CHAPTER 5
PROJECT DESCRIPTION

CHAPTER 5

This chapter shall provide information and discuss the following aspects:

5.1 A description of the project concept with the following details: size and capacity, land requirements, raw materials, energy source and consumption, water source and consumption, labor requirements, transportation, support facilities, investment, market, and special infrastructural requirements
5.2 Maps and diagrams (photographs might also be useful to describe some projects)
5.3 A summary of the technical, economic, and environmental features that is essential to the project
5.4 Proposed project implementation schedule and project lifespan (wherever applicable)
5.5 Comparison with the existing plant/project in Malaysia or elsewhere
5.6 Operation and maintenance activities

5.1 A description of the project concept with the following details: size and capacity, land requirements, raw materials, energy source and consumption, water source and consumption, labor requirements, transportation, support facilities, investment, market, and special infrastructural requirements

5.1.1 PROJECT LOCATION

The proposed granite quarry operation is located on Lot PT 23066 and PT 23741with an area of 13.4862 Hectares (33.325 Acres) in Mukim Kuala Paka, District of Dungun, Terengganu Darul Iman. The proposed Project area is located within forestry area. The nearest receptors are Kampung Tebing Tembah which situated about 750m western and Kampung Baharu and Kampung Kongsi which situated about 1.75km southwest from the proposed Project site respectively. The existing quarries located adjacent to the proposed project area which are Paka Kuari Sdn. Bhd. and about 1.0km northern from the proposed project area which is Hardy Builder Sdn. Bhd.. The quarries are currently operating. The location of the proposed quarry area is at Latitude N 4°39'39.28" – N 4°39'35.49" and Longitude E 103°26'30.12" – E 103°26'31.41". **Figure 5-1** shows the Key Plan of the proposed Project site while **Figure 5-2** shows the Location Plan proposed Project site. The google plan of the proposed Project site is shown in **Figure 5-3**.

5.1.2 LAND

The Project site encompasses a total area of about 13.4862 Hectares (33.325 Acres). The extraction covers an area of about 10.6504 ha (26.318 ac). The remaining shall be utilized as site for proposed crusher plant, proposed stockpile area, proposed sediment basin, proposed buffer zone, proposed haulage road, proposed site office, proposed store, proposed scheduled waste store, proposed toilet, proposed parking area, proposed weighbridge and proposed guard. Details on the land utilization of the proposed quarry operation are shown in **Table 5-1**. The proposed quarry scheme plan is attached in **Appendix 5-1**.

HEXATREND QUARRY SDN. BHD.

Figure 5-1

KEY PLAN OF THE PROJECT AREA

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Report Ref.: KCS/HQ/472-EIA-0119-2505-R1

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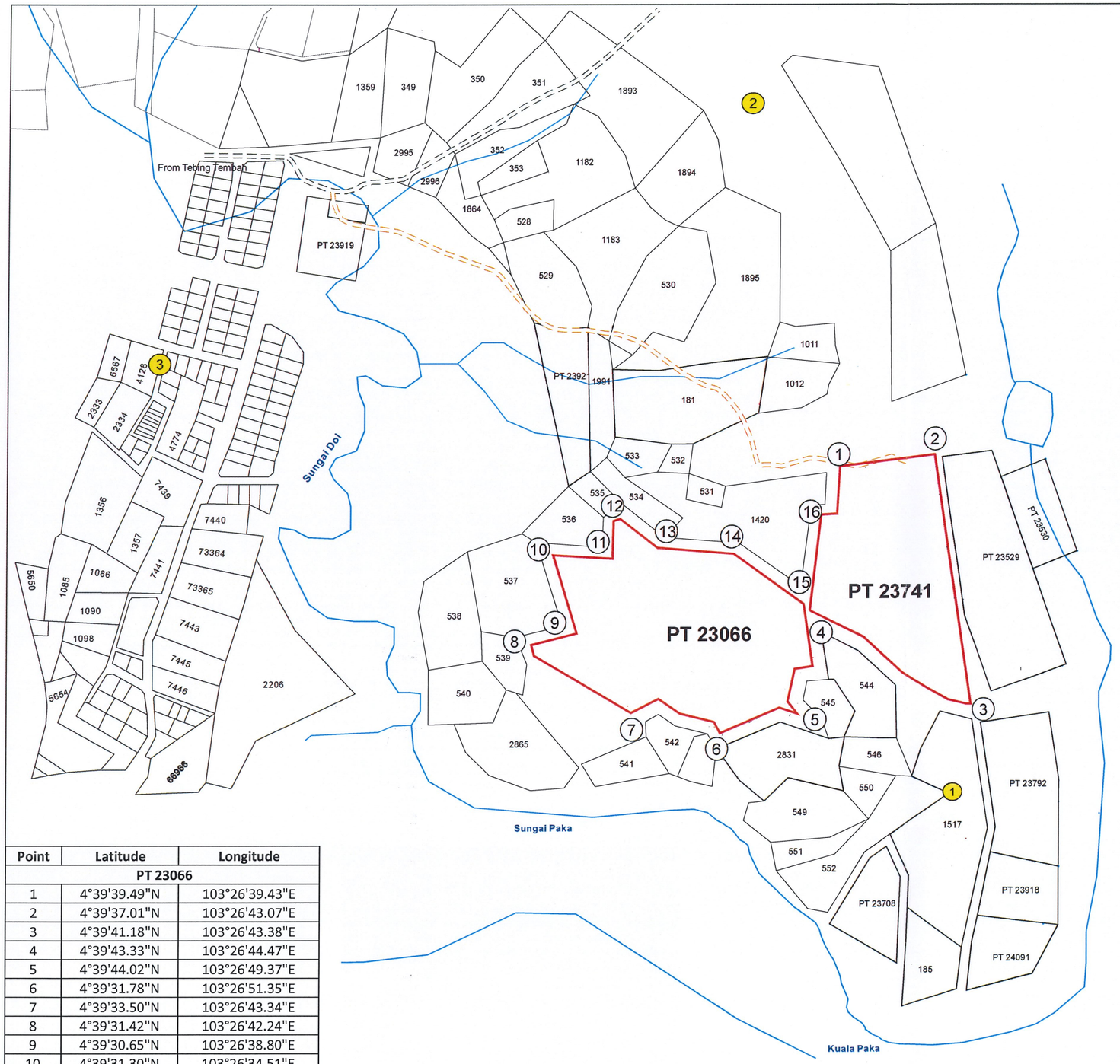

Point	Latitude	Longitude
PT 23066		
1	4°39'39.49"N	103°26'39.43"E
2	4°39'37.01"N	103°26'43.07"E
3	4°39'41.18"N	103°26'43.38"E
4	4°39'43.33"N	103°26'44.47"E
5	4°39'44.02"N	103°26'49.37"E
6	4°39'31.78"N	103°26'51.35"E
7	4°39'33.50"N	103°26'43.34"E
8	4°39'31.42"N	103°26'42.24"E
9	4°39'30.65"N	103°26'38.80"E
10	4°39'31.30"N	103°26'34.51"E
11	4°39'35.14"N	103°26'29.28"E
PT 23741		
1	4°39'39.28"N	103°26'30.12"E
2	4°39'39.36"N	103°26'33.16"E
3	4°39'41.11"N	103°26'33.52"E
4	4°39'39.53"N	103°26'36.01"E
5	4°39'35.49"N	103°26'31.41"E

N

MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU
SCALE 1: 5,000

LEGEND

- PROPOSED PROJECT AREA
- EXISTING ACCESS ROAD
- EXISTING MAIN ROAD
- SHORELINE

No.	Location
1	Paka Kuari Sdn Bhd
2	Hardy Builder Sdn Bhd
3	Kampung Tebing Tembah

PROJECT PROPONENT

HEXATREND QUARRY SDN. BHD.

DRAWING TITLE

Figure 5-2
LOCATION PLAN OF THE PROJECT AREA

Compiled by	PW Lin
Drawn by	PW Lin
Checked by	Ooi
Approved by	YK Wong
Report Ref.	KCS/HQ/472-EIA-0119-2505-R1
Date	19 November 2020
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N

MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU DARUL IMAN
SCALE 1: 8,000

LEGEND

- pROPOSED PROJECT AREA
- EXISTING ACCESS ROAD
- EXISTING MAIN ROAD

No.	Location
1	Hardy Builder Sdn Bhd
2	Kampung Tebing Tembah
3	Paka Kuari Sdn Bhd

PROJECT PROPONENT

HEXATREND QUARRY SDN. BHD.

DRAWING TITLE

Figure 5-3
500M RADIUS PLAN OF THE PROPOSED PROJECT AREA

Compiled by	PW Lin
Drawn by	PW Lin
Checked by	Ooi
Approved by	YK Wong
Report Ref.	KCS/HQ/472-EIA-0119-2505-R1
Date	19 November 2020
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Table 5-1: Land Utilization of the Proposed Quarrying Operation

Lot No.	Existing Land Use	Proposed Intended Use	Area
PT 23066	Forestry	Proposed haulage road, site offices, stores scheduled waste store, toilet, parking area, weighbridge, guard house and overburden dumping area	2.8358 ha (7.007 ac)
		Proposed haulage road, Proposed working area 1	2.7049 ha (6.684 ac)
PT 23741		Proposed working area 2, proposed haulage road	7.9455 ha (19.634 ac)
		Total	**13.4862 ha (33.325 ac).**

5.1.3 ACCESS ROAD

The proposed Project site can be accessed via Tebing Tembah Road. It is approximately 1.0km before reaching the quarry site. When the quarry starts its operation, this existing access road shall be upgraded and maintained to cater the transportation movement in and out of the quarry area. The plan showing the access road is shown in **Figure 5-3.**

5.1.4 PROJECT CONCEPT

The Project proponent proposed the quarry rate of a maximum of 80,000 TPM depending on the market demand. The proposed quarrying operation shall involve blasting and size reduction activities to produce aggregates. A crusher plant with a capacity of 240 TPH will be installed at the quarry site to produce certain sizes of aggregate. Since the quarrying operation involve multi-staged activities, the most critical activities that require specific attention being the overburden removal and rock excavation which include drilling, blasting and haulage.

The proposed quarrying operation on the applied area will involve drilling of 89 mm diameter holes into the rocks and charging them with explosive to blast the rocks. The blasted rocks are then loaded onto trucks and hauled to the quarry infrastructure area whereby crusher plant, stockpile area and other quarry infrastructures shall be located. Here, the rocks are crushed and screened into aggregates of certain sizes as its end products. Sizes of aggregates, which shall be produced by the quarry including the 20 mm, 50 mm, crusher run and 5 mm down (quarry dust). Then, the products shall be transported out using lorries for marketing purposes.

