2022 Annual
Environmental Protection and Enhancement Program
Rio Tuba Nickel Mining Corporation
Nickel Mining Project
MPSA No. 114-98-IV AMENDED I
Rio Tuba, Bataraza, Palawan

Photo: Rio Tuba Mine Complex

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1.0 Executive Summary

RTNMC, throughout its operation, has established the image of a responsible mining operation and sustainable resource use. It has been the face of the mining industry in the Philippines and won the First ASEAN Mineral Award for Sustainable Minerals Development, and is a consistent recipient of the Presidential Mineral Industry Environmental Award. It has established management systems on quality, environment, safety and health. It endeavors to attain Company's compliance responsibilities, deliver substantial products and services, set a safe and healthy working environment and mitigate any likely pollution and impact to the environment assuring sustainable and continual development of the operation.

With the continuous operation of RTNMC, the local populace has enjoyed developments in infrastructure, education, livelihood opportunities, among others. The presence of RTNMC in the municipality has been a pivotal cause in the growth of the local derivative economy.

Presently, RTN operates in an aggregated area of 4,538.44 hectares with 1 MPSA and 2 ECCs. For year 2022, is set to mine sporadic areas within Guintalunan and Mangingidong to produce 1,350,000 WMT of Saprolite and 3,500,000 WMT of Limonite ores. There are no changes in the mining method and process as the operation develops in other sites within the MPSA. RTN will maintain its current facilities, equipment, and programs to comply with its legal and compliance obligations. It ensures that licenses and permits are secured and valid before any project commencement and to operate under the law's premise.

Meanwhile, a total of PhP 95,307,915.00 is allocated for environmental protection projects/activities of its Nickel Laterite Project. The total environmental-related cost to the total direct mining cost is estimated at 10.86%. The Company plans to rehabilitate four (4) hectares of the mined-out area within the year in addition to more than 202 hectares final rehabilitation areas while maintaining previous rehabilitation and reforestation projects, the establishment of bamboo plantation and continuous development of the mine ecotourism project.

2.0 Company Background

Rio Tuba Nickel Mining Corporation or RTN is a joint venture with Japanese companies at 60% Filipino 40% Japanese sharing and is known as the oldest and the biggest operating nickel mine in the Philippines. It produces saprolite ores for sale to Japan, Australia, and China and is an exclusive supplier of limonite ore to Coral Bay Nickel Corporation (CBNC).

The mining operation of RTN started in 1967 with the exploration and subsequent discovery of nickel silicate ore at Barangay Rio Tuba, Bataraza, Palawan. In 1969, Rio Tuba Nickel Mining Corporation was formed and started the stripping operation in September 1975, with the first shipment of nickel ore to Japan in April 1977. Since then, it has sustainably operated and developed the Rio Tuba Export Processing Zone (RTEPZ) in December 2002, which paved the way for the stockpile retrieving and delivering limonite ores to Coral Bay Nickel Corporation, which started commercial operation in April 2005. In June 2008, RTN also started shipping low-grade ores to China.

With fifty years of experience in the mining and extractive business, RTN has marked its place as an exemplar of best practices in responsible mining not just in the country but in the ASEAN Region. As a result, in 2017, RTN was the recipient of the first ASEAN MINERAL AWARD embodying “Sustainable Mineral Development,” which ensures that its operation does not compromise the land and environment the Company operates.

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 1634 Taguig City
Project Site Office:	Rio Tuba Mine Complex Bgy. Rio Tuba, Bataraza 5306 Palawan
Telephone No.:	02-798-7622 02-798-7623 (fax)
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

Contact Persons

Name:	**Engr. Rommel L. Cruz**
Designation:	SVP and Head of Production
Company:	Nickel Asia Corporation

Main Office:	29th Floor NAC Tower 32nd Street, Bonifacio Global City, Taguig City 1634
Telephone:	+63-917-857-2180
Email Address:	rommel.cruz@nickelasia.com

Name:	**Engr. Ronelbert A. Suguitan**
Designation:	OIC - Resident Mine Manager
Company:	Rio Tuba Nickel Mining Corporation
Main Office:	Rio Tuba Mine Complex Bgy. Rio Tuba, Bataraza, 5306 Palawan
Telephone:	+63-917-893-7701
Email Address:	ronel.suguitan@rtn.nickelasia.com

Name:	**EnP. Janice M. Tupas**
Designation:	MEPEO
Company:	Rio Tuba Nickel Mining Corporation
Main Office:	Rio Tuba Mine Complex Bgy. Rio Tuba, Bataraza, 5306 Palawan
Telephone:	+63-917-590-0387
Email Address:	janice.tupas@rtn.nickelasia.com

3.0 Introduction

Since 1998, RTN converted to MPSA the 990 hectares out of the total 5,211 hectares covered by its mining claims wherein in October 2019, an order for the conversion of the remaining Mining Lease Contracts (MLCs) was approved by the DENR to include a total of 3,548.44 hectares through MPSA No. 114-98-IVAmended I **(Annex 1)**. However, the RTN's MPSA expired on October 8, 2021, in which renewal application has been lodged and submitted within the allotted time. Meantime that the new agreement is to be signed, an authority for RTNMC to continue operations pending the approval of its application for renewal of MPSA No. 114-98-IV-Amended I was issued last September 2021 **(Annex 2)**.

The amended MPSA was also issued with ECC-CO-1312-0043 **(Annex 3)** in March 2015 for the Rio Tuba Beneficiated Nickel Silicate Ore Expansion (Production/ Extraction Output) Project with a maximum annual extraction rate of 4.0 Million WMT of saprolite ores and 6.0 Million WMT of limonite, and yearly production capacity of 3.0 Million WMT of saprolite ores and 5.0 Million WMT of limonite within the 990 hectares of the MPSA superseding the ECC-CO-9612-008-302. Meanwhile, ECC-CO-1906-0015 **(Annex 4)** cover the nickel ore mining project under MPSA No. 114-98-IV Amended I as approved by the MGB through contour method at an annual extraction rate of 4.8 MWMT (1.1 MWMT of saprolite ore, 2.4 MWMT of limonite or for HPAL feed, 1.0 MWMT of limonite (no assay) and 0.3 MWMT of wastes) within MPSA Amended I (initially tagged as AMA-IVB-144A). The project was limited to areas within the Municipality Bataraza, Palawan and shall have the following major components:

- Mining areas;
- Bulanjao field office;
- Bulanjao motor pool;
- Hauling and access roads; and
- Other facilities shared with existing RTNMC operations (townsite infrastructure, mine and plant facilities, fuel storage, and RTNMC domestic water system)

While the pollution control facilities/structures and equipment shall include

- Silt control (siltation ponds, drainage canals and culverts);
- Dust emission control (water trucks);
- Heavy metal control measures;
- Wastewater treatment facilities; and
- Solid/hazardous waste management facilities (i.e. oil-water separators)

Generally, RTNMC Nickel Mining Project is working in an aggregated area of 4,538.44 hectares with 1 MPSA and the 2 ECCs, while the Company is also working on consolidating these two (2) ECCs.

Contract/Permit	
Contract/Permit Number	MPSA No. 114-98-IV-Amended I
Contractor/Permit Holder	Rio Tuba Nickel Mining Corporation
Status of MA/FTAA/MPP	N/A
Date Approved	October 28, 2019
Date of Expiration	October 8, 2021 (w/permission to continue operation)
Total Area Covered	4,538.44 hectares
Location of Contract/Permit Area	Bgy. Rio Tuba, Bataraza, Palawan
Issuing Office	Office of the DENR Secretary
Operating Agreement	
Name of Authorized Operator, if any	N/A
Date of Execution of the OA	N/A
Deed of Assignment	N/A
Name of Assignee, if any	N/A
Date of Execution of the Deed	N/A
Environmental Compliance Certificate	
ECC Reference Number	ECC-CO-1312-0043[1] ECC-CO-1906-0015[2]
Date of Issuance	March 9, 2015[1] August 22, 2019[2]
Total Area Covered	4,538.44 hectares
Location of the Project	Barangay Rio Tuba, Ocayan, and Taratak, Bataraza, Palawan
Issuing Office	DENR - EMB
Ore Supply Agreement (for MPP)	
Contracted Ore Supplier	N/A
Details of Mining Rights of Ore Supplier	N/A

4.0 Project Description

4.1 Project Details

4.1.1 Project Location

Rio Tuba Nickel Mining Corporation (RTNMC) are located in Barangay Rio Tuba, Ocayan and Taratak, Municipality of Bataraza, and Province of Palawan. The project site is bounded by 8°32'55" - 8°37'09" latitude and 117°21'23" - 117°26'09" longitude and approximately 850 kilometers from Manila, wherein most of the facilities are located. Meanwhile, other areas to be mined are bounded by the coordinates shown in Table 1, the project location in Figure 1 and **Annex 5**.

The land use of the MPSA area is classified as Mineral Development Area based on the MCLUP approved by the Sangguniang Panlalawigan on 10 January 2010. Meanwhile, the 2014 ECAN Map **(Annex 6)** classifies the MPSA area as Controlled-use except for areas above 1000m. Accordingly, RTNMC committed to excluding this section from the MPSA.

RTN has held an MLC covering the project site since 1979 and approved for an MPSA at the Mines and Geosciences Bureau (MGB). Hence, generally, there is no tenurial or land issue covered within the MPSA. However, with RTN encouragement and assistance, the mining periphery is currently applied for CADT by the Indigenous People in the area, covering about 5,000-ha of the mining claim as part of the Ancestral Domain.

Table 1. MPSA-114-98-IV Amended I boundary coordinates

ID	PRS92 LATITUDE			PRS92 LONGITUDE			ID	PRS92 LATITUDE			PRS92 LONGITUDE		
MPSA 114-98-IV (PARCEL 1)													
1	8	33	14.6800	117	24	59.5500	28	8	36	29.9930	117	23	1.8150
2	8	33	24.4460	117	24	59.5500	29	8	36	29.9930	117	22	52.0020
3	8	33	24.4460	117	24	49.7410	30	8	36	39.5790	117	22	52.0020
4	8	33	43.9770	117	24	49.7410	31	8	36	39.5790	117	23	21.4410
5	8	33	43.9770	117	24	39.9320	32	8	36	29.9930	117	23	21.4410
6	8	34	3.5080	117	24	39.9320	33	8	36	29.9930	117	23	31.2540
7	8	34	3.5080	117	24	30.1230	34	8	35	41.1650	117	23	31.2540
8	8	34	13.2740	117	24	30.1230	35	8	35	41.1650	117	23	41.0670
9	8	34	13.2740	117	24	39.9320	36	8	35	31.3990	117	23	41.0670
10	8	34	42.5710	117	24	39.9320	37	8	35	31.3990	117	24	39.9320
11	8	34	42.5710	117	24	49.7410	38	8	35	21.6330	117	24	39.9320
12	8	34	52.3370	117	24	49.7410	39	8	35	21.6330	117	25	19.1840
13	8	34	52.3370	117	24	59.5500	40	8	35	2.1020	117	25	19.1840
14	8	35	2.1020	117	24	59.5500	41	8	35	2.1020	117	25	28.9970
15	8	35	2.1020	117	24	20.3190	42	8	34	52.3370	117	25	28.9970
16	8	34	52.3370	117	24	20.3190	43	8	34	52.3370	117	25	38.8100
17	8	34	52.3370	117	23	50.8800	44	8	34	42.5710	117	25	38.8100
18	8	35	2.1020	117	23	50.8800	45	8	34	42.5710	117	25	48.6230
19	8	35	2.1020	117	23	41.0670	46	8	34	23.0400	117	25	48.6230
20	8	35	31.3990	117	23	41.0670	47	8	34	23.0400	117	25	58.4360
21	8	35	31.3990	117	23	1.8150	48	8	33	53.7430	117	25	58.4360
22	8	35	50.9300	117	23	1.8150	49	8	33	53.7430	117	25	48.6230
23	8	35	50.9300	117	23	21.4410	50	8	33	43.9770	117	25	48.6230
24	8	36	10.4610	117	23	21.4410	51	8	33	43.9770	117	25	28.9970
25	8	36	10.4610	117	23	11.6280	52	8	33	24.4460	117	25	28.9970
26	8	36	20.2270	117	23	11.6280	53	8	33	24.4460	117	25	19.1840
27	8	36	20.2270	117	23	1.8150	54	8	33	14.6800	117	25	19.1840

ID	PRS92						ID	PRS92					
	LATITUDE			LONGITUDE				LATITUDE			LONGITUDE		
AMA-IVB-144A (PARCEL 2)													
1	8°	33'	14.6800"	117°	24'	59.5500"	**36**	8°	36'	10.4610"	117°	23'	31.2540"
2	8°	33'	14.6800"	117°	24'	0.6930"	**37**	8°	36'	10.4610"	117°	23'	41.0670"
3	8°	32'	55.1480"	117°	24'	0.6930"	**38**	8°	36'	0.6950"	117°	23'	41.0670"
4	8°	32'	55.1480"	117°	21'	53.1710"	**39**	8°	36'	0.6950"	117°	23'	50.8800"
5	8°	33'	04.9140"	117°	21'	53.1710"	**40**	8°	35'	50.9300"	117°	23'	50.8800"
6	8°	33'	04.9140"	117°	21'	33.5450"	**41**	8°	35'	50.9300"	117°	24'	20.3010"
7	8°	33'	14.6800"	117°	21'	33.5450"	**42**	8°	35'	31.3990"	117°	24'	20.3010"
8	8°	33'	14.6800"	117°	21'	23.7320"	**43**	8°	35'	31.3990"	117°	24'	10.4995"
9	8°	35'	31.3990"	117°	21'	23.7320"	**44**	8°	35'	31.3990"	117°	23'	55.78325"
10	8°	37'	8.5960"	117°	23'	6.7220"	**45**	8°	35'	31.3990"	117°	23'	41.0670"
11	8°	37'	8.5960"	117°	23'	31.2540"	**46**	8°	35'	16.7505"	117°	23'	41.0670"
12	8°	36'	29.9930"	117°	23'	31.2540"	**47**	8°	35'	2.1020"	117°	23'	41.0670"
13	8°	36'	29.9930"	117°	23'	21.4410"	**48**	8°	35'	2.1020"	117°	23'	50.8800"
14	8°	36'	39.5790"	117°	23'	21.4410"	**49**	8°	34'	52.3370"	117°	23'	50.8800"
15	8°	36'	39.5790"	117°	23'	6.7215"	**50**	8°	34'	52.3370"	117°	24'	5.5995"
16	8°	36'	39.5790"	117°	22'	52.0020"	**51**	8°	34'	52.3370"	117°	24'	20.3190"
17	8°	36'	29.9930"	117°	22'	52.0020"	**52**	8°	35'	2.1020"	117°	24'	20.3190"
18	8°	36'	29.9930"	117°	23'	1.8150"	**53**	8°	35'	2.1020"	117°	24'	33.3960"
19	8°	36'	20.2270"	117°	23'	1.8150"	**54**	8°	35'	2.1020"	117°	24'	46.4730"
20	8°	36'	20.2270"	117°	23'	11.6280"	**55**	8°	35'	2.1020"	117°	24'	59.5500"
21	8°	36'	10.4610"	117°	23'	11.6280"	**56**	8°	34'	52.3370"	117°	24'	59.5500"
22	8°	36'	10.4610"	117°	23'	21.4410"	**57**	8°	34'	52.3370"	117°	24'	49.7410"
23	8°	36'	0.6955"	117°	23'	21.4410"	**58**	8°	34'	42.5710"	117°	24'	49.7410"
24	8°	35'	50.9300"	117°	23'	21.4410"	**59**	8°	34'	42.5710"	117°	24'	39.9320"
25	8°	35'	50.9300"	117°	23'	11.6280"	**60**	8°	34'	27.9225"	117°	24'	39.9320"
26	8°	35'	50.9300"	117°	23'	1.8150"	**61**	8°	34'	13.2740"	117°	24'	39.9320"
27	8°	35'	41.1645"	117°	23'	1.8150"	**62**	8°	34'	13.2740"	117°	24'	30.1230"
28	8°	35'	31.3990"	117°	23'	1.8150"	**63**	8°	34'	3.5080"	117°	24'	30.1230"
29	8°	35'	31.3990"	117°	23'	14.8990"	**64**	8°	34'	3.5080"	117°	24'	39.9320"
30	8°	35'	31.3990"	117°	23'	27.3780"	**65**	8°	33'	53.7425"	117°	24'	39.9320"
31	8°	35'	31.3990"	117°	23'	41.0670"	**66**	8°	33'	43.9770"	117°	24'	39.9320"
32	8°	35'	41.1650"	117°	23'	41.0670"	**67**	8°	33'	24.4460"	117°	24'	39.9320"
33	8°	35'	41.1650"	117°	23'	31.2540"	**68**	8°	33'	24.4460"	117°	24'	49.7410"
34	8°	35'	53.3720"	117°	23'	31.2540"	**69**	8°	33'	24.4460"	117°	24'	59.5500"
35	8°	36'	5.5790"	117°	23'	31.2540"							

ID	PRS92						ID	PRS92					
	LATITUDE			LONGITUDE				LATITUDE			LONGITUDE		
MPSA 114-98-IV (PARCEL 1)													
1	8	33	14.6800	117	24	59.5500	**28**	8	36	29.9930	117	23	1.8150
2	8	33	24.4460	117	24	59.5500	**29**	8	36	29.9930	117	22	52.0020
3	8	33	24.4460	117	24	49.7410	**30**	8	36	39.5790	117	22	52.0020
4	8	33	43.9770	117	24	49.7410	**31**	8	36	39.5790	117	23	21.4410
5	8	33	43.9770	117	24	39.9320	**32**	8	36	29.9930	117	23	21.4410
6	8	34	3.5080	117	24	39.9320	**33**	8	36	29.9930	117	23	31.2540
7	8	34	3.5080	117	24	30.1230	**34**	8	35	41.1650	117	23	31.2540
8	8	34	13.2740	117	24	30.1230	**35**	8	35	41.1650	117	23	41.0670
9	8	34	13.2740	117	24	39.9320	**36**	8	35	31.3990	117	23	41.0670
10	8	34	42.5710	117	24	39.9320	**37**	8	35	31.3990	117	24	39.9320
11	8	34	42.5710	117	24	49.7410	**38**	8	35	21.6330	117	24	39.9320
12	8	34	52.3370	117	24	49.7410	**39**	8	35	21.6330	117	25	19.1840
13	8	34	52.3370	117	24	59.5500	**40**	8	35	2.1020	117	25	19.1840
14	8	35	2.1020	117	24	59.5500	**41**	8	35	2.1020	117	25	28.9970
15	8	35	2.1020	117	24	20.3190	**42**	8	34	52.3370	117	25	28.9970
16	8	34	52.3370	117	24	20.3190	**43**	8	34	52.3370	117	25	38.8100
17	8	34	52.3370	117	23	50.8800	**44**	8	34	42.5710	117	25	38.8100
18	8	35	2.1020	117	23	50.8800	**45**	8	34	42.5710	117	25	48.6230
19	8	35	2.1020	117	23	41.0670	**46**	8	34	23.0400	117	25	48.6230
20	8	35	31.3990	117	23	41.0670	**47**	8	34	23.0400	117	25	58.4360
21	8	35	31.3990	117	23	1.8150	**48**	8	33	53.7430	117	25	58.4360
22	8	35	50.9300	117	23	1.8150	**49**	8	33	53.7430	117	25	48.6230
23	8	35	50.9300	117	23	21.4410	**50**	8	33	43.9770	117	25	48.6230
24	8	36	10.4610	117	23	21.4410	**51**	8	33	43.9770	117	25	28.9970
25	8	36	10.4610	117	23	11.6280	**52**	8	33	24.4460	117	25	28.9970
26	8	36	20.2270	117	23	11.6280	**53**	8	33	24.4460	117	25	19.1840
27	8	36	20.2270	117	23	1.8150	**54**	8	33	14.6800	117	25	19.1840

Figure 1. Photo of the Mine Location

Drone photo: RTN Minesite & Plantsite (Looking Northwest & showing various facilities such as sun drying areas, silt containment ponds, active areas, rehabilitation areas, and GPI & CBNC facilities)

Drone photo: RTN Minesite (Looking Southwest & showing Mangingidong rehabilitation area, active mine, Ecotourism area and portion of CBNC tailings storage facility no. 2)

Drone photo: RTN Townsite and other residential area in Barangay Rio Tuba along Macadam Road

Photo: RTN Pier loading facility

4.1.2 Estimated Project Cost

a. As of end December 2020, the company's total assets are estimated at Php 4,846,975.00 million broken down as follows:

Table 2. Project Cost Estimates

Particulars	(x Php 1,000)
Current Assets	
Cash and cash equivalents	2,296,601
Trade and other receivables	659,189
Inventories	504,001
Other current assets	40,164
Total Current Assets	**3,499,955**
Noncurrent Assets	
Property and equipment	903,730
Other noncurrent assets	302,468
Deferred income tax assets	140,822
Total Noncurrent Assets	**1,347,020**
Total Assets	**4,846,975**

b. The estimated Mining and Milling Cost for the 2022 mining operation is summarized below with Php 877, 362, 395. 00.

