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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 1-022-02-15-0-2  
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SCHEME : BINONGAN-R

RIVER SYSTEM : ABRA  
 STREAM : BINONGAN

WATER RESOURCES REGION : I  
 PROVINCE : ABRA

COORDINATES : N17-38-48 E120-58-53  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LHPPS

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**HYDRO/TOPO. INFORMATION**  
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CATCHMENT AREA (KM2) : 296.9 (MAIN : 297.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500 DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 14.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

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**SELECTED PLAN**  
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TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.80

PONDAGE FULL SUPPLY LEVEL (EL.M) : 521.5 PONDAGE STORAGE VOL. (1000M3) : 109.3  
 AVERAGE OPERATING LEVEL (EL.M) : 520.1 ACTIVE STORAGE VOL. (1000M3) : 54.1  
 MINIMUM OPERATING LEVEL (EL.M) : 518.8  
 DRAWDOWN DEPTH ( M ) : 2.7

MAIN DAM CREST ELEVATION (EL.M) : 521.5 CREST LENGTH ( M ) : 116.4  
 (WEIR) WEIR HEIGHT ( M ) : 8.5 WEIR CONCRETE VOL. (1000 M3) : 17.5

WATERWAY HEADRACE : LENGTH ( M ) : 17500.0 DIAMETER (WIDTH) ( M ) : 2.1 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 265.0 DIAMETER ( M ) : 1.6 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 61.3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 6.2 AVERAGE NET HEAD ( M ) : 110.7  
 /HEAD FIRM DISCHARGE (M3/S) : 1.9 TAILWATER LEVEL (EL.M) : 380.0

POWER INSALLED CAPACITY (MW) : 5.7 ANNUAL TOTAL ENERGY (GWH) : 37.5  
 /ENERGY FIRM POWER (MW) : 1.7 FIRM ENERGY (GWH) : 15.0  
 MIN. GUARANTEED POWER (MW) : 1.5 SECONDARY ENERGY (GWH) : 22.5

TRANSMISSION LINE LENGTH (KM) : 36.0 TO : BANGUED 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 27.0 FROM : LAGAYAN

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**CONSTRUCTION COST**  
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TOTAL COST (MIL USD) : 35.3 POWER COST (MIL USD) : 26.2  
 TOTAL COST/KW (USD/KW) : 6244.4 TRANSMISSION COST (MIL USD) : 1.4  
 TOTAL COST/KWH (USD/KWH) : 1.624 ACCESS ROAD COST (MIL USD) : 7.7

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**OTHER INFORMATION**  
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LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3172-1  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-03-16-0-1

SCHEME : PAGANAO

RIVER SYSTEM : ABRA  
 STREAM : MALANAS  
 WATER RESOURCES REGION : I  
 PROVINCE : ABRA  
 COORDINATES : N17-39-50 E120-49-14  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 154.0 (MAIN : 154.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500. DEMUNDTATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 7.5 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 273.0  
 AVERAGE OPERATING LEVEL (EL.M) : 258.4  
 MINIMUM OPERATING LEVEL (EL.M) : 229.2  
 DRAWDOWN DEPTH ( M ) : 43.8  
 GROSS STORAGE VOL. (MIL M3) : 236.9  
 ACTIVE STORAGE VOL. (MIL M3) : 176.6  
 DEAD STORAGE VOL. (MIL M3) : 60.3  
 SEDIMENT VOL. (MIL M3) : 10.8  
 CREST ELEVATION (EL.M) : 279.0  
 DAM HEIGHT ( M ) : 125.4  
 HEADRACE : LENGTH ( M ) : 600.0  
 PENSTOCK : HORIZONT. L ( M ) : 280.0  
 DIVERSION : LENGTH ( M ) : 1230.0  
 EXCAVATION VOL TOTAL (1000 M3) : 107.7

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 12.3  
 FIRM DISCHARGE (M3/S) : 6.2  
 POWER INSALLED CAPACITY (MW) : 10.2  
 FIRM POWER (MW) : 5.1  
 MIN. GUARANTEED POWER (MW) : 6.9

TRANSMISSION LINE LENGTH (KM) : 15.0 TO : BANGUED  
 ACCESS ROAD LENGTH (KM) : 17.0 FROM : LAMAG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 151.3  
 TOTAL COST/KW (USD/KW) : 14812.0  
 TOTAL COST/KWH (USD/KWH) : 3.263

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 9172-1  
 TECHNICAL COMMENT :

RESERVOIR DEVELOPMENT RATIO : 0.75  
 GROSS STORAGE VOL. (MIL M3) : 236.9  
 ACTIVE STORAGE VOL. (MIL M3) : 176.6  
 DEAD STORAGE VOL. (MIL M3) : 60.3  
 SEDIMENT VOL. (MIL M3) : 10.8  
 CREST LENGTH ( M ) : 511.8  
 EMBANKMENT VOL. (MIL M3) : 7.10  
 DIAMETER (WIDTH) ( M ) : 2.5  
 DIAMETER ( M ) : 2.1  
 DIAMETER ( M ) : 7.3  
 AVERAGE NET HEAD ( M ) : 100.6  
 TAILWATER LEVEL (EL.M) : 153.6  
 ANNUAL TOTAL ENERGY (GWH) : 50.1  
 FIRM ENERGY (GWH) : 44.7  
 SECONDARY ENERGY (GWH) : 5.4

69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

POWER COST (MIL USD) : 145.6  
 TRANSMISSION COST (MIL USD) : 0.2  
 ACCESS ROAD COST (MIL USD) : 4.8

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-03-17-0-1

SCHEME : MALANAS (LICUANO)

RIVER SYSTEM : ABRA  
STREAM : KAWAYAN

WATER RESOURCES REGION : I  
PROVINCE : ABRA

COORDINATES : N17-37-00 E120-54-00  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 94.6 (MAIN : 95.1 INTER TRANSFER TOTAL : 0.3) STREAM GAGE ID : 4-1-008-NW-106  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
AVERAGE DISCHARGE (M3/S) : 4.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 432.0 GROSS STORAGE VOL. (MIL M3) : 144.7  
AVERAGE OPERATING LEVEL (EL.M) : 417.8 ACTIVE STORAGE VOL. (MIL M3) : 108.5  
MINIMUM OPERATING LEVEL (EL.M) : 389.4 DEAD STORAGE VOL. (MIL M3) : 36.2  
DRAWDOWN DEPTH ( M ) : 42.6 SEDIMENT VOL. (MIL M3) : 5.6

MAIN DAM CREST ELEVATION (EL.M) : 439.0 CREST LENGTH ( M ) : 454.5  
(WEIR) DAM HEIGHT ( M ) : 107.2 EMBANKMENT VOL. (MIL M3) : 5.68

WATERWAY HEADRAGE : LENGTH ( M ) : 720.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 190.0 DIAMETER ( M ) : 1.8 NOS. : 1  
DIVERSION : LENGTH ( M ) : 1080.0 DIAMETER ( M ) : 6.4 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 72.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.6 AVERAGE NET HEAD ( M ) : 84.3  
/HEAD FIRM DISCHARGE (M3/S) : 3.8 TAILWATER LEVEL (EL.M) : 330.8

POWER INSATLLED CAPACITY (MW) : 5.3 ANNUAL TOTAL ENERGY (GWH) : 25.9  
/ENERGY FIRM POWER (MW) : 2.6 FIRM ENERGY (GWH) : 23.0  
MIN. GUARANTEED POWER (MW) : 3.3 SECONDARY ENERGY (GWH) : 2.9

TRANSMISSION LINE LENGTH (KM) : 26.0 TO : BANGUED 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 17.0 FROM : NALBAGAN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 120.5 POWER COST (MIL USD) : 114.6  
TOTAL COST/KW (USD/KW) : 22944.9 TRANSMISSION COST (MIL USD) : 1.1  
TOTAL COST/KWH (USD/KWH) : 5.051 ACCESS ROAD COST (MIL USD) : 4.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3172-1  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-04-18-0-1

SCHEME : TAPING

RIVER SYSTEM : ABRA  
STREAM : GAAY

WATER RESOURCES REGION : I  
PROVINCE : ABRA

COORDINATES : N17-33-55 E120-46-50  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 111.0 (MAIN : 111.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-008-NW-106  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
AVERAGE DISCHARGE (M3/S) : 5.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.55

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 206.3  
AVERAGE OPERATING LEVEL (EL.M) : 192.7  
MINIMUM OPERATING LEVEL (EL.M) : 165.7  
DRAWDOWN DEPTH ( M ) : 40.6  
CREST ELEVATION (EL.M) : 212.3  
DAM HEIGHT ( M ) : 105.3  
HEADRACE : LENGTH ( M ) : 700.0  
PENSTOCK : HORIZONT. L ( M ) : 330.0  
DIVERSION : LENGTH ( M ) : 1580.0  
EXCAVATION VOL TOTAL (1000 M3) : 114.6

GROSS STORAGE VOL. (MIL M3) : 128.3  
ACTIVE STORAGE VOL. (MIL M3) : 93.4  
DEAD STORAGE VOL. (MIL M3) : 34.9  
SEDIMENT VOL. (MIL M3) : 7.8

MAIN DAM (WEIR) CREST LENGTH ( M ) : 995.1  
EMBANKMENT VOL. (MIL M3) : 10.09

WATERWAY DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
DIAMETER ( M ) : 1.8 NOS. : 1  
DIAMETER ( M ) : 6.7 NOS. : 2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 8.0  
/HEAD FIRM DISCHARGE (M3/S) : 4.0

AVERAGE NET HEAD ( M ) : 82.2  
TAILWATER LEVEL (EL.M) : 107.0

POWER INSATTLLED CAPACITY (MW) : 5.4  
/ENERGY FIRM POWER (MW) : 2.7  
MIN. GUARANTEED POWER (MW) : 3.5

ANNUAL TOTAL ENERGY (GWH) : 28.5  
FIRM ENERGY (GWH) : 23.7  
SECONDARY ENERGY (GWH) : 4.8

TRANSMISSION

LINE LENGTH (KM) : 18.0 TO : BANGUED  
ACCESS ROAD LENGTH (KM) : 4.0 FROM : TAPING

69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 178.5  
TOTAL COST/KW (USD/KW) : 33040.5  
TOTAL COST/KWH (USD/KWH) : 7.110

POWER COST (MIL USD) : 176.5  
TRANSMISSION COST (MIL USD) : 0.9  
ACCESS ROAD COST (MIL USD) : 1.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3172-1  
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 1-022-05-19-0-1

SCHEME : UPPER MACUYEYEP

RIVER SYSTEM : ABRA  
 STREAM : BUCLOC  
 WATER RESOURCES REGION : 1  
 PROVINCE : ABRA

COORDINATES : N17-26-50 E120-47-07  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 156.4 (MAIN : 156.4, INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 7.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.65

RESERVOIR

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 331.6  
 AVERAGE OPERATING LEVEL (EL.M) : 317.0  
 MINIMUM OPERATING LEVEL (EL.M) : 287.7  
 DRAWDOWN DEPTH ( M ) : 44.0  
 GROSS STORAGE VOL. (MIL M3) : 214.3  
 ACTIVE STORAGE VOL. (MIL M3) : 155.5  
 DEAD STORAGE VOL. (MIL M3) : 58.9  
 SEDIMENT VOL. (MIL M3) : 10.9  
 CREST ELEVATION (EL.M) : 337.6  
 DAM HEIGHT ( M ) : 121.2  
 HEADRACE : LENGTH ( M ) : 880.0  
 PENSTOCK : HORIZONT. L ( M ) : 280.0  
 DIVERSION : LENGTH ( M ) : 1140.0  
 EXCAVATION VOL TOTAL (1000 M3) : 102.3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 12.0  
 FIRM DISCHARGE (M3/S) : 5.0  
 POWER INSATLLED CAPACITY (MW) : 9.5  
 FIRM POWER (MW) : 4.7  
 MIN. GUARANTEED POWER (MW) : 5.3

TRANSMISSION LINE LENGTH (KM) : 55.0 TO : BANTAY  
 ACCESS ROAD LENGTH (KM) : 14.0 FROM : SALLDENG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 145.4  
 TOTAL COST/KW (USD/KW) : 15349.5  
 TOTAL COST/KWH (USD/KWH) : 3.351

POWER COST (MIL USD) : 139.5  
 TRANSMISSION COST (MIL USD) : 2.0  
 ACCESS ROAD COST (MIL USD) : 4.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3172-II  
 TECHNICAL COMMENT :

69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-05-20-0-1

SCHEME : BUCLOC

RIVER SYSTEM : ABRA  
STREAM : SULDEN

WATER RESOURCES REGION : I  
PROVINCE : ABRA

COORDINATES : N17-26-34 E120-52-04  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 103.3 (MAIN : 103.3, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-008-NW-106  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
AVERAGE DISCHARGE (M3/S) : 5.0 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 437.0 GROSS STORAGE VOL. (MIL M3) : 158.8  
AVERAGE OPERATING LEVEL (EL.M) : 423.6 ACTIVE STORAGE VOL. (MIL M3) : 118.5  
MINIMUM OPERATING LEVEL (EL.M) : 396.7 DEAD STORAGE VOL. (MIL M3) : 40.3  
DRAWDOWN DEPTH (M) : 40.3 SEDIMENT VOL. (MIL M3) : 7.2

MAIN DAM CREST ELEVATION (EL.M) : 443.0 CREST LENGTH (M) : 657.8  
(WEIR) DAM HEIGHT (M) : 114.6 EMBANKMENT VOL. (MIL M3) : 8.92

WATERWAY HEADRAGE : LENGTH (M) : 530.0 DIAMETER (WIDTH) (M) : 2.5 NOS. : 1  
PENSTOCK : HORIZONTAL L (M) : 180.0 DIAMETER (M) : 1.8 NOS. : 1  
DIVERSTION : LENGTH (M) : 1100.0 DIAMETER (M) : 5.5 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 75.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 8.3 AVERAGE NET HEAD (M) : 92.5  
/HEAD FIRM DISCHARGE (M3/S) : 4.1 TAILWATER LEVEL (EL.M) : 328.4

POWER UNSATLLED CAPACITY (MW) : 6.3 ANNUAL TOTAL ENERGY (GWH) : 30.9  
/ENERGY FIRM POWER (MW) : 3.1 FIRM ENERGY (GWH) : 27.5  
MIN. GUARANTEED POWER (MW) : 4.2 SECONDARY ENERGY (GWH) : 3.4

TRANSMISSION

LINE LENGTH (KM) : 38.0 TO : BANGUED 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 25.0 FROM : SALLDENG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 163.4 POWER COST (MIL USD) : 154.8  
TOTAL COST/KW (USD/KW) : 25997.3 TRANSMISSION COST (MIL USD) : 1.5  
TOTAL COST/KWH (USD/KWH) : 5.726 ACCESS ROAD COST (MIL USD) : 7.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3172-11  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-05-21-0-1

SCHEME : DAGUIOMAN

RIVER SYSTEM : ABRA  
 STREAM : BUCLOC  
 WATER RESOURCES REGION : I  
 PROVINCE : ABRA  
 COORDINATES : N17-27-25 E120-55-00  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 66.1 (MAIN) : 66.1 INTER TRANSFER TOTAL : 0.0 STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575  
 AVERAGE DISCHARGE (M3/S) : 3.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 521.0 GROSS STORAGE VOL. (MIL M3) : 101.4  
 AVERAGE OPERATING LEVEL (EL.M) : 510.4 ACTIVE STORAGE VOL. (MIL M3) : 70.8  
 MINIMUM OPERATING LEVEL (EL.M) : 489.1 DEAD STORAGE VOL. (MIL M3) : 30.6  
 DRAWDOWN DEPTH ( M ) : 31.9 SEDIMENT VOL. (MIL M3) : 4.6

MAIN DAM CREST ELEVATION (EL.M) : 527.0 CREST LENGTH ( M ) : 757.0  
 (WEIR) DAM HEIGHT ( M ) : 87.0 EMBANKMENT VOL. (MIL M3) : 5.03

WATERWAY HEADRACE : LENGTH ( M ) : 400.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
 PENSTOCK : HORIZONT. L ( M ) : 220.0 DIAMETER ( M ) : 1.5 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 1640.0 DIAMETER ( M ) : 8.1 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 87.4

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 5.1 AVERAGE NET HEAD ( M ) : 68.1  
 /HEAD FIRM DISCHARGE (M3/S) : 2.6 TAILWATER LEVEL (EL.M) : 440.0

POWER UNSATLLED CAPACITY (MW) : 2.9 ANNUAL TOTAL ENERGY (GWH) : 14.4  
 /ENERGY FIRM POWER (MW) : 1.4 FIRM ENERGY (GWH) : 12.6  
 MIN. GUARANTEED POWER (MW) : 1.9 SECONDARY ENERGY (GWH) : 1.8

TRANSMISSION LINE LENGTH (KM) : 41.0 TO : BANGUED 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 30.0 FROM : SALLDENG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 112.6 POWER COST (MIL USD) : 102.5  
 TOTAL COST/KW (USD/KW) : 39084.0 TRANSMISSION COST (MIL USD) : 1.6  
 TOTAL COST/KWH (USD/KWH) : 8.555 ACCESS ROAD COST (MIL USD) : 8.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3172-11  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-05-22-0-1

SCHEME : BOYAN

RIVER SYSTEM : ABRA  
STREAM : IKMIN

WATER RESOURCES REGION : I  
PROVINCE : ABRA

COORDINATES : N17-24-47 E120-46-36  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 186.1 (MAIN : 186., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-008-NW-106  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
AVERAGE DISCHARGE (M3/S) : 9.0 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.60

RESERVOIR FULL SUPPLY LEVEL (EL,M) : 381.1 GROSS STORAGE VOL. (MIL M3) : 223.2  
AVERAGE OPERATING LEVEL (EL,M) : 362.4 ACTIVE STORAGE VOL. (MIL M3) : 170.8  
MINIMUM OPERATING LEVEL (EL,M) : 325.0 DEAD STORAGE VOL. (MIL M3) : 52.4  
DRAWDOWN DEPTH ( M ) : 56.2 SEDIMENT VOL. (MIL M3) : 13.0

MAIN DAM CREST ELEVATION (EL,M) : 387.1 ( M ) : 976.1  
(WEIR) DAM HEIGHT ( M ) : 143.8 (MIL M3) : 16.89

WATERWAY HEADSPACE : LENGTH ( M ) : 870.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 390.0 DIAMETER ( M ) : 2.2 NOS. : 1  
DIVERSION : LENGTH ( M ) : 1510.0 DIAMETER ( M ) : 7.7 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 147.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 14.0 AVERAGE NET HEAD ( M ) : 112.9  
/HEAD FIRM DISCHARGE (M3/S) : 7.0 TAILWATER LEVEL (EL,M) : 243.3

POWER INSATLLED CAPACITY (MW) : 13.0 ANNUAL TOTAL ENERGY (GWH) : 66.5  
/ENERGY FIRM POWER (MW) : 6.5 FIRM ENERGY (GWH) : 56.8  
MIN.GUARANTEED POWER (MW) : 8.3 SECONDARY ENERGY (GWH) : 9.7

TRANSMISSION LINE LENGTH (KM) : 56.0 TO : BANTAY 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 20.0 FROM : SALLDENG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 275.1 POWER COST (MIL USD) : 267.4  
TOTAL COST/KW (USD/KW) : 21205.9 TRANSMISSION COST (MIL USD) : 2.0  
TOTAL COST/KWH (USD/KWH) : 4.605 ACCESS ROAD COST (MIL USD) : 5.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3172-11  
TECHNICAL COMMENT :



I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 1-022-05-23-0-2

SCHEME : IKMIN

RIVER SYSTEM : ABRA  
 STREAM : IKMIN  
 WATER RESOURCES REGION : I  
 PROVINCE : ABRA  
 COORDINATES : N17-22-48 E120-48-25  
 STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 192.8 (MAIN : 193.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500.0 DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.0  
 AVERAGE DISCHARGE (M3/S) : 9.3 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.57

PONDAGE FULL SUPPLY LEVEL (EL.M) : 342.2 PONDAGE STORAGE VOL. (1000M3) : 66.8  
 AVERAGE OPERATING LEVEL (EL.M) : 340.7 ACTIVE STORAGE VOL. (1000M3) : 35.1  
 MINIMUM OPERATING LEVEL (EL.M) : 339.2  
 DRAWDOWN DEPTH ( M ) : 3.1

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 342.2 CREST LENGTH ( M ) : 75.6  
 WEIR HEIGHT ( M ) : 9.2 WEIR CONCRETE VOL. (1000 M3) : 13.5

WATERWAY HEADRACE : LENGTH ( M ) : 10650.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 350.0 DIAMETER ( M ) : 1.9 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 53.7

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 9.4 AVERAGE NET HEAD ( M ) : 132.6  
 FIRM DISCHARGE (M3/S) : 1.2 TAILWATER LEVEL (EL.M) : 190.0

POWER INSATLLED CAPACITY (MW) : 10.2 ANNUAL TOTAL ENERGY (GWH) : 47.6  
 FIRM POWER (MW) : 1.3 FIRM ENERGY (GWH) : 11.7  
 MIN. GUARANTEED POWER (MW) : 1.2 SECONDARY ENERGY (GWH) : 35.9

TRANSMISSION LINE LENGTH (KM) : 40.0 TO : SAN ESTEBAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 FROM : LAYUGAN

ACCESS ROAD LENGTH (KM) : 20.5

CONSTRUCTION COST

TOTAL COST (MIL USD) : 31.5 POWER COST (MIL USD) : 24.2  
 TOTAL COST/KW (USD/KW) : 3088.8 TRANSMISSION COST (MIL USD) : 1.5  
 TOTAL COST/KWH (USD/KWH) : 1.406 ACCESS ROAD COST (MIL USD) : 5.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3170-111  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-05-24-0-1

SCHEME : TOQUENG

RIVER SYSTEM : ABRA  
STREAM : IKMIN

WATER RESOURCES REGION : I  
PROVINCE : ABRA

COORDINATES : N17-22-46 E120-49-53  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 137.1 (MAIN : 137.1, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-006-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 6.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.65

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 534.3 GROSS STORAGE VOL. (MIL M3) : 187.0  
 AVERAGE OPERATING LEVEL (EL.M) : 518.4 ACTIVE STORAGE VOL. (MIL M3) : 136.3  
 MINIMUM OPERATING LEVEL (EL.M) : 486.4 DEAD STORAGE VOL. (MIL M3) : 50.7  
 DRAWDOWN DEPTH ( M ) : 47.9 SEDIMENT VOL. (MIL M3) : 9.6

MAIN DAM CREST ELEVATION (EL.M) : 540.3 CREST LENGTH ( M ) : 688.2  
 (WEIR) DAM HEIGHT ( M ) : 124.9 EMBANKMENT VOL. (MIL M3) : 11.23

WATERWAY HEADRACE : LENGTH ( M ) : 720.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 310.0 DIAMETER ( M ) : 2.0 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 1240.0 DIAMETER ( M ) : 7.1 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 102.3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 10.5 AVERAGE NET HEAD ( M ) : 98.8  
 /HEAD FIRM DISCHARGE (M3/S) : 5.3 TAILWATER LEVEL (EL.M) : 415.4

POWER /ENERGY INSTALLED CAPACITY (MW) : 8.6 ANNUAL TOTAL ENERGY (GWH) : 43.2  
 FIRM POWER (MW) : 4.3 FIRM ENERGY (GWH) : 37.5  
 MIN. GUARANTEED POWER (MW) : 5.5 SECONDARY ENERGY (GWH) : 5.7

TRANSMISSION LINE LENGTH (KM) : 36.0 TO : BONTOC 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 30.0 FROM : SALLDENG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 200.5 POWER COST (MIL USD) : 190.5  
 TOTAL COST/KW (USD/KW) : 23392.5 TRANSMISSION COST (MIL USD) : 1.4  
 TOTAL COST/KWH (USD/KWH) : 5.108 ACCESS ROAD COST (MIL USD) : 8.5

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3172-11  
 TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 1-022-05-25-0-1

SCHEME : DANAC

RIVER SYSTEM : ABRA WATER RESOURCES REGION : I COORDINATES : N17-23-05 E120-52-38  
 STREAM : IKMIN PROVINCE : ABRA STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 86.7 (MAIN : 87. INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 4.2 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 641.0 GROSS STORAGE VOL. (MIL M3) : 131.3  
 AVERAGE OPERATING LEVEL (EL.M) : 625.2 ACTIVE STORAGE VOL. (MIL M3) : 99.4  
 MINIMUM OPERATING LEVEL (EL.M) : 593.6 DEAD STORAGE VOL. (MIL M3) : 31.9  
 DRAWDOWN DEPTH (M) : 47.4 SEDIMENT VOL. (MIL M3) : 6.1  
 MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 647.0 CREST LENGTH (M) : 366.9  
 DAM HEIGHT (M) : 127.0 EMBANKMENT VOL. (MIL M3) : 5.24  
 WATERWAY HEADRACE : LENGTH (M) : 660.0 DIAMETER (WIDTH) (M) : 2.5 NOS. : 1  
 PERSTOCK : HORIZONT. L (M) : 220.0 DIAMETER (M) : 1.7 NOS. : 1  
 DIVERSION : LENGTH (M) : 1170.0 DIAMETER (M) : 8.8 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 74.6

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.0 AVERAGE NET HEAD (M) : 102.1  
 /HEAD FIRM DISCHARGE (M3/S) : 3.5 TAILWATER LEVEL (EL.M) : 520.0  
 POWER INSTALLED CAPACITY (MW) : 5.9 ANNUAL TOTAL ENERGY (GWH) : 28.7  
 /ENERGY FIRM POWER (MW) : 2.9 FIRM ENERGY (GWH) : 25.7  
 MIN. GUARANTEED POWER (MW) : 3.9 SECONDARY ENERGY (GWH) : 3.0

TRANSMISSION LINE LENGTH (KM) : 32.0 TO : BONTOC 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 36.5 FROM : SALLDENG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 120.3 POWER COST (MIL USD) : 108.6  
 TOTAL COST/KW (USD/KW) : 20506.4 TRANSMISSION COST (MIL USD) : 1.3  
 TOTAL COST/KWH (USD/KWH) : 4.521 ACCESS ROAD COST (MIL USD) : 10.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3172-11  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-06-26-0-1

SCHEME : ANLUAGAN

RIVER SYSTEM : ABRA  
STREAM : DAMANIT

WATER RESOURCES REGION : I  
PROVINCE : ABRA

COORDINATES : N17-18-35 E120-43-00  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 112.0 (MAIN : 112.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-008-NW-106  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
AVERAGE DISCHARGE (M3/S) : 5.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 311.0  
AVERAGE OPERATING LEVEL (EL.M) : 294.6  
MINIMUM OPERATING LEVEL (EL.M) : 261.7  
DRAWDOWN DEPTH ( M ) : 49.3

GROSS STORAGE VOL. (MIL M3) : 169.4  
ACTIVE STORAGE VOL. (MIL M3) : 119.9  
DEAD STORAGE VOL. (MIL M3) : 49.5  
SEDIMENT VOL. (MIL M3) : 7.8

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 317.0  
DAM HEIGHT ( M ) : 126.0

CREST LENGTH ( M ) : 870.0  
EMBANKMENT VOL. (MIL M3) : 14.04

WATERWAY HEADRAGE : LENGTH ( M ) : 620.0  
PENSTOCK : HORIZONT. L ( M ) : 380.0  
DIVERSTION : LENGTH ( M ) : 1470.0  
EXCAVATION VOL TOTAL (1000 M3) : 107.3

DIAMETER (WIDTH) ( M ) : 2.5  
DIAMETER ( M ) : 1.9  
DIAMETER ( M ) : 6.7  
NOS. : 1  
NOS. : 1  
NOS. : 2

DISCHARGE /HEAD PLANT MAX. DISCHARGE (M3/S) : 8.8  
FIRM DISCHARGE (M3/S) : 4.4

AVERAGE NET HEAD ( M ) : 99.4  
TAILWATER LEVEL (EL.M) : 191.0

POWER /ENERGY INSATLLED CAPACITY (MW) : 7.2  
FIRM POWER (MW) : 3.6  
MIN. GUARANTEED POWER (MW) : 4.6

ANNUAL TOTAL ENERGY (GWH) : 35.9  
FIRM ENERGY (GWH) : 31.5  
SECONDARY ENERGY (GWH) : 4.3

TRANSMISSION

LINE LENGTH (KM) : 24.0 TO : SAN ESTEBAN  
ACCESS ROAD LENGTH (KM) : 13.0 FROM : SAN EMILIO

NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 226.3  
TOTAL COST/KW (USD/KW) : 31423.5  
TOTAL COST/KWH (USD/KWH) : 6.892

POWER COST (MIL USD) : 221.5  
TRANSMISSION COST (MIL USD) : 1.1  
ACCESS ROAD COST (MIL USD) : 3.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUDMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3171-IV  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-06-27-0-2

SCHEME : DAMANIT

COORDINATES : N17-20-31 E120-49-39  
 STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

WATER RESOURCES REGION : I  
 PROVINCE : ABRA

RIVER SYSTEM : ABRA  
 STREAM : DAMANIT

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 45.0 (MAIN : 45.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2500.0 DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 2.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.57

PONDAGE FULL SUPPLY LEVEL (EL.M) : 706.7 PONDAGE STORAGE VOL. (1000M3) : 33.8  
 AVERAGE OPERATING LEVEL (EL.M) : 706.4 ACTIVE STORAGE VOL. (1000M3) : 8.2  
 MINIMUM OPERATING LEVEL (EL.M) : 706.0  
 DRAWDOWN DEPTH ( M ) : 0.7

MAIN DAM CREST ELEVATION (EL.M) : 706.7 CREST LENGTH ( M ) : 45.4  
 (WEIR) WEIR HEIGHT ( M ) : 5.7 WEIR CONCRETE VOL. (1000 M3) : 4.3

WATERWAY HEADRACE : LENGTH ( M ) : 4250.0 DIAMETER (WIDTH) ( M ) : 1.8  
 PENSTOCK : HORIZONT. L ( M ) : 790.0 DIAMETER ( M ) : 1.3  
 EXCAVATION VOL TOTAL (1000 M3) : 12.1 NOS. : 1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 2.2 AVERAGE NET HEAD ( M ) : 352.7  
 /HEAD FIRM DISCHARGE (M3/S) : 0.3 TAILWATER LEVEL (EL.M) : 346.0

POWER INSATLLED CAPACITY (MW) : 6.3 ANNUAL TOTAL ENERGY (GWH) : 29.3  
 /ENERGY FIRM POWER (MW) : 0.8 FIRM ENERGY (GWH) : 7.2  
 MIN. GUARANTEED POWER (MW) : 0.7 SECONDARY ENERGY (GWH) : 22.1

