

Chapter

3

Project Description

3.1 Introduction

This chapter describes the location of the proposed Project, the Project background, the statement of need, description of the Project concept, the surrounding land use, Project status and option as well as consideration concerning Project abandonment. The contents of this chapter are defined in accordance with EIA guideline specified by the Environment Protection Department (EPD), Sabah.

3.2 General Description

The Project site (comprising of Benta I and Benta IIC) is located in the southeast corner of Sabah within the Tawau District, on the eastern coast of Sabah. The geographical position of the proposed development is between longitude 117° 11' E and 117° 40' E and between latitude of 4° 23'N to 4° 52'N (see **Figure 2.2.1**). In terms of straight-line distance, the furthest corners of the Project site stretch approximately 60 km from south to north and also 60 km from east to west. The proposed site partially encompasses the Forest Management Units (FMU) No. 22, 23, 25 and 26 (see **Figure 3.2.1**).

Generally, Benta I is located in the Gunung Rara Reserve whereas Benta IIC is in the Kalabakan Forest Reserve, bordered by FMUs 16 and 20 to the north, Sabah Softwoods Bhd plantation to the east and south east, the township of Kalabakan to the south and Innoprise Corporation Sdn Bhd – ICSB's international collaborative projects such as the SUAS project^{3a}, the INIKEA rehabilitation project^{3b}, the RBJ/NEP Reduced Impact Logging (RIL) Project^{3c} to the west of the Project area (see **Figure 3.2.1**). The Luasong Forestry Centre^{3d} is located between Benta I and Benta IIC, with its northern portion bordering Benta I (see **Figure 2.2.2** and **Figure 3.2.1**).

The land area earmarked for the plantation currently consists mainly of logged over Lowland Mixed Dipterocarp Forest.

3.3 Project Background

Since early 1990's, concerns have been raised over the imminent shortage of timber to support the wood processing industry. Upon realising this fact, several plans have been

^{3a} A forestry project on timber harvesting between ICSB and Swedish University of Agricultural Sciences (1992).

^{3b} A forestry project on rehabilitation of degraded forest between ICSB and the Sow-A-Seed Foundation established by the IKEA group of Sweden (1996).

^{3c} A forestry project on the use of "Reduced Impact Logging (RIL)" between RBJ and New England Power Company (NEP) of USA (1992).

^{3d} Luasong Forestry Centre is a centre for tropical forest management and development of RBJ established in 1987.

drawn up and agreements have been made to designate areas for ITP development. Sabah Softwoods Bhd was created to address the shortfall of timber from the natural forest by planting fast growing timber species.

The most recent one was the proposed joint venture industrial tree plantation (ITP) for a pulp mill project in August 1999 at an area measuring 241,400 ha. The present Project is entirely enclosed within this original industrial tree plantation project on the eastern part. An SEIA was submitted and subsequently approved in April 2003. Although some areas have been planted with *Acacia mangium* since year 2000, various studies have then been performed to determine the economics and financial returns of *Acacia* and oil palm. It found that oil palm far outperformed *Acacia*. See **Table 3.3.1** below.

Table 3.3.1: Economic returns between Crude Palm Oil and *Acacia mangium*

CRUDE PALM OIL (CPO) PRICE (RM/MT)	RM/MT	RM/MT	RM/MT	RM/MT	RM/MT
	900	1,000	1,200	1,500	2,000
IRR (%)	%	%	%	%	%
Before Taxation	10	15	23	32	44
ACACIA MANGIUM (8 yrs pulplogs)	RM/M3	RM/M3	RM/M3	RM/M3	RM/M3
	50-80	-	-	-	-
(15 yrs sawlogs)	-	90	150	-	-
IRR (%)	%	%	%	%	%
Before Taxation (8 years)	5-6	-	-	-	-
Before Taxation (10+years)	-	13	7-17	-	-

*Note: Sources of various studies are contained in References in **Annex C**.

Hence, necessary plans have been made to ensure steady economics and financial returns for initiation of a forest rehabilitation programme in Yayasan Sabah Concession area (see **Section 3.4** below). One of the documents that was produced include the Development Plan^{3e} for Ratus Awansari Sdn Bhd or Benta IIC area.

The concept of this proposed Project is to develop forestry and non-forestry crops in accordance to slope gradient. Oil palm would be confined to land with slopes ranging from 0-20°. Industrial tree plantation is confined to slopes of 20-25°. Slopes of over 25° should be conserved for biodiversity to prevent erosion of the soil in accordance with present legislation and licence requirements. See **Table 3.3.2**. While Oil Palm Plantation (OPP) will be the first to be developed, the implementation of Industrial Tree Plantation (ITP) and Natural Forest Management (NFM) will be carried out at a much later stage.

Table 3.3.2: Proposed Land Usage at the Project Site

Slope	0-20° Slope	20-25° Slope	> 25° Slope
Usage	Oil Palm Plantation	Industrial Tree Plantation	Natural Forest Enrichment

^{3e} This Development Plan is dated August 2004 and it was prepared and submitted by Agric Consultancy and Management Sdn Bhd to Benta Wawasan Sdn Bhd.

3.4 Statement of Need

With the drastic dwindling of forest resources within the Yayasan Sabah Concession Area (YSCA), the generation of income for the Yayasan Sabah to continue its socio-economics activities will be greatly affected. In order to complement and supplement the loss in timber revenue, new sources of revenue have to be sought in order to generate sufficient funds for the Yayasan Sabah Group (YSG) to continue its social economics programme.

