

EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 Project Introduction

Batu Hitam Enterprise has planned to undertake the logging activity on the government land area with an area of approximately 60 hectares at Mukim Relai, Daerah Chiku, Jajahan Gua Musang, Kelantan Darul Naim with certain term and conditions. The project proponent has initially secured approval from Forestry Department Kelantan State through letter with the reference number: PHN.KN.195/3/1335 (55) dated 1 December 2011.

1.2 Statutory Requirement

The proposed logging project classified as a Prescribed Activity under Schedule 6(b) of the Environment Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 which states that *“Logging or conversion of forest land to other land use within the catchment area of reservoirs used for municipal water supply, irrigation or hydropower generation or in areas adjacent to state and national parks and national marine parks”* requires submission of Preliminary Environmental Impact Assessment report to the Department of Environment, Kelantan State for approval.

1.3 Objectives of the Environmental Impact Assessment (EIA) Study

- i. Provide requisite information and analysis to the Project Proponent for submission to the DOE and other relevant Government authorities on the extent and severity of short and long term potential environmental impacts which are likely to occur during every phases of the project development;
- ii. Review and identify the major environmental impacts that may result from project development;
- iii. Assess significant environmental impacts of the proposed development on the basis of information collected from existing sources and on supplementary information collected in the field;
- iv. Recommend practical and cost effective mitigation measures for those impacts that exceed acceptable levels or standards;
- v. Recommend environmental management and monitoring requirements for the project during development phase;
- vi. Discuss the environmental significance of potential residual impacts.

1.4 Study Approach

This report was adapted from DOE Handbook of Environmental Impact Assessment Guidelines (Fourth Edition, October 2007) and EIA Guidelines for Forestry Projects produced by DOE (First Edition, November 1998).

2.0 TITLE OF PROJECT

2.1 Project Title

The title of the proposed project is ***“Preliminary Environmental Impact Assessment (EIA) Study for the Proposed Logging Activities on 60 Hectares at Mukim Relai, Daerah Chiku, Jajahan Gua Musang, Kelantan Darul Naim”***.

2.2 Project Background

The proposed project is a logging activity on the government land and it was alienated to Batu Hitam Enterprise. In order to preserve the environment, project proponent shall develop the project area in stages to construct the access road, site office, temporary camp site and “Betau”.

3.0 PROJECT PROPONENT

The project proponent for this project is Batu Hitam Enterprise and Surawaki Environmental Sdn. Bhd. has been commissioned to prepare the Preliminary EIA Report.

4.0 STATEMENT OF NEEDS

The need to develop the proposed Logging Activities on 60 Hectares at Mukim Relai, Daerah Chiku, Jajahan Gua Musang, Kelantan Darul Naim is predicated on the following consideration:

- i. Contribution to the Economy**
 - The project is posed to increase the Malaysia’s economy through export of timber products.
- ii. Demand for Customer Product.**
 - The timber product is in line with customer needs such as wooden furniture and paper product.
- iii. Completing the Development of Malaysian Furniture Promotion Council (MFPC)**
 - The project is specially focused on the promotion of the furniture sector.

5.0 PROJECT OPTIONS AND SITE SELECTION

Two options are made available for selection, either to abandon it or to go ahead with development of the project which is:

- ‘No Project’ Option; and
- ‘With Project’ Option.

The ‘No Project’ Option where the development of the Project will not be undertaken. If no development, the project site will remain in its current state where existing vegetation will continue to grow.

The 'With Project' option where the reasons are predicated as follow:

i. Site Selection Option

The proposed project site under study is located at Mukim Relai on the region of Chiku District. Relai is considered as remote area and away from main stream development. Majority of the areas is still occupied by forest. Most population is living at Gua Musang town and some lives at Aring with limited source of income. Even there are few basic facilities available in the area, the conditions are considered still quite far behind compared to modern development.

ii. Social-economic Option

The best option would be to supply the Project with labour and materials locally as it will help the local economy and improve the social status of the local population.

iii. Environmental Option

The proposed project shall have minimal adverse impact to surrounding.

The justification in favour of the 'With Project' Option is based on the project can raise the socio-economic status of the Jajahan Gua Musang and state by providing better job opportunities for the local community.

Based on the above, the 'With Project' Option is recommended for this Project.