TRANSMISSION LINE LENGTH (KM) : 44.0 TO : SAN ESTEBAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 30.5 FROM : LAYUAN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 20.5 POWER COST (MIL USD) : 10.2  
 TOTAL COST/KW (USD/KW) : 3233.6 TRANSMISSION COST (MIL USD) : 1.7  
 TOTAL COST/KWH (USD/KWH) : 1.479 ACCESS ROAD COST (MIL USD) : 8.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3172-111  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-06-28-0-1

SCHEME : NAINA

RIVER SYSTEM : ABRA  
STREAM : UTIP

WATER RESOURCES REGION : I  
PROVINCE : ABRA

COORDINATES : N17-15-37 E120-43-20  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 216.0 (MAIN : 216.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-006-NW-106  
AVER. BASIN RAINFALL (MM/YR) : 2750. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
AVERAGE DISCHARGE (M3/S) : 12.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.50

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 412.2  
AVERAGE OPERATING LEVEL (EL.M) : 393.6  
MINIMUM OPERATING LEVEL (EL.M) : 356.5  
DRAWDOWN DEPTH ( M ) : 55.7  
CREST ELEVATION (EL.M) : 418.2  
DAM HEIGHT ( M ) : 143.2  
HEADRACE : LENGTH ( M ) : 1310.0  
PENSTOCK : HORIZONTAL L ( M ) : 240.0  
DIVERSION : LENGTH ( M ) : 1140.0  
EXCAVATION VOL TOTAL (1000 M3) : 125.6

GROSS STORAGE VOL. (MIL M3) : 272.4  
ACTIVE STORAGE VOL. (MIL M3) : 192.2  
DEAD STORAGE VOL. (MIL M3) : 80.2  
SEDIMENT VOL. (MIL M3) : 15.1

CREST LENGTH ( M ) : 907.4  
EMBANKMENT VOL. (MIL M3) : 17.94

DIAMETER (WIDTH) ( M ) : 2.7  
DIAMETER ( M ) : 2.4  
DIAMETER ( M ) : 8.1  
NOS. : 1  
NOS. : 1  
NOS. : 2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 17.5  
/HEAD FIRM DISCHARGE (M3/S) : 8.8  
POWER INSATLLED CAPACITY (MW) : 16.2  
/ENERGY FIRM POWER (MW) : 8.1  
MIN. GUARANTEED POWER (MW) : 10.3

AVERAGE NET HEAD (EL.M) : 112.1  
TAILWATER LEVEL (EL.M) : 275.0  
ANNUAL TOTAL ENERGY (GWH) : 87.0  
FIRM ENERGY (GWH) : 70.8  
SECONDARY ENERGY (GWH) : 16.1

TRANSMISSION LINE LENGTH (KM) : 33.0 TO : SAN ESTEBAN  
ACCESS ROAD LENGTH (KM) : 14.0 FROM : SAN EMILIO

69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 280.4  
TOTAL COST/KW (USD/KW) : 17322.6  
TOTAL COST/KWH (USD/KWH) : 3.704

POWER COST (MIL USD) : 275.0  
TRANSMISSION COST (MIL USD) : 1.3  
ACCESS ROAD COST (MIL USD) : 4.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3171-IV  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-022-06-29-0-2

SCHEME : UTIP

RIVER SYSTEM : ABRA  
 STREAM : UTIP  
 WATER RESOURCES REGION : 1  
 PROVINCE : ABRA  
 COORDINATES : N17-15-17 E120-49-32  
 STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHRPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 144.2 (MAIN : 144.2 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2750. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 8.1 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	OUTPUT FACTOR	:	OUTPUT FACTOR	:
PONDAGE	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
FULL SUPPLY LEVEL (EL.M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
AVERAGE OPERATING LEVEL (EL.M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
MINIMUM OPERATING LEVEL (EL.M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
DRAWDOWN DEPTH (M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
CREST ELEVATION (EL.M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
WEIR HEIGHT (M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
HEADRAGE : LENGTH (M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
PENSTOCK : HORIZONT. L (M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
EXCAVATION VOL TOTAL (1000 M3)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
PLANT MAX. DISCHARGE (M3/S)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
FIRM DISCHARGE (M3/S)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
INSATLLED CAPACITY (MW)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
FIRM POWER (MW)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
MIN. GUARANTEED POWER (MW)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
AVERAGE NET HEAD (M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
TAILWATER LEVEL (EL.M)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
ANNUAL TOTAL ENERGY (GWH)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
FIRM ENERGY (GWH)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:
SECONDARY ENERGY (GWH)	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:	TYPE OF DEVELOPMENT	:

TRANSMISSION LINE LENGTH (KM) : 45.0 TO : SAN ESTEBAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 34.0 FROM : SAN EMILIO

CONSTRUCTION COST

TOTAL COST (MIL USD)	:	TOTAL COST (MIL USD)	:
TOTAL COST/KW (USD/KW)	:	POWER COST (MIL USD)	:
TOTAL COST/KWH (USD/KWH)	:	TRANSMISSION COST (MIL USD)	:
	:	ACCESS ROAD COST (MIL USD)	:

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3171-1  
 TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 1-022-07-30-0-1

SCHEME : KUMANGA

RIVER SYSTEM : ABRA WATER RESOURCES REGION : I COORDINATES : N17-11-10 E120-43-24  
 STREAM : DITONG PROVINCE : ABRA STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 84.2 (MAIN : 84., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-008-NW-106  
 AVER. BASIN RAINFALL (MM/YR) : 2750. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
 AVERAGE DISCHARGE (M3/S) : 4.8 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.60

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 436.7 GROSS STORAGE VOL. (MIL M3) : 117.3  
 AVERAGE OPERATING LEVEL (EL.M) : 420.7 ACTIVE STORAGE VOL. (MIL M3) : 89.9  
 MINIMUM OPERATING LEVEL (EL.M) : 388.7 DEAD STORAGE VOL. (MIL M3) : 27.4  
 DRAWDOWN DEPTH ( M ) : 48.0 SEDIMENT VOL. (MIL M3) : 5.9

MAIN DAM CREST ELEVATION (EL.M) : 442.7 CREST LENGTH ( M ) : 493.4  
 (WEIR) DAM HEIGHT ( M ) : 117.4 EMBANKMENT VOL. (MIL M3) : 7.02

WATERWAY HEADRACE : LENGTH ( M ) : 630.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
 PENSTOCK : HORIZONT. L ( M ) : 180.0 DIAMETER ( M ) : 1.7 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 1320.0 DIAMETER ( M ) : 8.7 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 82.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.3 AVERAGE NET HEAD ( M ) : 92.7  
 /HEAD FIRM DISCHARGE (M3/S) : 3.7 TAILWATER LEVEL (EL.M) : 325.3

POWER UNSATLLED CAPACITY (MW) : 5.6 ANNUAL TOTAL ENERGY (GWH) : 28.7  
 /ENERGY FIRM POWER (MW) : 2.8 FIRM ENERGY (GWH) : 24.5  
 MIN. GUARANTEED POWER (MW) : 3.5 SECONDARY ENERGY (GWH) : 4.3

TRANSMISSION LINE LENGTH (KM) : 40.0 TO : SAN ESTEBAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 10.0 FROM : MALIDEG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 134.7 POWER COST (MIL USD) : 130.3  
 TOTAL COST/KW (USD/KW) : 24111.8 TRANSMISSION COST (MIL USD) : 1.5  
 TOTAL COST/KWH (USD/KWH) : 5.231 ACCESS ROAD COST (MIL USD) : 2.9

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3171-1V  
 TECHNICAL COMMENT :



I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 1-022-07-31-0-1

SCHEME : SUYSUYAN

RIVER SYSTEM : ABRA  
STREAM : BALASEAN

WATER RESOURCES REGION : I  
PROVINCE : ILOCOS SUR

COORDINATES : N17-07-30 E120-44-20  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 135.0 (MAIN : 135.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-008-NW-106  
AVER. BASIN RAINFALL (MM/YR) : 2750. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2575.  
AVERAGE DISCHARGE (M3/S) : 7.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 134.6

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 505.0 GROSS STORAGE VOL. (MIL M3) : 237.6  
AVERAGE OPERATING LEVEL (EL.M) : 488.8 ACTIVE STORAGE VOL. (MIL M3) : 168.1  
MINIMUM OPERATING LEVEL (EL.M) : 456.4 DEAD STORAGE VOL. (MIL M3) : 69.5  
DRAWDOWN DEPTH ( M ) : 48.6 SEDIMENT VOL. (MIL M3) : 9.4

MAIN DAM CREST ELEVATION (EL.M) : 511.0 CREST LENGTH ( M ) : 662.0  
(WEIR) DAM HEIGHT ( M ) : 125.0 EMBANKMENT VOL. (MIL M3) : 10.77

WATERWAY HEADRAGE : LENGTH ( M ) : 640.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 220.0 DIAMETER ( M ) : 2.1 NOS. : 1  
DIVERSION : LENGTH ( M ) : 1030.0 DIAMETER ( M ) : 7.1 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 89.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 12.3 AVERAGE NET HEAD ( M ) : 98.9  
/HEAD FIRM DISCHARGE (M3/S) : 6.2 TAILWATER LEVEL (EL.M) : 386.0

POWER INSATLLED CAPACITY (MW) : 10.0 ANNUAL TOTAL ENERGY (GWH) : 50.0  
/ENERGY FIRM POWER (MW) : 5.0 FIRM ENERGY (GWH) : 44.0  
MIN. GUARANTEED POWER (MW) : 6.4 SECONDARY ENERGY (GWH) : 6.0

TRANSMISSION LINE LENGTH (KM) : 46.0 TO : SAN ESTEDAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 13.0 FROM : MALIDEG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 188.8 POWER COST (MIL USD) : 182.8  
TOTAL COST/KW (USD/KW) : 18737.9 TRANSMISSION COST (MIL USD) : 1.7  
TOTAL COST/KWH (USD/KWH) : 4.110 ACCESS ROAD COST (MIL USD) : 3.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3171-111  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-037-00-01-0-1

SCHEME : DINGRAS

RIVER SYSTEM : LAOAG  
 STREAM : MADONGAN  
 WATER RESOURCES REGION : I  
 PROVINCE : ILOCOS NORTE  
 COORDINATES : N18-00-29 E120-45-39  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S-RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 152.9 (MAIN : 153.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-1-003-NW-102  
 AVER. BASIN RAINFALL (MM/YR) : 2750.0 DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 534.  
 AVERAGE DISCHARGE (M3/S) : 8.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 25.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.46

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 216.3 GROSS STORAGE VOL. (MIL M3) : 186.6  
 AVERAGE OPERATING LEVEL (EL.M) : 203.8 ACTIVE STORAGE VOL. (MIL M3) : 121.6  
 MINIMUM OPERATING LEVEL (EL.M) : 178.6 DEAD STORAGE VOL. (MIL M3) : 55.0  
 DRAWDOWN DEPTH (M) : 37.7 SEDIMENT VOL. (MIL M3) : 10.7

MAIN DAM CREST ELEVATION (EL.M) : 222.3 CREST LENGTH (M) : 597.1  
 (WEIR) DAM HEIGHT (M) : 96.7 EMBANKMENT VOL. (MIL M3) : 5.82

WATERWAY HEADRACE : LENGTH (M) : 370.0 DIAMETER (WIDTH) (M) : 2.5 NOS. : 1  
 PENSTOCK : HORIZONTAL L (M) : 290.0 DIAMETER (M) : 1.8 NOS. : 1  
 DIVERSION : LENGTH (M) : 1030.0 DIAMETER (M) : 7.3 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 89.1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 8.3 AVERAGE NET HEAD (M) : 75.3  
 /HEAD FIRM DISCHARGE (M3/S) : 4.2 TAILWATER LEVEL (EL.M) : 125.6

POWER UNSATLLED CAPACITY (MW) : 5.1 ANNUAL TOTAL ENERGY (GWH) : 35.9  
 /ENERGY FIRM POWER (MW) : 2.6 FIRM ENERGY (GWH) : 22.5  
 MIN. GUARANTEED POWER (MW) : 3.3 SECONDARY ENERGY (GWH) : 13.4

TRANSMISSION

LINE LENGTH (KM) : 16.0 TO : MARCOS 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 5.5 FROM : SAN MEGRO

CONSTRUCTION COST

TOTAL COST (MIL USD) : 122.0 POWER COST (MIL USD) : 119.7  
 TOTAL COST/KW (USD/KW) : 23713.0 TRANSMISSION COST (MIL USD) : 0.8  
 TOTAL COST/KWH (USD/KWH) : 4.595 ACCESS ROAD COST (MIL USD) : 1.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3174-11  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 1-039-00-01-0-1

SCHEME : VINTAR

RIVER SYSTEM : VINTAR  
STREAM : VINTAR

WATER RESOURCES REGION : 1  
PROVINCE : ILOCOS NORTE

COORDINATES : N18-22-08 E120-44-32  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 121.3 (MAIN : 121.0, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-003-NW-102  
AVER. BASIN RAINFALL (MM/YR) : 3050. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 534.  
AVERAGE DISCHARGE (M3/S) : 7.8 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 25.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.65

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 116.0 GROSS STORAGE VOL. (MIL M3) : 242.3  
AVERAGE OPERATING LEVEL (EL.M) : 109.5 ACTIVE STORAGE VOL. (MIL M3) : 159.9  
MINIMUM OPERATING LEVEL (EL.M) : 96.9 DEAD STORAGE VOL. (MIL M3) : 82.3  
DRAWDOWN DEPTH ( M ) : 19.1 SEDIMENT VOL. (MIL M3) : 8.5

MAIN DAM CREST ELEVATION (EL.M) : 122.0 CREST LENGTH ( M ) : 468.0  
(WEIR) DAM HEIGHT ( M ) : 51.8 EMBANKMENT VOL. (MIL M3) : 1.91

WATERWAY HEADRACE : LENGTH ( M ) : 300.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 200.0 DIAMETER ( M ) : 1.8 NOS. : 1  
DIVERSION : LENGTH ( M ) : 820.0 DIAMETER ( M ) : 6.8 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 62.3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 8.0 AVERAGE NET HEAD ( M ) : 37.7  
/HEAD FIRM DISCHARGE (M3/S) : 4.0 TAILWATER LEVEL (EL.M) : 70.2

POWER INSTALLED CAPACITY (MW) : 2.5 ANNUAL TOTAL ENERGY (GWH) : 16.9  
/ENERGY FIRM POWER (MW) : 1.2 FIRM ENERGY (GWH) : 10.9  
MIN. GUARANTEED POWER (MW) : 1.6 SECONDARY ENERGY (GWH) : 6.0

TRANSMISSION LINE LENGTH (KM) : 13.0 TO : LAOAG 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 1.0 FROM : LIPAY

CONSTRUCTION COST

TOTAL COST (MIL USD) : 57.2 POWER COST (MIL USD) : 56.2  
TOTAL COST/KW (USD/KW) : 22904.8 TRANSMISSION COST (MIL USD) : 0.7  
TOTAL COST/KWH (USD/KWH) : 4.490 ACCESS ROAD COST (MIL USD) : 0.3

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3175-111  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 1-039-00-02-0-1

SCHEME : TAMDAGAN

RIVER SYSTEM : VINTAR  
 STREAM : TAMDAGAN  
 WATER RESOURCES REGION : I  
 PROVINCE : ILOCOS NORTE

COORDINATES : N18-18-05 E120-47-20  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 244.0  
 AVER. BASIN RAINFALL (MM/YR) : 3333.  
 AVERAGE DISCHARGE (M3/S) : 17.9  
 INTER TRANSFER TOTAL : 0.1  
 (MM/YR) : 1.4  
 (MM/DAY) : 3.5  
 STREAM GAGE ID : 4-1-903-NW-102  
 GAGE CATCHMENT (KM2) : 534.  
 GAGE AVER. DISCHARGE (M3/S) : 25.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR  
 RESERVOIR DEVELOPMENT RATIO : 0.46

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 204.0  
 AVERAGE OPERATING LEVEL (EL.M) : 185.5  
 MINIMUM OPERATING LEVEL (EL.M) : 157.6  
 DRAWDOWN DEPTH ( M ) : 46.3  
 GROSS STORAGE VOL. (MIL M3) : 383.0  
 ACTIVE STORAGE VOL. (MIL M3) : 259.4  
 DEAD STORAGE VOL. (MIL M3) : 123.5  
 SEDIMENT VOL. (MIL M3) : 17.1

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 210.0  
 DAM HEIGHT ( M ) : 115.0  
 WATERWAY HEADRACE : LENGTH ( M ) : 840.0  
 PENSTOCK : HORIZONTAL L ( M ) : 140.0  
 DIVERSION : LENGTH ( M ) : 960.0  
 EXCAVATION VOL TOTAL (1000 M3) : 111.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 17.8  
 FIRM DISCHARGE (M3/S) : 8.9  
 POWER INSATLLED CAPACITY (MW) : 13.1  
 FIRM POWER (MW) : 6.5  
 MIN. GUARANTEED POWER (MW) : 8.2

TRANSMISSION LINE LENGTH (KM) : 22.0 TO : LAOAG  
 ACCESS ROAD LENGTH (KM) : 7.0 FROM : DIPILAT

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 170.5  
 TOTAL COST/KW (USD/KW) : 13015.4  
 TOTAL COST/KWH (USD/KWH) : 2.524

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3174-1  
 TECHNICAL COMMENT :

POWER COST (MIL USD) : 167.5  
 TRANSMISSION COST (MIL USD) : 1.0  
 ACCESS ROAD COST (MIL USD) : 2.0

AVERAGE NET HEAD ( M ) : 89.3  
 TAILWATER LEVEL (EL.M) : 95.0  
 ANNUAL TOTAL ENERGY (GWH) : 91.2  
 FIRM ENERGY (GWH) : 57.4  
 SECONDARY ENERGY (GWH) : 33.9

DIAMETER (WIDTH) ( M ) : 2.7  
 DIAMETER ( M ) : 2.5  
 DIAMETER ( M ) : 8.4  
 NOS. : 1  
 NOS. : 1  
 NOS. : 2

69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 1-047-00-01-0-1

SCHEME : BULU-1 (ILOCOS)

RIVER SYSTEM : BULU  
STREAM : BULU

WATER RESOURCES REGION : I  
PROVINCE : ILOCOS NORTE

COORDINATES : N18-31-08 E120-50-52  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 166.1 (MAIN : 166.1 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-003-NW-102  
AVER. BASIN RAINFALL (MM/YR) : 3750. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 534.  
AVERAGE DISCHARGE (M3/S) : 14.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 25.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVOIR DEVELOPMENT RATIO : 0.41

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 203.7 GROSS STORAGE VOL. (MIL M3) : 267.0  
AVERAGE OPERATING LEVEL (EL.M) : 185.7 ACTIVE STORAGE VOL. (MIL M3) : 185.8  
MINIMUM OPERATING LEVEL (EL.M) : 149.6 DEAD STORAGE VOL. (MIL M3) : 81.1  
DRAWDOWN DEPTH ( M ) : 54.1 SEDIMENT VOL. (MIL M3) : 11.6

MAIN DAM CREST ELEVATION (EL.M) : 209.7 CREST LENGTH ( M ) : 469.2  
(WEIR) DAM HEIGHT ( M ) : 159.7 EMBANKMENT VOL. (MIL M3) : 10.69

WATERWAY HEADRACE : LENGTH ( M ) : 800.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 300.0 DIAMETER ( M ) : 2.2 NOS. : 1  
DIVERSION : LENGTH ( M ) : 1300.0 DIAMETER ( M ) : 7.5 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 119.6

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 14.0 AVERAGE NET HEAD ( M ) : 129.9  
/HEAD FIRM DISCHARGE (M3/S) : 7.0 TAILWATER LEVEL (EL.M) : 50.0

POWER INSATLLED CAPACITY (MW) : 14.9 ANNUAL TOTAL ENERGY (GWH) : 104.9  
/ENERGY FIRM POWER (MW) : 7.5 FIRM ENERGY (GWH) : 65.5  
MIN. GUARANTEED POWER (MW) : 10.3 SECONDARY ENERGY (GWH) : 39.4

TRANSMISSION LINE LENGTH (KM) : 8.0 TO : BANGUI 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 2.0 FROM : ADAM

CONSTRUCTION COST

TOTAL COST (MIL USD) : 197.4 POWER COST (MIL USD) : 198.2  
TOTAL COST/KW (USD/KW) : 13204.4 TRANSMISSION COST (MIL USD) : 0.6  
TOTAL COST/KWH (USD/KWH) : 2.554 ACCESS ROAD COST (MIL USD) : 9.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3175-1  
TECHNICAL COMMENT :

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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 1-047-00-02-0-2  
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SCHEME : BULU-2(ILOCOS)

WATER RESOURCES REGION : 1  
 PROVINCE : ILOCOS NORTE

COORDINATES : N18-28-48 E120-52-54  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LHPPS

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**HYDRO/TOPO. INFORMATION**  
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CATCHMENT AREA (KM2) : 129.7 (MAIN : 130., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-1-003-NW-102  
 AVER. BASIN RAINFALL (MM/YR) : 4000. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 534.  
 AVERAGE DISCHARGE (M3/S) : 12.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 25.3

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**SELECTED PLAN**  
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TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.60

PONDAGE FULL SUPPLY LEVEL (EL.M) : 187.1 PONDAGE STORAGE VOL. (1000M3) : 311.0  
 AVERAGE OPERATING LEVEL (EL.M) : 187.0 ACTIVE STORAGE VOL. (1000M3) : 14.0  
 MINIMUM OPERATING LEVEL (EL.M) : 187.0  
 DRAWDOWN DEPTH ( M ) : 0.1

MAIN DAM CREST ELEVATION (EL.M) : 187.1 CREST LENGTH ( M ) : 107.8  
 (WEIR) WEIR HEIGHT ( M ) : 8.1 WEIR CONCRETE VOL. (1000 M3) : 10.0

WATERWAY HEADRACE : LENGTH ( M ) : 4900.0 DIAMETER (WIDTH) ( M ) : 2.3 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 220.0 DIAMETER ( M ) : 1.8 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 20.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.8 AVERAGE NET HEAD ( M ) : 116.9  
 /HEAD FIRM DISCHARGE (M3/S) : 0.5 TAILWATER LEVEL (EL.M) : 60.0

POWER INSTALLED CAPACITY (MW) : 7.5 ANNUAL TOTAL ENERGY (GWH) : 35.7  
 /ENERGY FIRM POWER (MW) : 0.5 FIRM ENERGY (GWH) : 4.1  
 MIN. GUARANTEED POWER (MW) : 0.4 SECONDARY ENERGY (GWH) : 31.6

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**TRANSMISSION**  
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LINE LENGTH (KM) : 42.0 TO : LADAG 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 15.5 FROM : ADAM

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**CONSTRUCTION COST**  
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TOTAL COST (MIL USD) : 19.3 POWER COST (MIL USD) : 13.3  
 TOTAL COST/KW (USD/KW) : 2581.5 TRANSMISSION COST (MIL USD) : 1.6  
 TOTAL COST/KWH (USD/KWH) : 1.421 ACCESS ROAD COST (MIL USD) : 4.4

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**OTHER INFORMATION**  
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LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3175-11  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-005-00-01-0-1

SCHEME : LUNA

RIVER SYSTEM : GATTU  
 STREAM : ZIJUANAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : KALAPAYAO  
 COORDINATES : N18-28-50 E121-14-00  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 255.5 (MAIN : 256.1 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-005-NW-203  
 AVER. BASIN RAINFALL (MM/YR) : 4000. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
 AVERAGE DISCHARGE (M3/S) : 27.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.53

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 100.0 GROSS STORAGE VOL. (MIL M3) : 671.0  
 AVERAGE OPERATING LEVEL (EL.M) : 88.5 ACTIVE STORAGE VOL. (MIL M3) : 458.3  
 MINIMUM OPERATING LEVEL (EL.M) : 65.4 DEAD STORAGE VOL. (MIL M3) : 212.7  
 DRAWDOWN DEPTH ( M ) : 34.6 SEDIMENT VOL. (MIL M3) : 17.9

MAIN DAM CREST ELEVATION (EL.M) : 106.0 CREST LENGTH ( M ) : 663.0  
 (WEIR) DAM HEIGHT ( M ) : 96.0 EMBANKMENT VOL. (MIL M3) : 7.34

WATERWAY HEADRACE : LENGTH ( M ) : 700.0 DIAMETER (WIDTH) ( M ) : 5.9 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 180.0 DIAMETER ( M ) : 4.6 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 360.0 DIAMETER ( M ) : 8.8 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 74.6

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 82.5 AVERAGE NET HEAD ( M ) : 76.2  
 /HEAD FIRM DISCHARGE (M3/S) : 20.6 TAILWATER LEVEL (EL.M) : 10.0

POWER INSATLLED CAPACITY (MW) : 51.7 ANNUAL TOTAL ENERGY (GWH) : 145.5  
 /ENERGY FIRM POWER (MW) : 12.9 FIRM ENERGY (GWH) : 113.2  
 MIN. GUARANTEED POWER (MW) : 34.3 SECONDARY ENERGY (GWH) : 32.2

TRANSMISSION LINE LENGTH (KM) : 30.0 TO : BALLESTEROS 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2  
 ACCESS ROAD LENGTH (KM) : 13.5 FROM : PAMPLONA

CONSTRUCTION COST

TOTAL COST (MIL USD) : 172.5 POWER COST (MIL USD) : 165.3  
 TOTAL COST/KW (USD/KW) : 3336.8 TRANSMISSION COST (MIL USD) : 3.4  
 TOTAL COST/KWH (USD/KWH) : 1.404 ACCESS ROAD COST (MIL USD) : 3.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3275-111  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-005-00-02-0-1

SCHEME : ZIMIGU

RIVER SYSTEM : GATTU  
 STREAM : ZIMUGUI  
 WATER RESOURCES REGION : II  
 PROVINCE : KAL-APAYAO  
 COORDINATES : N18-24-45 E121-12-06  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY,

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 342.7 (MAIN : 343., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-005-NW-203  
 AVER. BASIN RAINFALL (MM/YR) : 4749. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
 AVERAGE DISCHARGE (M3/S) : 44.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.57

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 74.0 GROSS STORAGE VOL. (MIL.M3) : 1427.9  
 AVERAGE OPERATING LEVEL (EL.M) : 64.3 ACTIVE STORAGE VOL. (MIL.M3) : 807.4  
 MINIMUM OPERATING LEVEL (EL.M) : 44.9 DEAD STORAGE VOL. (MIL.M3) : 620.5  
 DRAWDOWN DEPTH ( M ) : 29.1 SEDIMENT VOL. (MIL.M3) : 24.0

MAIN DAM CREST ELEVATION (EL.M) : 80.0 CREST LENGTH ( M ) : 685.0  
 (WEIR) DAM HEIGHT ( M ) : 74.0 EMBANKMENT VOL. (MIL.M3) : 5.60

WATERWAY HEADRAGE : LENGTH ( M ) : 620.0 DIAMETER (WIDTH) ( M ) : 5.4 NOS. : 2  
 PENSTOCK : HORIZONT. L ( M ) : 160.0 DIAMETER ( M ) : 4.4 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 660.0 DIAMETER ( M ) : 6.6 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 93.0

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 139.5 AVERAGE NET HEAD ( M ) : 56.3  
 /HEAD FIRM DISCHARGE (M3/S) : 34.9 TAILWATER LEVEL (EL.M) : 6.0

POWER UNSATLLED CAPACITY (MW) : 64.7 ANNUAL TOTAL ENERGY (GWH) : 177.5  
 /ENERGY FIRM POWER (MW) : 16.2 FIRM ENERGY (GWH) : 141.6  
 MIN. GUARANTEED POWER (MW) : 40.4 SECONDARY ENERGY (GWH) : 35.0

TRANSMISSION LINE LENGTH (KM) : 21.0 TO : BALLESTEROS 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2  
 ACCESS ROAD LENGTH (KM) : 10.5 FROM : PAMPLONA

CONSTRUCTION COST

TOTAL COST (MIL USD) : 171.3 POWER COST (MIL USD) : 165.6  
 TOTAL COST/KW (USD/KW) : 2648.1 TRANSMISSION COST (MIL USD) : 2.6  
 TOTAL COST/KWH (USD/KWH) : 1.124 ACCESS ROAD COST (MIL USD) : 3.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3275-11  
 TECHNICAL COMMENT :



-----INVENTORY OF HYDROPOWER SITES-----

SCHEME : SISIRITAN  
 RIVER SYSTEM : ABULOG  
 STREAM : ABULOG  
 WATER RESOURCES REGION : 11  
 PROVINCE : KAL-APAYAO  
 SCHEME ID : 2-006-00-01-0-1  
 COORDINATES : N18-09-42 E121-21-00  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 1870.0 (RAIN : 1870.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-005-NW-203  
 AVER. BASIN RAINFALL (MM/YR) : 4004. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
 AVERAGE DISCHARGE (M3/S) : 200.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER.DISCHARGE (M3/S) : 227.2

SELECTED PLAN  
 TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.30

RESERVOIR  
 FULL SUPPLY LEVEL (EL.M) : 100.0 GROSS STORAGE VOL. (MIL M3) : 3443.0  
 AVERAGE OPERATING LEVEL (EL.M) : 88.4 ACTIVE STORAGE VOL. (MIL M3) : 1900.8  
 MINIMUM OPERATING LEVEL (EL.M) : 65.2 DEAD STORAGE VOL. (MIL M3) : 1542.2  
 DRAWDOWN DEPTH ( M ) : 34.8 SEDIMENT VOL. (MIL M3) : 130.9

MAIN DAM (WEIR)  
 CREST ELEVATION (EL.M) : 106.0 CREST LENGTH ( M ) : 890.5  
 DAM HEIGHT ( M ) : 96.0 EMBANKMENT VOL. (MIL M3) : 11.45

WATERWAY  
 HEADRAGE : LENGTH ( M ) : 620.0 DIAMETER (WIDTH) ( M ) : 6.4 NOS. : 7  
 PENSTOCK : HORIZONT, L ( M ) : 250.0 DIAMETER ( M ) : 4.9 NOS. : 7  
 DIVERSION : LENGTH ( M ) : 970.0 DIAMETER ( M ) : 7.8 NOS. : 3  
 EXCAVATION VOL TOTAL (1000 M3) : 311.0

DISCHARGE /HEAD  
 PLANT MAX. DISCHARGE (M3/S) : 668.6 AVERAGE NET HEAD ( M ) : 75.0  
 FIRM DISCHARGE (M3/S) : 111.4 TAILWATER LEVEL (EL.M) : 10.0

POWER /ENERGY  
 UNSATLLED CAPACITY (MW) : 418.3 ANNUAL TOTAL ENERGY (GWH) : 1081.6  
 FIRM POWER (MW) : 69.7 FIRM ENERGY (GWH) : 610.7  
 MIN.GUARANTEED POWER (MW) : 276.9 SECONDARY ENERGY (GWH) : 471.0

