if the minerals or mineral products are sold or consigned abroad by the Contractor under C.I.F. terms, the actual cost of ocean freight and insurance shall be deducted: Provided further, That in the case of mineral concentrates which are not traded in commodity exchanges in the Philippines or abroad such as copper concentrate, the actual market value shall be the world price quotation of the refined mineral products contained thereof prevailing in the said commodity exchanges, after deducting the smelting, refining, treatment, insurance, transportation and other charges incurred

in the process of converting mineral concentrates into refined metal traded in those commodity exchanges.

- 2.23. Mine Development refers to work undertaken to prepare an ore body or a mineral deposit for mining, including the construction of necessary infrastructure and related facilities.
- 2.24. Minerals mean all naturally occurring inorganic substances in solid, liquid, gas or any intermediate state excluding energy materials such as coal, petroleum, natural gas, radioactive materials and geothermal energy.
- 2.25. Mineral Products mean materials derived from mineral ores/rocks and prepared into marketable state by metallurgical processes which include beneficiation, cyanidation, leaching, smelting, calcination and other similar processes.
- 2.26. Mining Area means that portion of the Contract Area identified by the Contractor as defined and delineated in a Survey Plan duly approved by the Director/Regional Director concerned for purposes of development and/or utilization and sites for support facilities.
- 2.27. Mining Operations means mining activities involving exploration, feasibility study, environmental impact assessment, development, utilization, mineral processing and/or mine rehabilitation.
- 2.28. Notice means notice in writing, telex or telecopy (authenticated by answer back or confirmation received) addressed or sent as provided in Section 13.2 of this Agreement.
- 2.29. Ore means naturally occurring substance or material from which a mineral or element can be mined and/or processed for profit.
- 2.30. Pollution means any alteration of the physical, chemical and/or biological properties of any water, air and/or land resources of the Philippines, or any discharge thereto of any liquid, gaseous or solid wastes or any production of unnecessary noise or any emission of objectionable odor, as will or is likely to create or render such water, air, and land resources harmful, detrimental or injurious to public health, safety or welfare or which will adversely affect their utilization for domestic, commercial, industrial, agricultural, recreational or other legitimate purposes.
- 2.31. Secretary means the Secretary of the Department of Environment and Natural Resources.
- 2.32. State means the Republic of the Philippines.
- 2.33. Work Program means a document which presents the plan of major mining operations and the corresponding expenditures of the Contractor in its Contract Area during a given period of time, including the plan and expenditures for development of host and neighboring communities and

of local geoscience and mining technology, as submitted and approved in accordance with the implementing rules and regulations of the Act.

SECTION III

TERM OF AGREEMENT

- 3.1. This Agreement shall have a term of twenty five (25) years from Effective Date, and may be renewed thereafter for another term not exceeding twenty five (25) years. The renewal of this Agreement, as well as the changes in the terms and conditions thereof, shall be upon mutual consent by the parties. In the event the Government decides to allow mining operations thereafter by other Contractor, this must be through competitive public bidding. After due publication of notice, the Contractor shall have the right to equal the highest bid upon reimbursement of all reasonable expenses of the highest bidder.

SECTION IV

CONTRACT AREA

- 4.1. Size, Shape, and Location of Contract Area - This Agreement covers a total area of Eighty Four and 5,364/10,000 hectares (84.5364 hectares), situated in Bataraza, Palawan and bounded by the following technical description (please refer to ANNEX "B" - 1:50,000 scale Location Map/Sketch Plan):

Corner	Latitude	Longitude
1	8°35'50"	117°27'45"
2	8°36'50"	117°27'45"
3	8°36'20"	117°28'15"
4	8°35'50"	117°28'15"

- 4.2. Survey Plan of the Contract Area - The Contractor shall submit for approval by the Regional Director concerned, a survey plan for the Contract Area within sixty (60) days from the effectivity of this Agreement.

SECTION V

OPERATING PERIOD

- 5.1 Timetable - The Contractor shall commence development and commercial utilization activity immediately upon approval and registration of this Agreement. The Contractor shall conduct mining operations and other activities for the duration of the Operating Period in accordance with the duly approved Work Program and Budget, and Environmental

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Compliance Certificate (please refer to ANNEXES "C" and "D"). Failure by the Contractor to undertake commercial utilization within the period in accordance with the said Work Program shall be considered a substantial breach of the Agreement.

