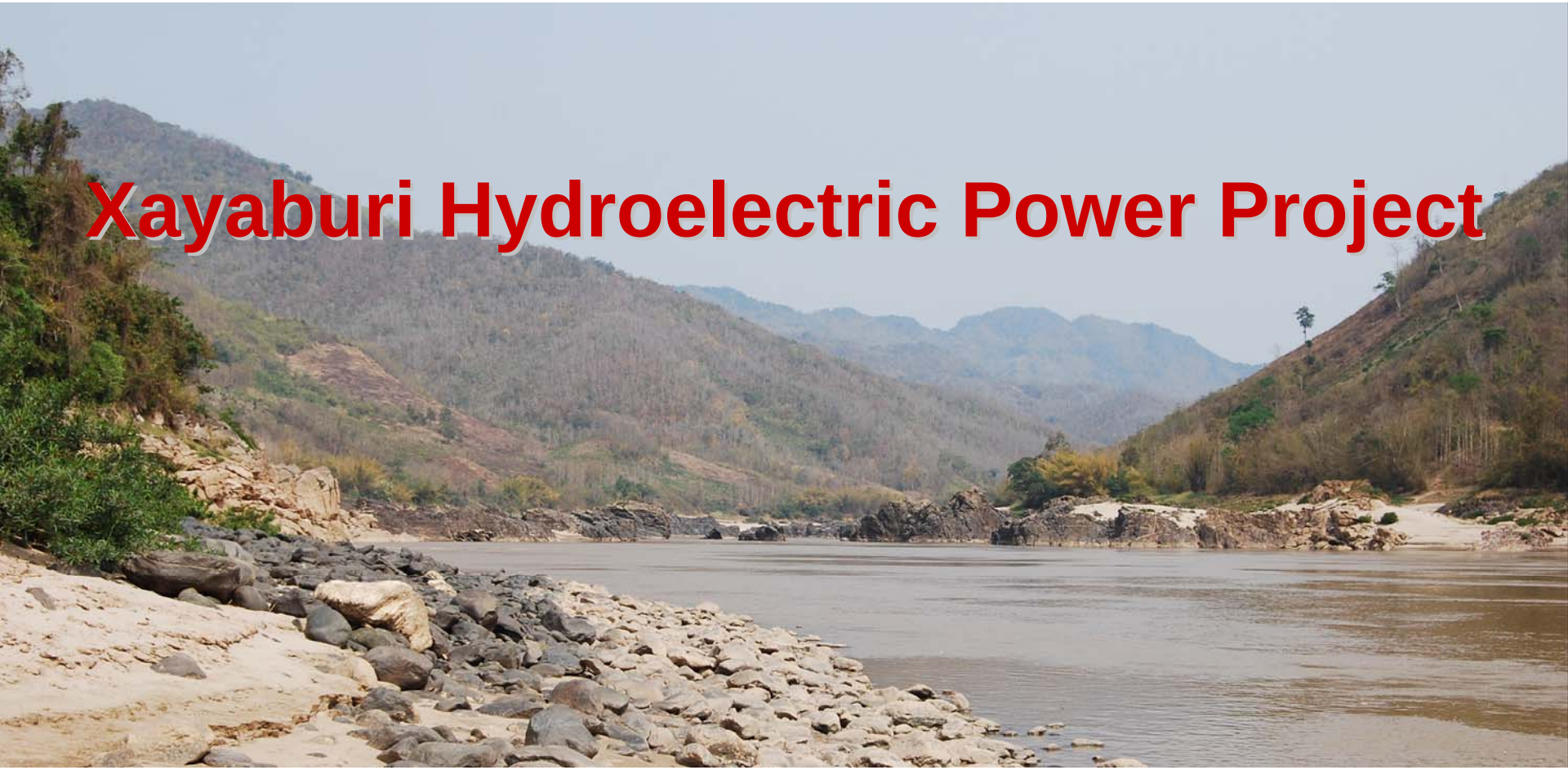
The MRC Regional Workshop

on Discharge and Sediment Monitoring and Geomorphological Tool for the Lower-Mekong Basin, 21-22 October 2008



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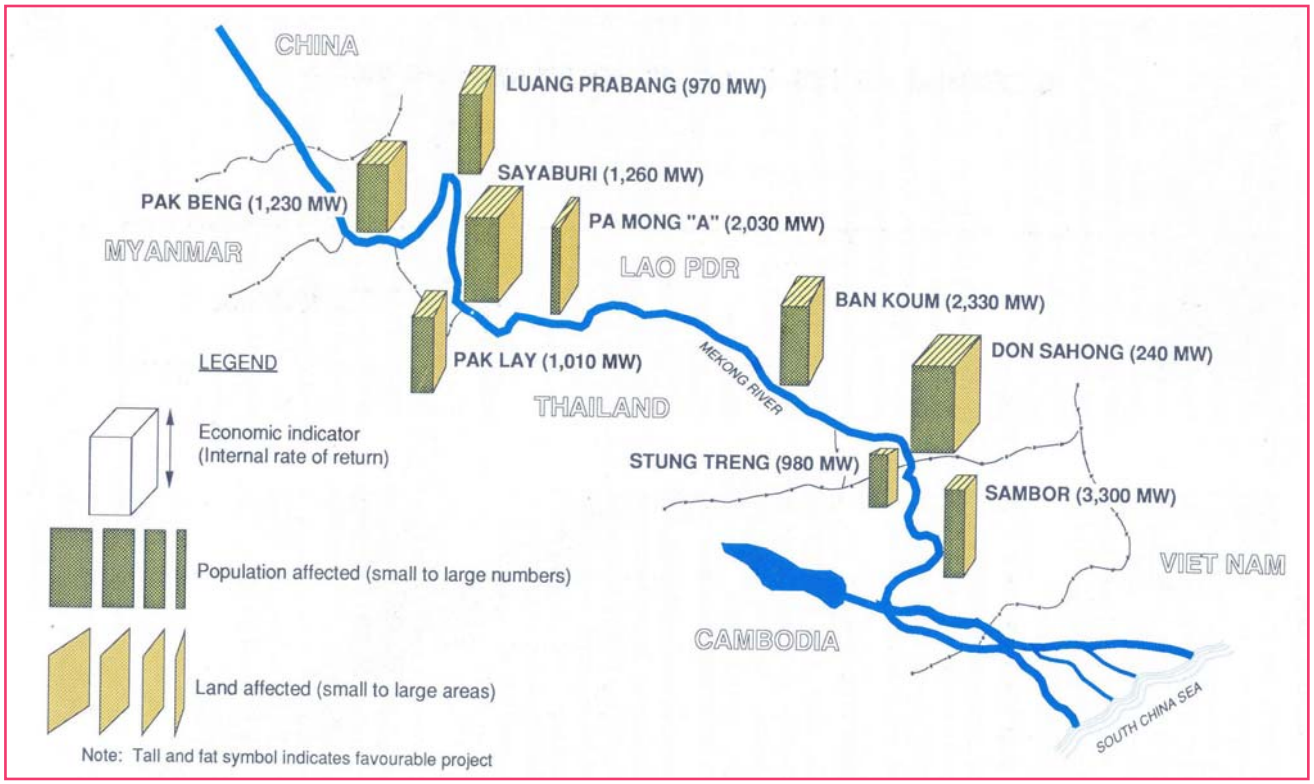
BACKGROUND