As mentioned in **Section 3.3** above, the Oil Palm (OP) plantation development in particular, is undertaken in lieu of *Acacia Mangium* as a financial approach to generate sufficient income to primarily rehabilitate the secondary forests in the Yayasan Sabah Concession Area, and secondarily as a stop gap measure to generate sufficient funds for the YSG and also the Sabah Government. The Project Proponent is confident oil palm development is environmentally safe for the following reasons:

- A perennial tree crop like oil palm provides permanent crop cover to reduce soil erosion especially where terracing and cover crops are used.
- It is not affected by serious pests or diseases, thus minimizing the use of pesticides.
- Existing and future technology utilises many plant parts and products to reduce waste generation.
- The crop cycle of 25 years makes it an effective crop in 'greening' of the environment.

The main *raison d'être* for the present Project proposal are the expected positive economic and development expectations. The OP development will in addition to the direct economic benefits to the stakeholders, the Sabah Government, the Yayasan Sabah and its beneficiaries and the plantation staff also bring about economic spin-offs to the Tawau region. According to the Project Proponent's forecasts, the plan to develop approximately 80,000 ha of the proposed Project area with oil palm is expected to generate about RM15 billion in revenue for one cycle of cultivation.

3.5 Project Concept and Phases

The Oil Palm Plantation (OPP) development will be carried out by three (3) major parties, i.e. 1) Yayasan-Melaka JV, 2) Ratus Awansari Sdn Bhd JV and 3) the Yayasan Sabah Group (with Sabah Softwoods Berhad^{3f} as the management consultant). The total land area involved is approximately 80,000 hectares (see **Table 3.5.1**). See areas of these various developers in **Figure 3.5.1**.

The Projects phased development schedule for the OPP plantation is as shown in **Table 3.5.1**. From the table, it can be seen that the OPP will be initiated from Year 2005

^{3f} Sabah Softwood Bhd (SSB), a subsidiary of Innoprise Corporation Sdn Bhd (ICSB) is the only large-scale commercial forest plantation company in Malaysia. SSB has currently developed 82% of its 60,000 ha of its area. Fast-growing forest tree species was planted in an area of 36,000 ha, including 18,000 ha of *Acacia*, 10,000 ha of *Albizia*, 6,000 ha of *Gmelina*, and 2,000 ha of pine and eucalyptus. Agricultural crops cover 14,900 ha of oil palm and 100 ha of cocoa. During its 26 years of operation, SSB has planted cumulatively 68,034.5 ha of agriculture and forest plantations.

onwards and expected to be fully developed by Year 2010. See **Figure 3.5.1**. This area will be rehabilitated back to forest after the 30-year cycle³⁹.

Table 3.5.1: Project Development Schedule for Oil Palm Plantation

DEVELOPER	YEAR 2005 HA	YEAR 2006 HA	YEAR 2007 HA	YEAR 2008 HA	YEAR 2009 HA	YEAR 2010 HA	TOTAL HA
RASB*	0	2,500	4,000	4,500	4,500	5,500	21,000
Yayasan Melaka*	500	1,000	1,200	1,200	1,100	0	5,000
BW Plantations 1	1,000	2,500	5,000	7,500	7,500	1,500	25,000
BW Plantations 2	1,000	2,500	5,000	7,500	7,500	1,500	25,000
BW Plantations 3	0	500	1,100	1,100	1,300	0	4,000
TOTAL HA	2,500	9,000	16,300	21,800	21,900	8,500	80,000

* Joint-Venture Companies

The Industrial Tree Plantation (ITP) development will be carried out at a much later stage and will mainly involve planting of high-value tree species such as Jelutong, Sentang, Mahogany, etc. Since the tree planting schedule is not ready yet at the time of preparation for this SEIA, the present report covers in principle both the oil palm plantation and the industrial tree plantation but will with frequent references to the SEIA of 2002 for the industrial tree plantation development and land clearing focus on the oil palm plantation.

3.6 Project Activities

The area designated for oil palm plantation (OPP) and industrial tree plantation (ITP) will only be handed over to the Project Proponent after salvaging of logs. While the activities related to the current harvesting of commercial timber had already been discussed in the previous SEIA (2002), this section discusses the main activities that take place after salvage logging.

3.6.1 Oil Palm Plantation Development

A detailed management plan or operation plans for the proposed conversion from degraded Dipterocarp forest to oil palm plantation is underway. The activities listed below are based on general proposals and interviews with relevant staff combined with the general experience of the Consultant and his team members.

The anticipated key activities for the proposed oil palm plantation (OPP) development are summarized below. The activities are described from an environmental impact point of view. Several issues are therefore not described in full, technical detail as these are outside the concerns of an SEIA. Understanding these activities in terms of environmental significance is vital in order to ascertain whether they produce any adverse impacts or not.

³⁹ This is in accordance to the approval issued by the Sabah Forestry Department on 17th June 2004 for the conversion of the area for oil palm plantation development, for a period not exceeding thirty (30) years and with conditions. See approval letter in **Annex A1.1**.

- Land preparation (i.e. underbrushing, felling, bucking, stacking and windrowing);
- Infrastructural development (i.e. roads – access road, main road, harvesting road and collection/in field road; drains, bridges and culverts);
- Oil palm nursery development (i.e. site selection and operation of large-polybag nursery);
- Field establishment (i.e. lining, terracing, cover crop establishment, holing and field planting);
- Maintenance (i.e. pruning, weed control, pest and diseases control, fertilizer application);
- Harvesting; and
- Rehabilitation to forest and abandonment.

The prospect of abandonment is not likely but has to be taken into account as an untimely abandonment without a rapid transfer of responsibilities may have significant adverse environmental impacts.