- 5.2 Commercial Operation Work Program and Budget - During the Operating Period, the Contractor shall submit to the Director, through the Regional Director concerned, Work Programs and Budgets covering a period of three (3) years each, which shall be submitted not later than thirty (30) days before the expiration of the period covered by the previous Work Program.

The amount to be spent by the Contractor during the Operating Period under the term of this Agreement shall not be less than that specified in the approved Work Program, such that during the first three (3) years of the Operating Period, this amount shall be as follows:

First Contract Year PhP 51,515,000.00

Second Contract Year PhP 51,515,000.00

Third Contract Year PhP 51,515,000.00

Should the Government wish to propose a revision to a certain specific feature in the Work Program or Budget, it shall, within thirty (30) days after receipt thereof, provide a Notice to the Contractor specifying in reasonable detail its reasons therefore. Promptly thereafter, the Government and Contractor will meet and endeavor to agree on the revision proposed by the Government. In any event, any portion of said Work Program or Budget as to which the Government shall fail to notify the Contractor of proposed revision shall, in so far as possible, be carried out as prescribed herein. If the Government should fail within sixty (60) days from receipt thereof to notify Contractor of the proposed revisions, the Work Program and Budget proposed by the Contractor shall be deemed to be approved.

It is recognized by the Government and the Contractor that the details of any Work Program may require changes in the light of changing circumstances. The Contractor may make such changes: Provided, That it shall not change the general objective of the Work Program: Provided further, That changes which entail a variance of at least twenty percent (20%) shall be subject to the approval of the Director.

The Government's approval of a proposed Work Program and Budget will not be unreasonably withheld.

- 5.3 Expansion and Modification of Facilities - The Contractor may make expansions, modifications, improvements, and/or replacements of the mining facilities and may add new facilities as the Contractor may consider necessary for the operations: Provided, That such plans shall be embodied in an appropriate Work Program approved by the Director.

5.4 Reporting

- a. Quarterly Reports - Beginning with the first Calendar Quarter following the approval of this Agreement, the Contractor shall submit, within thirty (30) days after the end of each Calendar Quarter, to the Director, through the Regional Director concerned, a Quarterly Report stating the tonnage of production in terms of ores, concentrates, and their corresponding grades and other types of products; value, destination of sales or exports and to whom sold; terms of sales and expenditures.
- b. Annual Reports - During the Operating Period, the Contractor shall submit, within sixty (60) days from the end of each Calendar Year, to the Director through the Regional Director concerned, an Annual Report indicating in sufficient detail:
 - b.1. The total tonnage of ore reserves whether proven, probable, or inferred, the total tonnage of ores, kind by kind, broken down between tonnage mined, tonnages transported from the minesite and their corresponding destination, tonnages stockpiled in the mine and elsewhere in the Philippines, tonnages sold or committed for export (whether actually shipped from the Philippines or not), tonnages actually shipped from the Philippines (with full details as to purchaser, destination and terms of sale), and if known to the Contractor, tonnages refined, processed or manufactured in the Philippines with full specifications as to the intermediate products, by-products or final products and of the terms at which they were disposed;
 - b.2. Work accomplished and work in progress at the end of the year under consideration in relation to the Work Program, including the investment actually made or committed; and
 - b.3. Profile of work force, including management and staff, stating particularly their nationalities, and for Filipinos, their place of origin (i.e., barangay, town, province, region).

The Contractor shall also comply with other reporting requirements as provided in the Implementing rules and regulations of the Act.

SECTION VI

FISCAL REGIME

- 6.1. General Principle - The fiscal regime of this Agreement shall be governed by the principle according to which the Government expects a reasonable return in economic value for the utilization of non-renewable mineral resources under its national sovereignty while the Contractor expects a reasonable return on its investment with special account to be taken for the high risk of exploration, the terms and conditions prevailing

elsewhere in the industry and any special efficiency to be gained by a particularly good performance of the Contractor.