TRANSMISSION LINE  
 LENGTH (KM) : 44.4 TO : CAMALANIUGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 0. FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 536.8 POWER COST (MIL USD) : 522.9  
 TOTAL COST/KW (USD/KW) : 1283.4 TRANSMISSION COST (MIL USD) : 13.9  
 TOTAL COST/KWH (USD/KWH) : 0.714 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
 SUBMERGED ROAD : PROVINCIAL ROAD 8.0 KMS.  
 MAP USED (1:50,000 SCALE) : 3274-11 1977  
 TECHNICAL COMMENT : - PERMEABLE LIMESTONE FORMATION AT THE RIGHT ABUTMENT SUSCEPTIBLE TO LEAKAGE IN THE RESERVOIR

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-006-00-02-0-1

SCHEME : BUBULAYAN

RIVER SYSTEM : ABULOG  
STREAM : ABULOG

WATER RESOURCES REGION : II  
PROVINCE : KAL-APAYAO

COORDINATES : N18-06-18 E121-18-18  
STUDY LEVEL : UNSCALED  
(PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 1609.7 (MAIN : 1610. INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-005-NW-203  
AVER. BASIN RAINFALL (MM/YR) : 3975. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
AVERAGE DISCHARGE (M3/S) : 171.5 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER.DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.80

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 206.0 GROSS STORAGE VOL. (MIL M3) : 5406.8  
AVERAGE OPERATING LEVEL (EL.M) : 182.3 ACTIVE STORAGE VOL. (MIL M3) : 4325.8  
MINIMUM OPERATING LEVEL (EL.M) : 134.8 DEAD STORAGE VOL. (MIL M3) : 1089.0  
DRAWDOWN DEPTH ( M ) : 71.2 SEDIMENT VOL. (MIL M3) : 112.7

MAIN DAM CREST ELEVATION (EL.M) : 212.0 CREST LENGTH ( M ) : 912.0  
(WEIR) DAM HEIGHT ( M ) : 190.0 EMBANKMENT VOL. (MIL M3) : 27.41

WATERWAY HEADRACE : LENGTH ( M ) : 990.0 DIAMETER (WIDTH) ( M ) : 6.2 NOS. : 5  
PENSTOCK : HORIZONTAL L ( M ) : 370.0 DIAMETER ( M ) : 4.6 NOS. : 5  
DIVERSION : LENGTH ( M ) : 1390.0 DIAMETER ( M ) : 7.5 NOS. : 3  
EXCAVATION VOL TOTAL (1000 M3) : 368.0

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 450.2 AVERAGE NET HEAD ( M ) : 155.7  
7/HEAD FIRM DISCHARGE (M3/S) : 150.1 TAILWATER LEVEL (EL.M) : 22.0

POWER UNSATLLED CAPACITY (MW) : 577.1 ANNUAL TOTAL ENERGY (GWH) : 1369.6  
/ENERGY FIRM POWER (MW) : 192.4 FIRM ENERGY (GWH) : 1685.0  
MIN.GUARANTEED POWER (MW) : 382.1 SECONDARY ENERGY (GWH) : 184.6

TRANSMISSION

LINE LENGTH (KM) : 56.0 TO : CAMALANIUGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 2.0 FROM : ARIPIP

CONSTRUCTION COST

TOTAL COST (MIL USD) : 742.9 POWER COST (MIL USD) : 707.8  
TOTAL COST/KW (USD/KW) : 1287.3 TRANSMISSION COST (MIL USD) : 34.5  
TOTAL COST/KWH (USD/KWH) : 0.427 ACCESS ROAD COST (MIL USD) : 0.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3274-11 1977  
TECHNICAL COMMENT : - LIMESTONE FORMATION WITH PROBABLE CRACKS AND CAVES  
- SITE GEOLOGY AFFECTED BY FAULTS  
- NOT PROCEEDED TO 2ND SCREENING DUE TO GEOLOGIC ASPECTS

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-006-00-03-0-1

SCHEME : BULU

RIVER SYSTEM : ABULOG  
STREAM : ABULOG

WATER RESOURCES REGION : 11  
PROVINCE : KAL-APAYAO

COORDINATES : N18-02-30 E121-13-00  
STUDY LEVEL : UNSCALED  
(PRE-F/S-RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 1540.0 (MAIN : 1540.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-005-NW-203  
AVER. BASIN RAINFALL (MM/YR) : 4020. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
AVERAGE DISCHARGE (M3/S) : 166.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR : RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL,M) : 218.0  
AVERAGE OPERATING LEVEL (EL,M) : 199.2  
MINIMUM OPERATING LEVEL (EL,M) : 161.5  
DRAWDOWN DEPTH ( M ) : 56.5

GROSS STORAGE VOL. (MIL M3) : 5227.8  
ACTIVE STORAGE VOL. (MIL M3) : 3689.7  
DEAD STORAGE VOL. (MIL M3) : 1558.1  
SEDIMENT VOL. (MIL M3) : 107.8

MAIN DAM CREST ELEVATION (EL,M) : 224.0  
(WEIR) DAM HEIGHT ( M ) : 145.7

CREST LENGTH ( M ) : 624.0  
EMBANKMENT VOL. (MIL M3) : 15.91

WATERWAY HEADRACE : LENGTH ( M ) : 600.0  
PENSTOCK : HORIZONTAL L ( M ) : 170.0  
DIVERSION : LENGTH ( M ) : 1170.0  
EXCAVATION VOL TOTAL (1000 M3) : 253.1

NOS. : 5  
NOS. : 5  
NOS. : 3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 419.5  
/HEAD FIRM DISCHARGE (M3/S) : 139.8

AVERAGE NET HEAD ( M ) : 118.1  
TAILWATER LEVEL (EL-M) : 78.3

POWER INSATLLED CAPACITY (MW) : 408.0  
/ENERGY FIRM POWER (MW) : 136.0  
MIN. GUARANTEED POWER (MW) : 264.7

ANNUAL TOTAL ENERGY (GWH) : 1365.1  
FIRM ENERGY (GWH) : 1191.2  
SECONDARY ENERGY (GWH) : 174.0

TRANSMISSION LINE LENGTH (KM) : 65.5 TO : CAMALANIUGAN  
ACCESS ROAD LENGTH (KM) : 4.0 FROM : KABUGAO

230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 517.7  
TOTAL COST/KW (USD/KW) : 1268.8  
TOTAL COST/KWH (USD/KWH) : 0.416

POWER COST (MIL USD) : 496.6  
TRANSMISSION COST (MIL USD) : 19.9  
ACCESS ROAD COST (MIL USD) : 1.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - DENSE POPULATION  
SUBMERGED ROAD : PROVINCIAL ROAD 10.0 KMS  
MAP USED (1:50,000 SCALE) : 3274-111 1975  
TECHNICAL COMMENT : - SITE GEOLOGY AFFECTED BY FAULTS

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME : NABABARAYAN  
 RIVER SYSTEM : ABULOG  
 STREAM : APAYAO  
 WATER RESOURCES REGION : II  
 PROVINCE : KAL-APAYAO  
 COORDINATES : N18-02-00 E121-08-00  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S-RECONNAISSANCE)

SCHEME ID : 2-006-01-04-0-1

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 1007.0 (MAIN : 1007.0, INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-005-NW-203  
 AVER. BASIN RAINFALL (MM/YR) : 4081. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
 AVERAGE DISCHARGE (M3/S) : 110.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.45

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 240.0 GROSS STORAGE VOL. (MIL M3) : 2250.6  
 AVERAGE OPERATING LEVEL (EL.M) : 222.3 ACTIVE STORAGE VOL. (MIL M3) : 1570.2  
 MINIMUM OPERATING LEVEL (EL.M) : 186.8 DEAD STORAGE VOL. (MIL M3) : 680.4  
 DRAWDOWN DEPTH (M) : 53.2 SEDIMENT VOL. (MIL M3) : 70.5

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 246.0 CREST LENGTH (M) : 704.0  
 DAM HEIGHT (M) : 145.0 EMBANKMENT VOL. (MIL M3) : 16.82

WATERWAY HEADRACE : LENGTH (M) : 760.0 DIAMETER (WIDTH) (M) : 5.7 NOS. : 4  
 PENSTOCK : HORIZONTAL (M) : 120.0 DIAMETER (M) : 4.4 NOS. : 4  
 DIVERSION : LENGTH (M) : 1000.0 DIAMETER (M) : 8.3 NOS. : 2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 311.4 AVERAGE NET HEAD (M) : 118.6  
 FIRM DISCHARGE (M3/S) : 77.9 TAILWATER LEVEL (EL.M) : 101.0

POWER INSATTLIED CAPACITY (MW) : 304.0 ANNUAL TOTAL ENERGY (GWH) : 907.3  
 FIRM POWER (MW) : 76.0 FIRM ENERGY (GWH) : 665.7  
 MIN. GUARANTEED POWER (MW) : 202.9 SECONDARY ENERGY (GWH) : 241.6

TRANSMISSION LINE LENGTH (KM) : 75.0 TO : CAMALANIGUAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 FROM : KABUGAO

ACCESS ROAD LENGTH (KM) : 6.0

CONSTRUCTION COST

TOTAL COST (MIL USD) : 456.3 POWER COST (MIL USD) : 432.0  
 TOTAL COST/KW (USD/KW) : 1501.3 TRANSMISSION COST (MIL USD) : 22.6  
 TOTAL COST/KWH (USD/KWH) : 0.618 ACCESS ROAD COST (MIL USD) : 1.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3274-111 1977  
 TECHNICAL COMMENT : - TOPOGRAPHIC LIMIT +/- 250.0 M.  
 - FAULT FRACTURED ZONE IN THE RESERVOIR AREA

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-006-01-05-0-1

SCHEME : DIBAGAT

RIVER SYSTEM : ABULOG  
STREAM : APAYAO

WATER RESOURCES REGION : 11  
PROVINCE : KAL-APAYAO

COORDINATES : N18-05-20 E121-07-17  
STUDY LEVEL : UNSCALED

(PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 798.9 (MAIN : 799.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-005-NW-203  
AVER. BASIN RAINFALL (MM/YR) : 4135. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
AVERAGE DISCHARGE (M3/S) : 89.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.80

RESERVOIR

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 341.0  
AVERAGE OPERATING LEVEL (EL.M) : 314.6  
MINIMUM OPERATING LEVEL (EL.M) : 261.8  
DRAWDOWN DEPTH ( M ) : 79.2

GROSS STORAGE VOL. (MIL M3) : 2857.7  
ACTIVE STORAGE VOL. (MIL M3) : 2249.2  
DEAD STORAGE VOL. (MIL M3) : 608.5  
SEDIMENT VOL. (MIL M3) : 55.9

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 347.0  
DAM HEIGHT ( M ) : 192.0

CREST LENGTH ( M ) : 572.1  
EMBANKMENT VOL. (MIL M3) : 18.60

WATERWAY HEADRACE : LENGTH ( M ) : 700.0  
PENSTOCK : HORIZONTAL L ( M ) : 140.0  
DIVERSION : LENGTH ( M ) : 1030.0  
EXCAVATION VOL TOTAL (1000 M3) : 164.4

DIAMETER (WIDTH) ( M ) : 5.8  
DIAMETER ( M ) : 4.3  
DIAMETER ( M ) : 7.9  
NOS. : 3  
NOS. : 3  
NOS. : 2

DISCHARGE /HEAD PLANT MAX. DISCHARGE (M3/S) : 234.4  
FIRM DISCHARGE (M3/S) : 78.1

AVERAGE NET HEAD ( M ) : 156.4  
TAILWATER LEVEL (EL.M) : 155.0

POWER /ENERGY UNSATLLED CAPACITY (MW) : 301.7  
FIRM POWER (MW) : 100.6  
MIN. GUARANTEED POWER (MW) : 190.3

ANNUAL TOTAL ENERGY (GWH) : 977.7  
FIRM ENERGY (GWH) : 880.9  
SECONDARY ENERGY (GWH) : 96.8

TRANSMISSION

LINE LENGTH (KM) : 75.6 TO : CAMALANIUGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 3.6 FROM : NEAREST NATIONAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 451.8 POWER COST (MIL USD) : 428.0  
TOTAL COST/KW (USD/KW) : 1497.5 TRANSMISSION COST (MIL USD) : 22.8  
TOTAL COST/KWH (USD/KWH) : 0.497 ACCESS ROAD COST (MIL USD) : 1.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3274-111 1977  
TECHNICAL COMMENT : - NONE

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-006-01-06-0-1

SCHEME : AGBULU

RIVER SYSTEM : ABULOG  
 STREAM : APAYAO  
 WATER RESOURCES REGION : 11  
 PROVINCE : KAL-APAYAO  
 COORDINATES : N18-08-20 E121-05-00  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S-RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 706.0 (MAIN : 706.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-005-NW-203  
 AVER. BASIN RAINFALL (MM/YR) : 3977.0 DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
 AVERAGE DISCHARGE (M3/S) : 75.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 346.0 GROSS STORAGE VOL. (MIL M3) : 2370.0  
 AVERAGE OPERATING LEVEL (EL.M) : 323.4 ACTIVE STORAGE VOL. (MIL M3) : 1779.7  
 MINIMUM OPERATING LEVEL (EL.M) : 276.1 DEAD STORAGE VOL. (MIL M3) : 590.3  
 DRAWDOWN DEPTH ( M ) : 67.9 SEDIMENT VOL. (MIL M3) : 49.4

MAIN DAM CREST ELEVATION (EL.M) : 352.0 CREST LENGTH ( M ) : 380.0  
 (WEIR) DAM HEIGHT ( M ) : 167.0 EMBANKMENT VOL. (MIL M3) : 10.09

WATERWAY HEADRACE : LENGTH ( M ) : 780.0 DIAMETER (WIDTH) ( M ) : 6.4 NOS. : 2  
 PENSTOCK : HORIZONTAL L ( M ) : 120.0 DIAMETER ( M ) : 4.8 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 1120.0 DIAMETER ( M ) : 7.7 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 160.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 193.9 AVERAGE NET HEAD ( M ) : 135.6  
 /HEAD FIRM DISCHARGE (M3/S) : 64.8 TAILWATER LEVEL (EL.M) : 185.0

POWER INSTALLED CAPACITY (KW) : 216.4 ANNUAL TOTAL ENERGY (GWH) : 712.5  
 /ENERGY FIRM POWER (KW) : 72.1 FIRM ENERGY (GWH) : 631.8  
 MIN. GUARANTEED POWER (KW) : 137.3 SECONDARY ENERGY (GWH) : 80.8

TRANSMISSION LINE LENGTH (KM) : 78.6 TO : CAMALANUGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 6.5 FROM : NEAREST NATIONAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 315.5 POWER COST (MIL USD) : 301.1  
 TOTAL COST/KW (USD/KW) : 1458.2 TRANSMISSION COST (MIL USD) : 12.5  
 TOTAL COST/KWH (USD/KWH) : 0.481 ACCESS ROAD COST (MIL USD) : 1.9

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3274-111 1977  
 TECHNICAL COMMENT : - THIN RIDGE ON LEFT ABUTMENT OF DAM (ABOVE EL. 360.0 M)  
 - ASSUMED FAULTS AT THE RIGHT BANK

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-006-01-07-0-1

SCHEME : AOAN

RIVER SYSTEM : ABULOG  
STREAM : APAYAO

WATER RESOURCES REGION : II  
PROVINCE : KAL-APAYAO

COORDINATES : N18-15-30 E120-00-20  
STUDY LEVEL : UNSCALED  
(PRE-F/S-RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 245.7 (MAIN : 245.7 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-005-NW-203  
 AVER. BASIN RAINFALL (MM/YR) : 4063. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
 AVERAGE DISCHARGE (M3/S) : 26.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR : RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 520.0 GROSS STORAGE VOL. (MIL M3) : 847.0  
 AVERAGE OPERATING LEVEL (EL.M) : 500.7 ACTIVE STORAGE VOL. (MIL M3) : 592.9  
 MINIMUM OPERATING LEVEL (EL.M) : 462.0 DEAD STORAGE VOL. (MIL M3) : 254.1  
 DRAWDOWN DEPTH ( M ) : 58.0 SEDIMENT VOL. (MIL M3) : 17.2

MAIN DAM CREST ELEVATION (EL.M) : 526.0 CREST LENGTH ( M ) : 701.7  
 (WEIR) ( M ) : 206.0 EMBANKMENT VOL. (MIL M3) : 27.57

WATERWAY HEADRACE : LENGTH ( M ) : 1080.0 DIAMETER (WIDTH) ( M ) : 5.4 NOS. : 2  
 PENSTOCK : HORIZONTAL, L ( M ) : 180.0 DIAMETER ( M ) : 4.1 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 1380.0 DIAMETER ( M ) : 8.7 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 137.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 135.6 AVERAGE NET HEAD ( M ) : 176.3  
 /HEAD FIRM DISCHARGE (M3/S) : 22.6 TAILWATER LEVEL (EL.M) : 320.0

POWER INSATLLED CAPACITY (MW) : 196.8 ANNUAL TOTAL ENERGY (GWH) : 337.4  
 /ENERGY FIRM POWER (MW) : 32.8 FIRM ENERGY (GWH) : 287.4  
 MIN. GUARANTEED POWER (MW) : 146.3 SECONDARY ENERGY (GWH) : 50.0

TRANSMISSION LINE LENGTH (KM) : 49.0 TO : LAGAG 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 18.0 FROM : DALIGAN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 463.9 POWER COST (MIL USD) : 450.5  
 TOTAL COST/KW (USD/KW) : 2356.8 TRANSMISSION COST (MIL USD) : 8.3  
 TOTAL COST/KWH (USD/KWH) : 1.534 ACCESS ROAD COST (MIL USD) : 5.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3274-IV  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-006-01-08-0-2

SCHEME : APAYAO

RIVER SYSTEM : ABULOG  
STREAM : APAYAO

WATER RESOURCES REGION : 11  
PROVINCE : KALINGA APAYAO

COORDINATES : N18-19-18 E120-58-53  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 148.9 (MAIN : 149., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-005-NW-203  
AVER. BASIN RAINFALL (MM/YR) : 3533. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
AVERAGE DISCHARGE (M3/S) : 14.0 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.69

PONDAGE FULL SUPPLY LEVEL (EL.M) : 455.1 PONDAGE STORAGE VOL. (1000M3) : 126.9  
AVERAGE OPERATING LEVEL (EL.M) : 454.4 ACTIVE STORAGE VOL. (1000M3) : 35.7  
MINIMUM OPERATING LEVEL (EL.M) : 453.6  
DRAWDOWN DEPTH ( M ) : 1.4

MAIN DAM CREST ELEVATION (EL.M) : 455.1 CREST LENGTH ( M ) : 63.4  
(WEIR) WEIR HEIGHT ( M ) : 8.1 WEIR CONCRETE VOL. (1000 M3) : 9.4

WATERWAY HEADRACE : LENGTH ( M ) : 3120.0 DIAMETER (WIDTH) ( M ) : 2.9 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 175.0 DIAMETER ( M ) : 2.2 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 55.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 14.0 AVERAGE NET HEAD ( M ) : 135.8  
/HEAD FIRM DISCHARGE (M3/S) : 1.2 TAILWATER LEVEL (EL.M) : 305.0

POWER UNSATLLED CAPACITY (MW) : 15.7 ANNUAL TOTAL ENERGY (GWH) : 85.3  
/ENERGY FIRM POWER (MW) : 1.4 FIRM ENERGY (GWH) : 12.1  
MIN. GUARANTEED POWER (MW) : 1.2 SECONDARY ENERGY (GWH) : 73.1

TRANSMISSION LINE LENGTH (KM) : 39.4 TO : PIDDIG 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 32.4 FROM : NEAREST NATIONAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 36.5 POWER COST (MIL USD) : 25.7  
TOTAL COST/KW (USD/KW) : 2330.1 TRANSMISSION COST (MIL USD) : 1.5  
TOTAL COST/KWH (USD/KWH) : 1.071 ACCESS ROAD COST (MIL USD) : 9.2

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3174-1 1977  
TECHNICAL COMMENT : - NONE



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME : ZINUNDUNGAN  
 RIVER SYSTEM : CAGAYAN  
 STREAM : ZINUNDUNGAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : CAGAYAN  
 COORDINATES : N17-59-45 E121-27-25  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S, RECONNAISSANCE)

SCHEME ID : 2-008-01-01-0-1

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 149.7 (MAIN : 150., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-005-NW-203  
 AVER. BASIN RAINFALL (MM/YR) : 2698. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 2066.  
 AVERAGE DISCHARGE (M3/S) : 9.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.65

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 89.0 GROSS STORAGE VOL. (MIL M3) : 292.2  
 AVERAGE OPERATING LEVEL (EL.M) : 81.7 ACTIVE STORAGE VOL. (MIL M3) : 202.6  
 MINIMUM OPERATING LEVEL (EL.M) : 67.0 DEAD STORAGE VOL. (MIL M3) : 89.6  
 DRAWDOWN DEPTH ( M ) : 22.0 SEDIMENT VOL. (MIL M3) : 10.5  
 MAIN DAM CREST ELEVATION (EL.M) : 95.0 CREST LENGTH ( M ) : 262.5  
 (WEIR) DAM HEIGHT ( M ) : 60.0 EMBANKMENT VOL. (MIL M3) : 1.14  
 WATERWAY HEADRACE : LENGTH ( M ) : 660.0 DIAMETER (WIDTH) ( M ) : 2.6  
 PENSTOCK : HORIZONTAL L ( M ) : 200.0 DIAMETER ( M ) : 2.4  
 DIVERSION : LENGTH ( M ) : 1010.0 DIAMETER ( M ) : 7.8  
 EXCAVATION VOL TOTAL (1000 M3) : 53.1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 15.8 AVERAGE NET HEAD ( M ) : 43.1  
 /HEAD FIRM DISCHARGE (M3/S) : 7.9 TAILWATER LEVEL (EL.M) : 35.0  
 POWER INSATLLED CAPACITY (MW) : 5.6 ANNUAL TOTAL ENERGY (GWH) : 28.2  
 /ENERGY FIRM POWER (MW) : 2.8 FIRM ENERGY (GWH) : 24.6  
 MIN. GUARANTEED POWER (MW) : 3.5 SECONDARY ENERGY (GWH) : 3.6

TRANSMISSION LINE LENGTH (KM) : 47.0 TO : CAMALANIUGAN NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 3.5 FROM : TULONG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 50.4 POWER COST (MIL USD) : 47.7  
 TOTAL COST/KW (USD/KW) : 9000.6 TRANSMISSION COST (MIL USD) : 1.7  
 TOTAL COST/KWH (USD/KWH) : 1.968 ACCESS ROAD COST (MIL USD) : 1.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3273-1  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-02-02-0-1

SCHEME : CAPISSAYAN

RIVER SYSTEM : CAGAYAN  
 STREAM : DUMNON  
 WATER RESOURCES REGION : 11  
 PROVINCE : CAGAYAN  
 COORDINATES : N18-03-06 E121-51-15  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 188.5 (MAIN : 189., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-020-NW-225  
 AVER. BASIN RAINFALL (MM/YR) : 2216. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 655.  
 AVERAGE DISCHARGE (M3/S) : 8.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 51.5

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.45

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 100.0 GROSS STORAGE VOL. (MIL M3) : 152.6  
 AVERAGE OPERATING LEVEL (EL.M) : 93.6 ACTIVE STORAGE VOL. (MIL M3) : 126.6  
 MINIMUM OPERATING LEVEL (EL.M) : 80.8 DEAD STORAGE VOL. (MIL M3) : 26.0  
 DRAWDOWN DEPTH ( M ) : 19.2 SEDIMENT VOL. (MIL M3) : 13.2  
 MAIN DAM CREST ELEVATION (EL.M) : 106.0 CREST LENGTH ( M ) : 688.7  
 (WEIR) DAM HEIGHT ( M ) : 52.0 EMBANKMENT VOL. (MIL M3) : 2.06  
 WATERWAY HEADRACE : LENGTH ( M ) : 410.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 160.0 DIAMETER ( M ) : 2.1 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 780.0 DIAMETER ( M ) : 8.2 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 44.1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 10.7 AVERAGE NET HEAD ( M ) : 37.7  
 /HEAD FIRM DISCHARGE (M3/S) : 5.3 TAILWATER LEVEL (EL.M) : 54.0  
 POWER INSATLLED CAPACITY (MW) : 3.3 ANNUAL TOTAL ENERGY (GWH) : 20.2  
 /ENERGY FIRM POWER (MW) : 1.7 FIRM ENERGY (GWH) : 14.5  
 MIN. GUARANTEED POWER (MW) : 2.1 SECONDARY ENERGY (GWH) : 5.7

TRANSMISSION LINE LENGTH (KM) : 32.0 TO : CAMALANIUGAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 13.0 FROM : CUMAO

CONSTRUCTION COST

TOTAL COST (MIL USD) : 60.6 POWER COST (MIL USD) : 55.6  
 TOTAL COST/KW (USD/KW) : 18298.7 TRANSMISSION COST (MIL USD) : 1.3  
 TOTAL COST/KWH (USD/KWH) : 3.738 ACCESS ROAD COST (MIL USD) : 3.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3374-11  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME : BASAO  
 RIVER SYSTEM : CAGAYAN  
 STREAM : CHICO  
 WATER RESOURCES REGION : 11  
 PROVINCE : KALAPAYAO  
 COORDINATES : N17-14-32 E121-07-30  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)  
 SCHEME ID : 2-008-03-03-0-1

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 897.0 (MAIN : 897.0, INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 3344. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 55.9 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.3

SELECTED PLAN  
 TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 768.0 GROSS STORAGE VOL. (MIL M3) : 1769.1  
 AVERAGE OPERATING LEVEL (EL.M) : 740.4 ACTIVE STORAGE VOL. (MIL M3) : 1234.2  
 MINIMUM OPERATING LEVEL (EL.M) : 685.2 DEAD STORAGE VOL. (MIL M3) : 534.9  
 DRAWDOWN DEPTH ( M ) : 82.8 SEDIMENT VOL. (MIL M3) : 62.8  
 MAIN DAM CREST ELEVATION (EL.M) : 774.0 CREST LENGTH ( M ) : 1146.6  
 (WEIR) DAM HEIGHT ( M ) : 264.0 EMBANKMENT VOL. (MIL M3) : 57.80  
 WATERWAY HEADRACE : LENGTH ( M ) : 1210.0 DIAMETER (WIDTH) ( M ) : 6.3 NOS. : 3  
 PENSTOCK : HORIZONTAL L ( M ) : 420.0 DIAMETER ( M ) : 4.5 NOS. : 3  
 DIVERSION : LENGTH ( M ) : 1850.0 DIAMETER ( M ) : 8.1 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 329.8  
 DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 283.2 AVERAGE NET HEAD ( M ) : 224.1  
 /HEAD FIRM DISCHARGE (M3/S) : 47.2 TAILWATER LEVEL (EL.M) : 510.0

POWER UNSATTLLED CAPACITY (MW) : 522.4 ANNUAL TOTAL ENERGY (GWH) : 894.6  
 /ENERGY FIRM POWER (MW) : 87.1 FIRM ENERGY (GWH) : 762.7  
 MIN. GUARANTEED POWER (MW) : 375.0 SECONDARY ENERGY (GWH) : 131.9

TRANSMISSION LINE LENGTH (KM) : 9.0 TO : BATONG BURAY 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 2.5 FROM : LUPLUPA

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 909.5 POWER COST (MIL USD) : 902.2  
 TOTAL COST/KW (USD/KW) : 1741.0 TRANSMISSION COST (MIL USD) : 6.6  
 TOTAL COST/KWH (USD/KWH) : 1.134 ACCESS ROAD COST (MIL USD) : 0.7

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3271-11  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-03-04-0-2

SCHEME : CHICO-1R

RIVER SYSTEM : CAGAYAN  
 STREAM : CHICO  
 WATER RESOURCES REGION : 11  
 PROVINCE : MT. PROVINCE  
 COORDINATES : N17-11-10 E121-03-53  
 STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 806.8 (MAIN : 807.1, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 3372. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 674.  
 AVERAGE DISCHARGE (M3/S) : 51.0 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 624.2 PONDAGE STORAGE VOL. (1000M3) : 510.2  
 AVERAGE OPERATING LEVEL (EL.M) : 623.6 ACTIVE STORAGE VOL. (1000M3) : 178.4  
 MINIMUM OPERATING LEVEL (EL.M) : 623.0  
 DRAWDOWN DEPTH ( M ) : 1.2

MAIN DAM CREST ELEVATION (EL.M) : 624.2 CREST LENGTH ( M ) : 119.8  
 (WEIR) WEIR HEIGHT ( M ) : 10.2 WEIR CONCRETE VOL. (1000 M3) : 24.2

WATERWAY HEADRACE : LENGTH ( M ) : 2950.0 DIAMETER (WIDTH) ( M ) : 4.7 NOS. : 1  
 PENSTOCK : HORIZONT. L ( M ) : 135.0 DIAMETER ( M ) : 3.8 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 53.7

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 50.9 AVERAGE NET HEAD ( M ) : 63.4  
 /HEAD FIRM DISCHARGE (M3/S) : 6.2 TAILWATER LEVEL (EL.M) : 555.0

POWER INSATLLED CAPACITY (MW) : 26.6 ANNUAL TOTAL ENERGY (GWH) : 140.2  
 /ENERGY FIRM POWER (MW) : 3.2 FIRM ENERGY (GWH) : 28.3  
 MIN. GUARANTEED POWER (MW) : 2.9 SECONDARY ENERGY (GWH) : 111.9

TRANSMISSION LINE LENGTH (KM) : 20.5 TO : BATONG BUHAY FROM : NATIONAL ROAD BESIDE DAMSITE 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 0.

