PULTEX ENVIRONMENT SDN. BHD.

PROPOSED IRON ORE MINING OPERATION ON LOT 112186 (ML. 7/2018), AN AREA 80.85 HA (199.78 AC.) LOCALITY OF BUKIT BESI, MUKIM JERANGAU TERENGGANU DARUL IMAN

EXECUTIVE SUMMARY

PROJECT PROPONENT

Rigid Global Sdn. Bhd. (1169582-K)
Level 8, Menara Zenith,
Jalan Putra Square 6, Putra Square
25200 Kuantan,
Pahang Darul Makmur.
Contact Person: Dato' Teh Teck Tee
(Director)
Contact Number: 09-5488888

EIA CONSULTANT

Pultex Environment Sdn. Bhd. (1330403-U)
No 130-M, Jalan Mega Mendung, Jalan Klang Lama,
58200, Kuala Lumpur,
Wilayah Persekutuan Kuala Lumpur.
Contact Person: Prof. Ir. Mohd Omar Bin Ab. Kadir
CEP-C0395 (Lead Consultant)
En Abdullah Mohd Omar
(Project Manager)
Contact Number: 03-79724516/012-41000708/
012-4005228

PROJECT OVERVIEW

Project Location

- Lot 112186 (ML. 7/2018), Locality of Bukit Besi, Mukim Jerangau, District of Dungun, Terengganu Darul Iman.

Mining Lease Duration

Total area: 80.85 Ha (199.78 ac)
5 Years (until 17 December 2023)

Environmental Sensitive Area Stage 2

Zoning

Based on RTD Dungun 2035, site is located in the landuse of Agriculture Zone, within the Blok Perancangan Kecil (BPK) 9.2 at Mukim Jerangau. This zone allow for mining activity. (PLANMalaysia@Terengganu)

Phasing

Proposed Working Area :

Phase 1	Phase 2	Phase 3
(13.661 Ha)	(25.716 Ha)	(10.623 Ha)

STATEMENT OF NEEDS

Economic Benefit

In 2013, Malaysia exported a total of 12,429,184 tonnes (RM 1.44 billion) of high-grade iron ore mainly to China and followed by Indonesia, Hong Kong, Singapore and Brazil. In Terengganu, the production of iron ore is about 939,197 tonnes from 13 operating mines.

State Taxes and Royalties

- Royalty 5% of the market value to the State based on Terengganu Mineral Enactment 2002.
- Royalty 10% to Lembaga Tabung Amanah Warisan Negeri Terengganu (LTAWNT)

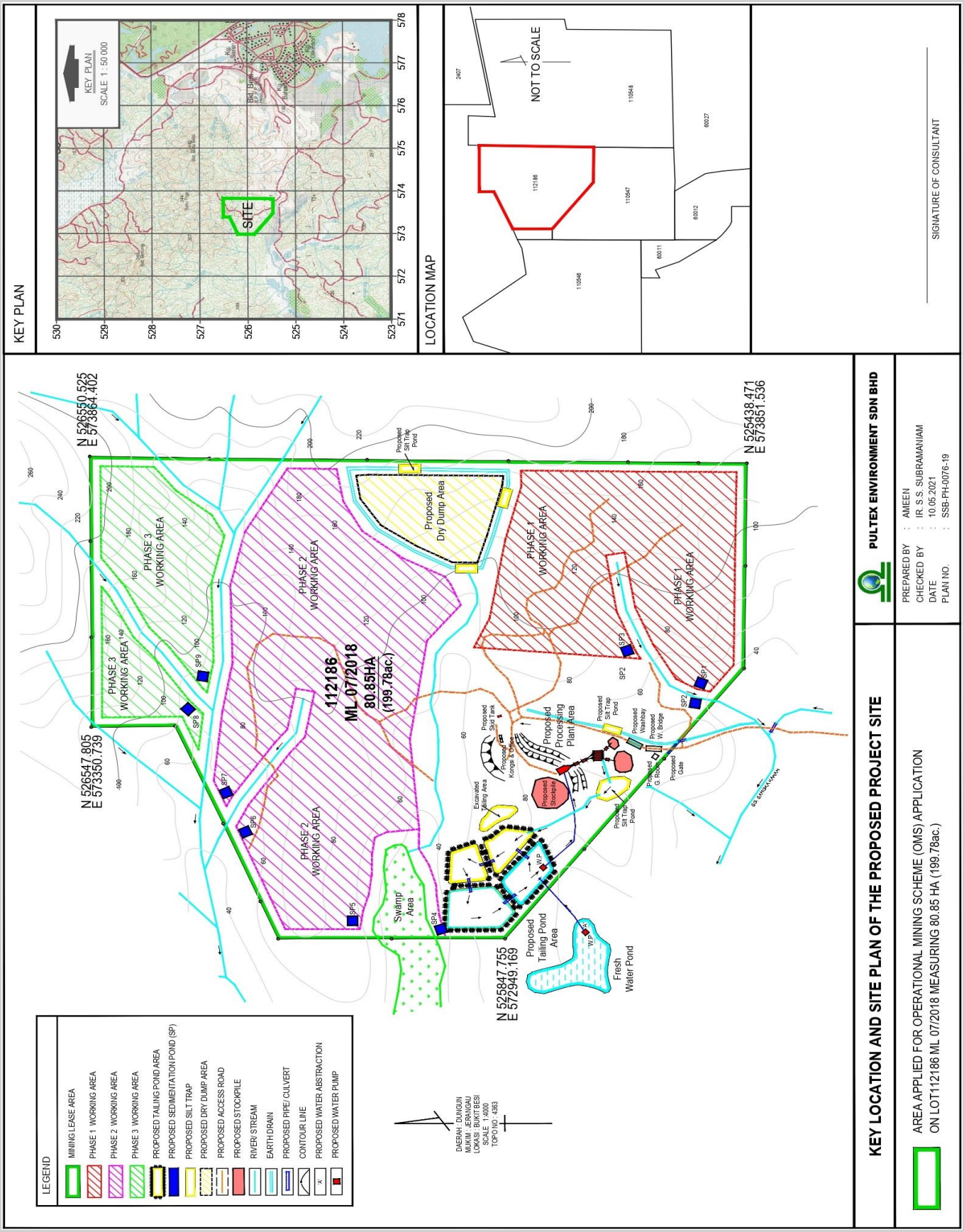
Socio – Economic Benefit

Employment opportunities

Local Planning Strategy

Thrust 1: Expansion of Mineral Sector of the NMP2

KEY, LOCATION AND SITE PLANS



PULTEX ENVIRONMENT SDN. BHD.