6.0 PROJECT DESCRIPTIONS

6.1 Project Location and Accessibility

The proposed logging project is located approximately 60 hectares at Mukim Relai, Daerah Chiku, Jajahan Gua Musang, Kelantan Darul Naim. The project site has been identified as a state government land and located within latitude 04°47.2'N to 04°48.2'N and longitude 102°19.7'E to 102°21'E (refer to Figure 6.1 and 6.2).

The project site is approximately about 100 meter northwest of Taman Negara boundary area, 5 km south of Felda Aring 5 road network, 11 km south of Gua Musang-Kuala Berang highway, 24 km southwest of Kuala Koh area, 29 km southeast of Gua Musang-Kuala Berang Highway and 50 km east of Gua Musang town area. Kota Bharu, Kelantan's capital city is about 140 km from the project area. The project site can be passed through Felda Aring 5.



Figure 6.1: Key Plan of the Project Site

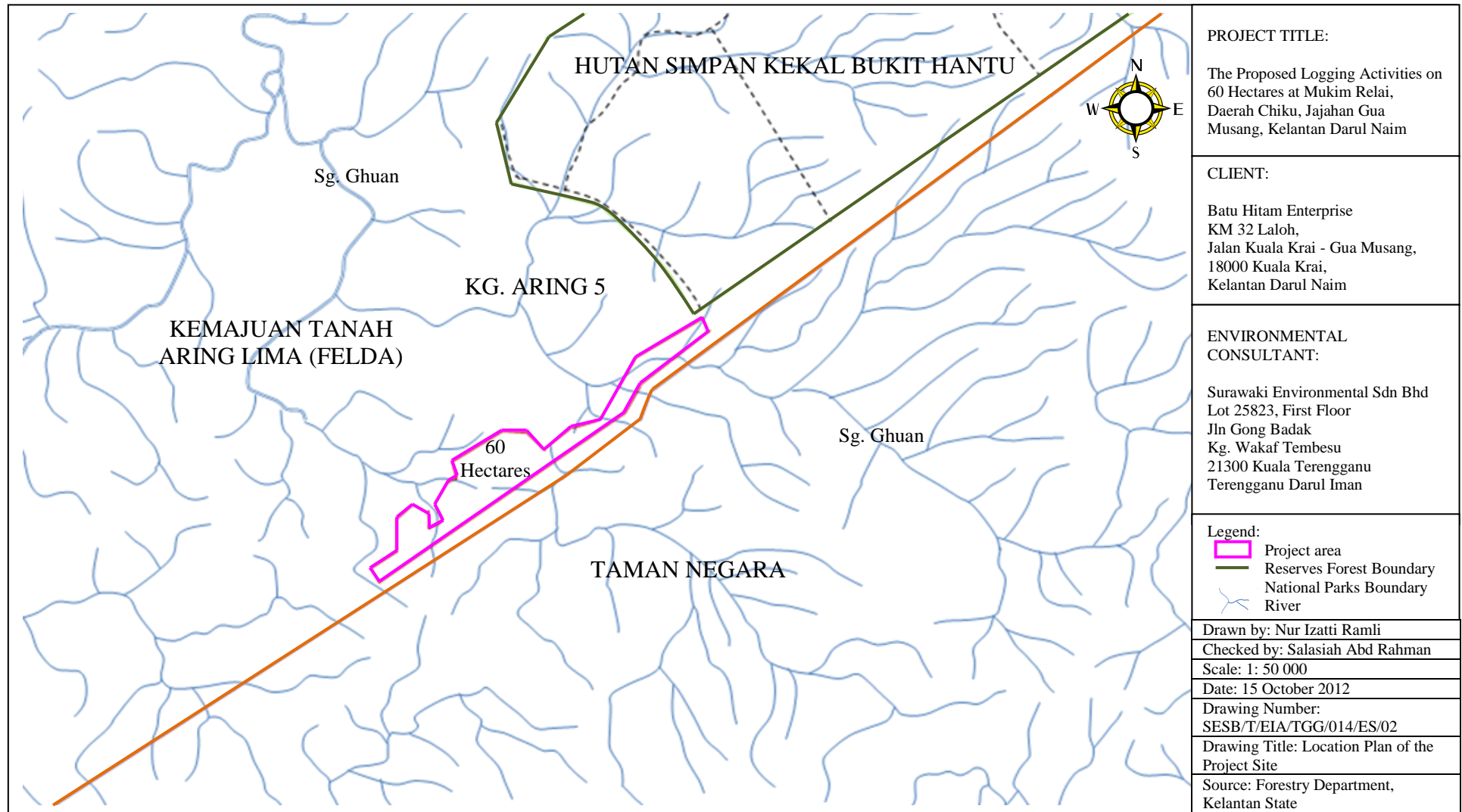


Figure 6.2: Location Plan of the Project Site

6.2 Project Concept

The conceptual plan of the proposed project consists of logging techniques and related plans, biomass management and sediment control plan and project proponent's commitment.