CONSTRUCTION COST

TOTAL COST (MIL USD) : 36.0 POWER COST (MIL USD) : 35.0  
 TOTAL COST/KW (USD/KW) : 1353.1 TRANSMISSION COST (MIL USD) : 1.0  
 TOTAL COST/KWH (USD/KWH) : 0.591 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3271-IV 1979  
 TECHNICAL COMMENT : - NONE

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-03-05-0-1

SCHEME : SADANGA

RIVER SYSTEM : CAGAYAN  
STREAM : CHICO

WATER RESOURCES REGION : 11  
PROVINCE : MT. PROVINCE

COORDINATES : N17-08-S3 E121-03-08  
STUDY LEVEL : UNSCALED  
(PRE-F/S, RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 725.0 (MAIN : 725.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 3413 DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 46.8 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVOIR DEVELOPMENT RATIO : 0.65

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 890.0 GROSS STORAGE VOL. (MIL M3) : 1471.7  
AVERAGE OPERATING LEVEL (EL.M) : 866.7 ACTIVE STORAGE VOL. (MIL M3) : 958.8  
MINIMUM OPERATING LEVEL (EL.M) : 820.2 DEAD STORAGE VOL. (MIL M3) : 512.9  
DRAWDOWN DEPTH ( M ) : 69.8 SEDIMENT VOL. (MIL M3) : 50.7

MAIN DAM CREST ELEVATION (EL.M) : 896.0 CREST LENGTH ( M ) : 615.6  
(WEIR) DAM HEIGHT ( M ) : 220.0 EMBANKMENT VOL. (MIL M3) : 23.10

WATERWAY HEADRACE : LENGTH ( M ) : 1270.0 DIAMETER (WIDTH) ( M ) : 5.7  
PENSTOCK : HORIZONT. L ( M ) : 190.0 DIAMETER ( M ) : 4.3  
DIVERSION : LENGTH ( M ) : 1600.0 DIAMETER ( M ) : 7.8  
EXCAVATION VOL TOTAL (1000 M3) : 224.4 NOS. : 2  
NOS. : 2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 155.5 AVERAGE NET HEAD ( M ) : 186.1  
/HEAD FIRM DISCHARGE (M3/S) : 38.9 TAILWATER LEVEL (EL.M) : 676.0

POWER INSATLLED CAPACITY (MW) : 238.2 ANNUAL TOTAL ENERGY (GWH) : 611.3  
/ENERGY FIRM POWER (MW) : 59.6 FIRM ENERGY (GWH) : 521.7  
MIN. GUARANTEED POWER (MW) : 170.2 SECONDARY ENERGY (GWH) : 85.6

TRANSMISSION LINE LENGTH (KM) : 28.1 TO : BATONG BUHAY 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 0 FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST

TOTAL COST (MIL USD) : 463.0 POWER COST (MIL USD) : 453.7  
TOTAL COST/KW (USD/KW) : 1943.4 TRANSMISSION COST (MIL USD) : 9.2  
TOTAL COST/KWH (USD/KWH) : 0.844 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
SUBMERGED ROAD : PROVINCIAL ROAD 8.5 KMS.  
MAP USED (1:50,000 SCALE) : 3271-111 1979  
TECHNICAL COMMENT : - NONE

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-03-06-0-2

SCHEME : CHICO-2R

RIVER SYSTEM : CAGAYAN  
STREAM : CHICO

WATER RESOURCES REGION : II  
PROVINCE : MT. PROVINCE

COORDINATES : N17-06-56 E121-01-30  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 592.0 (MAIN : 592.0 INTER TRANSFER TOTAL : 0.1) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 3361. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 37.2 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 780.4 PONDAGE STORAGE VOL. (1000M3) : 289.5  
AVERAGE OPERATING LEVEL (EL.M) : 779.6 ACTIVE STORAGE VOL. (1000M3) : 130.2  
MINIMUM OPERATING LEVEL (EL.M) : 778.9  
DRAWDOWN DEPTH ( M ) : 1.5

MAIN DAM CREST ELEVATION (EL.M) : 780.4 CREST LENGTH ( M ) : 88.5  
(WEIR) WEIR HEIGHT ( M ) : 9.8 WEIR CONCRETE VOL. (1000 M3) : 17.1

WATERWAY HEADRACE : LENGTH ( M ) : 5950.0 DIAMETER (WIDTH) ( M ) : 4.2 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 275.0 DIAMETER ( M ) : 3.3 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 85.4

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 37.2 AVERAGE NET HEAD ( M ) : 109.1  
FIRM DISCHARGE (M3/S) : 4.5 TAILWATER LEVEL (EL.M) : 660.0

POWER INSALLED CAPACITY (MW) : 33.4 ANNUAL TOTAL ENERGY (GWH) : 175.6  
FIRM POWER (MW) : 4.1 FIRM ENERGY (GWH) : 35.6  
MIN. GUARANTEED POWER (MW) : 3.6 SECONDARY ENERGY (GWH) : 140.0

TRANSMISSION LINE LENGTH (KM) : 12.6 TO : BONTOC 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2  
ACCESS ROAD LENGTH (KM) : 0. FROM : NATIONAL ROAD BESIDE DANGSITE

CONSTRUCTION COST

TOTAL COST (MIL USD) : 44.4 POWER COST (MIL USD) : 43.0  
TOTAL COST/KW (USD/KW) : 1331.5 TRANSMISSION COST (MIL USD) : 1.4  
TOTAL COST/KWH (USD/KWH) : 0.573 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3271-111 1979  
TECHNICAL COMMENT : - MUTUALLY EXCLUSIVE WITH SADANGA SCHEME

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-03-07-0-2

SCHEME : CHICO-3R

RIVER SYSTEM : CAGAYAN  
STREAM : CHICO

WATER RESOURCES REGION : II  
PROVINCE : MT. PROVINCE

COORDINATES : N17-06-01 E120-59-27  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO INFORMATION

CATCHMENT AREA (KM2) : 449.7 (MAIN : 450. INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 3238. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 26.5 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 868.6 PONDAGE STORAGE VOL. (1000M3) : 1020.4  
AVERAGE OPERATING LEVEL (EL.M) : 868.4 ACTIVE STORAGE VOL. (1000M3) : 92.7  
MINIMUM OPERATING LEVEL (EL.M) : 868.1  
DRAWDOWN DEPTH ( M ) : 0.5

MAIN DAM. CREST ELEVATION (EL.M) : 868.6 CREST LENGTH ( M ) : 95.7  
(WEIR) WEIR HEIGHT ( M ) : 8.1 WEIR CONCRETE VOL. (1000 M3) : 13.7

WATERWAY HEADRACE : LENGTH ( M ) : 3850.0 DIAMETER (WIDTH) ( M ) : 3.7 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 175.0 DIAMETER ( M ) : 2.9 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 42.9

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 26.5 AVERAGE NET HEAD ( M ) : 81.5  
/HEAD FIRM DISCHARGE (M3/S) : 3.2 TAILWATER LEVEL (EL.M) : 780.0

POWER INSATLLED CAPACITY (MW) : 17.8 ANNUAL TOTAL ENERGY (GWH) : 93.1  
/ENERGY FIRM POWER (MW) : 2.2 FIRM ENERGY (GWH) : 18.9  
MIN. GUARANTEED POWER (MW) : 1.9 SECONDARY ENERGY (GWH) : 74.2

TRANSMISSION LINE LENGTH (KM) : 6.6 TO : BONTOC 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 0. FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST

TOTAL COST (MIL USD) : 25.8 POWER COST (MIL USD) : 25.3  
TOTAL COST/KW (USD/KW) : 1454.2 TRANSMISSION COST (MIL USD) : 0.5  
TOTAL COST/KWH (USD/KWH) : 0.627 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : PADDY - DENSE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3171-11 1979  
TECHNICAL COMMENT : - A PART OF BONTOC TOWN AREA MIGHT BE SUBMERGED

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-03-03-0-1  
 COORDINATES : N17-04-18 E120-56-30  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

SCHEME : BONTOC  
 RIVER SYSTEM : CAGAYAN  
 STREAM : CHICO  
 WATER RESOURCES REGION : II  
 PROVINCE : MT. PROVINCE

WATER RESOURCES REGION : II  
 PROVINCE : MT. PROVINCE  
 INTER TRANSFER TOTAL : 0.0  
 (MM/YR) : 1.4  
 GAGE CATCHMENT (KM2) : 874.  
 AVER. BASIN RAINFALL (MM/YR) : 3399.  
 DENUDATION RATE (MM/DAY) : 3.0  
 GAGE AVER. DISCHARGE (M3/S) : 54.8  
 AVERAGE DISCHARGE (M3/S) : 16.2  
 EVAPORATION RATE

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 253.0 (MAIN : 253.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 3399. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 16.2 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVOIR DEVELOPMENT RATIO : 0.33

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 1056.6  
 AVERAGE OPERATING LEVEL (EL.M) : 1043.2  
 MINIMUM OPERATING LEVEL (EL.M) : 1016.3  
 DRAWDOWN DEPTH ( M ) : 40.3

GROSS STORAGE VOL. (MIL M3) : 283.6  
 ACTIVE STORAGE VOL. (MIL M3) : 168.7  
 DEAD STORAGE VOL. (MIL M3) : 114.9  
 SEDIMENT VOL. (MIL M3) : 17.7

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 1062.6  
 DAM HEIGHT ( M ) : 154.6

CREST LENGTH ( M ) : 569.1  
 EMBANKMENT VOL. (MIL M3) : 12.55

WATERWAY HEADRACE : LENGTH ( M ) : 760.0  
 PENSTOCK : HORIZONTAL L ( M ) : 120.0  
 DIVERSION : LENGTH ( M ) : 1080.0  
 EXCAVATION VOL TOTAL (1000 M3) : 34.4

DIAMETER (WIDTH) ( M ) : 5.3  
 DIAMETER ( M ) : 4.2  
 DIAMETER ( M ) : 3.8  
 NOS. : 1  
 NOS. : 1  
 NOS. : 1

DISCHARGE /HEAD PLANT MAX. DISCHARGE (M3/S) : 67.4  
 FIRM DISCHARGE (M3/S) : 11.2

AVERAGE NET HEAD ( M ) : 132.2  
 TAILWATER LEVEL (EL.M) : 908.0

POWER /ENERGY INSATLLED CAPACITY (MW) : 73.3  
 FIRM POWER (MW) : 12.2  
 MIN. GUARANTEED POWER (MW) : 55.7

ANNUAL TOTAL ENERGY (GWH) : 150.6  
 FIRM ENERGY (GWH) : 107.1  
 SECONDARY ENERGY (GWH) : 43.5

TRANSMISSION LINE LENGTH (KM) : 6.0 TO : BONTOC FROM :  
 ACCESS ROAD LENGTH (KM) : 0.

230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 238.8  
 TOTAL COST/KW (USD/KW) : 2256.5  
 TOTAL COST/KWH (USD/KWH) : 1.988

POWER COST (MIL USD) : 236.7  
 TRANSMISSION COST (MIL USD) : 2.1  
 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3171-11  
 TECHNICAL COMMENT :



INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-03-09-0-2

SCHEME : CHICO-4R

RIVER SYSTEM : CAGAYAN WATER RESOURCES REGION : 11 COORDINATES : N17-01-46 E120-56-23  
 STREAM : CHICO PROVINCE : MT. PROVINCE STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 193.2 (MAIN : 193.2 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 3463. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 12.8 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 994.4 PONDAGE STORAGE VOL. (1000M3) : 220.9  
 AVERAGE OPERATING LEVEL (EL.M) : 994.0 ACTIVE STORAGE VOL. (1000M3) : 44.7  
 MINIMUM OPERATING LEVEL (EL.M) : 993.5  
 DRAWDOWN DEPTH (M) : 0.9

MAIN DAM CREST ELEVATION (EL.M) : 994.4 CREST LENGTH (M) : 79.9  
 (WEIR) WEIR HEIGHT (M) : 7.4 WEIR CONCRETE VOL. (1000 M3) : 10.2

WATERWAY HEADRACE : LENGTH (M) : 620.0 DIAMETER (WIDTH) (M) : 2.8 NOS. : 1  
 PENSTOCK : HORIZONT. L (M) : 220.0 DIAMETER (M) : 2.1 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 42.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 12.7 AVERAGE NET HEAD (M) : 112.5  
 /HEAD FIRM DISCHARGE (M3/S) : 1.6 TAILWATER LEVEL (EL.M) : 870.0

POWER INSTALLED CAPACITY (MW) : 11.8 ANNUAL TOTAL ENERGY (GWH) : 62.0  
 /ENERGY FIRM POWER (MW) : 1.4 FIRM ENERGY (GWH) : 12.6  
 MIN. GUARANTEED POWER (MW) : 1.3 SECONDARY ENERGY (GWH) : 49.4

TRANSMISSION LINE LENGTH (KM) : 1.2 TO : BONTOC 69 K V SINGLE CIRCUIT. NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 0. FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST

TOTAL COST (MIL USD) : 21.1 POWER COST (MIL USD) : 21.1  
 TOTAL COST/KW (USD/KW) : 1821.3 TRANSMISSION COST (MIL USD) : 0.4  
 TOTAL COST/KWH (USD/KWH) : 0.785 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - DENSE POPULATION ALONG THE RIVER  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3171-11 1979  
 TECHNICAL COMMENT : - NONE

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-04-10-0-1

SCHEME : MATALAG

WATER RESOURCES REGION : 11  
 PROVINCE : CAGAYAN

COORDINATES : N17-49-53 E121-24-17  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 666.4 (MAIN : 666., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 2628. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 26.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.67

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 81.0 GROSS STORAGE VOL. (MIL M3) : 818.7  
 AVERAGE OPERATING LEVEL (EL.M) : 73.5 ACTIVE STORAGE VOL. (MIL M3) : 562.1  
 MINIMUM OPERATING LEVEL (EL.M) : 58.6 DEAD STORAGE VOL. (MIL M3) : 256.6  
 DRAWDOWN DEPTH (M) : 22.4 SEDIMENT VOL. (MIL M3) : 45.6

MAIN DAM CREST ELEVATION (EL.M) : 87.0 CREST LENGTH (M) : 358.2  
 (WEIR) DAM HEIGHT (M) : 59.3 EMBANKMENT VOL. (MIL M3) : 1.64

WATERWAY HEADRACE : LENGTH (M) : 540.0 DIAMETER (WIDTH) (M) : 5.2 NOS. : 1  
 PENSTOCK : HORIZONTAL L (M) : 120.0 DIAMETER (M) : 4.3 NOS. : 1  
 DIVERSION : LENGTH (M) : 630.0 DIAMETER (M) : 7.6 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 70.9

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 64.2 AVERAGE NET HEAD (M) : 44.2  
 /HEAD FIRM DISCHARGE (M3/S) : 21.4 TAILWATER LEVEL (EL.M) : 27.7

POWER INSATLLED CAPACITY (MW) : 23.4 ANNUAL TOTAL ENERGY (GWH) : 80.7  
 /ENERGY FIRM POWER (MW) : 7.8 FIRM ENERGY (GWH) : 68.3  
 MIN. GUARANTEED POWER (MW) : 14.7 SECONDARY ENERGY (GWH) : 12.4

TRANSMISSION LINE LENGTH (KM) : 28.0 TO : PIAT 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 1.5 FROM : FERRY SINGAGA

CONSTRUCTION COST TOTAL COST (MIL USD) : 78.2 POWER COST (MIL USD) : 78.2  
 TOTAL COST/KW (USD/KW) : 3414.6 TRANSMISSION COST (MIL USD) : 1.2  
 TOTAL COST/KWH (USD/KWH) : 1.109 ACCESS ROAD COST (MIL USD) : 0.4

OTHER INFORMATION LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3273-11  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-04-11-0-2

SCHEME : NABUANGAN

RIVER SYSTEM : CAGAYAN  
STREAM : MATALAG

WATER RESOURCES REGION : 11  
PROVINCE : KALINGA APAYAO

COORDINATES : N17-42-15 E121-13-41  
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 121.4 (MAIN : 121., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 2664. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 4.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 354.0 PONDAGE STORAGE VOL. (1000M3) : 49.5  
AVERAGE OPERATING LEVEL (EL.M) : 353.3 ACTIVE STORAGE VOL. (1000M3) : 17.3  
MINIMUM OPERATING LEVEL (EL.M) : 352.6  
DRAWDOWN DEPTH ( M ) : 1.4

MAIN DAM CREST ELEVATION (EL.M) : 354.0 CREST LENGTH ( M ) : 59.9  
(WEIR) WEIR HEIGHT ( M ) : 7.0 WEIR CONCRETE VOL. (1000 M3) : 7.2

WATERWAY HEADRACE : LENGTH ( M ) : 5850.0 DIAMETER (WIDTH) ( M ) : 1.9 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 415.0 DIAMETER ( M ) : 1.5 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 17.9

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 4.9 AVERAGE NET HEAD ( M ) : 95.7  
/HEAD FIRM DISCHARGE (M3/S) : 0.6 TAILWATER LEVEL (EL.M) : 245.0

POWER INSTALLED CAPACITY (MW) : 3.9 ANNUAL TOTAL ENERGY (GWH) : 20.5  
/ENERGY FIRM POWER (MW) : 0.5 FIRM ENERGY (GWH) : 4.1  
MIN. GUARANTEED POWER (MW) : 0.4 SECONDARY ENERGY (GWH) : 16.3

TRANSMISSION LINE LENGTH (KM) : 49.0 TO : PIAT 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 24.0 FROM : CONNOR

CONSTRUCTION COST

TOTAL COST (MIL USD) : 11.2 POWER COST (MIL USD) : 11.2  
TOTAL COST/KW (USD/KW) : 5087.6 TRANSMISSION COST (MIL USD) : 1.8  
TOTAL COST/KWH (USD/KWH) : 2.188 ACCESS ROAD COST (MIL USD) : 6.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3273-111  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-05-12-0-1  
 COORDINATES : N17-37-25 E121-22-56  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

SCHEME : PINUKPUK

RIVER SYSTEM : CAGAYAN  
 STREAM : SALTAN

WATER RESOURCES REGION : II  
 PROVINCE : KALAPAYAO

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 778.0 (MAIN : 778.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 2349. DERIVATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 23.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.63

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 158.0 GROSS STORAGE VOL. (MIL M3) : 760.8  
 AVERAGE OPERATING LEVEL (EL.M) : 148.1 ACTIVE STORAGE VOL. (MIL M3) : 475.8  
 MINIMUM OPERATING LEVEL (EL.M) : 128.4 DEAD STORAGE VOL. (MIL M3) : 285.0  
 DRAWDOWN DEPTH ( M ) : 29.6 SEDIMENT VOL. (MIL M3) : 54.5

MAIN DAM CREST ELEVATION (EL.M) : 154.0 CREST LENGTH ( M ) : 1370.0  
 (WEIR) DAM HEIGHT ( M ) : 77.0 EMBANKMENT VOL. (MIL M3) : 17.24

WATERWAY HEADRAGE : LENGTH ( M ) : 500.0 DIAMETER (WIDTH) ( M ) : 4.0 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 290.0 DIAMETER ( M ) : 3.4 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 1290.0 DIAMETER ( M ) : 7.9 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 135.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 38.7 AVERAGE NET HEAD ( M ) : 58.4  
 /HEAD FIRM DISCHARGE (M3/S) : 19.3 TAILWATER LEVEL (EL.M) : 87.0

POWER UNSATLLED CAPACITY (MW) : 18.6 ANNUAL TOTAL ENERGY (GWH) : 92.8  
 /ENERGY FIRM POWER (MW) : 9.3 FIRM ENERGY (GWH) : 61.4  
 MIN. GUARANTEED POWER (MW) : 11.7 SECONDARY ENERGY (GWH) : 11.3

TRANSMISSION LINE LENGTH (KM) : 32.0 TO : PIAT 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 3.0 FROM : PINUKPUK

CONSTRUCTION COST

TOTAL COST (MIL USD) : 273.7 POWER COST (MIL USD) : 271.6  
 TOTAL COST/KW (USD/KW) : 14724.4 TRANSMISSION COST (MIL USD) : 1.3  
 TOTAL COST/KWH (USD/KWH) : 3.227 ACCESS ROAD COST (MIL USD) : 0.9

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3272-1  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-05-13-0-1

SCHEME : ADAGA

RIVER SYSTEM : CAGAYAN  
STREAM : SALTAN

WATER RESOURCES REGION : II  
PROVINCE : KAL-APAYAO

COORDINATES : N17-30-15 E121-16-20  
STUDY LEVEL : UNSCALED  
(PRE-F/S. RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 352.7 (MAIN : 353., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 12.5 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.48

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 411.0 GROSS STORAGE VOL. (MIL M3) : 393.8  
AVERAGE OPERATING LEVEL (EL.M) : 397.3 ACTIVE STORAGE VOL. (MIL M3) : 189.9  
MINIMUM OPERATING LEVEL (EL.M) : 369.8 DEAD STORAGE VOL. (MIL M3) : 203.9  
DRAWDOWN DEPTH ( M ) : 41.2 SEDIMENT VOL. (MIL M3) : 24.7

MAIN DAM CREST ELEVATION (EL.M) : 417.0 CREST LENGTH ( M ) : 279.7  
(WEIR) DAM HEIGHT ( M ) : 170.0 EMBANKMENT VOL. (MIL M3) : 7.95

WATERWAY HEADRACE : LENGTH ( M ) : 750.0 DIAMETER (WIDTH) ( M ) : 4.9 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 340.0 DIAMETER ( M ) : 3.9 NOS. : 1  
DIVERSION : LENGTH ( M ) : 1220.0 DIAMETER ( M ) : 6.7 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 103.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 57.5 AVERAGE NET HEAD ( M ) : 145.8  
/HEAD FIRM DISCHARGE (M3/S) : 9.6 TAILWATER LEVEL (EL.M) : 247.0

POWER INSTALLED CAPACITY (MW) : 69.0 ANNUAL TOTAL ENERGY (GWH) : 129.2  
/ENERGY FIRM POWER (MW) : 11.5 FIRM ENERGY (GWH) : 100.8  
MIN. GUARANTEED POWER (MW) : 53.4 SECONDARY ENERGY (GWH) : 28.4

TRANSMISSION LINE LENGTH (KM) : 47.0 TO : BATONG BUHAY 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2  
ACCESS ROAD LENGTH (KM) : 21.0 FROM : PINUKPUK TAGA

CONSTRUCTION COST

TOTAL COST (MIL USD) : 207.2 POWER COST (MIL USD) : 196.3  
TOTAL COST/KW (USD/KW) : 3002.2 TRANSMISSION COST (MIL USD) : 4.9  
TOTAL COST/KWH (USD/KWH) : 1.856 ACCESS ROAD COST (MIL USD) : 6.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3273-I  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME : SALTAN-4  
 RIVER SYSTEM : CAGAYAN  
 STREAM : SALTAN  
 WATER RESOURCES REGION : II  
 PROVINCE : KAL-APAYAO  
 COORDINATES : N17-30-30 E121-11-00  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S, RECONNAISSANCE)

SCHEME ID : 2-008-05-14-0-1

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 196.0 (MAIN : 196.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 7.0 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.33

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 682.2 GROSS STORAGE VOL. (MIL M3) : 124.6  
 AVERAGE OPERATING LEVEL (EL.M) : 667.2 ACTIVE STORAGE VOL. (MIL M3) : 72.5  
 MINIMUM OPERATING LEVEL (EL.M) : 637.3 DEAD STORAGE VOL. (MIL M3) : 52.0  
 DRAWDOWN DEPTH (M) : 44.9 SEDIMENT VOL. (MIL M3) : 13.7

MAIN DAM CREST ELEVATION (EL.M) : 688.2 CREST LENGTH (M) : 564.5  
 (WEIR) DAM HEIGHT (M) : 178.2 EMBANKMENT VOL. (MIL M3) : 16.03

WATERWAY HEADRACE : LENGTH (M) : 720.0 DIAMETER (WIDTH) (M) : 2.5 NOS. : 1  
 PENSTOCK : HORIZONTAL (M) : 340.0 DIAMETER (M) : 1.9 NOS. : 1  
 DIVERSION : LENGTH (M) : 1390.0 DIAMETER (M) : 8.3 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 79.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 9.7 AVERAGE NET HEAD (M) : 152.0  
 /HEAD FIRM DISCHARGE (M3/S) : 4.8 TAILWATER LEVEL (EL.M) : 510.0

POWER UNSATLLED CAPACITY (MW) : 12.1 ANNUAL TOTAL ENERGY (GWH) : 65.9  
 /ENERGY FIRM POWER (MW) : 6.1 FIRM ENERGY (GWH) : 53.0  
 MIN. GUARANTEED POWER (MW) : 9.3 SECONDARY ENERGY (GWH) : 12.8

TRANSMISSION LENGTH (KM) : 41.0 TO : BATONG BUHAY 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 LINE FROM : LOCNAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 249.9 POWER COST (MIL USD) : 247.5  
 TOTAL COST/KW (USD/KW) : 20636.9 TRANSMISSION COST (MIL USD) : 1.6  
 TOTAL COST/KWH (USD/KWH) : 4.393 ACCESS ROAD COST (MIL USD) : 0.9

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3272-IV  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-05-15-0-2

SCHEME : SALTAN

RIVER SYSTEM : CAGAYAN  
STREAM : SALTAN

WATER RESOURCES REGION : II  
PROVINCE : MT. PROVINCE

COORDINATES : N17-30-14 E121-07-50  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPFS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 205.8 (MAIN : 206., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-083-NP-  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 7.3 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 679.6 PONDAGE STORAGE VOL. (1000M3) : 69.3  
AVERAGE OPERATING LEVEL (EL.M) : 678.8 ACTIVE STORAGE VOL. (1000M3) : 25.6  
MINIMUM OPERATING LEVEL (EL.M) : 677.9  
DRAWDOWN DEPTH ( M ) : 1.7

MAIN DAM CREST ELEVATION (EL.M) : 679.6 CREST LENGTH ( M ) : 61.5  
(WEIR) WEIR HEIGHT ( M ) : 7.6 WEIR CONCRETE VOL. (1000 M3) : 8.4

WATERWAY HEADRACE : LENGTH ( M ) : 8590.0 DIAMETER (WIDTH) ( M ) : 2.2 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 890.0 DIAMETER ( M ) : 1.6 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 35.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.3 AVERAGE NET HEAD ( M ) : 201.7  
/HEAD FIRM DISCHARGE (M3/S) : 0.9 TAILWATER LEVEL (EL.M) : 494.4

POWER INSATLLED CAPACITY (MW) : 12.1 ANNUAL TOTAL ENERGY (GWH) : 63.7  
/ENERGY FIRM POWER (MW) : 1.5 FIRM ENERGY (GWH) : 12.9  
MIN. GUARANTEED POWER (MW) : 1.3 SECONDARY ENERGY (GWH) : 50.8

TRANSMISSION LINE LENGTH (KM) : 51.6 TO : BATONG BUHAY 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 2.0 FROM : NEAREST PROVINCIAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 24.2 POWER COST (MIL USD) : 21.8  
TOTAL COST/KW (USD/KW) : 1995.7 TRANSMISSION COST (MIL USD) : 1.9  
TOTAL COST/KWH (USD/KWH) : 0.360 ACCESS ROAD COST (MIL USD) : 0.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3172-IV 1964  
TECHNICAL COMMENT : - ONE TRIBUTARY INTAKE

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME : SALTAN-5  
 RIVER SYSTEM : CAGAYAN  
 STREAM : SALTAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : KAL-APAYAO  
 COORDINATES : N17-30-04 E121-07-00  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S, RECONNAISSANCE)

SCHEME ID : 2-008-05-16-0-1

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 136.0 (MAIN : 136., INTER TRANSFER TOTAL : 0.)  
 AVER. BASIN RAINFALL (MM/YR) : 2500. (MM/YR) : 1.4  
 AVERAGE DISCHARGE (M3/S) : 4.8 (MM/DAY) : 3.0  
 GAGE AVER. DISCHARGE (M3/S) : 54.8  
 STREAM GAGE ID : 4-2-063-NP-  
 GAGE CATCHMENT (KM2) : 874.  
 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN  
 TYPE OF DEVELOPMENT : RESERVOIR  
 RESERVOIR DEVELOPMENT RATIO : 0.33

RESERVOIR  
 FULL SUPPLY LEVEL (EL.M) : 858.1  
 AVERAGE OPERATING LEVEL (EL.M) : 845.9  
 MINIMUM OPERATING LEVEL (EL.M) : 821.6  
 DRAWDOWN DEPTH ( M ) : 36.5  
 GROSS STORAGE VOL. (MIL M3) : 85.3  
 ACTIVE STORAGE VOL. (MIL M3) : 50.3  
 DEAD STORAGE VOL. (MIL M3) : 34.9  
 SEDIMENT VOL. (MIL M3) : 9.5  
 CREST ELEVATION (EL.M) : 864.1  
 DAM HEIGHT ( M ) : 129.1  
 HEADRACE : LENGTH ( M ) : 760.0  
 PENSTOCK : HORIZONT. L ( M ) : 410.0  
 DIVERSION : LENGTH ( M ) : 1130.0  
 EXCAVATION VOL TOTAL (1000 M3) : 57.0  
 DIAMETER (WIDTH) ( M ) : 2.5  
 DIAMETER ( M ) : 1.7  
 DIAMETER ( M ) : 7.7  
 NOS. : 1  
 NOS. : 1  
 NOS. : 1

DISCHARGE / HEAD  
 PLANT MAX. DISCHARGE (M3/S) : 6.7  
 FIRM DISCHARGE (M3/S) : 3.3  
 AVERAGE NET HEAD (EL.M) : 106.6  
 TAILWATER LEVEL (EL.M) : 735.0  
 POWER / ENERGY  
 INSTALLED CAPACITY (MW) : 5.9  
 FIRM POWER (MW) : 2.9  
 MIN. GUARANTEED POWER (MW) : 4.3  
 ANNUAL TOTAL ENERGY (GWH) : 32.1  
 FIRM ENERGY (GWH) : 25.7  
 SECONDARY ENERGY (GWH) : 6.4

TRANSMISSION LINE  
 LENGTH (KM) : 39.0  
 TO : BATONG BUHAY  
 FROM : LOCNAD  
 69 K V SINGLE CIRCUIT  
 NOS. OF CIRCUIT : 1

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 116.3  
 TOTAL COST/KW (USD/KW) : 19799.3  
 TOTAL COST/KWH (USD/KWH) : 4.208  
 POWER COST (MIL USD) : 112.7  
 TRANSMISSION COST (MIL USD) : 1.5  
 ACCESS ROAD COST (MIL USD) : 2.1

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3272-1V  
 TECHNICAL COMMENT :



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-05-17-0-1

SCHEME : BABACA-R

RIVER SYSTEM : CAGAYAN  
STREAM : BABACA

WATER RESOURCES REGION : 11  
PROVINCE : KALINGA APAYAO

COORDINATES : N17-35-48 E121-19-06  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO INFORMATION

CATCHMENT AREA (KM2) : 247.7 (MAIN : 248., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 2357. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 7.7 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVOIR DEVELOPMENT RATIO : 0.58

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 219.0  
AVERAGE OPERATING LEVEL (EL.M) : 209.2  
MINIMUM OPERATING LEVEL (EL.M) : 189.7  
DRAWDOWN DEPTH ( M ) : 29.3

GROSS STORAGE VOL. (MIL M3) : 245.4  
ACTIVE STORAGE VOL. (MIL M3) : 140.6  
DEAD STORAGE VOL. (MIL M3) : 104.8  
SEDIMENT VOL. (MIL M3) : 17.3

MAIN DAM CREST ELEVATION (EL.M) : 225.0  
(WEIR) ( M ) : 98.0

CREST LENGTH ( M ) : 270.0  
EMBANKMENT VOL. (MIL M3) : 3.54

WATERWAY HEADRACE : LENGTH ( M ) : 430.0  
PENSTOCK : HORIZONTAL L ( M ) : 90.0  
DIVERSTION : LENGTH ( M ) : 500.0  
EXCAVATION VOL TOTAL (1000 M3) : 32.4

DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
DIAMETER ( M ) : 2.1 NOS. : 1  
DIAMETER ( M ) : 8.7 NOS. : 1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 12.2  
/HEAD FIRM DISCHARGE (M3/S) : 6.1

AVERAGE NET HEAD ( M ) : 79.8  
TAILWATER LEVEL (EL.M) : 127.0

POWER UNSATLLED CAPACITY (MW) : 8.0  
/ENERGY FIRM POWER (MW) : 4.0  
MIN. GUARANTEED POWER (MW) : 5.8

ANNUAL TOTAL ENERGY (GWH) : 40.2  
FIRM ENERGY (GWH) : 35.1  
SECONDARY ENERGY (GWH) : 5.1

TRANSMISSION LINE LENGTH (KM) : 42.0 TO : PIAT  
ACCESS ROAD LENGTH (KM) : 11.5 FROM : PINUKPUK

59 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 82.1  
TOTAL COST/KW (USD/KW) : 10847.5  
TOTAL COST/KWH (USD/KWH) : 2.373

POWER COST (MIL USD) : 82.1  
TRANSMISSION COST (MIL USD) : 1.6  
ACCESS ROAD COST (MIL USD) : 3.3

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3272-1  
TECHNICAL COMMENT :

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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 2-008-05-18-0-2  
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SCHEME : BABACA

WATER RESOURCES REGION : 11  
 PROVINCE : KALINGA APAYAO  
 COORDINATES : N17-35-06 E121-13-23  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LHPPS

RIVER SYSTEM : CAGAYAN  
 STREAM : BABACA

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 134.9 (MAIN : 135., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 2446. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 4.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 400.8 PONDAGE STORAGE VOL. (1000M3) : 47.3  
 AVERAGE OPERATING LEVEL (EL.M) : 400.1 ACTIVE STORAGE VOL. (1000M3) : 16.0  
 MINIMUM OPERATING LEVEL (EL.M) : 399.5  
 DRAWDOWN DEPTH (M) : 1.3

MAIN DAM CREST ELEVATION (EL.M) : 400.8 CREST LENGTH (M) : 49.5  
 (WEIR) WEIR HEIGHT (M) : 6.8 WEIR CONCRETE VOL. (1000 M3) : 5.9

WATERWAY HEADRAGE : LENGTH (M) : 4150.0 DIAMETER (WIDTH) (M) : 1.9 NOS. : 1  
 PENSTOCK : HORIZONTAL L (M) : 620.0 DIAMETER (M) : 1.4 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 12.5

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 4.6 AVERAGE NET HEAD (M) : 166.8  
 /HEAD FIRM DISCHARGE (M3/S) : 0.6 TAILWATER LEVEL (EL.M) : 220.0

POWER INSTALLED CAPACITY (MW) : 6.3 ANNUAL TOTAL ENERGY (GWH) : 32.9  
 /ENERGY FIRM POWER (MW) : 0.8 FIRM ENERGY (GWH) : 6.7  
 MIN. GUARANTEED POWER (MW) : 0.7 SECONDARY ENERGY (GWH) : 26.2

TRANSMISSION LINE LENGTH (KM) : 48.0 TO : PIAT 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 24.0 FROM : PINUKPUK

CONSTRUCTION COST

TOTAL COST (MIL USD) : 19.3 POWER COST (MIL USD) : 10.6  
 TOTAL COST/KW (USD/KW) : 3074.9 TRANSMISSION COST (MIL USD) : 1.8  
 TOTAL COST/KWH (USD/KWH) : 1.325 ACCESS ROAD COST (MIL USD) : 6.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3272-1V  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-06-19-0-1

SCHEME : NANENG

RIVER SYSTEM : CAGAYAN  
STREAM : TANUDAN

WATER RESOURCES REGION : II  
PROVINCE : KAL-APAYAO

COORDINATES : N17-23-15 E121-16-41  
STUDY LEVEL : UNSCALED  
(PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 365.0 (MAIN) : 365.0 INTER TRANSFER TOTAL : 0.0 STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 3106. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 20.0 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 474.0 GROSS STORAGE VOL. (MIL M3) : 636.1  
AVERAGE OPERATING LEVEL (EL.M) : 455.5 ACTIVE STORAGE VOL. (MIL M3) : 441.4  
MINIMUM OPERATING LEVEL (EL.M) : 418.6 DEAD STORAGE VOL. (MIL M3) : 194.7  
DRAWDOWN DEPTH ( M ) : 55.4 SEDIMENT VOL. (MIL M3) : 25.5

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 480.0 CREST LENGTH ( M ) : 328.0  
DAM HEIGHT ( M ) : 178.0 EMBANKMENT VOL. (MIL M3) : 10.20

WATERWAY HEADRAGE : LENGTH ( M ) : 890.0 DIAMETER (WIDTH) ( M ) : 5.3 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 320.0 DIAMETER ( M ) : 4.1 NOS. : 1  
DIVERSTION : LENGTH ( M ) : 1230.0 DIAMETER ( M ) : 6.7 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 111.5

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 67.0 AVERAGE NET HEAD ( M ) : 149.1  
/HEAD FIRM DISCHARGE (M3/S) : 16.7 TAILWATER LEVEL (EL.M) : 302.0

POWER INSATLLED CAPACITY (MW) : 82.2 ANNUAL TOTAL ENERGY (GWH) : 209.6  
/ENERGY FIRM POWER (MW) : 20.6 FIRM ENERGY (GWH) : 180.1  
MIN.GUARANTEED POWER (MW) : 58.9 SECONDARY ENERGY (GWH) : 29.4

TRANSMISSION LINE LENGTH (KM) : 35.0 TO : BATONG BUHAY 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 3.5 FROM : NANENG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 238.2 POWER COST (MIL USD) : 231.0  
TOTAL COST/KW (USD/KW) : 2896.5 TRANSMISSION COST (MIL USD) : 6.3  
TOTAL COST/KWH (USD/KWH) : 1.261 ACCESS ROAD COST (MIL USD) : 1.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3272-11  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-08-20-0-1

SCHEME : MT. BOLONTOC

RIVER SYSTEM : CAGAYAN  
STREAM : PASIL

WATER RESOURCES REGION : II  
PROVINCE : KAL-APAYAO

COORDINATES : N17-23-15 E121-09-30  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 275.0 (MAIN : 275.0, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 9.8 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.23

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 586.5 GROSS STORAGE VOL. (MIL M3) : 93.5  
AVERAGE OPERATING LEVEL (EL.M) : 566.9 ACTIVE STORAGE VOL. (MIL M3) : 70.9  
MINIMUM OPERATING LEVEL (EL.M) : 527.8 DEAD STORAGE VOL. (MIL M3) : 22.6  
DRAWDOWN DEPTH ( M ) : 58.7 SEDIMENT VOL. (MIL M3) : 19.2

MAIN DAM CREST ELEVATION (EL.M) : 592.5 CREST LENGTH ( M ) : 649.6  
(WEIR) DAM HEIGHT ( M ) : 149.5 EMBANKMENT VOL. (MIL M3) : 17.46

WATERWAY HEADRACE : LENGTH ( M ) : 980.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 420.0 DIAMETER ( M ) : 2.1 NOS. : 1  
DIVERSION : LENGTH ( M ) : 1730.0 DIAMETER ( M ) : 8.9 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 114.5

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 11.6 AVERAGE NET HEAD ( M ) : 117.9  
/HEAD FIRM DISCHARGE (M3/S) : 5.8 TAILWATER LEVEL (EL.M) : 443.0

POWER INSTALLED CAPACITY (MW) : 11.3 ANNUAL TOTAL ENERGY (GWH) : 69.1  
/ENERGY FIRM POWER (MW) : 5.7 FIRM ENERGY (GWH) : 49.5  
MIN. GUARANTEED POWER (MW) : 7.2 SECONDARY ENERGY (GWH) : 19.6

TRANSMISSION LINE LENGTH (KM) : 26.0 TO : SATONG BUHAY FROM : ABLEG 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 4.5

CONSTRUCTION COST

TOTAL COST (MIL USD) : 270.0 POWER COST (MIL USD) : 267.6  
TOTAL COST/KW (USD/KW) : 23885.7 TRANSMISSION COST (MIL USD) : 1.1  
TOTAL COST/KWH (USD/KWH) : 4.874 ACCESS ROAD COST (MIL USD) : 1.3

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3272-111  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-06-21-0-1

SCHEME : LOWER PASIL

RIVER SYSTEM : CAGAYAN  
STREAM : PASIL

WATER RESOURCES REGION : 11  
PROVINCE : KALINGA APAYAO

COORDINATES : N17-23-59 E121-12-38  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO INFORMATION

CATCHMENT AREA (KM2) : 371.0 (MAIN : 371.0, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 13.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR : RESERVOIR DEVELOPMENT RATIO : 0.33

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 466.4 GROSS STORAGE VOL. (MIL M3) : 267.6  
AVERAGE OPERATING LEVEL (EL.M) : 453.1 ACTIVE STORAGE VOL. (MIL M3) : 137.3  
MINIMUM OPERATING LEVEL (EL.M) : 426.5 DEAD STORAGE VOL. (MIL M3) : 130.2  
DRAWDOWN DEPTH ( M ) : 39.8 SEDIMENT VOL. (MIL M3) : 26.0

MAIN DAM CREST ELEVATION (EL.M) : 472.4 CREST LENGTH ( M ) : 376.0  
(WEIR) DAM HEIGHT ( M ) : 146.4 EMBANKMENT VOL. (MIL M3) : 7.18

WATERWAY HEADRACE : LENGTH ( M ) : 670.0 DIAMETER (WIDTH) ( M ) : 4.8 NOS. : 1  
PENSTOCK : HORIZONTAL ( M ) : 110.0 DIAMETER ( M ) : 3.8 NOS. : 1  
DIVERSION : LENGTH ( M ) : 850.0 DIAMETER ( M ) : 6.7 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 74.4

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 54.8 AVERAGE NET HEAD ( M ) : 124.2  
/HEAD FIRM DISCHARGE (M3/S) : 9.1 TAILWATER LEVEL (EL.M) : 326.0

POWER INSTALLED CAPACITY (MW) : 56.0 ANNUAL TOTAL ENERGY (GWH) : 115.3  
/ENERGY FIRM POWER (MW) : 9.3 FIRM ENERGY (GWH) : 81.7  
MIN. GUARANTEED POWER (MW) : 41.9 SECONDARY ENERGY (GWH) : 33.6

TRANSMISSION LINE LENGTH (KM) : 30.0 TO : BATONG BURAY 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 0. FROM :

CONSTRUCTION COST

TOTAL COST (MIL USD) : 173.4 POWER COST (MIL USD) : 170.0  
TOTAL COST/KW (USD/KW) : 3098.1 TRANSMISSION COST (MIL USD) : 3.4  
TOTAL COST/KWH (USD/KWH) : 1.889 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3272-111  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-06-22-0-2

SCHEME : PASIL

RIVER SYSTEM : CAGAYAN  
STREAM : PASIL

WATER RESOURCES REGION : II  
PROVINCE : MT. PROVINCE

COORDINATES : N17-20-28 E121-03-25  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 208.1 (MAIN : 208.1 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 7.4 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.55

PONDAGE FULL SUPPLY LEVEL (EL.M) : 849.6 PONDAGE STORAGE VOL. (1000M3) : 69.7  
AVERAGE OPERATING LEVEL (EL.M) : 848.8 ACTIVE STORAGE VOL. (1000M3) : 25.9  
MINIMUM OPERATING LEVEL (EL.M) : 847.9  
DRAWDOWN DEPTH ( M ) : 1.7

MAIN DAM CREST ELEVATION (EL.M) : 849.6 CREST LENGTH ( M ) : 31.1  
(WEIR) WEIR HEIGHT ( M ) : 7.6 WEIR CONCRETE VOL. (1000 M3) : 4.9

WATERWAY HEADRACE : LENGTH ( M ) : 9330.0 DIAMETER (WIDTH) ( M ) : 2.2 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 700.0 DIAMETER ( M ) : 1.6 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 38.6

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.4 AVERAGE NET HEAD ( M ) : 329.1  
/HEAD FIRM DISCHARGE (M3/S) : 0.9 TAILWATER LEVEL (EL.M) : 495.0

POWER INSATLLED CAPACITY (MW) : 20.0 ANNUAL TOTAL ENERGY (GWH) : 105.0  
/ENERGY FIRM POWER (MW) : 2.4 FIRM ENERGY (GWH) : 21.3  
MIN. GUARANTEED POWER (MW) : 2.2 SECONDARY ENERGY (GWH) : 83.6

TRANSMISSION LINE LENGTH (KM) : 9.6 TO : BATONG BUHAY 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 2.0 FROM : NEAREST PROVINCIAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 25.4 POWER COST (MIL USD) : 24.2  
TOTAL COST/KW (USD/KW) : 1270.9 TRANSMISSION COST (MIL USD) : 0.6  
TOTAL COST/KWH (USD/KWH) : 0.548 ACCESS ROAD COST (MIL USD) : 0.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3272-111, 1960  
TECHNICAL COMMENT : - FOUR STREAM INTAKES PROVIDED ALONG THE WATERWAY

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-06-23-0-2

SCHEME : TANUDAN

RIVER SYSTEM : CAGAYAN  
STREAM : TANUDAN

WATER RESOURCES REGION : II  
PROVINCE : MT. PROVINCE

COORDINATES : N17-10-15 E121-12-38  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 175.6 (MAIN : 176.1, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
AVER. BASIN RAINFALL (MM/YR) : 3523 DEMINATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
AVERAGE DISCHARGE (M3/S) : 11.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.65

PONDAGE FULL SUPPLY LEVEL (EL.M) : 790.2 PONDAGE STORAGE VOL. (1000M3) : 93.4  
AVERAGE OPERATING LEVEL (EL.M) : 788.8 ACTIVE STORAGE VOL. (1000M3) : 41.8  
MINIMUM OPERATING LEVEL (EL.M) : 787.4  
DRAWDOWN DEPTH (M) : 2.8

MAIN DAM CREST ELEVATION (EL.M) : 790.2 CREST LENGTH (M) : 65.6  
(WEIR) WEIR HEIGHT (M) : 9.2 WEIR CONCRETE VOL. (1000 M3) : 11.5

WATERWAY HEADRAGE : LENGTH (M) : 8100.0 DIAMETER (WIDTH) (M) : 2.7 NOS. : 1  
PENSTOCK : HORIZONT. L (M) : 610.0 DIAMETER (M) : 2.0 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 50.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 11.9 AVERAGE NET HEAD (M) : 249.9  
/HEAD FIRM DISCHARGE (M3/S) : 1.5 TAILWATER LEVEL (EL.M) : 520.0

POWER UNSATLLED CAPACITY (MW) : 24.5 ANNUAL TOTAL ENERGY (GWH) : 128.9  
/ENERGY FIRM POWER (MW) : 9.0 FIRM ENERGY (GWH) : 26.1  
MIN. GUARANTEED POWER (MW) : 2.7 SECONDARY ENERGY (GWH) : 102.8

TRANSMISSION LINE LENGTH (KM) : 25.8 TO : BATONG DUHAY 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 13.0 FROM : NEAREST NATIONAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 34.2 POWER COST (MIL USD) : 29.3  
TOTAL COST/KW (USD/KW) : 1392.6 TRANSMISSION COST (MIL USD) : 1.1  
TOTAL COST/KWH (USD/KWH) : 0.600 ACCESS ROAD COST (MIL USD) : 3.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3271-IV 1979  
TECHNICAL COMMENT : - NONE

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-07-24-0-1

SCHEME : BANTAY

RIVER SYSTEM : CAGAYAN  
STREAM : PARET

WATER RESOURCES REGION : 11  
PROVINCE : CAGAYAN

COORDINATES : N17-54-52 E121-49-39  
STUDY LEVEL : UNSCALED  
(PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 742.0 (MAIN : 742., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-020-NW-225  
AVER. BASIN RAINFALL (MM/YR) : 2878. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 655.  
AVERAGE DISCHARGE (M3/S) : 50.7 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 51.5

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.80

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 62.0 GROSS STORAGE VOL. (MIL M3) : 1646.2  
AVERAGE OPERATING LEVEL (EL.M) : 56.2 ACTIVE STORAGE VOL. (MIL M3) : 1278.8  
MINIMUM OPERATING LEVEL (EL.M) : 44.5 DEAD STORAGE VOL. (MIL M3) : 367.4  
DRAWDOWN DEPTH (M) : 17.5 SEDIMENT VOL. (MIL M3) : 51.9

MAIN DAM CREST ELEVATION (EL.M) : 68.0 CREST LENGTH (M) : 428.0  
(WEIR) DAM HEIGHT (M) : 48.0 EMBANKMENT VOL. (MIL M3) : 1.39

WATERWAY HEADRACE : LENGTH (M) : 380.0 DIAMETER (WIDTH) (M) : 5.4 NOS. : 2  
PENSTOCK : HORIZONT. L (M) : 110.0 DIAMETER (M) : 4.4 NOS. : 2  
DIVERSION : LENGTH (M) : 470.0 DIAMETER (M) : 7.8 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 66.0

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 136.5 AVERAGE NET HEAD (M) : 34.9  
/HEAD FIRM DISCHARGE (M3/S) : 34.6 TAILWATER LEVEL (EL.M) : 20.0

POWER INSATLLED CAPACITY (MW) : 39.8 ANNUAL TOTAL ENERGY (GWH) : 122.7  
/ENERGY FIRM POWER (MW) : 10.0 FIRM ENERGY (GWH) : 87.2  
MIN. GUARANTEED POWER (MW) : 25.3 SECONDARY ENERGY (GWH) : 35.4

TRANSMISSION

LENGTH (KM) : 50.4 TO : CAMALANIUGAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 0. FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST

TOTAL COST (MIL USD) : 94.3 POWER COST (MIL USD) : 90.6  
TOTAL COST/KW (USD/KW) : 2369.5 TRANSMISSION COST (MIL USD) : 3.7  
TOTAL COST/KWH (USD/KWH) : 0.964 ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - DENSE POPULATION  
SUBMERGED ROAD : PROVINCIAL ROAD 7.0 KMS.  
MAP USED (1:50,000 SCALE) : 3373-1 1979  
TECHNICAL COMMENT : - TOPOGRAPHIC LIMIT +/- EL 80.0 M.  
- SITE COVERED WITH THICK RESIDUAL AND RIVER DEPOSITS SUSCEPTIBLE TO HIGH PERMEABILITY



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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 2-008-03-25-0-1  
 COORDINATES : N17-42-05 E121-50-05  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S. RECONNAISSANCE)

SCHEME : DABBA  
 RIVER SYSTEM : CAGAYAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : CAGAYAN

STREAM : PIN. TUGUEGARAO  
 CATCHMENT AREA (KM2) : 439.7  
 AVER. BASIN RAINFALL (MM/YR) : 3652.  
 AVERAGE DISCHARGE (M3/S) : 40.8

HYDRO/TOPO. INFORMATION  
 INTER TRANSFER TOTAL : 0.  
 DENUDATION RATE (MM/YR) : 1.4  
 EVAPORATION RATE (MM/DAY) : 3.5  
 STREAM GAGE ID : 4-2-020-NW-225  
 GAGE CATCHMENT (KM2) : 655.  
 GAGE AVER. DISCHARGE (M3/S) : 51.5

SELECTED PLAN  
 TYPE OF DEVELOPMENT : RESERVOIR  
 RESERVOIR DEVELOPMENT RATIO : 0.62

RESERVOIR  
 FULL SUPPLY LEVEL (EL.M) : 117.0  
 AVERAGE OPERATING LEVEL (EL.M) : 105.5  
 MINIMUM OPERATING LEVEL (EL.M) : 82.5  
 DRAWDOWN DEPTH ( M ) : 34.5  
 GROSS STORAGE VOL. (MIL M3) : 1290.3  
 ACTIVE STORAGE VOL. (MIL M3) : 798.3  
 DEAD STORAGE VOL. (MIL M3) : 492.0  
 SEDIMENT VOL. (MIL M3) : 30.8

MAIN DAM (WEIR)  
 CREST ELEVATION (EL.M) : 123.0  
 DAM HEIGHT ( M ) : 85.0  
 CREST LENGTH ( M ) : 561.0  
 EMBANKMENT VOL. (MIL M3) : 4.41

WATERWAY  
 HEADRACE : LENGTH ( M ) : 450.0  
 PENSTOCK : HORIZONT. L ( M ) : 80.0  
 DIVERSION : LENGTH ( M ) : 680.0  
 EXCAVATION VOL TOTAL (1000 M3) : 71.0  
 DIAMETER (WIDTH) ( M ) : 4.9  
 DIAMETER ( M ) : 4.0  
 DIAMETER ( M ) : 7.0  
 NOS. : 2  
 NOS. : 2  
 NOS. : 2

DISCHARGE  
 PLANT MAX. DISCHARGE (M3/S) : 111.3  
 FIRM DISCHARGE (M3/S) : 27.8  
 AVERAGE NET HEAD ( M ) : 65.8  
 TAILWATER LEVEL (EL.M) : 38.0

POWER /ENERGY  
 UNSATLLED CAPACITY (MW) : 60.3  
 FIRM POWER (MW) : 15.1  
 MIN. GUARANTEED POWER (MW) : 37.4  
 ANNUAL TOTAL ENERGY (GWH) : 186.5  
 FIRM ENERGY (GWH) : 132.1  
 SECONDARY ENERGY (GWH) : 54.4

TRANSMISSION  
 LINE LENGTH (KM) : 23.0 TO : TUGUEGARAO  
 ACCESS ROAD LENGTH (KM) : 14.5 FROM : PENABLANCA  
 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 147.4  
 TOTAL COST/KW (USD/KW) : 2444.2  
 TOTAL COST/KWH (USD/KWH) : 0.993  
 POWER COST (MIL USD) : 140.4  
 TRANSMISSION COST (MIL USD) : 2.8  
 ACCESS ROAD COST (MIL USD) : 4.1

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3373-11  
 TECHNICAL COMMENT :

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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 2-003-08-26-0-1  
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SCHEME : DALAYA

RIVER SYSTEM : CAGAYAN                      WATER RESOURCES REGION : II  
 STREAM : PIN.TUGUEGARAO                      PROVINCE : CAGAYAN  
 COORDINATES : N17-41-20    E121-55-40  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

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**HYDRO/TOPO. INFORMATION**  
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CATCHMENT AREA (KM2) : 216.7    (MAIN : 217., INTER TRANSFER TOTAL : 0.)    STREAM GAGE ID : 4-2-020-NW-225  
 AVER. BASIN RAINFALL (MM/YR) : 4284.    DENUDATION RATE (MM/YR) : 1.4    GAGE CATCHMENT (KM2) : 655.  
 AVERAGE DISCHARGE (M3/S) : 24.5    EVAPORATION RATE (MM/DAY) : 3.5    GAGE AVER. DISCHARGE (M3/S) : 51.5

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**SELECTED PLAN**  
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TYPE OF DEVELOPMENT : RESERVOIR                      RESERVOIR DEVELOPMENT RATIO : 0.52

RESERVOIR    FULL SUPPLY LEVEL (EL.M) : 222.0    GROSS STORAGE VOL. (MIL M3) : 544.3  
 AVERAGE OPERATING LEVEL (EL.M) : 200.8    ACTIVE STORAGE VOL. (MIL M3) : 401.2  
 MINIMUM OPERATING LEVEL (EL.M) : 158.6    DEAD STORAGE VOL. (MIL M3) : 143.2  
 DRAWDOWN DEPTH ( M ) : 53.4    SEDIMENT VOL. (MIL M3) : 15.2

MAIN DAM    CREST ELEVATION (EL.M) : 228.0    CREST LENGTH ( M ) : 536.6  
 (WEIR)    DAM HEIGHT ( M ) : 158.0    EMBANKMENT VOL. (MIL M3) : 11.27

WATERWAY    HEADRACE :    LENGTH ( M ) : 530.0    DIAMETER (WIDTH) ( M ) : 6.4    NOS. : 1  
 PENSTOCK :    HORIZONT. L ( M ) : 180.0    DIAMETER ( M ) : 4.8    NOS. : 1  
 DIVERSION :    LENGTH ( M ) : 810.0    DIAMETER ( M ) : 6.5    NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 66.4

DISCHARGE    PLANT MAX. DISCHARGE (M3/S) : 95.7    AVERAGE NET HEAD ( M ) : 128.1  
 /HEAD    FIRM DISCHARGE (M3/S) : 15.9    TAILWATER LEVEL (EL.M) : 70.0

POWER    INSTALLED CAPACITY (MW) : 100.9    ANNUAL TOTAL ENERGY (GWH) : 223.7  
 /ENERGY    FIRM POWER (MW) : 16.3    FIRM ENERGY (GWH) : 147.3  
 MIN. GUARANTEED POWER (MW) : 64.4    SECONDARY ENERGY (GWH) : 76.4

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**TRANSMISSION**  
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LINE    LENGTH (KM) : 24.0    TO : TUGUEGARAO    230 K V    DOUBLE CIRCUIT    NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 30.0    FROM : PERABLANCA

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**CONSTRUCTION COST**  
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TOTAL COST (MIL USD) : 245.3    POWER COST (MIL USD) : 232.1  
 TOTAL COST/KW (USD/KW) : 2431.4    TRANSMISSION COST (MIL USD) : 4.7  
 TOTAL COST/KWH (USD/KWH) : 1.441    ACCESS ROAD COST (MIL USD) : 8.6

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**OTHER INFORMATION**  
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LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3373-11  
 TECHNICAL COMMENT :

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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 2-008-08-27-0-2

SCHEME : TUGUEGARAO

RIVER SYSTEM : CAGAYAN  
 STREAM : PIN.TUGUEGARAO

WATER RESOURCES REGION : 11  
 PROVINCE : CAGAYAN

COORDINATES : N17-36-59 E122-03-23  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 95.3 (MAIN : 95.3, INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-020-NW-225  
 AVER. BASIN RAINFALL (MM/YR) : 4500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 655.  
 AVERAGE DISCHARGE (M3/S) : 11.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 51.5

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.62

PONDAGE FULL SUPPLY LEVEL (EL.M) : 306.5 PONDAGE STORAGE VOL. (1000M3) : 95.9  
 AVERAGE OPERATING LEVEL (EL.M) : 305.4 ACTIVE STORAGE VOL. (1000M3) : 36.6  
 MINIMUM OPERATING LEVEL (EL.M) : 304.4  
 DRAWDOWN DEPTH ( M ) : 2.1

MAIN DAM CREST ELEVATION (EL.M) : 306.5 CREST LENGTH ( M ) : 53.7  
 (WEIR) WEIR HEIGHT ( M ) : 8.5 WEIR CONCRETE VOL. (1000 M3) : 8.8

WATERWAY HEADRAGE : LENGTH ( M ) : 3430.0 DIAMETER (WIDTH) ( M ) : 2.7 NOS. : 1  
 PENSTOCK : HORIZONT. L ( M ) : 250.0 DIAMETER ( M ) : 2.1 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 20.6

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 11.4 AVERAGE NET HEAD ( M ) : 98.3  
 /HEAD FIRM DISCHARGE (M3/S) : 1.3 TAILWATER LEVEL (EL.M) : 200.0

POWER INSATLLED CAPACITY (MW) : 9.2 ANNUAL TOTAL ENERGY (GWH) : 46.6  
 /ENERGY FIRM POWER (MW) : 1.0 FIRM ENERGY (GWH) : 9.0  
 MIN. GUARANTEED POWER (MW) : 0.9 SECONDARY ENERGY (GWH) : 37.6

TRANSMISSION LINE LENGTH (KM) : 16.0 TO : TUGUEGARAO 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 37.0 FROM : AGUGADAM

CONSTRUCTION COST

TOTAL COST (MIL USD) : 25.5 POWER COST (MIL USD) : 14.1  
 TOTAL COST/KW (USD/KW) : 2755.8 TRANSMISSION COST (MIL USD) : 0.8  
 TOTAL COST/KWH (USD/KWH) : 1.255 ACCESS ROAD COST (MIL USD) : 10.5

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3472-1V  
 TECHNICAL COMMENT :

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 I N V E N T O R Y O F H Y D R O P O W E R S I T E S  
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SCHEME : SAN PABLO  
 RIVER SYSTEM : CAGAYAN  
 STREAM : PINACANAUAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : ISABELA  
 COORDINATES : N17-28-30 E121-55-00  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

SCHEME ID : 2-008-09-29-0-1  
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HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 120.0 (MAIN : 120.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-020-NW-225  
 AVER. BASIN RAINFALL (MM/YR) : 3915. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 655.  
 AVERAGE DISCHARGE (M3/S) : 12.1 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 51.5

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.57

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 255.3 GROSS STORAGE VOL. (MIL M3) : 274.4  
 AVERAGE OPERATING LEVEL (EL.M) : 233.9 ACTIVE STORAGE VOL. (MIL M3) : 218.3  
 MINIMUM OPERATING LEVEL (EL.M) : 191.1 DEAD STORAGE VOL. (MIL M3) : 56.1  
 DRAWDOWN DEPTH ( M ) : 64.2 SEDIMENT VOL. (MIL M3) : 8.4

MAIN DAM CREST ELEVATION (EL.M) : 261.3 ( M ) : 932.9  
 (WEIR) DAM HEIGHT ( M ) : 163.3 (MIL M3) : 30.61

WATERWAY HEADRAGE : LENGTH ( M ) : 770.0 DIAMETER (WIDTH) ( M ) : 2.6 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 240.0 DIAMETER ( M ) : 2.3 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 1540.0 DIAMETER ( M ) : 7.5 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 72.9

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 16.4 AVERAGE NET HEAD ( M ) : 130.5  
 /HEAD FIRM DISCHARGE (M3/S) : 8.2 TAILWATER LEVEL (EL.M) : 98.0

POWER UNSATLLED CAPACITY (MW) : 17.6 ANNUAL TOTAL ENERGY (GWH) : 98.8  
 /ENERGY FIRM POWER (MW) : 8.8 FIRM ENERGY (GWH) : 77.2  
 MIN. GUARANTEED POWER (MW) : 11.3 SECONDARY ENERGY (GWH) : 21.6

TRANSMISSION LINE LENGTH (KM) : 15.0 TO : TUGUEGARAO FROM : OLD SAN-PABLO NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 20.0

CONSTRUCTION COST

TOTAL COST (MIL USD) : 391.8 POWER COST (MIL USD) : 385.3  
 TOTAL COST/KW (USD/KW) : 22216.9 TRANSMISSION COST (MIL USD) : 0.8  
 TOTAL COST/KWH (USD/KWH) : 4.680 ACCESS ROAD COST (MIL USD) : 5.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3372-11  
 TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-11-29-0-1

