APPENDIX III

SUMMARY OF FIELD RECONNAISSANCE SURVEY

TABLE OF CONTENTS

1. SEKRANG-1 (Sri Aman Area)

-Topography

The slope and width of both banks at the damsite are suitable for the construction of fill type dam with a maximum height of 60 m and maximum length of 240 m. The maximum height of the dam, however, is limitted to be less than 40 m due to existence of a saddle about 3 km to the north of damsite. Excepting this site, there is no other suitable site for dam construction in this area. A 40 -50 m wide riverbed is composed of approximately 8 m thick gravel deposit.

-Geology

Base rock at the damsite is slate of the Belaga Formation of Upper Cretaceous to mid-upper Eocene age. Weathered soft slate is found in the right bank riverbed. The left abutment is covered with a 3 m thick clayey talus deposit. The right abutment consists of clayey slate to a height of 15 m above the riverbed, where soft slate outcrops are observed. A fill type dam but not concrete dam will be applicable at the damsite. Hard slate is found at the powerhouse site on the right bank.

-Quarry site

A quarry consisting of alternation of sandstone and slate is available at 2 km to the north-northwest of the damsite.

-Aggregate

River deposits consisting of sand, gravel and cobbles (5 cm average and 10 cm maximum size) are available abundantly along the Batang Sekrang.

-Accessibility

For access to the site, a 16 km access road is to be newly constructed being branched from the public road between BETONG and SRI AMAN.

-Land compensation and resettlement

No resettlement will be needed. Some compensation for the pepper cultivation area on the right abutment will be needed.

-Present water use

The Batang Sekrang is used for navigation by dwellers in the up- and downstream of the damsite.

-Transmission line

Approximately 30 km long transmission line should be constructed through primary rain forest.

2. SEKRANG-2 (Sri Aman Area)

-Topography

Slope and width of both banks are suitable for the construction of approximately 100 m high fill or concrete dam with a crest length of about 400 m. A 70 m wide riverbed is composes of approximately 4 - 5 m thick gravel deposit.

-Geology

Base rock at the damsite is graywacke of the Belaga Formation. Alternation of graywacke and slate is found about 100 m downstream from the damsite. The powerhouse site on the left bank consists of alternation of graywacke and hard slate. The right bank is covered with a 5 - 7 m thick clayey talus deposit. The riverbed is composed of a 1 - 2 m thick sand and gravel deposit. The left bank is covered with a 2 - 3 m thick terrace deposit consisting of fine sand and silt.

-Quarry site

A graywacke quarry site is located about 1 km to the north of damsite.

-Aggregate

Cobbles stones comprising 5 cm average and 10 cm maximum size are available abundantly along the Batang Sekrang.

-Accessibility

A 35 km long access road shall be newly constructed, being branched off from the public road between BETONG and SARIKEI.

-Land compensation and resettlement

No resettlement will be needed.

-Present water use

The Batang Sekrang is presently used for navigation by dwellers in the up- and downstream of the damsite.

-Transmission line

Approximately 45 km long transmission line should be constructed through primary rain forest.

3. KANOWIT (Sarikei Area)

-Topography

The damsite valley has a width of about 400 m. The left abutment is relatively steep up to a height of about 60 m above the riverbed. Top of the left bank forms a thin abutment. The 60 m wide riverbed is composed of sand and gravel deposit.

The right bank forms a low-lying open topography over a width of some 260 m until it reaches the massive abutment, being composed of low terrace in a width of about 80 m and a low hill for the remaining width (See Fig. V-7 of Appendix V).

The dam height is limited to be less than 40 m due to existence of many low saddles on both banks.

-Geology

The Kanowit area is in the zone of sedimentary rocks so called Belaga Formation of Upper Cretaceous to mid-upper Eocene age. Base rock at the damsite and powerhouse site consists of phylitte intercalated with argillite of the Belaga Formation.

Phyllite and argillite at the dam and surrounding areas are soft and cracky due to weathering. Schistosity and 3 - 10 cm interval joints are observed in the base rock. The left abutment is covered with a 3 - 5 m thick sand and silt. The riverbed is composed with of a 2 - 4 m thick sand and gravel deposit. The right bank is covered with a 1 - 4 m thick alluvial terrace deposit consisting of fine sandy materials. The foundation geology will only allow to build a fill type dam of low to medium height.

-Quarry site

No suitable rock material is found in the vicinity. All the vicinity seems to be covered with phyllite which will become fine materials when quarried.

The existence of beds of sandstone was clarified in the geological report* as follows.

> In the lower part of Stage II (Belaga Formation), beds of sandstone occur from 50 to 300 feet thick, as in the Sarikei, Nyelong, Julau, Entabai, upper Kanowit and Katibas Valleys. Such beds are composed of massive, hard, medium-to coarse-grained, dark grey-green rock.

As stated above, possible quarry site of this sandstone can be expected at some 20 km to south-southeast of the potential damsite.

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* Wolfenden, E. B. (1960) The geology and mineral resources of lower Rajang valley and adjoining areas, Sarawak Memoir II; Brit. Borneo Geol. Survey Ann. Rept., (P32-P33)

- Aggregate

Although there are abundant riverbed deposits in the Sungai Kanowit, these deposits consist of weathered sandstone, phyllite and slate which may be disqualified qualitatively. A further detailed survey is required if this site is choosen.

-Accessibility

The damsite will be accessible through a public road which is under construction aiming at completing within 4-5 years.

-Land compensation and resettlement

The reservoir area is widely used for cultivation with many housings. It is reported preliminarily that approximately 3,000 people have to be resettled.

-Present water use

The Sungai Kanowit is used for navigation by dwellers in up and downstream reaches of the damsite.

-Transmission line

Approximately 65 km long transmission line is needed to reach Sarikei. Most of the transmission towers will be accessible from the public roads, existing or under construction.

4. MEDAMIT-2 (Limbang Area)

--Damsite topography

River course at the damsite meanders complicatedly. It is possible to construct an intermediatly high dam. Width of the river is narrow, at about 15 m, with sandstones exposed on the both banks. Left abutment slope is steep with a height of about 90 m, but the right abutment slope is gentle.

--Powerhouse topography

The powerhouse will be located at a toe of gentle slope on the right bank of the Sungai Limbang. No topographic difficulty is found.

-Damsite geology

The foundation of damsite consists of about 15 m thick graywacke and hard shale of the Setap Shale formation. Dip and strike of these sedimentary rocks are 50 NE and N 30 W, respectively, dipping downstream at the damsite. Graywacke has dip joints of 25 degree downstreamward. The left abutment is covered with thin overburden. The riverbed is composed of a 2 m thick gravel and cobble stones. The right bank is covered with a 5 m thick clayey topsoils. Construction of a high concrete dam will be questionable in view of extensive joints dipping toward the downstream.

--Powerhouse geology

Geology of the powerhouse site consists of limestone and weathered shale. Limestone distributes beneath the shale along the Sungai Limbang. A 5 m thick fractured zone extends along the boundary of limestone and shale. The powerhouse is located on the limestone.