- 6.2. **Registration Fees** - Within fifteen (15) days upon receipt of the notice of approval of the Agreement from the Regional Office concerned, the Contractor shall cause the registration of this Agreement with the said Regional Office and pay the registration fee at the rate provided in the existing rules and regulations. Failure of the Contractor to cause the registration of this Agreement within the prescribed period shall be sufficient ground for cancellation of the same.
- 6.3. **Occupation Fees** - Prior to registration of this Agreement and at the same date every year thereafter, the Contractor shall pay to the Municipal/City Treasurer concerned an occupation fee over the Contract Area at the annual rate provided in the existing rules and regulations. If the fee is not paid on the date specified, the Contractor shall pay a surcharge of twenty five percent (25%) of the amount due in addition to the occupation fees.
- 6.4. **Share of the Government** - The Government Share shall be the excise tax on mineral products at the time of removal and at the rate provided for in Republic Act No. 7729 amending Section 151 (a) of the National Internal Revenue Code, as amended, as well as other taxes, duties and fees levied by existing laws. The Excise Tax shall be paid to the nearest Bureau of Internal Revenue Office in the province concerned.
- For purposes of determining the amount of the herein Government Share, the Contractor shall strictly comply with the auditing and accounting requirements prescribed under existing laws and regulations.
- The Government Share shall be allocated in accordance with Sections 290 and 292 of Republic Act No. 7160, otherwise known as "The Local Government Code of 1991."
- 6.5. **Pricing of Sales** - The Contractor shall endeavor to obtain the best achievable price for its production and pay the lowest achievable marketing commissions and related fees. It shall seek to strike a balance between long-term sales comparable to policies followed by independent producers in the international mining industry.

The Contractor shall likewise seek a balanced distribution among consumers. Insofar as sales to Contractor's affiliates are concerned, prices shall be at arm's length standard and competing offers for large scale and long-term contracts shall be procured. Before any sale and/or shipment of mineral product is made, existing and future marketing contract(s)/sales agreement(s) shall be submitted to the Director, copy furnished the Regional Director concerned, for registration. At the same time, the Contractor shall regularly inform the Director in writing of any revisions, changes or additions in said contract(s)/agreement(s).

[Handwritten signature]

The Contractor shall reflect in its Monthly/Quarterly Report on Production, Sales and Inventory of Minerals, as well as in the Integrated Annual Report, the corresponding registration number(s) of the marketing contract(s)/agreement(s) governing the export or sale of minerals.

- 6.6. Associated Minerals - If minerals other than limestone are discovered in commercial quantities in the Contract Area, the value thereof shall be added to the value of the principal mineral in computing the Government share.

SECTION VII

ENVIRONMENTAL PROTECTION AND MINE SAFETY AND HEALTH

- 7.1. The Contractor shall manage its Mining Operations in a technically, financially, socially, culturally and environmentally responsible manner to achieve the sustainable development objectives and responsibilities as provided for under the implementing rules and regulations of the Act.
- 7.2. The Contractor shall ensure that the standards of environmental protection are met in the course of the Mining Operations. To the extent possible, control of pollution and the transformation of the mined-out areas or materials into economically and socially productive forms must be done simultaneously with mining.
- 7.3. An Environmental Compliance Certificate (ECC) shall be secured first by the Contractor prior to the conduct of any development works, construction of production facilities and/or mine production activities in the Contract Area.
- 7.4. The Contractor shall submit within thirty (30) Calendar days after the issuance and receipt of the ECC, an Environmental Protection and Enhancement Program (EPEP) using MGB Form No. 16-2 covering all areas to be affected by development, utilization and processing activities under this Agreement. The Contractor shall allocate for its initial environment-related capital expenditures approximately ten percent (10%) of the total project cost or in such amount depending on the environmental/geological condition, nature and scale of operations and technology to be employed in the Contract Area.
- 7.5. The Contractor shall submit, within thirty (30) days prior to the beginning of every calendar year, an Annual Environmental Protection and Enhancement Program (AEPEP), using MGB Form 16-3, which shall be based on the approved EPEP. The AEPEP shall be implemented during the year for which it was submitted. To implement its AEPEP, the Contractor shall allocate annually three to five percent (3%-5%) of its direct mining and milling costs depending on the environmental/geologic condition, nature and scale of operations and technology employed in the Contract Area.

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- 10.1. The Contractor shall establish a Contingent Liability and Rehabilitation Fund (CLRF), which shall be in the form of the Mine Rehabilitation Fund (MRF) and the Mine Waste and Tailings Fee (MWTF).

The MRF shall be based on the financial requirements of the approved EPEP as a reasonable environmental deposit to ensure satisfactory compliance with the commitments/strategies of the EPEP/AEPEP and availability of funds for the performance of the EPEP/AEPEP during the specific project phase. The MRF shall be deposited as Trust Fund in a government depository bank and shall be used for physical and social rehabilitation of areas affected by mining activities and for research on the social, technical and preventive aspects of rehabilitation.