SCHEME : TUMAUNI-1

RIVER SYSTEM : CAGAYAN WATER RESOURCES REGION : 11 COORDINATES : N17-18-25 E121-57-38  
 STREAM : PINACANAAN DE TUMAUNI PROVINCE : ISABEL STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 165.6 (MAIN : 166., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-020-NW-225  
 AVER. BASIN RAINFALL (MM/YR) : 3438. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 655.  
 AVERAGE DISCHARGE (M3/S) : 14.3 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 51.5

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.47

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 267.8 GROSS STORAGE VOL. (MIL M3) : 301.4  
 AVERAGE OPERATING LEVEL (EL.M) : 250.6 ACTIVE STORAGE VOL. (MIL M3) : 211.3  
 MINIMUM OPERATING LEVEL (EL.M) : 216.0 DEAD STORAGE VOL. (MIL M3) : 90.2  
 DRAWDOWN DEPTH (M) : 51.8 SEDIMENT VOL. (MIL M3) : 11.6

MAIN DAM CREST ELEVATION (EL.M) : 273.8 CREST LENGTH (M) : 545.4  
 (WEIR) DAM HEIGHT (M) : 145.8 EMBANKMENT VOL. (MIL M3) : 9.77

WATERWAY HEADRACE : LENGTH (M) : 820.0 DIAMETER (WIDTH) (M) : 4.8 NOS. : 1  
 PENSTOCK : HORIZONT. L (M) : 140.0 DIAMETER (M) : 3.8 NOS. : 1  
 DIVERSION : LENGTH (M) : 1380.0 DIAMETER (M) : 3.0 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 86.1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 53.6 AVERAGE NET HEAD (M) : 119.4  
 /HEAD FIRM DISCHARGE (M3/S) : 8.9 TAILWATER LEVEL (EL.M) : 128.0

POWER INSTALLED CAPACITY (MW) : 52.7 ANNUAL TOTAL ENERGY (GWH) : 120.6  
 /ENERGY FIRM POWER (MW) : 8.8 FIRM ENERGY (GWH) : 77.0  
 MIN. GUARANTEED POWER (MW) : 35.7 SECONDARY ENERGY (GWH) : 43.6

TRANSMISSION

LINE LENGTH (KM) : 27.0 TO : TUGUECARAO 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2  
 ACCESS ROAD LENGTH (KM) : 24.5 FROM : TUMAUNI

CONSTRUCTION COST

TOTAL COST (MIL USD) : 205.9 POWER COST (MIL USD) : 195.8  
 TOTAL COST/KW (USD/KW) : 3906.4 TRANSMISSION COST (MIL USD) : 3.2  
 TOTAL COST/KWH (USD/KWH) : 2.287 ACCESS ROAD COST (MIL USD) : 7.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3371-1  
 TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-12-30-0-1

SCHEME : NATONIN

RIVER SYSTEM : CAGAYAN  
STREAM : SIFU

WATER RESOURCES REGION : 11  
PROVINCE : MT. PROVINCE

COORDINATES : N17-04-00 E121-30-10  
STUDY LEVEL : UNSCALED  
{PRE-F/S.RECONNAISSANCE}

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 466.0 (MAIN : 466., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-055-NW-  
AVER. BASIN RAINFALL (MM/YR) : 2000. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 10.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.85

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 134.0 GROSS STORAGE VOL. (MIL M3) : 346.2  
AVERAGE OPERATING LEVEL (EL.M) : 126.3 ACTIVE STORAGE VOL. (MIL M3) : 283.3  
MINIMUM OPERATING LEVEL (EL.M) : 110.8 DEAD STORAGE VOL. (MIL M3) : 62.9  
DRAWDOWN DEPTH (M) : 23.2 SEDIMENT VOL. (MIL M3) : 32.6

MAIN DAM CREST ELEVATION (EL.M) : 140.0 CREST LENGTH (M) : 380.0  
(WEIR) DAM HEIGHT (M) : 60.0 EMBANKMENT VOL. (MIL M3) : 2.19

WATERWAY HEADRACE : LENGTH (M) : 350.0 DIAMETER (WIDTH) (M) : 2.5 NOS. : 1  
PENSTOCK : HORIZONTAL L (M) : 120.0 DIAMETER (M) : 2.3 NOS. : 1  
DIVERSION : LENGTH (M) : 560.0 DIAMETER (M) : 7.1 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 46.1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 13.9 AVERAGE NET HEAD (M) : 44.2  
/HEAD FIRM DISCHARGE (M3/S) : 6.9 TAILWATER LEVEL (EL.M) : 80.0

POWER UNSATLLED CAPACITY (MW) : 5.0 ANNUAL TOTAL ENERGY (GWH) : 28.9  
/ENERGY FIRM POWER (MW) : 2.5 FIRM ENERGY (GWH) : 22.1  
MIN. GUARANTEED POWER (MW) : 3.1 SECONDARY ENERGY (GWH) : 6.8

TRANSMISSION LINE LENGTH (KM) : 8.0 TO : TABUK 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 17.0 FROM : MUNOZ

CONSTRUCTION COST

TOTAL COST (MIL USD) : 69.2 POWER COST (MIL USD) : 63.8  
TOTAL COST/KW (USD/KW) : 13720.0 TRANSMISSION COST (MIL USD) : 0.6  
TOTAL COST/KWH (USD/KWH) : 2.868 ACCESS ROAD COST (MIL USD) : 4.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3371-111  
TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-12-31-0-1

SCHEME : PASTOR

RIVER SYSTEM : CAGAYAN  
STREAM : SIFU

WATER RESOURCES REGION : II  
PROVINCE : MT. PROVINCE

COORDINATES : N17-05-53 E121-20-18  
STUDY LEVEL : UNSCALED  
(PRE-F/S RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 274.0 (MAIN : 274.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-055-NW-  
AVER. BASIN RAINFALL (MM/YR) : 2201. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 8.0 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.65

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 303.0  
AVERAGE OPERATING LEVEL (EL.M) : 291.0  
MINIMUM OPERATING LEVEL (EL.M) : 287.1  
DRAWDOWN DEPTH ( M ) : 35.9  
CREST ELEVATION (EL.M) : 309.0  
DAM HEIGHT ( M ) : 105.0  
HEADRACE : LENGTH ( M ) : 790.0  
PENSTOCK : HORIZONT. L ( M ) : 160.0  
DIVERSION : LENGTH ( M ) : 1020.0  
EXCAVATION VOL TOTAL (1000 M3) : 88.1

GROSS STORAGE VOL. (MIL M3) : 254.8  
ACTIVE STORAGE VOL. (MIL M3) : 163.2  
DEAD STORAGE VOL. (MIL M3) : 91.6  
SEDIMENT VOL. (MIL M3) : 19.2

MAIN DAM (WEIR) CREST LENGTH ( M ) : 318.0  
EMBANKMENT VOL. (MIL M3) : 3.66

WATERWAY DIAMETER (WIDTH) ( M ) : 2.5  
DIAMETER ( M ) : 2.0  
DIAMETER ( M ) : 3.9  
NOS. : 1  
NOS. : 1  
NOS. : 1

DISCHARGE / HEAD PLANT MAX. DISCHARGE (M3/S) : 9.7  
FIRM DISCHARGE (M3/S) : 4.9  
POWER / ENERGY INSATTLLED CAPACITY (MW) : 6.7  
FIRM POWER (MW) : 3.4  
MIN. GUARANTEED POWER (MW) : 4.6

AVERAGE NET HEAD ( M ) : 84.0  
TAILWATER LEVEL (EL.M) : 204.0  
ANNUAL TOTAL ENERGY (GWH) : 40.2  
FIRM ENERGY (GWH) : 29.5  
SECONDARY ENERGY (GWH) : 10.7

TRANSMISSION

LINE LENGTH (KM) : 41.0 TO : BATONG BUHAY 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 13.0 FROM : NATONIN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 97.4  
TOTAL COST/KW (USD/KW) : 14449.1  
TOTAL COST/KWH (USD/KWH) : 2.976  
POWER COST (MIL USD) : 92.1  
TRANSMISSION COST (MIL USD) : 1.6  
ACCESS ROAD COST (MIL USD) : 3.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3271-11  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-13-32-0-1

SCHEME : TABUK

RIVER SYSTEM : CAGAYAN  
STREAM : MALIG

WATER RESOURCES REGION : II  
PROVINCE : MT. PROVINCE

COORDINATES : N17-16-53 E121-31-06  
STUDY LEVEL : UNSCALED  
(PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 439.0 (MAIN : 439.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-055-NW-  
AVER. BASIN RAINFALL (MM/YR) : 2607. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 18.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.80

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 146.0 GROSS STORAGE VOL. (MIL M3) : 580.9  
AVERAGE OPERATING LEVEL (EL.M) : 136.5 ACTIVE STORAGE VOL. (MIL M3) : 464.3  
MINIMUM OPERATING LEVEL (EL.M) : 117.4 DEAD STORAGE VOL. (MIL M3) : 116.5  
DRAWDOWN DEPTH (M) : 28.6 SEDIMENT VOL. (MIL M3) : 30.7

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 152.0 CREST LENGTH (M) : 215.3  
DAM HEIGHT (M) : 79.0 EMBANKMENT VOL. (MIL M3) : 1.83

WATERWAY HEADRACE : LENGTH (M) : 440.0 DIAMETER (WIDTH) (M) : 5.5 NOS. : 1  
PENSTOCK : HORIZONT. L (M) : 80.0 DIAMETER (M) : 4.4 NOS. : 1  
DIVERSION : LENGTH (M) : 640.0 DIAMETER (M) : 7.0 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 60.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 71.8 AVERAGE NET HEAD (M) : 62.0  
/HEAD FIRM DISCHARGE (M3/S) : 12.0 TAILWATER LEVEL (EL.M) : 73.0

POWER INSTALLED CAPACITY (MW) : 36.6 ANNUAL TOTAL ENERGY (GWH) : 81.1  
FIRM POWER (MW) : 6.1 FIRM ENERGY (GWH) : 53.5  
MIN. GUARANTEED POWER (MW) : 24.2 SECONDARY ENERGY (GWH) : 27.6

TRANSMISSION

LINE LENGTH (KM) : 12.0 TO : TABUK 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 12.5 FROM : BARUCBUC

CONSTRUCTION COST

TOTAL COST (MIL USD) : 91.2 POWER COST (MIL USD) : 86.2  
TOTAL COST/KW (USD/KW) : 2489.2 TRANSMISSION COST (MIL USD) : 1.4  
TOTAL COST/KWH (USD/KWH) : 1.476 ACCESS ROAD COST (MIL USD) : 3.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3371-IV  
TECHNICAL COMMENT :



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-13-33-0-1

SCHEME : BANATAO

RIVER SYSTEM : CAGAYAN  
STREAM : MALIG

WATER RESOURCES REGION : 11  
PROVINCE : KAL-APAYAO

COORDINATES : N17-18-06 E121-28-55  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 379.0 (MAIN : 379.0, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-055-NW-  
AVER. BASIN RAINFALL (MM/YR) : 2623 DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 16.1 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.55

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 155.0 GROSS STORAGE VOL. (MIL M3) : 516.9  
AVERAGE OPERATING LEVEL (EL.M) : 150.8 ACTIVE STORAGE VOL. (MIL M3) : 278.9  
MINIMUM OPERATING LEVEL (EL.M) : 142.4 DEAD STORAGE VOL. (MIL M3) : 237.9  
DRAWDOWN DEPTH ( M ) : 12.6 SEDIMENT VOL. (MIL M3) : 26.5  
MAIN DAM CREST ELEVATION (EL.M) : 161.0 CREST LENGTH ( M ) : 145.2  
(WEIR) DAM HEIGHT ( M ) : 49.0 EMBANKMENT VOL. (MIL M3) : 0.38  
WATERWAY HEADRAGE : LENGTH ( M ) : 260.0 DIAMETER (WIDTH) ( M ) : 4.7 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 70.0 DIAMETER ( M ) : 3.9 NOS. : 1  
DIVERSTION : LENGTH ( M ) : 430.0 DIAMETER ( M ) : 6.8 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 36.3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 52.7 AVERAGE NET HEAD ( M ) : 33.8  
/HEAD FIRM DISCHARGE (M3/S) : 8.8 TAILWATER LEVEL (EL.M) : 116.0  
POWER INSATLLED CAPACITY (MW) : 14.7 ANNUAL TOTAL ENERGY (GWH) : 38.1  
/ENERGY FIRM POWER (MW) : 2.4 FIRM ENERGY (GWH) : 21.4  
MIN. GUARANTEED POWER (MW) : 10.5 SECONDARY ENERGY (GWH) : 16.7

TRANSMISSION LINE LENGTH (KM) : 18.0 TO : TABUK 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 17.0 FROM : MALLIG

CONSTRUCTION COST

TOTAL COST (MIL USD) : 47.0 POWER COST (MIL USD) : 41.2  
TOTAL COST/KW (USD/KW) : 3204.5 TRANSMISSION COST (MIL USD) : 0.9  
TOTAL COST/KWH (USD/KWH) : 1.779 ACCESS ROAD COST (MIL USD) : 4.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3271-1  
TECHNICAL COMMENT :



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-14-35-0-1

SCHEME : ILAGAN-1

RIVER SYSTEM : CAGAYAN WATER RESOURCES REGION : 11 COORDINATES : N16-35-03 E122-01-19  
 STREAM : PINACAUAN DE ILAGAN PROVINCE : ISABELA STUDY LEVEL : NEWLY IDENTIFIED THROUGH LRPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 413.7 (MAIN : 414., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2845. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 29.8 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.90

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 474.0 GROSS STORAGE VOL. (MIL M3) : 936.2  
 AVERAGE OPERATING LEVEL (EL.M) : 441.3 ACTIVE STORAGE VOL. (MIL M3) : 846.3  
 MINIMUM OPERATING LEVEL (EL.M) : 375.9 DEAD STORAGE VOL. (MIL M3) : 90.0  
 DRAWDOWN DEPTH ( M ) : 98.1 SEDIMENT VOL. (MIL M3) : 29.0

MAIN DAM CREST ELEVATION (EL.M) : 480.0 CREST LENGTH ( M ) : 500.0  
 DAM HEIGHT ( M ) : 156.0 EMBANKMENT VOL. (MIL M3) : 17.61

WATERWAY HEADRACE : LENGTH ( M ) : 710.0 DIAMETER (WIDTH) ( M ) : 5.3 NOS. : 2  
 PENSTOCK : HORIZONT. L ( M ) : 300.0 DIAMETER ( M ) : 4.0 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 1250.0 DIAMETER ( M ) : 6.9 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 134.0

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 135.0 AVERAGE NET HEAD ( M ) : 187.6  
 FIRM DISCHARGE (M3/S) : 22.5 TAILWATER LEVEL (EL.M) : 249.0

POWER INSATLLED CAPACITY (MW) : 208.4 ANNUAL TOTAL ENERGY (GWH) : 401.2  
 FIRM POWER (MW) : 34.7 FIRM ENERGY (GWH) : 304.3  
 MIN. GUARANTEED POWER (MW) : 129.3 SECONDARY ENERGY (GWH) : 96.9

TRANSMISSION LINE LENGTH (KM) : 66.0 TO : SANTIAGO 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 76.0 FROM : SAN.MARIANO

CONSTRUCTION COST

TOTAL COST (MIL USD) : 396.6 POWER COST (MIL USD) : 364.2  
 TOTAL COST/KW (USD/KW) : 1902.8 TRANSMISSION COST (MIL USD) : 10.7  
 TOTAL COST/KWH (USD/KWH) : 1.190 ACCESS ROAD COST (MIL USD) : 21.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3469-IV  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-14-36-0-1

SCHEME : ILAGAN-2

COORDINATES : N16-30-13 E122-00-01  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LHRPS

WATER RESOURCES REGION : II  
 PROVINCE : ISABELA

RIVER SYSTEM : CAGAYAN  
 STREAM : PINACAUAN DE ILAGAN

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 323.9 (MAIN : 324.7, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2871. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 23.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 544.0 GROSS STORAGE VOL. (MIL M3) : 740.6  
 AVERAGE OPERATING LEVEL (EL.M) : 526.7 ACTIVE STORAGE VOL. (MIL M3) : 521.2  
 MINIMUM OPERATING LEVEL (EL.M) : 492.0 DEAD STORAGE VOL. (MIL M3) : 219.4  
 DRAWDOWN DEPTH ( M ) : 52.0 SEDIMENT VOL. (MIL M3) : 22.7

MAIN DAM CREST ELEVATION (EL.M) : 550.0 ( M ) : 425.0  
 (WEIR) DAM HEIGHT ( M ) : 147.0 (MIL M3) : 10.02

WATERWAY HEADRACE : LENGTH ( M ) : 500.0 DIAMETER (WIDTH) ( M ) : 6.4 NOS. : 1  
 PENSTOCK : HORIZONT. L ( M ) : 320.0 DIAMETER ( M ) : 4.8 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 1000.0 DIAMETER ( M ) : 6.5 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 89.5

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 96.1 AVERAGE NET HEAD ( M ) : 120.4  
 /HEAD FIRM DISCHARGE (M3/S) : 16.0 TAILWATER LEVEL (EL.M) : 403.0

POWER INSTALLED CAPACITY (MW) : 95.3 ANNUAL TOTAL ENERGY (GWH) : 201.9  
 FIRM POWER (MW) : 19.9 FIRM ENERGY (GWH) : 139.1  
 MIN. GUARANTEED POWER (MW) : 64.6 SECONDARY ENERGY (GWH) : 62.8

TRANSMISSION LINE LENGTH (KM) : 68.0 TO : SANTIAGO 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 90.0 FROM : SAN MARIANO

CONSTRUCTION COST

TOTAL COST (MIL USD) : 263.7 POWER COST (MIL USD) : 227.0  
 TOTAL COST/KW (USD/KW) : 2767.3 TRANSMISSION COST (MIL USD) : 11.0  
 TOTAL COST/KWH (USD/KWH) : 1.669 ACCESS ROAD COST (MIL USD) : 25.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3369-1, 3469-IV  
 TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-14-37-0-1

SCHEME : DINAPIQUI

RIVER SYSTEM : CAGAYAN WATER RESOURCES REGION : 11 COORDINATES : N16-32-34 E122-08-24  
 STREAM : DINAPIQUI PROVINCE : ISABELA STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 95.0 (MAIN : 95.0 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2467. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 5.7 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.94

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 546.0 GROSS STORAGE VOL. (MIL M3) : 179.0  
 AVERAGE OPERATING LEVEL (EL.M) : 525.9 ACTIVE STORAGE VOL. (MIL M3) : 169.8  
 MINIMUM OPERATING LEVEL (EL.M) : 495.8 DEAD STORAGE VOL. (MIL M3) : 10.2  
 DRAWDOWN DEPTH (M) : 60.2 SEDIMENT VOL. (MIL M3) : 6.6  
 MAIN DAM CREST ELEVATION (EL.M) : 552.0 CREST LENGTH (M) : 370.7  
 (WEIR) DAM HEIGHT (M) : 102.0 EMBANKMENT VOL. (MIL M3) : 4.35  
 WATERWAY HEADRACE : LENGTH (M) : 9000.0 DIAMETER (WIDTH) (M) : 2.7 NOS. : 1  
 PENSTOCK : HORIZONT. L (M) : 680.0 DIAMETER (M) : 2.3 NOS. : 1  
 DIVERSION : LENGTH (M) : 550.0 DIAMETER (M) : 7.1 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 77.3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 17.4 AVERAGE NET HEAD (M) : 408.1  
 /HEAD FIRM DISCHARGE (M3/S) : 4.3 TAILWATER LEVEL (EL.M) : 80.0  
 POWER INSTALLED CAPACITY (MW) : 58.3 ANNUAL TOTAL ENERGY (GWH) : 159.4  
 /ENERGY FIRM POWER (MW) : 14.6 FIRM ENERGY (GWH) : 127.8  
 MIN. GUARANTEED POWER (MW) : 50.1 SECONDARY ENERGY (GWH) : 31.6

TRANSMISSION LINE LENGTH (KM) : 67.0 TO : CAWAYAN 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2  
 ACCESS ROAD LENGTH (KM) : 40.0 FROM : FROM NEAREST PUBLIC ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 146.4 POWER COST (MIL USD) : 128.3  
 TOTAL COST/KW (USD/KW) : 2509.8 TRANSMISSION COST (MIL USD) : 6.7  
 TOTAL COST/KWH (USD/KWH) : 1.067 ACCESS ROAD COST (MIL USD) : 11.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3469-IV  
 TECHNICAL COMMENT :

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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 2-008-15-38-0-1  
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SCHEME : BALLASANG  
 -----

RIVER SYSTEM : CAGAYAN  
 STREAM : ABUAN  
 WATER RESOURCES REGION : II  
 PROVINCE : ISABELA  
 COORDINATES : N17-05-05 E122-03-03  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

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**HYDRO/TOPO. INFORMATION**  
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CATCHMENT AREA (KM2) : 462.0 (MAIN : 462., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 3461. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 42.3 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

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**SELECTED PLAN**  
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TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.49

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 194.0 GROSS STORAGE VOL. (MIL M3) : 902.4  
 AVERAGE OPERATING LEVEL (EL.M) : 175.6 ACTIVE STORAGE VOL. (MIL M3) : 654.0  
 MINIMUM OPERATING LEVEL (EL.M) : 138.8 DEAD STORAGE VOL. (MIL M3) : 248.4  
 DRAWDOWN DEPTH ( M ) : 55.2 SEDIMENT VOL. (MIL M3) : 32.3

MAIN DAM CREST ELEVATION (EL.M) : 200.0 CREST LENGTH ( M ) : 700.0  
 (WEIR) DAM HEIGHT ( M ) : 141.0 EMBANKMENT VOL. (MIL M3) : 16.04

WATERWAY HEADRACE : LENGTH ( M ) : 720.0 DIAMETER (WIDTH) ( M ) : 5.6 NOS. : 2  
 PENSTOCK : HORIZONTAL L ( M ) : 240.0 DIAMETER ( M ) : 4.3 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 1140.0 DIAMETER ( M ) : 7.1 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 132.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 149.1 AVERAGE NET HEAD ( M ) : 119.4  
 /HEAD FIRM DISCHARGE (M3/S) : 24.9 TAILWATER LEVEL (EL.M) : 59.0

POWER INSATLLED CAPACITY (MW) : 139.2 ANNUAL TOTAL ENERGY (GWH) : 341.6  
 /ENERGY FIRM POWER (MW) : 23.2 FIRM ENERGY (GWH) : 209.3  
 MIN. GUARANTEED POWER (MW) : 89.5 SECONDARY ENERGY (GWH) : 138.4

TRANSMISSION LINE LENGTH (KM) : 58.0 TO : TUGUEGARAO 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 12.0 FROM : SAN ANTONIO

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**CONSTRUCTION COST**  
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TOTAL COST (MIL USD) : 339.3 POWER COST (MIL USD) : 326.3  
 TOTAL COST/KW (USD/KW) : 2437.2 TRANSMISSION COST (MIL USD) : 9.6  
 TOTAL COST/KWH (USD/KWH) : 1.386 ACCESS ROAD COST (MIL USD) : 3.4

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**OTHER INFORMATION**  
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LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3471-111  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-15-39-0-1

SCHEME : ABUAN-1

RIVER SYSTEM : CAGAYAN  
STREAM : ABUAN

WATER RESOURCES REGION : 11  
PROVINCE : ISABELA

COORDINATES : N17-05-22 E122-07-58  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 355.3 (MAIN) ; 355.3 INTER TRANSFER TOTAL : 0.1 STREAM GAGE ID : 4-2-044-NW-244  
AVER. BASIN RAINFALL (MM/YR) : 3598. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
AVERAGE DISCHARGE (M3/S) : 34.1 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.80

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 284.0 GROSS STORAGE VOL. (MIL M3) : 1095.1  
AVERAGE OPERATING LEVEL (EL.M) : 261.6 ACTIVE STORAGE VOL. (MIL M3) : 860.1  
MINIMUM OPERATING LEVEL (EL.M) : 216.7 DEAD STORAGE VOL. (MIL M3) : 235.0  
DRAWDOWN DEPTH (M) : 67.3 SEDIMENT VOL. (MIL M3) : 24.9

MAIN DAM CREST ELEVATION (EL.M) : 290.0 CREST LENGTH (M) : 590.0  
(WEIR) DAM HEIGHT (M) : 173.0 EMBANKMENT VOL. (MIL M3) : 18.45

WATERWAY HEADRACE : LENGTH (M) : 1400.0 DIAMETER (WIDTH) (M) : 5.6 NOS. : 2  
PENSTOCK : HORIZONT. L (M) : 280.0 DIAMETER (M) : 4.2 NOS. : 2  
DIVERSION : LENGTH (M) : 1020.0 DIAMETER (M) : 6.7 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 148.7

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 146.6 AVERAGE NET HEAD (M) : 153.8  
/HEAD FIRM DISCHARGE (M3/S) : 24.4 TAILWATER LEVEL (EL.M) : 103.0

POWER INSATLLED CAPACITY (MW) : 185.6 ANNUAL TOTAL ENERGY (GWH) : 373.3  
/ENERGY FIRM POWER (MW) : 30.9 FIRM ENERGY (GWH) : 271.0  
MIN. GUARANTEED POWER (MW) : 125.2 SECONDARY ENERGY (GWH) : 102.2

TRANSMISSION LINE LENGTH (KM) : 27.0 TO : ILAGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 22.5 FROM : SAN ANTONIO

CONSTRUCTION COST

TOTAL COST (MIL USD) : 382.4 POWER COST (MIL USD) : 370.8  
TOTAL COST/KW (USD/KW) : 2059.8 TRANSMISSION COST (MIL USD) : 5.1  
TOTAL COST/KWH (USD/KWH) : 1.267 ACCESS ROAD COST (MIL USD) : 6.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3471-111  
TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-16-40-0-1

SCHEME : CATALANGAN  
 RIVER SYSTEM : CAGAYAN  
 STREAM : CATALANGAN  
 WATER RESOURCES REGION : II  
 PROVINCE : ISABELA  
 COORDINATES : N16-59-24 E122-04-05  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 292.0 (MAIN : 292.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2959. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 22.1 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.44

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 154.0  
 AVERAGE OPERATING LEVEL (EL.M) : 141.7  
 MINIMUM OPERATING LEVEL (EL.M) : 117.0  
 DRAWDOWN DEPTH ( M ) : 37.0

GROSS STORAGE VOL. (MIL M3) : 403.7  
 ACTIVE STORAGE VOL. (MIL M3) : 306.7  
 DEAD STORAGE VOL. (MIL M3) : 97.1  
 SEDIMENT VOL. (MIL M3) : 20.4

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 160.0  
 DAM HEIGHT ( M ) : 101.0

CREST LENGTH ( M ) : 500.0  
 EMBANKMENT VOL. (MIL M3) : 5.87

WATERWAY HEADRACE : LENGTH ( M ) : 490.0  
 PENSTOCK : HORIZONTAL L ( M ) : 170.0  
 DIVERSION : LENGTH ( M ) : 910.0  
 EXCAVATION VOL TOTAL (1000 M3) : 73.1

DIAMETER (WIDTH) ( M ) : 5.5 NOS. : 1  
 DIAMETER ( M ) : 4.4 NOS. : 1  
 DIAMETER ( M ) : 6.4 NOS. : 2

DISCHARGE /HEAD PLANT MAX. DISCHARGE (M3/S) : 72.6  
 FIRM DISCHARGE (M3/S) : 12.1

AVERAGE NET HEAD (EL.M) : 80.5  
 TAILWATER LEVEL (EL.M) : 59.0

POWER /EMERGENCY INSTALLED CAPACITY (MW) : 48.1  
 FIRM POWER (MW) : 8.0  
 MIN. GUARANTEED POWER (MW) : 31.8

ANNUAL TOTAL ENERGY (GWH) : 126.0  
 FIRM ENERGY (GWH) : 70.2  
 SECONDARY ENERGY (GWH) : 55.8

TRANSMISSION LINE LENGTH (KM) : 27.0 TO : ILAGAN  
 ACCESS ROAD LENGTH (KM) : 1.5 FROM : ABBATUAN

175 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

CONSTRUCTION COST

TOTAL COST (MIL USD) : 151.4  
 TOTAL COST /KW (USD/KW) : 3149.9  
 TOTAL COST /KWH (USD/KWH) : 1.742

POWER COST (MIL USD) : 147.8  
 TRANSMISSION COST (MIL USD) : 3.2  
 ACCESS ROAD COST (MIL USD) : 0.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3470-1V  
 TECHNICAL COMMENT :



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-15-41-0-1

SCHEME : DISUSUAN

RIVER SYSTEM : CAGAYAN  
STREAM : DISABUNGAN

WATER RESOURCES REGION : 11  
PROVINCE : ISABELA

COORDINATES : N16-57-28 E122-06-07  
STUDY LEVEL : IDENTIFIED  
IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 127.8 (MAIN : 126.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-044-NW-244  
AVER. BASIN RAINFALL (MM/YR) : 2767. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
AVERAGE DISCHARGE (M3/S) : 8.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.50

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 154.0 GROSS STORAGE VOL. (MIL M3) : 194.4  
AVERAGE OPERATING LEVEL (EL.M) : 143.6 ACTIVE STORAGE VOL. (MIL M3) : 140.3  
MINIMUM OPERATING LEVEL (EL.M) : 122.8 DEAD STORAGE VOL. (MIL M3) : 54.1  
DRAWDOWN DEPTH ( M ) : 31.2 SEDIMENT VOL. (MIL M3) : 8.9

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 160.0 CREST LENGTH ( M ) : 280.0  
DAM HEIGHT ( M ) : 84.0 EMBANKMENT VOL. (MIL M3) : 2.47

WATERWAY HEADRACE : LENGTH ( M ) : 380.0 DIAMETER (WIDTH) ( M ) : 2.5 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 110.0 DIAMETER ( M ) : 2.0 NOS. : 1  
DIVERSION : LENGTH ( M ) : 780.0 DIAMETER ( M ) : 7.6 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 37.4

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 10.4 AVERAGE NET HEAD ( M ) : 65.6  
/HEAD FIRM DISCHARGE (M3/S) : 5.2 TAILWATER LEVEL (EL.M) : 76.0

POWER INSATLLED CAPACITY (MW) : 5.6 ANNUAL TOTAL ENERGY (GWH) : 34.7  
/ENERGY FIRM POWER (MW) : 2.5 FIRM ENERGY (GWH) : 24.5  
MIN. GUARANTEED POWER (MW) : 3.6 SECONDARY ENERGY (GWH) : 10.2