-Quarry site

No quarry site suitable for acquiring rockfill material is found in the vicinity. All the mountain in the vicinity seems to be covered with shale in palaeogene stage. This suggests a difficulty of construction of a fill type dam.

--Aggregate

Aggregate materials for concrete is available in river reaches within 2 km up- and downstream from the damsite in an order of approximately 10,000 m3. The concrete intake weir can be constructed by use of these aggregates. For the powerhouse and headrace tunnel, aggregate is available abanduntly in the Sungai Limbang.

-Accessibility

There exist logging roads passing just upstream of the damsite and also at the powerhouse site. Only a short access road of about

200 m, with a bridge to cross the Sungai Medamit, will be needed. No new access road will be needed at the powerhouse site except for a road to the head tank.

-Land compensation and resettlement

No compensation or resettlement will be needed.

-Downstream water use

River seems to be usable for navigation in a strech of about 20 km upstream from the confluence with the Sungai Limbang. No many houses, however, are obserbed along the river course.

-Transmission line

Transmission line from the powerhouse to Limbang will be 60 km in length. Most of the transmission towers will be accessible from the existing logging roads.

5. PASIA (Limbang Area)

- Damsite topography

The damsite is proposed on the top of rapid stream of the Sungai Pasia whereat the riverbed gradient is about 1/20. Width of the rock-exposed riverbed is approximately 20 m. Both banks at the damsite is confining the river in a steep V-shape gorge with graywacke exposed on the slopes. Construction of a high dam of over 150 m may be possible.

-Powerhouse topography

The powerhouse is located on the left bank of the Batang Trusan about 2 km upstream from the confluence with the Sungai Pasia. The scheme will harness a gross head of about 310 m. Topography at the powerhouse site is relatively steep.

-Geology

All the project area consists of graywacke of the Meligan Formation. Damsite, powerhouse site and along the Sungai Pasia are covered with the exposed rock. Proposed route of headrace tunnel also consists of graywacke.

-Quarry site

All the area in the vicinity is covered with graywacke. Rock quarry will be available elsewhere in the area.

-Aggragate

Aggregate material is scarce in the steep stretches of Sungai Pasia. About 5,000 m3 will be available in the Batang Trusan about 5 km upstream from the proposed powerhouse site. This area is located just at the end of the logging road now under construction.

-Accessibility

There exists a logging road reaching up to Lawas, about 5 km from the powerhouse site in air distance. The road to Lawas is via Long Sukang where there is an airport for domestic air flight. A bridge crossing the Batang Trusan at 2 km downstream from the abandoned village, Long Merarap, or about 5 km upstream from the proposed powerhouse, will be constructed by mid-1987, reported by a logging company. On completion of the bridge, the road would be put in service. The intake and powerhouse sites are situated in steep mountain areas in primary rain forest, which makes access thereto very difficult. An additional 20 km long access road will be needed to reach these construction sites.

-Land compensation and resettlement

No compensation nor resettlement is needed.

-Downstream water use

There is no inhabitant in the basin upstream from the intake site. The scheme will deplete river flow in stretches of about 8 km in length, but this 8 km rapid stream is presently not utilized for any purposes. No waterborne traffic nor fishery activity is observed in the vicinity.

- Transmission line

A 110 km long transmission line will be required for supply of power to Limbang area. About 20 km out of 110 km has to pass through primary rain forest area till it reach the upstream part of the Sungai Medamit. Remaining 90 km will be accessible either from the existing public road or logging roads.

6. AYAT (Kapit Area)

-General Topography

In the map study, the proposed dam site was selected just downstream of confluence of Sungai Sungkabang and Sungai Ayat. The powerhouse was proposed about 2.5 km downstream from the damsite aiming at utilizing a 110 m high head as shown on the map in a scale of 1/50,000.

However, field reconnaissance revealed by means of the altimeter meansurement that there is no high head available between the dam and powerhouse sites. The total head available in a series of rapids along the river is approximately 20 m at the maximum. This suggested that contour information extracted from the map was incorrect. Observation on field concluded power potential at this site to be less attractive.

7. BANGKIT (Kapit Area)

-General Topography

The potential site was selected just downstream from confluence of the Sungai Bangkit and Sungai Rirang. The powerhouse was proposed at about 900 m downstream from the damsite aiming at utilizing a 30 m head shown on the map in a scale of 1/50,000. However, as is the case of Ayat, this topographical information on the map was found to be incorrect during field reconnaissance.

Measurement by altimeter on the field indicated that power head available at the site be actually less than 10 m. The scheme was abandoned due to this finding.

8. KAPIT-2 (Kapit Area)

-Damsite Topography

The slope and width of both banks at the damsite are suitable for the construction of a fill type dam in a maximum height of some 65 m with a crest length of 170 m. A 23 m wide riverbed is exposed of rock. The right bank shows a open topography in immediately downstream area which offers a suitable site to provide powerhouse and switchyard. No any natural head exists along the river. The right abutment area and left abutment downstream area are cultivated for plantation of dry paddy and corn. All trees on both banks had been cut the fire cultivation. No fire cultivation area exists in the proposed reservoir area.

-Damsite geology

Base rock at the damsite consists of graywacke and slate of the Belaga Formation. In both abutments and river shores observed are the exposed faces of alternation of 2-10 cm thick hard graywacke and 1-8 cm thick hard slate. This alternation distributes along the Sungai Benuan. The both banks at damsite and its vicinity seems to be covered with weathered clayey slate. The outcrops of slate are observed on the top of right abutment along the existing logging road. There also exists exposed clayey slate on the left bank covered with a 4-5 m thick terrace deposit consisting of sand and gravel. A lower part of the right bank, some 10 m high above the riverbed, above is covered with topsoil consisting of clay and sand. The upper part is covered with topsoil consisting of clay. In general, geological condition is suitable for a fill type dam, but not for a concrete dam. Base rock at the powerhouse consists of weathered slate of the Belaga Formation. Weathered slate has schistosity at a thickness of 1-2 mm. The sistosity dips steeply. The geological condition is suitable for powerhouse foundation.

-Quarry site

A sandstone quarry site is available at 4 km north of the damsite, which is also conceived as the quarry site for the Mukoh scheme located about 1 km away from the quarry site.

-Aggregate

River deposit of aggregate materials is limited along the Sungai Benuan, though the deposit consisting of sand and gravel in a size of 3-7 cm and maximum size of 25 cm are observed occassionally.

-Accessibility

There exists logging road passing just downstream of the damsite.

-Land compensation and resettlement

About 2 hectares of the fire cultivation land should be compensated.

-Downstream water use

The damsite seems navigable. The river, however, seems not to be utilized for navigation to and from the downstream reaches because of existence of a series of rapids along the Sungai Mukoh about 5 km downstream from the damsite.

-Transmission line

Approximately 27 km long transmission line is needed to reach Kapit. The line route will be accessible from the existing logging roads.

9. MUKOH (Kapit Area) Additional Potential Site

The Mukoh potential site is located on the Sungai Mukoh 3.3 km straight distance downstream from the confluence of the Sungai Mukoh and Sungai Benuan (at which the Kapit-2 is proposed). The Mukoh damsite is located 5 km downstream from the Kapit-2. The Mukoh is selected as a run-of-river type scheme aiming at utilizing a natural and damming-up head of about 45 m and abundant annual discharge of 25 cms.