The Bench Cut Haul Method concept, which is capable of producing large quantity of rock shall be adopted in quarrying of the granite reserve on the applied area. This concept even though is much expensive if compared to the Bench Cut Drop Chute Method, it is safer and more environmentally friendly. The Bench Cut Haul Method concept is then further improved with pitting technique in order to minimize visual impact toward the surrounding.

In order to minimize the area open at any one time and thus area exposed to erosion, the staged extraction concept as shown in **Figure 5-4** shall be adopted. This concept will also permit progressive rehabilitation whenever possible to be executed in the Project.

5.1.5 RAW MATERIAL: ROCK RESERVE

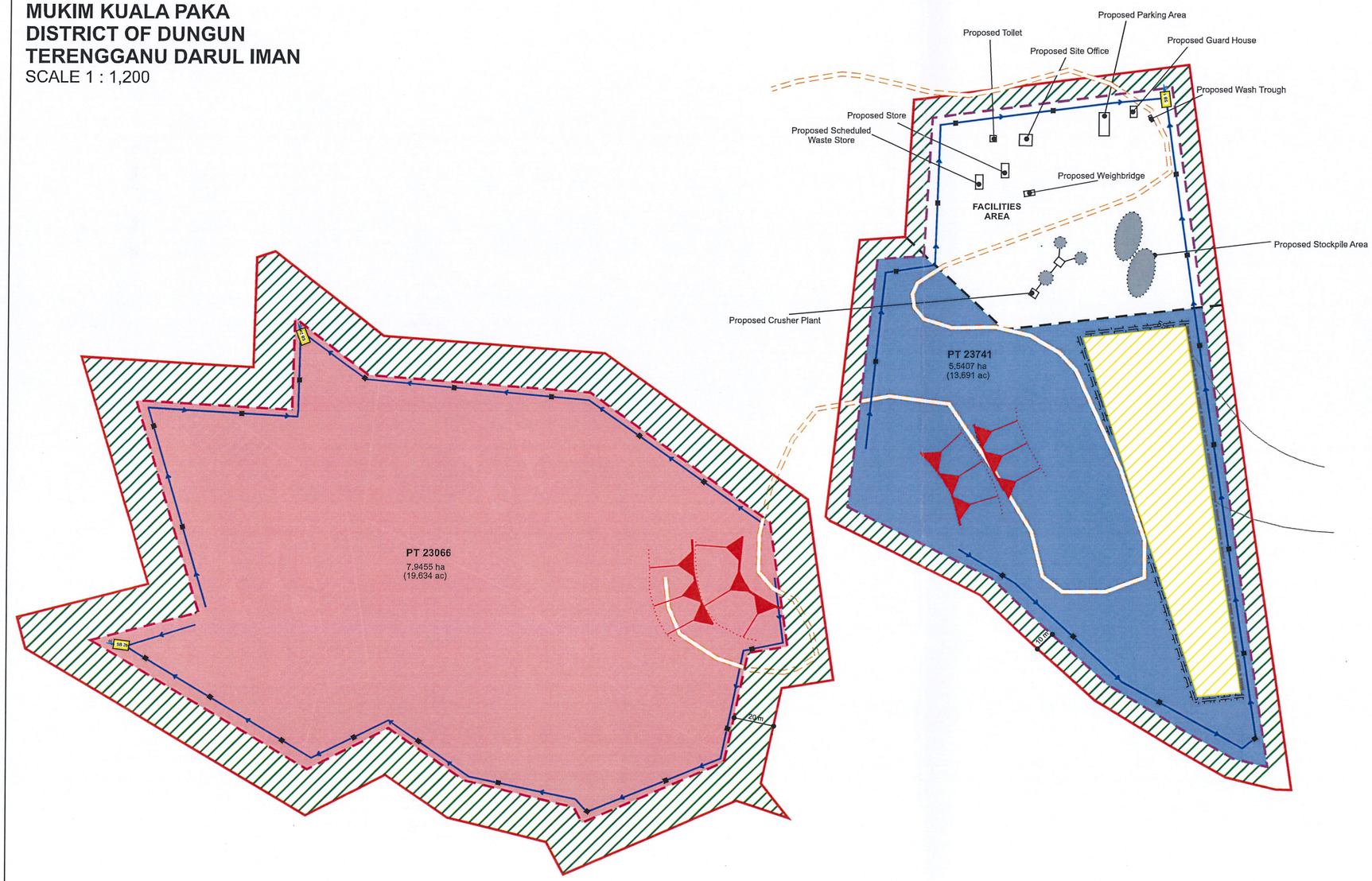
Granite Reserve Estimation

The estimated granite reserve on the proposed site is about 2,156,706 m^3. The granite reserves are based on hillside quarry design, working down to the final floor level at RL 5.0 meter above Mean-Sea-Level from RL 100 meter level. Taking the specific gravity of 2.60 for the granite, the rock reserve on the area is about 5,607,435.6 metric tonnes. The overburden of the area shall average 5.0 meter in thickness. The summary of the rock reserve is shown in **Table 5-2**.

N

MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU DARUL IMAN

SCALE 1 : 1,200



LEGEND

- Proposed Working Area Phase 1
- Proposed Working Area Phase 2
- Proposed Access/ Haulage Road
- SB 1 — Proposed Sediment Basin
- Proposed Overburden and Biomass Dumping Area
- Proposed Buffer Zone (10m)
- Proposed Buffer Zone (20m)
- 'S' — Proposed Final Spillway
- Proposed Temporary Drainage with Check Dam
- Chain Link Fencing
- Proposed Quarry Face
- Proposed Dykes/ Earth Bund
- Proposed Silt Fence
- Proposed Vegetation Strips

PROJECT PROPONENT

HEXATREND QUARRY SDN. BHD.

DRAWING TITLE

Figure 5-4
PROPOSED PHASING AREA

Compiled by	PW Lin
Drawn by	PW Lin
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Table 5-2: Summary of the Estimated Rock Reserve

Subjects	Particulars
Land	PT 23066 & PT 23741
Mukim	Kuala Paka
District	Dungun
Rock	Granite
Bulk Specific Gravity	2.60
Workable area	10.6504 ha = 106,504
Height of rock deposit inclusive of overburden	100 m
Average thickness of overburden	5.0 m
Estimated Final Floor level	5.0 m
Volume of rock inclusive of slopes	= (0.5 x 106,504 x 90) m^3 = 4,792,680 m^3
Less sloping and flat area 55%	= 4,792,680 x 0.55 = 2,635,974 m^3
Volume of rock reserve	= 4,792,680 – 2,635,974 m^3 = 2,156,706 m^3
Tonnage of rock reserve	= (2.60 x 2,156,706) metric tons = **5,607,435.6 MT**

5.1.6 PROJECT COMPONENTS

Design

The proposed rock quarry has been designed to produce a maximum of about 80,000 metric tonnes of quarry products per month. Facilities which shall be used for the Project is crusher plant which is able to produce a certain size of aggregates. Stockpile area, site office and other facilities shall also be provided. The quarry shall be operating 12 hours daily and 28 days per month.

Production Capacity

An evaluation was made to determine the most economical scale of operation. Capital investment, operating and working capital costs were estimated for a various rate of production resulting in various life spans. Aggregate production for the quarry is scheduled at about 10,000 TPM when it first comes into operation. The production shall be increased to 20,000 TPM after the second months of operation. A further increment of 10,000 TPM is planned for the third months of operation. When fully operational, the production is scheduled to be about 80,000 TPM (see **Table 5-3**) until the mineable granite is exhausted. It is anticipated that the transitional period shall take approximately 8 months.

Table 5-3: Proposed Production Rate of the Quarry

Schedule	Production Rate (TPM)
❑ 1st Month	10,000 TPM
❑ 2nd Month	20,000 TPM
❑ 3rd Month	30,000 TPM
❑ 4th Month	40,000 TPM
❑ 5th Month	50,000 TPM
❑ 6th Month	60,000 TPM
❑ 7th Month	70,000 TPM
❑ 8th Month	80,000 TPM

The Product

When fully operational, the production is planned for 80,000 TPM. Meanwhile, sizes of aggregates, which shall be produced 50 mm, 20 mm, crusher run and 5 mm (quarry dust).

5.1.7 LAYOUT

The Project site encompasses a total area of about 13.4862 Hectares (33.325 Acres). The extraction covers an area of about 10.6504 ha (26.318 ac) which will be subdivided into 2 working phases, in order to minimize the area open at any one time and thus area exposed to erosion. The remaining shall be utilized as site for proposed crusher plant, proposed stockpile area, proposed sediment basin, proposed buffer zone, proposed haulage road, proposed site office, proposed store, proposed toilet, proposed parking area, proposed weighbridge, proposed guard house and other quarry infrastructure and facilities. The proposed quarry scheme plan is shown in **Appendix 5-1**.

5.1.8 EQUIPMENT AND FACILITIES

A total quarrying system is a composite of many sub-systems. In the proposed quarry, selection of quarrying equipment and machinery shall be considered to ensure its efficiency and reliability. All machinery or equipment need to be registered with the Department of Safety and Health prior installation and operation. Equipment and machinery which shall be employed at the quarry may be categorized as follows:

Excavation and Loading Equipment

Excavation and loading equipment are required to excavate the overburden and fragmented rock materials at the quarry and then load them to the haulage equipment before being transported to the proposed stockpile area or to the crusher plant. Excavation and loading exercises shall be carried out using hydraulic excavators.

Alternative loading equipment considered is based on its technical feasibility. The crawler-mounted hydraulic shovel excavator has been identified as alternative loading equipment at the quarry. This is because excavator is capable of handling hard, dense, abrasive, badly fragmented ground by virtue of its positive crowd action and the possibility of applying a high breakout force. The excavator also is known for its high digging and dumping accuracy enables the selective removal of material and loading of dump trucks. The crawler-mounted excavator relatively mobile and has bucket capacities of between 5 m^3 to 35 m^3. A high work rate may compensate for relatively low bucket capacity. Details of machinery and equipment which shall be employed at the quarry are shown in **Table 5-4**.

Table 5-4: Proposed Machinery and Equipment at Quarry

Equipment	Type/Mode	Capacity	Units
❑ Drills	Crawler, Hydraulic	89 mm	2
❑ Drills	Hand Drills	38 mm	2
❑ Air Compressor	ATLAS COPCO	370 cfm	2
❑ Shovel	Hydraulic Face	4.1 m^3	2
❑ Loader	Front, Wheel	3.8 m^3	4
❑ Excavator	Hydraulic, Front End	1.6 m^3	4
❑ Tractor	Caterpillar	Bulldozer, D5	1
❑ Rock Breaker	Hydraulic Excavator	Breaker Attached	1
❑ Tipper Lorry	10-Wheeler	10 tonnes	5

Haulage Equipment

The locally fabricated 10-wheeler tipper lorries have been identified as the most suitable trucks to transport the excavated materials to the appropriate destination within the quarry area. Trucks are usually more advantageous when hauling long distance with good haul road conditions is considered. This haulage system is characterized by excellent production variability in material handling, but maximum production can only be achieved by rigidly engineered, coordinated and scheduled operating procedures. A maximum of 5 units of such trucks with a payload capacity of 10 tonnes shall be used at the quarry.