Table 3. Estimated DMMC for 2022

Mining activities & equipment operation	TOTAL, Php
In-house_Dump Truck	107,626,723
In-house_Track Excavator	23,133,453
In-house_Wheel Excavator	7,531,232
In-house_Wheel Loader	54,258,954
In-house_Bulldozer	15,881,274
In-house_Mobile Screener	6,247,567
In-house_Stationary Screener (Grizzly)	915,730
In-house_Mobile Crusher	6,506,316
Rental_Track Excavator	2,145,918
Rental_Wheel Loader	40,243,533
Rental_Breaker	3,729,837
Contract Mining_Dump Truck	85,726,387
Contract Mining_Track Excavator	839,777
Agency Services_Manual Sorting	2,513,145
In-house_Dump Truck	147,545,371
In-house_Track Excavator	81,771,099
In-house_Wheel Excavator	19,518,801
In-house_Wheel Loader	90,875,828
In-house_Bulldozer	92,239,478
In-house_Compactor	55,568
In-house_Road Grader	8,042
In-house_Breaker	300,063
Rental_Track Excavator	4,488
Rental_Bulldozer	80,251
Contract Mining_Dump Truck	83,015,314
Contract Mining_Track Excavator	4,648,243
ESTIMATED DMMC for NICKEL OPERATION	**877,362,395**

4.1.3 Types of Minerals and Ores

Lateritic nickel ore is the only mineral of interest in the property. It is formed by intensive tropical weathering of olivine-rich ultramafic rocks. It is generally composed of two accumulated zones: an upper laterite zone and a lower saprolite zone. The mineral composition found in the saprolite zone is serpentine, talc, garnierite, quartz and goethite. The iron minerals of the laterite are goethite, magnetite, hematite, magneto-hematite and limonite. Chromite is also present but not so common.

For lateritic deposits, the typical profile starting from the surface is; overburden, limonite, saprolite and then the parent rock or bedrock. Overburden is the layer where vegetation grows with relatively very low nickel content. The Limonite zone is characterized by its high iron content (usually >20%) but relatively low nickel. Saprolite is the zone where nickel is enriched, so a relatively high percentage of Ni characterizes it but low %Fe. As you go down further, %Ni values will drop due to the unweathered and unmineralized property of the parent rock or bedrock zone.

The figure below to the right shows the typical thickness of the overburden, limonite and saprolite layers. The aggregate thickness of the limonite and saprolite varies between 20-30 meters.

4.1.4 Mining Method/s

The process for the production of nickel ore is by surface mining following a sequence of operations consisting of drilling, planning and survey, clearing and overburden removal, limonite and saprolite mining, ore beneficiation, ore hauling and shipment (Figure 2).

A rigid grade control procedure is followed starting at the pit up to shipment to ensure that the final product is within the market specifications. The saprolite ore mining operation will have an annual

production of around 2,000,000 wet metric tons (WMT) of nickel silicate ore with grade of around 1.45% Ni and 14.12% Fe. The major activities are:

- Soft ore mining
- Hard ore mining
- Beneficiation involving solar drying of raw soft ore, reclamation of solar dried ore, screening and crushing and transfer of marginal ore to stockpiles
- Ore hauling and stockpiling of beneficiated ore

Presently, RTNMC markets its 1.50 % Ni saprolite ores to Japan and China. In addition, China also buys 1.40, 1.35 and 1.20 % Ni saprolite ores.

DESCRIPTION OF THE PROCESS

a) Development Drilling

This is needed to delineate ore locations and determine pit limits. It is a vital requirement before actual mining commence. Present and future drilling works are needed for the development and planning of the mine areas. The three stages for development drilling are:

1. Using a 100m x 100m grid spacing to verify exploratory areas with no subsurface data;
2. Using a 50m x 50m grid spacing in-fill drilling to verify the areas inside or near the 100m x 100m holes to verify the ore extent in semi-detailed;
3. Using a 25m x 25m (or 20m x 20m) in-fill drilling to verify the ore extent in detailed.

During Stage 1, Limonite ores are upgraded as Indicated Resources category while Saprolite ores as Inferred Resources category. For Stage 2, Limonite ores are upgraded from Indicated to Measured Resources category while Saprolite ores from Inferred to Indicated Resources category. Stage 3 development drilling was conducted in areas of Guintalunan, Mangingidong and Umawi. Meanwhile, confirmatory drilling was conducted in Bulanjao Area. Drilling is conducted in-house.

b) Mine Planning and Survey

Mine plans are generated after delineation of volume and grade of the nickel silicate ore. This includes stripping and mining limits, design of haul roads and ramps, establishment of drainage system, computation of equipment requirement, and creation of work schedule. These plans are used for both implementation and control.

Another important component of mine planning is survey. This involves, daily excavation mapping and routine survey works of mine advance, elevations, and extracted volumes.

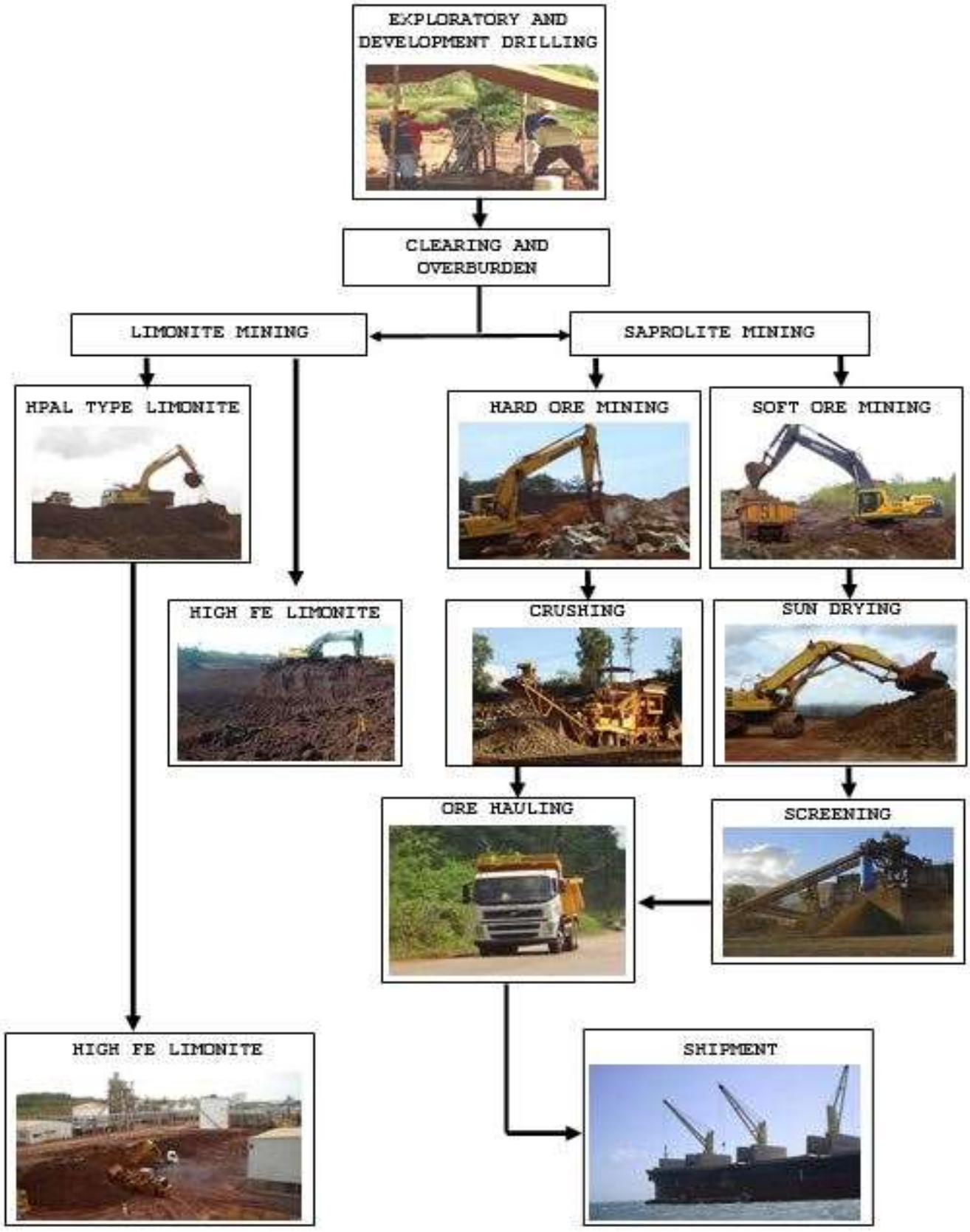


Figure 2. Mine operations Flowsheet

Surveys and plans shall ensure that there are sufficient provisions of areas to serve as buffer especially to areas that are to be opened. These areas should be planted with trees and necessary vegetation to serve as barriers of the adjacent area from the disturbance of the mining operation. Likewise, the plans and survey shall ensure that the operation shall not cross the delineated and approved MPSA limits.

c) Clearing and Grubbing

The area scheduled for mining is first cleared and grubbed of its topical trees and vegetation using bulldozers. Clearing and grubbing are normally undertaken months ahead of mining to expose the surface of the area for a longer time. The long surface exposure further reduces the moisture content of the ore to be mined. Large trees are separated from topsoil for areas that will be subjected for stripping. These trees are then collected and piled at designated area.

d) Overburden Waste Handling (Topsoil)

Overlying saprolite and limonite ore zones are thin soil and very low-grade lateritic materials. Since the material is heavily weathered and rippable, no blasting is conducted. The overburden waste to ore ratios for the nickel deposits is negligible. Overburden removal is conducted during the devegetation activities. To ensure smooth operations, a good drainage system in mining and stockpile areas are maintained.

Using tracked excavators, loaders and other appropriate equipment, topsoil is recovered, hauled and dumped directly to mined-out areas as part of the progressive rehabilitation program. This will give best results as it prevents or reduces biological deterioration of the soil. If the mined-out areas are not yet ready for rehabilitation, topsoil is stockpiled with the following conditions:

- Soils should not be stripped when they are wet or during rainy events as this can lead to loss of structure;
- Avoid the use of scrapers to build stockpiles as they will compact the soil reducing biological activity;
- Store at low mounds no more than 2 to 3 meters high;
- Stockpile location must be signposted;
- Truck volumes and topsoil stripped must be recorded and inventoried;
- Locate the stockpiles where they will not be disturbed by future mining;
- Conduct tree/grass planting on the stockpile to protect the soil from erosion of the pile will not be used within 6 months;
- Continual checking and inspection must be undertaken to the topsoil piles.

e) Limonite Mining

The limonite nickel ore reserves of RTNMC are both in the form of insitu (in-the-ground) ore and stockpiled ore. These low-grade nickel limonite ores are further classified into 1) HPAL – Type one with grades above 0.8% Ni and above 20% Fe; and 2) Hi-Fe ore with grades below 0.8% Ni and averaging at least 48% Fe. The HPAL – Type limonite ores are sold to CBNC's HPAL Processing Plant, while the Hi-Fe limonite ores are shipped out to China. Figure 3 describes the limonite production process.

e.1 In–Situ Limonite Ore Mining

In-situ limonite nickel ores are mined employing open pit mining using conventional mining equipment such as backhoes, wheel loaders, off-highway trucks, bulldozers, etc. This is normally carried out during the wet months from May up to November. Face sampling is conducted in the 3-meter benches every 5 meters by cutting a continuous channel. The limonite ores are classified into HPAL-type ore and Hi-Fe ores based on the sampling results. Backhoes with a 1.8 cubic meter bucket size are used to excavate the limonite ores and load onto dump trucks and delivered to Hydrometallurgical Processing Plant (HPP) or to the designated mine stockpile yard.

e.2 Stockpiled Limonite Ore Retrieving

The existing ore stockpiles are piled separately according to ore quality. The various ore stockpiles have been drilled previously and based on the drill hole assay results; a stockpiled retrieving plan is generated. The retrieval of ore from stockpiles shall be done using excavators fitted within1.6 cubic meters backhoe and 15 cubic meters dump trucks. Ore retrieving within soft-ground stockpiles will employ the "retreating method" wherein both the loading unit and dump trucks are positioned on top of the ore block being excavated. By this method, all the equipment is always on the stable ground during its operation in contrast to the "advancing method." Retrieved ore from stockpiles are then loaded into dump trucks, transported, and dumped at HPP's ore stockpile area or at pier stockyard depending on ore classification.

e.3 HPP Limonite Ore Feeding

Using a Front-End loader, the ore from the HPP stockyard are retrieved, hauled and dumped into the Receiving Hopper of the HPP's Ore Preparation Area. Within the Ore Preparation Area, the lateritic ores are then washed and screened separating the -1.40 mm fraction from the +1.40 mm size fraction. Rejected oversize materials are hauled back by RTNMC onto designated oversize ore stockyard. Depending on the quality of these oversize materials it may be shipped/exported to interested ore buyers. The -1.40 mm size (undersize materials) comprises the final products to be sold to CBNC.

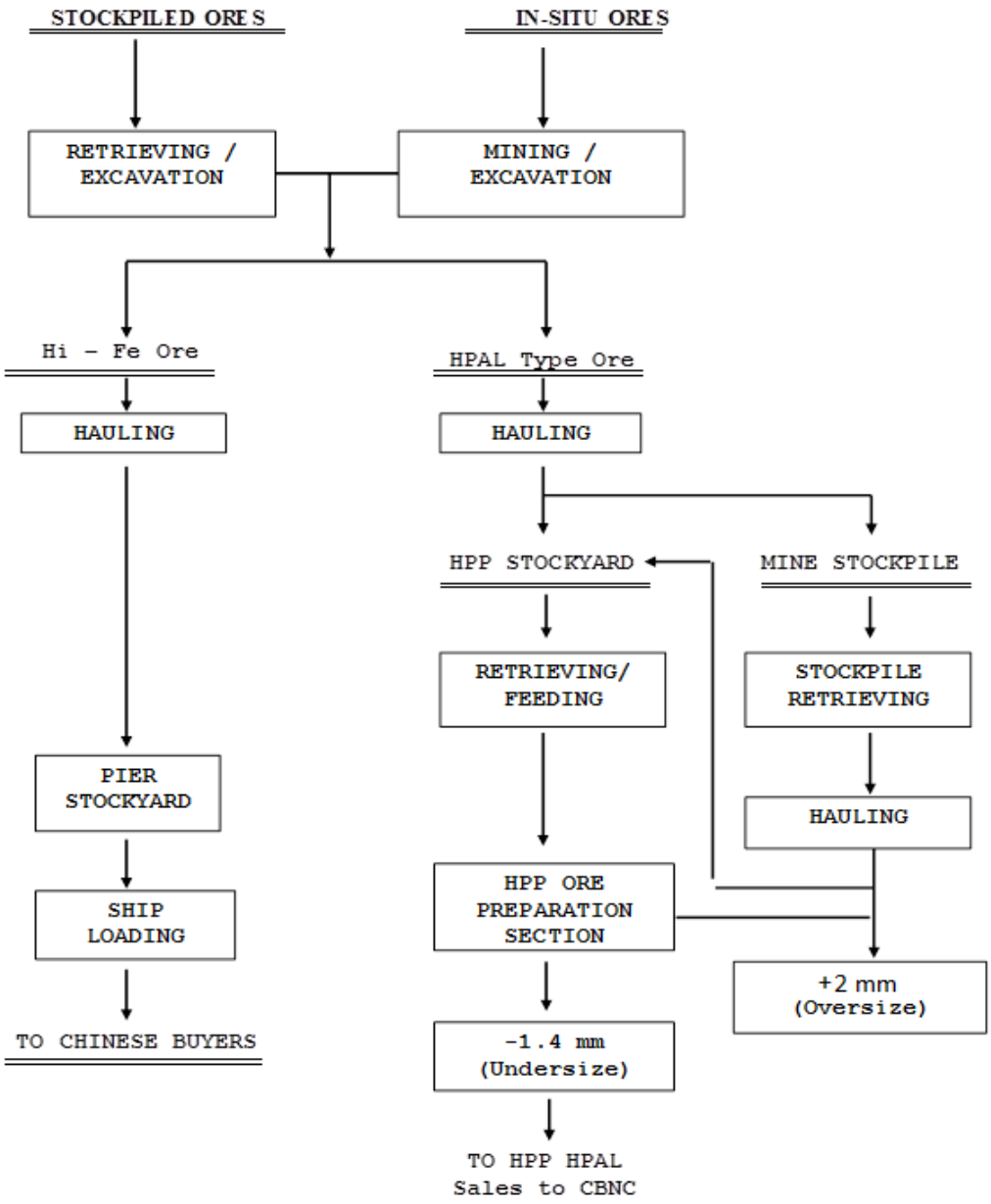


Figure 3. Limonite Operations Flowsheet

f) Saprolite Mining

f.1 Soft Ore Mining

This is typically carried out from January to March each year to provide ample time for the solar drying of the mined ore. Selective mining and ore segregation are guided by the results of sampling. The 3-meter benches are face-sampled every 5 meters by cutting a continuous channel. Based on the sampling results, the ore is classified into various ore classes. Backhoes with 1.6 cubic meter bucket size are used to selectively draw the nickel ore. Materials belonging to any one of the soft ore classes are loaded, hauled and dumped separately on designated piling spaces at solar drying area.

f.2 Hard Ore Mining

Hard ore is found on the top and within the saprolite zone. Mining of this ore is undertaken throughout the year. The use of explosives through blasting is not being employed in breaking hard ore materials. Using hydraulic breakers, hard ore is broken into smaller fragments enough to be loaded in dump trucks. The boulders are then brought to the breaking field stockyard where they are again broken down to about 200-mm diameter. The fragmented hard ore is then sorted according to various hard ore classifications.

Size reduction of the hard ore to 200 mm at the breaking field stockyard prevents the dilution by low-grade boulder chips with the soft ore at the pit. Hard ore mixed with the laterite and low-grade soft ore drawn from the pit is recovered in the stockpiles. This recovery employs the locals who are paid on a per cubic meter handpicked ore basis. The hard ore from the breaking field stockyards and those handpicked from the stockpiles are hauled and dumped for further crushing at the crusher feed stockyard. A typical cross-section of saprolite soft ore and hard ore mining area is shown below:

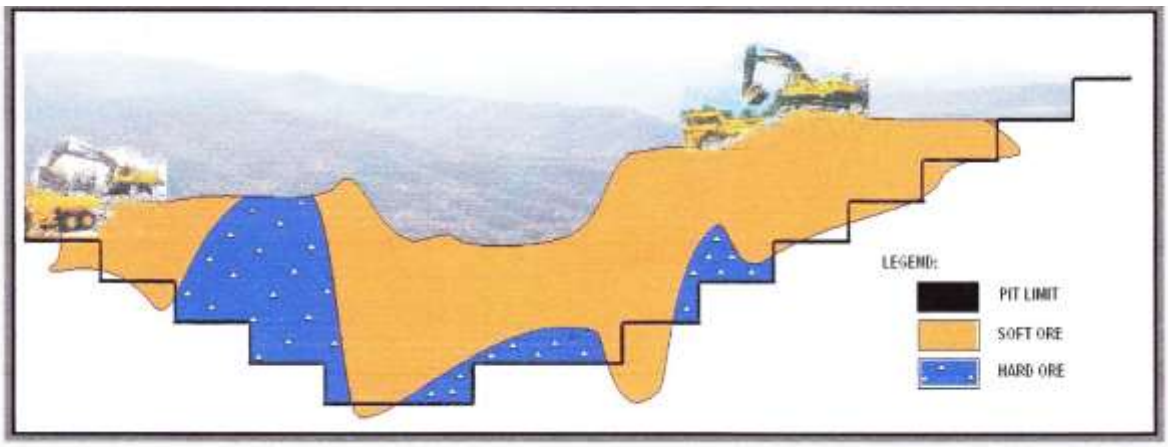


Figure 4. Typical Cross Section of Saprolite ore showing Soft and Hard ore portions

f.3 Saprolite Ore Beneficiation

Only saprolite ores for export to Japan and China are subjected to beneficiation. This involves solar drying of soft ore, reclamation of solar-dried ore, screening of soft ore, transferring of marginal ore, and crushing of hard ore. The sequence of operation comprising solar drying activity is presented in Figure 5.