PROPOSED IRON ORE MINING OPERATION ON LOT 112186 (ML. 7/2018), AN AREA 80.85 HA (199.78 AC.) LOCALITY OF BUKIT BESI, MUKIM JERANGAU TERENGGANU DARUL IMAN

EXECUTIVE SUMMARY

PROJECT CONCEPT

Open-cast Mining (Dry)

Internal Ore Haulage

Ore Processing (Wet)

There will be no chemicals involved.

IRON ORE RESERVES AND MINE OPERATIONAL LIFE

Estimated Mining Area (Phases 1, 2 & 3)	Iron Ore Reserves	Operational Mine Life
50 Ha	2,904,000 T	17 years

Open-cast Mining Operation

1. Excavation of the reserves around 4 to 6 m (overburden and ores).
2. Hauling of excavated ores (ROM) to the processing plants.
3. Transporting excavated overburden to dry-dump area for temporary stockpiling and re-use in reclamation.
4. Ore processing.
5. Tailing pond maintenance and monitoring.
6. Reclamation of completed mine sites will run concurrently to ore excavation.
7. Drying and stockpiling of product (high-grade iron).

Tailing Pond Water Recycling

1. Closed circuit water recirculation
2. There will be no effluent discharge
3. Desilting of the ponds will be carried out periodically to restore the tailing pond retention capacity.

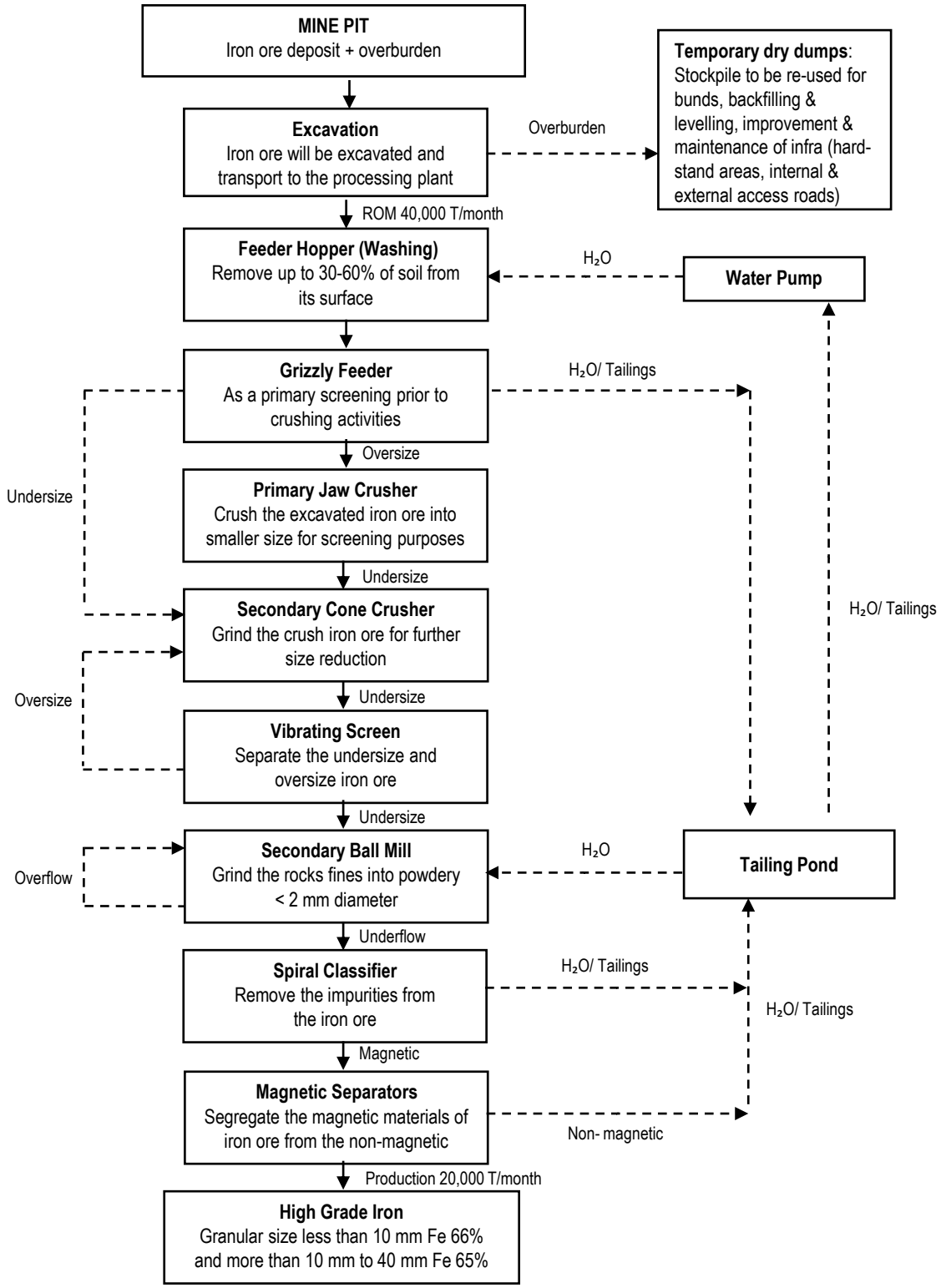
Production Capacity

20,000 T/month
≈ 240,000 T/year

Transportation Product

Final product (high-grade iron) with granular size <10 mm (Fe 66%) and > 10mm to 40 mm (Fe 65%) will be transported to Kemaman Port.