3.6.1.1 Land Preparation

In this phase, standing vegetation on undulating mineral soil with slopes of 0 – 20° will be cleared. Some small sized timber or timber of uncommon commercial species may be salvaged and sold or used for e.g. infrastructural development such as bridges, buildings, etc.

3.6.1.1.1 Underbrushing

Underbrushing involves manual slashing of undergrowth. All small tress up to a diameter 5 cm will be cut 15 cm above ground level. All creepers are to be slashed.

3.6.1.1.2 Felling

Felling of remnant, non usable trees can be done by machine, e.g. Caterpillar D6 or D8 or similar supported by chain saw crews. Ideally the entire operation should be done by chainsaw and manual labour but financially and in respect of management and human resources this is considered unrealistic. Any regrowth from stumps may later be poisoned using e.g. 20% c.p. trichlopyr in diesel oil.

All trees should be felled inwards at the perimeter of the area away from roads, rivers or streams. All trees shall be cut clear off stumps and not left suspended. All felled trees to be lopped within 6 days of felling.

It is prohibited in Malaysia to use burning in connection with industrial land clearing. This option is therefore not further considered in this report.

3.6.1.1.3 *Loping, Stacking and Windrowing*

After felling all remaining timber shall be lopped, mechanically stacked and windrowed. It is anticipated this will be done using bulldozers or excavators. It is during this operation important for the dozer operators to avoid blading or other forms of top soil destruction.

3.6.1.2 **Infrastructure Development**

Once the land has been cleared the construction of infrastructure will begin. The main infrastructure required for development includes roads, bridges, culverts and drains.

3.6.1.2.1 *Roads*

Well planned roads are vital in oil palm cultivation to facilitate transportation during various stages of development and operation. Roads are generally be categorized as main roads and collection roads. These roads should be properly planned and mapped out before development.

3.6.1.2.2 *Access Road*

Roads will be constructed to serve the entire field in the plantation. The main estate road will be gravelled for all weather use. This can be progressively done as planting is being completed. The width is 6 metres, with a gravel depth of 20 cm.

3.6.1.2.3 *Main road*

For this development, a main road width is 5 – 8 metres and a gravel depth of 20 cm is expected. The centre of the road is 20 – 30 cm higher to shed water to the sides during rain.

3.6.1.2.4 *Harvesting Road*

Harvesting roads are used for transport of fresh fruit bunches (FFBs) to collection centres along the field roads. The planned density of harvesting roads is 65 m / ha with 3 metre width and at least 12.5 cm gravel base. Normally one third of the harvesting roads are gravelled.

3.6.1.2.5 *Collection / In Field Road*

Collector roads link harvesting roads to the estates main roads. The density is between 70 metres to 100 metres / ha. The width is 4 metres with 1.5 metre road shoulders. The surface is normally gravelled.

3.6.1.2.6 *Drains, Bridges and Culvert*

A good drainage plan needs to be incorporated in the development plan. Initially, clearing of existing water ways need to be carried out to drain the existing water logged low lying areas.

Many bridges and culverts need to be built across streams and drains. For bridges, temporary ones are normally constructed and thereafter replaced by wooden ones. There should be minimal impact to the environment in this respect.

In low lying areas field drains shall be constructed to join up, in a suitable field drainage system to the main drain which shall in turn open into a natural waterway.

3.6.1.3 Oil Palm Nursery

3.6.1.3.1 Introduction

The objective of the oil palm nursery is to supply the highest standard seedlings which are healthy, vigorous and uniform for field planting. As a rough guide, one hectare of nursery caters for 100 ha of field planted oil palm.

3.6.1.3.2 Siting

One nursery site has been selected in Benta I but the management may decide to establish a number of nurseries. Nursery sites are likely to be placed centrally within each development block on flat, dry areas, close to permanent water supplies of good quality. Preparation of nursery site must be completed some fifteen (15) months prior to the intended date of field planting.

3.6.1.3.3 Large-Polybag Nursery

In the single stage system the seeds are planted directly in large poly-bags (plastic bags) and nursed until they are ready for field planting (**Plate 3-1**). A watering system will be required, e.g. Sumisansui or sprinkler system.

A good supply of soil mix (river sand and clay) will also be required, preferably locally.

After sowing of pre-germinated seeds in the bags, these are placed at 0.9 m triangular spacing directly on the ground. Watering of seedlings is twice a day except on raining days. Approximately 80,000 litres (17,600 gal) of water is required per ha per day. The water will be drawn from local rivers.

Fertilizers are given as Multicote and sumicote; controlled release fertilizers. Weeding is done monthly; manual weeding in the polybags, herbicide spraying inter-row with Basta and nozzle with conical shield.

Pest and disease infestation seldom occur and use of pesticides thus rare. Exceptions are red spider mites and Curvularia leaf spot if seedlings are weak and water stressed.

3.6.1.4 Field Establishment

3.6.1.4.1 Lining

Normal planting pattern in Sabah is 9.1 m x 9.1 m x 9.1 m triangular spacing, giving 136 points per ha.

On land where slope ranges from 12 – 20° where contour terracing is necessary, contour lining is done to give the same planting density of 136 points per ha.

3.6.1.4.2 Terracing

It is generally recommended that land slopes between 12° to 20° should be terraced for oil palm cultivation. Good terracing helps to avoid erosion on steep slopes (**Plate 3-2**). Besides, terraces will result in better field, improved access, water retention etc.

The advantages of terracing and construction of terraces will be discussed further in **Chapter 5: Recommended Mitigation Measures** and **Annex B1.4.1** of this SEIA.