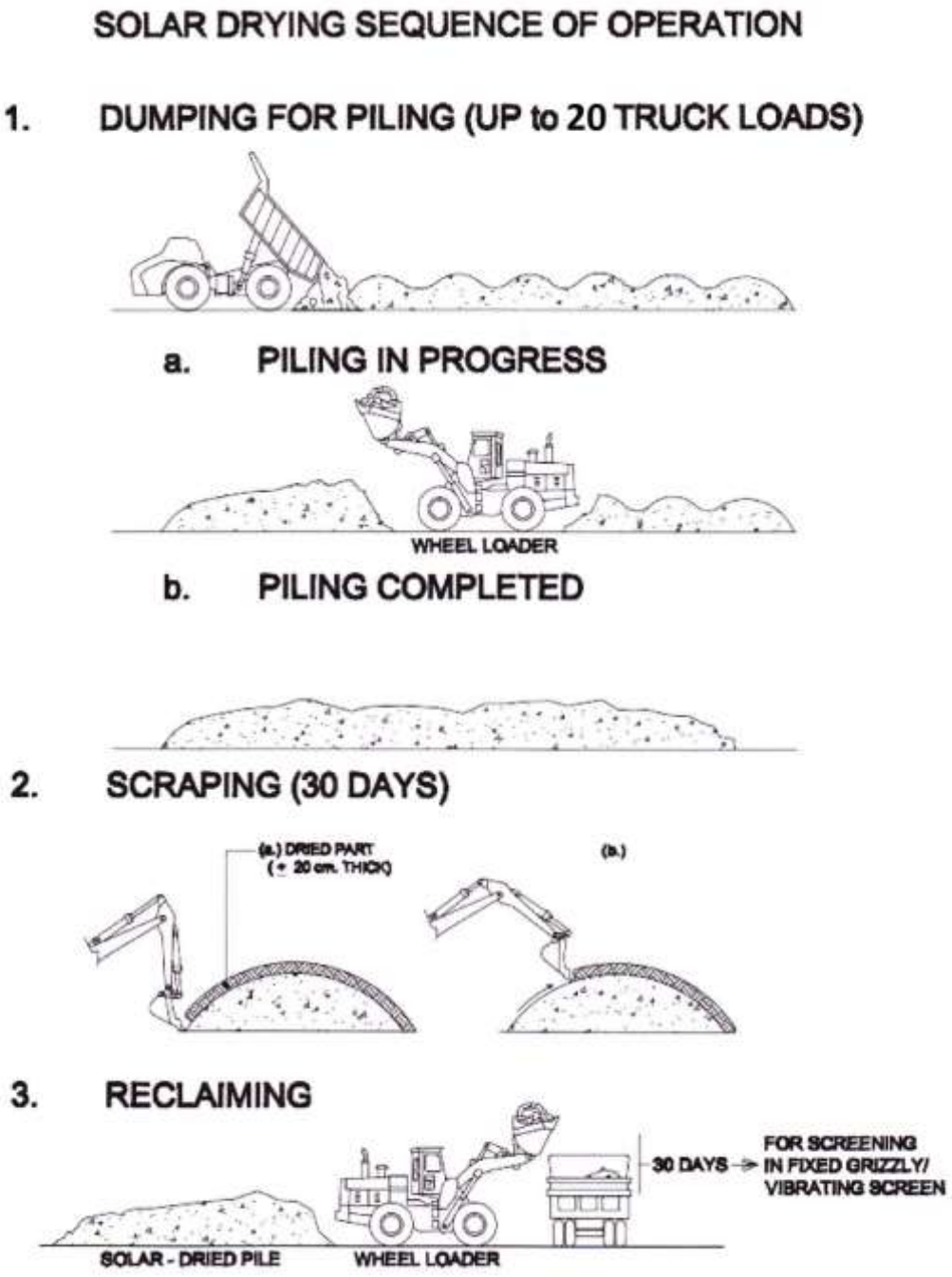


Figure 5. Solar Drying Sequence

f.4 Solar Drying of Soft Ore

This is executed during dry period each year from January to first week of May. This run of mine ore is hauled and dumped to designated solar drying area. A total of 20 truckloads is equivalent to 300 cubic meters from a solar dry pile. A pile, which is triangular in section, has a base of about 5m, height of 2.7m, and length of about 40m. The pile is scraped using hydraulic track excavators provided with a specially designed 6m long blade. About 20cm thick of the surface of one side of the pile is scraped and pushed over the top of the pile towards the other side. Scraping is done twice daily. It takes about 30 days or 60 scrapes to

bring the moisture content of the mined raw soft ore from 44% H20 to 32% H20.

f.5 Reclamation of Solar Dried Ore

Once the desired range for moisture content is reached, these piles are then ready for reclamation. Wheel loaders are used to load the ore into dump trucks for hauling and delivered to their respective stockpile at pier stockyard. Reclamation is done by batch according to ore classification.

f.6 Screening of Soft Ore

RTNMC maintains fixed grizzly with a size of 6m x 7m bars set a 50mm, top tapered to 120mm bottom openings and inclined at 30 degrees. The solar-dried ore is fed to the fixed grizzly line to scalp the oversize material larger than the required shipment size of less than 200 mm. The screening rate averages 160 tons per hour for the fixed grizzly. The oversize of the fixed grizzly is then fed to the portable crusher for further size reduction. The grizzly undersize together with the crushed oversize materials constitute the beneficiated nickel silicate soft ore products.

f.7 Transfer of Marginal Ore

After sampling and analysis, ores piled at solar drying area found not conforming to quality specifications are considered as marginal ores. These are then reclaimed, hauled, and dumped to the appropriate stockpile where it is stored and monitored waiting for proper market specification and demand.

f.8 Crushing of Hard Ore

Hard ore materials stockpiled at the crusher feed stockyard is fed to a portable jaw crusher with dimensions 500 x 500mm and discharge opening of 100mm. The crusher has a capacity of around 200 tons per hour. From February to May, crushing is at 16 hours per day simultaneous with the screening of solar dried soft ore while 8 hours per day for January and the rainy months from June to December. During this period, 10% of the year's required beneficiated nickel silicate ore production is generated.

g) Ore Shipment

g.1 Ore Hauling

Beneficiated nickel silicate ore (saprolite) and Hi-Fe limonite ores from the mine site are loaded using wheel loaders or backhoes and hauled 7km away to the pier ore stockyard by dump trucks. The unpaved portion of the haul road is maintained regularly by road graders and rollers to minimize dust generation. In addition, water trucks are further used to

suppress the dust. At present, the 7km Macadam haulage road is entirely concrete.

g.2 Ore Stockpiling

The beneficiated saprolite and Hi-Fe limonite ores are transported and stockpiled at the 38-hectare pier ore stockyard. The stockpiling is in accordance with the established ore classification based on %Ni and %Fe content for grade control purposes during shipment. For easy handling and grade control, each stockpile is limited to about 18,000 WMT. To prevent excessive saturation and maintain lower moisture content, the ore stockpiles are covered with canvass sheets. Covering and uncovering of the stockpile is an essential part of the operations. This generates employment to the Muslims in the area.

g.3 Shipment

Ore vessels anchor almost 3 km offshore due to shallow water. From the stockyard, wheel loaders are used to load the stockpiled ore materials onto dump trucks and deliver to pier area about 0.5-1.5 kilometer. Ores are then dumped directly to a 200-MT small barge anchored alongside the beaching area. The two 200-MT loaded barges are towed by one tugboat to the vessel. Furthermore, there are rental barges/LCT with 1000-1200MT capacity being used to deliver ores directly to the vessel. The ore is loaded unto the vessels' hatch using its crane. Usually, it takes 6-7 days to completely load 50,000-55,000WMT of ore with 8 barges and 6 rental LCT operating 24-hours a day. The ore is delivered and sold to China or Japan.

Figure 6. Aerial Photo of Pier Stockyard

With the target shipment of 1.350 WMT of ores to different buyers in 2022, the expected ore boats are expected to be loaded on the following schedule, thus, overstocking and extended stockpiling will not happen.

Table 4. Schedule of Ore Stockpiling at Piersite Stockyard

Date of Stock	Estimated Volume (WMT)	Target Date of Shipment	Estimated Volume (WMT)
1Q-2021	641,500	1Q-2021	650,000
2Q-2021	438,500	2Q-2021	215,000
3Q-2021	105,000	3Q-2021	0
4Q-2021	165,000	4Q-2021	485,000

4.1.5 Estimated Production

Extraction of the target products is from the current active mining areas in Guintalunan and Mangingidong Pits within the allowable 162-hectares disturbed area as host to a processing plant, HPP of Coral Bay Nickel Corporation. **Annex 7** elaborates the tentative land-uses of the Company as of October 2021.

Table 5. Estimated Production for 2022

Material	Volume (WMT)
A.1 Saprolite Ore	1,350,000
A.2 Limonite Ore	
Extraction	3,700,000
Production	3,500,000
A.3 Waste	
Saprolite	68,113
Limonite	62,000

Table 6. Land-use as of October 2021

Land Use	Total
Active Area	43.28
Rehabilitated Area	204.04
RTN ancillary area	394.86
CBNC use	537.51
GPI use	1.90
National Highway	20.22
Total Disturbed	**1,201.81**
Total Undisturbed	**3,336.63**
Total MPSA	**4,538.44**

4.1.6 Mill/Processing Plant

Nickel ore mining in Rio Tuba does not undergo processing and milling processes. Despite that the operation of the Coral Bay Nickel Corporation's Hydrometallurgical Processing Plant is within the MPSA of RTNMC, this is a separate operation of a different entity.

4.1.7 Proposed mine life (in years)

Based on the long-range mining/production plan and the existing ore reserve and mineral resource, the remaining life of the project is estimated to last until year 2033.

4.2 Mineral Resources and Ore Reserves

Taking into consideration the environmental, technical and economic factors affecting the present mining operation, the resulting Proven Ore Reserves based on the available Mineral Resources including existing stockpiles and ore inventory is shown in Table 7 and 8.

4.2.1 Resources

Table 7. Mineral Resource Estimate as of 2020

MINERAL TYPE	CLASS	TONNES (kwmt)	TONNES (kdmt)	%Ni	%Fe	Tonnes Nickel (kt)
Saprolite	Measured	31,310	20,104	1.55	14.13	312
	Indicated	12,456	7,961	1.58	24.12	126
	Total	**43,766**	**28,065**	**1.56**	**16.96**	**438**
	Inferred	13,823	9,028	1.48	12.72	134
Limonite	Measured	39,574	27,564	1.15	36.25	317
	Indicated	8,885	6,208	1.01	33.05	63
	Total	**48,458**	**33,772**	**1.12**	**35.66**	**380**
	Inferred	2,444	1,705	1.17	33.51	20

4.2.2 Reserves

Table 8. MPSA-114-98-IV Amended I Ore Reserves as of 2020

MINERAL TYPE	CLASS	TONNES (kwmt)	TONNES (kdmt)	%Ni	%Fe	Contained Nickel (kt)
Saprolite	Proved	27,969	18,113	1.50	14.06	271
	Probable	11,609	7,329	1.52	12.78	111
	Total	**39,579**	**25,442**	**1.51**	**13.69**	**382**
Limonite	Proved	38,393	26,807	1.13	36.41	304
	Probable	8,824	6,173	1.01	33.08	62
	Total	**47,216**	**32,980**	**1.11**	**35.79**	**366**

4.2.3 Average Grade of Ore

Ore	GRADE		
Saprolite	1.50% Ni	18.0% Fe	35.0% H2O
Limonite	1.06% NI	40.0% Fe	35.0% H2O

4.2.4 Cut-off Grade

Based on the minimum shippable grades set by the ore buyers and the tonnages and grades of the mineral resources, a cut-off grade is determined. The determined cut-off grade for saprolite and limonite ores is as follows:

Saprolite cut-off: ≥1.00% Nickel, <20.00% Fe
Limonite cut-off: HPAL Ore: ≥0.50% Ni, ≥20.00% Fe

4.2.5 Potential for additional resource and reserve

The RTN area as a whole has potential for additional reserves. These projected ore reserves will come from existing and subsisting claims of the company (AMA-IVB-144A) that were adversely affected by the emergence of the strategic Environmental Plan (SEP) for Palawan (R.A. 7611) that prohibited mining in certain areas that are classified as “Core Zone” under the Environmentally Critical Areas Network (ECAN).

4.3 Access/Transportation

4.3.1 Road

The mining site is 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

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

4.3.3 Shipping

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. Meanwhile, shipment of ores is facilitated in the privately owned port located at Sitio Marabajay, Barangay Rio Tuba. It can accommodate a maximum of nine (9) shipments a month on peak season and around four (4) per month during the peak of the rainy season; each shipment is approximately 55,000 MT.

4.4 Power Supply

4.4.1 Requirements

Roughly 4,276,000 kW power requirement annually are needed to maintain its current operations and the townsite where the families and dependents of employees are staying with a summary as follows:

Table 9. Power Requirements

Facilities	Working hours/day	Working days/year	Power Requirement (kW/hour)	Annual Power Requirement (kW)
Grizzly/Crusher	16	210	23.064	77,495
Townsite	24	365	256.125	2,243,655
Plant site	8	350	620.408	1,737,142
Piersite	24	365	24.899	218,115
		Total	**924.496**	**4,276,407**

4.4.2 Source of power supply

Coral Bay Nickel Corporation (CBNC) shares its electricity from its 22-megawatt coal-fired power plant to RTNMC for the daily electricity requirement of the plantsite operation of Rio Tuba Nickel Mining Corporation. Meanwhile, the piersite power plant maintains one unit of 90.4 KW Caterpillar generator and one unit of 160 KW Olympian Perkins generator set. These provide the electricity requirement of the pier facilities for drydocking maintenance and barge loading operations.

4.4.3 Supply alternatives

At present, RTNMC utilizes four (4) generator sets operating with Permit-to-Operate (PTO) issued by the EMB IVB (MIMAROPA) as indicated in the table below.

Table 10. List of Power Generator Sets

Source	Location	PTO	Date Issued	Expiry Date
One (1) unit 1200 kW Used Caterpillar Diesel Generator Set	Minesite	2017-POA-D-0453-027	7-Mar-17	6-Mar-22
One (1) unit 90.4 kW Caterpillar Diesel Generator Set (Cat-3)	Piersite	PTO-OL-R4B-2021-07178-R	9-Sep-21	9-Mar-22
One (1) unit 60 kW Cummins Diesel Generator Set (Cu-1)	Minesite	PTO-OL-R4B-2021-07178-R	9-Sep-21	9-Mar-22
One (1) unit 160 kW Olympian Diesel Generator Set (Perkins 2)	Piersite	PTO-OL-R4B-2021-07178-R	9-Sep-21	9-Mar-22

The Local Government Unit of Barangay Rio Tuba entered into an agreement with Power Source Corporation in July 2003 to include Rio Tuba in their Barangay Electrification Assistance Program, these was also taken over by PALECO earlier this year (1st quarter) of 2021. This, however, is not being used as an alternative power source for the company's industrial use hence, the Rio Tuba Nickel Mining Corporation recently acquired one (1) unit of used Caterpillar Diesel Generator Set with approximate Service Meter Reading of 6,237 Hours, Model 3512, 1200 kW (1500kVA), 480V, Continuous Rating, 1800 RPM, 60Hz, 3-Phase, as replacement of the two (2) decommissioned Detroit Diesel Generator Set units of 350 kW each which stationed at Main Power Plant building. The estimated capacity factor of the unit is 58 % (700 kW/ 1200 kW).

The 1200 kilo-Watt Diesel Generator Set serve as back-up of the three existing feeders namely Plantsite, Well Pump and Screening- Crushing Plant in case of power outage from the main supply.

4.5 Equipment to be used

RTNMC maintains the following equipment for the different operational and ancillary requirements and maintenance including the list of equipment powered by diesel and the list of mine facilities and infrastructures.

4.5.1 Table 11. Advance exploration activity equipment

EQUIPMENT	MAKE / MODEL	QUANTITY
DRILLS		
A. Yoshida Boring Machine	YHP-1	20 units

4.5.2 Construction/Development stage

The Company will utilize same equipment with mining for any developmental activities or from an outsource service provider.

4.5.3 Table 12. List of Equipment for Mining Activity

EQUIPMENT	MAKE / MODEL	QUANTITY
PRODUCTION EQUIPMENT		
A. Dump Truck	ISUZU CYZ51K	25 units
	ISUZU CYZ51KP	1 unit
	VOLVO FM-9 64R	4 units
	VOLVO FMX-11 64R	26 units
	VOLVO FM/X-13 66R	27 units
	VOLVO FMX-13 86R	4 units
B. Bulldozer	CATERPILLAR D7R-II	3 units
	CATERPILLAR D7R-II LGP	3 units
	KOMATSU D85EX-15R	6 units

	KOMATSU D85PX-15RLGP	2 units
	KOMATSU D85PX-15R	1 unit
	CATERPILLAR D7R LGP	2 units
C. Track Excavator	CATERPILLAR 320D	1 unit
	CATERPILLAR 336D	4 units
	KOMATSU PC200LC-8MO	6 units
	KOMATSU PC200-8SLF	3 units
	KOMATSU PC-300-8	4 units
	KOMATSU PC70-8	2 units
	KOMATSU PC210LC-10MO SLF	1 unit
	KOMATSU PC210-10MO	1 unit
	KOMATSU PC450	4 units
	VOLVO EC210BLCPrime	1 unit
	VOLVO EC460BLCPrime	4 units
	VOLVO EW145BPrime	7 units
	VOLVO EC210BPrime	1 unit
	VOLVO EC480 DL	4 units
D. Wheel Loader	CATERPILLAR 966H	7 units
	KOMATSU WA470-6	4 units
	KOMATSU WA470-5	1 unit
	VOLVO L150G	11 units
	VOLVO L150H	4 units
	VOLVO L150H HL	1 unit

4.5.4 Table 13. List of Equipment for Milling/Processing Activity

EQUIPMENT	MAKE / MODEL	QUANTITY
SCREENING / CRUSHING PLANT		
A. Portable Crushers	TEREX/PT400 194kW Premiertrak/ Terex Portable Crusher	1 unit
	SANDVIK QJ241 Tracked Jaw Crusher 39”x26” 100mm Closed Side Setting 168kW Sandvik Portable Crusher	1 unit
B. Mobile Scalper	SANDVIK QE340 screener unit, 74.5kW Sandvik Portable screener	1 unit
C. Fixed Grizzly	6m x 7m, 50mm opening tapered to 120mm bottom opening, Inclined at 30 deg.	1 unit

4.5.5 Table 14. List of Laboratory Equipment

EQUIPMENT	MAKE / MODEL	QUANTITY
A. Sample Preparation		
1. Jaw Crusher	feedable size: 150 mm max crushing size: -50 mm	1 unit
2. Roll Crusher (Twin Drive)	feedable size: -50 mm crushing size: -25 mm	1 unit
	feedable size: -25 mm crushing size: -10 mm	1 unit
3. Drying Oven	Assorted brands	6 units
4. Top Grinder	15 kg/hr crushing cap.	2 sets
5. V-Type Mixer	1101-3 V type, 3 Li. cap.	1 unit
6. Pulverizer, Direct Driven	BICO	2 units
7. Platform Balance, Mechanical	OHAUS, 20 kg cap.	1 set
8. Top Loading Balance	BOECO, BWL 60	1 unit
9. Microwave Oven	GE JEI 2870SP SS	1 unit
10. Vibratory Disc Mill	RETSCH, RS 200	1 unit
11. BOYD CRUSHER		1 unit
B. Analysis Room		
1. Hot Plate	Brand: Barnstead Model: HPA2240M	1 unit
	Brand: Thermo Scientific Model: HPA2240M	1 unit
2. Muffle Furnace	Brand: DAIHAN Model: Wisetherm / FM-14	1 unit
3. Universal Oven	Assorted Brands	2 units
4. Weighing Balance, Analytical	Brand: Metler Toledo	3 units
	Model: AB204S/ FACT & ML 204/02 200g cap	
5. Spectronic 20A	Milton Roy	1 unit
6. Spectroquant UV-VIS	Brand: PHARO Model: 300 UV-VIS	1 unit
7. Atomic Absorption Spectrophotometer	AA6300, Shimadzu	2 sets
8. Water de-ionizer	Matten D.I. System, 100 L/hr	1 set
9. Magnetic Stirrer	Nuova / SP18420Q, Thermolyne	2 units
10. Auto-desiccator Cabinet Type	Brand: SECADOR Model: F42073-1220	1 unit
11. Electronic Dry Cabinet	Model: All DRY - series	1 unit
12. Wavelength Dispersive X-Ray Fluorescence Spectrophotometer (XRF)	Brand: Shimadzu Sequential Model: XRF-1800	2 sets
13. Portable Dehumidifier	Model: DPI-45E-03	1 unit
14. UPS for XRF	Brand: INFORM Model: DSMP1110	1 unit

	Brand: EVOTECH, 10KVA	1 unit
15. UPS for Chiller	Brand: INFORM,10 kVa Model: DSPU33010	2 units
16. Press Machine for XRF Sample	Brand: SPECAC Model: T40	1 unit
17. pH Meter	Brand: Jenway Model: 3510	1 unit
	Brand: HANNA Model: HI 98130	1 unit
18. Auto Desiccator	Model: SECADOR	1 unit
19. Digital Burette	Brand: Titrette Model: 4760161	2 units
20. Vortex Mixer	Brand: BOECO	1 unit
21. Electromantle	Brand: BARNSTEAD	1 unit
22. Centrifuge Machine	Brand: BOECO	1 unit
23. Cleveland Flash & Fire Point tester	Brand:	1 unit
24. Fume Hood with Scrubber	Brand: BIOBASE	1 unit
25. Transformers	Brand:	2 units

4.5.6 Table 15. List of Motorpool & Other Equipment

EQUIPMENT	MAKE / MODEL	QUANTITY
OTHER EQUIPMENT		
A. Fuel Truck	ISUZU FORWARD	1 unit
	ISUZU CYZ51K	1 unit
	VOLVO FM 64R	1 unit
	UDCWE370	1 unit
	MIT.FV415M	1 unit
B. Water Truck	ISUZU CYZ51K	7 units
	HOWO SINOTRUCK	1 unit
C. Boom Truck	ISUZU NPR66	1 unit
	ISUZU CYZ51Q	1 unit
	ISUZU NPR22	1 unit
	ISUZU NPR71	1 unit
D. Garbage Truck	ISUZU NPS	2 units
E. Fire Truck	ISUZU NQR 4.6	1 unit
	ISUZU NQR 75	1 unit
F. Hauling Truck	ISUZU CYZ51K	1 unit
G. Road Grader	VOLVO G930	3 units
H. Vibratory Roller	BOMAG BW211D-40	1 unit
	CATERPILLAR CS533E	1 unit
I. Maintenance Truck	ISUZU NPS	1 unit
J. Man Lift	ISUZU 4KH1	1 unit
K. Lube Truck	ISUZU CYZ6MF	1 unit
	ISUZU CYZ51K	1 unit
L. Prime Mover	VOLVO FM64R	1 unit
M. Fork Lift	TCM	2 units