6.2.1 Logging Plans and Logging Techniques

The implementation of the proposed project is according to the concept of forest harvesting/logging on undulated hilly area which involve directional felling requirement. The types of timber to be felled mostly are those species that are common and valuable timber trees such as Meranti, Keruing and Balau.

Based on the official letter from Forestry Department Kelantan State, REF:PHN.KN.195/3/1335(55), item no 2 (f) stated that the felling limit for this area is 30.1cm dbh (diameter breast height) and above. Any trees with 30.0 cm dbh and below are not permitted to cut. Logging activities on site require machineries and vehicles as in Table 6.1.

Table 6.1: List of machineries and vehicles

MACHINERY/VEHICLE	NUMBER OF UNIT
Bulldozer	4
Excavator	2
San Tai Wong Lorry	2
Sawa (<i>Kiap</i>)	1
Chain Saw	2
TOTAL	11

The logging activities will be divided into two zones which is Zone A and Zone B with approximately 30 hectares for each zone. The felling operation shall start from southern region of project area and slowly shifting towards northern region of project area.

Buffer zones will be kept along the river banks of the logging area according to the width of the river. The biggest width of the river is 12 - 15 meter. Temporary bridge made of timber log will be built for logging vehicles accessibility. Small culverts will be used to pass through streams in the area depending on the suitability.

6.2.2 Biomass Management and Sediment Control Plan

The left over biomass for the proposed 60 hectares area could be estimated 30,000 metric tonnes on dry weight basis. The biomass will be stacked at a designated place within the site and left for complete drying under sunlight turning into dry mulch. The dry mulch will be covering the top soil and this will not create environmental problems. Thus, bare and empty land will be easily converted into any future development project in this land.

6.2.3 Project Proponent's Commitment

Project implementation shall practice environmental friendly concept operation where activities shall be controlled and maintained within permissible limits under environmental regulation. The attention is that, even certain impacts is negligible, implementation of mitigation measures shall reduce any impact as minimum as possible. Shall actual outcome during implementation exceed the requirement, immediate action shall be taken to rectify the problem.

6.3 Project Activities

The summary of activities for this project as below:-

ACTIVITY		
1.	INVENTORY (SITE INVESTIGATION OR PRE-CONSTRUCTION)	
	1.1	Creating access (roads, tracks, waterways) if necessary
	1.2	Establishing temporary base camps
	1.3	Site survey (inventory survey)
	1.3.1	<i>Rentis</i> cutting (survey lines)
	1.3.2	Preliminary assessment of forest type and volume of timber
	1.3.3	Flora and fauna and their habitat
	1.3.4	Water resources (river, stream, ponds, etc)
	1.3.5	Catchment area
	1.3.6	Identification of indigenous living region and their hunting area
2.	CONSTRUCTION (SITE PREPARATION)	
	2.1	Road
	2.1.1	Upgrade existing road and provide new access road to concessionaire
	2.1.2	Construction of logging track
		- Stream crossing
		- Cross drains
		- Cut and fill
		- Waste disposal
	2.2	Construct bridge to cross over Sungai Ghuan
	2.3	Establish workers base camp on site
	2.4	Establish of collection point (<i>Betau</i> or <i>Matau</i>)
	2.5	Transportation/conveyance of supplies and equipment
3.	FELLING(OPERATION)	
	3.1	Timber Felling
		- Bucking
		- Skidding and hauling
		- Landing
		- Loading
		- Waste disposal
	3.2	Documentation/ log of works
	3.3	Base Camp
	3.4	Transportation (Log of works)
	3.5	Socio-economics
4.	POST FELLING (ABANDONMENT/CLOSING REPORT)	
	4.1	Post-Felling Inventory (civil culture) Decommissioning
	4.1.1	Demolition of camp site and storage yards
	4.1.2	Removal of all machinery, vehicles, waste from concessions
	4.2	Rehabilitation by future development activity
	4.3	Post-closure, Environmental Monitoring and Audit

6.4 Project logistics and utilities

Those facilities and utilities are landing base (*betau*), workers base camp (*kongsi*), storage yard, temporary landing base and scheduled waste storage base.