3.6.1.4.3 Cover Crop Establishment

In order to avoid massive cases of soil losses, it has become standard in Sabah to plant cover crops immediately after clearing. It is assumed, this standard will be followed by the Project Proponent. The cover crops are normally fast growing leguminous creepers such as *Pueraria* and *Calopogonium*. These will prevent direct rain impact on the soil surface, form a felt of roots holding the soil and as legumes, they are capable of binding nitrogen in the soil.

- The rates of seeding of leguminous cover crop species.

Species	Rate (kg/ha)
<i>Pueraria javanica</i>	5
<i>Calopogonium mucunoides</i>	2
<i>Calopogonium caeruleun</i>	2
Total	9

- Seeds of the above composition and weight are mixed with 12g Rhizobium compost and 18 kg rock phosphate.
- Sowing is done immediately after strip clearing at the rate of 9 kg / ha. In mechanically windrowed area a line of seed should be drilled as close as possible to the windrow on each side of the stack. In the cleared inter-row, 3 to 5 drills can be made length wise along the row. No drill should be closer than 1.5 m to the planting row.

It is worth while pocketing some seed manually inside the windrow to help obtain a quick cover. Where spraying is required one round before sowing will suffice.

Further details on the benefits and establishment of various leguminous inter-row cover are outlined in **Annex B1.4.2**.

3.6.1.4.4 Planting Holes

Before planting, points should be cleared to a radius of 2 m from the lining peg. Paths are established for field operations.

Preparation of planting holes is normally best done at planting time. A hole large enough to accommodate the polybag using a hoe or tractor in areas with suitable terrain is dug.

3.6.1.4.5 Field planting

After removal of the plastic bags, the young palms are planted in the individual holes. A plastic mulch can be used to reduce erosion, suppress weed growth and conserve soil moisture (**Plate 3-3**). The plastic bags, which can not be re-used, will be collected and disposed in accordance with local council regulations.

3.6.1.5 Maintenance

Maintenance includes pruning, weeding, fertilizing and pest and disease control.

3.6.1.5.1 Pruning

Pruning at the early stage involves removal of dead fronds. Subsequent pruning is done during harvesting around thirty (30) months after planting. The pruned fronds are stacked in the inter-rows to decompose.

3.6.1.5.2 Thinning In High Density Planting

Oil palm is planted in the density range of 120 to 140 palms/ha. The higher densities give higher initial yield until canopy closure occurs. Overall life time yield from palms within the density range of 120 to 140 palm/ha differ little. At very high densities, e.g. 245 palms/ha, the decline becomes very acute. Similarly at very low densities where the canopy cover is not achieved lower yields results.

Apart from yield other considerations have to be taken. One of the effects of higher density is to shade out the inter-row vegetation. In easily eroded soils on sloping ground serious erosion may occur. Furthermore extensive bare ground are known to favour outbreaks of leaf eating insect pests since predators which maintain a biological balance are denied host plants.

The solution to yield decline of high density palms is to do thinning. One method is to remove one palm in seven to give a honeycomb design that let in light through a dense canopy. Yield is reduced very temporarily before the remaining palms compensate for the initial drop. It is best to cut and remove the extra palms. While it is convenient to poison the palm and left to rot, they may pose significant pest and disease risks.

3.6.1.5.3 Weed control

All competition by noxious weeds are removed to protect the leguminous cover crop and oil palm by ring weeding and selective weedicide spraying. Important noxious weeds are lalang (*Imperata cylindrica*), *Mikania macrantha*, *Chromolaena odorata*, *Mikanie*, *Melastoma malabathricum* and sedges are eradicated but herbaceous plants such as *Nephrolepis biserata* may be left as ground cover.

In year one (1), manual circle weeding is done 6 rounds a year while in year two (2), 6 rounds of weedicide spraying is carried out. In year three (3) it is reduced to 4 rounds and year four (4) three rounds. The most critical time for maintaining the leguminous cover is the period between sowing and obtaining a full cover, which will suppress most weed growth. Hand weeding once a month for the first six months is done in the cover rows. Spot spraying between the cover row using glyphosate for

grasses and metasulfuron-methyl for broad leaf species is very successful. It starts at monthly intervals extending to quarterly at a year old.

3.6.1.5.4 Pest and Disease Control

Mammalian pests such as rats, squirrels porcupines, monkeys and wild pigs may be controlled by shooting and poison baiting. For biological control, snakes and barn owls are effective in controlling small mammals. Insect pests such a leaf eating caterpillars rhinoceros beetles, cockchafers are best controlled biologically by natural enemies such as predators and parasites. Insecticides should only be used judiciously.

Many fungal diseases affect oil palm. In Malaysia and Indonesia basal stem rot caused by *Ganoderma* is of considerable economic importance with 50% mortality by the time palms are half way through their economic life.

The aspects of pest control will be discussed further in **Chapters 4 and 5**.

3.6.1.5.5 Fertilizer Application

- i) Crop: Oil palm is a nutrient demanding crop and in order to sustain yields adequate fertilizing is vital especially on poorer soils. A typical fertilizer programme is shown in **Table 3.6.1** for mineral soils.