		KOMATSU	1 unit
SERVICE VEHICLES			
A.	Service Vehicle	SUZUKI JIMNYJLXMT	13 units
		SUZUKI JIMNYJLAT	2 unit
		NISSAN FRONTIER	2 units
		ISUZU DMAX	2units
		ISUZU DMAX LS	5 units
		TOYOTA HILUX	1 units
		MITSUBISHI STRADA	1 unit
		NISSAN NAVARRA	2 units
B.	Shuttle Bus	ISUZU 6HK1	2 units
		ISUZU JALFTR33P	1 unit
		ISUZU CYZ510	1 unit
C.	Service Truck	ISUZU NPR66	4 units
		ISUZU NPS	4 units
		ISUZU NPS75L	1 unit
		ISUZU NPR	3 units
		ISUZU NPR85L	1 unit
		KIA 2700	3 units
		MITSUBISHI CANTER	6 units
		ENFORCER 4X2 (MAHINDRA)	1 unit
		SUZUKI-SUPER CARRY DIESEL TRUCK	2 units
		ISUZU NQR75	2 units
		ISUZU NPS75	1 unit
D.	Wagon		
		TOYOTA HI ACE COMMUTER	1 unit
		NISSAN URVAN ESTATE25	1 unit
		NISSAN SUPER SAFARI	1 unit
		TOYOTA HI ACE S. GRANDIA 3.0L DSL A/T	1 unit
		TOYOTA HI ACE S. GRANDIA 3.0L DSL M/T	1 unit
		MITSUBISHI MONTERO SPORT	2 unit
SERVICE EQUIPMENT			
A.	Welding Machine	DENYODLW400ESW	5 units
		YANMARYDW190AE	1 unit
B.	Tug Boat	CATERPILLAR 3406DI	1 unit
		CATERPILLAR 3406C	2 units
C.	Pump Boat		2 units
D.	Barge	250-Ton Capacity	11 units
E.	Fork Lift	KOMATSU FD30T-17	1 unit

	TCM Inoma FD30T37	1 unit
	TCM FD30T32	1 unit
F. Aircraft	Cessna-STATIONAIREU206G	1 unit
ENVIRONMENTAL MONITORING EQUIPMENT		
1. High Volume Air Sampler (Hourly)	Staplex Model TF1A	2 units
2. High Volume Air Sampler (24 Hours)	Tisch Model TE-5170V	1 unit
3. High Volume Air Sampler	BGI PQ200 PM_{10} /$PM_{2.5}$	1 set
4. Noise Level Meter	Casella CEL-244 Noise Level Meter	1 unit
5. Sound Level Meter	Extech	1 unit
6. Flowrate Meter	Flow probe	1 unit
7. Water Quality Meter	YSI	1 unit
8. Water Quality Meter	Horiba Multi Quality Meter G50	1 unit
9. Diving Equipment	Mares Diving Gears	2 sets
10. Vibration Meter	Vibracord FX	1 set
WEATHER INSTRUMENTS		
Manual Rain Gauge		10 units
Weather Station		1 unit
Thermohygrograph		1 unit
Evaporimeter		1 unit
Barometer		1 unit

4.5.7 Table 16. List of Other Diesel-Powered Equipment

EQUIPMENT	MAKE / MODEL	QUANTITY
Diesel Power Equipment		
A. Diesel Power Plant (Pier)	160 KW Perkins Diesel Generator AP 160	1 unit
	90.4 KW Caterpillar C4.4	1 unit
B. Mobile generator (Dewatering)	60 KW Cummins HGC-55	1 unit
C. Main Power Plant	1,200 KW Caterpillar 3512	1 unit
D. Power Maintenance use	15 KVA DENYODLW400ESW welding and generating set	1 unit
E. PSCM use	15 KVA DENYODLW400ESW welding and generating set	1 unit
F. Mechanical use (WF)	15 KVA DENYODLW400ESW welding and generating set	1 unit

G. Mechanical use (HER)	15 KVA DENYODLW400ESW welding and generating set	1 unit
H. Hospital	150 KVA Bradford Diesel Generator	1 unit
I. Fire hydrant at Townsite*	455 KW Caterpillar C15 diesel Generator	1 unit
Ice Plant		
A. Compressor	55 KW Yaskawa ammonia compressor	1 unit
2 Cooling tower	2.2 KW Ryowo motor	1 unit
Well Pump		
A. Water well # 2, 3 and 5	45 KW, 500 GPM, Franklin submersible pump	3 units
B. Water well # 4	143 Hp Isuzu Diesel Engine Drive	1 unit
Maintenance Truck		
A. MT-15	3-ton Boom truck Isuzu	1 unit
B. MT-14	Isuzu Aerial Platform	1 unit
C. ST- 33	Isuzu Service truck	1 unit
Others		
A. Tower Light	Terex	30 Units
B. Generator Sets	5 Hp Robin, Gasoline Engine drive for water pump	5 units
	10 HP Kubota Diesel Engine drive	2 units
	6KW Kubota Diesel engine drive	3 units
SCREENING / CRUSHING PLANT (mobile crusher/screener)		
A.	TEREX/PT400 194kW Premiertrak/ Terex Portable Crusher	1 unit
B.	SANDVIK QJ241 Tracked Jaw Crusher 39”x26” 100mm Closed Side Setting 168kW Sandvik Portable Crusher	1 unit
C.	SANDVIK QE340 screener unit, 74.5kW	1 unit

	Sandvik Portable screener	
D.	Fixed Grizzly wind breaker provided with accordion chute	1 unit

4.5.8 Table 17. List of mine facilities and infrastructures

FUEL STORAGE	**Area or Capacity**	**Quantity**
Diesel Tank	1,077,147 liters	1 unit
	1,711,018 liters	1 unit
	420,033 liters	1 unit
DOMESTIC WATER SYSTEM		
Water Wells		4 units
Plantsite Water Tank	99 m^3	2 units
Townsite Water Tanks	268 m^3 and 300 m^3	2 units
Water Disinfection Building	12 m^2	
Umawi Water Source	2,880 m^2	
OTHER INFRASTRUCTURES	**AREA (m^2)**	
Plantsite		
Mine Office	235	
Administration Building	774	
Safety and MEPED Building	250	
Old Mechanical Building	1,358	
New Mechanical Office	804	
Mine Lookout Office	222	
Preventive Maintenance Office and Shop	586	
Wash pad	113.3	
Light Equipment Shop/Expansion of Tire Shop	2,300.5	
Mechanical Workshop	2,010	
Mechanical Paint Shop	120	
Assay Laboratory	424	
Power Plant Building	469	
Screening/Crushing Plant	576	
Warehouse Building	1,120	
Airport Office and Hangar	383	
Ore Shed	580	
Engineering Store Room	50	
Poultry and Swine	354	
Ice Plant	250	
Tire Wash Area	44	
Carpentry Shop	60	
Wash Pad	160	
AVGAS Shed Platform	15	
AVGAS and Gasoline Shed	60	
CPFMS Workshop	154	
Nitric Acid Magazine	105	

Biodiesel Plant	300	
New CPFMS Building	165	
Temporary Hazardous Waste Materials Storage Facility	154	
Central Nursery	12,600	
Piersite		
Stockyard B Shed	120	
PSCM Office	180	
PSCM Workshop	74.4	
PSCM Warehouse	45	
Maintenance Shed	60	
Powerhouse	168	
Canvass Sheet Stockroom	450	
Sampling Stand	22	
Customs Office	63.6	
Nagoya Beach	2,000	
Magazine	665.4	
Truck Scale/Shed	142.8	
Townsite		
Townsite waste water treatment facility	Capacity: 2000 cu.m/day	2 units
Training Center	1192	
Material Recovery Facility	96	
Mine and Plant Site		
Mine Pit	142 hectares	1 unit
Siltation Ponds		
Tagpisa Pond	16.54 hectares; 574,000 cubic meter capacity	203,588 cu.m.
Upper Togpon Pond	11.66 hectares; 433,175 cubic meter capacity	282,175 cu.m
Lower Togpon Pond	9.10 hectares; 126,000 cubic meter capacity	182,753 cu.m 1,160.56 cu.m.
Upper Kinurong Pond	5 hectares; 120,000 cubic meter capacity	99,994 cu.m
Lower Kinurong Pond	12.43 hectares; 88,200 cubic meter capacity	79,678 cu.m.
Stockpile and Solar Drying Area	101.42 hectares	
Hauling/Access Road		48 km
Macadam Road		7.1 km

4.6 Workforce Information

4.6.1 Total operational workforce

The operation of RTNMC currently comprises 633 regular employees and more than 2,000 employments for support activities. All employees of RTNMC are Filipino citizens, with more than 60% local hiring or those coming from Municipality of Bataraza. With the expected opening of the new mining area, this workforce will be retained while outsourcing will be made to augment supplementary human resources. Meantime below table shows the current manpower:

Table 18. RTNMC Workforce as of October 2021

Manpower Distribution		I. Bataraza	II. Outside Bataraza (w/in Palawan)	III. Outside Palawan	Total
Regular	Male	312	104	52	468
	Female	43	11	11	65
Probational	Male	0	0	1	1
	Female	0	0	0	0
Consultancy	Male	2	1	1	4
	Female	0	0	1	1
Project Based	Male	41	0	0	41
	Female	41	0	0	41
Fixed Term	Male	194	3	0	197
	Female	4	0	0	4
Contractors					820
Grand Total					**1,642**

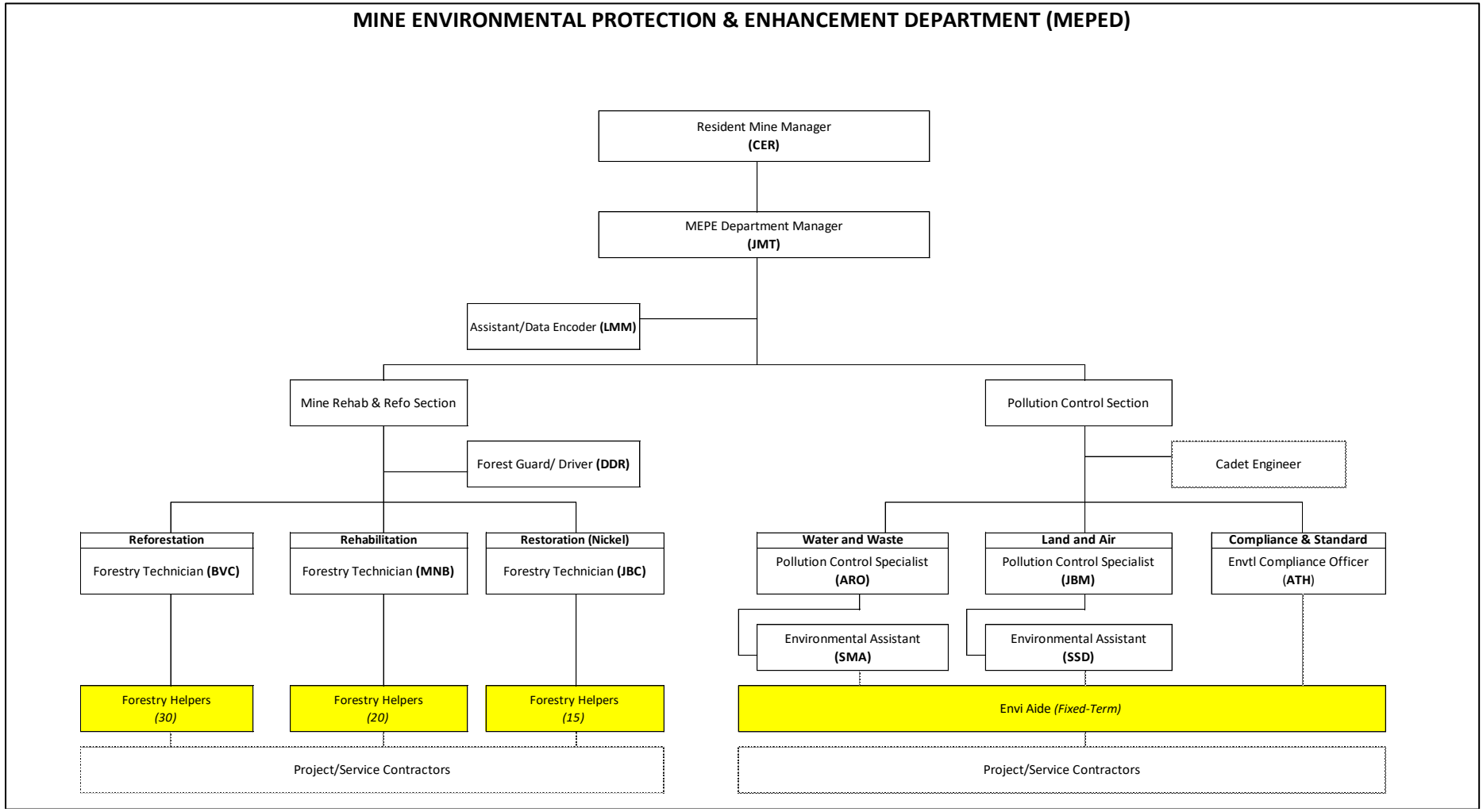
Meanwhile, the Mine Environmental Protection and Enhancement Office (MEPEO) is incorporated in the RTNMC's organizational structure consistent with Section 173 of DENR Administrative Order 96-40 (Revised Implementing Rules and Regulations of Republic Act No. 7942, Philippine Mining Act of 1995). The MEPEO reports directly to the Resident Mine Manager which function mainly to ensure compliance with environmental laws and proper performance, operation, and maintenance of environmental programs and pollution mitigating measures.

Table 19 shows the Mine Environmental Protection and Enhancement Department's organizational set-up that spearhead the activities on environmental protection.

4.6.2 Housing options

The Company encourages the concept of “Achievement and Enjoyment” by supporting its employees in their pursuit of work-life balance. Employees can split their time and energy between work and other important aspects of their lives for it is provided with a Townsite facility that is complete with housing units, recreational and sports facilities and institutions such as the school and the church. The employees enjoy free housing, furnished with free water & electricity and 24/7 security.

Table 19. Mine Environmental Protection and Enhancement Department (MEPED) Table of Organization for 2022



The established townsite consists primarily of housing units, hospital, school, recreational facilities, among others. A detailed list of townsite facilities is enumerated in Table 20 which is shared with CBNC, GPI and other third-party service providers.

Figure 7. Photo of RTNMC Town Site

Table 20. List of Townsite Facilities

Facility	Floor Area/Capacity	Quantity/ Remarks
Townsite Infrastructure		
ATM Booth/Waiting Shed	30 m^2	1 lot
Bachelor's Quarter	766 m^2	2 units
Badging Office, Gate 1	24 m^2	1 unit
Badminton, 2 courts	391m^2	1 unit
Bath House and Filtration/Pump Room	119 m^2	1 unit
Camp Maintenance Bldg/Storage room/Workshops	653 m^2	1 unit
Church Convent/Parish Hall	955 m^2	1 lot
Clubhouse	370 m^2	1 unit
Fitness Gym	70 m^2	1 unit
Foreman's Duplex	119 m^2/unit	32 units
GSSI Dormitory	196 m^2	2 units
Guest House (Ex. Consultant's Res.)	158 m^2	1 unit

Guest lodge	463 m^2	1 unit
Guest lodge Laundry Shed	30 m^2	1 unit
Gymnasium	854 m^2	1 unit
Hospital Building	1,654 m^2	Level 1
Hospital Garage	110 m^2	1 unit
Hospital Kitchen/Storage Room	223 m^2	1 lot
Hospital Morgue	32 m^2	1 unit
Information Center (CRA) Bldg.	440 m^2	1 unit
Junior Staff House	82 m^2	24 units
Laborer's Dormitory	232 m^2	116 units
Laborer's Row Houses	202 m^2	1 unit
Ladies Dormitory	338 m^2	1 unit
Resident Mine Manager Residence	118 m^2	1 unit
LSVMS School Bldg. (Elementary Dept.)	5,460 m^2	1 lot
LSVMS School Bldg. (High School Dept.)	4,900 m^2	1 lot
Market Building	384 m^2	1 unit
Motorcycle Shed, Gate 2	127 m^2	1 unit
Rice/Cement Warehouse Bldg.	60 m^2	1 unit
Senior Staff House	102 m^2	8 units
Senior Staff Dorm (Ex. JTA Dorm)	422 m^2	1 unit
Shopping Center	420 m^2	1 unit
Swimming Pool	655 m^2	1 area
Oval Sport Facilities: Basketball Court Volleyball Court	495 m^2	1 unit
Tennis Court, 3 units	2,937 m^2	1 area
Nickel Nook Two-storey bldg. and dirty kitchen	566 m^2	1 unit
Water Disinfection Bldg.	12 m^2	1 unit
Water Refilling Station	39 m^2	1 unit

4.7 Development/Utilization Schedule

Presently, RTN operates in an aggregated area of 4,538.44 hectares with 1 MPSA and 2 ECCs. It will embark on developing the Bulanjao deposit once the conditions of the amended MPSA (MPSA-114-98-IV Amended I) are already complied with and revision of the Bataraza ECAN zones is approved.

The development of the Bulanjao area is targeted to commence in the first semester of 2022, focusing on developing the mine, such as constructing environmental mitigating measures and establishing hauling roads upon release of the necessary permits. The current operation will also be maintained and will still use the various mining facilities and equipment in the mining activity in other locations of the MPSA. In addition to the existing facilities, RTN will construct a satellite office and a motor pool to support the operation in the field and install environmental structures such as drainage systems, siltation ponds, silt collector sumps, among others. The summary of project components is

shown in the table below. At the same time, the locations of the existing and future facilities to be installed are provided in **Annex 8**.

The nickel ore mining process will use the contour method of surface mining. The sequence of operations shall consist of drilling, planning and survey, clearing and overburden removal, limonite and saprolite mining, ore beneficiation, ore hauling and shipment. In addition, the Company will apply the mining method, pit design, and production estimates discussed in the previous sections.

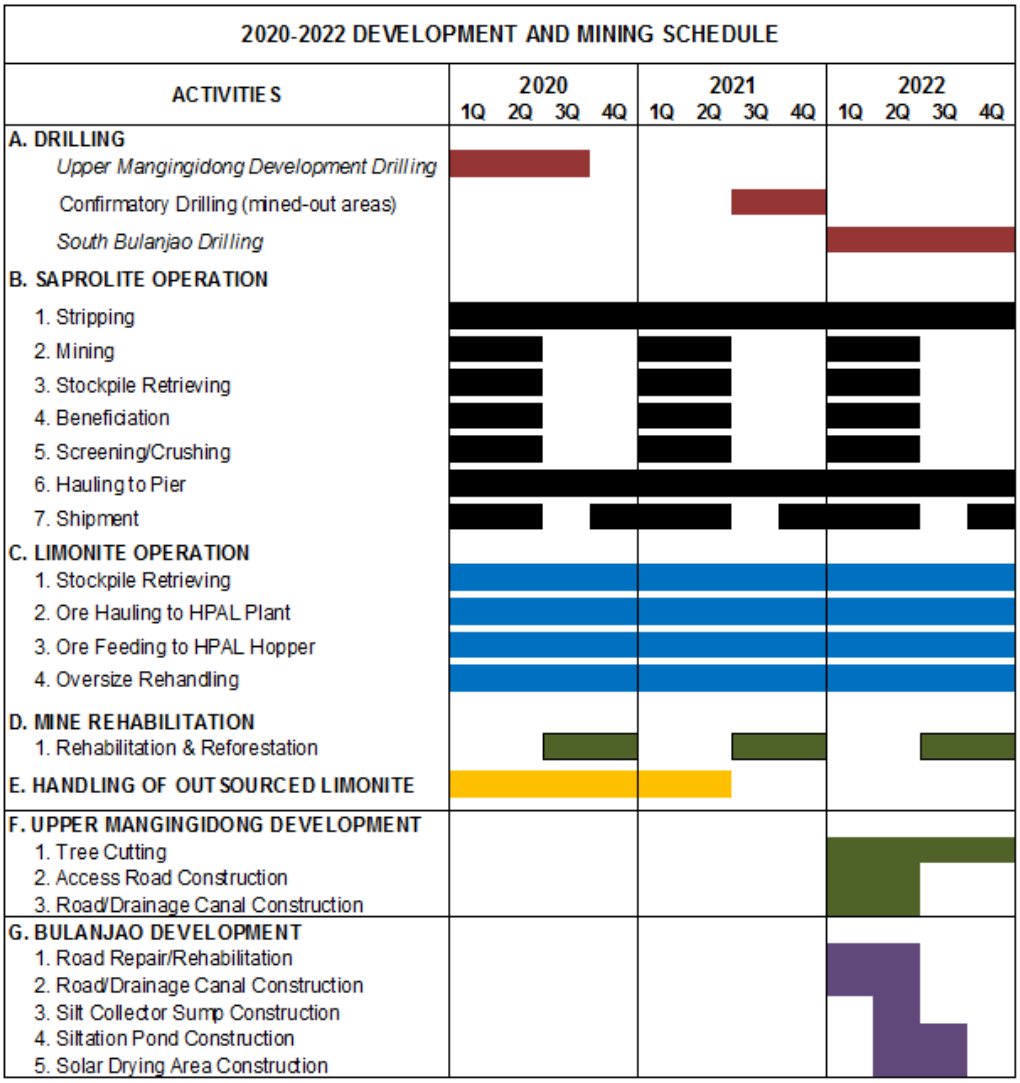
RTNMC shall have a production capacity of 1.350M WMT for saprolite, 3.7M WMT for limonite in 2022. The proposed long-range mining plan is provided in **Annex 9**, while the components of the mining operation are presented in the table below.

Table 21. Components of the mining operations

Component	**Details of the Proposed Mining Operations**
Total MPSA	MPSA-114-98-IV Amended I (4,538.44 hectares)
Average Annual Production Capacity	Saprolite: 1.350 M WMT Limonite: 3.7 M WMT
Ore reserves	Saprolite: 39,579 kWMT Limonite: 47,216 kWMT Cut-Off Grades used: Saprolite: ≥1.00% Nickel, <20.00% Fe Limonite: HPAL Ore: ≥0.50% Ni, ≥20.00% Fe
Method of ore extraction	Contour Method of Surface Mining
No. of stockyards	One (1) 61-hectare Ore Stockyard
Average # of ore shipments/year	*25 shipments per year (assuming 52,000 WMT/shipment)
Port loading capacity	Maximum of three ships at any given time.
Stockpile limit	18,000 WMT

In addition, below table presents the overall development schedule for the project.