MEKONG HYDROPOWER CASCADE

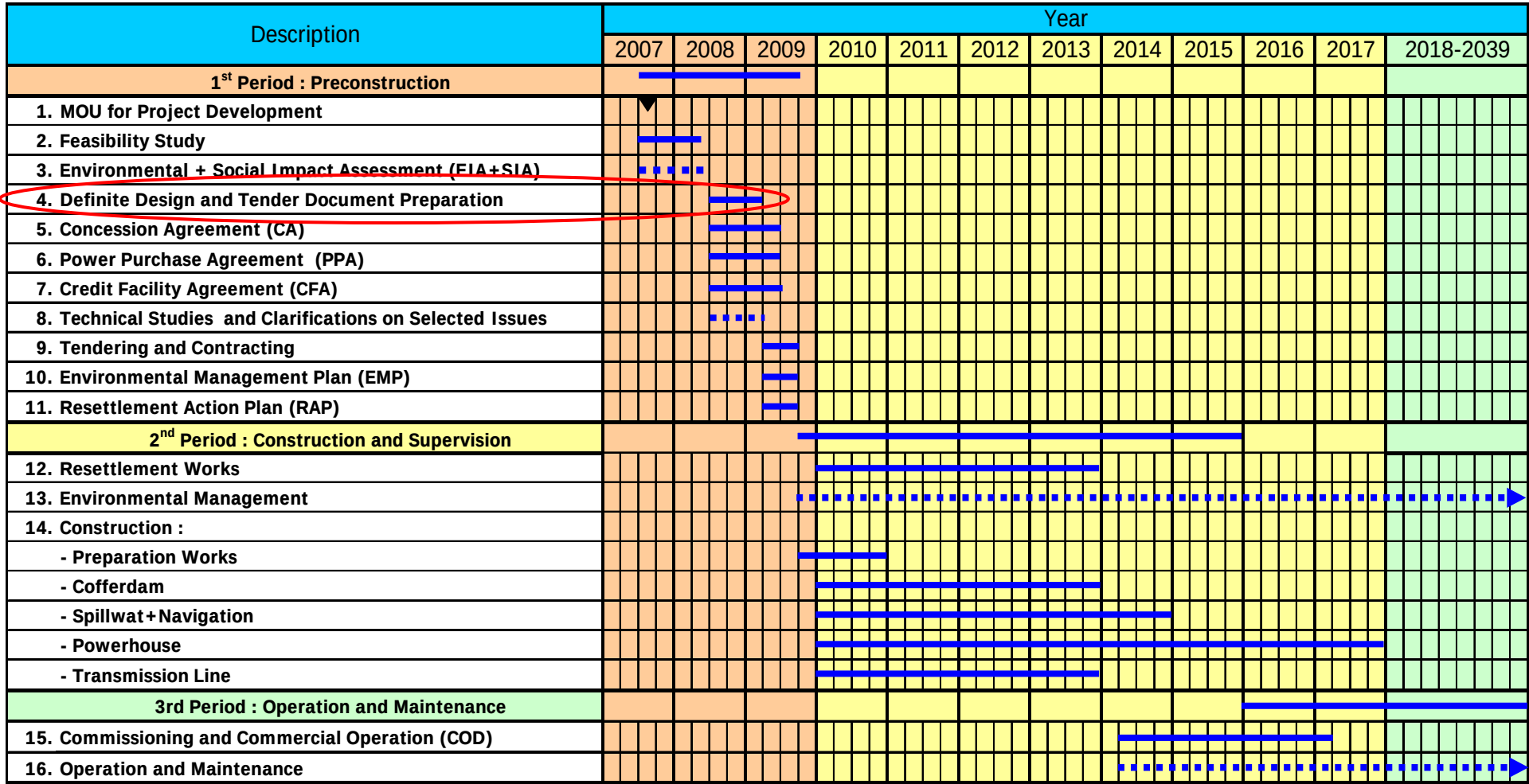


- **Lower Mekong Basin has high potential for Water Resources and Hydropower Development**
- **MRC Study on the Mekong Mainstream Run-of-River Hydropower in 1994**
- **12 Projects from Chiang Saen to Tonle Sap**
- **9 Sites are found promising, Xayaburi is one of them**