Table 3.6.1: Fertilizer Recommendations for Young Oil Palm

Year	Application round	Age from planting (month)	Fertilizer	Rate (kg/palm)
			Rock phosphate	0.50
FIRST	1 st	1	Compound 25	0.50
	2 nd	4	Compound 25	0.80
	3 rd	7	Compound 25	1.00
	4 th	11	Compound 25	1.40
SECOND	1st	15	Mixture 44	2.00
			Borate	0.10
			Kieserite	0.50
	2 nd	19	Mixture 44	2.25
	3 rd	23	Mixture 44	2.25
THIRD	1st	27	Mixture 44	2.50
	2 nd	31	Mixture 44	2.50
			Kieserite	0.50
			Borate	0.10
	3 rd	35	Mixture 44	2.50

Percentage (%) nutrient content:

Fertilizer	N	P ₂ O ₅	K ₂ O	MgO
Compound 25	14	13	9	2.5
Mixture 44	12	6	22	3.0

Partial replacement of fertilizers with composted empty fruit bunches and POME is further discussed in the sections on waste management.

In mature palms from the 4th to 25th year, the specific fertilizer programme should be determined by soil and foliar analyses.

Fertilizer nutrient inputs of 120 kg N, 15 kg P, 150 kg K, 35 kg Mg in addition to nutrients recycled in EFB and POME are required to increase oil palm productivity to yield levels of more than 6 tonne crude palm oil/ha/year commercially (Mutert, 2001).

ii) Cover crop

- At 2 months after planting, 63 kg/ha Nitrophoska Yellow is applied.
- At 3 and 8 months after establishment rock phosphate is applied at the rate of 280 kg/ha per application.

3.6.1.6 HARVESTING

- Pre-harvesting sanitation is done 6 months prior to commencement. It involves the removal of dead or moribund fronds over-ripe bunches and small deformed and uneconomic fruit bunches.
- Collection platforms 5m x 3m to be constructed along the road for every alternative harvesting path.
- Harvesting interval of 10 days is ideal to ensure free fatty acid content of less than 5%.
- The minimum ripeness standard: 5 loose fruits for palms less than 7 years, 1 loose fruit for palms 7 years and above.

During harvesting, the fruit bunches are cut using knives or chisels with handles. The FFB is transported to collection centres by mini-tractors. From the collection centres, it is delivered to the factory by lorry.

3.6.1.7 PROCESSING FACILITIES AND CAMPS

The Project Proponent has plans to build 16 mills to support this plantation development: 4 mills in Benta IIC and the remaining within the Benta I area. The mill locations are shown in **Figure 3.6.1**. The mill locations are chosen to satisfy a number of criteria including transport distances, access to permanent water supply but avoiding dangers of floods, gentle and stable topography as well as vicinity to planned man power settlements.

Each 5,000 ha plantation requires a mill of 30 tonne/hour capacity to be fully operational by year 7 which should be upgraded to 60 tonne capacity by year 9.

Effluent Disposal

There is considerable volume of liquid effluent from steriliser condensate and the clarification station as well as less potent liquid wastes from kernel separation and wash

water. POME can be used as a fertilizer in the oil palm plantation for application at the rate of 5 cm rainfall/year equivalent (rey) to achieve the win-win situation of benefiting the crop and solving the problem of waste disposal. The proposed composting method by the Project Proponent will be further discussed in **Chapter 5**.

Camps

Camps containing management functions, technical support services as well as living quarters for plantation staff are expected to be constructed in the vicinity of the processing facilities in order to share infrastructure and security.

The sections on mitigating measures will provide some limiting factors for camp site selection and camp operation in general.

3.6.1.8 REHABILITATION TO FOREST AND ABANDONMENT

3.6.1.8.1 Rehabilitation to Forest

This aspect will be described further in **Chapter 5**.

3.6.1.8.2 Project Completion and Abandonment

The Project will be completed at the end of one rotation of oil palms, i.e. after approximately 30 years after which the Project Proponent is required to rehabilitate the area to forest land. As technical or political development cannot be foreseen in detail, no detailed plans for how this conversion will take place and this SEIA does not include this conversion.

There is always a risk of pre-mature abandonment for technical, organizational, political or financial reasons. With Yayasan Sabah as the main proponent and since this foundation is government controlled, complete abandonment seems unlikely. Partners may disappear but can be replaced. This risk is dealt with in **Chapter 6**.

3.6.2 Industrial Tree Plantation Development

The proposed industrial tree plantation is planned to be implemented on areas with a slope gradient of 20⁰-25⁰. Areas of slope less than 20⁰ are designated for oil palm plantation and those exceeding 25⁰ are excluded from commercial development under the present plans and policies of the Government of Sabah.

Similar to oil palm plantation development, the anticipated key activities for the proposed ITP development are summarized below. Understanding some of these activities in terms of environmental significance is vital so as to ascertain whether they produce any adverse impacts or not and balance these with the expected positive impacts.

- Land Clearing and Site Preparation;
- Infrastructural development (mainly access road and drains);
- Planting, Maintenance and Protection;

- Harvesting and Transporting Wood from Plantations; and
- Reforestation of Harvested Areas and abandonment.

3.6.2.1 Land Clearing and Site Preparation

At this stage, the remaining vegetation following salvage logging will be cleared and contractors will be engaged to prepare planting lines, dig holes and plant trees raised in a nursery or at designated sites.

3.6.2.2 Infrastructural Development

When the ITP development begins, most of the infrastructures will be in place. This development will then be minimal and mainly involve constructing access roads and roadside drains.

3.6.2.3 Planting, Maintaining and Protecting

The planting density for the ITP will be according to specific species requirement. While the forest biomass is left to accumulate between the planting rows, the trees will be maintained by frequent weeding until the plants are free to grow. The plantations will also need to be protected from insect, fire, disease and illegal cutting.