Proposed Drilling and Blasting Equipment

Blasting and rock excavation operations require machinery and equipment to suit the purpose they are designed for. The equipment needs to meet certain specifications based on the topography, layout and design of the quarry. This is important in ensuring not only the safety of the operation but also its economic aspects. The lists of equipment and machinery for drilling and blasting are tabulated in **Table 5-4**.

Proposed Crusher Plant Facility

Based on aggregate production of 80,000 TPM, crusher plant with capacity of 240 TPH is used for this proposed Project. With its capacity, 80,000 TPM can be achieved with operating at maximum 12 hours daily and 28 days per month. The proposed crusher plant consists of a jaw crusher, two cone crushers, and a series of screens. The crusher units are supplied complete with frame and supporting legs, motors, discharge conveyors, chutes, guards, platforms, stepladders and guardrails. The lists of equipment and machinery which shall be used in the crushing of the aggregate are shown in **Table 5-5**.

Table 5-5: Proposed Crusher Plants Facility at Quarry

Description	*Size*	*Power(kW)*
❑ Primary Jaw Crusher	0.76m x 1.05m	90
❑ Vibrating Grizzly Feeder	1.1m x 3.7m	15
❑ Waste Screen	1.2m x 2.4m x 1D	1.6
❑ Secondary Scalping Screen	1.8m x 4.9m x 2D	19
❑ Concrete Bunker Pan Feeders	900 x 1200	4
❑ Secondary Cone Crusher	1m – Cone	55
❑ Bin Pan Feeders	-	1.6
❑ Final Screen	1.8m x 4.9m x 2D	15
❑ Tertiary Screen	1.8m x 4.9m x 2D	18.5
❑ Conveyor	600mm to 900mm	123
❑ Tertiary Cone Crusher	36 FC Cone	75
❑ Generator Set	750 kVA	-

Proposed Diesel Storage Facility

Diesel shall be used as fuel for a number of machinery and equipment during the construction and operational stage of the Project. A dedicated area within the quarry site shall be established to accommodate the diesel storage tanks, delivering pump sets and associated piping. The location of the proposed centralized fuel oil storage tanks shall be determined at a later stage. The storage tank facility complete with an appropriate bund is shown in **Figure 5-5**. Diesel is delivered to the site on a periodical basis. At less two storage tanks with a capacity of 18,200 liters shall be installed.

5.1.9 INFRASTRUCTURE, UTILITIES AND MANPOWER REQUIREMENT

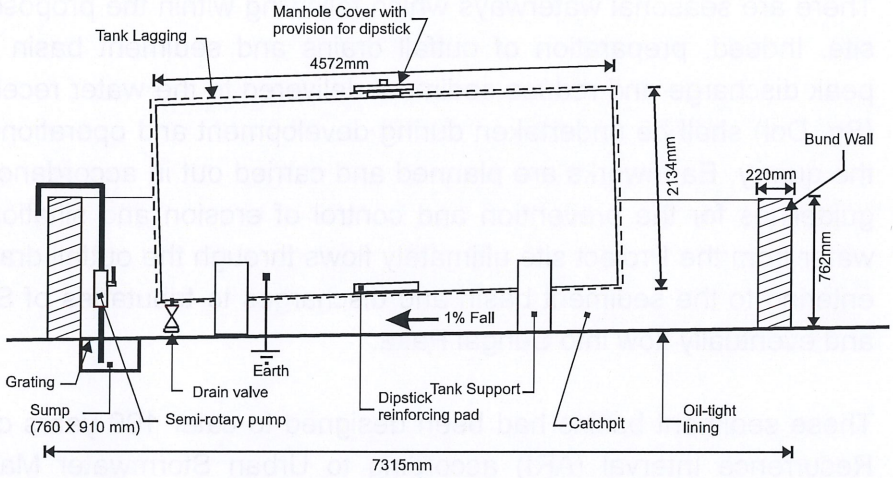
Infrastructure

The infrastructure of relevance to the Project includes access road, site office and workshop. An internal haulage road connecting the quarry faces to the crusher plant and stockpile areas to be constructed. It is used to transport the stripped overburden and the fragmented rock from the working faces to the plant or the fill/stockpile areas. Such a road is essential to promote efficient operations and safety. The internal haulage road is constructed based on certain specifications and design by taking into consideration the topography, the layout of the quarry and also the type of vehicles employed.

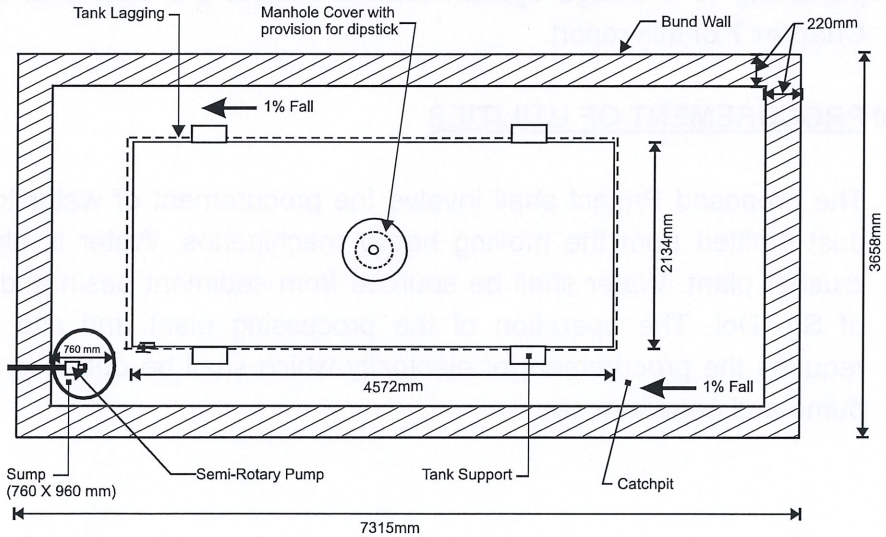
Access Road

Currently, the proposed Project site can be accessed via Tebing Tembah Road. It is approximately 1.0km before reaching the quarry site. When the quarry starts its operation, this existing access road shall be upgraded and maintained to cater the transportation movement in and out of the quarry area. The Project Proponent will develop the internal road during the pre-construction stage.

SIDE VIEW



PLAN VIEW



Note:
Diesel Tank Storage Capacity - 16,495 litres
Area For Storage Tank Capacity - 20,571 litres

HEXATREND QUARRY SDN. BHD..	KenEp Consultancy & Services
Figure 5-5 TYPICAL DIESEL TANK DESIGN	Report Ref.: KCS/HQ/472-EIA-0119-2505-R1
	Not to Scale

Drainage System

There are seasonal waterways which following within the proposed Project site. Indeed, preparation of outfall drains and sediment basin to control peak discharge and reduce sediment delivered to the water receiving body (Sg. Dol) shall be undertaken during development and operation stages of the quarry. Earthworks are planned and carried out in accordance with the guidelines for the prevention and control of erosion and siltation. Run-off water from the Project site ultimately flows through the outfall drains before entering to the sediment basin and discharges to tributaries of Sungai Dol and eventually flow into Sungai Paka.

These sediment basins had been designed to cater 100 years of Average Recurrence Interval (ARI) according to Urban Stormwater Management Manual for Malaysia (Manual Saliran Mesra Alam 2) 2012 produced by Department of Irrigation and Drainage, Malaysia. The water from the sediment basin will be retained to use for suppression of dust from the proposed crushing plant and regular water browser to spray road. Issues pertaining to drainage system for the Project are deal with in detail in **Chapter 7** of this report.

5.1.10 PROCUREMENT OF UTILITIES

The proposed Project shall involve the procurement of water to suppress dust emitted from the moving heavy machineries. Water is also used in crusher plant. Water shall be sourced from sediment basin and tributaries of Sg. Dol. The operation of the processing plant and site office also requires the procurement of electricity which shall be obtained from water pump and generator set.

Water Supply

The need for water supply is for domestic use of the Project, which is for human consumption and operation needs. Water is required both during the construction and operational stage of the Project. The volume of water required for the proposed Project is minimal during the operational stage. It shall be used mainly in the dust suppression system. The source of water shall be from the sediment basin or seasonal waterways in the Project site shall be constructed for the purpose.

Sewerage

Sewage originating from the site office shall be channeled into septic tank. Septic tank with SPAN approval will be installed at the Project site. Individual septic tank with filter beds is conventional systems that can be effectively designed to provide the desired level of treatment, provided that they are maintained and dislodged regularly. The sewage system adopted is to be designed to treat sewage to meet Standard A of the Environmental Quality (Sewage) Regulations 2009.

Solid Waste

Solid waste is not expected to be of any major problems to the operation of the Project. Upon completion of the Project, the quantity of solid waste generated is minimal. The wastes generated are basically garbage from the office. All of these solid wastes shall be internally collected and disposed nearest local authority dump site.

Electricity Supply

An electricity power supply is required as early as the starts of the construction phase of the Project. The estimated load for the development would be in the region of 200 kW with an estimated maximum 'peak hour' power consumption reaching 250 kW. The supply of electricity at this moment is using a generator set. Consideration shall be taken to tap the electricity from nearby supply.

Telecommunication

The facilities are available either in the form of fixed line or cellular phone. An adequate number of fixed telephone lines shall be provided for the quarry.

5.1.11 MANPOWER REQUIREMENT

The proposed quarry shall generate employment opportunities to various categories of workers. It is estimated that a total of 22 workers shall be employed at the quarry when it is fully operational. The manpower requirement shall comprise of manager, professional, technical, clerk, skilled/semi-skilled. The breakdown of the manpower requirement is shown in **Table 5-6**.

Table 5-6: The Proposed Quarry Manpower Requirement

Category	Employment		Total
	Direct	Contract	
❑ Management	2	-	2
❑ Professional	1	1	2
❑ Technical	1	2	3
❑ Clerical	2	1	3
❑ Skilled / Semi skilled	4	8	12
Total	**10**	**12**	**22**

5.2 MAPS AND DIAGRAM

Figure 5-1 and **Figure 5-2** show the key plan and the location plan of the site, respectively. The google plan of the proposed Project site is shown in **Figure 5-3**. **Figure 5-4** shows the staging of the proposed quarry operation. While **Figure 5-5** shows the storage tank facility complete with appropriate bund.