-Damsite Topography

The damsite is located on almost top of 1 km long rapids of the Sungai Mukoh whereat a total natural head of about 25 m exists. The river at the dam axis is confined by high mountain projections from both banks. Steep slopes are formed on both banks, ascending at 60 degrees from the 15 m wide sandstone exposed riverbed. A 110 m high dam may be constructed from topographic viewpoint. Although the shifting of the dam axis upstreamward by about 300 m will obtain an additional 5 m natural head from the upstream rapids, the proposed downstream site seems more advantages than the upstream site since the latter would require a 300 m long additional tunnelling.

-Powerhouse topography

The powerhouse site located at the end of a series of rapids is situated on the right bank of the Sungai Mukoh about 1.5 km downstream from the damsite. The site shows a steep topography, which may involve a large excavation work. The river is formed by hard banks with exposed rock.

-Damsite geology

Base rock at the damsite consists of hard graywacke of the Belaga Formation. Graywacke exposes at both abutments as well as river-shores. No riverbed deposit is observed at the damsite. Two types of joints are observed in graywacke, tight vertical joint and open flat-lying joint. Vertical joints at an intervals of 15-20 cm are observed in a direction along the Sungai Mukoh. Flat-lying joints at an intervals of 10-20 cm dip downstreamward in 20 degrees. The geological condition will be suitable for a low concrete dam or high fill type dam. Construction of a high concrete dam will need a further detailed investigation, in view of particular geological structure dipping downstreamward.

-Powerhouse geology

Base rock at the powerhouse site consists of hard slate of the Belaga Formation. Slate has vertical schistosity with a thickness of 1-2 mm. The geolocical condition is suitable for powerhouse foundation.

-Quarry site

Graywacke quarry is available on both banks. High mountains forming a V-shape gorge around the damsite mostly consist of hard graywacke.

-Aggregate

Gravel/cobbles deposits containing 10-50 cm size gravel and 150-200 cm size boulder are available about 100 m upstream from the damsite. Some of aggregate materials for concrete will have to be produced either from these gravel/cobbles or excavated graywackes. Fine aggregates must be secured in the sources away from the site.

-Accessibility

A logging road exists along top of mountains about 1.5 km upstream on the right bank. Being branched off therefrom, a 6 km long access road is to be built to reach the dam and powerhouse sites.

-Land compensation and resettlement

Neither land compensation nor resettlement are needed in the reservoir/pondage area.

-Downstream water use

No utilization of river in reaches of steep rapids. The rapids is innavigable.

-Transmission line

Approximately 25 km long transmission line will be needed to reach Kapit. The line route will be accessible from the existing logging roads.

10. KAPIT-1 (Kapit Area)

-Damsite topography

The river valley is relatively wide, with right abutment slope slanting downstreamward. Maximum practicable dam height is about 35 m with a crest length of 200 m. Dam volume will be large due to non-uniform topography prevailed at the damsite. The powerhouse and switchyard will be provided on the flat right bank.

-Damsite geology

Base rock at the damsite consists of slate and graywacke of the Belaga Formation. Strike of the bedding is N 60 W, and dips toward right bank in 40 degrees. Soft slate crops out on the left abutment. The soft slate has open joints at an intervals of 5-10 cm in parallel with schistosity. A 3-5 m thick alluvial terrace deposit exists along the left bank river shore about 10-20 m downstream from the proposed dam axis. Weathered graywacke crops out on the right bank. Weathered graywacke has open joints at an intervals of 15-30 cm. The rock is soft to hard. Another alluvial terrace deposit exists left bank about 5-10 m upstream from the damsite. Thickness of the graywacke is estimated to be 40-50 m. The riverbed is composed of a 2-3 m thick sand and gravel. The geological condition is not suitable for a concrete dam. Base rock at the powerhouse is slate. It is soft due to weathering and has schistosity at an interval of 2-3 mm.

-Quarry site

All the mountains in the vicinity seems to be covered with soft slate. No suitable rock material is found in the vicinity.

-Aggregate

River deposit containing 7 cm average and 15 cm maximum size sandstone particles are available along the Sungai Menuan sufficiently for the construction use.

-Accessibility

Approximately 15 km long access road will be needed from the Batang Rajang to the damsite.

-Land compensation and resettlement

Approximately 40% of the reservoir area is cultivated for plantation of pepper, dry paddy and rubber. Four (4) longhouses, one (1) school and approximately 500 people have to be resettled.

-Present water use

The Sungai Menuan is being used for navigation by dwellers in reaches up and downstream of the damsite.

-Transmission line

Approximately 8 km long transmission line is needed to reach Kapit, passing through the cultivated land.

11. IBAU (Kapit Area)

-Damsite topography

The damsite is suitable for building a 60 m high and 230 m long fill type dam. The valley bottom is relatively wide, being composed of a water channel of 25 m wide on the right side and a 25 m wide and 5 m high terrace deposit on the left side. The powerhouse and switch-yard will be located on the right bank.

-Damsite geology

Base rock at the damsite consists of slate of the Belaga Formation. The lower part of left abutment, to a height of 5 m above the riverbed, is covered with alluvial terrace deposit consisting of silty sand and gravel. The upper part is covered with weathered slate consists of clay and rubbles. Slate crops out on the right bank and has joints at an intervals of 5-10 cm in parallel with schistosity. The riverbed is composed of 2-3 m thick silt, sand and gravel deposit. The base rock of slate is not suitable for a concrete dam. Base rock at the powerhouse also consists of slate. The slate is soft due to weathering and has open joints at an intervals of 5-10 cm in parallel with schistosity.

-Quarry site

No suitable rock material is found in the vicinity. All the mountains in the vicinity seem to be covered with weathered slate.

-Aggregate

River deposits containing 3-7 cm size and 20 cm maximum size sandstone gravels are available along the Sungai Ibau sufficiently for the construction use.

-Accessibility

Approximately 8 km long access road is needed from the Batang Rajang to the damsite.

-Land compensation and resettlement

Approximately 2 hectares of the cultivated land and one longhouse shall be compensated and resettled.

-Present water use

The Sungai Ibau is used for navigation by dwellers in the reaches up- and downstream of the damsite.

-Transmission line

Approximately 25 km long transmission line is needed to reach Kapit.