The MWTF shall be collected based on the amounts of mine waste and mill tailings generated during the conduct of Mining Operations. The MWTF collected shall accrue to a Mine Waste and Tailings Reserve Fund and shall be deposited in a government depository bank for payment of compensation for any damages caused by the Mining Operations.

- 7.6. The Contractor shall set up mitigating measures such as mine waste and mill tailings disposal system, mine rehabilitation or plan, water quality monitoring, etc. to minimize land degradation, air and water pollution, acid rock drainage and changes in hydrogeology.
- 7.7. The Contractor shall set up an Environmental and Safety Office at its minesite manned by qualified personnel to plan, implement and monitor its approved EPEP.
- 7.8. The Contractor shall be responsible in the monitoring of environmental, safety and health conditions in the Contract Area and shall strictly comply with all the rules and regulations embodied under DAO No. 2000-98, otherwise known as the "Mine Safety and Health Standards."
- 7.9. The Contractor shall be responsible for the submission of a final mine rehabilitation and/or decommissioning plans, including its financial requirements and incorporating the details and particulars set forth in the Implementing rules and regulations of the Act.

SECTION VIII

RIGHTS AND OBLIGATIONS OF THE PARTIES

- 8.1. Obligations of the Contractor:
- To exclusively conduct sustainable Mining Operations within the Contract Area in accordance with the provisions of the Act and its implementing rules and regulations;
 - To construct and operate any facilities specified under the Mineral Agreement or approved Work Program;

- c. To determine the exploration, mining and treatment process to be utilized in the Mining Operations;
- d. To extract, remove, use and dispose of any tailings as authorized by an approved Work Program;
- e. To secure all permits necessary or desirable for the purpose of Mining Operations;
- f. To keep accurate technical records about the Mining Operations, as well as financial and marketing accounts, and make them available to Government representatives authorized by the Director for the purpose of assessing the performance and compliance of the Contractor with the terms of this Agreement. Authorized representatives of other Government Agencies may also have access to such accounts in accordance with existing laws, rules and regulations;
- g. To furnish the Bureau all the data and information gathered from the Contract Area and that all the books of accounts and records shall be open for inspection;
- h. To allow access to Government during reasonable hours in inspecting the Contract Area and examining pertinent records for purposes of monitoring compliance with the terms of this Agreement;
- i. To hold the Government free and harmless from all claims and accounts of all kinds, as well as demands and actions arising out of the accidents or injuries to persons or properties caused by Mining Operations of the Contractor and indemnify the Government for any expenses or costs incurred by the Government by reason of any such claims, accounts, demands or actions;
- j. In the development of the community:
 - j.1. To recognize and respect the rights, customs and traditions of Indigenous cultural communities over their ancestral lands and to allocate royalty payment of not less than one percent (1%) of the value of the gross output of minerals sold;
 - j.2. To coordinate with proper authorities in the development of the mining community and for those living in the host and neighboring communities through social infrastructure, livelihood programs, education, water, electricity and medical services. Where traditional self-sustaining income and the community activities are identified to be present, the Contractor shall assist in the preservation and/or enhancement of such activities;

- j.3. To allot annually a minimum of one percent (1%) of the direct mining and milling costs necessary to implement the activities undertaken in the development of the host and neighboring communities. Expenses for community development may be charged against the royalty payment of at least one percent (1%) of the gross output intended for the concerned indigenous cultural community;
- j.4. To give preference to Filipino citizens who have established domicile in the neighboring communities, in the hiring of personnel for its mining operations. If necessary skills and expertise are currently not available, the Contractor must immediately prepare and undertake a training and recruitment program at its expense; and
- j.5. To incorporate in the Mining Feasibility Study the planned expenditures necessary to implement (j.1) to (j.3) of this Section;
- k. In the development of Mining Technology and Geosciences:
- k.1. In the course of its operations, to produce geological, geophysical, geochemical and other types of maps and reports that are appropriate in scale and in format and substance which are consistent with the internationally accepted standards and practices. Such maps shall be made available to the scientific community in the most convenient and cost effective forms, subject to the condition that the Contractor may delay release of said information for a reasonable period of time which shall not exceed three (3) years;
- k.2. To systematically keep the data generated from the Contract/ Mining Area such as cores, assays and other related information, including economic and financial data and make them accessible to students, researchers and other persons responsible for developing mining, geoscience and processing technology subject to the condition that the Contractor may delay release of data to the science and technology community within a reasonable period of time which shall not exceed three (3) years;
- k.3. To transfer to the Government or local mining company the appropriate technology it may adapt in the exploration, development and commercial utilization of the minerals in the Contract Area;
- k.4. To allocate research and development budget for the advancement of mining technology and geosciences in coordination with the Bureau, research institutions, academe, etc.; and