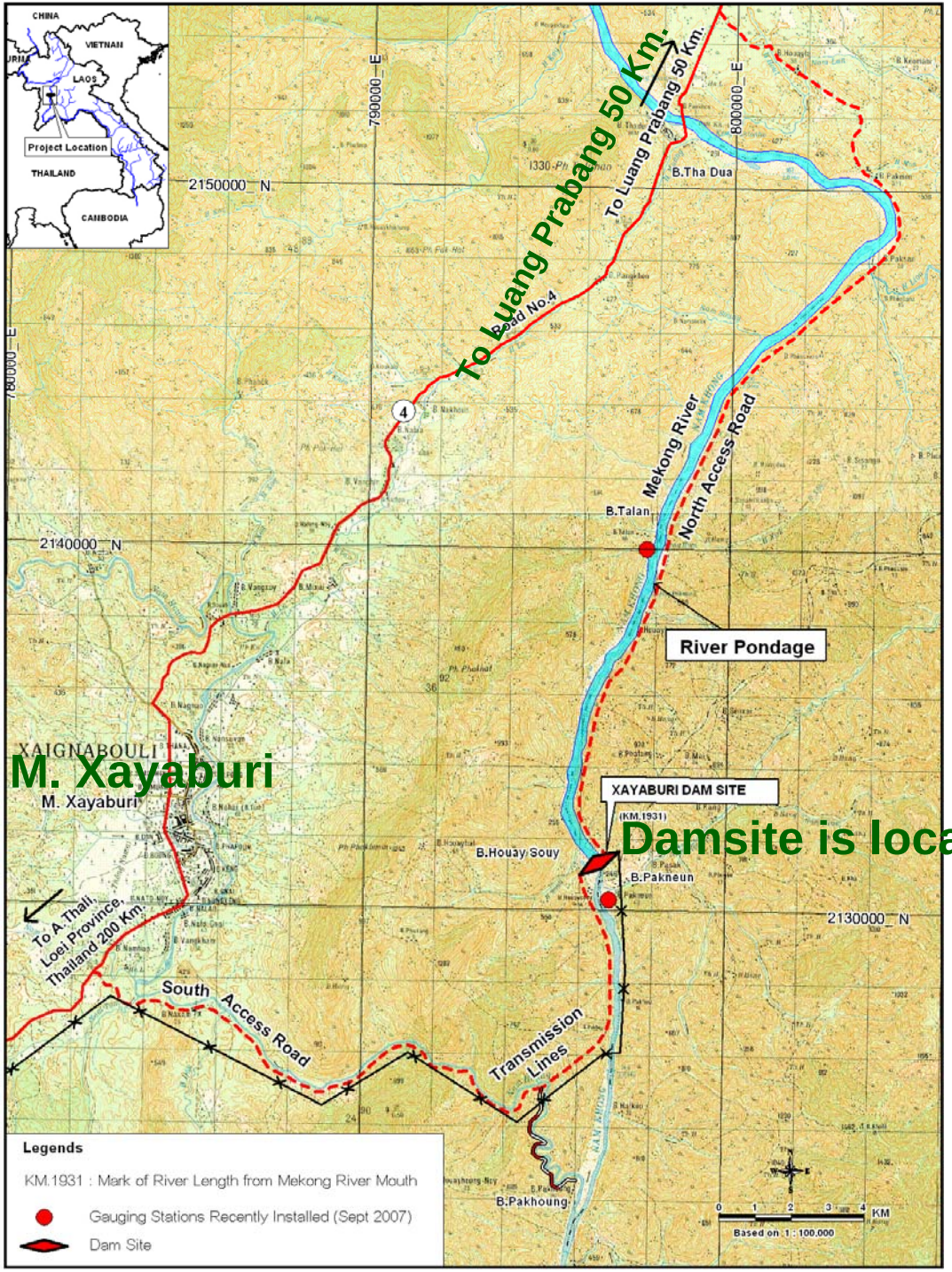
CK and Lao PDR signed MOU on 4 May 2007

Feasibility Study Completed on June 2008

Preparing for Tender Design in 2009



Location of Xayaburi HPP



M. Xayaburi

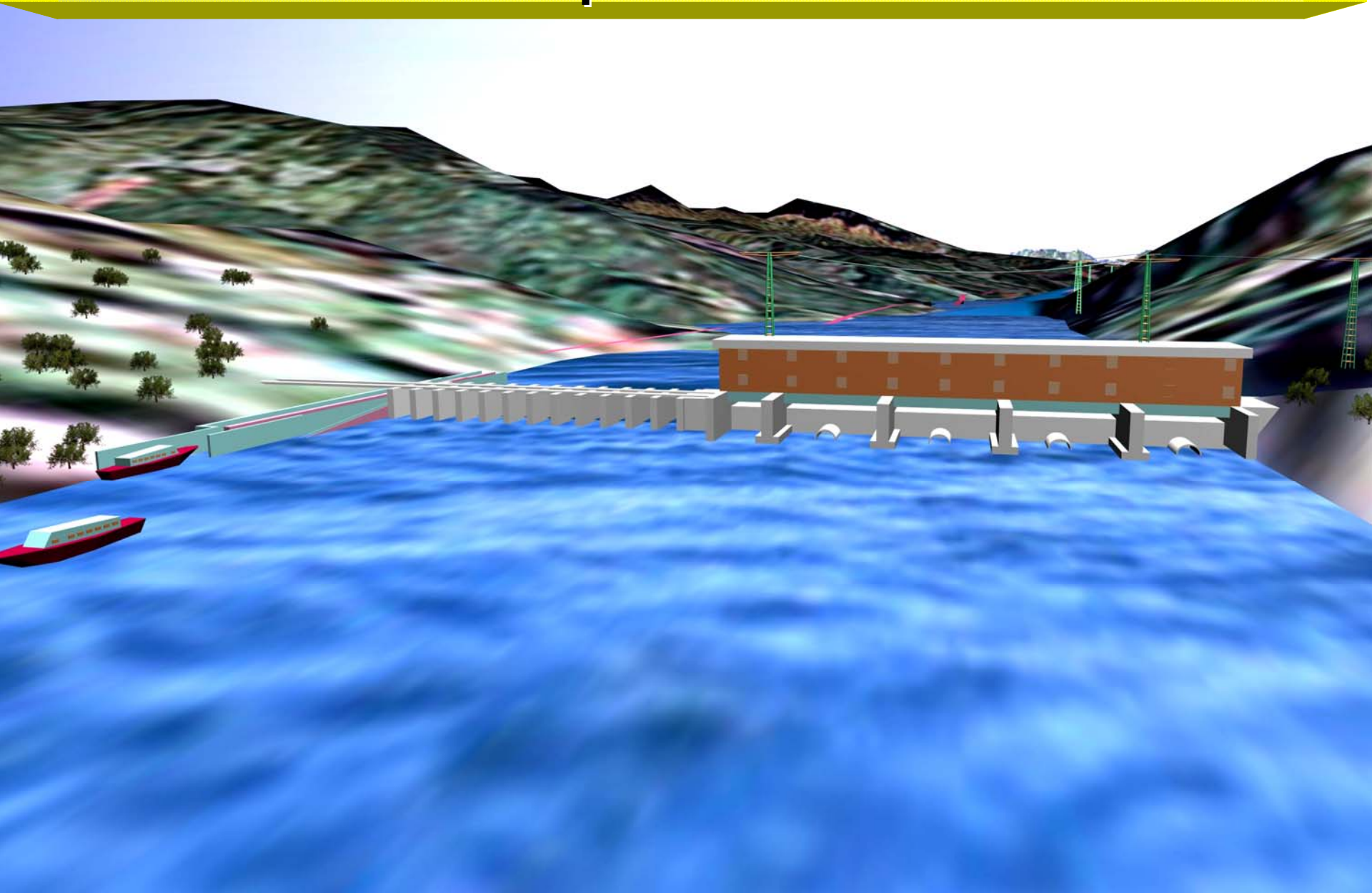
Damsite is located at KM. 1931

Main Features of Xayaburi Project

Catchment area (sq. km):	272,000
Average inflow (m3/sec):	3,980
Normal operating water level (NWL above MSL):	275
Pond area (sq. km):	49
Total barrage length (m):	About 810
Navigation System: 2-step navigation locks, upstream and downstream approach channels for accommodating boats up to 500 tons	
Spillway: gated spillway with downstream stilling basin	
▪Design flood - PMF (m3/sec)	47,500
▪Crest elevation (m MSL)	255.0
▪12 Radial gates width and height (m)	18 x 20
▪Total length (m)	271
Intake – powerhouse: 10 Kaplan units	
▪Total installed capacity (MW):	1,260
▪Design flow through turbines (m^3/sec):	5,000
▪Maximum head (m):	32.6
▪Total length, including unloading – erection area (m)	About 470 m
Fish passing facilities	

PROJECT LAYOUT

Perspective View



Concept of Project Planning

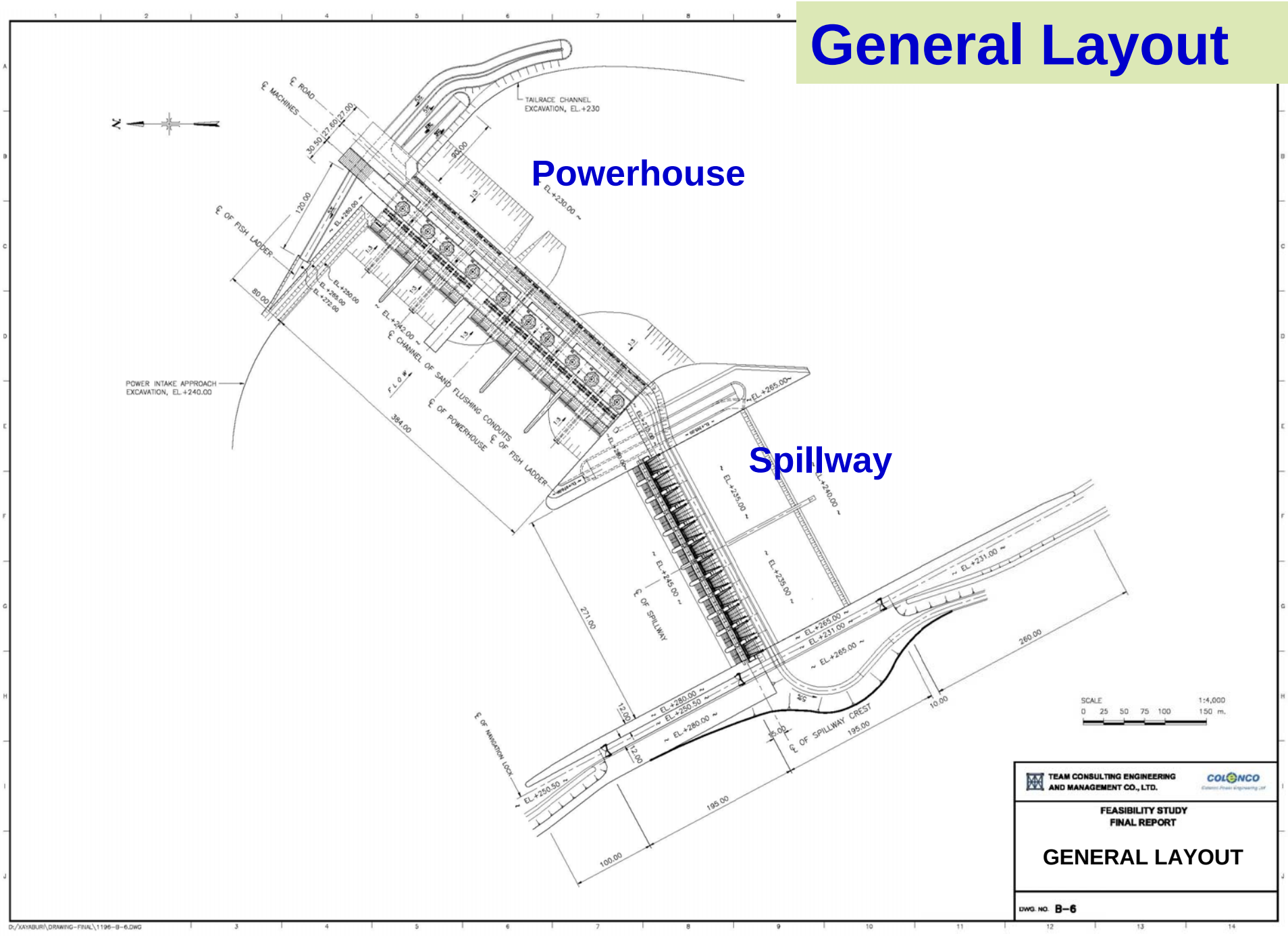
- Maintain flow regime by operating in such a way that outflow equals to inflow and power generation is obtained without peaking operation to avoid water fluctuations upstream and downstream and prevent consequent serious bank erosions;