APPENDIX IV

INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING

TABLE OF CONTENTS

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
****

1. LOAD CENTER : LIMBANG
2. POTENTIAL SITE : MEDAMIT-2 (S.MEDAMIT)
3. IDENTIFICATION NO. : 15
4. LOCATION : LATITUDE 4 21 0 N LONGITUDE 115 4 0 E
NOTE : ABOUT 500 M DOWNSTREAM FROM THE CONFLUENCE OF THE S.DEDAMONG
5. DISTANCE FROM LOAD CENTER : 35.0 KM
6. TYPE OF DEVELOPMENT : RUN-OF-RIVER

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	185.0	
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	134.0	
AVERAGE ANNUAL RAINFALL	(MM) :	3750.0	
AVERAGE ANNUAL EVAPORATION	(MM) :	1410.0	
AVERAGE ANNUAL RUNOFF	(CMS) :	14.0	
HEADRACE TUNNEL LENGTH	(M) :	4400.0	
PENSTOCK TUNNEL LENGTH	(M) :	350.0	
PLANT FACTOR	:	0.5	

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. FULL SUPPLY LEVEL	(EL;M) :	137.0
RIVERBED WIDTH	(M) :	15.0
TAIL WATER LEVEL	(EL;M) :	70.0
TRANSMISSION LINE LENGTH	(KM) :	60.0
ACCESS ROAD LENGTH	(KM) :	4.0
LAND ACQUISITION	(HA) :	0.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

FIRM DISCHARGE	(CMS) :	7.9
DEPENDABLE PEAK DISCHARGE	(CMS) :	7.9
MAXIMUM TURBINE DISCHARGE	(CMS) :	25.1
FULL SUPPLY LEVEL	(EL;M) :	137.0
TAIL WATER LEVEL	(EL;M) :	70.0
POWER GENERATION EFFICIENCY	:	0.82
GROSS HEAD	(M) :	67.0
NET HEAD	(M) :	60.3
FIRM OUTPUT	(MW) :	1.9
DEPENDABLE PEAK OUTPUT	(MW) :	3.9
INSTALLED CAPACITY	(MW) :	12.5
CONSTRUCTION COST	(MILL.M$) :	64.9
ANNUAL ENERGY OUTPUT	(GWH) :	32.4
COST / KWH	(M$) :	20.2

10. REMARKS : PROCEEDED TO THE THIRD SCREENING

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
****

1. LOAD CENTER : LIMBANG
2. POTENTIAL SITE : PASIA (S.PASIA)
3. IDENTIFICATION NO. : 17
4. LOCATION : LATITUDE 4 21 0 N LONGITUDE 115 24 0 E
NOTE : ABOUT 8.2 KM UPSTREAM FROM THE CONFLUENCE OF THE S.TRUSAN
5. DISTANCE FROM LOAD CENTER : 61.0 KM
6. TYPE OF DEVELOPMENT : RUN-OF-RIVER

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM)	:	177.0
RIVERBED ELEVATION AT DAMSITE	(EL;M)	:	674.0
AVERAGE ANNUAL RAINFALL	(MM)	:	3500.0
AVERAGE ANNUAL EVAPORATION	(MM)	:	1180.0
AVERAGE ANNUAL RUNOFF	(CMS)	:	13.0
HEADRACE TUNNEL LENGTH	(M)	:	3800.0
PENSTOCK TUNNEL LENGTH	(M)	:	550.0
PLANT FACTOR		:	0.5

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. FULL SUPPLY LEVEL	(EL;M)	:	677.0
RIVERBED WIDTH	(M)	:	20.0
TAIL WATER LEVEL	(EL;M)	:	366.0
TRANSMISSION LINE LENGTH	(KM)	:	110.0
ACCESS ROAD LENGTH	(KM)	:	10.0
LAND ACQUISITION	(HA)	:	0.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

FIRM DISCHARGE	(CMS)	:	3.6
DEPENDABLE PEAK DISCHARGE	(CMS)	:	7.3
MAXIMUM TURBINE DISCHARGE	(CMS)	:	24.2
FULL SUPPLY LEVEL	(EL;M)	:	677.0
TAIL WATER LEVEL	(EL;M)	:	366.0
POWER GENERATION EFFICIENCY		:	0.82
GROSS HEAD	(M)	:	311.0
NET HEAD	(M)	:	279.9
FIRM OUTPUT	(MW)	:	8.2
DEPENDABLE PEAK OUTPUT	(MW)	:	16.4
INSTALLED CAPACITY	(MW)	:	54.5
CONSTRUCTION COST	(MILL.M$)	:	123.5
ANNUAL ENERGY OUTPUT	(GWH)	:	137.8
COST / KWH	(M$)	:	9.4

10. REMARKS : PROCEEDED TO THE THIRD SCREENING

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
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1. LOAD CENTER : KAPIT
2. POTENTIAL SITE : KAPIT-1 (S.PELIAN)
3. IDENTIFICATION NO.: 21
4. LOCATION : LATITUDE 2 5 0 N LONGITUDE 115 54 0 E
NOTE : ABOUT 1.5 KM DOWNSTREAM FROM THE CONFLUENCE OF THE S.ENGKATAN
5. DISTANCE FROM LOAD CENTER : 0.0 KM
6. TYPE OF DEVELOPMENT : RESERVOIR

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	101.0	MAX. TOPOGRAPHICAL ELEVATION	(EL;M) :	65.0
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	30.0	MAX. WIDTH OF DAM CREST	(M) :	200.0
AVERAGE ANNUAL RAINFALL	(MM) :	6000.0	RIVERBED WIDTH	(M) :	30.0
AVERAGE ANNUAL EVAPORATION	(MM) :	1470.0	TAIL WATER LEVEL	(EL;M) :	30.0
AVERAGE ANNUAL RUNOFF	(CMS) :	3.0			
HEADRACE TUNNEL LENGTH	(M) :	180.0	TRANSMISSION LINE LENGTH	(KM) :	8.0
PENSTOCK TUNNEL LENGTH	(M) :	40.0	ACCESS ROAD LENGTH	(KM) :	15.0
PLANT FACTOR	:	0.5	LAND ACQUISITION	(HA) :	80.0
DENUDATION RATE	(MM/YR) :	1.0			

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	1.671	0.571	0.471	0.671	0.571	0.471	0.671	0.571	0.471
FIRM DISCHARGE	(CMS)	5.4	4.6	3.8	5.4	4.6	3.8	5.4	4.6	3.8
PEAK DISCHARGE	(CMS)	10.7	9.1	7.5	10.7	9.1	7.5	10.7	9.1	7.5
FULL SUPPLY LEVEL	(EL;M)	66.000	66.000	66.000	64.800	63.200	61.800	64.700	61.300	58.500
RATED WATER LEVEL	(EL;M)	59.406	62.502	63.339	58.906	60.136	60.068	58.440	56.172	54.304
MIN. OPERATION LEVEL	(EL;M)	48.000	57.600	60.600	47.100	54.000	56.600	45.900	45.900	45.900
TAIL WATER LEVEL	(EL;M)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
GROSS STORAGE	(MCM)	60.000	60.000	60.000	59.100	59.100	59.100	58.300	42.000	28.600
ACTIVE STORAGE	(MCM)	51.530	35.260	21.860	51.530	35.260	21.860	51.530	35.260	21.860
SEDIMENT VOLUME	(MCM)	5.050	5.050	5.050	5.050	5.050	5.050	5.050	5.050	5.050
POWER GENERATION EFFICIENCY		0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	29.4	32.5	33.5	28.9	30.1	30.1	29.4	26.2	24.3
NET HEAD	(M)	26.5	29.5	30.2	26.0	27.1	27.1	25.6	23.6	21.9
INSTALLED CAPACITY	(MW)	2.3	2.1	1.8	2.2	2.0	1.6	2.2	1.7	1.3
CONSTRUCTION COST	(MILL.MP)	46.6	45.1	43.8	46.2	41.7	37.8	46.0	38.4	34.2
ANNUAL ENERGY	(GWH)	9.9	9.2	7.8	9.6	8.5	7.0	9.4	7.4	5.7
COST/ KWH	(MP)	48.1	49.6	56.6	48.5	49.4	54.5	49.1	52.4	60.9