Table 22. Development and Mining Schedule



Meanwhile, the planned construction of the CBNC's Tailings Storage Facility No. 3 (TSF-3) at the Guintalunan area started in 2019 and will be finished in 2023. It has its own ECC and will necessitate the excavation of about 16,800,000 cu.m of waste and rock materials (+/- 10%). The excavated materials will be used as:

1) backfill for the reshaping of scheduled rehab areas,
2) matting for the construction/maintenance of SDA areas & haul roads,
3) stockpiled in the designated areas and
4) used as embankment material.

5.0 Environmental Impacts and Mitigating Measures

Rio Tuba Nickel Mining Corporation is certified to ISO 14001:2015, ISO 9001:2015 and ISO 45001:2018 for its Environmental, Quality and Safety and Health Management System. Thus, imposing the following policy commitment:

QUALITY, ENVIRONMENTAL, SAFETY AND HEALTH POLICY

RIO TUBA NICKEL MINING CORPORATION, the first ASEAN Mineral Awardee in Sustainable Mineral Development, is committed to responsible development of the country's natural resources.

Through the effective implementation of the Integrated Management System, RTNMC aims to:

- Fulfill all compliance obligations;
- Satisfy customer requirements and product specifications;
- Practice the highest standards of safety and health in the prevention of accidents, personnel injury and work-related illnesses;
- Consistently innovate effective pollution prevention measures and optimize the efficient use of resources;
- Achieve ecosystem restoration through progressive rehabilitation; and
- Promote an inclusive decision-making process in all areas of operations.

RTNMC endeavors to continually improve in quality, environmental, and occupational health and safety management for the welfare of interested parties.

CYNTHIA E. ROSERO
Resident Mine Manager

ROMMEL L. CRUZ
Vice President for Operations

Effective Date: October 16, 2019

Figure 8. RTNMC QESH Policy

It is also the environmental ethics of subsidiary companies of Nickel Asia Corporation to keep the balance of the elements of nature while in operation. In this regard, RTNMC developed its environmental framework and environmental risk mitigation by avoiding, minimizing, rectifying, and compensating any impacts to the components of CLAWWS – Compliance, Land and Forest, Air, Water, Waste and Standardization.

5.1 Land Resource

5.1.1. Loss of vegetation

Sources of Impact

One of the essential activities conducted before the actual ore mining is clearing vegetation. Removing vegetation within the mining areas is inevitable and incidental to a mining operation. The RTNMC EIS 2019 identified the various species of plants and tree species endemic to Palawan and those belonging to the list of threatened species, and the fauna species belonging to herps, avian, and mammals will be affected by mining operation activities.

Various road networks traverse the mining area for accessibility and economical hauling from excavation sites to designated dumping areas. Access roads to and from new mining sites are occasionally altered due to the mining area's progressive development. Likewise, the expected impacts of haul road construction are the permanent alteration of the topography and vegetation removal.

The construction sites of all the facilities were generally subject to devegetation and site clearing. In addition, the buildings and structures' location/land were either concreted, compacted, or altered. But having these facilities installed many years ago, the significant impacts have already been mitigated and continuously controlled.

The construction of residential areas and community facilities has altered the surface due to site clearing and installation of buildings. Having been constructed more than 20 years ago, the sites have now turned into a built-up area and continuously altering with the installation of new facilities to ease the way of living for the residents resulting in a positive impact of creating a thriving community.

Mitigating Measures:

- **Production of native trees thru the establishment of nursery**

Promote biodiversity by using native and endemic species in the establishment of vegetation. Achieve an average 85% survival rate for the plantation area and satisfy the rehabilitation completion criteria.

Before establishing vegetation, an essential aspect of selecting suitable species is crucial for the successful restoration goal. The assessments conducted before mining will serve as a selection guide for the variety of suitable species that can be planted in the rehabilitation area, in addition to the rescued and recovered wildlings and earthballed plants and trees during the land clearing stage. The use of suitable species for rehabilitation has the following advantages:

- It can adapt to local conditions and require lesser maintenance costs
- They are hardy and withstand extreme climatic and physical stress
- It is environment-friendly and requires fewer pesticides or fertilizers because of natural adaptations
- It promotes biodiversity and conservation
- It is socially acceptable because it provides food and shelter to wildlife
- Prevents the invasion of exotic plants

- **Collection of wildlings**

Therefore, rescuing plants and trees is vital before tree cutting. In this stage, massive wildling collection and earth balling activity are organized to recover and save the plant and tree species in the area to nurture them in the nursery. Afterwards, the remaining vegetation will be cut and cleared subject to the terms and conditions of the permits.

Planting stock production of the selected species are tedious and comes with challenges; thus, an option for banking of planting materials is through:

- Earthballing of trees from the area to be disturbed
- Cloning of none seed-producing species and propagate representative specimens of plants and propagules for use in a progressive rehabilitation
- Wildlings and seeds collection in the adjacent forested area is undertaken to ensure that the species planted in mined-out rehabilitation areas are endemic and indigenous.
- Genebanking by maintaining an arboretum, botanical garden and perpetual forest that are produced with native and endemic plants and trees
- Seed growing in the typical nursery operation

Nursery operation is one of the crucial elements in rehabilitation, as this is where most seedlings are produced. RTNMC operates several nurseries that can hold/accommodate enough seedling stocks corresponding to the planting material requirements of the

rehabilitation and reforestation projects, donations, and replacement for trees affected by tree cutting activities. Seedling purchasing/outsourcing is conducted when deemed necessary, but only local seedling suppliers/partners, particularly IPs, are contracted to give an alternative livelihood and assure the endemicity of the acquired plants. The standard measures applied in the nursery to produce healthy seedlings are as follows:

- Fruits or seeds must be collected from selected mother trees. The seeds are processed, tested, and treated to ensure germination into healthy seedlings.
- The seeds are sown in seedbeds with a soil mix consisting of 50% sieved washed river sand and 50% top garden soil. Watering is done daily.
- When the second leaves are fully developed, the seedlings are transferred to plastic bags. The potting mixture consists of 35% sieved washed river sand, 35% sterilized sandy loam soil and 30% compost.
- Seedling care and maintenance consist of daily watering, shading and gradual removal of shade, root pruning, and protection from pests and diseases.

One of the critical techniques of RTNMC in seedling production is adding to the potting medium of Mykovam, which contains vesicular-arbuscular mycorrhiza (VAM). The fungi will assist the plant in absorbing water and nutrients, preventing root infection, and increasing plant tolerance to drought and heavy metals.

The planting materials are prepared at least six months before the planting season making most of the planting materials large and beyond the usually prescribed size of seedlings to ensure survival. As a unique strategy of RTNMC, some species are left in the nurseries to overgrow up to 2 meters high to produce large planting materials (LPM) and reduce the lag time of rehabilitating the bare areas.

To establish vegetative cover in protection forests, the planting activity shall be conducted in the rainy season using a tree, shrub, and ground cover species identified at the appropriate reference site as the species for planting.

The candidate plant species by habit, elevation, ecological succession, and site condition is based on the initial assessments in the pre-mining stage and the conducted tree inventories. The planting pattern will follow a nominal grid of 2 m x 2 m along the furrows using the seedlings from a heterogeneous seedling mix of native species to ensure the source of foods and habitat of fauna/wildlife to encourage immediate recolonization.

- **Establishment of buffer zone (20 meters per DAO No. 2018-19) as source of planting materials**

Adhere to DAO 2018-19 for Topsoil and Subsoil Management, Buffer Zone Management, and Maximum Disturbed Areas. Declared mined-out areas are immediately rehabilitated, including slopes and bare spots.

Rehabilitation of the mined-out sites is an integral part of mining activity and is undertaken progressively alongside mining operations. A maximum effort shall be made to save existing vegetation; thus, in all mining plans, the clearing of vegetation is in segments and only when needed; and shall keep the area of exposed bare soil to a minimum. Area clearing shall be within the premise of the Special Tree Cutting Permit and 3YU/DP.

- **Offsetting**

Rehabilitation shall be in the mined-out areas and reforestation of denuded non-mineralized areas within and outside the mining claims.

RTNMC also displayed efforts to establish vegetation and reforest non-mineralized sites within and outside the mining claims in partnership with various organizations/NGOs, local communities/groups, academe, and other agencies/entities from the public and private sectors and encouraged stakeholder's involvement through a series of tree planting activities and the "Adopt-A-Forest" program. The plantation that totalled 659.27 hectares also as a commitment of support to the Office of the President of the Philippines' initiative in the implementation of the National Greening Project (NGP) to wit:

- The establishment of mangrove plantations is intended to develop and rehabilitate these areas to improve and enhance the natural defences and resilience of the country's coastline and its environs due to the impacts of climate change. The company committed to establishing mangrove plantations in an area identified by DENR CENRO as a partnership project.
- One of the problems encountered in protecting the existing Bakawan plantation is the utilization of Bakawan for the fuelwood needs of the community, whether for domestic or commercial usage. The company established a 10-hectare fuelwood plantation at Area 5, So. Tuka Angri, Rio Tuba, Bataraza, Palawan with the primary purpose of providing the community living within and adjacent to the mangrove area an alternative source of Firewood/Fuelwood for their

domestic consumption, thereby reducing/minimizing the use of Mangrove species for the purpose.

- In line with RTNMC's commitment to providing livelihood opportunities to stakeholders, a Coffee Plantation Project was launched in 2015 with a total of 50.50 hectares planted by more or less, 51,000 seedlings of Liberica coffee species located at Sitio Racub (48 has) and Sitio Tagpisa (2.50 has). As of October 2021, an additional 2.50 has was included at Sitio Tagpisa, totalling 53 hectares of the project. Regular protection and maintenance of the plantation are carried out, especially since it will now enter into its third fruiting cycle and is now ready for continuous coffee production.
- In compliance with one of the RTNMC ECC requirements, this is subjected to periodic maintenance activities, including frequent ring weeding, under brushing, and fertilization in the 4.5-ha area. The 3,700 seedlings planted are composed of four species maintained are Narra, Ipil, Apitong and Agoho. Project sites are within the vicinity of Airport Road and Bataraza National Highway.
- Establishment, care and maintenance of 55 hectares bamboo plantation.

- **Progressive rehabilitation of mined-out area to establish land cover**

To date, RTNMC rehabilitated 202.54 hectares of the disturbed area planted with 1,339,615 various species of plants and trees and continuously enhanced into forestland, an ecotourism destination and aqua-agro forestry project. As the mining operation progresses, mine rehabilitation will also continue. The summary and details of the accomplishment and rehabilitation plan for 2022 are shown in **Annexes 10 and 11**.

Mining rehabilitation and reforestation have been a continuing activity of RTNMC since the 1980s, following the principles of progressive mine rehabilitation. For the year 2022, P-17 at the Mangingidong area will be scheduled for planting.

- **Others**

The Company uses the best practices and techniques to prevent the removal and displacement of the wildlife; thus, a comprehensive Biodiversity Conservation Action Plan is carried out considering conservation and restoration in all stages of the mining project cycle.

Moreover, the rehabilitation planning and implementation should coincide with the mining project cycle to best attain the functional ecosystem restoration objectives summarized as follows as adapted from the presentation of Dr. Edwino Fernando (2017).
To ensure the survival of newly planted trees, rehabilitated areas shall be cared for, maintained and monitored closely. Activities to carry out are the following:

a. Stand improvement
b. Watering
c. Fertilizer Application
d. Pest and Fire Control
e. Monitoring and Patrolling

5.1.2. Removal of Topsoil/Subsoil

Sources of Impact:

Topsoil or overburden removal happen during the devegetation activities. The area scheduled for mining is first cleared and grubbed of its topical trees and vegetation using bulldozers. Clearing and grubbing are normally undertaken months ahead of mining to expose the surface of the area for a longer time. Large trees are separated from topsoil for areas that will be subjected for stripping.

Mitigating Measures:

- **Implementation of topsoil management plan (DAO No. 2018-19)**

Topsoil or overburden removal happens during the devegetation activities. The area scheduled for mining is first cleared and grubbed of its topical trees and vegetation using bulldozers. Clearing and grubbing are normally undertaken months ahead of mining to expose the surface of the area for a longer time. Large trees are separated from topsoil for areas subjected to stripping.

Mine waste is handled due to the overburden stripping in the mine operation of the nickel project. This waste, often called overburden or topsoil, is piled at designated areas to be used in the rehabilitation activity in the mined-out areas. Management of such waste is embedded in the Organization's Environmental Management System (EMS).

Chronologically, after clearing and grubbing, RTNMC recovers the topsoil that is usually 25 cm thick and will be subject to proper handling and management to prevent biological deterioration.

Facilitate the use of topsoil and soil amelioration to ensure plant survival and growth.

Topsoil is recovered and stockpiled in a designated area using appropriate equipment. As a general rule, the recovered topsoil shall be hauled and dumped directly to mined-out areas as part of the progressive rehabilitation. However, if mined-out areas are not yet identified/available for restoration, the retrieved topsoil shall be stockpiled in the following manner:

- Topsoil should not be stripped when wet or during the rainy season as this can lead to compaction and loss of essential soil characteristics/structure.
- Avoid scrapers in topsoil stockpiling as they will compact the soil, reducing/distracting any biological activity.
- Stockpiles shall be located in areas not to be subjected to future mining.
- Store in low mounds no more than 2.0-meter to 3.0-meter high.
- Covering topsoil stockpiles with plants or grasses should prevent direct exposure to rain and sunlight and protect soil organisms if not used within six months.
- Provision of drainage system to prevent erosion and waterlogging.
- Stockpile location must be signposted.
- Conduct regular monitoring or inventory and inspection of topsoil stockpiles.

5.1.3. Land Erosion

Sources of Impact:

More often, the operation of mining areas falls on or near the ridge and along the slopes of the mountain range that are susceptible to soil erosion and landslides. Soil erosion will occur once an area is cleared of its vegetation cover, particularly areas with steep to very steep slopes. And the continued surface mining operation will entail vegetation removal, change in topography, and disturbance to surface water run-off pattern and might increase surface water run-off and enhanced erosion in open and slope areas.

The extracted materials that are generally stockpiled are the low-grade limonite and the unmarketable low-grade saprolite ores. In addition, some materials are directly dumped/fed to CBNC's processing plant, utilized as matting material, filing materials to restore mined-out areas, etc. However, most of these overburdened materials are dumped and stockpiled in designated

stockpile areas located within an unmineralized portion of the mining area.

Generally, overburden spoil piles (low wall) are accumulated extracted low-grade and unshippable ore materials. While some of these overburden materials can be utilized and set aside for future use, most of these overburden materials are dumped and stored in designated areas. The continued storing of these materials is susceptible to erosion during heavy rains that will carry the silt in the drainage system of the mining area.

These piles are also susceptible to erosion during heavy rains. The rain carries the silt in the drainage system of the mining area. If not controlled, the silted run-off will join the tributaries resulting in tributary overflow.

Mitigating Measures:

For mining operations, the settling ponds maintained and additional ponds installed in Bulanjao will generally result in alteration of land topography, removal of vegetation, and disturbance to natural water flow.

Diversion canals within the project site were constructed for the following purposes:

a) To direct the effluent of one siltation pond to the next siltation pond in series for effective settling of silted surface run-off.
b) To prevent relatively clean surface run-off from mixing/merging with silt-laden mine run-off flowing towards siltation ponds.
c) To divert drainage from flowing to agricultural farms that would eventually cause siltation of said farms in case of overflowing.

The diversion canals, as mentioned earlier, have slightly altered the topography with the presence of these canals. Nevertheless, its impacts are considered minimal since these structures' slopes have been partly stabilized and reforested.

Also, the watercourse diversions prevent the silted water from intruding no discharge areas to avoid damaging adjacent lands and waterways.

Hence, to minimize soil erosion from the stockpiles, the slopes are planted with suitable plants and grasses for stability. Some stockpiles are even protected with boulders lining at the toe and, on some occasions, are covered with canvas. Moreover, proper drainage systems are provided and maintained.

In addition to pit benching on high walls, the slopes are likewise stabilized through reshaping, revegetation and application of

bioengineering. However, there is a possibility of stockpile erosion. Therefore, all stockpiles are built based on the following designed parameters to avoid slope failures (Figure 9):

Max. Bench Height	-	12 meters
Overall Stockpile Slope Angle	-	40.60 degrees

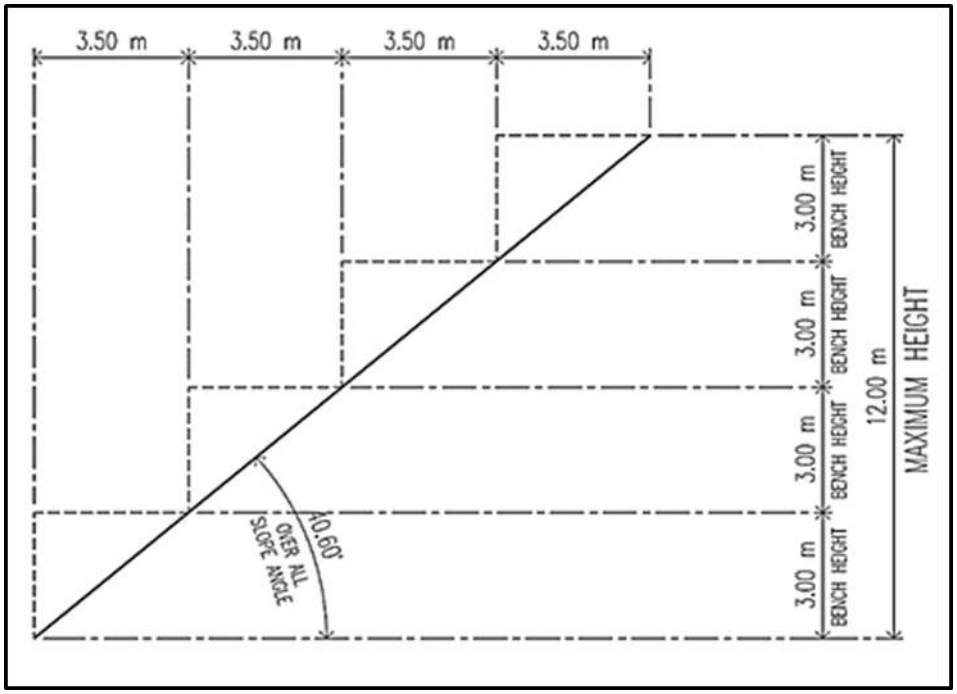


Figure 9. Stockpile Specifications

Thus, storing these piles follows stockpiling methods where the low walls are battered back from the angle of repose ~18° to ensure long-term slope stability.

Likewise, contour and drainage control are placed to minimize surface water drains and erosion, and by the establishment of suitable vegetation, in most occasions are slope greening and temporary greening using grasses for piles that will eventually be used for some purposes.

5.1.4. Change in soil properties including contamination

Sources of Impact:

Land contamination may occur only from chemical spills from Assay Laboratory, fuel leaks from equipment and storage tanks, temporary hazardous waste storage facilities, and unwanted leaks from containers. However, the impacted areas are insignificant, and pollution mitigation facilities are placed on the identified potential sources of hazardous materials that contaminate the land.

Only minor effects such as land contamination from oil spillages and hazardous waste generation are continually being addressed through the maintenance and operation of pollution control facilities like fuel tanks. In addition, the pipeline is equipped with bund walls, installation of oil-water-separators, and proper operation of the hazardous waste storage facility.

Mitigating Measures:

Land surface preparation is necessary to reconstruct the soil profile of the area and allow the reintroduction of desirable plant species for mining rehabilitation. Surface preparation starts with the landform grading of mined-out area floors and walls followed by the backfilling of depressed areas or pushed into crater-like depression using overburden and unsuitable materials and then levelled off to the desired land design and configuration. Next, the 0.75-m thick lateritic subsoil materials will be spread and levelled using bulldozers. An adequate drainage system is then provided within the reclaimed land surface. After stabilizing the area, the 0.25-m thick topsoil initially set aside in the pre-mining stage is spread over the subsoil in the area. Spreading of topsoil is vital for site revegetation because it contains native seeds, beneficial soil organisms, organic matter, and a range of nutrients and trace elements essential to plant growth (FMRDP, 2021).

In this aspect, the Company adopted options to enhance the reconstruction of the land or the soil profile:

- Ground ripping – slopes and ground of the prepared area for plantation shall be ripped at 0.5-m depth and 2-m interval for soil and water conservation.
- Soil amelioration – fertilizer application is made after ground ripping to improve soil fertility and rectify nutrient deficiency by using organic fertilizer if available, on some occasion's commercial fertilizers such as a combination of complete and urea. Organic fertilizers are sourced from company-owned Bioreactor processing projects, vermicomposting, sludge from Townsite STP, and chicken dung from poultry and swine projects.
- Hole excavation – holes with dimensions of 50cm x 50cm are dug directly into the mined-out soil surface areas for planting purposes. The basal application is conducted to serve as a growth medium for the planted tree seedlings and rectify the nutrient deficiency. This approach is practicable in areas with adverse grades and rolling terrains. Spacing is similar in 4m x 4m distances.
- Slope stabilization – slopes of contoured areas in rehabilitation are often planted with grasses and native bamboos or plants with complex root systems for soil

stability. The Company has also established its own coconut production facility to reinforce slope stabilization and use bioengineering techniques such as fascine and live check dams.