- Maintain freedom of navigation in providing a two-step navigation lock at the barrage for passage of boats up to 500 tons in future, as defined in the agreement for river improvement by the government of China, Myanmar, Lao PDR and Thailand. It is noted that at present boats up to 30-50 tons can travel during dry season and 100-150 tons during wet season;

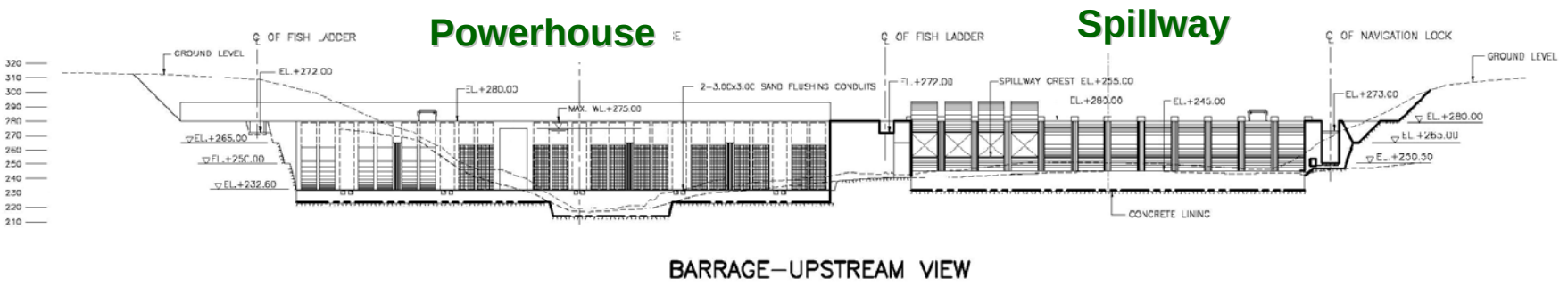
- Maintain fish passage through the barrage by providing suitable fish passing facilities for migration in both upstream and downstream directions;

- Maintain sediment passage by installing sluices for sediment flushing, protecting the turbines, avoiding deposits upstream of the barrage , as well as not reducing sediment inflow downstream, which may cause subsequent bank erosions and less protein for fish consumption and less nutrient in water for agriculture.

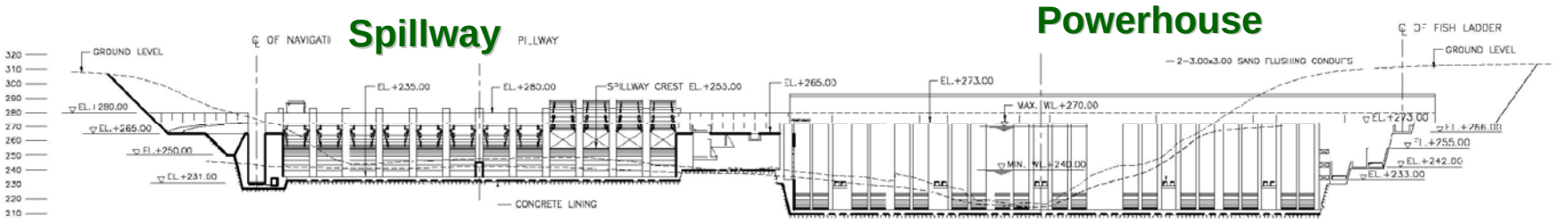
General Layout



Barrage Upstream and Downstream View



BARRAGE–UPSTREAM VIEW



BARRAGE–DOWNSTREAM VIEW

SCALE 1:3 000
0 20 40 60 80 100 m.

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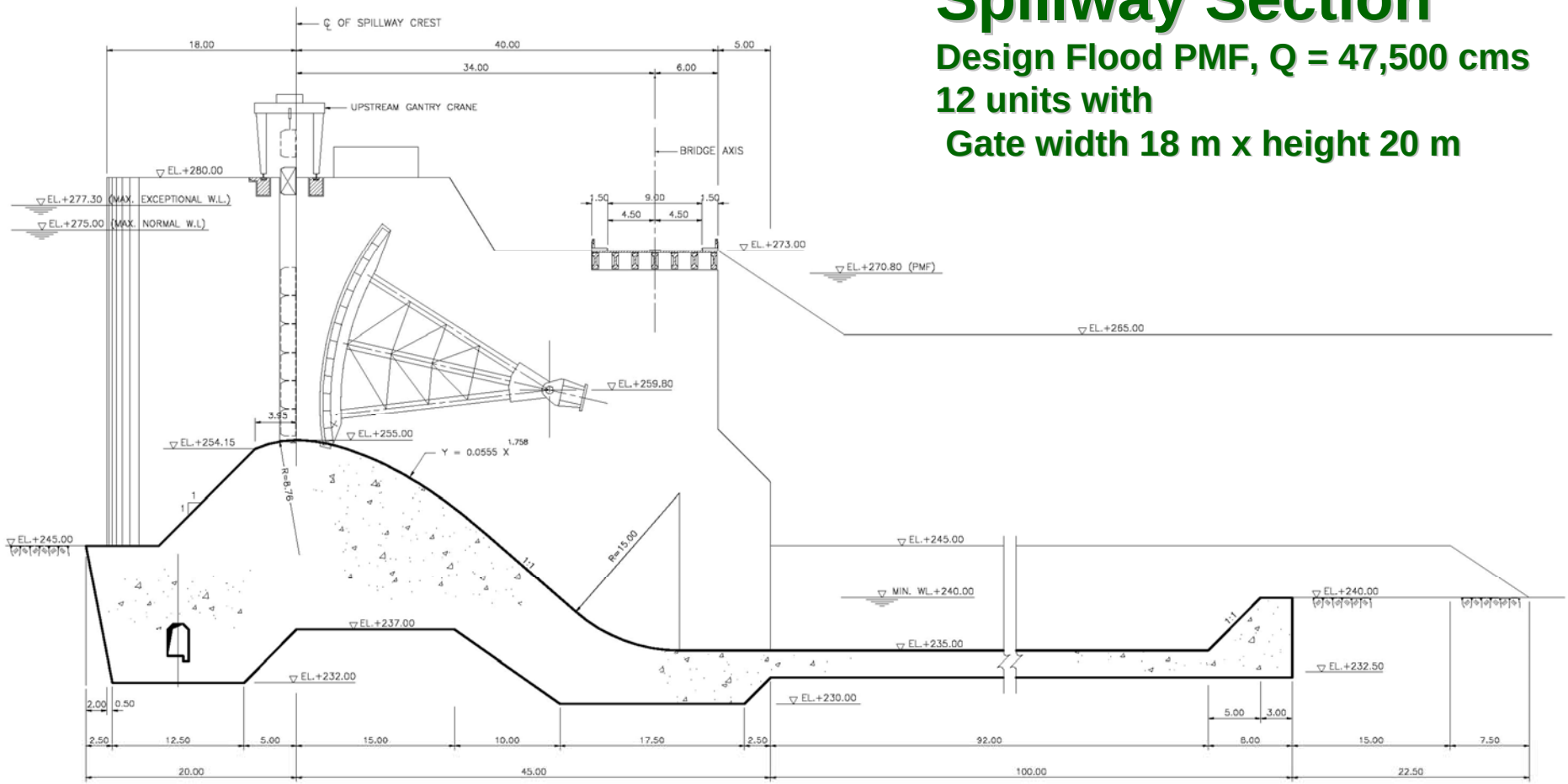
FEASIBILITY STUDY
FINAL REPORT

UPSTREAM AND DOWNSTREAM VIEW (METHOD A)

DWG. NO. B–7

Spillway Section

Design Flood PMF, Q = 47,500 cms
12 units with
Gate width 18 m x height 20 m



SCALE 1:800
0 2 4 8 12 16 m.