TRANSMISSION LINE LENGTH (KM) : 41.0 TO : CAWAYAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 7.5 FROM : ABBATUAN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 67.8 POWER COST (MIL USD) : 64.1  
TOTAL COST/KW (USD/KW) : 12106.3 TRANSMISSION COST (MIL USD) : 1.6  
TOTAL COST/KWH (USD/KWH) : 2.458 ACCESS ROAD COST (MIL USD) : 2.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3470-IV  
TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME : MARIANO  
 RIVER SYSTEM : CAGAYAN  
 STREAM : DISABUNGAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : ISABELA  
 COORDINATES : N16-51-56 E122-08-35  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

SCHEME ID : 2-008-16-42-0-1

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 134.0 (MAIN : 134., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 3000. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 10.3 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.72

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 245.0  
 AVERAGE OPERATING LEVEL (EL.M) : 230.0  
 MINIMUM OPERATING LEVEL (EL.M) : 200.1  
 DRAWDOWN DEPTH ( M ) : 44.9  
 CREST ELEVATION (EL.M) : 251.0  
 DAM HEIGHT ( M ) : 115.0  
 HEADRACE : LENGTH ( M ) : 640.0  
 PENSTOCK : HORIZONTAL LENGTH ( M ) : 140.0  
 DIVERSION : LENGTH ( M ) : 1030.0  
 EXCAVATION VOL TOTAL (1000 M3) : 51.2

GROSS STORAGE VOL. (MIL M3) : 326.6  
 ACTIVE STORAGE VOL. (MIL M3) : 234.2  
 DEAD STORAGE VOL. (MIL M3) : 92.4  
 SEDIMENT VOL. (MIL M3) : 9.4  
 CREST LENGTH ( M ) : 376.0  
 EMBANKMENT VOL. (MIL M3) : 5.27  
 DIAMETER (WIDTH) ( M ) : 2.5  
 DIAMETER ( M ) : 2.3  
 DIAMETER ( M ) : 7.7  
 NOS. : 1  
 NOS. : 1  
 NOS. : 1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 14.1  
 /HEAD FIRM DISCHARGE (M3/S) : 7.0  
 POWER INSATLLED CAPACITY (MW) : 10.5  
 /ENERGY FIRM POWER (MW) : 5.2  
 MIN.GUARANTEED POWER (MW) : 6.7

AVERAGE NET HEAD ( M ) : 90.3  
 TAILWATER LEVEL (EL.M) : 136.0  
 ANNUAL TOTAL ENERGY (GWH) : 58.3  
 FIRM ENERGY (GWH) : 45.9  
 SECONDARY ENERGY (GWH) : 12.4

TRANSMISSION

LINE LENGTH (KM) : 45.0 TO : CAGAYAN  
 ACCESS ROAD LENGTH (KM) : 34.0 FROM : ABBATJUAN

69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 121.3  
 TOTAL COST/KW (USD/KW) : 11574.8  
 TOTAL COST/KWH (USD/KWH) : 2.445

POWER COST (MIL USD) : 109.9  
 TRANSMISSION COST (MIL USD) : 1.7  
 ACCESS ROAD COST (MIL USD) : 9.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3470-1V  
 TECHNICAL COMMENT :

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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME : ALIMIT-1  
 RIVER SYSTEM : CAGAYAN  
 STREAM : ALIMIT  
 WATER RESOURCES REGION : II  
 PROVINCE : IFUGAO  
 COORDINATES : N16-46-38 E121-15-56  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)  
 SCHEME ID : 2-008-19-43-0-1

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 594.9 (MAIN : 595., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-055-NW-  
 AVER. BASIN RAINFALL (MM/YR) : 2463. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
 AVERAGE DISCHARGE (M3/S) : 22.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

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**SELECTED PLAN**  
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TYPE OF DEVELOPMENT : RESERVOIR      RESERVOIR DEVELOPMENT RATIO : 0.65  
 RESERVOIR      FULL SUPPLY LEVEL (EL.M) : 299.0      GROSS STORAGE VOL. (MIL M3) : 703.8  
                  AVERAGE OPERATING LEVEL (EL.M) : 286.9      ACTIVE STORAGE VOL. (MIL M3) : 455.6  
                  MINIMUM OPERATING LEVEL (EL.M) : 262.8      DEAD STORAGE VOL. (MIL M3) : 248.2  
                  DRAWDOWN DEPTH ( M ) : 36.2      SEDIMENT VOL. (MIL M3) : 41.6  
 MAIN DAM      CREST ELEVATION (EL.M) : 305.0      CREST LENGTH ( M ) : 495.0  
                  DAM HEIGHT ( M ) : 113.4      EMBANKMENT VOL. (MIL M3) : 6.47  
 WATERWAY      HEADRACE : LENGTH ( M ) : 640.0      DIAMETER (WIDTH) ( M ) : 5.9      NOS. : 1  
                  PENSTOCK : HORIZONT. L ( M ) : 220.0      DIAMETER ( M ) : 4.6      NOS. : 1  
                  DIVERSION : LENGTH ( M ) : 800.0      DIAMETER ( M ) : 7.4      NOS. : 2  
                  EXCAVATION VOL TOTAL (1000 M3) : 91.0

DISCHARGE      PLANT MAX. DISCHARGE (M3/S) : 81.6      AVERAGE NET HEAD ( M ) : 92.7  
                  FIRM DISCHARGE (M3/S) : 13.6      TAILWATER LEVEL (EL.M) : 191.6  
 POWER      INSATLLED CAPACITY (MW) : 62.3      ANNUAL TOTAL ENERGY (GWH) : 145.2  
                  FIRM POWER (MW) : 10.4      FIRM ENERGY (GWH) : 90.9  
                  MIN. GUARANTEED POWER (MW) : 43.8      SECONDARY ENERGY (GWH) : 54.3

TRANSMISSION      LINE LENGTH (KM) : 36.0      TO : SANTIAGO      115 K V SINGLE CIRCUIT      NOS. OF CIRCUIT : 2  
                  ACCESS ROAD LENGTH (KM) : 17.0      FROM : HALOG

CONSTRUCTION COST  
 -----  
 TOTAL COST (MIL USD) : 179.0      POWER COST (MIL USD) : 170.2  
 TOTAL COST/KW (USD/KW) : 2874.5      TRANSMISSION COST (MIL USD) : 4.0  
 TOTAL COST/KWH (USD/KWH) : 1.670      ACCESS ROAD COST (MIL USD) : 4.8

OTHER INFORMATION  
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 LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3270-11  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-19-44-0-1

SCHEME : ALIMIT-2

RIVER SYSTEM : CAGAYAN  
STREAM : ALIMIT

WATER RESOURCES REGION : 11  
PROVINCE : IFUGAO

COORDINATES : N16-54-11 E121-16-22  
STUDY LEVEL : UNSCALED  
(PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 446.6 (MAIN : 447.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-055-NW-  
AVER. BASIN RAINFALL (MM/YR) : 2620. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 18.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.60

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 404.3 GROSS STORAGE VOL. (MIL M3) : 480.0  
AVERAGE OPERATING LEVEL (EL.M) : 386.5 ACTIVE STORAGE VOL. (MIL M3) : 357.8  
MINIMUM OPERATING LEVEL (EL.M) : 351.1 DEAD STORAGE VOL. (MIL M3) : 122.3  
DRAWDOWN DEPTH ( M ) : 53.2 SEDIMENT VOL. (MIL M3) : 31.3

MAIN DAM CREST ELEVATION (EL.M) : 410.3 CREST LENGTH ( M ) : 470.8  
(WEIR) DAM HEIGHT ( M ) : 138.9 ENDANKMENT VOL. (MIL M3) : 9.60

WATERWAY HEADRACE : LENGTH ( M ) : 800.0 DIAMETER (WIDTH) ( M ) : 5.4 NOS. : 1  
PENSTOCK : HORIZONT. L ( M ) : 150.0 DIAMETER ( M ) : 4.2 NOS. : 1  
DIVERSION : LENGTH ( M ) : 1020.0 DIAMETER ( M ) : 7.0 NOS. : 2  
EXCAVATION VOL TOTAL (1000 M3) : 99.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 68.5 AVERAGE NET HEAD ( M ) : 112.2  
/HEAD FIRM DISCHARGE (M3/S) : 11.4 TAILWATER LEVEL (EL.M) : 271.4

POWER UNSATLLED CAPACITY (MW) : 63.3 ANNUAL TOTAL ENERGY (GWH) : 150.9  
/ENERGY FIRM POWER (MW) : 10.6 FIRM ENERGY (GWH) : 92.4  
MIN. GUARANTEED POWER (MW) : 41.2 SECONDARY ENERGY (GWH) : 58.5

TRANSMISSION LINE LENGTH (KM) : 41.0 TO : SANTIAGO 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 15.5 FROM : DUCLIGAN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 217.8 POWER COST (MIL USD) : 208.9  
TOTAL COST/KW (USD/KW) : 3439.6 TRANSMISSION COST (MIL USD) : 4.4  
TOTAL COST/KWH (USD/KWH) : 1.980 ACCESS ROAD COST (MIL USD) : 4.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3270-1  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-20-45-0-1

SCHEME : HUOAB

RIVER SYSTEM : CAGAYAN  
STREAM : IBULAO

WATER RESOURCES REGION : 11  
PROVINCE : IFUGAO

COORDINATES : N16-44-36 E121-10-00  
STUDY LEVEL : UNSCALED  
(PRE-F/S, RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 551.6 (MAIN : 552.0, INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-055-IW-  
AVER. BASIN RAINFALL (MM/YR) : 2739. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 25.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.65

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 460.0  
AVERAGE OPERATING LEVEL (EL.M) : 443.6  
MINIMUM OPERATING LEVEL (EL.M) : 410.9  
DRAWDOWN DEPTH ( M ) : 49.1  
CREST ELEVATION (EL.M) : 466.0  
DAM HEIGHT ( M ) : 150.3  
HEADRACE : LENGTH ( M ) : 530.0  
PENSTOCK : HORIZONTAL L ( M ) : 230.0  
DIVERSION : LENGTH ( M ) : 1160.0  
EXCAVATION VOL TOTAL (1000 M3) : 119.1

GROSS STORAGE VOL. (MIL M3) : 747.3  
ACTIVE STORAGE VOL. (MIL M3) : 521.4  
DEAD STORAGE VOL. (MIL M3) : 225.9  
SEDIMENT VOL. (MIL M3) : 38.6  
CREST LENGTH ( M ) : 688.5  
EMBANKMENT VOL. (MIL M3) : 16.90

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 94.4  
/HEAD FIRM DISCHARGE (M3/S) : 15.7  
POWER INSATLLED CAPACITY (MW) : 97.1  
/ENERGY FIRM POWER (MW) : 16.2  
MIN. GUARANTEED POWER (MW) : 68.2

NOS. : 1  
NOS. : 1  
NOS. : 2

AVERAGE NET HEAD ( M ) : 125.0  
TAILWATER LEVEL (EL.M) : 315.7  
ANNUAL TOTAL ENERGY (GWH) : 224.2  
FIRM ENERGY (GWH) : 141.7  
SECONDARY ENERGY (GWH) : 82.5

TRANSMISSION LINE LENGTH (KM) : 41.0 TO : SOLANO  
ACCESS ROAD LENGTH (KM) : 1.5 FROM : HALOG  
230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 315.1  
TOTAL COST/KW (USD/KW) : 3246.3  
TOTAL COST/KWH (USD/KWH) : 1.893  
POWER COST (MIL USD) : 307.5  
TRANSMISSION COST (MIL USD) : 7.1  
ACCESS ROAD COST (MIL USD) : 0.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3270-111  
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-20-46-0-2

SCHEME : IBULAO  
 RIVER SYSTEM : CAGAYAN  
 STREAM : IBULAO

WATER RESOURCES REGION : II  
 PROVINCE : IFUGAO

COORDINATES : N16-46-19 E120-59-29  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LKPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 159.1 (MAIN : 159.1, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-055-NW-  
 AVER. BASIN RAINFALL (MM/YR) : 2827. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
 AVERAGE DISCHARGE (M3/S) : 7.8 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.64  
 PONDAGE FULL SUPPLY LEVEL (EL.M) : 813.7 PONDAGE STORAGE VOL. (1000M3) : 110.6  
 AVERAGE OPERATING LEVEL (EL.M) : 813.3 ACTIVE STORAGE VOL. (1000M3) : 21.3  
 MINIMUM OPERATING LEVEL (EL.M) : 813.0  
 DRAWDOWN DEPTH (M) : 0.7

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 813.7 CREST LENGTH (M) : 59.2  
 WEIR HEIGHT (M) : 5.7 WEIR CONCRETE VOL. (1000 M3) : 6.7

WATERWAY HEADRACE : LENGTH (M) : 8060.0 DIAMETER (WIDTH) (M) : 2.3 NOS. : 1  
 PENSTOCK : HORIZONTAL (M) : 440.0 DIAMETER (M) : 1.7 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 34.4

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.8 AVERAGE NET HEAD (M) : 254.1  
 /HEAD FIRM DISCHARGE (M3/S) : 0.7 TAILWATER LEVEL (EL.M) : 540.0

POWER UNSATLLED CAPACITY (MW) : 16.3 ANNUAL TOTAL ENERGY (GWH) : 83.9  
 /ENERGY FIRM POWER (MW) : 1.5 FIRM ENERGY (GWH) : 13.6  
 MIN. GUARANTEED POWER (MW) : 1.4 SECONDARY ENERGY (GWH) : 70.3

TRANSMISSION LINE LENGTH (KM) : 42.0 TO : SOLANO 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 14.2 FROM : NEAREST NATIONAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 26.3 POWER COST (MIL USD) : 20.6  
 TOTAL COST/KW (USD/KW) : 1611.6 TRANSMISSION COST (MIL USD) : 1.6  
 TOTAL COST/KWH (USD/KWH) : 0.759 ACCESS ROAD COST (MIL USD) : 4.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3170-II 1975  
 TECHNICAL COMMENT : - ONE TRIBUTARY INTAKE

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**I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S**  
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SCHEME ID : 2-008-22-47-0-2

SCHEME : MATUNO-1R

RIVER SYSTEM : CAGAYAN  
 STREAM : CADACLAN

WATER RESOURCES REGION : 11  
 PROVINCE : IFUGAO

COORDINATES : N16-39-46 E121-01-51  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LHPPS

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**HYDRO/TOPO. INFORMATION**  
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CATCHMENT AREA (KM2) : 177.3 (MAIN : 177.3, INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-055-NW-  
 AVER. BASIN RAINFALL (MM/YR) : 2714. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
 AVERAGE DISCHARGE (M3/S) : 8.0 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 69.0

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**SELECTED PLAN**  
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TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.64

PONDAGE FULL SUPPLY LEVEL (EL.M) : 756.4 PONDAGE STORAGE VOL. (1000M3) : 97.2  
 AVERAGE OPERATING LEVEL (EL.M) : 755.9 ACTIVE STORAGE VOL. (1000M3) : 22.0  
 MINIMUM OPERATING LEVEL (EL.M) : 755.5  
 DRAWDOWN DEPTH ( M ) : 0.9

MAIN DAM CREST ELEVATION (EL.M) : 756.4 CREST LENGTH ( M ) : 95.5  
 (WEIR) WEIR HEIGHT ( M ) : 6.9 WEIR CONCRETE VOL. (1000 M3) : 10.7

WATERWAY HEADRAGE : LENGTH ( M ) : 9050.0 DIAMETER (WIDTH) ( M ) : 2.3 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 335.0 DIAMETER ( M ) : 1.8 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 39.1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 8.1 AVERAGE NET HEAD ( M ) : 138.4  
 /HEAD FIRM DISCHARGE (M3/S) : 0.8 TAILWATER LEVEL (EL.M) : 600.0

POWER INSATLLED CAPACITY (MW) : 9.2 ANNUAL TOTAL ENERGY (GWH) : 47.2  
 /ENERGY FIRM POWER (MW) : 0.9 FIRM ENERGY (GWH) : 7.6  
 MIN. GUARANTEED POWER (MW) : 0.8 SECONDARY ENERGY (GWH) : 39.6

TRANSMISSION LINE LENGTH (KM) : 29.0 TO : SOLANO 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 38.0 FROM : BALUNGAO

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**CONSTRUCTION COST**  
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TOTAL COST (MIL USD) : 31.8 POWER COST (MIL USD) : 19.8  
 TOTAL COST/KW (USD/KW) : 3467.4 TRANSMISSION COST (MIL USD) : 1.2  
 TOTAL COST/KWH (USD/KWH) : 1.630 ACCESS ROAD COST (MIL USD) : 10.8

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**OTHER INFORMATION**  
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LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3269-1V  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-22-48-0-2

SCHEME : MATUNO-2R

RIVER SYSTEM : CAGAYAN  
STREAM : MATUNO

WATER RESOURCES REGION : 11  
PROVINCE : IFUGAO

COORDINATES : N16-32-34 E120-58-49  
STUDY LEVEL : NEWLY IDENTIFIED  
THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 85.2 (MAIN : 85.2, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-055-NW-  
AVER. BASIN RAINFALL (MM/YR) : 2750. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 4.0 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.64

PONDAGE FULL SUPPLY LEVEL (EL.M) : 803.3 PONDAGE STORAGE VOL. (1000M3) : 41.0  
AVERAGE OPERATING LEVEL (EL.M) : 802.8 ACTIVE STORAGE VOL. (1000M3) : 10.8  
MINIMUM OPERATING LEVEL (EL.M) : 802.4  
DRAWDOWN DEPTH ( M ) : 0.9

MAIN DAM CREST ELEVATION (EL.M) : 803.3 CREST LENGTH ( M ) : 46.6  
(WEIR) WEIR HEIGHT ( M ) : 6.3 WEIR CONCRETE VOL. (1000 M3) : 5.0

WATERWAY HEADRACE : LENGTH ( M ) : 6500.0 DIAMETER (WIDTH) ( M ) : 1.8 NOS. : 1  
PENSTOCK : HORIZONTAL L ( M ) : 560.0 DIAMETER ( M ) : 1.3 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 17.4

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 4.0 AVERAGE NET HEAD ( M ) : 265.6  
/HEAD FIRM DISCHARGE (M3/S) : 0.4 TAILWATER LEVEL (EL.M) : 520.0

POWER INSTALLED CAPACITY (MW) : 8.7 ANNUAL TOTAL ENERGY (GWH) : 44.6  
/ENERGY FIRM POWER (MW) : 0.8 FIRM ENERGY (GWH) : 7.2  
MIN. GUARANTEED POWER (MW) : 0.7 SECONDARY ENERGY (GWH) : 37.4

TRANSMISSION LINE LENGTH (KM) : 17.0 TO : SOLANO FROM : BALUNGAO 69 K V SINGLE CIRCUIT. NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 30.0

CONSTRUCTION COST

TOTAL COST (MIL USD) : 22.4 POWER COST (MIL USD) : 13.0  
TOTAL COST/KW (USD/KW) : 2579.0 TRANSMISSION COST (MIL USD) : 0.9  
TOTAL COST/KWH (USD/KWH) : 1.214 ACCESS ROAD COST (MIL USD) : 8.6

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3169-1  
TECHNICAL COMMENT :



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-22-49-0-1

SCHEME : STA. CRUZ

RIVER SYSTEM : CAGAYAN  
STREAM : STA. CRUZ

WATER RESOURCES REGION : 11  
PROVINCE : N. VIZCAYA

COORDINATES : N16-22-00 E121-02-00  
STUDY LEVEL : UNSCALED  
(PRE-F/S. RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 281.6 (MAIN : 282., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-055-NW-  
AVER. BASIN RAINFALL (MM/YR) : 2309. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 1784.  
AVERAGE DISCHARGE (M3/S) : 9.1 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 69.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.30

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 434.0  
AVERAGE OPERATING LEVEL (EL.M) : 428.0  
MINIMUM OPERATING LEVEL (EL.M) : 415.9  
DRAWDOWN DEPTH (M) : 18.1

GROSS STORAGE VOL. (MIL M3) : 128.9  
ACTIVE STORAGE VOL. (MIL M3) : 86.7  
DEAD STORAGE VOL. (MIL M3) : 40.2  
SEDIMENT VOL. (MIL M3) : 19.7

MAIN DAM CREST ELEVATION (EL.M) : 440.0  
(WEIR) DAM HEIGHT (M) : 52.9

CREST LENGTH (M) : 620.0  
EMBANKMENT VOL. (MIL M3) : 3.26

WATERWAY HEADRACE : LENGTH (M) : 560.0  
PENSTOCK : HORIZONTAL L (M) : 100.0  
DIVERSION : LENGTH (M) : 760.0  
EXCAVATION VOL TOTAL (1000 M3) : 51.0

DIAMETER (WIDTH) (M) : 2.5 NOS. : 1  
DIAMETER (M) : 1.8 NOS. : 1  
DIAMETER (M) : 9.0 NOS. : 1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 7.5  
/HEAD FIRM DISCHARGE (M3/S) : 3.8

AVERAGE NET HEAD (M) : 39.4  
TAILWATER LEVEL (EL.M) : 387.1

POWER INSATLLED CAPACITY (MW) : 2.4  
/ENERGY FIRM POWER (MW) : 1.2  
MIN. GUARANTEED POWER (MW) : 1.6

ANNUAL TOTAL ENERGY (GWH) : 19.5  
FIRM ENERGY (GWH) : 10.7  
SECONDARY ENERGY (GWH) : 8.8

TRANSMISSION LINE LENGTH (KM) : 15.0 TO : SOLANO  
ACCESS ROAD LENGTH (KM) : 0. FROM :

69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST

TOTAL COST (MIL USD) : 73.6  
TOTAL COST/KW (USD/KW) : 30173.4  
TOTAL COST/KWH (USD/KWH) : 5.522

POWER COST (MIL USD) : 72.9  
TRANSMISSION COST (MIL USD) : 0.8  
ACCESS ROAD COST (MIL USD) : 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3269-111  
TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-26-50-0-1  
 COORDINATES : N16-27-56 E121-34-50  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

SCHEME : PINARIPAD

RIVER SYSTEM : CAGAYAN  
 STREAM : ADDALAM

WATER RESOURCES REGION : II  
 PROVINCE : QUIRINO

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 651.1 (MAIN : 851.1, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2250. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 45.3 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.41

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 194.0 GROSS STORAGE VOL. (MIL M3) : 832.2  
 AVERAGE OPERATING LEVEL (EL.M) : 182.9 ACTIVE STORAGE VOL. (MIL M3) : 585.5  
 MINIMUM OPERATING LEVEL (EL.M) : 160.6 DEAD STORAGE VOL. (MIL M3) : 246.7  
 DRAWDOWN DEPTH ( M ) : 33.4 SEDIMENT VOL. (MIL M3) : 59.6

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 200.0 CREST LENGTH ( M ) : 740.0  
 DAM HEIGHT ( M ) : 66.7 EMBANKMENT VOL. (MIL M3) : 6.85

WATERWAY HEADRAGE : LENGTH ( M ) : 480.0 DIAMETER (WIDTH) ( M ) : 5.5 NOS. : 2  
 PENSTOCK : HORIZONT. L ( M ) : 310.0 DIAMETER ( M ) : 4.4 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 920.0 DIAMETER ( M ) : 8.0 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 125.9

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 142.6 AVERAGE NET HEAD ( M ) : 67.0  
 /HEAD FIRM DISCHARGE (M3/S) : 23.8 TAILWATER LEVEL (EL.M) : 113.3

POWER UNSATLLED CAPACITY (MW) : 78.7 ANNUAL TOTAL ENERGY (GWH) : 216.0  
 /ENERGY FIRM POWER (MW) : 13.1 FIRM ENERGY (GWH) : 114.9  
 MIN. GUARANTEED POWER (MW) : 50.0 SECONDARY ENERGY (GWH) : 101.1

TRANSMISSION

LINE LENGTH (KM) : 38.0 TO : SANTIAGO 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 5.0 FROM : PINARIPAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 208.1 POWER COST (MIL USD) : 200.0  
 TOTAL COST/KW (USD/KW) : 2645.9 TRANSMISSION COST (MIL USD) : 6.7  
 TOTAL COST/KWH (USD/KWH) : 1.434 ACCESS ROAD COST (MIL USD) : 1.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3369-111  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-27-51-0-1

SCHEME : DIBULUAN

RIVER SYSTEM : CAGAYAN  
STREAM : DIBULUAN

WATER RESOURCES REGION : 11  
PROVINCE : QUIRINO

COORDINATES : N16-25-56 E121-50-40  
STUDY LEVEL : UNSCALED  
(PRE-F/S. RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 194.7 (MAIN : 195., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
AVER. BASIN RAINFALL (MM/YR) : 2783. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
AVERAGE DISCHARGE (M3/S) : 13.6 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT

RESERVOIR DEVELOPMENT RATIO : 0.68

RESERVOIR : RESERVOIR  
FULL SUPPLY LEVEL (EL.M) : 321.0  
AVERAGE OPERATING LEVEL (EL.M) : 302.6  
MINIMUM OPERATING LEVEL (EL.M) : 265.9  
DRAWDOWN DEPTH ( M ) : 55.1

GROSS STORAGE VOL. (MIL M3) : 431.1  
ACTIVE STORAGE VOL. (MIL M3) : 292.7  
DEAD STORAGE VOL. (MIL M3) : 138.4  
SEDIMENT VOL. (MIL M3) : 13.6

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 327.0  
DAM HEIGHT ( M ) : 138.7

CREST LENGTH ( M ) : 481.0  
EMBANKMENT VOL. (MIL M3) : 7.06

WATERWAY HEADRAGE : LENGTH ( M ) : 560.0  
PENSTOCK : HORIZONT. L ( M ) : 260.0  
DIVERSION : LENGTH ( M ) : 1200.0  
EXCAVATION VOL TOTAL (1000 M3) : 78.3

DIAMETER (WIDTH) ( M ) : 4.8  
DIAMETER ( M ) : 3.8  
DIAMETER ( M ) : 8.3  
NOS. : 1  
NOS. : 1  
NOS. : 1

DISCHARGE /HEAD PLANT MAX. DISCHARGE (M3/S) : 54.9  
FIRM DISCHARGE (M3/S) : 9.2

AVERAGE NET HEAD ( M ) : 111.1  
TAILWATER LEVEL (EL.M) : 188.3

POWER /ENERGY UNSATLLED CAPACITY (MW) : 50.2  
FIRM POWER (MW) : 8.4  
MIN. GUARANTEED POWER (MW) : 32.0

ANNUAL TOTAL ENERGY (GWH) : 108.3  
FIRM ENERGY (GWH) : 73.3  
SECONDARY ENERGY (GWH) : 34.9

TRANSMISSION

115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

LINE LENGTH (KM) : 57.0 TO : SANTIAGO  
ACCESS ROAD LENGTH (KM) : 18.0 FROM : MINURI

CONSTRUCTION COST

TOTAL COST (MIL USD) : 174.0  
TOTAL COST/KW (USD/KW) : 3462.6  
TOTAL COST/KWH (USD/KWH) : 2.075

POWER COST (MIL USD) : 163.0  
TRANSMISSION COST (MIL USD) : 5.8  
ACCESS ROAD COST (MIL USD) : 5.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3369-11  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-28-52-0-1  
 COORDINATES : N16-13-32 E121-37-31  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

SCHEME : CABINGATAN  
 RIVER SYSTEM : CAGAYAN  
 STREAM : CONWAP

WATER RESOURCES REGION : II  
 PROVINCE : QUIRINO

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 1660.3 (MAIN : 1660., INTER TRANSFER TOTAL : 0.)  
 AVER. BASIN RAINFALL (MM/YR) : 2465. DENUDATION RATE (MM/YR) : 1.4  
 AVERAGE DISCHARGE (M3/S) : 99.7 EVAPORATION RATE (MM/DAY) : 3.5  
 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN  
 TYPE OF DEVELOPMENT : RESERVOIR  
 RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 303.0  
 AVERAGE OPERATING LEVEL (EL.M) : 284.6  
 MINIMUM OPERATING LEVEL (EL.M) : 247.7  
 DRAWDOWN DEPTH ( M ) : 55.3  
 GROSS STORAGE VOL. (MIL M3) : 3153.6  
 ACTIVE STORAGE VOL. (MIL M3) : 2199.9  
 DEAD STORAGE VOL. (MIL M3) : 953.7  
 SEDIMENT VOL. (MIL M3) : 116.2

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 309.0  
 DAM HEIGHT ( M ) : 145.8  
 CREST LENGTH ( M ) : 385.2  
 EMBANKMENT VOL. (MIL M3) : 9.07

WATERWAY HEADRACE : LENGTH ( M ) : 400.0  
 PENSTOCK : HORIZONTAL ( M ) : 140.0  
 DIVERSION : LENGTH ( M ) : 880.0  
 EXCAVATION VOL TOTAL (1000 M3) : 163.8  
 DIAMETER (WIDTH) ( M ) : 6.2  
 DIAMETER ( M ) : 4.7  
 DIAMETER ( M ) : 7.5  
 NOS. : 3  
 NOS. : 3  
 NOS. : 3

DISCHARGE /HEAD PLANT MAX. DISCHARGE (M3/S) : 271.0  
 FIRM DISCHARGE (M3/S) : 67.7  
 AVERAGE NET HEAD ( M ) : 119.0  
 TAILWATER LEVEL (EL.M) : 163.2  
 POWER /ENERGY INSTALLED CAPACITY (MW) : 255.5  
 FIRM POWER (MW) : 66.4  
 MIN. GUARANTEED POWER (MW) : 174.6  
 ANNUAL TOTAL ENERGY (GWH) : 818.6  
 FIRM ENERGY (GWH) : 581.4  
 SECONDARY ENERGY (GWH) : 237.2

TRANSMISSION LINE LENGTH (KM) : 72.0 TO : SANTIAGO  
 ACCESS ROAD LENGTH (KM) : 38.5 FROM : PALASTIAN  
 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 359.2  
 TOTAL COST/KW (USD/KW) : 1353.3  
 TOTAL COST/KWH (USD/KWH) : 0.551  
 POWER COST (MIL USD) : 326.5  
 TRANSMISSION COST (MIL USD) : 21.7  
 ACCESS ROAD COST (MIL USD) : 11.0

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA : MIXED - DENSE POPULATION  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3368-IV 1977  
 TECHNICAL COMMENT : - TOPOGRAPHIC LIMIT +/- EL 310.0 M  
 - SITE GEOLOGY OF WELL BEDDED LIMESTONE SUSCEPTIBLE TO HIGH PERMEABILITY THRU BEDDING PLANE.