5.1.5. Change in Landforms and Topography

Sources of Impact:

Nickel deposits are usually found between 5 – 20 meters near the surface, where overburden (surface material covering the deposit) is relatively thin, making it suitable for extraction on the surface. Thus, deep pits or voids and high walls are unlikely to be created in the surface mining technique. But changes in topography are expected in surface mining areas. The original sloping and rolling terrain will be transformed into small crater-like formations and high walls occurring at the mining perimeter with a maximum depth of only 20 meters at any elevation. The high wall material comprises a range of naturally occurring soil or rock materials of varying strengths and states of weathering.

Present plant structures include power plant, screening and crushing plant, assay laboratory, and motor pool/mechanical shop. These structures occupy only a small area component of the whole project site and practically flat/level ground. Having the structures installed many years ago, its impact on surface alteration has been stabilized and while the FMRDP bears the plan to address the change in landform.

However, operating the structures mentioned above can generate hazardous emissions and odors/fumes and accumulate solid or liquid wastes that can cause land and water contamination when undisposed properly.

The provision of hardstands and parking areas in all significant plant buildings and mining areas has removed the vegetative cover and surface compaction.

Mitigating Measures:

Shallow pits are the significant and unavoidable impact of the mining project and are caused by the excavation and earthmoving activities associated with mineral extraction. Therefore, to ensure safety and minimize the effects of this scenario, the mine development plan will only open the allowed area for mining extraction at a given time. Furthermore, the mining method is designed that will leave the surrounding final high wall slopes in a condition where the risk of slope failures is minimized by adopting the following parameters and achieving a high factor of safety:

Overall pit slope - 30.96 degrees
Bench Slope - 90 degrees
Bench Height - 3 meters
Bench Width - 5 meters

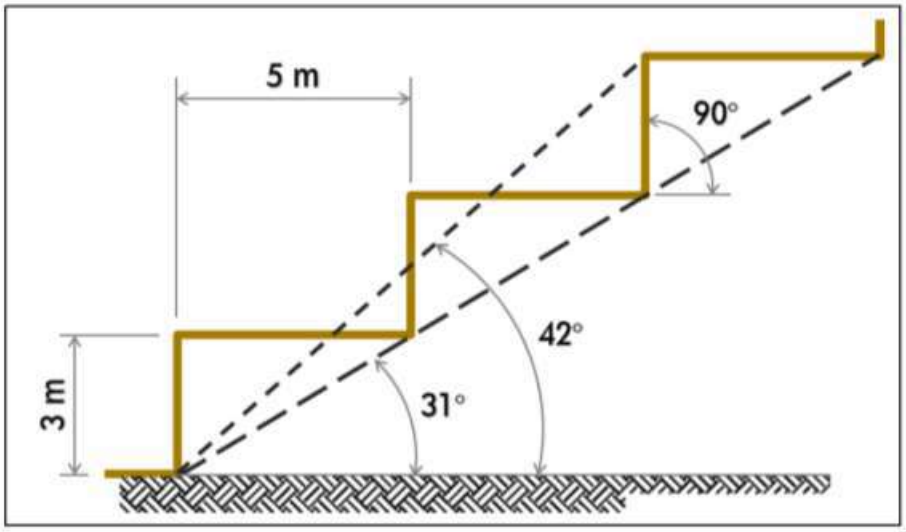


Figure 10. Mine bench designs

Landform design and construction are reshaping and recontouring of the mined-out area to a safe, non-erodible condition that involves physical-chemical modification that using the following sequential activities:

- Topography survey of the area for rehabilitation
- Preparation of the reshaping plan, which consists of dozing and levelling, slope smoothening, subsoil backfill and topsoil matting
- Estimation of cost, scheduling and approval of reshaping plan
- Site preparation and lay-outing
- Implementation of reshaping plan
- Final survey and verification of plan

The overall design of the rehabilitated area shall more or less conform with the original surface configuration but relatively of lower elevation by some 15 meters, as shown in Figure 9. Thus, the reshaping plan corresponds to the grading and site design that shows clearly, through high points, slope directions, spot elevations, contours, swales (drainage channels), and significant features, the form of the desired final landscape (Strom, Nathan, and Woland, 2009).

Meanwhile, derelict is sold to second-hand equipment buyers and scrap buyers to prevent accumulation. Undisposed machinery and parts are temporarily stored/piled at designated areas with perimeter fences.

5.2. Water Resource and Quality

5.2.1. Change in Drainage Pattern

Sources of Impact

Localize ponding at the mine pit may occur during a heavy downpour. In addition, surface run-off water coming from disturbed mining faces and mine road networks usually collect soil and other suspended solids from the mine slopes itself, mine roads, and along its path as it drains to low-lying areas, especially the mine pits. This silt-laden mine surface run-off may contribute to the siltation and sedimentation of adjacent water bodies.

There is no threat of tailings ponds and impounding dikes since the existing operation of RTNMC does not involve any ore treatment/processing plant that produces mill tailings. Process chemicals are likewise not used in the present direct-ore-shipping operation.

Meanwhile, although primarily constructed as pollution control facilities, settling ponds is a possible source of water pollution. These structures impound a large volume of run-off water and silt. Thus, in dike failure, a large volume of turbid water will flood the receiving water bodies causing sedimentation and damage to aquatic habitat.

Acid drainage, however, is not present in a lateritic environment, unlike in areas with sulphide deposits.

5.2.2. Water contamination

Sources of Impact

In RTNMC Assay laboratory, volumetric analysis is conducted by titration and instrumental analysis using Atomic Absorption Spectrometer in its daily operation. The primary wastes generated by the laboratory include liquid wastes from the chemical and instrumental studies. Typically, wastes are acidic and developed at an average rate of about 50 to 60 liters per day with an average pH of 2.2.

Therefore, measures are undertaken to eliminate the negative impact of these wastes on the environment. All liquid wastes from the analyses are directed to a waste tank (capacity = 12 m3). Neutralization is done so that the pH range of the liquid waste is maintained between 6 and 9. Regular pH monitoring of the wastewater inside the tank is conducted. If, at any instance, the

pH is lower than 6, lime is introduced to raise the pH; on the other hand, if it goes up to more than 9, a sulfuric acid solution is introduced to lower the pH.

Sewerage/septic tanks for domestic wastes within the industrial plant and townsite area were installed to prevent contamination of the water resources and surface environment. The septic tank's effluent within the townsite goes to the treatment facilities located in Areas A and C before being discharged to the natural drainage. In the industrial plant, the septic tank's effluent goes to the siltation ponds considering that the volume is relatively much smaller than townsite.

Leachate from landfills may contaminate land and water resources. Presently, the leachate from the existing landfill is allowed to drain into the Tagpisa Siltation Pond, where dilution occurs, and any suspended solids, if any, are allowed to settle in the pond.

Product waste generated is used oils and, if not properly collected, shall also contaminate water resources and waterways. When accumulated and not correctly disposed of, wastes can get their way to contaminate water bodies.

The production of beneficiated nickel is sun-drying, dry screening, and crushing; thus, it does not employ process water, posing any threat. However, petrochemical spills such as fuels and lubricants may occur, causing isolated water and land contamination.

The existing mine operations do not apply any toxic chemicals that procreate poisonous substances such as tailings or acid drainage. Consequently, the only chance for contaminating the groundwater resources is from the unwanted spill of petrochemicals, oil and lubricants generated from maintaining the equipment used in the mining operation and discharge from sustaining the Assay Laboratory and waste disposals.

The leaching of potentially harmful heavy metals is also a notable concern that needs to be addressed besides the siltation of important waterways.

To mitigate and control the possible leaching of heavy metals, RTNMC employs and researches several Leaching Control Measures.

Mitigating Measures:

Therefore, measures are undertaken to eliminate the negative impact of these wastes on the environment. All liquid wastes from the analyses are directed to a waste tank (capacity = 12 m3).

Neutralization is done so that the pH range of the liquid waste is maintained between 6 and 9. Regular pH monitoring of the wastewater inside the tank is conducted. If, at any instance, the pH is lower than 6, lime is introduced to raise the pH; on the other hand, if it goes up to more than 9, a sulfuric acid solution is introduced to lower the pH.

In the primary drainage discharge at the Preventive Maintenance Services (PMS) wash bay, the wastewater mixed with oil and grease is let flow to the oil-water separators before the oil-free water is discharged to the drainage canals leading to the siltation ponds. The oil-water separator operates simply by the concept of difference in specific gravity. In a water-oil mixture, water being heavier separates, forming the lower layer while the oil floats over the water. The oil layer is decanted and stored in drums while the water flows through the drain pipe towards the drainage canal. The wash rack is with three (3) units of oil-water separators (OWS) and, overall, ten (10) units of oil-water separators spread out to areas where oil is to be discharged.

Used oil from the OWS is regularly collected and put in drums to store in a 20 m x 20 m restricted Temporary Hazardous Waste Storage facility while awaiting disposal to interested buyers along with the product wastes generated such as busted fluorescent lamps, used lead-acid batteries, Polychlorinated Biphenyls from an old power plant, among others. If not properly collected, these wastes shall also contaminate water resources and waterways. The product wastes are appropriately segregated and stacked in a crate for proper air ventilation. The concrete flooring is slightly slanted and provided with a gutter. The lowest point of the flooring is provided with one unit of a water-oil separator. Spilled oils are washed by rains and flow towards the separator unit.

Moreover, proper engineering design of waterways is likewise practiced, such as:

- Installation of charcoal gabions at the discharge point of Lower Togpon and Lower Kinurong Siltation Ponds was done to contain possible percolation of heavy metals in the area.

- Certain species of vetiver grass are placed at strategic locations to test the capacity of the plants to absorb heavy metals.

- A regulated amount of Ferrous Sulfate (FeSO4) is dosed at the inlets of central siltation ponds during the rainy season. This chemical compound reduces Hexavalent

Chromium (Cr+6) level to the non-harmful Trivalent Chromium (Cr+3).

- The design of the significant siltation ponds is a countermeasure to the occurrence of heavy metals: the series of siltation ponds ensure that any volume of water carrying heavy metals is detained long enough and its velocity decreased to provide heavy metal precipitation.

- Regular desilting is conducted to ensure that all heavy metal precipitates are removed from the silt ponds and will not have a chance to re-oxidize into harmful aqueous cations.

The office in the plant site is equipped with septic tanks and sewerage systems that are regularly maintained to prevent contamination of adjacent water bodies. Meanwhile, the septic tank's effluent within the townsite goes to the treatment facilities located strategically before being discharged to the natural drainage. This is done by having the sewage water pass through the primary screening of a series of boxes containing charcoal then to the newly constructed secondary treatment facility that can accommodate 2000 cu.m. of discharge water per day.

Leachate from landfills may contaminate water resources. Presently, the leachate from the existing landfill is allowed to drain into the Tagpisa Siltation Pond, where dilution takes place and any suspended solids, if any, are allowed to settle in the pond.

Solid domestic wastes from townsites and industrial areas are appropriately disposed of. The Organization maintains that solid wastes are managed in an environmentally sound manner per the RA 9003. It emphasizes waste reduction thru recycling, reducing, refusing/rejecting and reusing programs. A No to Plastic Policy was implemented and continuously monitored to ensure that the employees and the whole RTNMC community adhere to the Policy. A Materials Recovery/Drop-Off Facility was established in RTNMC Town Site and received varied recoverable materials from the community. Disposable materials and used parts like metal shavings, used equipment parts, etc., are stored in designated scrap metal pile areas for eventual sale to scrap buyers. A Bioreactor was also established to process biodegradable wastes and convert them into fertilizer.
Meanwhile, the Company will also explore the possibility of processing PET bottles into reusable items. These efforts are geared toward minimizing wastes dumped to the Sanitary Landfill Facility located at GP-28 and co-operated with CBNC and LGU Rio Tuba. In this manner, it will extend the capacity and service life of the landfill.

5.2.3. Erosion, Sedimentation and Siltation

Sources of Impact

Surface run-off water coming from disturbed mining faces and mine road network usually collect soil and other suspended solids from mine slopes itself, mine roads and along its path as it drains to low-lying areas. This silt-laden mine surface run-off also contributes to siltation and sedimentation.

When subjected to soil erosion during heavy rains, laterite overburden and low-grade ore stockpiles are sources of silts and sediments. Silt-laden surface run-off from these areas, if uncontrolled, shall result in siltation or sedimentation within the drainage system, especially on low-lying areas along banks of rivers and creeks.

The project site's infrastructure is located in the industrial area, in the townsite, and the pier site. These may cause environmental degradation if not maintained and left to rot after the useful life.

These infrastructures, however, are presently being maintained ever since their construction in the early 1970s that involved ground clearings and earth movement. As a result, these are potential sources of contaminated water run-off and sedimentation of adjacent water bodies.

Mitigating Measures:

Similarly, mined-out areas shall be restored and rehabilitated/revegetated to minimize soil erosion. In addition, silt collector sumps shall be constructed along with its drainage systems as silt traps, thus minimizing suspended solids gravitating into siltation ponds.

Drainage canal and culverts were installed along the peripheries of the mining area to catch and prevent surface run-off from elevated areas within site and to manage domestic sewerage from mine offices. Along with proper slope engineering, boulder toe dressing and reforestation activities, containment of run-off and stabilization of slope is being practiced by RTNMC.

RTNMC controls and prevents soil erosion and subsequent siltation of the river through slope management and soil stabilization techniques. Other soil erosion control measures include covering stockpiles with canvass sheets and providing a drainage system that allows run-off to be contained first to siltation ponds before it discharges to the receiving water bodies. Regular retrieving of settled silt materials, called desiltation, is performed monthly, particularly during the dry season when the water levels are low in the silt ponds.

Drainage canal and culverts were installed along the peripheries of the mining area to catch and prevent surface run-off from elevated areas within the site from flowing to undisturbed nearby waterbodies. Thus, diversion and catchment sumps are constructed along with drainage systems as silt traps, thus minimizing suspended solids gravitating into siltation ponds.

Residual voids are very unlikely to occur, but open spaces and minor ponding in open areas are expected wherein siltation/sedimentation, soil erosion should be, in turn, checked and or minimized through the provision of the appropriate drainage system, proper slope engineering, and reforestation activities, as practiced by RTNMC.

At present, the Company has already implemented siltation prevention measures such as sediment barriers and containment ponds at strategic places to avoid siltation of adjacent farmlands, the Rio Tuba River, and the coastal waters. Water flowing from disturbed areas is directed into existing siltation ponds. There is a series of siltation ponds for the existing mine site. The silt control facilities constructed include diversion canals and settling ponds. There are currently five (5) siltation ponds in the mining complex that catches run-off: Upper and Lower Kinurong, Tagpisa, Lower and Upper Togpon. These basins temporarily impound the run-off water and then release it in a more manageable flow toward Togpon Creek and Kinurong Creek, finally to Rio Tuba River. These siltation ponds have a combined capacity of approximately 1 million cubic meters. There are also plans to install additional settling ponds such as M23, M24, D19, Ibelnan, SDA-P, B1, to B12. The mine drainage map is shown in **Annex 12**.

The Company will continue to improve these siltation prevention measures by adding more silt collector sumps whenever necessary and regularly desilt/dredge these sumps and ponds to maintain its holding capacities. In addition, a series of desilting pads were also recently added. These structures significantly improved water retention within the ponds and allowed desilting activities to be undertaken manageably at any time, even during the rainy season.

To minimize siltation/sedimentation, soil erosion should, in turn, be checked and or minimized thru revegetation of disturbed areas and stockpile slopes and provision of a proper drainage system to eliminate flowing of run-off water across the slopes.

5.2.4. Water Usage/Balance

Sources of Impact

The water requirement for the domestic water of Townsite and nearby communicates supplied by a water system whose source is Umawi Creek. This creek is a sub-catchment of the Ocayan River.

Mitigating Measures:

As mentioned earlier, RTNMC production of beneficiated nickel is sun drying, dry screening, and crushing and does not require a large amount of water in its operation. Therefore, the primary source for RTNMC's mining operation and industrial area needs is conventional water wells and does not compete with the water supply for domestic consumption.

5.3. Air Quality

5.3.1. Dust generation

Sources of Impact

The effect of dust emission from exploration and drilling activities is confined only within the immediate vicinity where the activities mentioned above are being performed and often negligible.

In any open-pit mining operation, dust emission is inevitable during the dry season. The loading-hauling-dumping activities, other earthwork operations and wind action on an open stockpile are the most common dust emission sources. The effect of dust emission is confined within the immediate vicinity where the activities described above are being performed.

Being a dry process, the crushing and screening operations typically generate dust. Likewise, only the immediate vicinity of the screening crushing plant is adversely affected by dust pollution.

In addition to the mining activities mentioned above, the movement of service vehicles tends to make settled dust airborne, thus, contributing to dust pollution in the mine area. This, however, is confined only along active mine roads.

Mitigating Measures:

Access roads within mine areas and along Macadam Highway are subjected to frequent water spraying and regular water spraying

of the mine haulage roads, especially during the dry season. The ground wetness and the frequency of vehicle passage and speed shall be considered in determining the desired frequency of road sprinkling to keep the particulate matter concentrations within allowable levels. The 7km-portion of Macadam Road was already cemented sometime in 2005, together with some portions within the plant site.

The Company installed a dust collector at the grizzly hopper and crusher/screen areas, paved some of the frequented areas within the plant site, and conducted Silt retrieval and greening of berms and Macadam. In addition, telescopic and accordion chutes are used at stockpiling conveyor discharge to avoid dust emissions by wind action.

Setting up the maximum speed limit to all vehicular equipment passing unpaved roads (particularly within the mine site area). Constructing road humps across Macadam highway to somehow reduce the speed of hauling trucks and other vehicles.

Planting of trees and grasses, which act as dust curtain, along sides of the Macadam Road, Pier site, and mine operation area
Placing of canvass windbreakers and planting of fast-growing trees, which act as windbreakers, around the open storage areas to prevent fugitive dust emission by wind action

With the acquisition of new equipment measuring particulate matter (PM) 10 and 2.5, RTNMC conducted the new dispersion modelling to identify appropriate sampling locations and to read applicable standards. Whenever suitable, TSP and PM 10 levels are being measured and monitored.

- Concreting of Macadam Road shoulders and put-up of loading bays
- Street sweeping along Macadam Road during the day
- Proper maintenance of haulage road through the use of road grader and road roller/compactor, bringing the road to a near paved-road status.
- Using minimum drop height during ore loading to minimize fugitive dust
- Covering ore stockpiles with canvas sheets

5.3.2. Gases and fumes emission

Sources of Impact

Though Palawan is still a carbon sink, RTNMC commits to reducing carbon emissions from fuel-burning equipment and other consumptions.

Mitigating Measures:

The low carbon lifestyle through reducing fuel consumption and power is being adopted throughout the organization. In addition, through rehabilitation and reforestation efforts, continuous planting of trees is being made to negate and sequester the emitted carbons by the mining operation.

5.4. Noise and Vibration

5.4.1. Noise and Vibration generation

Sources of Impact

Noise generation is expected in construction sites whenever there are activities but will be minimal due to isolated locations and not continuously.

Noise levels are expected to be relatively high but within standard along with access to existing roads and ore haulage where company vehicles, including off-highway trucks and other private vehicles (buses and jeepneys), are plying. Noise is generated only whenever these vehicles pass and not continuously.

Noise from the screening and crushing operations is confined within the location of the crusher; therefore, noise levels are expected to be within the standards.

Sources of noise in the mine pit areas are heavy equipment such as excavators, bulldozers, wheel loaders and other auxiliary mining equipment. Likewise, noise generated by these machines is very minimal and far from adversely affecting the community, which is located some three (3) kilometers away.

The power plant is presumed not to cause high noise levels in residential areas since it is located far (3 km) from the communities. Inside the powerhouse, however, noise is expected to be relatively high.

Mitigating Measures:

All potential noise sources emanate from the project area located far away from the communities and residential areas. Hence, the construction of sound barriers is not necessary.
However, a portion of the townsite area is exposed to the Macadam Road, where haulers of beneficiated ore regularly travel to the pier during the dry season. Therefore, the Company planted different kinds of trees along the sides of the Macadam Road to act as sound barriers. In addition, the townsite premises

have a concrete perimeter fence which also serves as a sound barrier.

Instead of using explosives to break the rigid rock portion of the pit area, rock breakers are utilized, thus reducing the generation of noise from explosives.

The mining operation has a unique work schedule customized to the local climatic conditions. From December to May, every day is a regular working day during the dry season. The primary activities include:

a) Soft Ore Mining and Hard Ore Mining
b) Beneficiation involving solar drying of raw soft ore, reclamation of solar-dried ore, screening and crushing, transfer of marginal ore to stockpiles
c) Ore hauling and stockpiling of beneficiated ore

During the wet season from June to November, the working days are reduced to around 20 days per month, and the major activities are:

a) Hard Ore Mining
b) Beneficiation involving crushing and transfer of marginal ore stockpiles
c) Ore hauling and stockpiling of crushed ore

From February to May, crushing is at 16 hrs. Per day simultaneously with the screening of solar-dried soft ore. For January and the rainy months of June to December, crushing is 8 hours per day.

Similarly, constructing a series of humps along Macadam Road forces vehicles to slow down, reducing noise levels. Furthermore, silencers and mufflers shall be installed in machines that generate uncontrollable noise levels whenever necessary.

In general, except for some private houses located along Macadam Road, the whole mining community situated some three (3) kilometers from the mining and industrial areas are not affected adversely by the noise generated by the mining activities.

Personnel and workers exposed to noise are provided with appropriate personal protective equipment (PPE) such as earplugs, earmuffs and the likes.

Appropriate speed limits of motor vehicles (e.g., 30 kph) are imposed in the mine area and Macadam and within Townsite premises to minimize noise generation from cars. Meanwhile, haulage trucks are installed with silencers and mufflers to prevent noise generation from this source.