FLOWCHART


MINE PIT
Iron ore deposit + overburden
Excavation
Iron ore will be excavated and transport to the processing plant
Overburden
Temporary dry dumps: Stockpile to be re-used for bunds, backfilling & levelling, improvement & maintenance of infra (hard-stand areas, internal & external access roads)
ROM 40,000 T/month
Feeder Hopper (Washing)
Remove up to 30-60% of soil from its surface
H2O
Water Pump
Grizzly Feeder
As a primary screening prior to crushing activities
H2O/ Tailings
Oversize
Undersize
Primary Jaw Crusher
Crush the excavated iron ore into smaller size for screening purposes
Undersize
Secondary Cone Crusher
Grind the crush iron ore for further size reduction
H2O/ Tailings
Oversize
Undersize
Vibrating Screen
Separate the undersize and oversize iron ore
Undersize
Overflow
Secondary Ball Mill
Grind the rocks fines into powdery < 2 mm diameter
H2O
Tailing Pond
Underflow
Spiral Classifier
Remove the impurities from the iron ore
H2O/ Tailings
H2O/ Tailings
Magnetic
Magnetic Separators
Segregate the magnetic materials of iron ore from the non-magnetic
Non- magnetic
Production 20,000 T/month
High Grade Iron
Granular size less than 10 mm Fe 66% and more than 10 mm to 40 mm Fe 65%

PROJECT ACTIVITIES

BEFORE OPERATION

EXPLORATION AND INVESTIGATION

- Exploration of mineral deposits

BEFORE OPERATION

DEVELOPMENT AND PLANNING

- Demarcation of boundary and setting-out survey
- Mobilization of machineries, manpower and materials for construction
- Land clearing of areas for mine pit, processing plant and infrastructures.
- Construction of internal haulage road
- Construction of tailing ponds
- Construction of sedimentation ponds
- Construction of P2M2 and BMPs (bunds, drainage system)
- Installation of processing plant
- Construction of Infrastructures & facilities
  - *Site office and facilities for employees*
  - *Procurement of utilities (power and water supply)*
  - *Diesel storage facility*
  - *Sewerage*
  - *Solid waste & scheduled waste*
  - *Perimeter fence, entrance gate/guard post and workshop*
  - *Washing bay*

DURING OPERATION

MINING AND PROCESSING

- Excavation of ores
- Stockpiling overburden at dry dump
- Haulage of ROM to the processing plant
- ROM Processing
- Tailing pond maintenance and monitoring
- Maintenance of haulage and access road
- Management of BMPs
- Concurrent reclamation of mine sites
- Transportation of end products

AFTER OPERATION

REHABILITATION & ABANDONMENT

- Plan for mine closure
- Decommissioning
- Reclamation and backfilling
- Rehabilitation

PULTEX ENVIRONMENT SDN. BHD.

PROPOSED IRON ORE MINING OPERATION ON LOT 112186 (ML. 7/2018), AN AREA 80.85 HA (199.78 AC.) LOCALITY OF BUKIT BESI, MUKIM JERANGAU TERENGGANU DARUL IMAN

EXECUTIVE SUMMARY

EXISTING ENVIRONMENT

Land Use

- Immediate surrounding project site is a combination of forest and secondary vegetations.
- Other than forest, there are existing iron ore mines (total of 8 active mines) located to the east side of project site.
- Nearest settlement is Bandar Bukit Besi (2.8 km-east). Other settlements/ receptors are all located beyond the 3 km radius ZoS.

Topography

- Hilly
- The site terrains are inclined toward the north-eastern part of the site with the highest elevation point of 200 mRL.

Soil Characteristic

- Mainly under soil series of Mined Land (MLD).
- The soils at Bukit Besi are developed on granite.
- The soils are characterized by clayey structure texture with large amounts of course and medium sand.

Surface Hydrology

- Proposed development area lies within the Sg. Dungun River Basin.
- Tributaries of Sg. Cemuak run through the project site area.
- Three (3) WTPs located nearest to Project Site (downstream), which are Tepus WTP (21 km), Kemudi WTP (49.5 km) and Serdang WTP (51 km). Water intake is from Sg. Dungun (downstream)

Site Geology

- Site is underlain by the Permian-Triassic granite of the Eastern Belt which commonly found in shale, and some were found in limestone skarn and granite.

Climate and Meteorology

Rainfall

Highest : December (679 mm)
Lowest : March (43.1 mm)

Temperature

Highest : April (28.9 ^{0} C)
Lowest : January (25.8 ^{0} C)

Relative Humidity

Highest : November (84.7%)
Lowest : July (62%)

Rain Days

Highest = December (21 days)
Lowest = March & April (7 days)

Wind Speed

Highest : Northeast (NE) and Southeast (SE) (2.6 m/s)
Lowest : Northwest (NW) (1.3 m/s)

PULTEX ENVIRONMENT SDN. BHD.

PROPOSED IRON ORE MINING OPERATION ON LOT 112186 (ML. 7/2018), AN AREA 80.85 HA (199.78 AC.) LOCALITY OF BUKIT BESI, MUKIM JERANGAU TERENGGANU DARUL IMAN

EXECUTIVE SUMMARY

EXISTING ENVIRONMENT

ENVIRONMENTAL QUALITY

Water Quality

- Nine (9) sampling points.
- Water Quality Index (WQI) for most sampling points classify as Class II except from W4, W7 and W9 under Class III.
- Most of the parameter are well below the Mineral Development (Effluent) Regulations 2016 except for TSS (>100 mg/L) and iron (>5 mg/L).
- Baseline river water status for all sampling points is considered as "slightly polluted".

Groundwater Quality

- Three (3) sampling points.
- Most of the parameters are well below the Environmental Standards except for pH, COD, manganese (Mn) and aluminium (Al).
- Groundwater Quality Index (GWQI) for GWI is 92.52 (Excellent), GW2 is 76.04 (Good) and GW3 is 74.62 (Moderate).

Air Quality

- Three (3) monitoring stations.
- NO_2, SO_2, O_3 are not detected at all stations.
- All PM_{10}, $PM_{2.5}$ and CO are within the permissible limits as per Malaysia Ambient Air Quality Standards (Standard value by 2020) (MAAQS).