3.6.2.4 Harvesting and Transporting Wood from Plantations

When the trees are ready for harvesting, felling planned to be done by chain saw and harvesting is mainly done by small sky-line cable or cable yarding system. These systems pull logs up to 250 metres from the point of felling to a forest road, where they are loaded onto 20-tonne capacity trucks using a hydraulic loader. Unlike conventional logging systems (crawler tractors, skidders), cable logging systems do not disturb or compact soil as logs are harvested with one end raised above the ground and without skid tracks and frequent passes by mobile equipment. The temporary harvesting road used by the cable yarder will be rehabilitated and covered with biomass upon completion of works.

3.6.2.5 Site Preparation and Reforestation of Harvested Area

Harvested areas are immediately reforested, generally with the same species as was harvested. The process described in **Section 3.6.2.3** will be repeated. Logging residues are expected to be significantly less than when the natural forest is cleared, thus minimal land clearing is required.

3.7 Project Status

Located within the Benta Wawasan license area, the Project area is classified for commercial timber production. A forest plantation or Industrial Tree Plantation (ITP) development covering a much bigger area than the proposed Oil Palm Plantation and Industrial Tree Plantation Project area was suggested in Year 1999 and an SEIA was carried out, submitted in June 2002 and subsequently approved by the Environment Protection Department (EPD) in April 2003. However, the ITP Project was not fully

implemented whereby as of October 2004, only approximately 24,652 hectares of the area was planted with *Acacia mangium*. See **Figure 2.2.2** and **Plate 3-4 to Plate 3-6**.

With the plan to develop the proposed Project area into an oil palm plantation, the Sabah Forestry Department has on 17th June 2004 approved the conversion of the area for oil palm plantation development, for a period not exceeding thirty (30) years and with conditions. See **Annex A1.5**.

Currently, the proposed Project area is being logged in coupes. The current status (a projection or guideline only) of the logging coupes are presented in **Figure 2.2.2** and **Table 3.7.1**. See also current situation in **Plate 3-7 to Plate 3-9**. From the data provided by the Project Proponent and from site observation, a large portion of the proposed Project area is either salvaging in progress (approx. 43,503 ha), planted with *Acacia mangium* under the JV SSB Planting Tree Project (approx. 24,652 ha), or re-entry logging in progress (approx. 19,492 ha). A nursery for oil palm is also already established in Benta Wawasan I, Coupe BW3/01 (**Plate 3-1**). The area that has been planted with *Acacia* will only be developed into oil palm plantation after harvesting.

Following the approval of the SEIA for the ITP Project in Year 2003, compliance monitoring was conducted for the logging coupes for the period October to December 2003 and October to December 2004 and the reports were submitted to the Environment Protection Department (EPD).

Table 3.7.1: Status of Logging Operation at the Proposed OPP and ITP Project Sites (as of October 2004)

Coupes	Area (ha)	Current Status
JV Sabah Softwoods Sdn Bhd Planting Tree Project		
BW1/98	1,615	Logging was completed in mid 1999. Land clearing and planting of <i>Acacia mangium</i> have started in Dec 2000 and is now fully developed.
BW2/98	1,875	Logging was completed in the 1999. Land clearing and planting of <i>Acacia mangium</i> have started in Dec 2000 and is now fully developed.
BW3/98	1,560	Re-entry logging was completed in Dec 2000. Fully developed with <i>Acacia mangium</i> .
BW4/98	2,885	Second re-logging operation has completed and about 2055.13 ha are already planted with <i>Acacia mangium</i> .
BW5/98	2,115	Fully developed with <i>Acacia mangium</i> after completion of second re-logging operation.
BW1/99	2,230	First and second round of Re-entry has been completed. About 1950.03 ha are already planted with <i>Acacia mangium</i> .
BW3/99	1,713	First and second round of Re-entry has been completed. About 704.22 ha are already planted with <i>Acacia mangium</i> .
BW4/99	2,140	First and second round of Re-entry has been completed. About 683.67 ha are already planted with <i>Acacia mangium</i> . The balance will be for Oil Palm development.

BW5/99	1,445	Second Round of Re-entry has been completed. About 480.51 ha are already planted with <i>Acacia mangium</i> .
BW4/00 (B1)	3,170	Re-entry logging in progress. About 505.5 ha already planted with <i>Acacia mangium</i> .
BW2/00 (2)	2,410	First and second round of Re-entry has been completed. KIV for oil palm development.
BW5/00	1,494	First and second round of Re-entry has been completed. KIV for oil palm development.
Subtotal	24,652	
Salvaging In Progress		
BW2/99	2,280	Salvaging in progress. Expected to be completed in November 2005.
BW9/99	5,306	Salvaging in progress. Expected to be completed in August 2005.
BW1/00	1,407	Salvaging in progress. Expected to be completed in January 2006.
BW2/00/I	2,971	Salvaging in progress. Expected to be completed in June 2005.
BW4/00 (A)	5,772	Salvaging in progress. Expected to be completed in December 2005.
BW4/00 (BII)	2,537	Salvaging in progress. Expected to be completed in February 2006.
BW9/00	4,045	Salvaging in progress. Expected to be completed in February 2006.
BW10/00	2,843	Salvaging in progress. Expected to be completed in February 2006.
BW11/00	2,011	Salvaging in progress. Expected to be completed in May 2006.
BW1/01	1,008	Salvaging in progress. Expected to be completed in June 2005.
BW2/01	3,739	Salvaging in progress. Expected to be completed in June 2005.
BW3/01	1,804	Salvaging in progress. Expected to be completed in June 2005.
BW5/01	1,907	Salvaging in progress. Expected to be completed in October 2005.
BW9/01	3,040	Salvaging in progress. Expected to be completed in July 2005.
BW14/01	1,079	Salvaging in progress. Expected to be completed in January 2006.
BW2/02	534	Salvaging in progress. Expected to be completed in December 2005.
BW10/02	1,220	Salvaging in progress. Expected to be completed in July 2005.
Subtotal	43,503	
Salvaging Not In Operation Yet		
BW3/00	1,420	18 MONTHS TO COMPLETE AFTER OPERATION.
BW4/01	1,769	18 MONTHS TO COMPLETE AFTER OPERATION.
BW12/01	1,543	18 MONTHS TO COMPLETE AFTER OPERATION.
BW5/02	1,857	18 MONTHS TO COMPLETE AFTER OPERATION.
Subtotal	6,589	