10. REMARKS :

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
****

1. LOAD CENTER : KAPIT
2. POTENTIAL SITE : KAPIT-2 (S.BENUANG)
3. IDENTIFICATION NO. : 22
4. LOCATION : LATITUDE 1 48 0 N LONGITUDE 115 47 0 E
NOTE : ABOUT 1.5 KM UPSTREAM FROM THE CONFLUENCE OF THE S.MUKOH
5. DISTANCE FROM LOAD CENTER : 27.0 KM
6. TYPE OF DEVELOPMENT : RESERVOIR

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	220.0	
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	104.0	
AVERAGE ANNUAL RAINFALL	(MM) :	4100.0	
AVERAGE ANNUAL EVAPORATION	(MM) :	1430.0	
AVERAGE ANNUAL RUNOFF	(CMS) :	19.0	
HEADRACE TUNNEL LENGTH	(M) :	320.0	
PENSTOCK TUNNEL LENGTH	(M) :	20.0	
PLANT FACTOR	:	0.5	
DENUDATION RATE	(MM/YR) :	1.0	

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. TOPOGRAPHICAL ELEVATION	(EL;M) :	169.0	
MAX. WIDTH OF DAM CREST	(M) :	170.0	
RIVERBED WIDTH	(M) :	23.0	
TAIL WATER LEVEL	(EL;M) :	105.0	
TRANSMISSION LINE LENGTH	(KM) :	27.0	
ACCESS ROAD LENGTH	(KM) :	4.0	
LAND ACQUISITION	(HA) :	4.0	

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	0.518	0.418	0.318	0.518	0.418	0.318	0.518	0.418	0.318
FIRM DISCHARGE	(CMS)	9.9	8.0	6.1	9.9	8.0	6.1	9.9	8.0	6.1
PEAK DISCHARGE	(CMS)	19.7	15.9	12.1	19.7	15.9	12.1	19.7	15.9	12.1
FULL SUPPLY LEVEL	(EL;M)	169.000	169.000	169.000	168.500	163.800	160.700	168.100	158.600	152.400
RATED WATER LEVEL	(EL;M)	159.410	164.837	166.736	158.577	158.439	157.770	157.810	151.474	147.338
MIN. OPERATION LEVEL	(EL;M)	140.200	156.500	162.200	138.700	147.700	151.900	137.200	137.200	137.200
TAIL WATER LEVEL	(EL;M)	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000
GROSS STORAGE	(MCM)	83.700	83.700	83.700	82.100	66.100	57.500	80.400	51.700	36.400
ACTIVE STORAGE	(MCM)	66.120	37.450	22.100	66.120	37.450	22.100	66.120	37.450	22.100
SEDIMENT VOLUME	(MCM)	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
POWER GENERATION EFFICIENCY		0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	54.4	59.8	61.7	53.6	53.4	52.8	52.8	46.5	42.3
NET HEAD	(M)	49.0	53.9	55.6	48.2	48.1	47.5	47.5	41.8	38.1
INSTALLED CAPACITY	(MW)	7.8	6.9	5.4	7.6	6.1	4.6	7.5	5.3	3.7
CONSTRUCTION COST	(MILL.M$)	100.7	96.6	92.7	99.7	87.0	78.8	98.9	79.9	68.6
ANNUAL ENERGY	(GWH)	33.3	29.5	23.2	32.8	26.4	19.8	32.3	22.9	15.9
COST/ KWH	(M$)	30.5	33.0	40.3	30.7	33.3	40.1	30.9	35.1	43.5

10. REMARKS : PROCEEDED TO THE THIRD SCREENING

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
****

1. LOAD CENTER : KAPIT
2. POTENTIAL SITE : IRAU (S.IRAU)
3. IDENTIFICATION NO. : 23
4. LOCATION : LATITUDE 2 4 0 N LONGITUDE 112 43 0 E
NOTE : ABOUT 800 M UPSTREAM FROM THE CONFLUENCE OF THE S.SANYABU
5. DISTANCE FROM LOAD CENTER : 75.0 KM
6. TYPE OF DEVELOPMENT : RESERVOIR

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	163.0
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	42.0
AVERAGE ANNUAL RAINFALL	(MM) :	3500.0
AVERAGE ANNUAL EVAPORATION	(MM) :	1465.0
AVERAGE ANNUAL RUNOFF	(CMS) :	11.0
HEADRACE TUNNEL LENGTH	(M) :	400.0
PENSTOCK TUNNEL LENGTH	(M) :	40.0
PLANT FACTOR	:	0.5
DENUDATION RATE	(MM/YR) :	1.0

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. TOPOGRAPHICAL ELEVATION	(EL;M) :	102.0
MAX. WIDTH OF DAM CREST	(M) :	230.0
RIVERBED WIDTH	(M) :	25.0
TAIL WATER LEVEL	(EL;M) :	42.0
TRANSMISSION LINE LENGTH	(KM) :	25.0
ACCESS ROAD LENGTH	(KM) :	8.0
LAND ACQUISITION	(HA) :	70.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	0.451	0.775	0.665	0.851	0.735	0.665	0.851	0.735	0.665
FIRM DISCHARGE	(CMS)	9.4	8.6	7.3	9.4	8.6	7.3	9.4	8.6	7.3
PEAK DISCHARGE	(CMS)	18.7	17.3	14.6	18.7	17.3	14.6	18.7	17.3	14.6
FULL SUPPLY LEVEL	(EL;M)	102.000	102.000	102.000	98.200	96.000	92.900	94.300	89.900	83.800
RATED WATER LEVEL	(EL;M)	96.039	96.137	99.502	90.574	90.472	88.904	82.012	79.077	75.009
MIN. OPERATION LEVEL	(EL;M)	94.100	90.400	94.500	75.300	79.400	80.900	57.400	57.400	57.400
TAIL WATER LEVEL	(EL;M)	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000
GROSS STORAGE	(MCM)	221.400	221.400	221.400	185.900	165.300	137.100	150.300	114.600	80.100
ACTIVE STORAGE	(MCM)	139.450	103.950	69.450	139.650	103.950	69.450	139.650	103.950	69.450
SEDIMENT VOLUME	(MCM)	8.150	8.150	8.150	8.150	8.150	8.150	8.150	8.150	8.150
POWER GENERATION EFFICIENCY		0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	54.0	56.1	57.5	48.6	48.5	46.9	40.0	37.1	33.0
NET HEAD	(M)	48.4	50.5	51.8	43.7	43.6	42.2	36.0	33.4	29.7
INSTALLED CAPACITY	(MW)	7.3	7.0	6.1	6.6	6.1	5.0	5.4	4.6	3.5
CONSTRUCTION COST	(MILL.M$)	96.4	94.9	92.1	89.8	84.7	77.1	83.8	75.8	64.5
ANNUAL ENERGY	(GWH)	32.0	30.3	26.6	28.8	26.6	21.7	23.7	20.3	15.3
COST/ KWH	(M$)	30.4	31.1	34.9	31.5	32.1	35.8	35.7	37.6	42.6

