

# DRAFT TECHNICAL REVIEW REPORT FOR THE LUANG PRABANG HYDROPOWER PROJECT – NAVIGATION

THE 9<sup>TH</sup> MRC REGIONAL STAKEHOLDER FORUM

DAY 1: THE 2<sup>ND</sup> REGIONAL INFORMATION SHARING ON PRIOR CONSULTATION FOR LUANG PRABANG HYDROPOWER PROJECT

05 FEBRUARY 2020, LUANG PRABANG, LAO PDR

Ms. Ton Nu Thi Thanh Yen, Navigation Operations Specialist, Planning Division, MRC Secretariat



# OUTLINES



**Background**



**Main Review findings**



**Public comments from 8<sup>th</sup> RSF  
and MRC's address in TRR**



**Recommendations**

# Background

- The Mekong River shall be kept **free from obstructions**, measures, conduct and actions that might directly or indirectly impair navigability;
- **A navigation lock is incorporated** into the design of the HPP to guarantee continuation of navigation;
- Ensure **consistent design and operation of ship locks** at all mainstream dams;
- Make sure that dam infrastructure does not prevent the **potential future development of mainstream navigation**;
- Ensure **safe and efficient** lock operations.

# Main review findings (1)

## Main features:

- The navigation facilities are designed to be operated for 95% of the time and will only be shut down during large floods
- The locks are designed in tandem to divide the maximum lifting height of 35.5m into two equal steps, as recommended by the PDG2009.
- The lockage time for the two-step ship lock: shorter than 50 minutes.
- The navigation lock on the **right river-bank: requires extensive excavation works.**
- **The navigation facilities situated adjacent to (next to) the spillway: might pose a danger to navigation when the spillway is in operation.**
- There is **no evidence** that a grouting screen perpendicular to the ship lock axis has been included in the design **to avoid seepage.**

## Main review findings (2)

Filling and Emptying system:

- The filling of the chambers of the Navigation Lock is done via a gravity-based feeding system from the headwaters
- Computational fluid dynamics (CFD) modelling was used to assess the hydraulic performance of the water feeding system.
- The bottom filling system consists of 7 diffusers with 5 openings each.
- The drawings **do not indicate baffler beams to avoid strong vertical flows during filling** which **will shake the [smaller] vessels and the boats** inside the lock chamber.
- **Only one single culvert** filling system with three gates. It is recommended to double the culvert: one on each of the chamber walls.

# Main review findings (3)

## Lock Equipment:

- The Feasibility Study only provides a brief description of the lock equipment (ladders, floating bits, wall armours, line hooks, etc.), but there is **no information on the numbers or exact location of this equipment.**
- Both lock chambers are long enough to accommodate the stoppage equipment, but **no detail of the stoppage-system** that will be used. Only three stoppage cables are needed, one of them being permanent (downstream the uppermost lock gate)

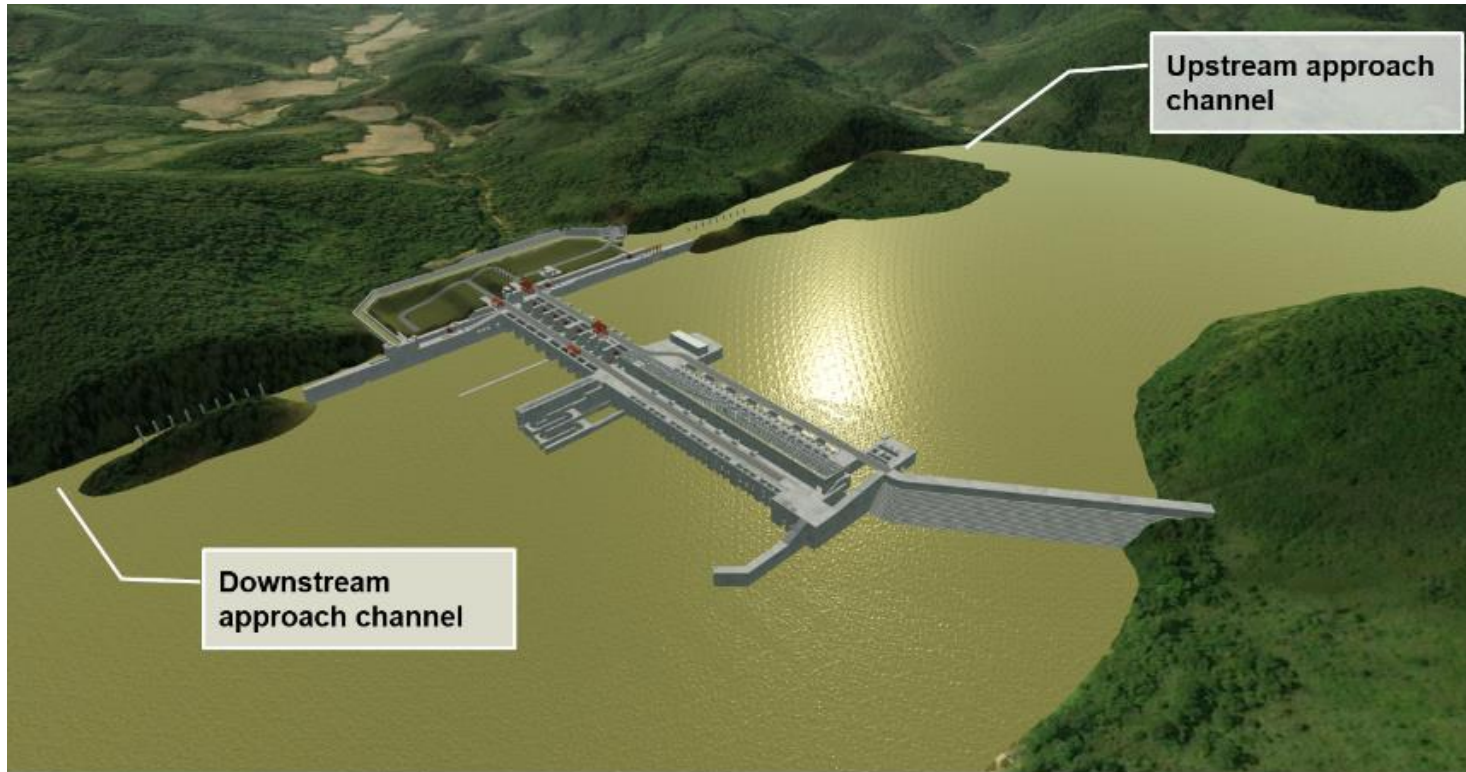
## Design standards:

- European waterways ship classification (CEMT) is not applicable to the Mekong.
- Existing agreements on the Mekong using the Chinese ship classification indicate that the navigation facilities should accommodate the 500 ton Chinese self-propelled barge and a push convoy of 2 barges with a pusher.



# Main review findings (4)

Approach channel:



*An aerial view of the dam with the access channels*

# Main review findings (5)

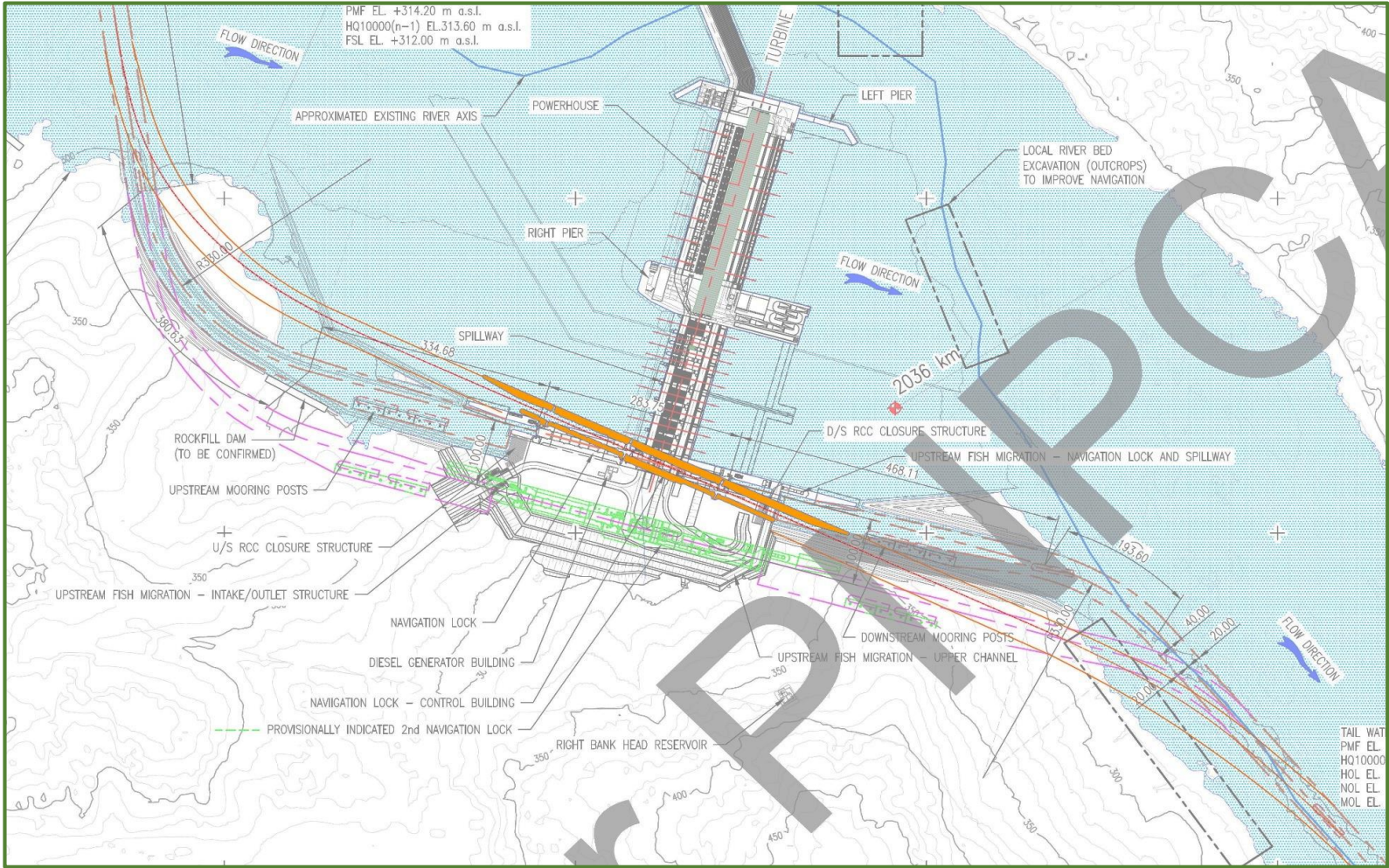
Approach channel:

- The **upstream island may obstruct the view of the locks** and shipping in the resting areas, potentially posing a safety risk
- The documentation only mentions a **single lay-by area**, whereas the **PIANC guidelines recommend 3 areas**. All three must be linked to the mainland
- The provision of fresh water, waste collection and power supply not specified
- The **downstream channel is separated from the spillway by a short separation wall** which appears to tie into the downstream island
- *Improving the visibility inside the channel and reducing the risk the vessels may be sucked into the spillway by **decreasing this angle to 85° or 80°** (actual ship lock is 90° to the axis of the barrage) could possibly improve the layout of both access channels.*



# Main review findings (6)

## Approach channel:



A plan view of the LPHPP showing the current alignment of the navigation locks in green, and a proposed revised alignment in orange.

# Main review findings (7)

Operation safety and Maintenance:

- The chapter for operation of the navigation lock system proposes keeping the tandem **ship lock open on both sides** (upstream and downstream) **when no navigation is occurring to improve fish migration and reduce lockage time.**
- **Little or no information on safety and maintenance** of the navigation facilities has been provided.

# Public comments from 8<sup>th</sup> RSF and MRC's address in TRR

Public comments from 8 <sup>th</sup> RSF	MRC's address in 2 <sup>nd</sup> draft of TRR
<p>1. Concern on ship lock design for the water head is 35.5m; the proposed is too high.</p>	<p>The MRC PDG 2009 stated that water head of more than 30m requires a double lift system which has been included.</p>
<p>2. If the size of vessel 500ton is designed based on study of the Mekong-Lancang navigation plan and MRC Navigation master plan agree with this size of the vessels.</p>	<p>Yes, this is consistent with the Chinese Standards that are used on the Mekong.</p>
<p>3. Cambodia recalled the need of a training on navigation aspect, and also suggested to have a visit to the Xayaburi's ship lock operation before the next meeting.</p>	<p>A training course was provided during the PNCPA Pak Lay process on navigation and ship lock design and operation. It is good to have another one now that the Xayaburi dam and ship lock is fully operational.</p>
<p>4. Cambodia also reminded that the Master Plan on Regional Navigation should be taken into account by considering 2<sup>nd</sup> ship lock in the future in the design and plan.</p>	<p>The Navigation Master Plan does not call for bigger ships (upstream Khone Fall), vessels and barges than those that can be accommodated by the actual approved ship lock chamber dimensions: 120x12x4m. The PDG2009 and PDG2019 only requires that sufficient place should be allocated to the construction of a second [line of] ship locks.</p>



# Recommendations

- For the filling, include baffler beams to **reduce the risks of strong upwards currents**;
- **Double the culverts** should be included in the chamber walls;
- Consider the pros and cons of offsetting the **alignment of the navigation locks to 80 or 85 degrees from the 90 degree to the dam**;
- **Run hydraulic physical model tests** to determine the impacts of side currents between the downstream island and separating wall when the spillway is opened at full capacity;
- Compliance to **Chinese Classification instead of the CEMT (European)** ship and waterway classification;
- **A list of mechanical ship lock spare parts** should be prepared, and spares to be kept in stock in order to reduce the outage times for repair and maintenance;
- **Hydraulic conditions in the narrowed section of the river during construction** of the entire dam with ship lock, behind the cofferdam must be checked during flood regime;
- **A “River Information System”** is recommended over the Mekong River;
- Operational coordination among Navigation and other sectors should be implemented.





**THANK YOU**

*One Mekong. One Spirit.*