6.5 Project Manpower

The breakdown of manpower is tabulated as below:-

POSITION	NUMBER OF WORKERS
Project Manager	1
Supervisor	1
Timber Clerk	2
Excavator Operator	2
San Tai Wong Lorry Operator	2
Bulldozer Operator	4
Chain Saw Operator	2
Sawa/Kiap Operator	1
TOTAL	15

6.6 Project Implementation Schedule

The proposed project is estimated to take 6 months to complete. By the middle of year 2014 the logging activities may end if logging starts by the end of this year. It can however be somewhat faster or delayed depending on the rainfall pattern as no logging operation will be conducted on rainy days.

7.0 THE EXISTING ENVIRONMENT

PARAMETERS	DESCRIPTIONS
<i>Physical-chemical environment</i>	
Topography	The proposed project is undulating with gradient between 6° to 12°. It is sited 100 m from the boundary of Taman Negara with an elevation between 100 meter and 230 meter above mean sea level (MSL). The highest point located at the northern side and sloping down from south west towards north east. Flat lands are available along sides of tributaries of Sungai Ghuan.
Drainage Pattern	Few tributaries of Sg. Ghuan are flowing southwesterly across the proposed project. Sg. Ghuan length is 10 km with a width of 15 meters at the downstream and 12 meters of the upstream of the river. There is no water intake point near to the proposed project. Sg. Ghuan flows into Sg. Aring which eventually exits into Sg. Kelantan and finally discharges into South China Sea.
Soil and Geology	Sedimentary Rock (Carboniferous) underlies the geology at the project site. There is no mineral of economic value in the site area. The manganese mine can only be found within 5 km from

PARAMETERS	DESCRIPTIONS
	the project site with the coordinate of 04°47.602'N and 102°17.599' E.
Meteorology	<p>Climate data based from Malaysian Meteorological Service (MMS) located at Kuala Krai (Latitude 5°31'53.44"N, Longitude 10°21'28.77"E) are as below:</p> <p>Highest rainfall (2009) = 3610.7 mm</p> <p>Lowest rainfall (2008) = 3316.5 mm</p> <p>24 hr mean temperature = 22.2°C to 34.0°C</p> <p>Annual 24 hr mean relative humidity = 77-96</p> <p>Maximum wind speed = 3.4-5.4 m/s</p>
Water Quality	Water quality sampling was carried out at six (6) locations for river water. Based on the Water Quality Index obtained, it indicated that the water quality at WR1 until WR6 was slightly polluted.
Ambient Air Quality	Air quality sampling was carried out at three (3) locations. The air quality results for total suspended particulate (TSP) complied with the Malaysian Ambient Air Quality Guideline.
Noise Level Measurement	Noise level measurement was carried out at five (5) locations during daytime and nighttime. Noise level for all stations not exceeded the DOE Maximum Permissible Sound Level.
Landuse	<p>Land-use Within Proposed Project Site</p> <ul style="list-style-type: none"> The proposed site is part of the lowland dipterocarp forest which is extremely unique in terms of ecology as the entire hill range consists of virgin forest underlain by granite rock outcrop. In general, there are no other developments that may affect the proposed development on the site. <p>Existing Landuse within 3 km Radius</p> <ul style="list-style-type: none"> This landuse is mainly agriculture, forest and interspersed with settlement area. Agriculture is the main landuse and will continue to be largest component in the future based in the Rancangan Tempatan Jajahan Gua Musang, 2007-2020. The main agriculture crops are oil palm plantation.
Ecological (Biological) Environment	
Flora	Based on rough counting of tree species and number of tree in random plots, a total of approximately 1,200 dipterocarp and non-dipterocarp trees (> 45 cm dbh) belonging to 22 tree species were estimated in 60 hectares site. Meranti (<i>Shorea Sp.</i>) was one of the most dominant timber tree species. There is a total of 34 species belonging to 12 families were identified for undersized tree, shrubs, herbs and climbers, 7 fern species belonging to 6 families identified and 4 species of palm belonging to a single family was identified in the study.
Fauna	The study indicated a total of 8 species of mammals and 10 species of birds were observed and those recorded from literature review. Based on the Wildlife and National Parks Department, elephant interference was detected within 6 km radius on the west side of the project site.