5.3 A SUMMARY OF THE TECHNICAL, ECONOMIC, AND ENVIRONMENTAL FEATURES THAT IS ESSENTIAL TO THE PROJECT

The key emissions from the quarry activities of the granite that constitute pollution and therefore warrant control are those consisting of particulate matter emissions.

The following parts of the process may give rise to particulate matter in the form of dust:

- Crushing
- Screening
- Loading and unloading
- On-site transfer of dusty materials
- Stockpiles
- Roadways, including haulage roads

As such it is necessary to equip the facilities with environmental protection systems to ensure any releases shall comply with the following relevant regulations. The relevant control techniques which shall be implemented are shown in **Table 5-7**. Details pertaining to these issues are elaborated in **Chapter 7** of this report. The crusher plant shall be equipped with water sprinklers to suppress dust from the transfer point and stockpiling areas. Watering of haul roads, benches, stockpiles: the quarry operators must be aware when hot, dry and windy conditions are likely to occur and they must take appropriate action in deploying water sprays before such conditions arise so as to prevent dust emissions.

Table 5-7: Summary of Control Techniques

Release Sources of Dust	Control Technique
❑ Loading and unloading processes • Transfer of materials ❑ Containment ❑ Suppression	❑ Containment ❑ Suppression
❑ Stockpiles	❑ Wind dynamics management • use of fencing, bunding, profiling etc ❑ Suppression • water and/or suppressants • sufficient coverage by sprays ❑ Covering • plastic/ any suitable materials • dust covers
❑ Roadways including haulage roads	❑ Suppression • Regular water browser to spray road
❑ External operations • Stockpiles • Roadways	❑ Appropriate siting • away from site boundary especially if near residential or other sensitive receptors ❑ Wind dynamics management • use of fencing, bunding, profiling etc.
❑ Vehicles - bodies and wheels.	❑ Wheel-wash and under-body vehicle wash ❑ Tarpaulin to cover products

5.4 PROPOSED PROJECT IMPLEMENTATION SCHEDULE AND PROJECT LIFESPAN (WHEREVER APPLICABLE)

Production Capacity and Operational Life

It is anticipated that the maximum rate of quarrying achievable by the proposed quarry scheme is about 80,000 tonnes per month. Therefore, the operational life of the quarry total throughput of 5,607,435.6 MT can be estimated as follow:

$$\text{Reserve Life} = \frac{\text{Total Throughput To Be Quarried}}{\text{Rate of Quarrying}}$$

$$= 5{,}607{,}435.6 / 80{,}000$$

$$= 70.09 \text{ months}$$

$$= \mathbf{5.8 \text{ years}}$$

Add = 2.0 months/reserve life for inclement weather, amendment in quarrying scheme etc.

Operational Life	=	2.0 x 5.8 years
	=	11.6 months
	=	**1.0 years**
Total Operational Life	=	5.8 years + 1.0 years
	=	**6.8 years ≈ 7.00 years**

A total of 5.8 years should be added to 1.0 year to give 7 years approximately due to miscellaneous interruption during the operation. It needs to be pointed that the proposed 80,000 tonnes of aggregates production per month as mentioned above shall be achievable when the plant is fully operational and the quarry face has been well developed.

Implementation Schedule

Before quarrying could proceed, the Proponent has to submit an Environmental Impact Assessment (EIA) report to the Department of Environment for approval where this study is being carried out to fulfil this requirement. Relevant permit pertaining to others shall be obtained from the relevant authorities. It is understood that the Project will commence as soon as the EIA report is approved by the DOE and also approval from other relevant authorities. It will start with the preparation of the quarry platform and the procurement of other facilities, to be followed by other activities, which as has been discussed in the previous sections.

As far as the proposed project is concerned, the present development is at the 'Feasibility & EIA' stage under the "Pre-Production Phase". The implementation of the Project includes all aspects of planning, procurement, construction and commissioning of the Project. It shall start with the construction of haulage road to the quarry face and construction of a quarry working platform or bench. The proposed implementation schedule is shown in **Table 5-8.**

Table 5-8: Implementation Schedule for Proposed Project

Description	Months													Status of work as to..
	1	2	3	4	5	6	7	8	9	10	11	12	Year 2-4	
Proposed Quarry Facilities Area Lot PT 23066														
Mobilization equipment and development	■													
Site Survey	■													
Site Clearing		■	■											
Earthwork		■	■											
Silt Trap & Sedimentation Pond -Maintenances of BMPs			■	■										
Drainage			■	■	■									
Haulage Road to Platform						■								
Progressive Rehabilitation (Trees planting)				■	■	■	■	■	■	■	■	■	■	
Proposed Working Area (Phase 1) Lot PT 23066														
Site Survey	■													
Site Clearing		■	■											
Earthwork		■	■											
Silt Trap & Sedimentation Pond -Maintenances of BMPs			■	■										
Drainage			■	■	■									
Haulage Road to Platform						■								
Drilling and Blasting (NONEL Blasting Design)							■	■						
Overburden Stripping									■					
Bench Development										■	■			
Production (80,000 TPM)												■		
Progressive Rehabilitation (Trees planting)				■	■	■	■	■	■	■	■	■	■	

Table 5-8: Implementation Schedule for Proposed Project

Description	Months													Status of work as to..
	1	2	3	4	5	6	7	8	9	10	11	12	Year 6-7	
Proposed Working Area (Phase 2) Lot PT 23741														
Site Survey														
Site Clearing														
Earthwork														
Silt Trap & Sedimentation Pond -Maintenances of BMPs														
Drainage														
Haulage Road to Platform														
Drilling and Blasting (NONEL Blasting Design)														
Overburden Stripping														
Bench Development														
Production (80,000 TPM)														
Progressive Rehabilitation (Trees planting)														

5.5 COMPARISON WITH THE EXISTING QUARRY/PROJECT IN MALAYSIA OR ELSEWHERE

The quarry industry is integral to the construction industry. Its growth is in tandem with the growth of the Malaysian economy and the construction sector. The raw materials from a quarry are needed, among others, to make concrete, build roads and fill material in civil engineering and building works. Currently, one of the main issues that are affecting the industry is the impact of quarry activities on the environment as well as the surrounding residential areas.

The existing quarry operation in Malaysia:

- Granite Quarry Operation on Lot 7705 With an Area of 641 Acres (259.40 Hectares), in Mukim of Ulu Langat, District of Ulu Langat, Selangor Darul Ehsan by Ang Cheng Ho Quarry Sdn. Bhd.
- Rock Extraction On PT 3262, Crushing Operation On PT 1119 and PT 1120 and Additional Facilities Area On Lot 1313, Lot 1314, Lot 1315, Lot 1316, Lot 1318 and Lot 1319, In Mukim Of Hulu Semenyih, District Of Hulu Langat, Selangor Darul Ehsan by Batu Tiga Quarry Sdn. Bhd.
- Granite Quarry Operation on Lot 874, 875, 14686 (PTD 5403), 14687 (PTD 5404), 14688 (PTD 5405), 14689 (PTD 5406), 14690 (PTD 5407), and Lot 1483 with a total area of 16.8144 ha (41.5493 ac) in Mukim Jorak, District of Muar, Johor Darul Takzim by Seri Jorak Quarry Sdn. Bhd.
- Temporary Quarry with an Area of 124 Acres (50.50 Ha) on Approved Housing Scheme of Kebenaran Merancang Approval (Ref: JSS.JB/2013/176/KM-9), Mukim Kulai, District of Kulai, Mukim Pulai, District of Johor Bahru, Johor Darul Takzim by Saroma Engineering Sdn. Bhd.
- Granite Quarry Operation on Plot 6 in Segari Industrial Area, Mukim Pengkalan Baharu, District of Manjung, Perak Darul Ridzuan by Pantai Quarry Sdn. Bhd.
- The Granite Quarry Operation on PTD 53813, 105810, 105813, Mukim Senai-Kulai, Daerah Johor Bahru, Johor Darul Takzim by Aman Quarry Sdn. Bhd.

- Granite Quarry Operation on Approved Quarry Lease with an Area of 34.21 Hectare (84.5450 Acre) in Bukit Pengorak, Mukim of Sungai Karang, District of Kuantan, Pahang Darul Makmur by Spring Energy Sdn. Bhd.
- Site Development of A New Granite Quarry and Granite Processing on Lot PTD 4222 & PTD 4223, Mukim Ulu Sungai Sedili Besar, District of Kota Tinggi, Johor Darul Takzim by Unibase Quarry Industries Sdn. Bhd.
- Granite Quarry Operation on Lot 1517 GM 313, PT 23529, Lot 544 GM 4591, Lot 185 GM 3110, Lot 181 GM 4569, Lot 2831 GM 1020, PT 23708, PT 23792, PT 23918, PT 23919, PT 23920, PT 23921 and PT 24091 With An Area of 19.9164 Hectares (49.214 Acres) In Pelor, Mukim Kuala Paka, District of Dungun, Terengganu Darul Iman by Paka Kuari Sdn. Bhd.

5.6 OPERATION AND MAINTENANCE ACTIVITIES

5.6.1 PROJECT ACTIVITIES

Quarrying development involve multi-tiered activities, ranging from site clearance to make way for the overburden excavation to infrastructure construction for the entire quarrying operation. These activities may be discussed separately under the various stages of implementation. The main stages of the Project implementation are as follows:

- The exploration and prospecting stage.
- The development and initial site preparation and construction stage.
- The rock quarrying and operation stage.
- The rehabilitation and abandonment stage.

Typical Project activities for the rock quarrying development are as summarized in **Table 5-9**. Some of the stages may take place simultaneously on the Project site though at different localities. For example, while rock quarrying operations are being carried out at one place, rehabilitation activities may be undertaken nearby at the same time.

Table 5-9: Typical List of Project Activities

Stage	Activity
Investigation	❑ Exploration ❑ Environmental Impact Assessment
Initial Site Preparation and Construction Stage	❑ Site Clearing ❑ Overburden Removal ❑ Infrastructure Construction ❑ Quarry Face and Benches Development ❑ Crushing Plant Installation
Production	❑ Drilling ❑ Blasting ❑ Crushing ❑ Screening ❑ Stockpiling ❑ Transportation
Abandonment	❑ Rehabilitation

Investigation Stage

The main activity during the investigation stage is the prospecting and geological exploration study and the Environmental Assessment (EA) study by the consultants. The purpose of prospecting and exploration is to locate, delineate and evaluate the rock deposit available within the proposed Project area while the EIA study is generally to study the impact of the Project on the environment. Most of these relevant activities involve the use of mobile equipment, which is easily transported to the site.