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- k.5. To replicate data, maps and reports cited in (k.1) and (k.2) and furnish the Bureau for archiving and systematic safekeeping which shall be made available to the science and technology community for conducting research and undertaking other activities which contribute to the development of mining, geoscience and processing technology and the corresponding national pool of manpower talents: Provided, however, that the release of data, maps and the like shall be similarly constrained in accordance with (k.1) and (k.2) above;
- l. To incorporate in the Mining Feasibility Study the planned expenditures necessary to implement all the plans and programs set forth in this Agreement; and
- m. To pay all other taxes and fees mandated by existing laws, rules and regulations.
- 8.2. Rights of the Contractor:
- a. To conduct Mining Operations within the confines of its Contract/Mining Area in accordance with the terms and conditions hereof and without interfering with the rights of other Contractors/Lessees/Operators/ Permittees/Permit Holders;
- b. Of possession of the Contract Area, with full right of ingress and egress and the right to occupy the same, subject to surface and easement rights;
- c. To use and have access to all declassified geological, geophysical, drilling, production and other data relevant to the mining operations;
- d. To sell, assign, transfer, convey or otherwise dispose of all its rights, interests and obligations under the Agreement subject to the approval of the Government;
- e. To employ or bring into the Philippines foreign technical and specialized personnel, including the immediate members of their families as may be required in the operations of the Contractor, subject to applicable laws and regulations: Provided, That if the employment connection of such foreign persons with the Contractor ceases, the applicable laws and regulations on immigration shall apply to them. Every time foreign technologies are utilized and where alien executives are employed, an effective program of training understudies shall be undertaken. The alien employment shall be limited to technologies requiring highly specialized training and experience subject to the required approval under existing laws, rules and regulations;

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- f. To enjoy easement rights and use of timber, water and other natural resources in the Contract Area subject to pertinent laws, rules and regulations and the rights of third parties;
- g. Of repatriation of capital and remittance of profits, dividends and interest on loans, subject to existing laws and Bangko Sentral ng Pilipinas rules and regulations; and
- h. To import when necessary all equipment, spare parts and raw materials required in the operations in accordance with existing laws and regulations.

8.3. Obligations of the Government:

- a. To ensure that the Contractor has the Government's full cooperation in the exercise of the rights granted to it under this Agreement;
- b. To use its best efforts to ensure the timely issuance of necessary permits and similar authorizing documents for use of the surface of the Contract Area; and
- c. To cooperate with the Contractor in its efforts to obtain financing contemplated herein from banks or other financial institutions: Provided, That such financing arrangements will in no event reduce the Contractor's obligation on Government rights hereunder.

SECTION IX

ASSETS AND EQUIPMENT

- 9.1. The Contractor shall acquire for the Mining Operations only such assets that are reasonably estimated to be required in carrying out such Mining Operations.
- 9.2. All materials, equipment, plant and other installations of a movable nature erected or placed on the Contract Area by the Contractor shall remain the property of the Contractor. The Contractor shall have the right to remove and re-export such materials and equipment, plant and other installations from the Philippines, subject to existing rules and regulations. In case of cessation of Mining Operations on public lands occasioned by its voluntary abandonment or withdrawal, the Contractor shall have a period of one (1) year from the time of cessation within which to remove its improvements; otherwise, all social infrastructures and facilities shall be turned over or donated tax free to the proper government authorities, national or local, to ensure that said infrastructures and facilities are continuously maintained and utilized by the host and neighboring communities.