5.5. Biodiversity Conservation/Consideration

5.5.1. Disturbance/Loss of Biodiversity

Sources of Impact

The continued operation in the area will directly remove vegetation, resulting in the displacement of some wildlife habitats for birds and mammals. Forest patches for in-situ conservation shall be spared from disturbance. Banned tree species shall also be transplanted to an area designated as Perpetual Forest. Meanwhile, aquatic biota will be disturbed primarily due to silted water passing through and discharging from the mining area.

The temporary scar on the mountainside resulting from the ground excavations is the only adverse effect on the scenic values of the area. Designated scrap/junkyard and used equipment storage areas are also "eyesore" in the project. However, being located in a very remote area far away from the public eye, the project's impact on visual aesthetics may be insignificant.

Mitigating Measures:

Meanwhile, the effectiveness of applied technology and the rehabilitation per se can be evaluated using the listed below techniques:

- Biodiversity assessment – continuous monitoring that focuses on the habitat complexity of flora and fauna and its status in the ecosystem.
- Reforestation and Carbon Sink Program
- Aquatic Biota Assessments
- Vegetation and structure composition assessment using reference site and completion criteria. Refer to the FMRDP for the details of the vital ecosystem attributes that contribute to overall ecosystem integrity and can be used to describe the reference site and track the outcome of rehabilitation work.

Lastly, the area rehabilitation is continuously enhanced, conducive to the wildlife's return and eventual faunal recolonization. Planting flora species that are endemic to the area will significantly help the fauna's recovery because it will provide food and habitat. Furthermore, to protect the endemic and threatened species within the project site, RTNMC implements a Biodiversity Conservation Action Plan, which involves:

- Inventory and mapping of affected plants and trees prioritizing the endemic and threatened species

- Operation of a plant nursery with complete facilities and staff to store and propagate representative specimens of balled and transplanted plants and propagules for use in a progressive rehabilitation
- Confinement of mining activities within defined areas to protect the surrounding native vegetation.

The Company shall continue reforestation and mine rehabilitation activities to restore disturbed areas proximate to its original wildlife habitat. Clearing vegetation shall be in the segment and only when needed to retain habitat highway and shelter during operation disturbance. Likewise, the Company shall implement immediate rehabilitation of used-up areas. The Company's pollution mitigation measures and conservation measures shall protect the water resources while various conservation strategies will be applied.

Lastly, to protect the endemic and threatened species within the project site, RTNMC implements a Biodiversity Conservation Action Plan.

Total rehabilitation and greening of disturbed areas, especially the mined-out pits, are the only mitigating measures possible to enhance the visual aesthetics of the affected area. In the meantime, thick vegetation curtains (trees planted along sides of major access roads and the periphery of the disturbed areas) are installed to somehow temporarily conceal the ill effects of excavations and junkyards while at the same time observing good housekeeping. The DENR Secretary Roy A. Cimatu commented that RTNMC is generally pleasant to look at due to its good housekeeping and tidiness from the operation, rehabilitation, and settlement areas.

5.5.2. Change in Landscape/View

Sources of Impact

Throughout mine development, changes in landscape and view are inevitable but temporary.

Mitigating Measures:

In addition to the progressive mine rehabilitation thrust, an Ecotourism area is developed in the mine site that will serve as a recreational area for visitors and residents, offering different activities, sports, and learning of a responsible mining operation. Furthermore, various landscaping activities and aesthetic improvements are made at this stage.

5.6. Heritage and Cultural Values

5.6.1. Disturbance of historical, archeological and cultural sites/ resources

There are no known historical, archeological or cultural sites/resources within the MPSA.

5.6.2. Cultural Change

Sources of Impact

A very limited minority of the present population in the host community are classified as natives or "Palaw'ans." However, most current community inhabitants are migrant workers and settlers who migrated to Rio Tuba to earn a living through direct or indirect employment in the mines and business activity. As such, changes and cultural values in the community were greatly influenced by these migrant people. With the increased earnings, some tend to engage in vices, such as gambling and drinking.

Mitigating Measures:

The natives are encouraged to maintain most of their cultural values through the human resource program embedded in the Social Development Projects. Moreover, having lived separately in isolation and away from the migrants, having occasional interactions, the natives still sided their innate beliefs and values. Therefore, any changes in cultural traits are expected to be positive.

RTNMC formulated guidelines on vices incorporated in the company rules and regulations, such as the prohibition of gambling and drinking hard liquors inside the company's town site. Instead, sports and recreation are encouraged among the residents of the community. Furthermore, the company shall continue to respect the indigenous people's customs and traditions by:

a) Encouraging Indigenous Cultural Communities (ICC's) to conduct tribal festivals and traditional cultural events.

b) Allowing ICCs to practice their laws, customs and traditions such as conflict resolution systems, etc.

c) Promoting their traditional knowledge systems such as ethnobotanical and herbal medicine.

5.7. Social Issues

5.7.1. Displacement of Communities

Sources of Impact

Mining, to some extent, has negative impacts on the environment and the community, but the Company programs can mitigate its adverse effect, and the advantages/benefits derived from the project by the community far outweigh the negative impacts. Today, RTNMC is an example of how a mining company had transformed and brought the once remote, underdeveloped and less inhabited Bgy. Rio Tuba into the portals of the civilized world. The provisions of community infrastructures, employment opportunities and other amenities have attracted many populations to work and do business in the newly-established mining community.

Indeed, mining does not displace communities and livelihood but instead propels the socio-economic progress of a host community under a sustainable framework of development.

The whole mining industry is challenged and entrusted with the responsibility of meeting the need for minerals without compromising the interests of the future. Furthermore, it assumes a collective responsibility to advance and strengthen the interdependent and mutually enforcing pillars of sustainable development --- economic development, social development, and environmental protection --- at the local, national, regional, and global levels (UN 2002a).

Mitigating Measures:

Efforts have advanced the understanding of mining practices designed to protect the environment, contribute to local communities, and build value into the economy—sustainability in mine management deals with operational efficiency, enhanced stakeholder relationships, and responsible management of environmental issues.

With this, the RTNMC shall adopt measures to solve issues and enhance the project's benefits to the communities. The Social Development and Enhancement Program is one of the tools and control strategies in addressing the social problems commonly poverty in the mining community. RTNMC plays a vital role in the socio-economic development of the host community and the neighboring Barangays. As had always been emphasized, RTNMC is a real government partner on community development, as manifested in its socio-economic contributions from the time it started its operation up to the present. In other

words, community development assistance has been part and parcel of the Company's long-term development plans and objectives. The various socio-economic contributions made so far by RNTMC's mining operations to the host community and nearby Barangays are elaborated in the SMDP. Furthermore, the Company shall continue the social services and development programs for the host community throughout its mine life.

The Company shall continue to listen to all the concerns and grievances of the residents. To counter occasional adverse publicity by pseudo-Environmentalists, the Company shall embark on an information and education campaign (IEC) program to constantly inform the residents and public of the Company's plans concerning environmental and socio-economic issues.

Rio Tuba Nickel Mining Corporation accepted the challenge and has stated its commitment to the values of sustainability – and to become the face of responsible mining in the Philippines. However, social issues, particularly the sustainability of host and neighboring communities, including IPs, are still apparent impeded by the beneficiaries' culture of dependency and entitlement. Hence, concerning the FMRDP, RTNMC will implement the following measures:

- Development of social closure criteria in the SDMP with MGB4B
- Programmatic SDMP and social closure plan involving RTNMC, CBNC, and UMPI with individual roles and responsibilities
- Capacity building of Community Relations (ComRel) staff, POs, LGU, and MGB4B staff.
- As part of the SDMP and initially, for RTNMC's progressive rehabilitation, development works local enterprises for nursery and plantation establishment.

6.0 Research Proposals at the Mine

A. In-house study

I. Sedimentation Rate and Trap Efficiency of RTN Settling Ponds

II. Rationale

Surface mining involves vegetation removal and excavation to extract the desired minerals from the land, resulting in accelerated erosion and silted water going into the waterways. Fortunately, RTNMC has established large settling ponds to trap the surface runoffs and suspended solids generated from the mining activity and prevent the deterioration of natural streams and waterways. However, ever since creating the settling ponds, the documentation of the effectiveness of the settling ponds for removing suspended solids is not formally determined, including its trap efficiency, especially during the rainy season.

On this note, it is widely known that sediments play an essential role in elemental cycling in the aquatic environment. Therefore, they are responsible for transporting a significant proportion of many nutrients and contaminants. Rio Tuba River has been the primary catchment of the mining effluent and the first to be affected of any impact as a result of the mining operations. However, the sediment transport from the RTNMC mining areas to Rio Tuba River is not yet explicitly studied except for the aquatic biota assessments conducted. Hence, it is high time that sediment transport in the Rio Tuba River will be examined, focusing on the suspended sediments/solids found in the water column where the water movement transports it.

III. Goals and Objectives

1. To determine the trap efficiency of the settling ponds in Rio Tuba mines
2. Assess fluxes of nutrients and contaminants to Rio Tuba River
3. Further determine areas for improvement to increase the efficiency of the ponds and protect surface water resources

IV. Methodology and expected outputs

1. Conduct analysis of the following factors of the siltation ponds:
    - As-built measurements of the pond, location, topography, soil type, design
    - Sampling results from water inlets and outlets of the pond
    - Rainfall measurement records
    - Quantity and quality of discharge that includes frequency, concentrations, loading, flow
    - Maintenance activities and desilting materials records
    - Comparison of the result to the criteria and guidelines

2. Conduct sediment quantity assessments by using the results of the water sampling analysis and conducting suspended sediment sampling to determine the quality of sediments in the river beds. For correlation, the following factors influencing erosion and sediment transport shall also be considered and assessed:

- Soil type and texture
- Volume and velocity of runoff from precipitation events
- Rate of precipitation infiltration downward through the soil
- Amount of vegetative cover
- Length or distance from the origin of overland flow to the start of deposition
- Operational erosion control structures

V. Timeline and Budget

Activities	**2021**	**2022**	Est. Cost, Php
1. Analysis of available data			**0.00**
2. Water sampling and analysis			**Part of the AEPEP**
3. Soil sampling and analysis			**80,000.00**
4. Sediment sampling and analysis			**100,000.00**
5. Full paper writing and submission			**20,000.00**
Total			**200,000.00**

B. Partnership study

I. Morphological and Anatomical Characterization of Selected Hyperaccumulator Plants in Two Types of Ultramafic Soils in Palawan Island

7.0 Approach and Scope of Environmental Monitoring Program

The scope of the environmental monitoring program of the Company is not limited to the conditions outlined in the Environmental Compliance Certificate and other permit conditions issued by DENR and relevant Government Agencies. RTNMC also commits to implementing mitigating measures for all types of conditions stipulated.

With the creation of the MEPEO, the environmental management programs will be implemented and monitored in close coordination with various agencies and partners. Likewise, the created Multipartite Monitoring Team will conduct the quarterly monitoring and validation activities. In addition, the Company is also subjected to multiple inspections and audits such as the DENR, MICC, SHES by MGB, EMB, third party audits, and various other visitations by the different stakeholders.

7.1 Significant impacts

The previous section of this document discussed the acceptable levels of impacts in each aspect of the project. In contrast, the significant impacts were identified, and the summarized environmental pollution/degradation to include, among others, the following shall be monitored:

a) Compliance with various regulations
b) Emissions to air
c) Releases to water
d) Avoidance, recycling, reuse, transportation and disposal of solid and other wastes, particularly hazardous wastes
e) Use and contamination of land
f) Use of natural resources and raw materials, including energy
g) Local issues such as noise, vibration, dust, and visual appearance
h) Risks of environmental accidents and impacts arising or likely to occur as consequences of incidents and potential emergencies and
i) Effects on biodiversity
j) Adverse Socio-Economic Impacts, if any

A more detailed monitoring matrix showing the source of impacts (activities) and their corresponding adverse impacts, parameters to be monitored, purpose of monitoring, monitoring location, and monitoring frequency is presented in Table 23.

7.2 Parameters to be monitored and standards to be used

- **Mining activities/Infrastructures**

Parameters to be monitored are the stability of the excavation and high walls, stockpiles and waste dumps, slopes and haul roads, erosion and siltation of the drainage system, sumps and settling ponds effectiveness, waste generation,

rehabilitation success and plant growth, implementation of the progressive rehabilitation program, and general cleanliness and orderliness.

- **Water resource/quality**

Based on DAO 2016-08 Water Quality Guidelines and General Effluent Standards of 2016, the significant effluent quality parameter to be monitored for the Nickel ore mining industry under PSIC Code 07294 are pH, Total Suspended solids, Manganese, Arsenic, Cadmium, Lead, and Nickel. Nevertheless, other parameters such as Color, Iron, BOD, and Hexavalent Chromium are continuously monitored for reference and relevant studies. Meanwhile, RTNMC includes the parameters for Oil & Grease and BOD for aspects of oil and grease discharges from the motor pool joining the main drainage and going to the determined water outfall. Also, domestic discharges from the offices are not expected since the septic tank system is in place while the Townsite area is secured with a separate discharge permit for applicable parameters. Depending on sampling and the water body classification, the relevant standards and guidelines for the parameters vary. RTNMC shall likewise monitor the quantity or volume of water discharge, rainfall, and other physical observations. In addition, a biennial aquatic resource/biota assessment is conducted. Nevertheless, below is a summary of monitoring conducted in terms of water resource/quality.

Table 23. Summary of water quality monitoring

Type	Location	Parameters
Effluent	Mine site & Townsite	DAO 2016-08
Ambient	Mine site Vicinity	
Potable Water	Water source, tanks and faucets, Water wells	DOH AO 2017-0010 Philippine National Standards for Drinking Water of 2017
Effluent Discharge	Mine site & Townsite	Discharge Permit
Water consumption	Mine site & Townsite	Sustainability Reporting
Aquatic Resource	Mine site Vicinity	Freshwater and Marine Ecosystem Assessments

- **Noise and Vibration**

Monitoring of noise levels is in a 3-time trial, morning, daytime and evening. The results are recorded in decibel (dB) compared to the Philippine Ambient Noise Standard for the different DENR classes.

Table 24. Philippine Ambient Noise Standard

Category	Type	Daytime	Morning/ Evening	Night time
AA	Within 100m from school sites, nursery schools, hospitals and	50 dB	45 dB	40dB

	special home for the aged			
A	Residential Areas	55 dB	50 dB	45 dB
B	Commercial Areas	65 dB	60 dB	55 dB
C	Light industrial areas	70 dB	65 dB	60 dB
D	Heavy industrial areas	75 dB	70 dB	65 dB
	Time	9am to 6pm	5am to 9am 6pm to 10pm	10pm to 5am

- **Air quality**

Total Suspended Particulates (TSP) and Particulate Matter 10 (PM10) shall be monitored, but the latter is reliant on equipment availability. The ambient TSP concentration shall be measured in conformity to DAO 2000-81 ambient air quality guideline values for PM10 and TSP, at 150 µg/Ncm and 230 µg/NCM, respectively. Results are then compared to the standard but depending on sources.

Meanwhile, third-party emission testing is conducted depending on the requirement of the Permit to Operate pollution control source and equipment.

- **Conservation values**

Impacts and disturbance on biodiversity shall be monitored, including the commitment to the pollution mitigating and environmental management programs. RTNMC shall conduct the Biodiversity Assessment every two years and report progress on the comprehensive Biodiversity Action Plan.

Monitoring until the ecosystem restoration goal is achieved will be done concerning the mine rehabilitation completion criteria and agreed on standards or levels of performance that indicate the success of rehabilitation, as mentioned in the FMRDP.

- **Heritage and cultural values**

Monitoring of the artifacts of archaeological significance if any and the customs and traditions of native Palaw'ans.

- **Social issues**

Parameters to be monitored includes community development and livelihood projects, per capita income, migration of people in the area, alternative means of livelihood other than mining and implementation of SDMP and its progress.

7.3 Purposes of monitoring

- **Mining activities/Infrastructures**

Monitoring is a must to ensure that the best practices are consistently implemented in all work areas to reduce adverse impacts brought by mining and determine if the impact mitigation measures are effectively and adequately implemented.

- **Water resource/quality**

To determine the water quality degradation, particularly erosion and siltation level to apply the appropriate treatment or mitigating measures as well as to assess the effectiveness of mitigation efforts while the aquatic resource assessment is conducted to determine the impacts and changes of the mining operation in the aquatic life and determine further mitigating measures, rectify and compensate the affected resources.

- **Noise**

To determine the noise level at all phases of operation and asses if noise generated is within the standard set by DENR to ensure acceptable noise level in the environment and implement appropriate mitigating measures on occasions of exceedance.

- **Air quality**

To determine dust emission levels, especially dust particulates that can affect flora and fauna, degrade the environment and are detrimental to human health.

- **Conservation values**

The monitoring will be conducted to determine the presence and degree of environmental degradation and disturbance to wildlife and the ecosystem. The monitoring results, data and information can help identify solutions to prevent the negative impacts of the activities further.

- **Heritage and cultural values**

To help preserve the customs and traditions of native “Palaw’ans” living in the vicinity of the mine site. Also, to turn over to the National Museum any artifacts found in the area.

- **Social issues**

To determine the socio-economic issues related to the mining operations within the area so that appropriate measures could be implemented to improve the living conditions/well-being of the community residents as a whole, thereby attaining social acceptability.

7.4 Monitoring methods

- **Mining activities/Infrastructures**

Monitoring includes ocular inspection recorded in a checklist and geotagged photo documentations of the observed activity or structures. Corrective actions and measures should be immediately taken once an infraction is observed.

- **Water resource/quality**

Water sampling activity is conducted following the EMB Water Quality Monitoring Manuals, and the water samples are sent to EMB and DOH third-party accredited laboratory for analysis. The discharge measurement is done in-house using a flowmeter probe, while the aquatic resource assessment is based on the standard assessment methods for marine and freshwater.

- **Noise**

The noise meter EXTECH shall be used in measuring the noise level in the predetermined locations, time and frequency.

- **Air quality**

TSP and PM10 concentrations will be measured using the gravimetric method and a high-volume air sampler (Staplex Model TF1A and BGI PQ200 PM10/PM2.5). The filter papers for TSP are read in the laboratory, while the PM10 filters are sent to the third-party laboratory before and after measurement for more accurate weighing using appropriate balance.

- **Conservation values**

Regular field visual inspection/observation by deputized forest guard and/or MEPEO personnel and shall also seek the services of the third-party providers to carry out studies and assessments, mainly the Biodiversity Assessment.

- **Heritage and cultural values**

Actual interactions/interview with the native “Palaw’ans.” Also, an actual ocular inspection of the newly disturbed land area is suspected of artifacts.

- **Social issues**

Regular interaction with the community residents, the LGUs, and POs within the mining areas and immediate vicinity. Likewise, census/inventory, including profiling and analysis of the socio-economic-cultural conditions of the affected IP’s will be undertaken. RTNMC shall also conduct a Social Impact Assessment (SIA).

7.5 Monitoring locations

- **Mining activities/Infrastructures**

The location of the monitoring is not limited to only one area. All areas should be accessible and open, especially to the monitoring team, for transparency and the best representation of the status of the area of concern.

- **Water resource/quality**

Sampling stations are predetermined, especially in areas where the water is expected to be discharged. The water sampling locations are as follows and identified in the map in **Annex 13**.

Table 25. Water quality monitoring stations

Station ID	Description	Location	Classification	
RTN OR-1	Ocayan R. tributary upstream, adjacent to Rio Tuba Water System	8˚35'40.6" 117˚24'0.5"	Class C	Freshwater
RTN OR-2	Ocayan R. tributary midstream, Sitio Bohoy	8˚36'24.4" 117˚23'59.5"	Class C	Freshwater
RTN OR-3	Ocayan R tributary downstream, before merging with another tributary	8˚35'43.9" 117˚25'30.6"	Class C	Freshwater
RTN OR-4	Ocayan R, under Ocayan bridge	8˚34'20" 117˚26'20.1"	Class C	Freshwater
RTN RTR-1	Rio Tuba R. tributary 1	8˚32'34.1" 17˚22'38.7"	Class C	Freshwater
RTN RTR-2	Rio Tuba R. tributary 2	8˚32'40.5" 17˚23'6.4"	Class C	Freshwater
RTN RTR-3	Rio Tuba R. tributary 3, under bridge	8˚33'8.6" 117˚24'1.1"	Class C	Freshwater
RTN SR-1	Sumbiling R. tributary, near rice fields	8˚33'14.9" 117˚20'54.3"	Class C	Freshwater
RTN SR-2	Sumbiling R. tributary, near paddle wheel	8˚33'16.2" 117˚21'11.0"	Class C	Freshwater
RTN SR-3	Sumbiling R. tributary downstream, near roadside	8˚31'34.7" 117˚21'31.4"	Class C	Freshwater
RTN GW-1	Tagpisa water pump	8˚33'51.2" 117˚26'18.6"	Class C	Freshwater
RTN GW-2	RTN Supply Pump	8˚32'44.5" 117˚25'53.8"	Class C	Freshwater

RTN GW-3	Water pump at Sumbiling	8˚31'36.1" 117˚21'30.4"	Class C	Freshwater
RTN MW-1	Mouth of Rio Tuba R.	8˚31'32.2" 117˚25'5.3"	Class SC	Marine water
RTN MW-2	Mouth of Sumbiling R.	8˚29'14.4" 117˚23'46.9"	Class SC	Marine water
Station 1	Upper Tagpisa (ambient)		Class C	Freshwater
Station 2	Upper Magas-Magas (ambient)		Class C	Freshwater
Station 2A	Upper Togpon Pond (discharge)		--	Treatment Facility
Station 3	Tagpisa Settling Pond (discharge)		--	Treatment Facility
Station 4	Lower Kinurong Pond (discharge)		--	Treatment Facility/ Effluent
Station 5	Lower Togpon Pond (discharge)		--	Treatment Facility/ Effluent
Station 6	Confluence of Stations 4 & 5 (discharge)		--	Treatment Facility/ Effluent
Station 7	500-m from Station 6 (discharge)		Class SC	Final Effluent
Station 8	Togpon-Kinurong Tributary to Rio Tuba River (ambient)		Class SC	Marine water
Station 9	Gamayon Tributary to Rio Tuba River (ambient)		Class SC	Marine water
Station 10	Log pond tributary to Rio Tuba River (ambient)		Class SC	Marine water

- **Noise**

Monitoring locations are in areas and activities where a significant noise level is observed, especially in the residential area. The sampling locations in RTN that are relevant to operations are the exact location of air sampling stations.