Noise Level

- Three (3) monitoring stations.
- Daytime period level: 58.3 to 59.3 dB(A) Nighttime period level: 49.4 to 50.0 dB(A)
- Noise level were below the limit under Schedule 1 (Sub-urban) of 60 dB(A) for daytime and 55 dB(A) for nighttime.
- Noise sources are from vehicles passing by, people talking, birds and insects.

Geotechnical

- Terrain classification based on the site survey plan.

Terrain Classes	Area (m²)	Percentage (%)
Class 1: 0° – < 15°	299,468.40	34.04
Class 2: ≥ 15° – < 25°	369,080.25	45.65
Class 3: ≥ 25° – < 35°	127,500.45	15.77
Class 4: ≥ 35°	12,450.90	1.54

Terrain at Proposed Site
CLASS II

EXISTING ENVIRONMENT

Terrestrial Fauna (Wildlife)

- Mammalia -66 mammalian species.
- Birds - 166 species of birds.
- Amphibians- 29 species of frogs.
- Reptiles - 45 species of reptiles (22-lizards, 19-snakes and 4-turtle).

Species	Protection Status Wildlife Conservation Act 2010 (Act 716)			IUCN Red List of Threatened Species (2020)						Red List of Mammals for Peninsular Malaysia (2017)					
	TP	P	NP	CR	EN	VU	NT	LC	DD	CR	EN	VU	NT	LC	DD
Mammalia	18	11	37	1	4	6	7	48	-	1	4	3	13	43	2
Birds	143	13	10	-	0	0	19	147	-	-	-	-	-	-	-
Amphibians	0	5	24	-	1	0	2	25	1	-	-	-	-	-	-
Reptiles	2	25	18	-	1	2	1	41	-	-	-	-	-	-	-

(TP) Totally Protected (P) Protected (NP) Not Protected (EN) Endangered (VU) Vulnerable
(NT) Near Threatened (LC) Least Concern (CR) Critically Endangered (DD) Data Deficient

Terrestrial Flora

- Categorized as lowland forest.

Plant Habit	Number of species
Tree(T)	149
Shrub (S)	13
Herbaceous (H)	38
Fern (F)	10
Palm (P)	6
Climber (C)	42

PULTEX ENVIRONMENT SDN. BHD.

PROPOSED IRON ORE MINING OPERATION ON LOT 112186 (ML. 7/2018), AN AREA 80.85 HA (199.78 AC.) LOCALITY OF BUKIT BESI, MUKIM JERANGAU TERENGGANU DARUL IMAN

EXECUTIVE SUMMARY

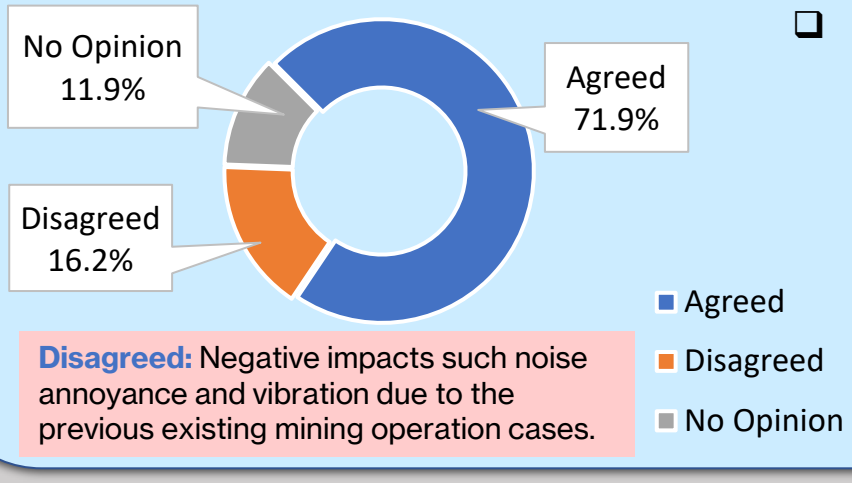
EXISTING ENVIRONMENT

Socio-economic

Total Respondent: 210

- ❑ Bandar Bukit Besi
- ❑ Kg. Tersusun Rantau Panjang
- ❑ Taman Perumahan Paya Lawas

Respondents' Acceptance toward Project



Disagreed: Negative impacts such noise annoyance and vibration due to the previous existing mining operation cases.

High percentage of acceptance among the locals are influenced by the good performance of existing mining operations that take place in Bukit Besi area.

Community Health

Existing Burden Disease at KK Bukit Besi and Dungun District (Incidence as per 100,000 population)

Dungun District

Vector Borne Disease
- Dengue Cases(Incidence rate 13.0)
- Malaria Cases (Incidence rate 1.0)
- Filariasis Cases (Incidence rate 1.0)

Food-water Borne Disease
- Food Poisoning Cases (Incidence rate 47.0)
- No cases of Cholera, Dysentery, Hepatitis A and Typhoid