The process of prospecting and geological investigation included ground access, surveying and drilling operation while the EIA study involved inter alia activities such as sampling of water, air, noise and vibration. Data and information on the area gathered during the investigation phase are used in the planning, development and operation of the quarry.

Initial Site Preparation and Construction Stage

Before rock excavation may be properly carried out, there are a wide variety of both on-site and off-site activities, which need to be undertaken. This involved multi-tiered activities, ranging from site clearance to make way for the overburden excavation to infrastructure construction for the entire quarrying operation. The main objective of this phase is to prepare the selected site for production.

Major activities in the initial site preparation and construction stage are as follows:

- Boundary demarcation and positioning.
- Mobilization of workforce.
- Transport of equipment and supplies.
- Site clearing.
- Upgrading and construction of internal roads.
- Improvement of watercourses and drainage system.
- Installation of crusher, buildings and other facilities.
- Overburden removal.
- Construction of haulage road and working platform.
- Construction of sediment basins.
- Managing waste at the Project site.
- Creation of buffer zone.

Boundary Demarcation and Positioning

During this stage of the Project, an appointed Licensed Surveyor shall carry out the boundary survey. Most of the relevant activities involve the use of mobile equipment, which are easily transported to the site. No workers are expected to camp at the site as they shall commute daily to the Project site.

General Mobilization

As soon as the Project is permitted to proceed, the interim personnel including the technical staff, skilled construction workers and heavy equipment operators shall be mobilized. These workers prepared the site for the proposed quarry faces and and for the construction of crushers and other facilities. After the initial preparatory works have been completed, the general workforce begins to get involved in the actual quarrying.

Transport of Equipment and Supplies

Equipment, supplies and other materials needed during the construction stage shall all be brought in. All these equipment and supplies shall be obtained from the nearest commercial centers.

Site Clearing

The clearing activity involved land clearing, grubbing and total removal of vegetation at the quarry site using excavators and other heavy equipment. Some of the larger trees shall be cut down using chain saws. The existing vegetation comprises mostly of vegetation, grasses, shrubs and other secondary regrowth. Trees and stumps are removed and disposed. Non-woody materials may be composted at the site while the large woody materials may be processed and consumed as source of timber. The spoils and other refuses from the clearing activities are disposed at specific area within the Project site.

Upgrading and Construction of Internal roads

Currently, the proposed Project site can be accessed via Tebing Tembah Road. It is approximately 1.0km before reaching the quarry site. When the quarry starts its operation, this existing access road shall be upgraded and maintained to cater the transportation movement in and out of the quarry area. The Project Proponent will develop the internal road during the pre-construction stage. A good access road is necessary to ensure efficient workers and material transportation to and from the quarry. Regular maintenance involving patching up of pot-holes, minor grading and further resurfacing shall be undertaken for this stretch of road as and when necessary.

Improvement of Watercourses and Drainage System

The existing drainage system within the Project site shall be improved. The drainage system network shall take into consideration the site topographical features of the Project site. Earth drains/ outfall drains of suitable specification shall be constructed for this purpose to cater run-off water from the surrounding areas within the Project site and then to be channelled to the nearest sediment basin before released into tributaries of Sg. Dol then eventually flow into Sg.Paka, especially during the construction stage and also theoperational stage.

Installation of Crusher and other Construction of Buildings

Construction of structures shall be a major activity during the construction stage of the Project. In view of the nature of structures to be constructed, foundation works shall be an important aspect of the activity. Appropriate foundation shall be designed based on the geotechnical investigation carried out. Pilling works shall most likely be involved in the foundation work.

Overburden Removal

Overburden removal is the initial stage of a quarrying operation where soil and other 'unwanted' materials are removed to expose the rock outcrop. Hydraulic excavators and tipper lorries are used in the overburden removal exercise. In this Project, the estimated stripping ratio between overburden and rock is about 1:18. The excavated overburden is stockpiled within the Project area as shown in **Appendix 5-1**, where it can be used for filling depressions and levelling within the Project site.

Construction of Haulage Road and Working Platform

The initial development of the quarry involved the construction of an access road to the quarry face. Upon completion of the access road, the construction of production platforms and benches shall follow. Construction of access/haulage road and production platform shall take about 3-4 months to complete. Working platform need to be well-developed before any commercial productions may start.

Constructions of Sediment Basins

A sediment basin is a structure formed by excavation and/or construction of an embankment across a waterway or other suitable location. Its purpose is to collect and store sediment from run-off water within the Project sites which flow through earth drains/ outfall drains before entering the sediment basin. The water from sediment basin will be retained to use for suppression of dust from the proposed crushing plant and regular water browser to spray road.

Suitable sediment basin in the form of a simple sediment basin shall be constructed at identified suitable locations within the Project area. Detailed elaboration on the principle and calculation of a sediment basin design by taking into consideration all relevant site factors of the Project area shall be discussed in **Para 5.9.2** and **Appendix 5-2** (Land-Disturbing Pollution Prevention and Mitigation Measures, LD-P2M2). These sediment basin had been designed to cater 100 years of Average Recurrence Interval (ARI) according to Urban Stormwater Management Manual for Malaysia (Manual Saliran Mesra Alam 2) 2012 produced by Department of Irrigation and Drainage, Malaysia.

Managing Solid Waste on the Project Site

Waste management shall mainly involve the disposal of vegetative residues/ cut vegetation, excavated materials, general refuse, construction wastes and hazardous wastes.

Creation of buffer zone

An adequate buffer zone of 10-20m from the boundary along the perimeter of Project site shall be reserved as well.

Operational Stage

The quarry scheme plan to be implemented is shown in **Appendix 5-1**. When fully operational, it is proposed that the quarry production shall be operated by utilising at least 2 quarry benches at one time. The reserve of this quarry is situated on a slope of a hill, staging is achieved by extracting from successive benches and terraces, commencing from the top of the hill towards its bottom. The quarry has been planned to progress down the hill creating an open-pit quarry, forming a series of benches of 12 to 15 meter in height and 9 to 10 meter in width. The extraction works shall be subdivided into two (2) phases to minimise impacts towards the surrounding environment. The main activities involved in the production stage of a quarry are related to rock excavation, transportation and processing. Details of the activities are elaborated in **Para 5.6.4** and **Para 5.6.5** of this report.

Abandonment

Under the unforeseen event of abandonment, planned and orderly removal and disposal of various plants, structures and facilities shall be required. However, restoration or rehabilitation plans for Project site after the cessation of Project operation shall be carried out progressively. Abandonment of the Project would hamper the Proponent's programmes to supply quarry products to their clients and capture part of the expanding market.

The life span of a Project shall depend on the available amount of granite reserve and the quarry product market demand. With the rock reserve available and the quantum of investment required, the quarry shall be in operation for at least 7 years. It is favourable that the abandoned site may probably be developed for residential, commercial or industrial purposes in the future.

Experience showed that the potential for environmental disturbance continues even after a quarry has ceased operation permanently. Its degree of disturbance decreases as the areas concerned is returned to its natural form. Remedial measures in the form of restoration and rehabilitation of the area are indeed necessary to be initiated in order to expedite this process of naturalisation. Incorporation of these measures into the planning of the quarry developments is therefore vital. The quarry management has therefore planned to incorporate the element of reclamation and restoration process into their overall long-term plan of the quarry. In short, the restoration will be carried out progressively and concurrently with the quarrying operation itself.

5.6.2 QUARRYING OPERATION

The proposed quarry scheme plan to be implemented is as shown in **Appendix 5-1.** It is basically consists of proposed working benches, crusher plant, stockpile area, overburden dumping area and other infrastructure necessary for the quarry operation.

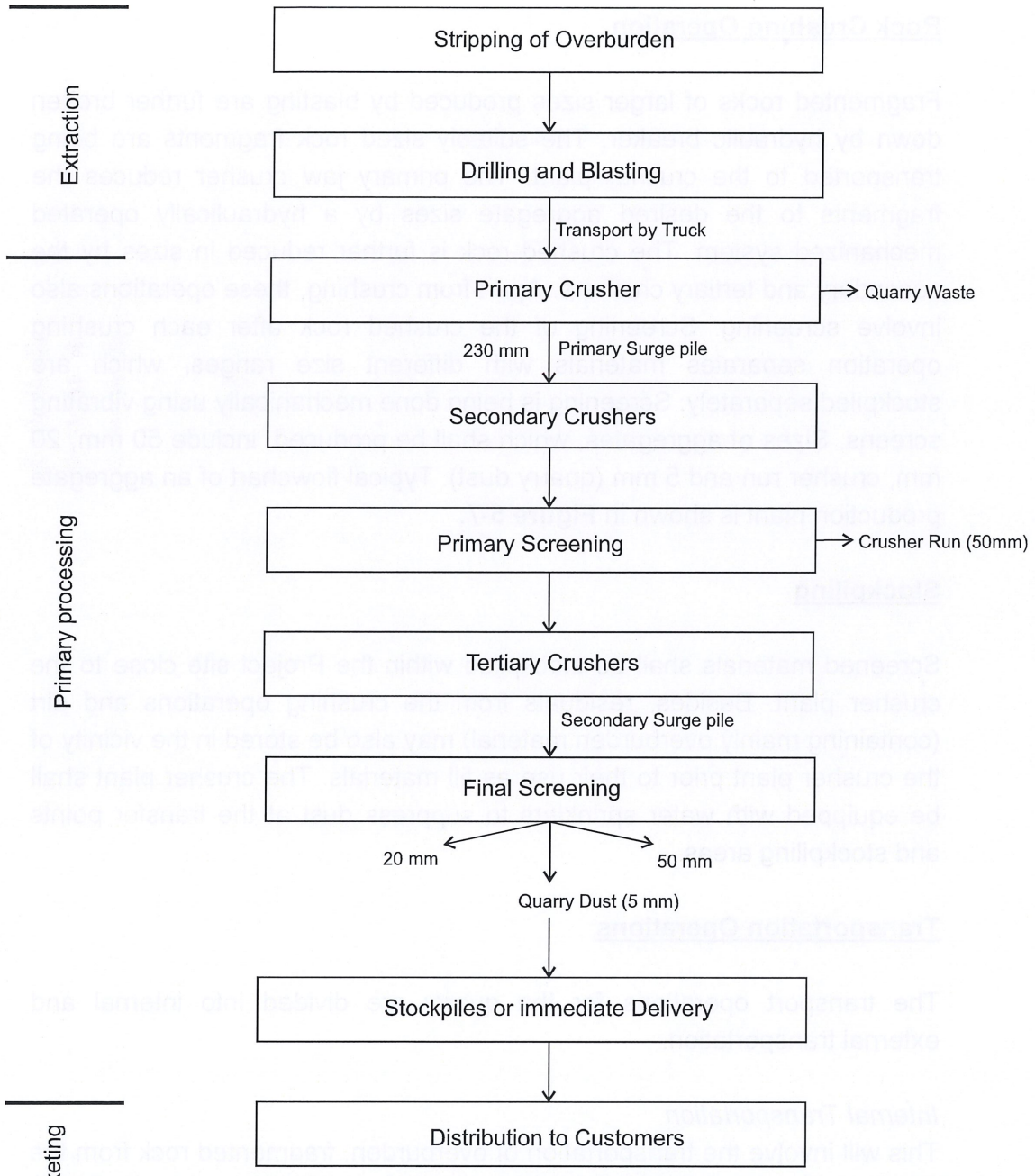
Initially, the first phase of quarrying operation shall be located at 100 m elevation, covering an area of 2.7049 ha (6.684 ac). The final floor level proposed is at 5 m elevation. As the reserve of this quarry is situated on a high wall, staging is achieved by extracting from successive benches and terraces, commencing at the top of the hill and moving towards its bottom, creating a hillside quarry. The quarry shall be planned to progress down the hill forming a series of benches of about 12-15 meter in height and 9-10 meter in width.