- **Air quality**

Sampling locations are determined as a result of air dispersion modelling. Hence, existing and new sampling locations are as follows and as shown in **Annex 14**.

Table 26. Air quality and Noise level monitoring stations

Station ID	Description	Location
RTN AQ1	RTN Oval	08º 32’ 3.02” N 117º 26’ 7.88” E
RTN AQ2	Pier Stockyard A	08º 30’ 07.48” N 117º 26’ 16.35” E
RTN AQ3	Sitio Bohoy	08º 36’ 0.4” N 117º 24’ 12.4” E
RTN AQ4	Tagpisa Pond	08º 33’ 47.3” N 117º 26’ 19.5” E
RTN AQ5	Upper Kinurong	08º 33’ 15.93” N 117º 25’ 26.17” E
RTN AQ6	Barangay Taratak	08º 31’ 28.9” N 117º 23’ 36.6” E
RTN AQ7	Barangay Sumbiling	08º 30’ 35.8” N 117º 21’ 30.0” E

- **Conservation values**

Permanent control plots and biodiversity monitoring areas are initially established and continuously developed. Locations for the regular field ocular inspection/observation are within the MPSA and its vicinities, while for the biodiversity assessments, locations are assigned based on the requirements of the assessment methods.

- **Heritage and cultural values**

Locations shall be in nearby sitios where native “Palaw’ans” have reportedly settled and newly disturbed land areas.

- **Social issues**

Impact and neighboring barangays.

7.6 Monitoring frequency

- **Mining activities/Infrastructures**

The frequency of the monitoring depends on the parameters to be observed. However, a regular inspection is a must not only by the MEPEO but by the concerned group in the Organization and as deemed necessary.

- **Water resource/quality**

In-house sampling and measurement are conducted every month, while the aquatic resource assessment is conducted every two years.

- **Noise**

Noise level measurement shall be every month.

- **Air quality**

Air quality monitoring and measurement are conducted monthly at a 1-hour averaging time. Special sampling is conducted when necessary.

- **Conservation values**

Regular forest patrol is conducted every month, while the biodiversity assessment is conducted every two years. In addition, other monitoring and observations are carried out as the need arises.

- **Heritage and cultural values**

Monitoring will be conducted or as the need arises.

- **Social issues**

Semi-annual consultation with the host community. SIA is conducted every five years.

Table 27. Environmental Monitoring Program

Impacts	Mitigating Measures	Parameters Considered	Monitoring Method/s	Monitoring Location/s	Monitoring Frequency	Responsible Person	Remarks
A. Land Resource							
Loss of vegetation	1. Revegetation of Mined-out Areas	1.1 Area (in hectares) subject for rehab	1.1 Field inspection	1.1 Mined-out areas	1.1 Annually	MEPED/Mine Operations	Previous slope and stockpile greening areas are maintained and monitored.
	2. Establishment of projects for ecotourism through enhancement of declared mined-out areas	2.1 No. of projects completed	2.1 Project Plans	2.1 Rehab areas	2.1 Annually		
	3. Maintenance and enhancement of rehabilitated areas such as enrichment planting, degrassing, etc.	3.1 Area (in hectares) of previous rehab areas maintained	3.1 Field inspection	3.1 Rehab areas	3.1 Monthly		
		3.2 No. seedlings planted	3.2 Seedlings inventory	3.2 Rehab areas	3.2 Monthly		
Removal of Topsoil	1. Backfilling & Reshaping of Mined-out Areas	1.1 Volume (cu.m) of materials used for land preparation	1.1 Data Management Record	1.1 Mined-out areas	1.1 Quarterly	MEPED/Mine Operations	Backfilling of topsoil and subsoil materials in the mined-out areas are conducted.
	2. Topsoil Management	2.1 Volume (cu.m) topsoil materials stockpiled and utilized	2.1 Data Management Record	2.1 Mined-out areas	2.1 Monthly		
Change in land form/topography	1. Maintenance of vegetation cover in the designated	1.1 Area (in hectares) of berms planted and maintained	1.1 Field Inspection	1.1 Mine pit areas	1.1 Quarterly	MEPED/Mine Operations	

	buffer zones and in the peripheries of roads and mine pits						
Soil Contamination with Oil & Grease	1. Maintenance of vehicles/ heavy equipment strictly at motor pool 2. Regular maintenance of the oil and water separator will be done to ensure optimum performance	1.1 No. of audits/inspection conducted 2.1 No. of audits/inspection conducted	1.1 Ocular observation 2.1 Ocular observation	1.1 Mechanical area/External Providers Area 2.1 Mechanical area/External Providers Area	1.1 Monthly 2.1 Monthly	MEPED/Mine Operations/Mechanical	
Soil erosion	1. Installation of proper drainage along road systems and open areas to avoid slope failure or mass	1.1 No. of drainages installed 1.2 Length (in kilometers) of canals maintained	1.1 Ocular observation 1.2 Ocular observation	1.1 Active mine pit areas 1.2 Active mine pit areas	1.1 Annually 1.2 Monthly	MEPED/Mine Operations	
B. Water Resource and Quality							
Change in drainage pattern	1. Proper design of drainage channels 2. Regular inspection of drainage channels of sediments and debris that may inhibit the flow of water	1.1 No. of drainages installed 2.1 No. of installed drainages maintained	1.1 Ocular observation 2.1 Ocular observation	1.1 Active mine pit areas 2.1 Active mine pit areas	1.1 Annually 2.1 Quarterly	MEPED/Mine Operations	

Sedimentation/ Siltation	1. Installation of siltation ponds including water quality monitoring 2. Diversion of run-off away from steep slopes and denuded areas by constructing berms	1.1 No. of siltation ponds/silt collector sumps maintained 1.2 Monitoring of pH, TSS, Mn, As, Cd, Pb, Ni (DAO 2016-08 PSIC Code 07294) *Continuous monitoring of other parameters such as Color, Fe, BOD, Oil and Grease, and Cr+6* 2.1 Area (in hectares) of berms installed	1.1 Ocular observation 1.2 Laboratory analysis 2.1 Ocular observation	1.1 Major siltation ponds 1.2 Pond effluent 2.1 Active mine pit areas	1.1 Monthly 1.2 Monthly 2.1 Annually	MEPED/Mine Operations	Major siltation ponds are regularly maintained.
Water Usage	1. Proper and constant monitoring of water sources	1.1 Volume (cu.m) of water consumed	1.1 Water Meter Data	1.1 Mine Facilities/ Residential Area	1.1 Monthly	CPFMS	
Water contamination	1. Regular clean-up/collection of solid/hazardous wastes and removal to designated disposal area 2. Regular maintenance of the oil and water separator to ensure	1.1 Total wastes collected (in metric tons) 2.1 No. of audits/inspection conducted	1.1 Weighbridge Data 2.1 Ocular observation	1.1 Mine Facilities/Residential Area 2.1 Mechanical area/External Providers Area	1.1 Monthly 2.1 Monthly	MEPED	Continuous implementation of waste segregation and solid waste management plan and activities.

	optimum performance						
C. Air Quality							
Dust generation from mining operations/activities	1. Dust control through continuous road watering and street sweeping 2. Regular monitoring of air quality at established strategic locations.	1.1 Length (km) of haulage road maintained through watering 1.2 Volume (cu.m) of water used in road watering 1.3 Length (km) of haulage road maintained through street sweeping 2.1 No. of samplings conducted	1.1 Field Validation 1.2 Records and Field Validation 1.3 Field Validation 2.1 Air samples	1.1 Active in-pit roads/Macadam highway/Piersite 1.2 Active in-pit roads/Macadam highway/Piersite 1.3 Macadam highway/Piersite 2.1 Established strategic sampling stations	1.1 Daily or as needed 1.2 Monthly 1.3 Daily or as needed 2.1 Monthly	MEPED/Mine Operations	Continuous road watering to the 14-km haulage road. 50% of the water used for road watering is from Tagpisa Silt Containment pond. The Company is maintaining 5 water trucks for this activity. The street sweeping activity and Macadam road maintenance is conducted by IP workers wherein majority are female. Also conducted major retrieval of silt

							along Macadam road sides. Regularly conducted an inhouse air quality monitoring.
Gas/Fumes emissions	1. Use of properly maintained motor vehicles and heavy equipment 2. Regular monitoring of carbon dioxide levels.	1.1 No. of maintained equipment 2.1 No. of samplings conducted	1.1 Ocular inspections 2.1 GHG emissions	1.1 Mechanical Area 2.1 Minesite	1.1 Daily or as scheduled 2.1 Monthly	MEPED	Implement conservation measures to maintain GHG emissions from the operation.
D. Noise and Vibration							
Noise generation from mining operations/ activities	1. Ensure result of noise level monitoring is within the Philippine Ambient Noise standard	1.1 No. of monitoring conducted	1.1 Noise meter	1.1 Established strategic sampling stations	1.1 Monthly	MEPED	Regularly conducted an inhouse ambient noise level monitoring.
E. Conservation Values							
Loss of biodiversity	1. Progressive Rehabilitation of Mined-out areas 2. Use of local provenance species of native plants for mine rehabilitation.	1.1 No. of seedlings planted 2.1 No. of native species produced or collected and planted	1.1 Seedlings Inventory and Field Validation 2.1 Initial Biodiversity Assessment Data	1.1. Declared Mined-out Areas 2.1 Within MPSA and identified impact areas	1.1 Quarterly 2.1 Quarterly	MEPED	Continuous support and assistance to

	3. Conduct of biodiversity assessment (flora and fauna). 3.2 No. of studies/activities/projects implemented	3.1 No. of species sighted 3.2 Field Validation	3.1 Field observation 3.2 Within MPSA and identified impact areas	3.1 Within MPSA and identified impact areas 3.2 Annually	3.1 Monthly 3.2 Annually		PAMB-UIGRBS; Launching of 5Million Trees for Palawan Project; Edible Landscaping Project; Foster-a-Tree, Make-a-Legacy Program
F. Heritage and Cultural Values							
Disturbance of archaeological and cultural sites	1. Conduct assessment on newly disturbed areas suspected with artifacts 2. Formulation of plans to protect the ancestral domains	1.1 No. of artifacts and archaeological sites maintained and monitored 2.1 No. of field visits wherein customs and traditions of native Palaw'ans are preserved	1.1 Conducted prior to commencement of mining operations 2.1 Actual interview/interactions with the natives	1.1 Nearby Sitios/Newly Disturbed Lands 2.1 Nearby Sitios/Newly Disturbed Lands	1.1 Annually or as the need arise 2.1 Annually or as the need arise	Geology/Community Relations Office	
G. Social Issues							
Adverse Socio-Economic Impacts	1. Implementation of the Social Development and Management Program 2. Increase in jobs/social services directly generated by mining operations	1.1 No. of livelihood projects implemented 2.1 No. of people migrated in the area	1.1 Field monitoring and validation of projects 2.1 Conduct census/inventory	1.1 Neighboring barangays 2.1 Neighboring barangays	1.1 Quarterly 2.1 Semi-annual	Community Relations Office	

8.0 Total Cost of AEPEP

8.1 Estimated Direct Mining Cost for 2022

Table 28. Estimated DMC for 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
In-house_Dump Truck	9,306,497	10,081,469	10,292,366	10,607,656	14,547,720	7,537,551	7,314,646	8,016,763	7,861,887	5,077,442	5,253,962	11,728,766	107,626,723
In-house_Articulated Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Track Excavator	3,582,780	3,553,509	3,781,050	3,435,682	3,693,710	170,616	-	-	-	-	-	4,916,105	23,133,453
In-house_Wheel Excavator	892,582	844,874	840,947	831,003	1,200,955	224,053	522,501	537,454	548,595	-	-	1,088,268	7,531,232
In-house_Wheel Loader	6,147,587	5,987,668	6,162,755	5,967,291	9,905,555	5,119,337	1,987,413	2,183,115	2,125,459	1,095,059	1,221,776	6,355,939	54,258,954
In-house_Mini Wheel Loader	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Bulldozer	2,328,971	1,588,714	1,405,266	2,007,263	2,333,497	486,211	1,108,966	1,255,336	1,137,757	501,998	555,903	1,171,392	15,881,274
In-house_Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Road Grader	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Breaker	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Mobile Screener	476,947	452,648	465,824	463,487	512,980	209,481	35,343	313,618	313,737	2,352,904	314,417	336,180	6,247,567
In-house_Stationary Screener (Grizzly)	98,107	118,919	100,929	93,218	116,626	76,058	58,099	39,663	39,642	55,232	63,585	55,653	915,730
In-house_Mobile Crusher	179,541	186,787	1,092,993	372,338	189,039	188,696	1,966,673	278,689	141,740	1,425,951	283,442	200,428	6,506,316
In-house_Stationary Crusher	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_LCT	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Water Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Limestone Crushing Plant	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Articulated Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Track Excavator	327,879	327,879	327,677	327,879	794,186	-	-	-	-	-	-	40,417	2,145,918
Rental_Wheel Loader	9,338,265	9,347,745	9,338,265	9,366,705	2,852,552	-	-	-	-	-	-	-	40,243,533
Rental_Bulldozer	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Road Grader	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Breaker	701,350	701,350	701,350	701,350	701,350	-	-	-	-	-	-	223,087	3,729,837
Rental_LCT	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Drilling Machine	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Dump Truck	16,640,810	16,641,269	16,606,626	16,642,188	11,209,279	160,668	-	-	-	-	-	7,825,548	85,726,387
Contract Mining_Articulated Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Track Excavator	138,890	138,890	137,970	138,890	101,178	-	-	-	-	-	-	183,960	839,777
Contract Mining_Wheel Loader	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Bulldozer	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Road Grader	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Breaker	-	-	-	-	-	-	-	-	-	-	-	-	-
Agency Services_Manual Sorting	506,342	506,342	506,342	506,342	253,171	234,604	-	-	-	-	-	-	2,513,145
Agency Services_Manual Crushing	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Dump Truck	8,486,068	8,964,942	9,013,929	9,226,788	15,218,116	16,407,761	16,315,858	17,106,392	17,769,804	8,770,559	6,989,629	13,275,525	147,545,371
In-house_Articulated Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Track Excavator	6,431,233	6,561,866	6,987,514	6,349,462	6,272,677	6,478,274	7,858,026	7,094,209	6,902,372	6,942,753	6,096,167	7,796,547	81,771,099
In-house_Wheel Excavator	1,630,190	1,575,121	1,550,756	1,540,597	2,049,046	1,654,680	1,712,753	1,358,042	1,746,634	1,371,435	1,628,742	1,699,807	19,518,801
In-house_Wheel Loader	7,554,950	7,313,495	7,672,519	7,420,780	6,506,378	7,054,544	7,704,938	8,389,684	8,385,440	7,027,686	6,360,225	9,485,191	90,875,828
In-house_Mini Wheel Loader	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Bulldozer	8,734,269	7,309,421	6,912,090	9,067,136	8,420,531	9,282,406	6,764,815	7,950,334	6,513,768	6,748,230	6,445,300	8,091,179	92,239,478
In-house_Compactor	16,488	15,502	8,678	14,899	-	-	-	-	-	-	-	-	55,568
In-house_Road Grader	2,385	2,161	1,625	1,872	-	-	-	-	-	-	-	-	8,042
In-house_Breaker	85,040	85,847	54,551	74,624	-	-	-	-	-	-	-	-	300,063
In-house_Mobile Screener	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Stationary Screener (Grizzly)	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Mobile Crusher	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Stationary Crusher	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_LCT	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Water Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
In-house_Limestone Crushing Plant	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Articulated Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Track Excavator	-	-	-	-	-	-	-	-	-	-	-	4,488	4,488
Rental_Wheel Loader	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Bulldozer	-	-	-	-	80,251	-	-	-	-	-	-	-	80,251
Rental_Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Road Grader	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Breaker	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_LCT	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental_Drilling Machine	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Dump Truck	14,309,120	14,316,169	14,143,142	14,316,169	6,121,820	1,185,457	-	-	-	7,257,244	6,651,313	4,714,882	83,015,314
Contract Mining_Articulated Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Track Excavator	942,602	950,612	838,627	950,612	965,790	-	-	-	-	-	-	-	4,648,243
Contract Mining_Wheel Loader	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Bulldozer	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Road Grader	-	-	-	-	-	-	-	-	-	-	-	-	-
Contract Mining_Breaker	-	-	-	-	-	-	-	-	-	-	-	-	-
Agency Services_Manual Sorting	-	-	-	-	-	-	-	-	-	-	-	-	-
Agency Services_Manual Crushing	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL NICKEL	98,858,895	97,573,199	98,943,791	100,424,230	94,046,407	56,470,397	53,350,031	54,524,299	53,486,834	48,626,492	41,864,462	79,193,359	877,362,395

8.2 Estimated Cost of EPEP 2022

For year 2022, RTNMC allocated a total of PhP95,307,915.00 for the environmental protection projects/activities of its Nickel Laterite Project. These covers various activities including mining rehabilitation and reforestation projects, silt and dust emission control projects and other pollution mitigation activities. The summary and the matrix for the quarterly implementation of these projects/activities are presented in **Annex 15**. With estimated direct mining cost of PhP877 million, the percentage of the total environmental-related cost to the total direct mining cost is estimated at 10.86%.

Total Environment-Related Costs	= PHP 95,307,915.00
Estimated Direct Mining Costs	= PHP 877,362,395.00
Percentage of Total Environment-Related Costs to the Direct Mining Costs	= 10.86%

9.0 Name and Signature of Applicant or Person(s) preparing the EPEP (Specify PRC and PTR numbers)

Prepared by:

JANICE M. TUPAS
Mine Environmental Protection and Enhancement Officer (MEPEO)
Pollution Control Officer (PCO)
Environmental Planner

License No.	: 1779
PTR No.	: 2572568
Date Issued	: 13 January 2022
Place Issued	: Bataraza, Palawan
TIN	: 934-428-820

Conform by:

RONELBERT A. SUGUITAN
OIC-Resident Mine Manager (RMM)
Mining Engineer

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

Noted by:

MR. MARTIN ZAMORA
President
Rio Tuba Nickel Mining Corporation

10.0 Plan(s)/Map(s) of the Proposed Operations

Plan(s)/Map(s) of the Proposed Operations showing location of area(s) subject of operations, access to property, location of works and roads, water courses, working areas, camps and other surface facilities.

11.0 Bibliography

Approaches for Assessing Health and Environmental Risks. Plenum Press, New York.

Australian Mining Industry Countcil, 1990. Mine Rehabilitation Handbook.

DENR and UPLB. 2014. Landscape Function Analysis Field Guide: Guidelines for application in mine sites and land rehabilitation projects in the Philippines.

DENR Administrative Order (DAO) No. 2018-19, 2018. Guidelines for Additional Environmental Measures for Operating Surface Metallic Mines

DENR Consolidated Administrative Order (DAO) No. 21, 2010. Implementing Rules and Regulations of Republic Act No. 7942, Otherwise Known as the "Philippine Mining Act of 1995".

DENR Administrative Order (DAO) No. 08, 2016. Water Quality Guidelines and General Effluent Standards of 2016.

Gaia South, Inc., 2015. Environmental Impact Statement for Technical Screening of RTNMC's MPSA Renewal/Conversion of Rio Tuba Nickel Mining Project (AMA-IVB-144A), draft.

Hoffmann, P., Baker, AJM., Madulid, DA., and Proctor, J. 2003. Phyllanthus balgooyi (Euphorbiaceae sl), a new nickel-hyperaccumulating species from Palawan and Sabah. Blumea-Biodiversity, Evolution and Biogeography of Plants

International Council on Mining & Metals, 2014. Biodiversity performance review Executive summary. Environment and Climate Change.

Landloch, 2005. Designing Stable Constructed Landforms for Minesites. Leopold, L.B., 1994. A view of the River. Harvard University.

Lasco, R.D. and Pulhin, F.B. 1998. Philippine Forestry and Carbon Dioxide (CO2) Sequestration: opportunities for Mitigating Climate Change, Environmental Forestry Programme, College of Forestry and Natural Resources, University of the Philippines, Los Banos, Laguna.

Lasco, R.D. and Sales, R.F. 2003. Estimating carbon storage and sequestration of Philippine Forest Ecosystems, Smallholder Forestry Research Paper Series No. 1.

Madulid, D.A., et.al. 2001. Biological screening of rain forest plot trees from Palawan Island (Philippines). Phytomedicine

Masangkay, Noel. 2017. Utilization of Drip Water Irrigation System in Mine Rehabilitation Areas. Development Academy of the Philippines (DAP) Re-Entry Project.

Palawan Council for Sustainable Development, 2003. Amended Rules and Regulations Implementing the Strategic Environmental Plan for Palawan Act.

Rio Tuba Nickel Mining Corporation, 2015. A Feasibility Study on Mt. Bulanjao Mining Project (AMA-IVB-144A) MPSA Acquisition.

Rio Tuba Nickel Mining Corporation, 2015. Revised Environmental Protection and Enhancement Program for Nickel Laterite Project.

USEPA. 2014. Reference Guide to Treatment Technologies for Mining-Influenced Water.

ANNEXES