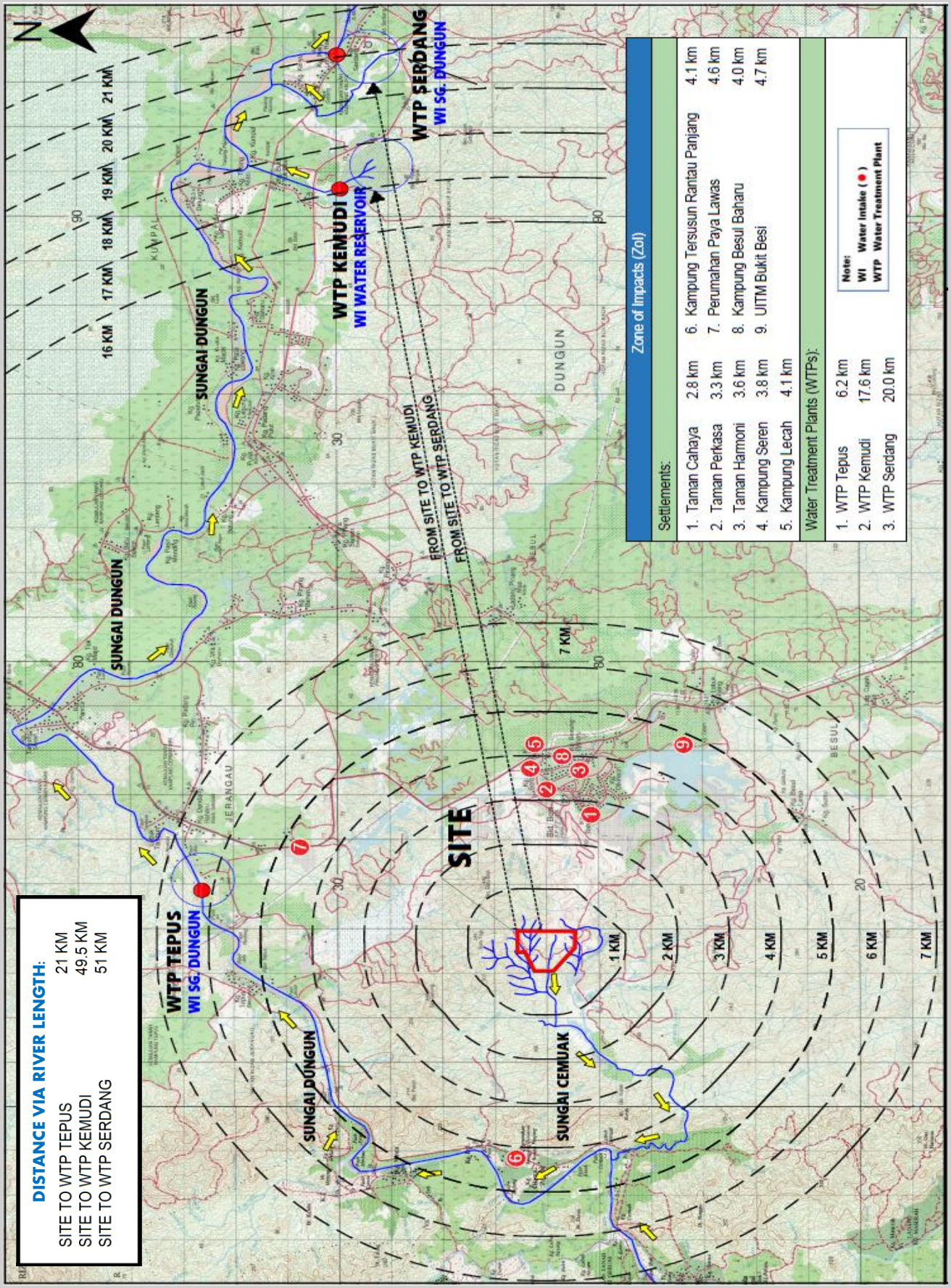
Other Diseases
- Tuberculosis Cases (Incidence rate 47.0)
- Leptospirosis Cases (Incidence rate 33.0)
- Influenza Cases (incidence rate 22.0)
- Covid-19 Cases (Incidence rate 116.0)

KK Bukit Besi

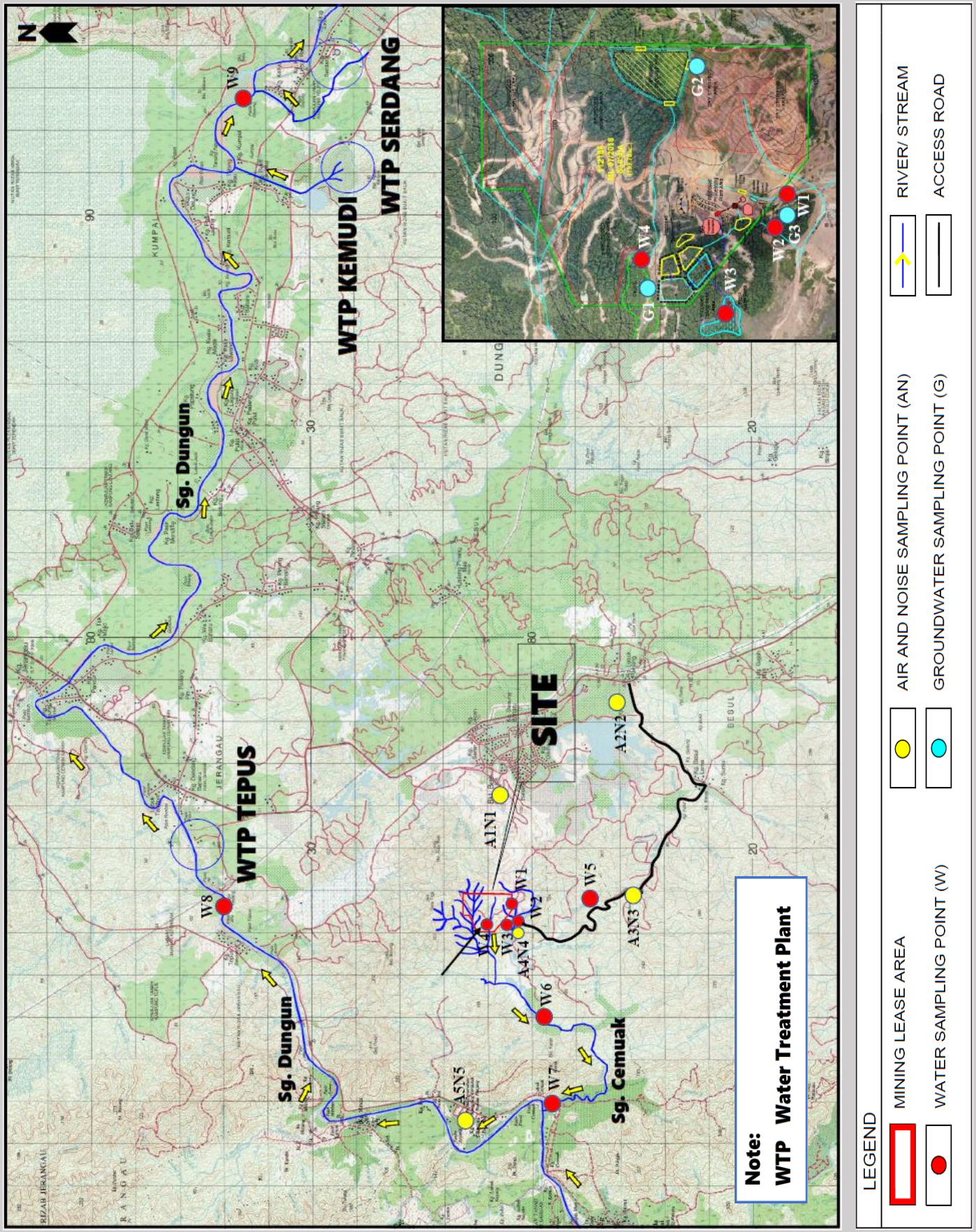
Air pollution-related Diseases
- URTI (Incidence rate 13,040)
- Tuberculosis (Incidence rate 80.0)
- Pneumonia (Incidence rate 30.0)
- Conjunctivitis (Incidence rate 10.0)