Re-log In Progress		
BW6/01	2,096	Re-entry logging in progress. To be completed in August 2005.
BW10/01	1,533	Re-entry logging in progress. To be completed in May 2005.
BW11/01	2,140	Re-entry logging in progress. To be completed in May 2005.
BW9/02	4,784	Re-entry logging in progress. To be completed in October 2005.
BW11/02	2,121	Re-entry logging in progress. To be completed in September 2005.
BW12/02	2,993	Re-entry logging in progress. To be completed in January 2006.
BW9/03	2,305	Re-entry logging in progress. To be completed in March 2006.
BW10/03(OLCS)	1,520	Re-entry logging in progress. To be completed in June 2006.
Subtotal	19,492	
Re-log (OLCS) Not In Operation Yet		
BW12/03	2,292	Awaiting coupe permit from the Sabah Forestry Department.
BW12/04	1,063	Awaiting coupe permit from the Sabah Forestry Department.
BW12/05	1,750	Approximate area only. Not surveyed yet.
Subtotal	5,105	
Sensitive area	9,920	Unworkable area which includes river reserve, road buffer, steep area, salt lick area, VJR buffer, excised area
Under NFM area	339	
Grand Total	109,600	

Source: Benta Wawasan Sdn Bhd, 2004

3.8 Description of Project Area

3.8.1 Forest Resources

According to the definition of the Sabah Forestry Department (1989) the proposed logging coupes are within the Lowland Mixed Dipterocarp Forest Formation except for small portions located over the 900-m elevation, which are covered by montane forest types. The lowland Dipterocarp forest is intersected by riverine forest types on the banks of streams and rivers and in some low lying areas.

Although lying mostly within the lowland Dipterocarp forest, these topographic and edaphic features of the Project site as well as the previous logging history have created different vegetation habitats allowing specific floristic variation within the Project area. The very intensive logging activities conducted in the 1970s and 80s had resulted in massive opening of the forest canopy along gentle slopes and undulating areas resulting in the absence of many commercial trees. This massive opening destroyed the main primary forest habitat and has prevented the primary forest to regenerate directly without going through the succession of secondary forest

with its pioneer species and creepers. Secondary forest species such as *Macaranga spp.* and *Anthocephalus* thus dominate areas that have undergone re-entry logging, e.g. BW12/01 and BW2/00(I). The big fires in 1985 have also destroyed a large track of the forest resulting in the pure stands of secondary species.

At the moderately harvested sites especially along the steep ridges large number of the original trees especially the Dipterocarpaceae are present, e.g. in BW1/00. The reassessment of the flora component, together with the methodology and findings are presented in **Annex A1.3.2**.

3.8.2 Water Catchment River Basins

The main rivers draining through the Project area are the Sg. Kalabakan, Sg. Brantian and the upper Sg. Kuamut (refer **Figure 3.8.1**). Sg. Kinabatangan has the largest catchment area of about 13,204 km². Sg. Kalabakan has about 1,212 km² and Sg. Brantian about 491 km². The catchment area that is within the Project area with respect to the nearest gauging station and village is as follow:

River Systems	Catchment Area, km ²
Sg. Kalabakan At Gauging Station	1,150
Sg. Kalabakan Near Kpg. Kalabakan	1,229
Sg. Brantian Near Kpg. Brantian	490
Upper Kuamut Catchments K1	236
Upper Kuamut Catchments K2	122
Upper Kuamut Catchments K3	46
Upper Kuamut Catchments K4	34

The Project area within the Sg. Kinabatangan catchment is situated at the southern upper and hilly subcatchment of one of the main tributary named Sg. Kuamut, which has a total catchment area of about 3,140 km². The Project area occupies about 14 percent of its catchment (K1, K2, K3 and K4) and the river flows northerly and then easterly for another 160 km downstream before discharging into Sulu Sea at the northeastern Sabah coastline. See **Figure 3.8.2**.

The Project area within the Sg. Kalabakan catchment covers the middle and upper catchment of the river system. The main river channel stretches over 80 km from the catchment boundary to the river mouth at the Cowie Bay.

Sg. Brantian catchment lies adjacent to the east of the Sg. Kalabakan catchment. The Project area covers almost the whole of the Sg. Brantian catchment. The main river channel flows southerly for about 30 km from the catchment boundary before discharging at the Cowie Bay.

3.8.3 Land Use Surrounding the Project

The entire Project area covers approximately 109,600 hectares within the Kalabakan and Gunung Rara Forest Reserves. The site, particularly the southern and south-eastern part, has been logged during the 1970s, 1980s and more recently 1998-2001 by ICSB and other logging companies e.g. North Borneo Timber Bhd (NBT), Hap

Seng Sdn Bhd, Wallace Bay Sdn Bhd, Seranum Sdn Bhd, Banita Sdn Bhd and other smaller companies who employed mainly crawler tractors and to a lesser extent high-lead logging systems.