Consideration has also been given in the overall planning of the quarry to permit drilling and blasting operation being carried out without the operation interfering with the loading and clearing up of material. The benches are also planned in such a way that they are of sufficient width to allow safe working space. The main activities involved in the production stage of a quarry are related to rock excavation, transportation and processing.

The main activities involved in the production stage of a quarry are related to rock excavation, transportation and processing. **Figure 5-6** presents the flowchart of the overall quarrying operation.

Rock Excavation Operation

Rock blasting shall be the main activity in the rock excavation operation at the quarry. In view of the capacity of the proposed production, blasting shall be planned and scheduled accordingly. Detail blast designs pertaining to the proposed rock excavation operation at the quarry shall be elaborated in **Para 5.6.3**.



HEXATREND QUARRY SDN. BHD.	KenEp Consultancy & Services
Figure 5-6 FLOW CHART OF THE OVERALL QUARRY OPERATION	Report Ref.: KCS/HQ/472-EIA-0119-2505-R1 Not to Scale

Rock Crushing Operation

Fragmented rocks of larger sizes produced by blasting are further broken down by hydraulic breaker. The suitably sized rock fragments are being transported to the crusher plant. The primary jaw crusher reduces the fragments to the desired aggregate sizes by a hydraulically operated mechanized system. The crushed rock is further reduced in sizes by the secondary and tertiary crushers. Apart from crushing, these operations also involve screening. Screening of the crushed rock after each crushing operation separates materials with different size ranges, which are stockpiled separately. Screening is being done mechanically using vibrating screens. Sizes of aggregates, which shall be produced, include 50 mm, 20 mm, crusher run and 5 mm (quarry dust). Typical flowchart of an aggregate production plant is shown in **Figure 5-7.**

Stockpiling

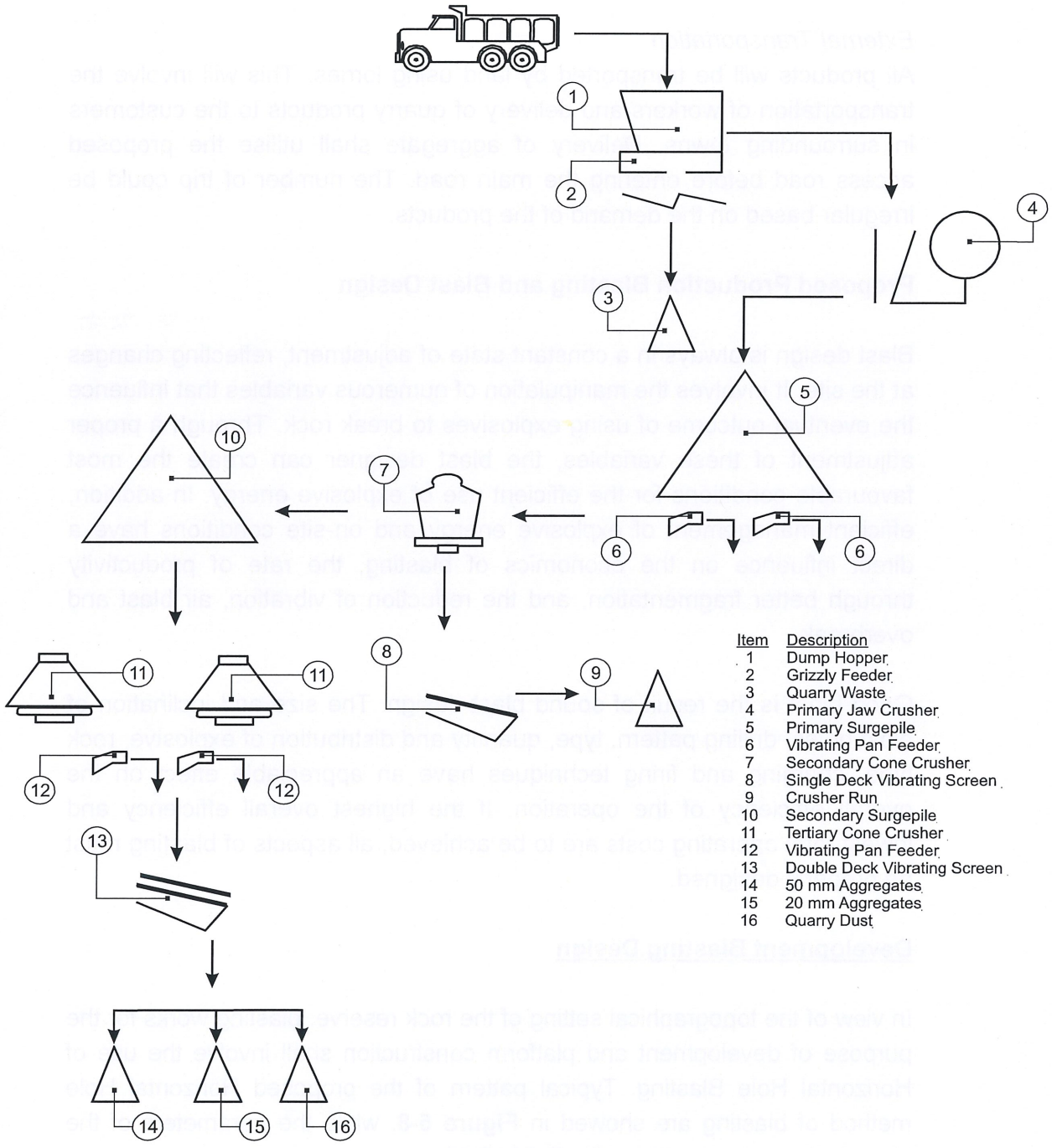
Screened materials shall be stockpiled within the Project site close to the crusher plant. Besides, residuals from the crushing operations and dirt (containing mainly overburden material) may also be stored in the vicinity of the crusher plant prior to their use as fill materials. The crusher plant shall be equipped with water sprinklers to suppress dust at the transfer points and stockpiling areas.

Transportation Operations

The transport operations for the quarry are divided into internal and external transportation.

Internal Transportation

This will involve the transportation of overburden, fragmented rock from the working areas to the dumping area and crusher plant, respectively. About 58 trips of lorry are required daily to transport the blasted rock from the quarry face to the crusher plant with 5 units of lorries. This is based on aggregate production of 80,000 TPM with the crusher plant's capacity (240TPH) using 10-tonne trucks working 28 days per month. The internal road shall also be used to transport all the quarry products to the stockpile areas.



Item	Description
1	Dump Hopper
2	Grizzly Feeder
3	Quarry Waste
4	Primary Jaw Crusher
5	Primary Surgepile
6	Vibrating Pan Feeder
7	Secondary Cone Crusher
8	Single Deck Vibrating Screen
9	Crusher Run
10	Secondary Surgepile
11	Tertiary Cone Crusher
12	Vibrating Pan Feeder
13	Double Deck Vibrating Screen
14	50 mm Aggregates
15	20 mm Aggregates
16	Quarry Dust

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Figure 5-7 FLOW CHART OF THE PRODUCTION PLANT	Report Ref.: KCS/HQ/472-EIA-0119-2505-R1 Not to Scale

External Transportation

All products will be transported by land using lorries. This will involve the transportation of workers and delivery of quarry products to the customers in surrounding towns. Delivery of aggregate shall utilise the proposed access road before entering the main road. The number of trip could be irregular based on the demand of the products.

Proposed Production Blasting and Blast Design

Blast design is always in a constant state of adjustment, reflecting changes at the site. It involves the manipulation of numerous variables that influence the eventual outcome of using explosives to break rock. Through a proper adjustment of these variables, the blast designer can create the most favourable conditions for the efficient use of explosive energy. In addition, efficient management of explosive energy and on-site conditions have a direct influence on the economics of blasting, the rate of productivity through better fragmentation, and the reduction of vibration, air blast and overbreak.

Good blast is the result of sound blast design. The size and inclination of blast holes, drilling pattern, type, quantity and distribution of explosive, rock type, charging and firing techniques have an appreciable effect on the overall efficiency of the operation. If the highest overall efficiency and lowest total operating costs are to be achieved, all aspects of blasting must be properly designed.

Development Blasting Design

In view of the topographical setting of the rock reserve, blasting works for the purpose of development and platform construction shall involve the use of Horizontal Hole Blasting. Typical pattern of the proposed Horizontal Hole method of blasting are showed in **Figure 5-8**, while the parameters of the blast design are summarized in **Table 5-10**.

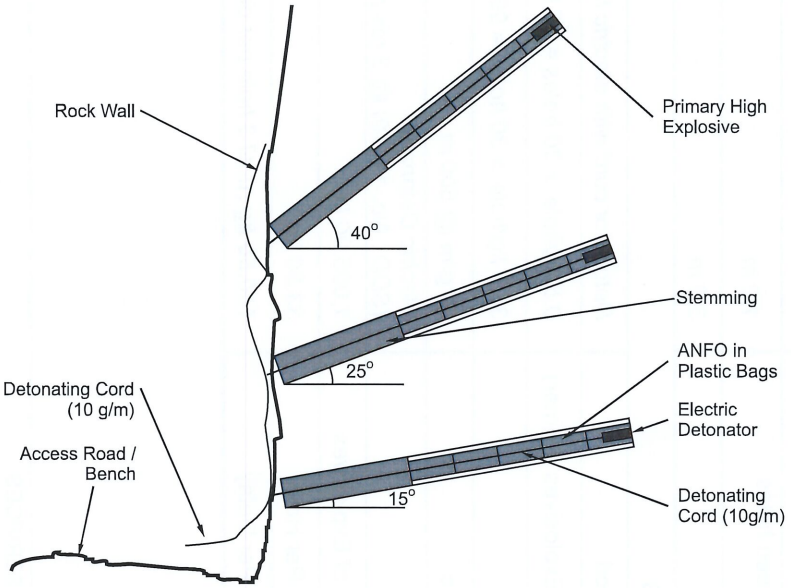
This method of blasting operation is necessary, as the normal vertical blast hole method is not possible due to the topographical constraints of the Project site. A relatively flat platform may be produced utilizing the above method which subsequently will enable vertical hole method of blasting be carried out.