Skin Diseases
- Cellulitis (Incidence rate 10.0)
- Psoriasis (Incidence rate 10.0)
- Urticaria (Incidence rate 190.0)

ZONE OF IMPACT (ZoI)



WATER, GROUNDWATER, AIR & NOISE SAMPLING POINT



EVALUATION OF POTENTIAL IMPACT

HYDROLOGY

- Land clearing activities may expose a large tract of bare soil to erosion where it could result in the tremendous increase in surface runoff laden with sediments.
- Increase sediment loading in rivers potential flash flood in the downstream area due to reduction in river conveyance capacities.
- Sediment deposits on river beds destroy aquatic habitats.

SOIL EROSION AND SEDIMENTATION

- Removal of ground cover will expose surface soil to erosion. The eroded soil or sediments carried in the surface runoffs will enter the river and affect the water quality, e.g., increase in the turbidity and TSS.
- High rainfall intensity (direct impact on ground) will increase the volume of surface runoffs with higher sediments, leading to an increase in sediment deposition in rivers.
- Excess sediments will affect the aquatic life and habitat.
- Reduction in river depth, resulting channel overflow during high rainfall.

EROSION OF OVERBURDEN AT DUMP SITE

- Overburden mounds may be exposed to soil erosion. Surface runoffs carrying sediments from the mounds into nearby rivers.
- Implementation of appropriate BMPs including terracing and furrow to reduce soil erosion of the overburden mounds.
- Dumping mound is unsightly, and more importantly, pose safety hazard to workers if landslide occur.

RIVERINE RIPARIAN ZONE

- Clearing of vegetations from riverbanks will leave the area and river unprotected from erosion and sedimentation respectively. Causing a decrease in water quality through the loss of filtration effects.
- Clearing also leads to loss of critical species habitat. A river buffer zone of 25 m or more, will be kept along the rivers/streams.

EVALUATION OF POTENTIAL IMPACT

WATER QUALITY

- Water quality in mines are indirectly affected by soil erosions that carry sediments and these sediments are not controlled or managed well.
- Release of sediments into rivers will impact the water quality : turbidity, total suspended solids , and mineral contaminants.
- Fine silt increases the suspended solids and turbidity of the water bodies and can be detrimental to aquatic life.
- The use of machinery and equipment on site may lead to water pollution through leakage of oil, grease, and fuel into the water courses.
- Based on the water quality modeling (with mitigation at 85% efficiency), most of the parameter at Sg Dungun are well below the Mineral Development (Effluent) Regulations 2016 except for TSS 133.7 mg/L (>100 mg/L) and iron 6.1 mg/L (>5 mg/L). Meanwhile at Sg. Cemuak, all the parameters are well below the acceptable limit.

GROUNDWATER QUALITY

- Potential change in groundwater recharge behavior to an area due to the land clearing activity.
- Land clearing may enhance surface runoff and subsequently may cause water impoundment or flooding on area of low in elevation, low permeability and shallow in groundwater levels.
- Potential change in groundwater levels and flow.
- Potential groundwater contamination and contaminant movement.

AIR QUALITY

- Sources of air pollution in mines are the ore excavation, ore haulage, and ore processing.
- Types of air quality impacts: dust (total suspended particulate TSP, PM_{10}, $PM_{2.5}$) and vehicles (gaseous: CO).
- Elevation, wind direction, and wind speed greatly influence the dispersion of air pollutants with hotspots mainly lying downwind of the dominant wind directions.

EVALUATION OF POTENTIAL IMPACT

NOISE QUALITY

- The main source of operating noise is primarily from equipment and machinery.
- Excessive and prolonged exposure to noise can cause disruption and cause high noise levels, potentially causing hearing problems.
- Cumulative impact can significantly affect humans and wildlife and create annoyance to the local community.

TERRESTRIAL FLORA

- The loss of tree species due to timber extraction and subsequently the other vegetation due to mining activities is critical impacts on flora diversity.
- Habitat degradation due to vegetation clearing and removal.
- Removal of vegetation could increase water runoff and siltation during rain which affect the water quality in nearby water source and stream.

TERRESTRIAL FAUNA (WILDLIFE)

- Loss of habitat, species and impact on forest edge.
- Human-wildlife conflict and food shortage.
- The presence of workers post threat to the wildlife through illegal hunting.
- Noise will directly or indirectly cause a disturbance to the existing mammal community.

SOLID & HAZARDOUS WASTE

- Significant amount of solid waste (tree trunks, branches, shrubs, and green vegetative material) will be generated due to the clearing and site preparation.
- Poor storage and handling of general refuse resulting in odor problems and attraction of pest, disease vectors and scavenging animals (insects, rodents etc.) to the site.
- Scheduled wastes such as lubricating oils and diesel spill may affect the surface quality and aquatic ecology if they infiltrate to the surrounding water bodies.

EVALUATION OF POTENTIAL IMPACT

SEWERAGE

- If the domestic sewage is not well designed and maintained, odor and diseases might be triggered.
- Organic matter, coliform bacteria and suspended solids is the primary contaminants in sanitary effluents which will result in decreasing dissolved oxygen content elevated organic and coliform levels in downstream watercourses.