There is no stateland within the Project area and spontaneous agricultural settlements are scarce. Main settlements that may be affected by the development are Kpg. Kalabakan downstream from Benta IIC and the smaller Kpg. Brantian downstream from Benta I.

The northern part of Benta I drains through Sg. Kuamut, which feeds the Kinabatangan river, where there are several settlements as well as conservation and tourism interests.

There are several conservation and research interests of national as well as of international interest in the immediate vicinity of the area. See **Figure 3.8.3**.

Within the proposed Oil Palm and ITP Plantation Project boundary but excluded from the development is:

- o Brantian-Tatulit Virgin Jungle Reserve (4,140 ha) is located to the south eastern part of the proposed plantation project.

Outside the proposed Oil Palm and ITP Plantation Project boundary are (in increasing distance measured in a direct line):

- o Ulu Sg Nagapon Virgin Jungle Reserve (523 ha) is located directly to the northwest boundary of Benta I;
- o Sabah Softwoods Berhad (60,618 ha) is sited to the south and southeast of the Project boundary;
- o Oil Palm Plantations (FELDA and other private companies) to the south of the Project site;
- o Luasong Forestry Centre (LFC) and its water catchment area (16,230 ha) are sandwiched between Benta I and Benta IIC;
- o INIKEA Project^{3h} (18,500 ha) is sited on the northern boundary of Benta IIC;
- o RBJ/NEP RIL Project (1,685 ha) is located south of the INIKEA Project and close to the north western boundary of the proposed Project;
- o SUAS Project (3,300 ha) is located on the western side of the proposed plantation Project;
- o Maliau Basin Conservation Area (58,840 ha) is situated to the northwest; and
- o Danum Valley Conservation Area (43,800 ha) is situated to the northeast of the proposed plantation.

^{3h} The size of this Project area has now been increased from 14,300 ha (according to SEIA 2002) to 18,500 ha.

The international projects, INIKEA and RBJ/NEP together with the Luasong Forestry Centre and part of the Sabah Softwoods' plantations cover most of the area dividing Benta I from Benta IIC.

3.9 Project Options

3.9.1 Without Project or “No Project” Option

If the Project area was not to be developed into an oil palm and forest plantations or mainly oil palm plantation, YSG would continue to manage the area as semi natural forest until their license expires (99 years).

However, this depends on the ability of the logged-over forest to regenerate naturally to its original biological composition and commercial value. The management system employed over the past three decades (70s, 80s and 90s) - in many cases with high-lead cable systems - has led to a disruption of the forest habitat and an associated reduction of the forest growing stock. This has led to an invasion of vines (*e.g. Merimia*), shrubs and non-commercial, pioneer tree species (*e.g. Macaranga*), over extensive portions of the Project area as part of the natural succession to revert to the primary forest conditions. This may take anywhere between 50 to 100 years. See **Plate 3-10**.

In the mean time the area will produce very meagre annual economic returns. Growth and yield surveys in similar heavily logged forests in other parts of Borneo, indicate that volume increment of commercial tree species is low (1 m³/ha/yr). Annual log production from the Project area is estimated at 190,000 m³ annually³ⁱ, with a market value of about RM 76 million, (i.e. 1 m³/ha/yr x RM 400/m³ x 190,000 ha).

3.9.2 Site Option

Due to the massive size of area intended for the Project development, there is no other site considered by the Project Proponent. There is however, an alternative site proposed by the WWF Malaysia during the TOR briefing on 15th March 2004, i.e. Sg. Pinangah Forest Reserve (see **Figure 3.9.1**) with a total area of about 191,652 ha^{3j}. However, further investigation revealed that the alternative site is not considered favourable due to the following reasons:

- o The Forestry Division of ICSB has started some reforestation works in this area since year 2004. This is under the Certification Support Programme (CSP), which is a stepwise approach to eventual certification by the Forest Stewardship Council (FSC).
- o The area is in close proximity with the Maliau Basin Conservation Area.
- o Economic distance of the plantation to the nearest town that has existing infrastructure facilities to support such development.

³ⁱ This estimate was based on the feasibility study conducted in SEIA 2002 (Chemsain Konsultant Sdn Bhd, 2002).

^{3j} Source: Sabah Forestry Department.

3.9.3 Reduced Scale Development

The proposed oil palm plantation is planned in blocks of about 5,000 ha, each serving one processing plant. The possibility of a reduced scale development on blocks of 5,000 ha is possible but will not satisfy the Yayasan Sabah's need for economic returns to finance his legal obligations of social and economic development, particularly in the rural areas of Sabah.

The implementation of this proposed OPP Project will mainly depend on the Project Proponent and his capacity to manage his consortium of partners. The scale of the development is thus partly dependent on the realization of the joint-venture commitments by Ratus Awansari Sdn Bhd JV and Yayasan-Melaka JV. If, due to whatever reasons and circumstances, the joint-venture cannot be materialised, the proposed Project would still be implemented in a much reduced size within the area studied for this SEIA. Any environmental requirements e.g. EIA, etc. will be addressed in accordance with the advice and directive by the Environment Protection Department, Sabah (EPD).

3.9.4 Project Abandonment

The proposed Project could be abandoned at any time due to financial, social, and/or political problems or the occurrence of natural disasters or wars within or outside of the country.

Abandonment after timber harvesting would leave a mosaic landscape of regenerating and recently logged-over stands. Abandonment after clearing of forest could intensify soil erosion and surface runoff, if exposed area is not revegetated immediately. The biodiversity in the Project area will virtually be lost. Abandonment at the end of the Project (e.g. 99 years) will leave the area with oil palm trees and low biodiversity resources.

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