SECTION X

EMPLOYMENT AND TRAINING OF PHILIPPINE PERSONNEL

- 10.1. The Contractor agrees to employ, to the extent possible, qualified Filipino personnel in all types of mining operations for which they are qualified; and after Commercial Production commences shall, in consultation and with consent of the Government, prepare and undertake an extensive training programme suitable to Filipino nationals in all levels of employment. The objective of said programme shall be to reach within the timetable set forth below the following targets of "Filipinization:"

	Unskilled (%)	Skilled (%)	Clerical (%)	Professional (%)	Management (%)
Year 1	100	100	100	70	70
Year 3	100	100	100	80	80
Year 5	100	100	100	90	90
Year 7	100	100	100	100	95
Year 10	100	100	100	100	95
Year 15	100	100	100	100	95

- 10.2. Cost and expenses of training such Filipino personnel and the Contractor's own employees shall be included in the Operating Expenses.
- 10.3. The Contractor shall not discriminate on the basis of gender and shall respect the right of women workers to participate in policy and decision-making processes affecting their rights and benefits.

SECTION XI

ARBITRATION

- 11.1. The Government and the Contractor shall consult with each other in good faith and shall exhaust all available remedies to settle any and all disputes or disagreements arising out of or relating to the validity, interpretations, enforceability, or performance of this Agreement before resorting to arbitration as provided for in Section 11.2. below.
- 11.2. Any disagreement or dispute which can not be settled amicably within a period of one (1) year from the time the issue is raised by a Party shall be settled by a tribunal of three (3) arbitrators. This tribunal shall be constituted as follows: one to be appointed by the Contractor and the other to be appointed by the Secretary. The first two appointed arbitrators shall consider names of qualified persons until agreement on a mutually acceptable Chairman of the tribunal is selected. Such arbitration shall be initiated and conducted pursuant to Republic Act No. 876, otherwise known as the "Arbitration Act."

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In any event, the arbitration shall be conducted applying the substantive laws of the Republic of the Philippines.

- 11.3. Each party shall pay fifty percent (50%) of the fees and expenses of the Arbitrators and the costs of arbitration. Each party shall pay its own costs and attorney's fee.

SECTION XII

SUSPENSION OR TERMINATION OF CONTRACT, TAX INCENTIVES AND CREDITS

- 12.1. This Agreement may be suspended for failure of the Contractor: (a) to comply with any provision or requirement of the Act and/or its Implementing rules and regulations; (b) to pay taxes, fees and/or other charges demandable and due the Government.
- 12.2. This Agreement terminates or may be terminated for the following causes: (a) expiration of its term, whether original or renewal; (b) withdrawal from the Agreement by the Contractor; (c) violation by the Contractor of the Agreement's terms and conditions; (d) failure to pay taxes, fees/or charges or financial obligations for two (2) consecutive years; (e) false statement or omission of facts by the Contractor; and (f) any other cause or reason provided under the Act and its Implementing rules and regulations, or any other relevant laws and regulations.
- 12.3. All statements made in this Agreement shall be considered as conditions and essential parts hereof, and any falsehood in said statements or omission of facts which may alter, change or affect substantially the fact set forth in said statements shall be a ground for its revocation and termination.
- 12.4. The Contractor may, by giving due notice at any time during the term of this Agreement, apply for its cancellation due to causes which, in the opinion of the Contractor, render continued mining operation no longer feasible or viable. In this case, the Secretary shall decide on the application within thirty (30) days from notice: Provided, That the Contractor has met all the financial, fiscal and legal obligations.
- 12.5. No delay or omissions or course of dealing by the Government shall impair any of its rights under this Agreement, except in the case of a written waiver. The Government's right to seek recourse and relief by all other means shall not be construed as a waiver of any succeeding or other default unless the contrary intention is reduced in writing and signed by the party authorized to exercise the waiver.
- 12.6. In case of termination, the Contractor shall pay all the fees and other liabilities due up to the end of the year in which the termination becomes effective. The Contractor shall immediately carry out the restoration of the Contract Area in accordance with good mining industry practice.

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- 12.7. The withdrawal by the Contractor from the Mineral Agreement shall not release it from any and all financial, environmental, legal and fiscal obligations under this Agreement.
- 12.8. The following acts or omission, *inter alia* shall constitute breach of contract, upon which the Government may exercise its right to terminate the Agreement:
- a. Failure of the Contractor without valid reason to commence Commercial Production within the period prescribed; and/or
 - b. Failure of the Contractor to conduct mining operations and other activities in accordance with the approved Work Programs and/or any modification thereof as approved by the Director.
- 12.9. The Government may suspend and cancel tax incentives and credits if the Contractor fails to abide by the terms and conditions of said incentives and credits.

SECTION XIII

OTHER PROVISIONS

- 13.1. Any terms and conditions resulting from repeal or amendment of any existing laws or regulation or from the enactment of a law, regulation or administrative order shall be considered a part of this Agreement.