SOCIO-ECONOMIC

Potential Negative Impact:

- Disturb communities' daily activities and sources of income.
- Expose communities to health, safety and environment risk.
- Decrease the aesthetic value of the forest landscape.
- Risk of natural disaster due to the mining operation.

Potential Positive Impact:

- Increase employment opportunities.
- Improve socio-economic in term of income and quality of surrounding communities.
- Increase state and country revenue through expansion in mining sector.

COMMUNITY HEALTH

- Air pollution and elevated noise levels might have greater impact on workers but minimal impact on community.
- Water and groundwater pollution can affect the workers and the community.
- Biological hazards, such as dengue and leptospirosis, may become an issue if no proper care is taken to manage the vectors.

MITIGATION MEASURES

HYDROLOGY

- Build detention ponds to provide temporary storage for the excess runoff during storm event.
- Build sufficient diversion and earth drains and other BMPs on site to direct the surface runoff flows within the site to the sedimentation ponds, or silt ponds.
- Continuous monitoring and maintenance of all the BMPs and take immediate action on any noncompliance.
- Enough storage volume within the ponds should be provided in order to control flood of 50-year ARI.
- Construct sufficient height and length of perimeter bunds in low lying areas.

SOIL EROSION & SEDIMENTATION

- Control stormwater flows/surface runoffs onto, though, and from the site in stable drainage structures.
- Install perimeter runoffs controls.
- Stabilize and covering disturbed land areas promptly in a timely manner to minimize the exposure to rain.
- Protect steep slopes.
- Drainage and slope stabilization specifically designed to nurture the geology, soils, and terrain of the affected areas.
- Maintain river riparian buffer zones; rehabilitate areas that have been worked out.

EROSION OF OVERBURDEN AT DUMP SITE

- Overburden stockpiles shall be constructed with stable slopes appropriate for the high rainfall of the area.
- Reused the surplus excavated material as bund and embankment.
- Disposed the overburden at the designated dumping area.
- Install silt fence at the base of the mounds.
- Proper drainage systems and facilities shall be constructed surrounding overburden dump area.

MITIGATION MEASURES

RIVERINE RIPARIAN ZONE

- No clearing of vegetation from stream banks to prevent soil erosion and decrease in water quality through the loss of filtration services and the loss of critical species habitat.
- No mining or other activities to be conducted within the restricted stream/river buffer zones.
- Maintenance of riparian reserve to ensure no disturbance to the natural vegetation.

WATER QUALITY

- Implementation of water management techniques.
- Preservation and stabilization of drainage and waterways.
- Minimize the extent and duration of disturbance.
- Control of runoff flows into, through and from the site via stable drainage structures.
- Installation of perimeter controls (silt fence, perimeter drains, etc.)
- Fuel, grease, and engine oil storage must be carefully sited to avoid contamination of the surface waters.
- Proper drainage and sanitation facilities.
- Ensure minimum sediment discharge. Provide vegetated filter strips between exposed soil surfaces and receiving waters.
- Protect inlets, storm drain outfalls and culverts.
- Inspect and maintain BMPs for control measures.
- Streams must be protected with a vegetated buffer zone.
- Prepare an emergency plan on used oil spills and pond overflow.

GROUNDWATER QUALITY

- Regular monitor and maintenance of groundwater monitoring well.
- Properly design the tailing ponds to prevent any leakages and overflow and prevent infiltration of contaminant to sub-surface.
- Mining operation (excavation for the extraction of minerals) in the working areas shall be performed sequentially in order to minimize the accumulative impacts to the groundwater system.

MITIGATION MEASURES

AIR QUALITY

- Periodically check on maintenance of machinery and vehicles.
- Conveyance with minimum height of fall.
- Vehicle speed restrictions.
- Exposed soil areas, excavated materials, stockpiles and haul roads shall be dampened with water.
- Frequent spraying of water on the exposed surface (stockpiles of loose materials).
- Train workers to operate machinery properly to reduce dust generation.
- Workers should be supplied with respiratory masks.
- Open burning of biomass or domestic waste is prohibited.

NOISE QUALITY

- All machinery should be utilized and properly maintained during the operation.
- Impose and enforce a speed limit on all vehicles.
- Heavy vehicles moving in the path that will cause minimal interruption.
- Restricted the hours of operation.
- Install effective noise suppression systems.
- Installation of proper sound barriers and/or noise containment.
- Provide workers with earplugs or earmuffs.
- Carry out a noise monitoring program.
- Noise level can be reduced by undertaking the mining activity on phase by phases basis

SEWERAGE

- Use of septic tanks. The septic tanks must be maintained by regular desludging, and it will be prohibited from throwing used oil down the toilets or sinks.
- No direct discharge is allowed from any toilet facility to rivers or streams.

MITIGATION MEASURES

TERRESTRIAL FLORA

- Vegetation on higher elevation and steep slope will be left undisturbed to minimize soil erosion and filter the run-off during rainy days.
- Vegetation strips shall be planted in around ponds and waterways to create buffer and filter the net delivery of silt during runoff from higher ground area to the lower areas.
- Progressive rehabilitation of affected areas to restore ecosystem function, where possible with fast growing trees and leguminous creeper species.
- Any major removal of plants will be directed towards the adjacent forested area to facilitate fauna movement.

TERRESTRIAL FAUNA (WILDLIFE)

- Mining operations should not infringe upon protected areas or other critical or sensitive ecological areas.
- Include wildlife awareness information in regular safety and environmental inductions.
- Mining in an orderly sequence to minimize habitat disruption and facilitate gradual movement of wildlife away from the mining areas.
- Site clearing direction must be towards the forest reserve
- Placed warning signs at specific locations to reduce road kills.
- Advise mining workers to not interfere or harass wildlife.
- No hunting by project personnel permitted while working or residing on site.
- Fence the mining area, processing sites and processing ponds to prevent entering of wildlife to the areas.
- Any sighting of displaced or presence of wildlife within or near project site need to be reported to PERHILITAN.
- Seek the assistance and advice of PERHILITAN on how to handle wildlife and human conflicts.
- Proper signage on prohibition of bird hunting or trapping.