PARAMETERS	DESCRIPTIONS
Freshwater Fish	There are 5 list of fish were recorded from site which is <i>Osteochilus vittatus</i> , <i>Cyclocheilichthys apogon</i> , <i>Chela anomalura</i> , <i>Rasbora</i> sp and <i>Puntius hexazona</i> .
<i>Social (Human) Environment</i>	
Population Distribution	Total population of the Gua Musang area estimated to be approximately 86,189 persons in year 2010. There are ten Jajahans in the State of Kelantan and within the Jajahan Gua Musang there are three mukims. Relai is under Mukim Chiku and had a population of 26,093 persons in year 2010.
Socio Economy, Health and Perception Survey	<p>Establishment of quantitative account of the baseline socio-economy, health and perceptions of the population directly affected by the development.</p> <p>Sampling Size and Area of Surveys Sampling frame consists of several villages in the Chiku District was the main source of primary data. The total household is 57, sampling size of 6.</p> <p>Public Utilities and Amenities Basic amenities are ready provided such as good interior roads leading to the housing areas, electricity to homes, telecommunications and water supplies. <i>Orang asli</i> area was seen along Sg. Ghuan and connected by lateritic road. There is no direct road system connecting propose project site with Gua Musang Town except passing Felda Oil Palm Estate lateritic road. The location was also found to have public telephone booth, <i>surau</i> nearby to their homes and treatment station. Other public facilities such as hybrid solar and water tapping from the groundwater source were acceptable.</p> <p>Ethnicity and Religion 100% of the respondents were Bateq and Muslims in Kg. Aring 5. Bateq is an indigenous tribe of Negritos in this area.</p> <p>Household Income Average monthly household income of the respondents is less than RM 500.</p> <p>Educational Level The <i>orang asli</i> people also were attained an education up to upper secondary school (Form 5). Most of their children go to Sekolah Kebangsaan Pasir Linggi, Pos Lebir and Sekolah Menengah Chiku. None of the respondents received tertiary level education.</p> <p>Employment According to JAKOA Kelantan State, <i>orang asli</i> worked mainly</p>

PARAMETERS	DESCRIPTIONS
	<p>at the nearest oil palm estate, self-employed and looking for forest products</p> <p>Health and Safety There were no serious illness or diseases found from the response. Only 5% of the family members of the respondents reported to have minor health complaints such as the normal flue and coughing. 95% of the households were generally in good health.</p> <p>Labour Force During the logging period, there will be an influx of labour force to the area. This labour will from unskilled labourers. The development of this project therefore can create employment opportunities and increase the income to the nearest residents. These factors will improve the standard living of the residents nearest the project area.</p> <p>Awareness and Perception about the Project The general perception of <i>orang asli</i> is quite understood to the project operation and its related activities as long as the activities are being carried out in orderly manner.</p>

8.0 ASSESSMENT OF POTENTIAL IMPACTS

Effects of the proposed project to the existing environment had been identified. Predicted environmental impacts either positive or negative impacts has been evaluated based on primary and secondary data. Assessment of environmental impacts involves hand computation, computer modelling and observation as well. The predicted environmental impacts are depicted and analyzed as below.

ASPECT	SIGNIFICANT ENVIRONMENTAL IMPACT
i. Soil erosion risk and sedimentation	<p>Soil erosion impact by</p> <ul style="list-style-type: none"> ▪ Site clearance. ▪ Construction of logging road and skid trail. ▪ Forestry inventory survey. ▪ Felling.
ii. Water quality	<p>Degradation of water quality</p> <ul style="list-style-type: none"> ▪ Increased turbidity. ▪ Discharged of untreated/partially treated sewage. ▪ Indiscriminate disposal of Municipal Solid Waste ▪ Indiscriminate disposal of Scheduled Waste ▪ Decrease in drinking water quality
iii. Air quality	<p>Degradation of air quality</p> <ul style="list-style-type: none"> ▪ Eye irritation, headaches and aggravation of respiratory difficulties.