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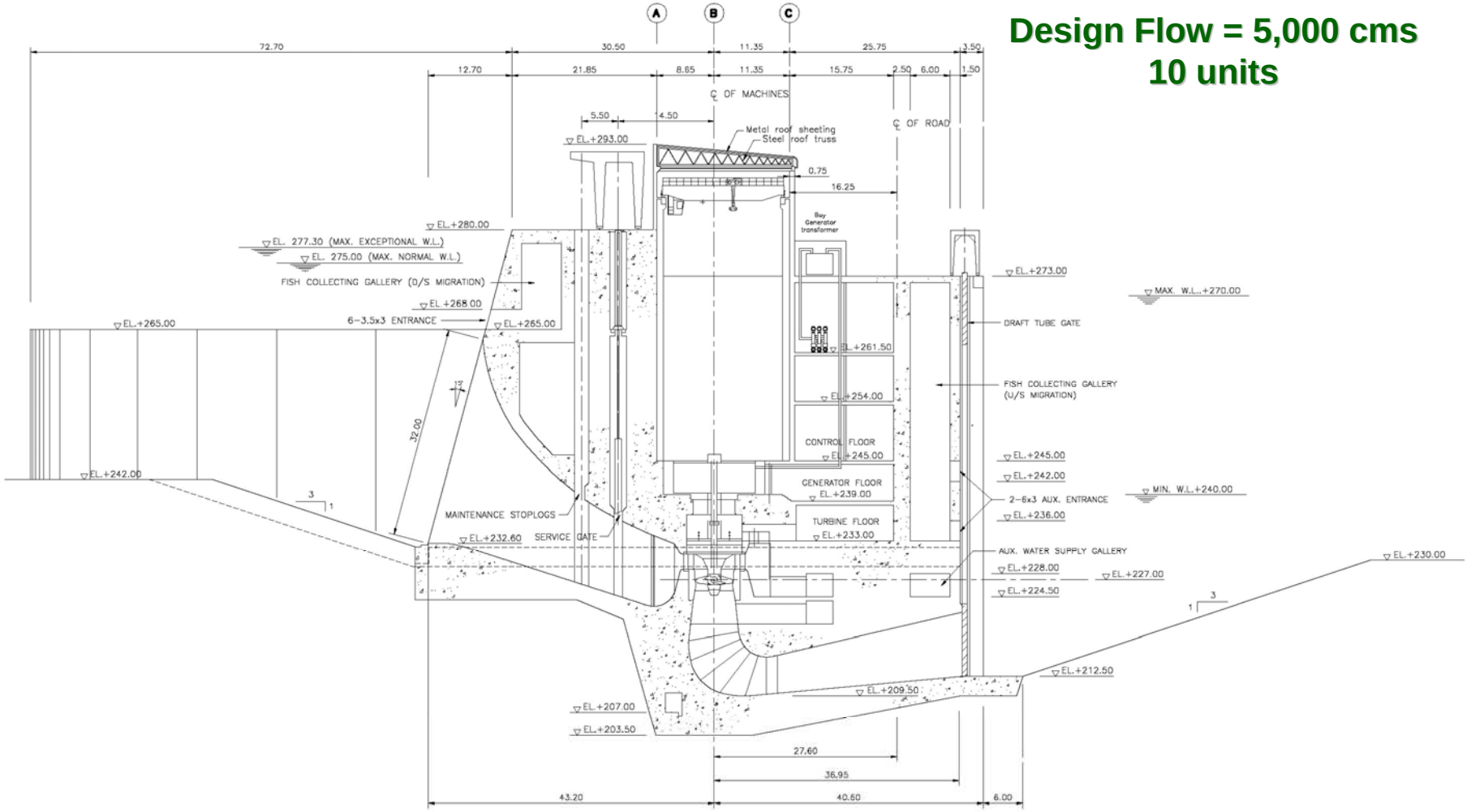
FEASIBILITY STUDY
FINAL REPORT

SPILLWAY
GATE TYPE G1 (WITHOUT FLAP)

DWG. NO. B-27

Powerhouse Section

Design Flow = 5,000 cms
10 units



SCALE 1:600
0 2.5 5 10 20 30 40 m.

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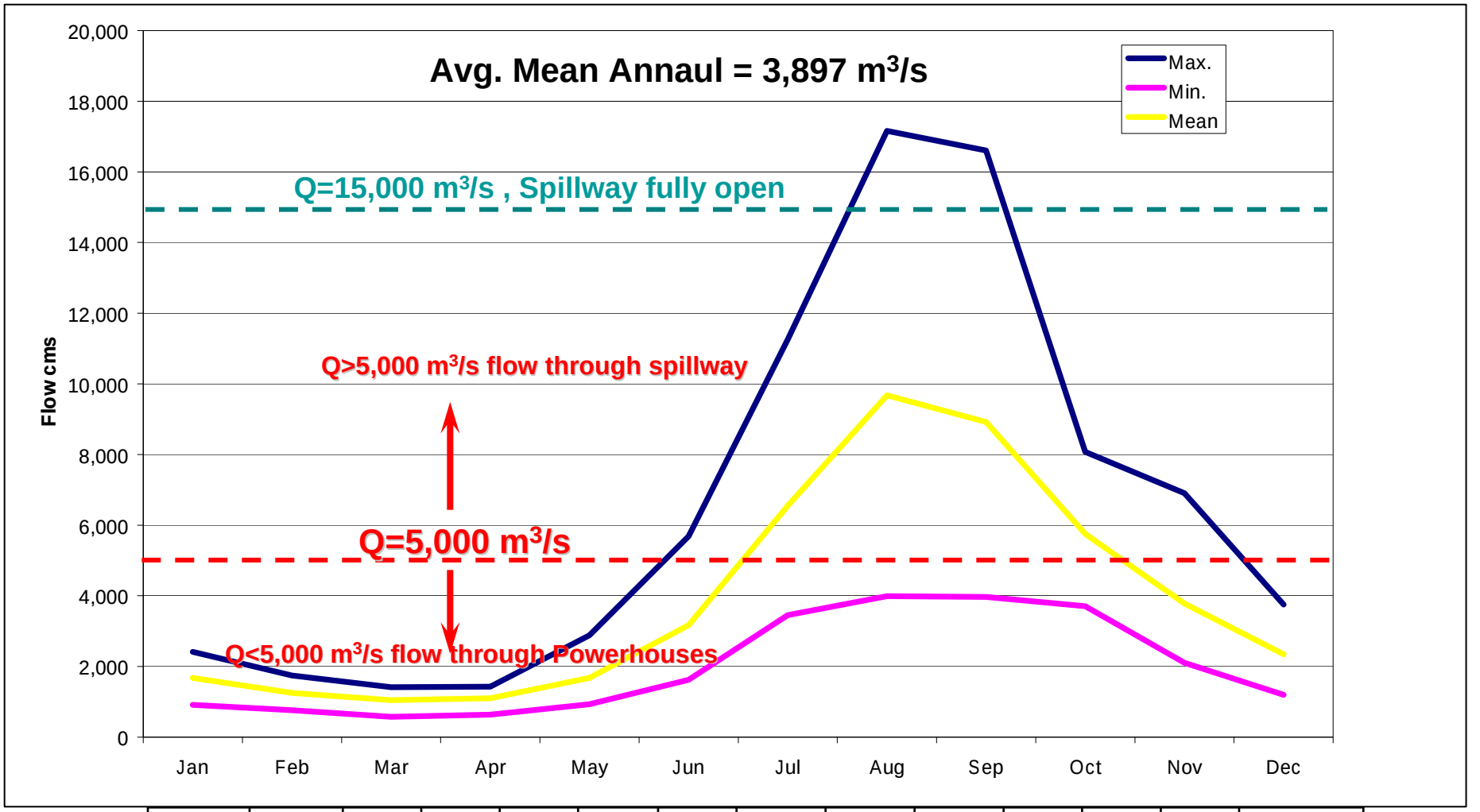
FEASIBILITY STUDY
FINAL REPORT