The result of a Horizontal Hole method of blasting is normally difficult to predict. Rock fragmentation may vary from average to poor with the degree of boulders amounting to 25 % - 35 %. Depending on the height of the slope to be blasted, horizontal hole blasting may also generate overhanging of rock. It is therefore vital on the part of the quarry operator to 'clean up' the over-hanging rock or any loose rock from the new quarry face before any further rock extraction works may proceed.

Table 5-10: Typical Horizontal Hole Blast Design Parameters

Parameters	Specification
Area	*PT 23066 & PT 23741*
Rock Type	*Granite*
Blasting Time	*12.00 pm – 4.00 pm*
BLAST HOLES	
No. of Holes	*30 holes*
Rows	*3 rows @ 10 / 10 / 10*
Depth of Holes	*12.0 / 12.9 / 15.2 meters*
Diameter of Holes	*76 mm with PVC pipe 50 mm*
Inclination of Holes	*15° / 25° / 40°*
Distance between the hole (vertical)	*0.6 m*
Distance between holes (horizontal)	*1.2 m*
Stemming	*3.0 m*
EXPLOSIVES	
Initiation Method	*Detonator cord with electric initiation*
Primary High Explosives (Primer)	*0.5 kg/hole x 30 holes = 15.0 kg*
ANFO	*33.0 kg/hole x 30 holes = 990.0 kg*
Detonator Cord	*10 g/m @ 500 m*
Detonator	*Electric Detonator (SDD : No. 1 – 10) @ 3 rds per one number*
Total Quantity of Explosives	*1,005.00 kg*
Average Load Per Hole	*33.50 kg*
Average Load Per Delay	***100.50 kg** (until 3 hole per delay)*

SIDE VIEW
Charging of Blasthole



Legend

○ = Blasthole
1 = Electric Detonator Number

FRONT VIEW
Position of Blasthole

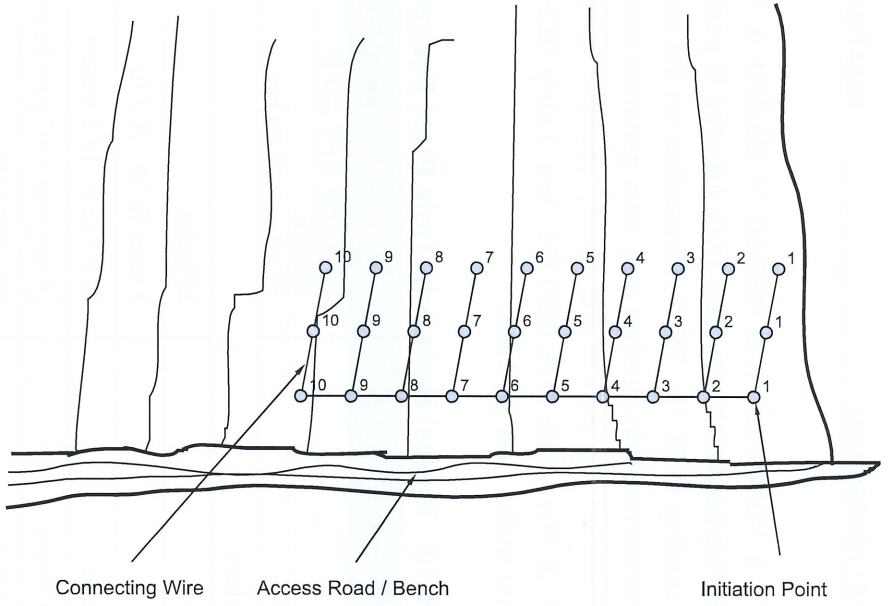


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Figure 5-8

TYPICAL PATTERN OF THE HORIZONTAL HOLE BLASTING

KENEP CONSULTANCY & SERVICES

Report Ref. : KCS/HQ/472-EIA-0119-2505-R1

No to Scale

Proposed Production Blast Design

Multi-rows with staggered initiation system blast design shall be used in the primary production blasting at the quarry. The firing pattern as typically shown in **Figure 5-9** is for NONEL system (Initiation method) is designed to give each blastholes a free breakage. The proposed production blast design parameters are as shown in **Table 5-11**.

The drilling of rock is done according to the drilling pattern designed for the Project. The rectangular drilling pattern is being used, as it is easy to mark out. However, it will be adjusted depending among others on the following factors:

- Structural characteristics of the rock
- Blast ability of the rock
- Choice of the hole size
- Bench height

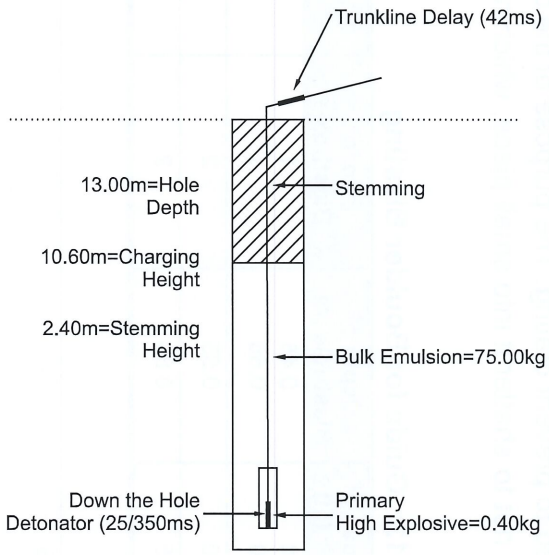
Secondary Blasting

Certain percentage of oversize rock which shall be produced during blasting operation and also the existence of natural boulders at the Project site create the necessity for secondary blasting to be carried out. **Table 5-12** gives a guide for boulder blasting to be adopted at the Project site while typical pattern of boulder blasting is shown in **Figure 5-10.** In boulder blasting, the blastholes should be drilled into near centre of the boulder and there should not be areas where the rock thickness is too thin. The blastholes are stemmed to prevent crating. The purpose of the blasting is to crack the boulder and not to shatter it into small piece, which may become flying projectiles.

Table 5-12: Guide for Boulder Blasting

Size of Boulder (m^3)	Thickness of boulder (m)	Depth of Blasthole (m)	No. of Blastholes	Charge (kg/hole)
0.5	0.8	0.45	1	0.03
1.0	1.0	0.55	1	0.06
2.0	1.0	0.55	2	0.06
3.0	1.5	0.80	2	0.09

SIDE VIEW
Charging of Blasthole



Bench Height=12.00m

NONEL Detonator=50 rds (25/350ms)

Trunkline Delay=4 rds (42ms)

Blast Sequence=1 hole per delay

Legend

NONEL Detonator (25/350ms)

Trunkline Delay (42ms)

(25) Timing

PLAN VIEW
Position of Blasthole

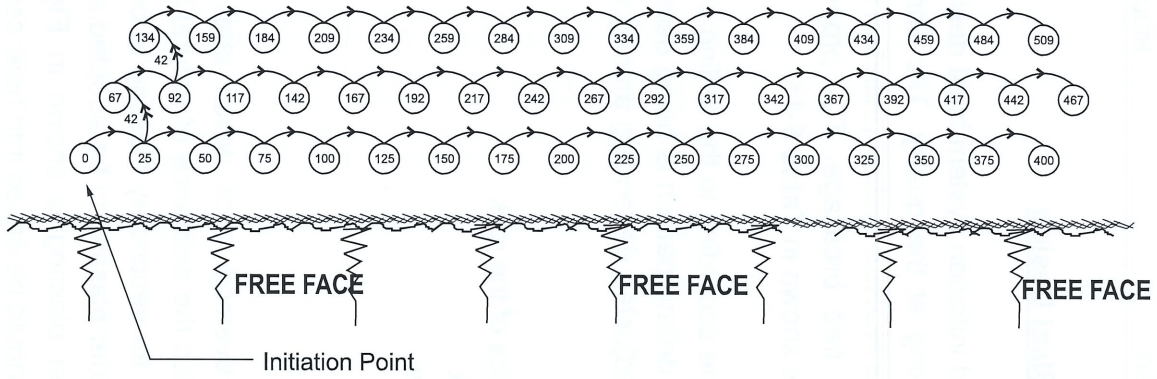


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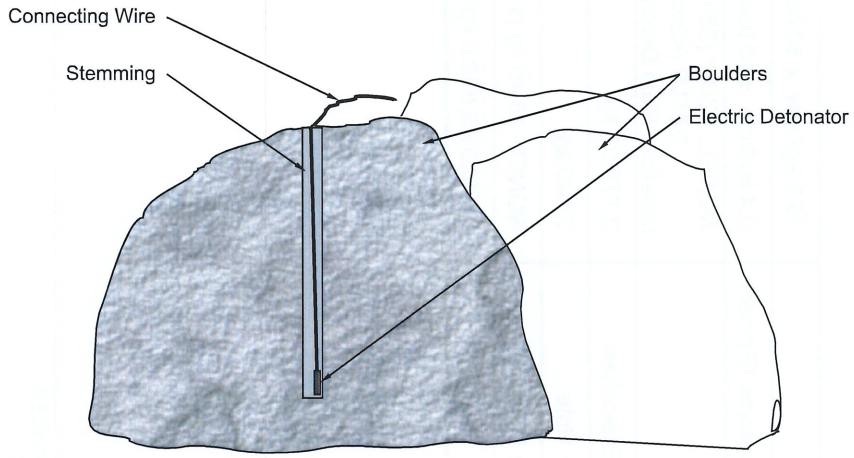
Figure 5-9 TYPICAL PATTERN OF THE PRODUCTION BLASTING (NONEL INITIATION SYSTEM)	Report Ref.: KCS/HQ/472-EIA-0119-2505-R1 WITHOUT SCALE