10. REMARKS :

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
****

1. LOAD CENTER : KAPIT
2. POTENTIAL SITE : PANGKIT (SUNGKIT)
3. IDENTIFICATION NO. : 24
4. LOCATION : LATITUDE 1 32 0 N LONGITUDE 112 48 0 E
NOTE : ABOUT 200 M UPSTREAM FROM THE CONFLUENCE OF THE S.RIRANG
5. DISTANCE FROM LOAD CENTER : 42.0 KM
6. TYPE OF DEVELOPMENT : DIVERSION

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	167.0
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	162.0
AVERAGE ANNUAL RAINFALL	(MM) :	4100.0
AVERAGE ANNUAL EVAPORATION	(MM) :	1393.0
AVERAGE ANNUAL RUNOFF	(CMS) :	14.0
HEADRACE TUNNEL LENGTH	(M) :	700.0
PENSTOCK TUNNEL LENGTH	(M) :	100.0
PLANT FACTOR	:	0.5
DENUDATION RATE	(MM/YR) :	1.0

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. TOPOGRAPHICAL ELEVATION	(EL;M) :	222.0
MAX. HIGTH OF DAM CREST	(M) :	750.0
RIVERBED WIDTH	(M) :	30.0
TAIL WATER LEVEL	(EL;M) :	152.0
TRANSMISSION LINE LENGTH	(KM) :	75.0
ACCESS ROAD LENGTH	(KM) :	20.0
LAND ACQUISITION	(HA) :	0.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	0.725	0.625	0.625	0.725	0.625	0.525	0.725	0.625	0.525
FIRM DISCHARGE	(CMS)	10.1	8.7	7.3	10.1	8.7	7.3	10.1	8.7	7.3
PEAK DISCHARGE	(CMS)	20.3	17.5	14.7	20.3	17.5	14.7	20.3	17.5	14.7
FULL SUPPLY LEVEL	(EL;M)	222.000	222.000	220.000	220.000	204.400	205.300	218.000	194.300	188.600
RATED WATER LEVEL	(EL;M)	209.192	209.745	211.810	204.615	199.442	199.373	203.048	187.574	183.438
MIN. OPERATION LEVEL	(EL;M)	174.500	185.200	191.400	173.800	181.500	187.500	173.100	173.100	173.100
TAIL WATER LEVEL	(EL;M)	152.000	152.000	152.000	152.000	152.000	152.000	152.000	152.000	152.000
GROSS STORAGE	(MCM)	124.200	124.200	124.200	122.200	110.400	107.500	120.200	87.900	61.800
ACTIVE STORAGE	(MCM)	108.710	76.370	50.320	108.710	76.370	50.320	108.710	76.370	50.320
SEDIMENT VOLUME	(MCM)	8.350	8.350	8.350	8.350	8.350	8.350	8.350	8.350	8.350
POWER GENERATION EFFICIENCY		0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	54.2	57.7	59.8	52.6	47.4	47.4	51.0	35.6	31.4
NET HEAD	(M)	48.8	52.0	53.8	47.4	42.7	42.6	45.9	32.0	28.3
INSTALLED CAPACITY	(MW)	8.0	7.3	6.4	7.7	6.0	5.0	7.5	4.5	3.3
CONSTRUCTION COST	(MILL.MS)	145.9	142.5	139.2	137.9	111.4	103.7	130.5	93.5	84.0
ANNUAL ENERGY	(GWH)	32.5	31.1	27.0	32.8	25.5	21.4	31.8	19.1	14.2
COST/ KWH	(MS)	43.5	46.3	52.0	42.4	44.0	48.9	41.3	49.3	59.7

10. REMARKS :

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
****

1. LOAD CENTER : KAPIT
2. POTENTIAL SITE : AYAT (S.AYAT)
3. IDENTIFICATION NO. : 26
4. LOCATION : LATITUDE 1 38 0 N LONGITUDE 112 43 0 E
NOTE : ABOUT 100 M DOWNSTREAM FROM THE CONFLUENCE OF THE S. SUNGKABANG
5. DISTANCE FROM LOAD CENTER : 48.0 KM
6. TYPE OF DEVELOPMENT : RESERVOIR

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	59.0
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	244.0
AVERAGE ANNUAL RAINFALL	(MM) :	4000.0
AVERAGE ANNUAL EVAPORATION	(MM) :	1355.0
AVERAGE ANNUAL RUNOFF	(CMS) :	5.0
HEADRACE TUNNEL LENGTH	(M) :	1380.0
PENSTOCK TUNNEL LENGTH	(M) :	100.0
PLANT FACTOR	:	0.5
DENUDATION RATE	(MM/YR) :	1.0

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. TOPOGRAPHICAL ELEVATION	(EL;M) :	305.0
MAX. WIDTH OF DAM CREST	(M) :	350.0
RIVERBED WIDTH	(M) :	70.0
TAIL WATER LEVEL	(EL;M) :	134.0
TRANSMISSION LINE LENGTH	(KM) :	80.0
ACCESS ROAD LENGTH	(KM) :	25.0
LAND ACQUISITION	(HA) :	0.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	0.851	0.785	0.665	0.851	0.785	0.665	0.851	0.785	0.665
FIRM DISCHARGE	(CMS)	4.3	3.9	3.3	4.3	3.9	3.3	4.3	3.9	3.3
PEAK DISCHARGE	(CMS)	8.5	7.9	6.7	8.5	7.9	6.7	8.5	7.9	6.7
FULL SUPPLY LEVEL	(EL;M)	304.800	304.800	304.800	304.400	302.300	299.300	303.900	299.700	293.900
RATED WATER LEVEL	(EL;M)	292.545	298.873	301.870	291.013	293.409	293.606	288.915	286.114	282.245
MIN. OPERATION LEVEL	(EL;M)	266.000	287.000	296.000	264.200	275.600	282.200	258.900	258.900	258.900
TAIL WATER LEVEL	(EL;M)	134.000	134.000	134.000	134.000	134.000	134.000	134.000	134.000	134.000
GROSS STORAGE	(MCM)	71.600	71.600	71.600	69.600	59.800	50.100	67.600	51.400	35.700
ACTIVE STORAGE	(MCM)	63.480	47.250	31.570	63.480	47.250	31.570	63.480	47.250	31.570
SEDIMENT VOLUME	(MCM)	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950	2.950
POWER GENERATION EFFICIENCY		0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	158.5	164.9	167.9	157.0	159.4	159.6	154.9	152.1	148.2
NET HEAD	(M)	142.7	148.4	151.1	141.3	143.5	143.6	139.4	136.9	133.4
INSTALLED CAPACITY	(MW)	9.7	9.4	8.1	9.7	9.1	7.7	9.5	8.7	7.2
CONSTRUCTION COST	(MILL.M$)	115.5	114.4	112.8	114.6	109.1	101.4	113.6	104.0	91.8
ANNUAL ENERGY	(GWH)	18.5	18.7	16.5	18.0	17.4	14.8	17.5	15.5	12.4
COST/ KWH	(M$)	63.1	61.6	68.8	64.1	63.4	69.2	65.5	67.5	74.9