ASPECT	SIGNIFICANT ENVIRONMENTAL IMPACT
	<ul style="list-style-type: none"> ▪ Visibility, discoloration of air and general disruptions of traffic. <p>Cause by exhaust emission, open burning and dust generation.</p>
iv. Noise pollution	The primary noise sources during operation activities will be the vehicle and equipment utilize which includes excavators, bulldozer, chainsaw, generator and etc.
v. Flora and Fauna	Logging often destroys natural habitats, resulting in the loss of biodiversity and sometimes leading to the local and possibly global extinction of species.
vi. Aquatic Life	Site clearance, construction of logging tract and removal of logs shall result in the water quality deterioration. This activity will degrade the habitat of mostly small ornamental and recreation fish species, such as <i>Rasbora sp.</i>
vii. Socio-economic	Economically, the project's employment opportunities will reduce the households' dependency in add-jobs and self employment.
viii. Safety Impact	The company and its workers will have safety cover in terms of insurance and liability.
ix. Solid and Hazardous waste	<ul style="list-style-type: none"> ▪ Minor impacts from the base camp construction are expected. ▪ Accidental oil spillage due to vehicle operation. ▪ Biomass management during post logging phase.
x. Aesthetic and land use	No major impact on land use profile as the surrounding environment is either forest or estate.

9.0 MITIGATION AND ABATEMENT MEASURES

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
1.	Soil erosion risk and sedimentation	<ul style="list-style-type: none"> ▪ Site clearance ▪ Construction of logging road and skid trail. ▪ Forest inventory survey ▪ Felling 	<ul style="list-style-type: none"> i. Implementation of stage by stage land clearing process <ul style="list-style-type: none"> ▪ Pre-plan the sequence of compartment of land to be cleared. ▪ Preserve existing vegetation on areas that are not affected by current activities. It shall reduce the size of area exposed to erosion. ▪ Avoid working on rainy season. ii. Use cut biomass (branches, leaves and roots) as protection barrier to protect bared soil from erosion agent. iii. Minimize disturbance towards existing environment. <ul style="list-style-type: none"> ▪ Use existing roads, unless use of such roads would cause aggravate erosion problem. ▪ Avoid working (site clearing and felling) during raining periods unless it is necessary and reasonable. iv. Vegetation cover is to be retained for the entire site apart from the designated access paths. v. Exposed surfaces must be turf with grass seed to stabilized soil. vi. When clearing for right of ways, push trees, logs and other debris to the downhill side. This material will serve as a filter for trapping soil and other material which may wash away from existing road surface. vii. Buffer zones must be clearly demarcated as 20 m width on each side of water course. Strictly no logging is

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
			<p>permitted in buffer strips.</p> <p>viii. More erosion prone activities should be scheduled for drier period.</p> <p>ix. Avoidance of using inappropriate machineries particularly in wet conditions.</p>
	Water quality degradation	<ul style="list-style-type: none"> ▪ Site clearance ▪ Leakage of scheduled waste such as diesel and engine oil. ▪ Illegal sewage and sullage discharge from worker camp. ▪ Illegal disposal of solid waste into river. 	<p>i. Provision of good housekeeping practices.</p> <p>ii. Locate roads as high above and far away from streams as possible.</p> <p>iii. Minimize number of stream crossing and choose stable crossing sites.</p> <p>iv. Locate all log landings above away from streams.</p> <p>v. Provide adequate buffer for the riverbanks of Sg. Ghuan and other tributaries to reduce erosion at the areas concerned as well as control eroded soil being washed into the rivers.</p> <p>vi. Buffer zones must be clearly demarcated as 20 m width on each side of water course. Strictly no logging is permitted in buffer strips.</p> <p>vii. Cease logging operation during rainy season.</p> <p>viii. Monthly water monitoring of Total Suspended Solid (TSS) for the final discharge point is proposed. TSS concentrations tested shall be complied with Standard B (100 mg/l) or Class III of the Proposed Interim National Water Quality Standard (INWQS).</p>
3.	Air quality degradation	<ul style="list-style-type: none"> ▪ Movement of heavy vehicles ▪ Felling operation 	<p>i. Maintain the existing vegetation as purification for dust and as filter to block dust dispersion.</p>

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
			<ul style="list-style-type: none"> ii. Minimize the area of bared soil to reduce amount of dust generated on soil surface due to wind agent. iii. Set speed limit of 20 km/hr within proposed site as to reduce the chances of dust generated due to movement of vehicles. iv. Visual inspection shall be conducted on regular basis to identify significant dust entrainment and as mean of assessing effectiveness or requirement for additional mitigation measures. v. If any complaints received, it shall be investigated promptly with remedial measures implemented as appropriate. Complaints, investigation and corrective action shall be documented. vi. Vehicle or equipment exhaust discharges shall be visually inspected to ensure no excessive emission of black smoke. vii. Burning of tree trunks, leaves and branches are strictly prohibited. viii. No open burning for biomass and construction waste in or outside the project area.
4.	Noise pollution	<ul style="list-style-type: none"> ▪ Movement of vehicles ▪ Operation of equipment/machinery 	<ul style="list-style-type: none"> i. Proper and regular maintenance of operating machineries and hauling truck. ii. Use of hearing protection for personnel exposed to noise levels above 85 dBA. iii. Continual monitoring of noise level within proposed project site in an interval of every 3 months. iv. Submit an environmental quality monitoring (EQM) report to Department of Environment (DOE) Kelantan