Table 5-11: Proposed Production Blast Design Parameters

Parameters	Specification
PRODUCTIONS	
Volume Per Blast	*6,630.0 m^3*
Tonnage Per Blast	*17,238 tonnes*
No. of Blast Per Month	*Four (4) per month*
BLAST HOLES	
Initiation Method	*NONEL*
Depth of Holes	*13.0 meters*
No. of Holes	*50 holes*
Diameter of Holes	*89 mm*
Inclination of Holes	*85°*
Rows	*3 rows @ 17 / 17 / 16*
Spacing	*3.0 meters*
Burden	*2.4 meters*
Subdrill	*1.0 meters*
Stemming	*2.4 meters*
EXPLOSIVES	
Bulk Emulsion	*75.0 kg/hole x 50 holes = 3,750.00 kg*
Primary High Explosives (Primer)	*0.4 kg/hole x 50 holes =20.00 kg*
Detonator	*NONEL: EZDet (25ms) @ 50 rds* *EZTLD (42ms) @ 2 rds* *Initiation: Plain Detonator @ 1 rds*
Total Quantity of Explosives	*3,770.00 kg*
Average Load Per Hole	*75.40 kg*
Average Load Per Delay	*NONEL: 75.40 kg (1 hole per delay)*
Powder Factor	*3,770.0 / 6,630.0 kg/m^3= 0.60 kg/m^3*

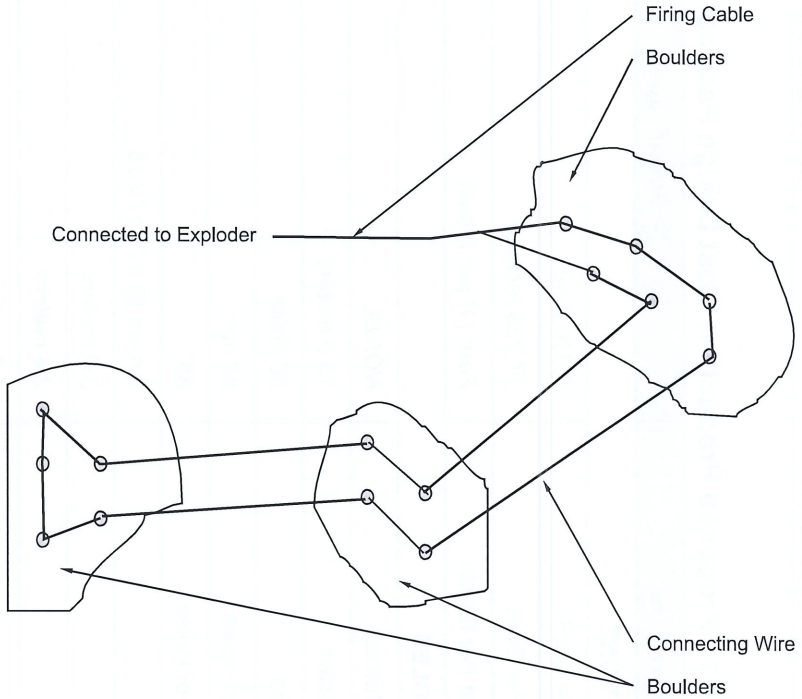
SIDE VIEW
Charging of Blasthole



Legend

○ = Blasthole

PLAN VIEW
Position of Blasthole



HEXATREND QUARRY SDN. BHD.

Figure 5-10

TYPICAL PATTERN OF THE BOULDER BLASTING

KENEP CONSULTANCY & SERVICES

Report Ref. : KCS/HQ/472-EIA-0119-2505-R1

Not to Scale

Explosive Storage and Handling

Explosives and all its accessories are safe to handle when they are properly treated. As explosive are perishable materials, they need to be handled properly, stored in the proper magazine and consumed in a proper manner. Other than the existing law and regulations enforced pertaining to the safe handling, storing and transportation of explosives (Explosives Acts, 1957 and Rules, 1923), there are many publications and literature dealing with the matter in detail. This information will be very useful in updating the knowledge of the personnel involved in the handling of the explosives in the quarries.

The Project Proponent does not have its own magazine. Explosives therefore need to be bought early in the morning of the blasting day from Tenaga Kimia Sdn. Bhd. or other explosive supplier. The handling, transportation and management of the explosives in the proposed quarry would be under the responsibility of the quarry shotfirer, registered with the Department of Minerals and Geoscience and Polis Diraja Malaysia.

Shotfirer

The handling, transportation and management of the explosives in the quarry shall be under the responsibility of a shotfirer registered with the Department of Minerals and Geoscience. Appointment of such shotfirer shall be made by the Project Proponent. Blasting accessories to be consumed per blast by the quarry are as listed in **Table 5-13**.

Table 5-13: Estimated Maximum Consumption of Explosive per Blast

Items	Quantity
❑ Primary High Explosives (Primer)	15.0 kg + 20 kg = 35 kg
❑ Detonator, NONEL	50 rds + 2 rds +1 rds = 53 rds
❑ Bulk Emulsion	3,750 kg
❑ ANFO	990 kg

5.6.3 ENVIRONMENTAL CONTROL SYSTEM

Overall environmental control management at the quarry are elaborated in detail in **Chapter 6**. However, for easy references, some of the prominent practices implemented at the quarry are highlighted in this section.

Overburden Stockpile Area

The overburden material containing mainly of clay shall be stockpiled in a suitable designated dumping area. The capacity of the dumping area is capable of storing the expected volume of overburden materials to be removed from one particular area. For the purpose of this report, the capacity of dry dumping areas have been identified and shall be adequate to cater for the expected volume of overburden generated at least for the first year of operation.

As the operation progress, new dumping area near the working areas shall be identified. As far as dumping area is concerned, no problem shall be envisaged, as suitable areas are readily available. A summary to illustrate the size and capacity of dry dumping area planned for the quarry is shown in **Table 5-14**.

Table 5-14: Estimation of Dry Dumping Capacity

Parameter	Data
Quarrying Rate	
❑ Tonnage (Ton per Month)	**80,000**
❑ Density for Granite (kg/m^3)	**2.60**
❑ Volume (m^3 per Month)	30,769
Overburden	
❑ Stripping Ratio (Overburden : Rock)	1 : 18
❑ Overburden (m^3 per Month)	1709.39
Dumping Area	
❑ Area (ha →m^2)	1.3 ha x 10,000 = 13,000 m^2
❑ Average Height (m)	10
❑ Dumping Capacity (m^3)	130,000
❑ Expected Life (Month)	76 months

Construction of Sediment Basin

Runoff discharging from the Project site, which is sediment laden, should be passed through sediment basin. Suitable sediment basin in the form of simple sediment basin as shown in **Appendix 5-2** will be constructed at suitable locations within the Project site. The principle and calculation of a sediment basin design by taking into consideration all relevant site factors of a Project area is also enclosed.

Managing Waste at the Project Site

Overall waste and environmental management of the Project are elaborated in detail in appropriate sections in **Chapter 8**. Since these activities help to get rid of wastes and debris resulted from other activities, they may be construed as a mitigation measure. However, they may cause some adverse environmental impacts themselves and shall be targeted for proper execution. For easy references, some of the prominent practices which shall be implemented during various stages of the Project implementations are highlighted in this section.

Cut Vegetation

Cut vegetation shall be generated during site clearing and shall consist of tree trunks, branches, shrubs and green vegetative material. The Project site comprises open areas with isolated trees and shrubs. Quantities of cut vegetation are expected to be easily manageable.

Cut vegetation has the potential to be a fire risk unless properly managed. The preferred disposal route for this type of material is for the extraction of wood for use in the relevant industry; large stumps shall require on-site transport for disposal at dump sites. Wherever practicable, green vegetation, small branches and other organic materials shall be disposed of via mulching / composting in a suitable area within the site. The disposal of cut vegetation by open burning shall not be permitted.

Based on the site investigation carried out, the average biomass estimated on site is 1.24 ton/hectare

Total affected area	=	13.4862 hectares
Biomass estimated to be cleared	=	13.4862 hectares x 1.24 ton/hectare
	=	16.723 ton

Excavated Materials

Excavated materials from site formation, earthworks etc. shall consist primarily of soils, sand, organic matter (eg material from swamp areas) and broken ore body / gravels. It is expected that the majority of these materials shall be reused on the site in forming the elevated site base level. All suitable excavated material shall be required for onsite fill / structural purposes. Associated impacts are expected to be negligible.

General Refuse

The construction site, with its large number of workers, offices and shall generate a variety of types of general refuse including food waste, paper wastes, packaging materials (e.g. plastic bags, plastic sheeting etc), and plastic / metal cans and containers. The storage and handling of general refuse has the potential to give rise to a variety of adverse impacts. These include odour problems if the waste is not collected regularly (daily); windblown litter; water quality impacts if waste enters water courses; visual impacts; and attraction of pests, disease vectors and scavenging animals (insects, rodents etc.) to the site if waste materials are incorrectly stored or allowed to accumulate on-site.

The disposal of these types of waste at sites other than approved landfills can also lead to similar impacts at the disposal sites. General wastes must be kept segregated and reused or recycled wherever possible. Appropriate storage areas for waste must be designated. Wastes should be collected on a daily basis by reputable contractors for disposal by appropriate methods at appropriate sites.

Construction Wastes

Construction waste shall consist of unwanted materials generated during construction works including rejected structures and materials, materials that have been over ordered or are surplus to requirements and materials that have been used and discarded. Construction type wastes shall arise from a number of different activities carried out by the Contractor during construction and maintenance activities. The disposal of construction waste is unlikely to raise any long-term concerns due to the inert nature of these types of materials. However, it is good practice to segregate different categories of construction waste at source to facilitate recycling / disposal. Inert materials (eg broken concrete, waste concrete etc.) should be used as structural fill wherever possible.

The generation of construction wastes should be minimized through careful control of materials ordering procedures to avoid the purchase of surplus materials. Scrap metals, aluminium, wood, paper, and plastic should be sent for recycling. Materials which cannot be reused or recycled should be sent for disposal at an appropriate site by a reputable contractor.

Hazardous Wastes

Hazardous type wastes can pose serious environmental and health / safety hazards unless they are handled, stored, transported and disposed of in an appropriate manner at suitable sites (prescribed premises) by competent personnel (contractor) as stipulated under Environmental Quality (Scheduled Wastes) Regulations, 2005. Provided that any hazardous wastes generated from the construction activities are stored, transported and disposed in accordance with regulations and appropriate measures, then associated impacts should be minor. Scheduled waste such as used oil or material contaminated with used oil will be produced due to maintenance of equipment and machinery at Project site. Thus, scheduled waste generated onsite which are SW305 (used lubricant oil), SW306 (spent hydraulic oil) and SW 409 (empty contaminated containers) will be stored at proposed scheduled waste store. The storage area shall compliance with the specification set by the relevant authority. After that, the scheduled waste will be collected by DOE approved licensed contractor within 180 days.