



CHAPTER 4
PROJECT OPTIONS

— KenEp Consultancy & Services

CHAPTER 4

4.1 PROJECT OPTION

This chapter shall discuss project options including the advantages and disadvantages from the perspective of technical, economic, social, and environmental aspects of the following alternatives.

- Site Options- Refer **Section i**
- Project Options (including “no project option”, and “scaled-down project option”)- Refer **Section ii**
- Technology Options- Refer **Section iii**
- Raw Materials Options- Not Relevant for Quarry Operation
- Construction Method Options- Not Relevant for Quarry Project
- Layout Options – Refer **Section iv**
- Alignment Options- Not Relevant for Quarry Project
- Operation Options- Refer **Section v**

(i) Site Options

According to “*Pelan Guna Tanah Semasa Dungun 2019*”, the proposed project site is located within forestry zone (Refer **Figure 1-3a**). Referring to **Figure 1-3b**, “*Rancangan Tempatan Daerah Dungun 2035*”, the proposed project area is fall within Blok Perancangan 2 Kuala Paka (BP 2), which is zoned for forestry area. The Project site is immediately surrounded by secondary forest. No resident located within 500m radius. 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.

Quarry operation is resources based industrial. There is no alternative sites are examined. The project is site specific.

A multi-year aggregate exploration and reconnaissance program was undertaken by the Proponent to investigate potential quarry sites in the. The following technical criteria were evaluated for potential sites:

- Geological resource suitability;
- Size and availability of the site;
- Proximity to deep, ice free, sheltered water;
- Engineering feasibility;
- Presence or potential for environmental constraints such as species at risk
- Zoning, proximity to residential development and existing transportation networks;
- Economic diversity and sustainability; and
- Presence or potential for unique heritage resources.

Because granite is a high-bulk low-cost and quality concern commodity, the cost of transportation can easily exceed the price of the granite. The capital of the quarry can be profitable if the source is located immediately adjacent to the enduser.

Insofar as no other economically viable sites were identified, the key valued component (VC) affected by an alternate location would be Local Economy, Land and Resource Use. Alternate Project sites would presumably also impact other VCs related to the natural and human environment.

The key technical criteria which led to the selection of the Quarry Project site are:

- Availability of high quality, large tonnage, fine-to-medium grained, homogenous granite that meets or exceeds all of the necessary physical and chemical requirements.
- Proximity to existing logistical support, such as North South Highway; and,
- Appropriate zoning with no fundamental environmental or regulatory constraints, based on a preliminary review.

(ii) Project Option

There are two realistic options that need to be considered which are with Project option and without Project option in the assessment of development options, some possible criteria that may be considered include the following aspects:-

- ✓ Environmental acceptability
- ✓ Landuse compatibility
- ✓ Relevance to the Government's policies, plans and strategies
- ✓ Social and economic value

The merits and demerits of the two competing options are discussed below;

"With Project" Option

The option to carry out the Project will involve the proposed granite quarry operation PT 23066 and Lot PT 23741 with an area of 13.4862 Hectares (33.325 Acres) Mukim Kuala Paka, District of Dungun, Terengganu Darul Iman. The pros and cons of this option will be discussed here under the following criteria:

Environmental Acceptability

The Project site is immediately surrounded by secondary forest. No resident located within 500m radius. No resident located within 500m radius. The nearest receptors are Kampung Tebing Tembah which situated about 750m western and Kampung Baharu and Kampung Kongsu 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. Thus, the proposed quarry activity is compatible with the existing surrounding environment.

For the hydrological impact, during the development phase, the highest peak flow for Sungai Dol catchment is 6.61 m³/s for Hexatrend Quarry and 27.26 m³/s for others project corresponding to 25.7% increment due to contribution area of surrounding project which is estimated 61 hectares. Volumetric flowrate / carrying capacity at downstream of Sungai Dol is estimated at 651 m³/s. This value is higher than the estimated peak discharge of each project catchment during the development phase. Volumetric flowrates / carrying capacity at downstream of Sungai Dol are higher than the estimated peak discharge during the development phase. Hence, flash flooding at downstream the rivers are not expected. Nevertheless, the impact could be considerably minimized via mitigation measures as recommended as in the following **Appendix 7-2**.