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
			<p>every three months for inspection and documentation purposes.</p> <p>v. Comply with OSHA standard of permissible exposure noise level which is 90 dBA in exposure duration of 8 hours.</p> <p>vi. Educate workers associated with logging operation with awareness of harmful effect of noise.</p> <p>vii. Natural vegetation should be maintained as much as possible to act as natural barrier that could disperse and absorbs the noise.</p>
5.	Ecological impact on Aquatic and Terrestrial habitat and species.	<ul style="list-style-type: none"> ▪ Site clearance ▪ Construction of logging road and skid trail ▪ Operation of machinery ▪ Water and air quality degradation ▪ Felling of timber 	<p>i. Provision of migrating route for existing fauna to move to surrounding habitat.</p> <p>ii. Loggers must be trained and disciplined. The loggers should not intrude into the forest areas for various kinds of illegal activities such as cutting for firewood, burning and hunting.</p> <p>ii. All necessary measures in accordance to the existing guidelines for development projects in hill forest must be strictly adhered to in order to minimize adverse impacts to the forests. This includes strict implementation of road construction in compliance with the last Road Specifications Guidelines of the Forestry Department, Peninsular Malaysia. Drainage of roads must be addressed properly to minimize soil erosion and siltation. Stream crossing of roads should also be minimized.</p> <p>iii. Supervision must also be enforced to ensure that no unnecessary logging is done in areas outside the</p>

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
			<p>logging blocks and only more than 30.1 cm dbh trees are removed.</p> <p>iv. Skid trails shall be re-vegetated with appropriate species, mainly indigenous tree species.</p> <p>v. Oils, metals and other chemicals which are brought into the forest must be carefully-handled and controlled.</p> <p>vi. The logging activity should be undertaken during the drier months in order to minimize soil erosion and siltation at the downstream of Sg. Ghuan.</p> <p>vii. Forest operations should not cause avoidable ponding or water-logging.</p> <p>viii. Provide appropriate signs/ notices to warn others particularly local population about specific location/ route taken by wildlife species.</p> <p>ix. To impose a “No Hunting” policy throughout the project site. Signboard shall be made and installed at strategic location within the project site.</p> <p>x. Provide adequate opportunity for the wildlife to escape and seek refuge in the nearby undisturbed area.</p> <p>xi. Shouting and make some noise to scare the wildlife once they are sighted entering human areas.</p>
6.	Impact due to transportation of logs	<ul style="list-style-type: none"> ▪ Transportation of logs 	<p>i. Proper signage at the entry/exit points from the site to road.</p> <p>ii. Long trailer or heavy duty truck carrying the logs must be equipped with safety facilities</p> <p>iii. Speed of transporting truck must be at minimal at entry/exit point.</p>

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
			iv. Security guard or flag man at the entry/exit points off. v. The access road shall be constructed and maintained in accordance with Spesifikasi Jalan Hutan (Jalan Tuju and Lorong Penarik) untuk Semenanjung Malaysia 1999. vi. The signage, 'AWAS-LORI BALAK KELUAR' will be placed at about 100 and 50 meters away respectively. It will be placed on the both sides of road. vii. Signage 'Beri Laluan' will be placed at the exit point so that lorry driver can safety exit to public road from logging site.
7.	Socio-economic impact	<ul style="list-style-type: none"> ▪ Logging operation 	i. Staff communications shall ensure the workforce is aware of project progress and completion dates and staff will be provided with financial planning advice to encourage them to make provision for after the logging period.
8.	Safety and health impact	Logging operation <ul style="list-style-type: none"> ▪ Operation of machineries ▪ Felling operation 	i. Briefing by Health and Safety Supervisor every morning before work starts to ensure workers aware of occupational safety procedures. ii. Safety equipments/system or personal protective equipments such as heavy duty shoes, helmet, protective clothes and emergency medical kits will be provided for the workforce. iii. Continual monitoring by Health and Safety Supervisor. iv. Other utilities, such as, adequate cooking and drinking facilities, water and medicines will be in place to