POWERHOUSE
SECTION THROUGH CENTRE LINE
OF MACHINE

DWG. NO. B-38

Estimated Flows at Xayaburi



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max.	2,414	1,742	1,415	1,425	2,883	5,684	11,256	17,159	16,604	8,073	6,901	3,753	5,559
Min.	911	764	575	634	935	1,621	3,456	3,992	3,969	3,704	2,103	1,200	2,455
Mean	1,676	1,251	1,047	1,100	1,677	3,169	6,555	9,675	8,917	5,756	3,777	2,347	3,897

Results of Water Quality Analysis from The Mekong River (November 24, 2007)

Properities	Parameter	UNIT	W1	W2	W3	W4	W5	W6	Standard*
1. Physical	1.1 Current Velocity[1/]	m/s	0.25	0.50	0.33	0.50	0.50	0.50	-
	1.2 Conductivity [1/]	µS/cm	231	232	233	223	230	232	-
2. Chemical	2.1 pH [1/]	-	7.70	7.90	7.16	7.74	7.86	7.06	5.0-9.0
	2.2 Total Suspended Solids[1/]	mg/l	133.68	152.08	149.78	140.11	156.38	138.54	-
	2.3 Dissolved Oxygen[1/]	mg/l	7.60	7.90	7.26	7.32	7.62	7.52	6.0

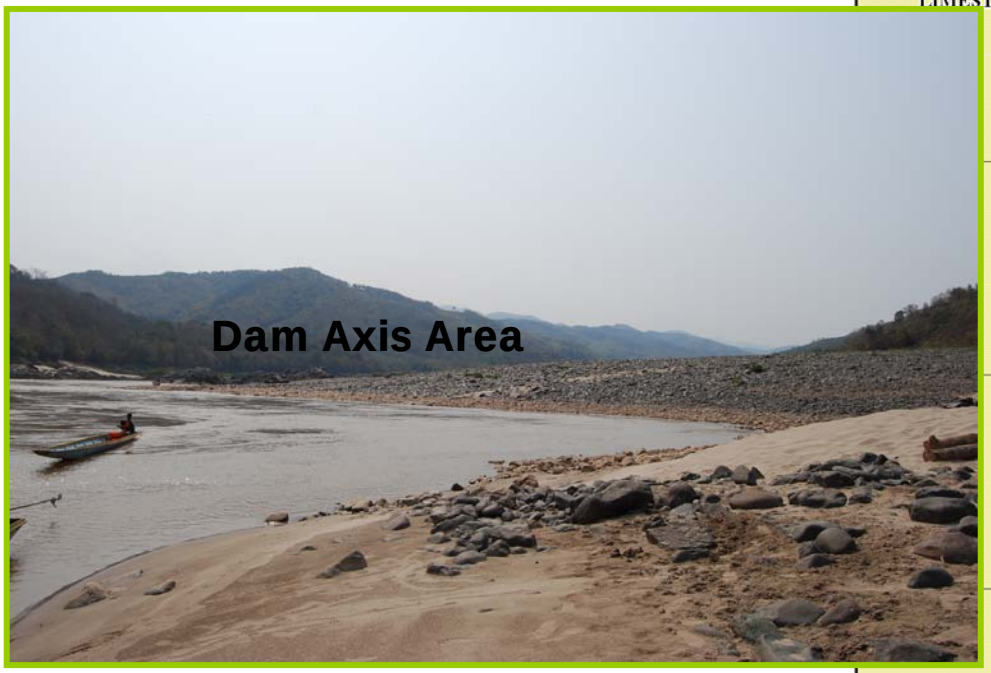
Remark : W1 Mekong River downstream from proposed dam site 2 km.
W2 Mekong River at proposed dam site
W3 Mekong River upstream from proposed dam site 8 km.
W4 Mekong River upstream from proposed dam site 12 km.
W5 Mekong River upstream from proposed dam site 16 km.
W6 Mekong River upstream from proposed dam site 20 km.

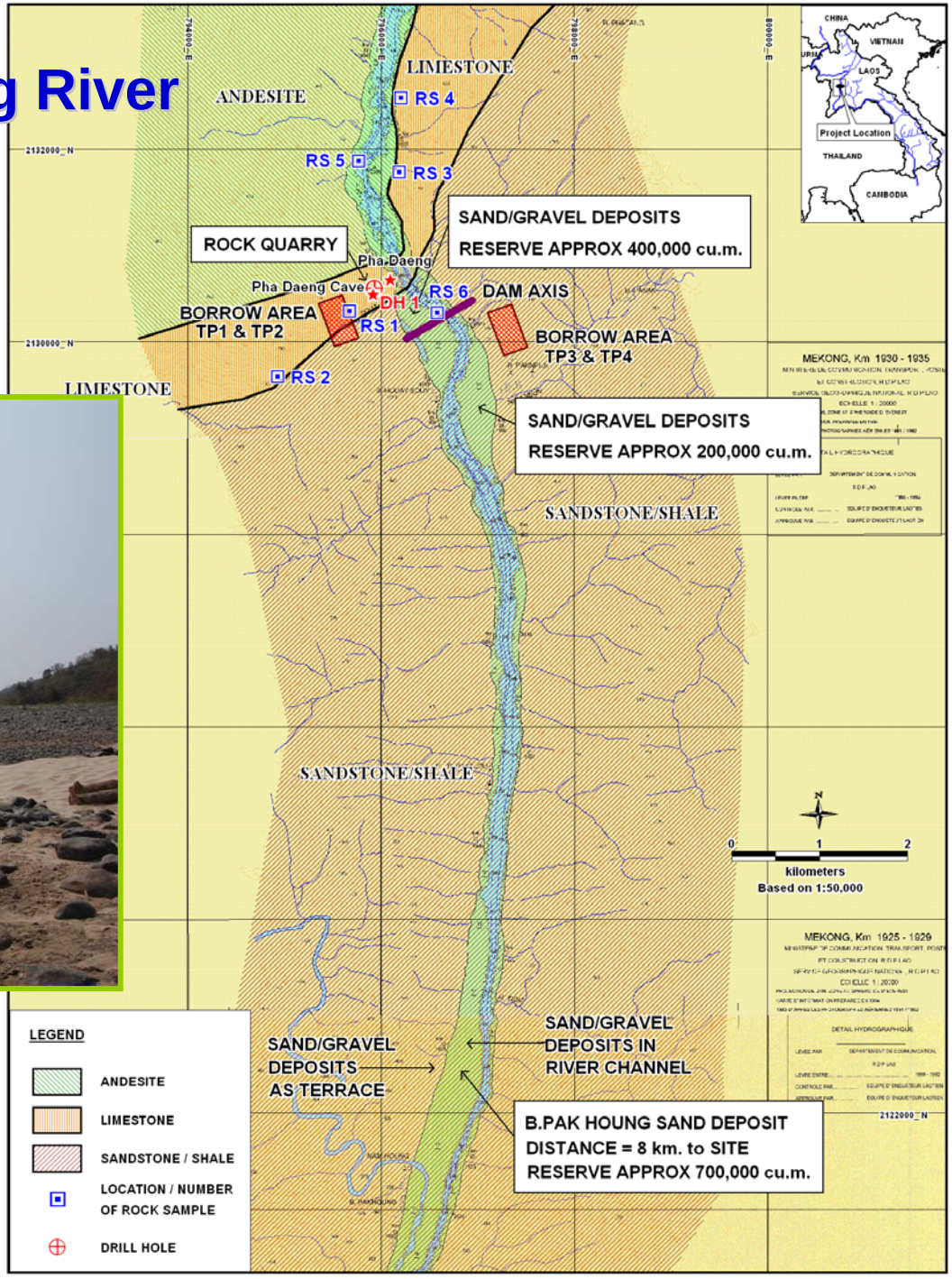
Results of Water Quality Analysis from The Mekong River (March 10-11, 2008)