The natural biological resources at the surrounding area had been greatly disturbed by existing quarry activity located adjacent to the proposed project area which is Paka Kuari Sdn. Bhd. and 1.0km northern from the proposed project area which is Hardy Builder Sdn. Bhd.. Thus, there is no significant biological habitat in this area as the habitat for wildlife and primary vegetation has been disturbed by surrounded approved quarry activities. Large wildlife has long vanished and the common fauna found are those that can co-exist with man.

Furthermore, the estimated soil losses for the worst-case scenario were based on the assumptions that the vegetation was cleared and the soil left exposed for extended period of time. However, it must be recognised that the worst-case scenario is only hypothetical, and the situation is most unlikely to happen. Firstly, the clearing and earthworks is minimal with the only concern is during the construction of haulage road to the quarry face platform. Then rock extraction works shall be carried out within the face itself. Even if the site were abandoned halfway through the site preparation stage, the cleared area would soon be colonised and covered by the pioneer vegetation. If the Project is progressing as planned, there will be no soil or loose materials to erode along the slope as the area shall be retained as green-belting.

Hence, the proposed Project is designed such a way to reserve buffer area and proposed Best Management Practices (BMP) to be implemented onsite, thus the vibration, air, water and noise pollution from the Project may slightly be significant but their impact is ameliorated.

Landuse Compatibility

According to "*Pelan Guna Tanah Semasa Dungun 2019*", the proposed project site is located within forestry zone (Refer **Figure 1-3a**). Referring to **Figure 1-3b**, "*Rancangan Tempatan Daerah Dungun 2035*", the proposed project area is fall within Blok Perancangan 2 Kuala Paka (BP 2), which is zoned for forestry area. The Project site is immediately surrounded by secondary forest.

No resident located within 500m radius. The nearest receptors are Kampung Tebing Tembah which situated about 750m western and Kampung Baharu and Kampung Kongsu 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 proposed quarry operation is seen to be compatible with the existing landuse.

Project proponent had submitted the application to *Majlis Perbandaran Dungun (MPD)* regards the zoning status. As mentioned in the MPD letter, land can be developed as quarry activity with term and conditions. Letter from *Majlis Perbandaran Dungun (MPD)* is attached in **Appendix 1-2** (Ref: MPD.08/01/2/88 (6) dated on 13 February 2019).

Moreover, Project proponent had submitted the application to *Jabatan Perancang Bandar Dan Desa (JPBD) Negeri Terengganu* regards the zoning status. As mentioned in the JPBD letter, the proposed Project site is gazette under *Perhutanan, Rancangan Tempatan Daerah Dungun (Penggantian) 2035* and the land can be developed as quarry activity. Letter from *Jabatan Perancang Bandar Dan Desa (JPBD) Negeri Terengganu* is attached in **Appendix 1-3** (Ref: JPBD.Tr.06/9372 (3) dated on 26 Jun 2018). Based on the comment from *Jabatan Perancang Bandar Dan Desa (JPBD) Negeri Terengganu*, the EIA has taken account those aspects by referred to the *Rancangan Fizikal Negara Ke-3* and *Rancangan Struktur Negeri Terengganu*.

Social-Economic Value

The proposed Project will provide employment and business opportunities and improvement in amenities and utilities. Thus it will be positive if the area is being developed with the care and steps being carried out. If the area is undeveloped, no investment shall be made in the area. Thus will incur a loss of employment and business opportunities to the local people.

‘No Project’ Option

‘No Project’ option is normally considered when there is a need to preserve the environment of a particular area.

Under the “No Project” option, no further development will be carried out within the proposed Project site. The land will be left under its present conditions. The secured demand for aggregates could not be met. There shall be loss of opportunities to extract the rock reserve and market the abundant rock resources from the site and also other economic benefits.

Based on the development schedule and the demand for the rocks products in the region, it is unlikely the Project Proponent would consider aborting the Project after securing potential market. With due consideration to the above stated needs, a 'No Project' option at this stage is therefore not likely, nor recommended.

Evaluation

The 'No Project' option, if adopted, will incur significant opportunity loss when compared to the 'With Project' option. The evaluation of the Project options is shown in **Table 4-1**.