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
			<p>facilitate the logging operation.</p> <p>v. Prepare Emergency Respond Plan (ERP). Formulation of comprehensive ERP will be undertaken involving Local Police, Bomba, project management, site manager and main and sub-contractors to ensure safety of the workers.</p> <p>vi. Remind workers of emergency escape route and assembly point.</p> <p>vii. Demarcation of hazardous areas and provision of guidelines for storage and handling of hazardous materials, so that workers aware of it and not causing any unwanted accident.</p> <p>viii. Hire local people to avoid various kinds of infectious illness.</p>
9.	Solid and hazardous waste impact	<ul style="list-style-type: none"> ▪ Base camp ▪ Accidental oil spillage due to vehicle operation ▪ Cut vegetation 	<p>i. Solid waste from worker camp shall be stored at designated places before disposing it.</p> <p>ii. Biomass such as cut vegetation shall be reused as protection layer for soil erosion from rain eroding agent and the rest shall deposited at designated area before disposing.</p> <p>iii. Scheduled waste should keep within a concrete bonded area with shelter on top of it.</p> <p>iv. The design capacity of bundled volume for skid tank storage shall 110% of the volume of skid tank.</p> <p>v. Minimize the generation of solid waste by proper planning and reusing whenever it is possible.</p>
10.	Aesthetic and land use	<ul style="list-style-type: none"> ▪ Logging operation ▪ Perhaps plantation of oil 	No specific mitigating measures shall be adopted as the impact is minimal, localized and insignificant.

NO	POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS	ACTIVITY	PROPOSE MITIGATION MEASURES
		palm.	
11.	Post Closing (Post Felling)		
11.1	Decommissioning - Demolition of workers base camp, quarters, storage yard - Removal of all machinery and vehicles, oil drums and waste	Waste arising giving rise to ▪ Poor aesthetics ▪ Fire hazards ▪ Surface water pollution - Spills and leaks - Dust/air	i. Disposal of all solid waste materials ii. Ensure safe work procedures prepared and conducted iii. Ensure area is nearly rehabilitated as originally iv. Ensure safe work procedures prepared and conducted v. Ensure no vehicles/machinery left in the concession area vi. Remove all drums, material from site vii. Bury any unscheduled biodegradable waste
11.2	Reforestation and Conservation	▪ Rehabilitation of track, log yards, disturbed areas	Plant selected species on tracks, log yards and disturbed areas in accordance to Guidelines
11.3	Post-closure Environmental Monitoring and Audit	▪ Minimal impact	Minimal, no mitigation necessary

10. RESIDUAL IMPACTS

Residual impacts can be considered as those that remain significant following the application of mitigation measures, although they are likely to have been reduced in magnitude because of the mitigation measures implemented. Basic negative residual impacts that could derive from this project activity are loss of biodiversity, loss of habitat, noise pollution, dust pollution, water quality degradation and accident involving community members. However, there is also socio-economic benefit that could derive from this project activity which is limited direct and indirect employment creation, enhanced local experience and employability.

11. ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan (EMP) is concerned with the mitigation of environmental impacts at the planning stage to ensure the impacts from the development of this project do not induce impacts that surpass the regulatory environmental parameter levels. This is to ensure the project activities are controlled at the management level to curb the incidence of unacceptable impacts occurring, the EMP also defines a monitoring inventory and sampling schedule for the collection of data and information to assess the project performance. The policy and commitment of the project proponent in managing environmental issues related to the implementation of this development shall be included in the EMP. EMP covers all phases of the project including planning, pre-construction, construction and operational phases. EMP also includes Environmental Audit shall be carried out once every three (3) months to observe any drastic changes in the environmental elements and ensure the compliance of the project activities with the legislative laws and regulation. Wildlife Management Plan (WMP) also included in EMP in order to conserve the elephants at the surrounding area of project site.

12. SUMMARY AND CONCLUSION

Based on the analysis and assessments carried out in this Preliminary EIA study has shown that with proper planning and diligent implementation of the recommended mitigation measures and monitoring program, the proposed development has been found to be environmentally sound without uncontrollable or significant long-term adverse impacts on the environment. The Project can be implemented at the proposed site if all the proposed mitigation measures are taken into consideration.