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-28-53-0-2

SCHEME : GANIP

WATER RESOURCES REGION : II  
 PROVINCE : QUIRINO

COORDINATES : N16-04-41 E121-20-23  
 STUDY LEVEL : NEWLY IDENTIFIED THROUGH LRPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 114.7 (MAIN : 115. INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2250. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 6.1 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.66

PONDAGE FULL SUPPLY LEVEL (EL.M) : 706.4 PONDAGE STORAGE VOL. (1000M3) : 85.8  
 AVERAGE OPERATING LEVEL (EL.M) : 706.1 ACTIVE STORAGE VOL. (1000M3) : 17.2  
 MINIMUM OPERATING LEVEL (EL.M) : 705.7  
 DRAWDOWN DEPTH (M) : 0.7

MAIN DAM CREST ELEVATION (EL.M) : 706.4 (M) : 43.4  
 WEIR HEIGHT (M) : 6.4 WEIR CONCRETE VOL. (1000 M3) : 4.9

WATERWAY HEADRACE : LENGTH (M) : 3000.0 DIAMETER (WIDTH) (M) : 2.1 NOS. : 1  
 PENSTOCK : HORIZONTAL (M) : 350.0 DIAMETER (M) : 1.6 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 11.1

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 6.1 AVERAGE NET HEAD (M) : 157.0  
 /HEAD FIRM DISCHARGE (M3/S) : 0.6 TAILWATER LEVEL (EL.M) : 540.0

POWER INSATLLED CAPACITY (MW) : 7.9 ANNUAL TOTAL ENERGY (GWH) : 41.5  
 FIRM POWER (MW) : 0.8 FIRM ENERGY (GWH) : 6.8  
 MIN. GUARANTEED POWER (MW) : 0.7 SECONDARY ENERGY (GWH) : 34.8

TRANSMISSION LINE LENGTH (KM) : 59.0 TO : SOLANO 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 49.0 FROM : FROM NEAREST PUBLIC ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 26.1 POWER COST (MIL USD) : 10.0  
 TOTAL COST/KW (USD/KW) : 3307.8 TRANSMISSION COST (MIL USD) : 2.1  
 TOTAL COST/KWH (USD/KWH) : 1.515 ACCESS ROAD COST (MIL USD) : 14.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3268-11  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME : DAKGAN  
 RIVER SYSTEM : CAGAYAN  
 STREAM : CASECINAN  
 WATER RESOURCES REGION : II  
 PROVINCE : QUIRINO  
 COORDINATES : N16-03-04 E121-27-31  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)  
 SCHEME ID : Z-008-29-54-0-1

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 731.4 (MAIN : 731.4 INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2334. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 40.9 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER.DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.75  
 RESERVOIR FULL SUPPLY LEVEL (EL.M) : 433.0 GROSS STORAGE VOL. (MIL M3) : 1278.7  
 AVERAGE OPERATING LEVEL (EL.M) : 413.2 ACTIVE STORAGE VOL. (MIL M3) : 966.5  
 MINIMUM OPERATING LEVEL (EL.M) : 373.5 DEAD STORAGE VOL. (MIL M3) : 312.2  
 DRAWDOWN DEPTH ( M ) : 59.5 SEDIMENT VOL. (MIL M3) : 51.2  
 MAIN DAM CREST ELEVATION (EL.M) : 439.0 CREST LENGTH ( M ) : 599.1  
 (WEIR) DAM HEIGHT ( M ) : 148.1 EMBANKMENT VOL. (MIL M3) : 14.81  
 WATERWAY HEADRACE : LENGTH ( M ) : 300.0 DIAMETER (WIDTH) ( M ) : 6.0 NOS. : 2  
 PENSTOCK : HORIZONT. L ( M ) : 150.0 DIAMETER ( M ) : 4.6 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 630.0 DIAMETER ( M ) : 7.8 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 83.0

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 171.1 AVERAGE NET HEAD ( M ) : 119.9  
 FIRM DISCHARGE (M3/S) : 28.5 TAILWATER LEVEL (EL.M) : 290.9  
 POWER INSTALLED CAPACITY (MW) : 169.0 ANNUAL TOTAL ENERGY (GWH) : 350.3  
 FIRM POWER (MW) : 28.2 FIRM ENERGY (GWH) : 246.7  
 MIN.GUARANTEED POWER (MW) : 107.7 SECONDARY ENERGY (GWH) : 103.6

TRANSMISSION LINE LENGTH (KM) : 55.0 TO : MUNOS(VIA PANTABANGAN) 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 23.5 FROM : NAYA

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 330.4 POWER COST (MIL USD) : 314.6  
 TOTAL COST/KW (USD/KW) : 1955.6 TRANSMISSION COST (MIL USD) : 9.1  
 TOTAL COST/KWH (USD/KWH) : 1.190 ACCESS ROAD COST (MIL USD) : 6.7

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3268-111  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-29-55-0-1

SCHEME : MADDELA

RIVER SYSTEM : CAGAYAN  
STREAM : TABOYONG

WATER RESOURCES REGION : II  
PROVINCE : QUIRINO

COORDINATES : N16-01-04 E121-27-33  
STUDY LEVEL : UNSCALED  
(PRE-F/S, RECONVAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 126.2 (MAIN : 126.2, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
AVER. BASIN RAINFALL (MM/YR) : 2500. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
AVERAGE DISCHARGE (M3/S) : 7.7 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.64

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 474.7 GROSS STORAGE VOL. (MIL M3) : 193.9  
AVERAGE OPERATING LEVEL (EL.M) : 455.6 ACTIVE STORAGE VOL. (MIL M3) : 155.7  
MINIMUM OPERATING LEVEL (EL.M) : 417.2 DEAD STORAGE VOL. (MIL M3) : 38.2  
DRAWDOWN DEPTH (M) : 57.6 SEDIMENT VOL. (MIL M3) : 8.8

MAIN DAM CREST ELEVATION (EL.M) : 480.7 CREST LENGTH (M) : 583.3  
(WEIR) DAM HEIGHT (M) : 140.7 EMBANKMENT VOL. (MIL M3) : 10.05

WATERWAY HEADRACE : LENGTH (M) : 750.0 DIAMETER (WIDTH) (M) : 2.5 NOS. : 1  
PENSTOCK : HORIZONT. L (M) : 230.0 DIAMETER (M) : 1.9 NOS. : 1  
DIVERSION : LENGTH (M) : 1280.0 DIAMETER (M) : 7.6 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 61.8

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 10.1 AVERAGE NET HEAD (M) : 111.7  
/HEAD FIRM DISCHARGE (M3/S) : 5.0 TAILWATER LEVEL (EL.M) : 340.0

POWER INSTALLED CAPACITY (MW) : 9.3 ANNUAL TOTAL ENERGY (GWH) : 53.2  
/ENERGY FIRM POWER (MW) : 4.6 FIRM ENERGY (GWH) : 40.6  
MIN. GUARANTEED POWER (MW) : 5.8 SECONDARY ENERGY (GWH) : 12.6

TRANSMISSION LINE LENGTH (KM) : 54.0 TO : MUNOS(VIA PANTABANGAN) 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 25.5 FROM : NAYA

CONSTRUCTION COST

TOTAL COST (MIL USD) : 179.6 POWER COST (MIL USD) : 170.4  
TOTAL COST/KW (USD/KWH) : 19359.9 TRANSMISSION COST (MIL USD) : 2.0  
TOTAL COST/KWH (USD/KWH) : 4.044 ACCESS ROAD COST (MIL USD) : 7.3

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
SUBMERGED ROAD :  
MAP USED (1:50,000 SCALE) : 3268-11  
TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME : KAGIPSIPAN  
 RIVER SYSTEM : CAGAYAN  
 STREAM : CASECNAV  
 WATER RESOURCES REGION : II  
 PROVINCE : N.VIZCAYA  
 COORDINATES : N16-01-29 E121-22-43  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S, RECONNAISSANCE)

SCHEME ID : 2-008-29-56-0-1

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 608.7 (MAIN : 609.. INTER TRANSFER TOTAL : 0.)  
 AVER. BASIN RAINFALL (MM/YR) : 2270. DENUDATION RATE (MM/YR) : 1.4  
 AVERAGE DISCHARGE (M3/S) : 32.8 EVAPORATION RATE (MM/DAY) : 3.5  
 STREAM GAGE ID : 4-2-044-NW-244  
 GAGE CATCHMENT (KM2) : 4244.  
 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 525.0 GROSS STORAGE VOL. (MIL M3) : 1042.2  
 AVERAGE OPERATING LEVEL (EL.M) : 503.6 ACTIVE STORAGE VOL. (MIL M3) : 775.1  
 MINIMUM OPERATING LEVEL (EL.M) : 480.7 DEAD STORAGE VOL. (MIL M3) : 267.1  
 DRAWDOWN DEPTH ( M ) : 64.3 SEDIMENT VOL. (MIL M3) : 42.5

MAIN DAM CREST ELEVATION (EL.M) : 531.0 CREST LENGTH ( M ) : 474.3  
 (WEIR) DAM HEIGHT ( M ) : 171.0 EMBANKMENT VOL. (MIL M3) : 14.69

WATERWAY HEADRAGE : LENGTH ( M ) : 770.0 DIAMETER (WIDTH) ( M ) : 5.4  
 PENSTOCK : HORIZONT. L ( M ) : 240.0 DIAMETER ( M ) : 4.2  
 DIVERSTION : LENGTH ( M ) : 1580.0 DIAMETER ( M ) : 7.5  
 EXCAVATION VOL TOTAL (1000 M3) : 181.7 NOS. : 2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 137.5 AVERAGE NET HEAD ( M ) : 139.9  
 /HEAD FIRM DISCHARGE (M3/S) : 22.9 TAILWATER LEVEL (EL.M) : 360.0

POWER UNSATLLED CAPACITY (MW) : 158.4 ANNUAL TOTAL ENERGY (GWH) : 326.7  
 /ENERGY FIRM POWER (MW) : 25.4 FIRM ENERGY (GWH) : 231.2  
 MIN. GUARANTEED POWER (MW) : 104.6 SECONDARY ENERGY (GWH) : 95.5

TRANSMISSION LINE LENGTH (KM) : 70.0 TO : SOLANO NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 7.5 FROM : NAYA 230 K V DOUBLE CIRCUIT

CONSTRUCTION COST

TOTAL COST (MIL USD) : 345.6 POWER COST (MIL USD) : 332.1  
 TOTAL COST/KW (USD/KW) : 2182.0 TRANSMISSION COST (MIL USD) : 11.3  
 TOTAL COST/KWH (USD/KWH) : 1.330 ACCESS ROAD COST (MIL USD) : 2.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3268-11  
 TECHNICAL COMMENT :



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME : GADENG  
 RIVER SYSTEM : CAGAYAN  
 STREAM : CASECVAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : N.VIZCAYA  
 COORDINATES : N16-01-30 E121-20-54  
 STUDY LEVEL : UNSCALED  
 (PRE-F/S.RECONNAISSANCE)

SCHEME ID : 2-008-29-57-0-1

HYDRO/TOPO. INFORMATION  
 CATCHMENT AREA (KM2) : 576.0 (MAIN) : 576.0 INTER TRANSFER TOTAL : 0.0 STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2289.0 DEHURATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 31.0 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER.DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.70  
 RESERVOIR FULL SUPPLY LEVEL (EL.M) : 555.0 GROSS STORAGE VOL. (MIL M3) : 969.3  
 AVERAGE OPERATING LEVEL (EL.M) : 535.8 ACTIVE STORAGE VOL. (MIL M3) : 684.2  
 MINIMUM OPERATING LEVEL (EL.M) : 497.5 DEAD STORAGE VOL. (MIL M3) : 285.1  
 DRAWDOWN DEPTH ( M ) : 57.5 SEDIMENT VOL. (MIL M3) : 40.3  
 MAIN DAM CREST ELEVATION (EL.M) : 561.0 CREST LENGTH ( M ) : 720.6  
 (WEIR) DAM HEIGHT ( M ) : 161.4 EMBANKMENT VOL. (MIL M3) : 19.84  
 WATERWAY HEADRACE : LENGTH ( M ) : 290.0 DIAMETER (WIDTH) ( M ) : 5.2 NOS. : 2  
 PENSTOCK : HORIZONT. L ( M ) : 270.0 DIAMETER ( M ) : 4.0 NOS. : 2  
 DIVERSION : LENGTH ( M ) : 1010.0 DIAMETER ( M ) : 7.4 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 106.8  
 DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 126.5 AVERAGE NET HEAD ( M ) : 133.0  
 /HEAD FIRM DISCHARGE (M3/S) : 21.1 TAILWATER LEVEL (EL.M) : 399.6

POWER /ENERGY INSATLLED CAPACITY (MW) : 138.5 ANNUAL TOTAL ENERGY (GWH) : 292.9  
 FIRM POWER (MW) : 23.1 FIRM ENERGY (GWH) : 202.3  
 MIN.GUARANTEED POWER (MW) : 94.0 SECONDARY ENERGY (GWH) : 90.6  
 TRANSMISSION LINE LENGTH (KM) : 69.0 TO : SOLANO NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 2.5 FROM : NAYA

CONSTRUCTION COST  
 TOTAL COST (MIL USD) : 369.0 POWER COST (MIL USD) : 357.2  
 TOTAL COST/KW (USD/KW) : 2653.6 TRANSMISSION COST (MIL USD) : 11.2  
 TOTAL COST/KWH (USD/KWH) : 1.608 ACCESS ROAD COST (MIL USD) : 0.7

OTHER INFORMATION  
 LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3268-11  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-29-58-0-2

SCHEME : CASECMAN

WATER RESOURCES REGION : II  
 PROVINCE : QUIRINO

RIVER SYSTEM : CAGAYAN  
 STREAM : CASIGNAN

COORDINATES : N16-03-21 E121-16-45  
 STUDY LEVEL : NEWLY IDENTIFIED  
 THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 286.4 (MAIN : 286.4, INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2250. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 15.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.66

PONDAGE FULL SUPPLY LEVEL (EL.M) : 548.2 PONDAGE STORAGE VOL. (1000M3) : 155.7  
 AVERAGE OPERATING LEVEL (EL.M) : 547.5 ACTIVE STORAGE VOL. (1000M3) : 42.9  
 MINIMUM OPERATING LEVEL (EL.M) : 546.8  
 DRAWDOWN DEPTH ( M ) : 1.4

MAIN DAM CREST ELEVATION (EL.M) : 548.2 CREST LENGTH ( M ) : 60.4  
 (WEIR) WEIR HEIGHT ( M ) : 8.2 WEIR CONCRETE VOL. (1000 M3) : 9.2

WATERWAY HEADRAGE : LENGTH ( M ) : 5650.0 DIAMETER (WIDTH) ( M ) : 3.0 NOS. : 1  
 PENSTOCK : HORIZONT. L ( M ) : 205.0 DIAMETER ( M ) : 2.3 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 41.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 15.2 AVERAGE NET HEAD ( M ) : 89.8  
 /HEAD FIRM DISCHARGE (M3/S) : 1.5 TAILWATER LEVEL (EL.M) : 448.0

POWER INSATLLED CAPACITY (MW) : 11.2 ANNUAL TOTAL ENERGY (GWH) : 59.6  
 /ENERGY FIRM POWER (MW) : 1.1 FIRM ENERGY (GWH) : 9.7  
 MIN. GUARANTEED POWER (MW) : 1.0 SECONDARY ENERGY (GWH) : 50.0

TRANSMISSION LINE LENGTH (KM) : 66.0 TO : SOLANO 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 10.0 FROM : INQUEBERGA

CONSTRUCTION COST

TOTAL COST (MIL USD) : 26.0 POWER COST (MIL USD) : 20.8  
 TOTAL COST/KW (USD/KW) : 2309.8 TRANSMISSION COST (MIL USD) : 2.3  
 TOTAL COST/KWH (USD/KWH) : 1.054 ACCESS ROAD COST (MIL USD) : 2.9

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3288-11 1982  
 TECHNICAL COMMENT : MUTUALLY EXCLUSIVE WITH UPPER CASECMAN-3 PLAN

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-008-29-59-0-2

SCHEME : UPPER CASECANAN

RIVER SYSTEM : CAGAYAN  
STREAM : CASIGNAN

WATER RESOURCES REGION : 11  
PROVINCE : QUIRINO

COORDINATES : N16-06-39 E121-15-39  
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO INFORMATION

CATCHMENT AREA (KM2) : 247.0 (MAIN : 247.0 INTER TRANSFER TOTAL : 0.0) STREAM GAGE ID : 4-2-044-NW-244  
AVER. BASIN RAINFALL (MM/YR) : 2250. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
AVERAGE DISCHARGE (M3/S) : 13.1 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER OUTPUT FACTOR : 0.66

PONDAGE FULL SUPPLY LEVEL (EL.M) : 675.0 PONDAGE STORAGE VOL. (1000M3) : 126.1  
AVERAGE OPERATING LEVEL (EL.M) : 674.3 ACTIVE STORAGE VOL. (1000M3) : 37.0  
MINIMUM OPERATING LEVEL (EL.M) : 673.6  
DRAWDOWN DEPTH (M) : 1.5

MAIN DAM CREST ELEVATION (EL.M) : 675.0 CREST LENGTH (M) : 50.1  
(WEIR) WEIR HEIGHT (M) : 8.0 WEIR CONCRETE VOL. (1000 M3) : 7.7

WATERWAY HEADRACE : LENGTH (M) : 6800.0 DIAMETER (WIDTH) (M) : 2.8 NOS. : 1  
PENSTOCK : HORIZONT. L (M) : 200.0 DIAMETER (M) : 2.2 NOS. : 1  
EXCAVATION VOL TOTAL (1000 M3) : 44.2

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 13.1 AVERAGE NET HEAD (M) : 112.7  
/HEAD FIRM DISCHARGE (M3/S) : 1.3 TAILWATER LEVEL (EL.M) : 550.0

POWER UNSATLLED CAPACITY (MW) : 12.2 ANNUAL TOTAL ENERGY (GWH) : 64.5  
/ENERGY FIRM POWER (MW) : 1.2 FIRM ENERGY (GWH) : 10.4  
MIN. GUARANTEED POWER (MW) : 1.1 SECONDARY ENERGY (GWH) : 54.0

TRANSMISSION LINE LENGTH (KM) : 57.6 TO : SOLANO 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
ACCESS ROAD LENGTH (KM) : 17.0 FROM : INQUEBERGA

CONSTRUCTION COST

TOTAL COST (MIL USD) : 28.4 POWER COST (MIL USD) : 21.5  
TOTAL COST/KW (USD/KW) : 2335.3 TRANSMISSION COST (MIL USD) : 2.1  
TOTAL COST/KWH (USD/KWH) : 1.067 ACCESS ROAD COST (MIL USD) : 4.8

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
SUBMERGED ROAD : NONE  
MAP USED (1:50,000 SCALE) : 3268-11 1982  
TECHNICAL COMMENT : - MUTUALLY EXCLUSIVE WITH UPPER CASECANAN-3 PLAN

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-29-60-0-1

SCHEME : UPPER CASECANAN-2

RIVER SYSTEM : CAGAYAN WATER RESOURCES REGION : II COORDINATES : N16-06-45 E121-15-28  
 STREAM : CASIGNAN PROVINCE : QUIRINO STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 243.0 (MAIN : 243., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2250. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 12.9 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.95

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 795.0 GROSS STORAGE VOL. (MIL M3) : 411.9  
 AVERAGE OPERATING LEVEL (EL.M) : 774.0 ACTIVE STORAGE VOL. (MIL M3) : 386.7  
 MINIMUM OPERATING LEVEL (EL.M) : 731.9 DEAD STORAGE VOL. (MIL M3) : 25.2  
 DRAWDOWN DEPTH ( M ) : 63.1 SEDIMENT VOL. (MIL M3) : 17.0

MAIN DAM CREST ELEVATION (EL.M) : 801.0 CREST LENGTH ( M ) : 423.0  
 DAM HEIGHT ( M ) : 121.0 EMBANKMENT VOL. (MIL M3) : 6.75

WATERWAY HEADRACE : LENGTH ( M ) : 8100.0 DIAMETER (WIDTH) ( M ) : 4.1 NOS. : 1  
 PENSTOCK : HORIZONTAL L ( M ) : 375.0 DIAMETER ( M ) : 3.2 NOS. : 1  
 DIVERSION : LENGTH ( M ) : 720.0 DIAMETER ( M ) : 8.7 NOS. : 1  
 EXCAVATION VOL TOTAL (1000 M3) : 153.6

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 39.8 AVERAGE NET HEAD ( M ) : 195.2  
 /HEAD FIRM DISCHARGE (M3/S) : 9.9 TAILWATER LEVEL (EL.M) : 560.0

POWER UNSATLLED CAPACITY (MW) : 64.0 ANNUAL TOTAL ENERGY (GWH) : 174.9  
 FIRM POWER (MW) : 16.0 FIRM ENERGY (GWH) : 140.1  
 MIN. GUARANTEED POWER (MW) : 47.8 SECONDARY ENERGY (GWH) : 34.9

TRANSMISSION LINE LENGTH (KM) : 51.0 TO : SOLANO 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2  
 ACCESS ROAD LENGTH (KM) : 12.0 FROM : MALASIN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 194.8 POWER COST (MIL USD) : 136.1  
 TOTAL COST/KW (USD/KW) : 3045.8 TRANSMISSION COST (MIL USD) : 5.3  
 TOTAL COST/KWH (USD/KWH) : 1.294 ACCESS ROAD COST (MIL USD) : 3.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3268-11  
 TECHNICAL COMMENT :

I N V E N T O R Y   O F   H Y D R O P O W E R   S I T E S

SCHEME ID : 2-008-29-61-0-1

SCHEME : UPPER CASECINAN-3

RIVER SYSTEM : CAGAYAN  
 STREAM : CASIGUAN  
 WATER RESOURCES REGION : 11  
 PROVINCE : QUIRINO  
 COORDINATES : N16-08-09 E121-14-34  
 STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 172.1 (MAIN : 172., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-044-NW-244  
 AVER. BASIN RAINFALL (MM/YR) : 2250. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 4244.  
 AVERAGE DISCHARGE (M3/S) : 9.2 EVAPORATION RATE (MM/DAY) : 3.0 GAGE AVER. DISCHARGE (M3/S) : 250.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.91

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 796.0  
 AVERAGE OPERATING LEVEL (EL.M) : 782.9  
 MINIMUM OPERATING LEVEL (EL.M) : 755.6  
 DRAWDOWN DEPTH ( M ) : 39.4

GROSS STORAGE VOL. (MIL M3) : 287.3  
 ACTIVE STORAGE VOL. (MIL M3) : 263.3  
 DEAD STORAGE VOL. (MIL M3) : 24.0  
 SEDIMENT VOL. (MIL M3) : 12.0

MAIN DAM (WEIR) CREST ELEVATION (EL.M) : 802.0  
 DAM HEIGHT ( M ) : 85.0

CREST LENGTH ( M ) : 406.7  
 EMBANKMENT VOL. (MIL M3) : 4.09

WATERWAY HEADRACE : LENGTH ( M ) : 12850.0  
 PENSTOCK : HORIZONTAL L ( M ) : 1350.0  
 DIVERSION : LENGTH ( M ) : 700.0  
 EXCAVATION VOL TOTAL (1000 M3) : 161.6

DIAMETER (WIDTH) ( M ) : 3.4  
 DIAMETER ( M ) : 2.7  
 DIAMETER ( M ) : 3.1

NOS. : 1  
 NOS. : 1  
 NOS. : 1

DISCHARGE /HEAD PLANT MAX. DISCHARGE (M3/S) : 27.4  
 FIRM DISCHARGE (M3/S) : 6.8

AVERAGE NET HEAD ( M ) : 310.2  
 TAILWATER LEVEL (EL.M) : 430.0

POWER /ENERGY INSATLLED CAPACITY (MW) : 70.0  
 FIRM POWER (MW) : 17.5  
 MIN. GUARANTEED POWER (MW) : 61.0

ANNUAL TOTAL ENERGY (GWH) : 193.6  
 FIRM ENERGY (GWH) : 153.2  
 SECONDARY ENERGY (GWH) : 40.4

TRANSMISSION LINE LENGTH (KM) : 48.0 TO : SOLANO

115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 37.0 FROM : CAMAY, MALASIN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 179.9  
 TOTAL COST/KW (USD/KWH) : 2571.7  
 TOTAL COST/KWH (USD/KWH) : 1.038

POWER COST (MIL USD) : 164.3  
 TRANSMISSION COST (MIL USD) : 5.0  
 ACCESS ROAD COST (MIL USD) : 10.5

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION  
 SUBMERGED ROAD : NONE  
 MAP USED (1:50,000 SCALE) : 3268-111 1979  
 TECHNICAL COMMENT : - SITE GEOLOGY ASSUMED TO BE AFFECTED BY FAULTS  
 - ADAPTABILITY OF THE PLAN DEPENDS ON WATER BALANCE OF PROPOSED CASECINAN TRANS BASINS PLAN.  
 - NO PROCEEDING PLAN TO 2ND SCREENING WITHOUT ANY EFFECT UPON WATER BALANCE OF CTBP



I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-039-00-01-0-1

SCHEME : DIKATAYAN

RIVER SYSTEM : DIKATAYAN WATER RESOURCES REGION : 11 COORDINATES : N17-28-13 E122-09-52  
 STREAM : DIKATAYAN PROVINCE : ISABELA STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 222.2 (MAIN) : 222., INTER TRANSFER TOTAL : 0. STREAM GAGE ID : 4-2-020-NW-225  
 AVER. BASIN RAINFALL (MM/YR) : 4440. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 655.  
 AVERAGE DISCHARGE (M3/S) : 26.2 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 51.5

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 166.0 GROSS STORAGE VOL. (MIL M3) : 822.3 NOS. : 2  
 AVERAGE OPERATING LEVEL (EL.M) : 147.0 ACTIVE STORAGE VOL. (MIL M3) : 578.0 NOS. : 2  
 MINIMUM OPERATING LEVEL (EL.M) : 108.9 DEAD STORAGE VOL. (MIL M3) : 244.3 NOS. : 1  
 DRAWDOWN DEPTH (M) : 57.1 SEDIMENT VOL. (MIL M3) : 15.6  
 MAIN DAM CREST ELEVATION (EL.M) : 172.0 CREST LENGTH (M) : 596.0  
 (WEIR) DAM HEIGHT (M) : 157.0 EMBANKMENT VOL. (MIL M3) : 14.17  
 WATERWAY HEADRACE : LENGTH (M) : 550.0 DIAMETER (WIDTH) (M) : 4.8  
 PENSTOCK : HORIZONT. L (M) : 220.0 DIAMETER (M) : 3.8  
 DIVERSION : LENGTH (M) : 950.0 DIAMETER (M) : 8.5  
 EXCAVATION VOL TOTAL (1000 M3) : 80.5

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 110.9 AVERAGE NET HEAD (M) : 128.6  
 /HEAD FIRM DISCHARGE (M3/S) : 18.5 TAILWATER LEVEL (EL.M) : 15.0  
 POWER INSATLLED CAPACITY (MW) : 117.5 ANNUAL TOTAL ENERGY (GWH) : 239.8  
 /ENERGY FIRM POWER (MW) : 19.6 FIRM ENERGY (GWH) : 171.5  
 MIN. GUARANTEED POWER (MW) : 78.8 SECONDARY ENERGY (GWH) : 68.3

TRANSMISSION LINE LENGTH (KM) : 27.0 TO : TUGUEGARAO 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 10.0 FROM : FROM NEAREST PUBLIC ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD) : 286.6 POWER COST (MIL USD) : 278.7  
 TOTAL COST/KW (USD/KW) : 2439.8 TRANSMISSION COST (MIL USD) : 5.1  
 TOTAL COST/KWH (USD/KWH) : 1.493 ACCESS ROAD COST (MIL USD) : 2.9

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3472-111  
 TECHNICAL COMMENT :

I N V E N T O R Y O F H Y D R O P O W E R S I T E S

SCHEME ID : 2-047-00-01-0-1

SCHEME : PALANAN

RIVER SYSTEM : PALANAN  
 STREAM : PINACANAUAN  
 WATER RESOURCES REGION : II  
 PROVINCE : ISABELA  
 COORDINATES : N16-55-15 E122-23-50  
 STUDY LEVEL : IDENTIFIED  
 IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 358.0 (MAIN : 358., INTER TRANSFER TOTAL : 0.) STREAM GAGE ID : 4-2-063-NP-  
 AVER. BASIN RAINFALL (MM/YR) : 3000. DENUDATION RATE (MM/YR) : 1.4 GAGE CATCHMENT (KM2) : 874.  
 AVERAGE DISCHARGE (M3/S) : 19.4 EVAPORATION RATE (MM/DAY) : 3.5 GAGE AVER. DISCHARGE (M3/S) : 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR RESERVOIR DEVELOPMENT RATIO : 0.18

RESERVOIR FULL SUPPLY LEVEL (EL.M) : 94.0 GROSS STORAGE VOL. (MIL M3) : 153.3  
 AVERAGE OPERATING LEVEL (EL.M) : 86.9 ACTIVE STORAGE VOL. (MIL M3) : 103.2  
 MINIMUM OPERATING LEVEL (EL.M) : 72.6 DEAD STORAGE VOL. (MIL M3) : 50.2  
 DRAWDOWN DEPTH (M) : 21.4 SEDIMENT VOL. (MIL M3) : 25.1

MAIN DAM CREST ELEVATION (EL.M) : 100.0 CREST LENGTH (M) : 250.0  
 (WEIR) DAM HEIGHT (M) : 65.0 EMBANKMENT VOL. (MIL M3) : 1.04

WATERWAY HEADRACE : LENGTH (M) : 500.0 DIAMETER (WIDTH) (M) : 4.9 NOS. : 1  
 PENSTOCK : HORIZONT. L (M) : 80.0 DIAMETER (M) : 4.0 NOS. : 1  
 DIVERSION : LENGTH (M) : 610.0 DIAMETER (M) : 6.7 NOS. : 2  
 EXCAVATION VOL TOTAL (1000 M3) : 53.3

DISCHARGE PLANT MAX. DISCHARGE (M3/S) : 56.4 AVERAGE NET HEAD (M) : 50.3  
 FIRM DISCHARGE (M3/S) : 9.4 TAILWATER LEVEL (EL.M) : 35.0

POWER INSTALLED CAPACITY (MW) : 23.4 ANNUAL TOTAL ENERGY (GWH) : 65.2  
 FIRM POWER (MW) : 3.9 FIRM ENERGY (GWH) : 34.1  
 MIN. GUARANTEED POWER (MW) : 15.9 SECONDARY ENERGY (GWH) : 31.1

TRANSMISSION LINE LENGTH (KM) : 68.0 TO : ILAGAN 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1  
 ACCESS ROAD LENGTH (KM) : 27.0 FROM : PALANAN

CONSTRUCTION COST

TOTAL COST (MIL USD) : 73.4 POWER COST (MIL USD) : 63.4  
 TOTAL COST/KW (USD/KW) : 3143.9 TRANSMISSION COST (MIL USD) : 2.4  
 TOTAL COST/KWH (USD/KWH) : 1.691 ACCESS ROAD COST (MIL USD) : 7.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :  
 SUBMERGED ROAD :  
 MAP USED (1:50,000 SCALE) : 3470-1  
 TECHNICAL COMMENT :