Table 4-1: Evaluation of the Project Options

Criteria	With Project Option	Without Project Option
Government Strategy	(+)	(-)
Land use Compatibility	(+)	(-)
Environmental Acceptability	(-)	(+)
Socio-economic Acceptability	(+)	(-)
Marketability	(+)	(-)

- + = positive option
- = negative option

Furthermore, referring to the National Mineral Policy 2, Thrust 1, Expansion of the mineral sector, to enhance the mineral sector's contribution to the economy, the mineral sector needs to be expanded through: Recognizing the importance of quarry as the first landuse.

The justification of the Project option is based on the following:

Government Strategy

- Referring to National Mineral Policy 2, Thrust 1, Expansion of the mineral section, to enhance the mineral sector's contribution to the economy, the mineral sector needs to be expanded through: Recognizing the importance of quarry as the first landuse. It is in line with the government strategy.
- The proposed Project area is located within the forestry area. The Project site is immediately surrounded by secondary forest. Thus, it will be positive if the area is being developed.

- If undeveloped, the land shall be left under its present conditions. The secured demand for source of granite could not be met.
- Thus, the proposed project is positive to be developed.

Landuse compatibility

- According to "*Pelan Guna Tanah Semasa Dungun 2019*", the proposed project site is located within forestry zone (Refer **Figure 1-3a**). Referring to **Figure 1-3b**, "*Rancangan Tempatan Daerah Dungun 2035*", the proposed project area is fall within Blok Perancangan 2 Kuala Paka (BP 2), which is zoned for forestry area.
- No resident located within 500m radius. The nearest receptors are Kampung Tebing Tembah which situated about 750m western. Meanwhile, Kampung Baharu and Kampung Kongsu which are 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. Thus, the proposed quarry is compatible with the landuse.
- Project proponent had submitted the application to *Majlis Perbandaran Dungun (MPD)* regards the zoning status. As mentioned in the MPD letter, land can be developed as quarry activity with term and conditions. Letter from *Majlis Perbandaran Dungun (MPD)* is attached in **Appendix 1-2** (Ref: MPD.08/01/2/88 (6) dated on 13 February 2019).
- Moreover, Project proponent had submitted the application to *Jabatan Perancang Bandar Dan Desa (JPBD) Negeri Terengganu* regards the zoning status. As mentioned in the JPBD letter, the proposed Project site is gazette under *Perhutanan, Rancangan Tempatan Daerah Dungun (Penggantian) 2035* and the land can be developed as quarry activity. Letter from *Jabatan Perancang Bandar Dan Desa (JPBD) Negeri Terengganu* is attached in **Appendix 1-3** (Ref: JPBD.Tr.06/9372 (3) dated on 26 Jun 2019). Based on the comment from *Jabatan Perancang Bandar Dan Desa (JPBD) Negeri Terengganu*, the EIA has taken account those aspects by referred to the *Rancangan Fizikal Negara Ke-3* and *Rancangan Struktur Negeri Terengganu*.

Environmental Acceptability

- For the hydrological impact, during the development phase, the highest peak flow for Sungai Dol catchment is 6.61 m³/s for Hexatrend Quarry and 27.26 m³/s for others project corresponding to 25.7% increment due to contribution area of surrounding project which is estimated 61 hectares. Volumetric flowrate / carrying capacity at downstream of Sungai Dol is estimated at 651 m³/s. This value is higher than the estimated peak discharge of each project catchment during the development phase. Volumetric flowrates / carrying capacity at downstream of Sungai Dol are higher than the estimated peak discharge during the development phase. Hence, flash flooding at downstream the rivers are not expected. Nevertheless, the impact could be considerably minimized via mitigation measures as recommended as in the following **Appendix 7-2**.
- The natural biological resources at the surrounding area had been greatly disturbed by existing quarry activity located adjacent to the proposed project area which is Paka Kuari Sdn. Bhd. and 1.0km northern from the proposed project area which is Hardy Builder Sdn. Bhd.. Thus, there is no significant biological habitat in this area as the habitat for wildlife and primary vegetation has been disturbed by surrounded approved quarry activities. Large wildlife has long vanished and the common fauna found are those that can co-exist with man.
- Furthermore, the estimated soil losses for the worst-case scenario were based on the assumptions that the vegetation was cleared and the soil left exposed for extended period of time. However, it must be recognised that the worst-case scenario is only hypothetical, and the situation is most unlikely to happen. Firstly, the clearing and earthworks is minimal with the only concern is during the construction of haulage road to the quarry face platform. Then rock extraction works shall be carried out within the face itself. Even if the site were abandoned halfway through the site preparation stage, the cleared area would soon be colonised and covered by the pioneer vegetation. If the Project is progressing as planned, there will be no soil or loose materials to erode along the slope as the area shall be retained as green-belting.