Properities	Parameter	UNIT	W1	W2	W3	W4	W5	W6	Standard*
1. Physical	1.1 Current Velocity[1/]	m/s	0.6	0.5	0.4	0.4	0.5	0.5	-
	1.2 Conductivity [1/]	µS/cm	287	283	283	283	285	311	-
2. Chemical	2.1 pH [1/]	-	8.06	8.25	8.25	8.29	7.29	7.85	5.0-9.0
	2.2 Total Suspended Solids[1/]	mg/l	40.60	37.11	38.40	39.10	43.86	46.20	-
	2.3 Dissolved Oxygen[1/]	mg/l	6.66	6.72	6.23	6.16	6.20	6.49	≥ 6.0

Remark : W1 Mekong River downstream from proposed dam site 2 km.
W2 Mekong River at proposed dam site
W3 Mekong River upstream from proposed dam site 8 km.
W4 Mekong River upstream from proposed dam site 12 km.
W5 Mekong River upstream from proposed dam site 16 km.
W6 Mekong River upstream from proposed dam site 20 km.

The Deposit Along Mekong River In Xayaburi

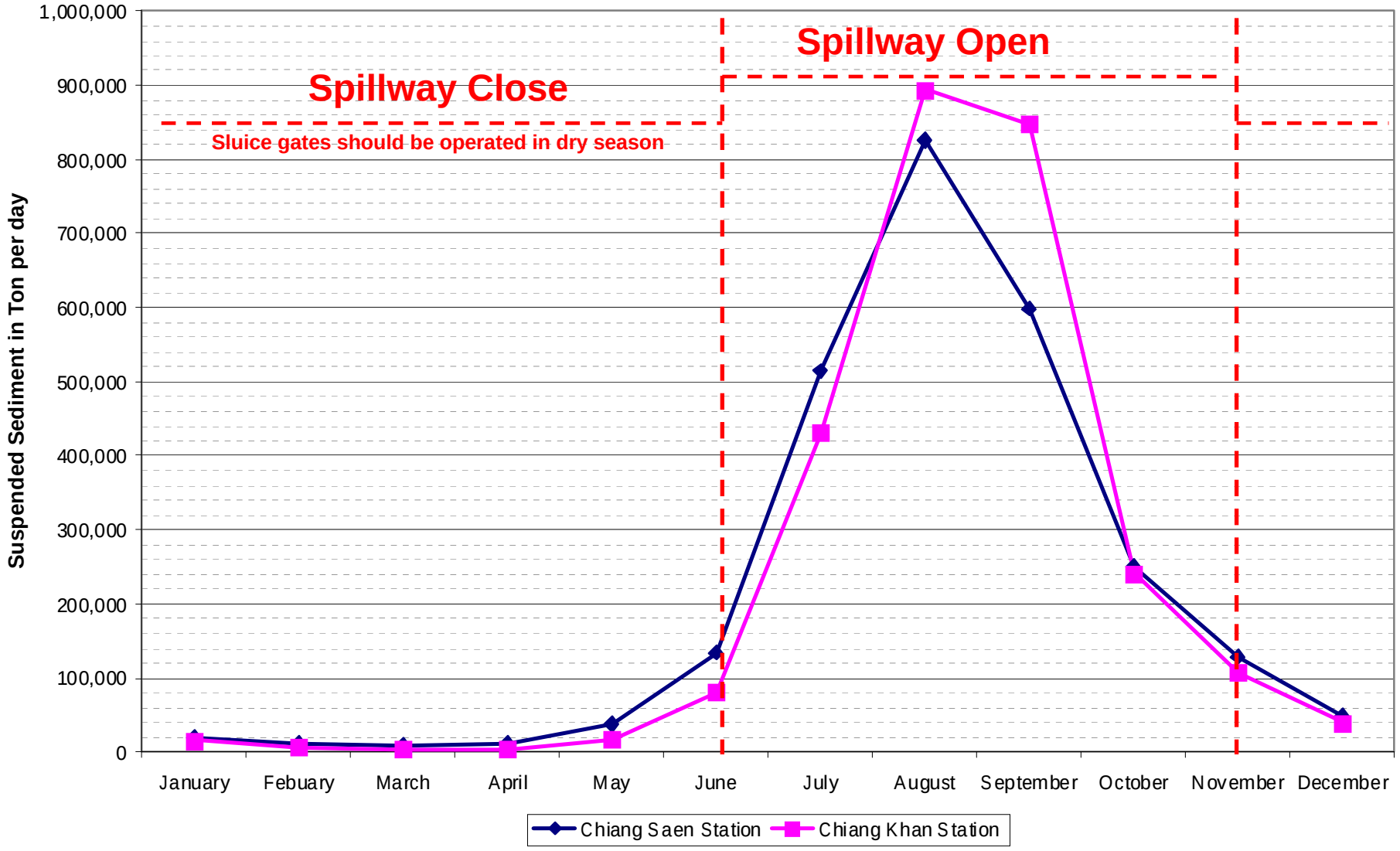




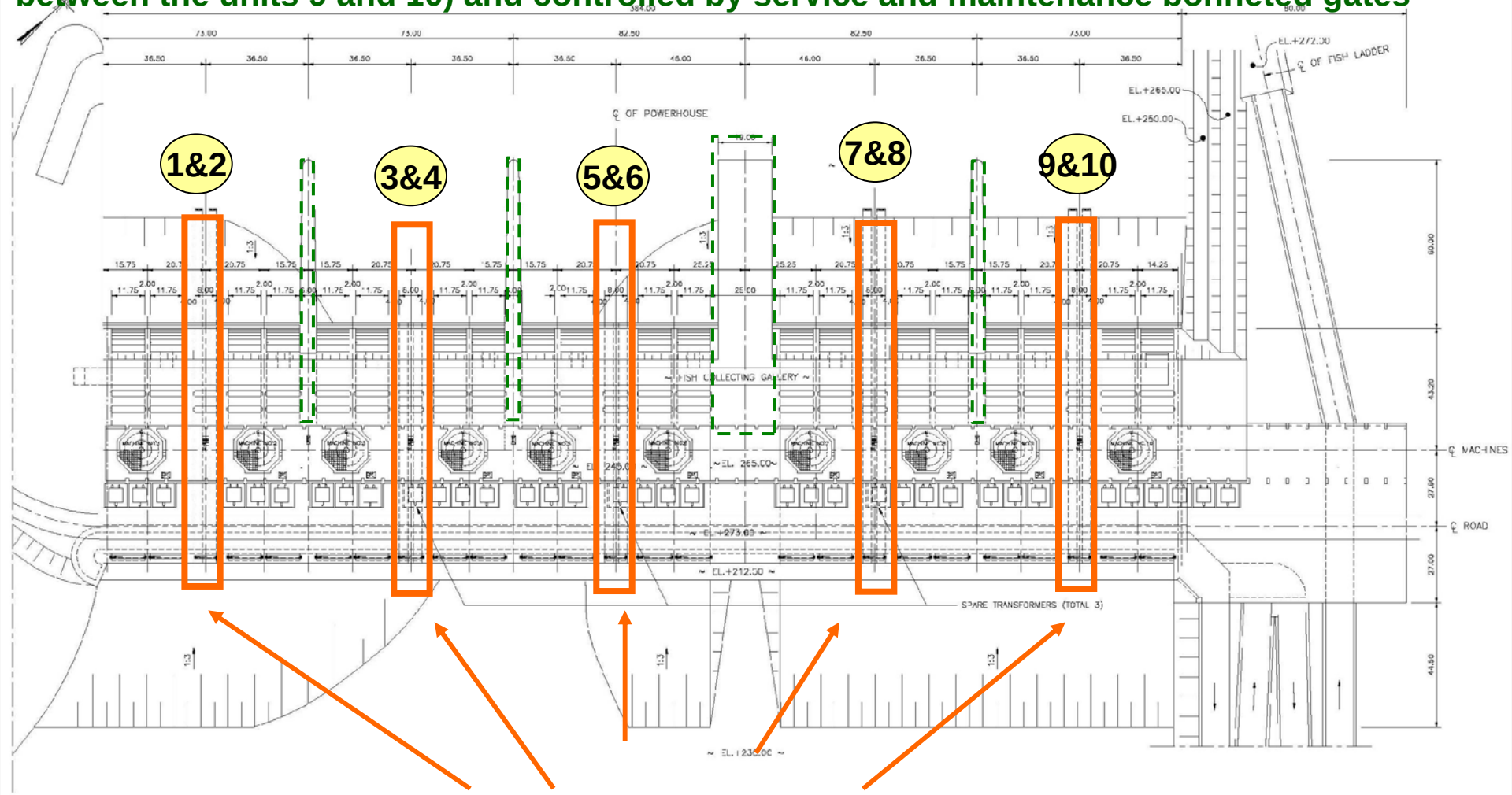
Sand and Silt deposit along Mekong River at Damsite

Commercial sand quarry along Mekong

Suspended Sediment Discharge in Ton , Chiang Saen & Chiang Khan Station



Sand sluice located every two units (between the units 1 and 2, 3 and 4, 5 and 6, 7 and 8, and between the units 9 and 10) and controlled by service and maintenance bonneted gates