MITIGATION MEASURES

SOLID & HAZARDOUS WASTE

- Solid waste need to be segregated and disposed appropriately at approved dumping ground so as not to create potential vector source.
- A proper signage shall be made in order to create awareness among the workers in term of good waste management within the mining site area.
- No open burning can be carried out at all (strictly prohibited) within and outside the mining site area.
- No haphazard disposal on site or off site.
- All scheduled wastes shall be stored in containers and clearly labelled which are compatible with the scheduled wastes to be stored, durable and which are able to prevent spillage or leakage of the scheduled wastes into the environment as stated in **Regulation 9: Storage of scheduled waste under Environmental Quality (Scheduled Waste) Regulation, 2005**.
- If there is any spillage on the ground, the mining operator must according to the **Regulation 14: Spill or accidental discharge under Environmental Quality (Scheduled Waste) Regulation, 2005**.

SOCIO-ECONOMIC

- Project Proponent is advised to carry out a suitable continuous Company Social Responsibility (CSR) in effort to build trust and responsibility to the surrounding community.
- Project Proponent shall comply with any mitigation measures suggested in P2M2 in reducing the impacts that may disrupt the community surrounding.
- Provision of monitoring mechanisms and action plans to regarding environmental issues.
- Priority of employment to the locals.
- Provision of community facilities and amenities to cater for population growth.
- If there are any issues regarding natural disasters and damage during the development and operation of the project such as flooding, operator shall coordinate with **National Disaster Management Agency (NADMA) and Department of Social Welfare (JKM)** to provide help to affected community such as temporary shelter and economic relief.

MITIGATION MEASURES

SAFETY AND HEALTH

- Vector control through elimination of breeding sites and fogging to avoid any vector-borne and zoonotic diseases.
- Practise good sanitation including hygienic toilets, clean and safe water supplies, and proper solid waste disposal to avoid food and waterborne diseases.
- The workers safety, security and health are governed by the Occupational Safety and Health Act, 1994 (OSHA, 1994), Factories and Machinery Act, 1967 (FMA, 1967), Employee Social Security Acts, 1969, and Workmen's Compensation Act, 1952.
- Encourage workers to be vaccinated against vaccine-preventable diseases such as COVID-19, Hepatitis B, and influenza.
- Proper and suitable personal protective equipment are required for workers when the hazards are above the permissible exposure limits.
- Seek medical consultation immediately if the workers are sick and separate them from the healthy workers.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

PERFORMANCE MONITORING (PM)

LD-P2M2	PM Parameters	Recommended Limits	Frequencies
Silt Trap	Silt marker	-	Weekly or after rain event
Sediment Basin	Silt marker	-	
Earth Drains	Sediment level		
Earth Bund	Performance	-	
Silt Fence	Performance	-	
Roadside Drain	Performance	-	
Overburden Stockpile	Performance	20 m away from any watercourse	Quarterly
River Riparian Buffer Zone	Performance	25 m or more at both sides	
Boundary Buffer	Performance	20 m away from site boundary	

COMPLIANCE MONITORING (CM)

Item	Monitoring Frequency	Environmental Quality Standards
Water Quality	Once a month	i. National Water Quality Standards (NWQS). ii. Mineral Development (Effluent) Regulations 2016
Ground water Quality	Twice a year	i. National Standard for Drinking Water Quality (Revised December 2000), Second Version (MOH, 2004). ii. Malaysia Groundwater Quality Standards and Index – for Conventional use of Raw Water Treatment (Drinking Water) (DOE, 2019).
Noise Level	Once a month Daytime 15 hours (from 7.00 am to 10.00 pm) Nighttime 9 hours (from 10.00 pm to 7.00 am)	i. Guidelines for Environmental Noise Limits & Control, Third Edition (DOE, 2019), First Schedule of Permissible Sound Levels.
Air Quality	Once a month	i. Malaysia Ambient Air Quality Standards (Standard value by 2020).

IMPACT MONITORING (IM)

Item	Impact Monitoring
Water Quality	i. Continuous water quality monitoring for turbidity and total suspended particulates. ii. If silt trap/sediment containment structure is employed to contain the resuspended particulates, this must be regularly monitored for tear and displacement from the intended location. iii. Even with a silt trap/sediment containment structures in place, the water quality beyond the silt trap/sediment must be sampled for turbidity. iv. Records regular maintenance of the drainage structure provided on site and ensure there is no blockage to the water flow or excessive siltation.
Groundwater Quality	i. Continuous groundwater quality monitoring. ii. Records the measured water level. iii. Records regular maintenance of monitoring well to prevents well water quantity and quality deteriorating in longer term.
Air Quality	i. Records to show regular maintenance of equipment, machineries and vehicles used for this project development. ii. Records of provision of adequate dust protective device to workers working in dusty areas. iii. Records of provision of dust suppression facilities such as water bowser. iv. Records on air quality monitoring results. v. Checking on the soil surface to ensure proper soil compaction is practiced onsite especially on exposed area.
Noise Level	i. Records to show regular maintenance of equipment, machineries and vehicles used for this project development. ii. Records of provision of adequate noise protective device to workers working in high noise level areas. iii. Schedule of working hours, transportation in and out of the project site showing the type of loading and maintenance tasks carried out for vehicles.

CONCLUSIONS

The major activities that can potentially spawn impacts : Site clearing, Ore excavation, Ore haulage and Ore processing.

The aspects of the activities annexed to impacts: Dust formation (air quality), Noise generation (noise level), Soil erosion and river sedimentation (water quality).

The major impacts ensuing these aspects; Air pollution (PM_{10}, $PM_{2.5}$, etc.), Noise pollution (increase dBA) and Water pollution (turbidity, total suspended solids, DO and metal contaminants).

Abatement of impacts:

- ✓ Pollution prevention and impact mitigating measures on land disturbance, operations and post operation.
- ✓ Maintenance and Monitoring of BMPs
- ✓ Environmental Management Plan
- ✓ Environmental Auditing
- ✓ Self Regulation
- ✓ Commitment and financial allocations for BMPs and other measures.

These measures are to be stringently adhered by the mine operator for assurance of environmentally secure operation.