- The proposed Project is designed such a way to reserve buffer area and carry out relevant mitigation measures, thus the vibration, air, noise, water pollution and etc. from the Project may be slightly significant but their impact is ameliorated. Thus, it is still environmentally acceptable if the area is being developed.

Socio-economic Acceptability

- The proposed Project will provide employment and business opportunities and improvement in amenities and utilities. Thus, it will be positive if the area is being developed with the care and steps being carried out.
- If the area is undeveloped, no investment shall be made in the area. Thus, will incur a loss of employment and business opportunities to the local people.

Marketability

- The Project will help maintain the market demand in the various industries.
- This Project will have a high multiplier effect on development in the state and country by creating business and job opportunities. Thus, it will be positive if the area is being developed.
- If the area is left undeveloped, it will lose the opportunities to extract and market the abundant natural resources within the site. It is a negative option if the area is left undeveloped.

(iii) Technology Options

Technical criteria to determine the feasibility of alternate extraction methods include simple practicality. Drilling and blasting is the proposed approach for material extraction from the Quarry. Alternative mechanical methods of rock extraction (e.g., ripping) are not practical or feasible due to the hard and dense characteristics of the granite. Therefore, there are no feasible alternatives to drilling and blasting as a means of extracting this material. The impact of the alternatives rock extraction methods would be similar in both cases: both methods would result in noise and particulate emissions to air.

The differences in these methods relative to noise and particulate emissions are that ripping involves the use of heavy equipment with hardened metal teeth that essentially scrapes into the rock from above and along the front wall face. The noise created during ripping would be extreme due to the fact that granite ripping would be a slow process and continuous, requiring multiple machines to generate the amount of material needed to feed the process. The ripping process also would be a continuous source of dust emissions.

In the case of drilling and blasting, the drilling process does not generate noise at such levels and the drill rigs include equipment to collect or reduce dust generated by drilling. Blasting is a very short duration event that is capable of generating ample amounts of stone to supply the plant; blasts only occur a few days a week at the most. Ultimately, the operation would not be economically feasible without the use of drilling and blasting.

(iv) Layout Option

The Bench Cut Haul Method concept (rock extraction from developed quarry benches), which is capable of producing large quantity of rock shall be adopted in quarrying of the reserve on the area since this is the most suitable method for the proposed quarry operation. This concept is safer and more environmental friendly. In order to minimize the area open at any one time and thus area exposed to erosion, staged extraction concept shall be adopted. This concept will also permit progressive rehabilitation whenever possible to be executed in the Project.

The direction of rock motion as a result of blasting operation will be planned in the proposed quarry in order to ensure that should any fly-rock generated from the blasting operation will not endanger any adjacent interests. In this particular case, attention must be drawn to ensure that the direction of the rock motion or the quarry face must be away from the sensitive areas.

Ideally, a buffer zone need to be created to ensure that there is always sufficient distance between rock excavation activity and other forms of development so that potentially conflicting land uses do not come into close proximity. The need is more demanding when we consider the impact of blasting on the surrounding especially on matters related to fly-rock generated from blasting operation.

(v) Operation Options

Based on production capacity, the proposed quarrying operation on the applied area is design to involve drilling of 89 mm diameter holes into the rocks and charging them with explosive to blast the rocks. The blast design shall be four (4) blasts per month. About 50 of blast holes have been proposed for NONEL initiation method. Some 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 50 mm, 20 mm, crusher run and 5 mm (quarry dust). Then, the products shall be transported out using lorries for marketing purposes. Meanwhile, 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 environmental friendly. The Bench Cut Haul Method concept is then further improved with pitting technique in order to minimize visual impact toward the surrounding.