10. REMARKS :

** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **

1. LOAD CENTER : KAPIT
2. POTENTIAL SITE : MUKOH (S.MUKOH)
3. IDENTIFICATION NO.: 27
4. LOCATION : LATITUDE 1 50 0 N LONGITUDE 112 47 0 E
   NOTE : ABOUT 5.0 KM DOWNSTREAM FROM KAPIT-2 SITE
5. DISTANCE FROM LOAD CENTER : 23.0 KM
6. TYPE OF DEVELOPMENT : RUN-OF-RIVER

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	292.0	
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	77.0	
AVERAGE ANNUAL RAINFALL	(MM) :	4100.0	
AVERAGE ANNUAL EVAPORATION	(MM) :	1430.0	
AVERAGE ANNUAL RUNOFF	(CMS) :	26.5	
HEADRACE TUNNEL LENGTH	(M) :	1550.0	
PENSTOCK TUNNEL LENGTH	(M) :	40.0	
PLANT FACTOR	:	0.5	

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. FULL SUPPLY LEVEL	(EL;M) :	80.0
RIVERBED WIDTH	(M) :	15.0
TAIL WATER LEVEL	(EL;M) :	45.0
TRANSMISSION LINE LENGTH	(KM) :	25.0
ACCESS ROAD LENGTH	(KM) :	4.0
LAND ACQUISITION	(HA) :	0.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

FIRM DISCHARGE	(CMS) :	7.4
DEPENDABLE PEAK DISCHARGE	(CMS) :	14.8
MAXIMUM TURBINE DISCHARGE	(CMS) :	49.4
FULL SUPPLY LEVEL	(EL;M) :	80.0
TAIL WATER LEVEL	(EL;M) :	45.0
POWER GENERATION EFFICIENCY	:	0.82
GROSS HEAD	(M) :	35.0
NET HEAD	(M) :	31.5
FIRM OUTPUT	(MW) :	1.9
DEPENDABLE PEAK OUTPUT	(MW) :	3.8
INSTALLED CAPACITY	(MW) :	12.5
CONSTRUCTION COST	(MILL.M$) :	52.2
ANNUAL ENERGY OUTPUT	(GWH) :	25.3
COST / KWH	(MK) :	20.4

10. REMARKS : THIS SITE WAS IDENTIFIED THROUGH SITE RECONNAISSANCE SURVEY FOR KAPIT AREA, AND PROCEEDED TO THE THIRD SCREENING.

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
****

1. LOAD CENTER : SARIKEI
2. POTENTIAL SITE : KANOWIT (S.KANOWIT)
3. IDENTIFICATION NO. : 31
4. LOCATION : LATITUDE 1 49 0 N LONGITUDE 111 56 0 E
NOTE : ABOUT 3.0 KM DOWNSTREAM FROM THE CONFLUENCE OF THE S.ENTABAI
5. DISTANCE FROM LOAD CENTER : 47.0 KM
6. TYPE OF DEVELOPMENT : RESERVOIR

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	1331.0	
RIVERBED ELEVATION AT DAMSITE	(EL.M) :	20.0	
AVERAGE ANNUAL RAINFALL	(MM) :	3600.0	
AVERAGE ANNUAL EVAPORATION	(MM) :	1480.0	
AVERAGE ANNUAL RUNOFF	(CMS) :	90.0	
HEADRACE TUNNEL LENGTH	(M) :	400.0	
PENSTOCK TUNNEL LENGTH	(M) :	100.0	
PLANT FACTOR	:	0.5	
DENUDATION RATE	(MM/YR) :	1.0	

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. TOPOGRAPHICAL ELEVATION	(EL.M) :	61.0
MAX. WIDTH OF DAM CREST	(M) :	400.0
RIVERBED WIDTH	(M) :	60.0
TAIL WATER LEVEL	(EL.M) :	22.0
TRANSMISSION LINE LENGTH	(KM) :	65.0
ACCESS ROAD LENGTH	(KM) :	30.0
LAND ACQUISITION	(HA) :	4000.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	0.712	0.612	0.512	0.712	0.612	0.512	0.712	0.612	0.512
FIRM DISCHARGE	(CMS)	64.0	55.0	46.0	64.0	55.0	46.0	64.0	55.0	46.0
PEAK DISCHARGE	(CMS)	128.1	110.1	92.1	128.1	110.1	92.1	128.1	110.1	92.1
FULL SUPPLY LEVEL	(EL.M)	61.000	61.000	61.000	60.400	55.400	51.300	59.700	49.700	41.500
RATED WATER LEVEL	(EL.M)	49.878	53.241	55.938	49.278	47.608	46.238	48.611	41.941	36.472
MIN. OPERATION LEVEL	(EL.M)	27.600	37.700	45.800	27.000	32.000	36.100	26.400	26.400	26.400
TAIL WATER LEVEL	(EL.M)	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000
GROSS STORAGE	(MCM)	816.900	816.900	816.900	804.300	704.300	622.900	791.600	591.800	428.900
ACTIVE STORAGE	(MCM)	664.870	465.000	302.130	664.870	465.000	302.130	664.870	465.000	302.130
SEDIMENT VOLUME	(MCM)	66.550	66.550	66.550	66.550	66.550	66.550	66.550	66.550	66.550
POWER GENERATION EFFICIENCY		0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	27.9	31.2	33.9	27.3	25.6	24.2	26.6	19.9	14.5
NET HEAD	(M)	25.1	28.1	30.5	24.6	23.0	21.8	23.9	17.9	13.0
INSTALLED CAPACITY	(MW)	25.8	24.9	22.6	25.3	20.4	16.1	24.7	15.9	9.6
CONSTRUCTION COST	(MILL.M$)	257.8	245.7	233.5	255.6	227.3	204.3	253.2	211.7	181.6
ANNUAL ENERGY	(GWH)	113.1	109.0	99.1	110.7	89.3	70.7	108.0	69.6	42.2
COST/ KWH	(M$)	23.0	22.7	23.8	23.3	29.7	29.1	23.7	30.7	43.4

10. REMARKS : PROCEEDED TO THE THIRD SCREENING

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
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1. LOAD CENTER : SRI AMAN
2. POTENTIAL SITE : SCKRANG-1(R.SCKRANG)
3. IDENTIFICATION NO. : 43
4. LOCATION : LATITUDE 1 21 0 N LONGITUDE 111 43 0 E
NOTE : ABOUT 2.0 KM UPSTREAM FROM THE CONFLUENCE OF THE S.TEDAT
5. DISTANCE FROM LOAD CENTER : 30.0 KM
6. TYPE OF DEVELOPMENT : RESERVOIR