13.2. Notice

All notices, demands and other communications required or permitted hereunder shall be made in writing, telex or telecopy and shall be deemed to have been duly given notice, in the case of telex or telecopy, if answered back or confirmation received, or if delivered by hand, upon receipt or ten days after being deposited in the mail, airmail postage prepaid and addressed as follows:

If to the Government:

THE SECRETARY

Department of Environment and Natural Resources
DENR Building, Visayas Avenue
Diliman, Quezon City

If to the Contractor:

THE PRESIDENT

Rio Tuba Nickel Mining Corporation
2nd Floor, Solid Mills Bldg.
Dela Rosa St., Legaspi Village
Makati City

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Either party may substitute or change such address on notice thereof to the other party.

13.3. Governing Law

This Agreement and the relation between the parties hereto shall be governed by and construed in accordance with the laws of the Republic of the Philippines. The Contractor hereby agrees and obliges itself to comply with the provisions of the Act, its implementing rules and regulations and other relevant laws and regulations.

13.4. Suspension of Obligation

- a. Any failure or delay on the part of any party in the performance of its obligation or duties hereunder shall be excused to the extent attributable to *Force Majeure* as defined in the Act: Provided, That the suspension of Mining Operations due to *Force Majeure* causes shall be subject to approval by the Director.
- b. If Mining Operations are delayed, curtailed or prevented by such *Force Majeure* causes, then the time for enjoying the rights and carrying out the obligations thereby affected, the term of this Agreement and all rights and obligations hereunder shall be extended for a period equal to the period involved.
- c. The Party, whose ability to perform its obligations is affected by such *Force Majeure* causes, shall promptly give Notice to the other in writing of any such delay or failure of performance, the expected duration thereof and its anticipated effect and shall use its efforts to remedy such delay, except that neither Party shall be under any obligation to settle a labor dispute: Provided, That the suspension of obligation by the Contractor shall be subject to prior approval by the Director.

13.5. Amendments

This Agreement shall not be annulled, amended or modified in any respect except by mutual consent in writing of the herein parties.

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IN WITNESS WHEREOF, the Parties hereto have executed this Agreement,
as of the day and year first above written

THE REPUBLIC OF THE PHILIPPINES

BY:


MICHAEL T. DEFENSOR
Secretary

Department of Environment and Natural Resources



RIO TUBA NICKEL MINING CORPORATION


TIN: 000-142-665-000

BY:


MANUEL B. ZAMORA, JR.
President

SIGNED IN THE PRESENCE OF:


J. S. SARMIENTO
(Signature over Printed Name)


DEINRADO SIMON D. DIMALIBOT
(Signature over Printed Name)
Mining and Legal Affairs