Sand Sluice

In order to allow the operation of the sand flushing outlets without stopping the operation of the nearby units, separating walls are foreseen between the units 2 and 3, 4 and 5, 6 and 7, and 8 and 9

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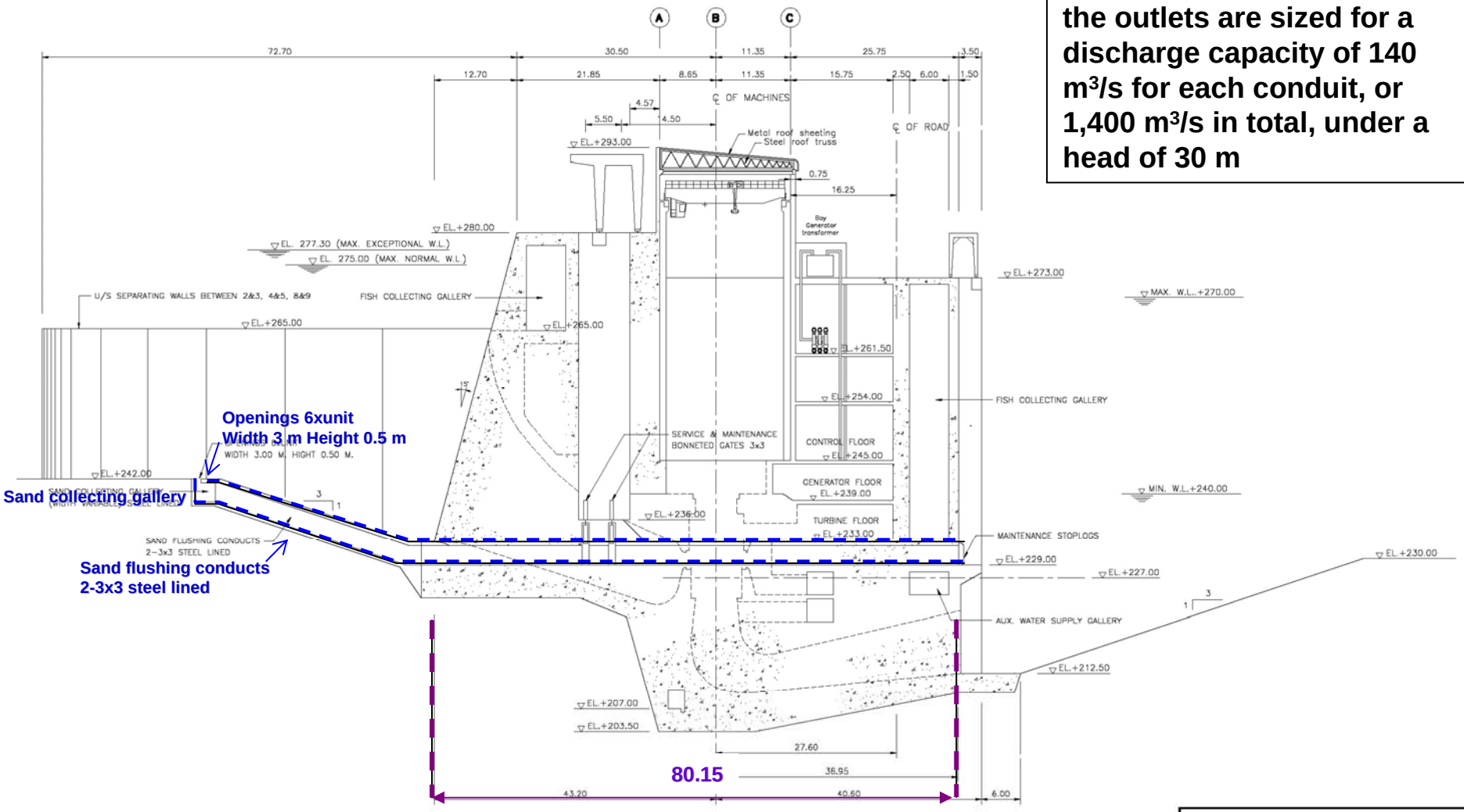
FEASIBILITY STUDY
FINAL REPORT

POWERHOUSE
PLAN AT EL.+273.00 (METHOD A)

DWG. NO. B–33

At the present Feasibility Design stage ,
the outlets are sized for a discharge capacity of 140 m^3/s for each conduit, or 1,400 m^3/s in total, under a head of 30 m



In dry season, the sediment flushing outlets will be operating quite frequently. It is considered that the outlets *shall be operated in night time, off the primary and secondary energy production hours.*

1:600
0 2.5 5 10 20 30 40 m.

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FEASIBILITY STUDY
FINAL REPORT

POWERHOUSE
SECTION OF SAND FLUSHING CONDUITS
UNITS 1,2 AND 7 TO 10

DWG. NO. B-39

The overall concept and the hydraulic design of the sand flushing outlets shall be detailed and checked by hydraulic model in a more advanced design stage.

Thank You for Your Attentions