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	508.0	
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	22.0	
AVERAGE ANNUAL RAINFALL	(MM) :	3409.0	
AVERAGE ANNUAL EVAPORATION	(MM) :	1480.0	
AVERAGE ANNUAL RUNOFF	(CMS) :	31.0	
HEADRACE TUNNEL LENGTH	(M) :	300.0	
PENSTOCK TUNNEL LENGTH	(M) :	20.0	
PLANT FACTOR	:	0.5	
DENUDATION RATE	(MM/YR) :	1.0	

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. TOPOGRAPHICAL ELEVATION	(EL;M) :	62.0	
MAX. WIDTH OF DAM CREST	(M) :	240.0	
RIVERBED WIDTH	(M) :	45.0	
TAIL WATER LEVEL	(EL;M) :	24.0	
TRANSMISSION LINE LENGTH	(KM) :	30.0	
ACCESS ROAD LENGTH	(KM) :	16.0	
LAND ACQUISITION	(HA) :	50.0	

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	0.823	0.723	0.623	0.823	0.723	0.623	0.823	0.723	0.623
FIRM DISCHARGE	(CMS)	25.5	22.4	19.3	25.5	22.4	19.3	25.5	22.4	19.3
PEAK DISCHARGE	(CMS)	51.0	44.8	38.6	51.0	44.8	38.6	51.0	44.8	38.6
FULL SUPPLY LEVEL	(EL;M)	62.000	62.000	62.000	61.800	60.400	59.500	61.600	58.900	57.100
RATED WATER LEVEL	(EL;M)	55.440	59.269	60.568	54.774	56.570	56.936	53.941	52.140	50.939
MIN. OPERATION LEVEL	(EL;M)	42.300	53.800	57.700	40.700	48.900	51.800	38.400	38.600	38.600
TAIL WATER LEVEL	(EL;M)	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000
GROSS STORAGE	(MCM)	400.000	400.000	400.000	391.600	338.700	303.100	383.200	277.400	206.200
ACTIVE STORAGE	(MCM)	344.850	239.090	167.870	344.850	239.090	167.870	344.850	239.090	167.870
SEDIMENT VOLUME	(MCM)	25.400	25.400	25.400	25.400	25.400	25.400	25.400	25.400	25.400
POWER GENERATION EFFICIENCY		0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	31.4	35.3	36.6	30.8	32.6	32.9	29.9	28.1	26.9
NET HEAD	(M)	28.3	31.7	32.9	27.7	29.3	29.6	26.9	25.3	24.2
INSTALLED CAPACITY	(MW)	11.6	11.4	10.2	11.4	10.6	9.2	11.0	9.1	7.5
CONSTRUCTION COST	(MILL.M$)	138.3	133.4	128.7	138.1	131.2	125.4	137.9	129.5	122.6
ANNUAL ENERGY	(GWH)	49.3	48.6	43.4	48.2	44.9	39.1	46.9	38.7	32.0
COST/ KWH	(MC)	28.3	27.7	30.0	28.9	29.5	32.4	29.6	33.7	38.7

10. REMARKS : PROCEEDED TO THE THIRD SCREENING

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** INVENTORY OF POTENTIAL SITE FOR THE SECOND SCREENING **
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1. LOAD CENTER : SRI AMAN
2. POTENTIAL SITE : SEKRANG-2(R.SEKRANG)
3. IDENTIFICATION NO. : 44
4. LOCATION : LATITUDE 1 27 0 N LONGITUDE 111 46 0 E
NOTE : ABOUT 100 M DOWNSTREAM FROM THE CONFLUENCE OF THE S.SENAN
5. DISTANCE FROM LOAD CENTER : 45.0 KM
6. TYPE OF DEVELOPMENT : RESERVOIR

7. PROJECT FEATURES

CATCHMENT AREA	(SQ.KM) :	360.0
RIVERBED ELEVATION AT DAMSITE	(EL;M) :	70.0
AVERAGE ANNUAL RAINFALL	(MM) :	3400.0
AVERAGE ANNUAL EVAPORATION	(MM) :	1450.0
AVERAGE ANNUAL RUNOFF	(CMS) :	22.0
HEADRACE TUNNEL LENGTH	(M) :	400.0
PENSTOCK TUNNEL LENGTH	(M) :	40.0
PLANT FACTOR	:	0.5
DENUDATION RATE	(MM/YR) :	1.0

8. IDENTIFIED ITEMS THROUGH FIELD RECONNAISSANCE

MAX. TOPOGRAPHICAL ELEVATION	(EL;M) :	170.0
MAX. WIDTH OF DAM CREST	(M) :	400.0
RIVERBED WIDTH	(M) :	70.0
TAIL WATER LEVEL	(EL;M) :	72.0
TRANSMISSION LINE LENGTH	(KM) :	45.0
ACCESS ROAD LENGTH	(KM) :	35.0
LAND ACQUISITION	(HA) :	500.0

9. PRELIMINARY POWER OUTPUT CALCULATION AND PRELIMINARY COST ESTIMATE

DESCRIPTION	UNIT	CASE-1	CASE-2	CASE-3	CASE-4	CASE-5	CASE-6	CASE-7	CASE-8	CASE-9
DRAFT RATE	(%)	0.851	0.785	0.665	0.851	0.785	0.665	0.851	0.785	0.665
FIRM DISCHARGE	(CMS)	18.7	17.3	14.6	18.7	17.3	14.6	18.7	17.3	14.6
PEAK DISCHARGE	(CMS)	37.4	34.5	29.3	37.4	34.5	29.3	37.4	34.5	29.3
FULL SUPPLY LEVEL	(EL;M)	170.000	170.000	170.000	154.000	150.500	147.100	138.000	131.000	124.100
RATED WATER LEVEL	(EL;M)	165.837	166.936	167.969	147.973	145.838	144.070	124.347	119.678	115.076
MIN. OPERATION LEVEL	(EL;M)	157.500	160.800	163.900	135.900	136.500	138.000	97.000	97.000	97.000
TAIL WATER LEVEL	(EL;M)	72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000
GROSS STORAGE	(MCM)	917.300	917.300	917.300	559.900	495.300	442.500	303.300	231.900	162.900
ACTIVE STORAGE	(MCM)	279.310	207.890	138.900	279.310	207.890	138.900	279.310	207.890	138.900
SEDIMENT VOLUME	(MCM)	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000
POWER GENERATION EFFICIENCY		0.87	0.87	0.82	0.82	0.82	0.82	0.82	0.82	0.82
GROSS HEAD	(M)	93.8	94.9	96.0	76.0	73.8	72.1	52.3	47.7	43.1
NET HEAD	(M)	84.5	85.4	86.4	68.4	66.5	64.9	47.1	42.9	38.8
INSTALLED CAPACITY	(MW)	25.4	23.7	20.3	20.5	18.4	15.3	14.2	11.9	9.1
CONSTRUCTION COST	(MILL.M$)	311.1	308.1	302.8	233.4	216.7	199.1	179.8	158.7	138.6
ANNUAL ENERGY	(GWH)	107.9	100.7	86.4	87.3	78.3	64.9	60.2	50.6	38.8
COST/ KWH	(M$)	29.1	30.9	35.3	27.0	27.9	31.0	30.1	31.7	36.1

10. REMARKS : PROCEEDED TO THE THIRD SCREENING