ACKNOWLEDGMENT

Republic of the Philippines)
Quezon City) s s

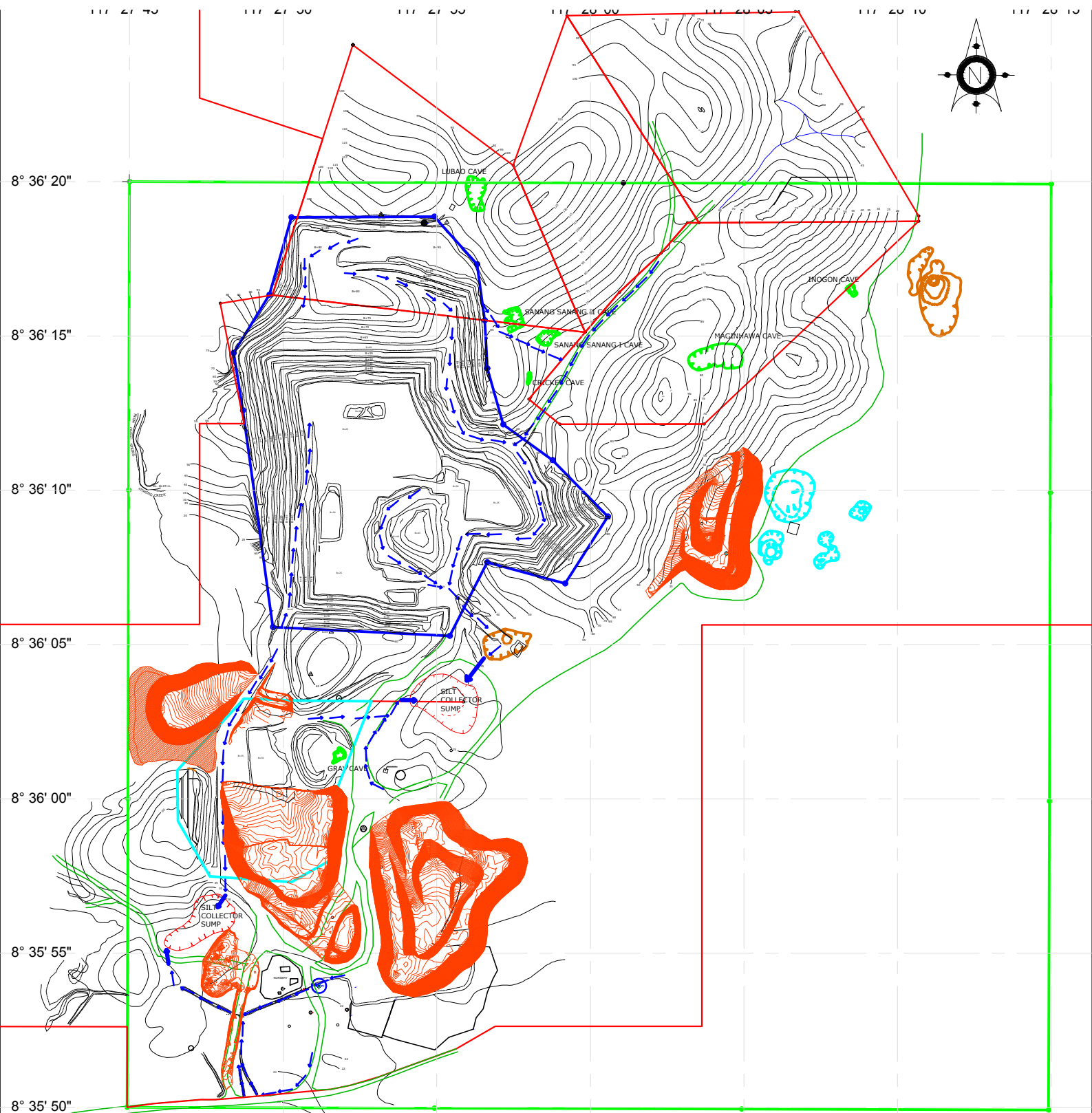
Before me, a Notary Public for and in the City of Quezon, personally appeared **MICHAEL T. DEFENSOR**, with Community Tax Certificate No. 15653147 issued on January 5, 2005 at Quezon City, in his capacity as Secretary of the Department of Environment and Natural Resources, and **MANUEL B. ZAMORA, JR.**, with Community Tax Certificate No. 14673098 issued on January 21, 2005 at Makati City, in his capacity as President, of Rio Tuba Nickel Mining Corporation, both known to me and to me known to be the same persons who executed the foregoing instrument consisting of twenty one (21) pages, including this acknowledgment page, and acknowledged to me that the same is their voluntary acts and deeds.

IN WITNESS WHEREOF, I have hereunto set my hand and affix my notarial seal, this 11 MAY 2005 day of _____.











Jewelyn D. Valenton
JEWELYN D. VALENTON, CARREON
NOTARY PUBLIC
Notary Public for 31, 2005
IEP O.R. No. 617618-1-7-05, Manila
PTR O.R. No. 3607635, 1-7-05, Manila
TIN No. 264905051

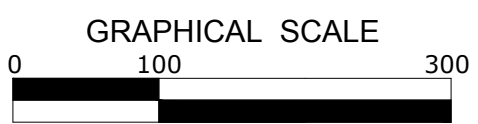
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Page No. 49
Book No. I
Series of 2005

Zamora



LEGEND :

-  - CAVE
-  - DEPRESSION W/O VISIBLE OPENING
-  - SINKHOLE W/ VISIBLE OPENING
-  - MPSA-213-2005-IVB(84.50 has.)
-  - SILT Collector Sump
-  - RTN LOTS
-  - ECC BOUNDARY Phase II (10.40 has.)
-  - ECC BOUNDARY Phase I (2.60 has.)
-  - Limestone Stockpile
-  - DRAINAGE



  	
TITLE : GOTOK DRAINAGE MAP As of OCTOBER 31, 2020	
CADD BY: JAG CHECKED BY: JSL / RAS	APPROVED BY: CER SCALE: