FEASIBILITY STUDY ON THE DEVELOPMENT OF SELECTED AIDS TO NAVIGATION ALONG THE UPPER MEKONG RIVER

Terms of Reference

November 2014
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FEASIBILITY STUDY ON THE DEVELOPMENT OF SELECTED AIDS TO NAVIGATION ALONG THE UPPER MEKONG RIVER

1. CONTEXT

1.1 Introduction

The history of other river basins and their organisations seems to suggest that basin organisations over time, and with the increasing development status of their basins, shift from a development phase to a longer-term monitoring and interstate-facilitation phase with an emphasis on providing necessary regional services to Member Countries. Fundamental functions of the MRC Secretariat need to be maintained in the long term if the organisation is to be sustainable and administer the 1995 Agreement. It has been recommended that the MRC agrees on the core functions of the organisation.

However, as the level of external financial support to the MRC reduces over time, an increasing proportion of the budget will be funded by member states.

When defining MRC’s functions for navigation and while recognising the need for a transition to monitoring and interstate facilitation, it is important to note that Mekong waterborne transportation is a truly cross-boundary sector and will always require an intergovernmental body to coordinate its safety and efficiency, and promote sustainable use.

The MRC Navigation Strategy is a useful and applicable tool to determine the core functions for navigation towards the future. Moreover, the development goal of the current MRC Navigation Programme (NAP) will remain in place for a long time as the NAP is not a fixed-term programme but a plan consisting of long-term functions.

In line with the transition to long-term core functions comes the decentralisation process. Decentralisation means transfer of decision making power and assignment of accountability and responsibility for results from the MRC Secretariat level to the country level. It is accompanied by delegation of commensurate authority to individuals or units at all levels even those away from the MRC Secretariat.

Decentralisation will vary among the Member Countries and will have a high degree of decentralisation in areas such as navigation safety, data acquisition and monitoring. Other areas will require a substantial implementation role of MRC-NAP due to the need for a more independent and regional perspective.

For the waterborne transportation sector, ‘decentralizing activities’ means that eventually, the Member Countries will not only be technically and operationally but also fully financially responsible for selected national navigation activities. In the near future, it is envisaged that the navigation sector of MRC will only focus on core functions for navigation.

Decentralization of the development of Aids to Navigation along the Upper Mekong River in Thailand and Lao PDR is an activity, representing a part of the decentralization process.

It has to be noted that, as all the Thai stretches of the Mekong River are border stretches with the Lao PDR under this project area, cross border cooperation for these activities will be vital. For this MRCS can administratively assist.
Development process will actually be composed of two main activities: (i) conduct a feasibility of developing the aids to navigation and (ii), develop the aids to navigation, depending on the results of the F/S. This ToR is only related to the Feasibility Study. Inter-country cooperation is also promoted and in view of the available expertise the Marine Department will have the leading role. In this connection it is the responsibility of the selected Thai company to include trainees from the Lao PDR.

1.2 Consultation Meeting of Key Stakeholders

For planning of the Study, a meeting between the Thai National Mekong Committee Secretariat, the Marine Department and the MRC Navigation Programme, was organized in Bangkok on 7 August 2014. During the meeting, the Marine Department advised that the F/S should be required, i.e., as a basis for the Department to request for national budget for a sound development work. However, it would take more than a year for the Thai Government to allocate and reserve funds even for the study. Based on the situation as it was, the first opportunity to obtain the national financial resources could be expected only in 2016. Therefore, an alternative for accelerating the decentralization process of activities had to be found.

The meeting discussed and finally agreed that the F/S should cover the following aids to navigation: Automatic Identification System (AIS), Communication Systems and, Low Water Gauges and Alert Systems.

Representatives from NAP shared a common view that AIS, Communication Systems and Water Level Alert Systems can help improving vessel safety and make voyage planning more efficient. So, the first step should be the feasibility and detailed study of these components.

The Marine Department, in coordination with the TNMCS agreed to be involved intensively at this stage. The study outcomes will then be the inputs for the Department to ask the Government to allocate the financial and human resources to implement the Aids to Navigation system being recommended for implementation in 2016 and beyond.

Discussions were also held with the Waterway Department in the Lao PDR who agreed with the institutional set-up of the project. The WD in the Lao PDR did however request that, with the exception of very specific and localized surveys for the Low Water Gauges, no mainstream-covering bathymetric or topographic surveys will be conducted in the Lao part of the project area.

It was advised that budget for the Feasibility Study will be taken from the NAP current PIP for OUTCOME 4: Active Participation of Stakeholders including Relevant Agencies in Member Countries, Development and Dialogue Partners, MRC Programmes and Regional Entities in the Navigation Sector.

Also, it must be noted that the available budget for the F/S is from the above activities in the PIP.

The Marine Department reaffirmed its cooperation in conducting the Feasibility Study by a team of local/national consultants. Based on the initial Draft TOR prepared by NAP, the Department in collaboration with TNMCS have subsequently incorporated their views and suggestions for the Study.

It was pointed out also that during the study process, involvement of the Lao PDR is needed. Therefore, this should be coordinated through MRCS (NAP), TNMCS and LNMCS.
2. PROJECT DESCRIPTION AND JUSTIFICATION

2.1 Rationale on the Implementation of the Selected Aids to Navigation

All MRC Member Countries have acknowledged that safe navigation should be one of the fundamental underpinnings of the NAP for regional economic development. It is clear that safety issues have not been high on the agenda when discussing water transportation. Yet improving safety and increasing navigation efficiency go hand in hand. All measures that reduce accidents and collisions enhance safety. Examples, such as correct ship inspection, installation of buoys and beacons, other aids to navigation facilities, communication, appropriate charts, proper training, river policing and dredging works to clear hot spots, would all have positive consequences for the efficiency of water transportation. These would allow rapid increases in trade once these navigation, real-time information and inland water vessels traffic systems and regulations are in place. Allocation of resources to maintain modern standardised and accurate navigation aids should be given high priority. Safe navigation is one of the fundamental underpinnings of the strategy implementation.

During the formulation of the MRC Navigation Programme 2011-2015, three specific aids to navigation systems were considered for Upper Mekong Navigation. They include:

1) Automatic Identification System (AIS);
2) Critical Low Water Level Alerts; and

As these three systems are inter-linked and fall under the same category, it was decided to prepare the feasibility study on the three together and, to prepare implementation plans for all.

2.2 Three systems that will be considered under this Feasibility Study

2.2.1 Automatic Identification System (AIS)

Thailand has called for an implementation of AIS coverage along the Mekong River between Golden Triangle and Chiang Khong and later, to upstream and downstream areas. These stretches of river have been identified as areas of navigation in extremely dangerous, complexity of the waterways, large seasonal variability in water levels, substantial amount of flood debris in the wet season, difficult to navigate because of the numerous rocks and rocky outcrops, submerge the obstacles, high shipping traffic, environmentally sensitive and is home to local villages and is a source of food for communities. Consequently, Thailand intends to improve its awareness of the presence and movement of shipping traffic (real-time and historic) in the Mekong River region.

The AIS is an automatic tracking system used on ships and by Vessel Traffic Services (VTS) for identifying and locating vessels by electronically exchanging data with other nearby ships, AIS base stations, and satellites. When satellites are used to detect AIS signatures then the term Satellite-AIS (S-AIS) is used.

Information provided by AIS equipment, such as unique identification, position, course, and speed, can be displayed on a screen. AIS is intended to allow maritime or river-controlling authorities to track and monitor vessel movements. Vessels fitted with AIS transceivers and transponders can be tracked by AIS base stations located along coast lines or, when out of range of terrestrial networks, through a growing number of satellites that are fitted with special AIS receivers which are capable of deconflicting a large number of signatures.

The 2002 IMO SOLAS Convention included a mandate that required most vessels over 300GT on international voyages to fit a Class A type AIS transceiver. This was the first mandate for the use of AIS
equipment. In 2006, the AIS standards published the Class B type AIS transceiver specification, designed to enable a simpler and lower cost AIS device. In 2006, the world's first Class B transceiver was developed.

IMO is however not mandated on the rivers and therefore there are no international guidelines or regulations applicable. However, on many navigable international rivers AIS has become a well-known reference. The introduction of low cost Class B transceivers has triggered multiple additional national mandates by making large scale rollout of AIS devices onto vessels of all sizes commercially viable. Since then a wide range of applications from the largest vessel to small fishing vessels and life boats are using AIS.

Application and use

- Although the benefits of increased trade are obvious, caution has to be paid to controlling the import and export of contraband (customs, and police need to monitor the movements of all foreign ships along their route on the Mekong River). This is also vital for detecting the trafficking of people.
- In case of oil spills, the ships in question, need to be easily tracked down so contingency plans can be started and the cause mitigated.
- Thailand needs to be able to monitor the movement of incoming vessels to prepare the port of call for discharging operations.
- Presence and movement of shipping traffic (real-time and historic) must be recorded; voyage data recorders to provide improved “black box” tracking
- Finally but critically, the Mekong River system is very environmentally sensitive. The vessels have to remain clear of dangerous obstacles, and should be able to be contacted if they are seen to be on a dangerous course.

According to Safety of Life at Sea - SOLAS - convention, AIS shall:

- Provide automatically to appropriately equipped shore stations, other ships and aircraft information, including ship’s identity, type, position, course, speed, navigational and manoeuvring status and other safety-related information;
- Be able to track the position of ships carrying dangerous cargo very closely in real time and within meter accuracy;
- Automatically receive information from similarly equipped ships;
- Monitor and track ships and exchange data with shore-based facilities; and
- Improve the safety of navigation by assisting in the efficient navigation of ships, protection of the environment, and operation of Vessel Traffic Services (VTS).

The AIS should be capable of providing to ships and to competent authorities, information from the ship, automatically and with the required accuracy and frequency.

AIS data can be gathered from local, regional, national or international network systems of AIS base stations and can be applied to Aids to Navigation to further improve and enhance services provided to mariners.

AIS is an extremely useful tool to monitor the movement of ships along the river and to plan river voyages. The system, however, is not always reliable when the radio waves are interrupted by hills or mountains. Before installing the system it is necessary to conduct a survey/investigation to assess its
technical and financial viability. During the Feasibility Study it will also be investigated whether the GPS vessel Guidance System can be combined or integrated with the AIS System.

2.2.2 Critical Low Water Level Alerts

The water levels of the Upper Mekong were exceptionally low between January and March 2010. The lack of access to water has not only made livelihoods from farming and fishing difficult for affected communities but the very low water levels have disrupted river transportation. Moreover, navigation has become particularly dangerous: submerged rocks that were not previously known to the waterway users suddenly became additional obstacles to navigation. In one instance a cruise boat with more than thirty tourists on board hit rock bottom which pierced the hull sinking the boat within ten minutes. The location of this obstacle was not known before. Even on the Lancang river numerous boats had run aground and had to stay in the middle of the river for weeks before the water levels started to rise again.

At one stage, mainly as a result of the surge in boating accidents navigation was stopped at several stretches along the river. Suitable low water level warning system made available by the authorities could prevent many of the accidents and groundings and enable skippers to take more cargo depending on the available water depths.

In this connection it is clear that the Lao PDR and Thailand should have Low Water Navigation Alert Systems. As this may be quite complex, it needs to be done in phases, starting with a more simple approach leading to a comprehensive and full functioning system. The idea is to alert the waterway users at different locations of water levels that once reached, navigation becomes dangerous. As a next step forecasts can be integrated.

Warnings for low water levels for navigation are different than flood warnings. There is actually not one level per station that can be called the critical level. This is because there are different classes of boats with draughts ranging from 0.5m to 3.5m. A critical level for the highest class vessel is of course not so dangerous for small boats.

In addition to this, it is required to find a reliable way of indicating the shipping what the water level is at the specific dangerous area (shallow) at the moment of the passage and particularly what the most dangerous level is. This can be done by erecting Low water Level Gauges. This ‘guiding’ mark is a very efficient way but needs careful planning and full knowledge of the river bed along the stretch. The Critical Low Water Level Alerts system can be a useful tool for other users (importer, exporter) to determine whether it is ready for their voyage.

2.2.3 Radio Communication Systems

Currently, there is limited communication available between the boats and the shore. In some stretches with sharp bends vessels cannot be seen and collisions sometimes occur during approach. A system with Single Side Band (SSB), Very High Frequency (VHF) or alternative system needs to be installed on all boats and in one or two central stations to allow for open lines between boats and between the shores. Improved communication methods will also be useful to exchange information regarding water depths and possible obstructions.

Ships’ radio is used for the safe navigation of vessels and for making distress calls in emergency situations. It enables communication with harbour authorities and with other vessels.

Radiotelephone is one of the ‘traditional’ River Information System (RIS). The radiotelephone service on inland waterways enables the establishment of radio communication for specific purposes by using

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1 The Central Commission for Navigation on the Rhine (CCNR) made radiotelephone mandatory in Rhine navigation for vessel with machine propulsion as of 1 January 1995.
agreed channels and an agreed operational procedure (service categories). The radiotelephone service comprises four service categories:

1) Ship-to-ship;
2) Nautical information;
3) Ship-to-shore authorities; and
4) Public correspondence (service on a non-mandatory basis).

Of these five categories, only the first three are important for RIS. Radiotelephone service enables direct and fast communication between skippers, waterway authorities and port authorities. It is best suited for urgently needed information on a real time basis.

In the service categories ship-to-ship, nautical information and ship-to-shore-authorities, the transmission of messages should deal exclusively with the safety of human life, and with the movement and the safety of vessels.

**Fairway information** by voice in the nautical information (shore/ship) service category could be communicated by radiotelephone:

1) For urgent information needing to be updated frequently and having to be communicated on a real time basis, and
2) For dynamic information having to be communicated on a daily basis.

The **urgent and dynamic information** to be communicated by voice radio could concern for example:

1) Temporary obstructions in the fairway, malfunctions of aids to navigation;
2) Restrictions in navigation caused by floods; and
3) Present and future water levels at gauges.

In the **nautical information** service category, notices to skippers are transmitted "to all users" as:

1) Scheduled reports on the state of the waterways incl. water level reports at the gauges at fixed times of the day, and
2) Urgent reports at special events (e.g. traffic regulations after accidents).

A marine VHF set is a combined transmitter and receiver and only operates on standard, international frequencies known as channels. Channel 16 (156.8 MHz) is the international calling and distress channel. Transmission power ranges between 1 and 25 watts, giving a maximum range of up to about 60 nautical miles (111 km) between aerials mounted on tall ships and hills, and 5 nautical miles (9 km; 6 mi) between aerials mounted on small boats at sea level Frequency Modulation (FM) is used, with vertical polarization, meaning that antennas have to be vertical in order to have good reception.

Sets can be fixed or portable. A fixed set generally has the advantages of a more reliable power source, higher transmit power, a larger and more effective aerial and a bigger display and buttons. A portable set (often essentially a waterproof, VHF walkie-talkie in design) can be carried on small craft.

A distress button automatically sends a digital distress signal identifying the calling vessel and the nature of the emergency. A connection to a GPS receiver can allow the digital distress message to contain the distressed vessel's position.

2.3 **Project Area**

For the present Phase of study, the Project Area lies between the Golden Triangle and Phadai (border point, 30 km downstream Chiang Khong).
3. **OBJECTIVES**

**Overall objective** of the Project is to improve safety/security and vessel/port efficiency through the development of selected navigational aids.

**Specific objectives** of the Feasibility Study are to:

1. Investigate the technical feasibility and economic viability of developing the selected navigational aids, i.e., Automatic Identification System, Critical Low Water Level Alerts and Radio Communication Systems;

2. Prepare a draft detailed procurement and implementation plan, based on the F/S result; and

3. Prepare a draft document to request for human and financial resources, to be subsequently submitted for Government approval.
4. OUTPUTS AND ACTIVITIES

To achieve the Objectives, the following outputs and corresponding activities are envisaged.

Output1: Economic and Technical Viability Report and Recommendations clearly showing which components of the Project are feasible from a technical and economical perspectives²

Activity 1.1 Field visit to gathering information on the existing river transport management and operation methods currently used. This field visit goes for all 3 navigation aids systems.

Activity 1.2 Desk and field visit to check the topographical limitations of installing AIS, (mountains, hills or other restrictions), the radio communication system and the low water alert gauges and system.

Activity 1.3 Check the river condition and river characteristic of the project site. Discuss with the provincial and local agencies.

A/ Specifically for AIS:

Activity 1.4 Check what the power supplies for booster antennas could be, including where the antennas could be located. Calculate the Range coverage for selecting a potential site; combination of an AIS base station and AIS repeater to achieve the required coverage.

Activity 1.5 Indicate which AIS equipment, base station equipment, repeaters via the internet or an alternative communications link would be required.

Activity 1.6 Describe which software for operations and management of the AIS network should be installed in the future.

Activity 1.7 Define which vessels should have a transponder.

Activity 1.8 Investigate what could be the AIS capabilities (Functionality, Availability, Maintenance...).

Activity 1.9 Define what would be the ability to remotely monitor the condition of the site power supply?

Activity 1.10 Define how much personnel would be required

Activity 1.11 Provide what brands and systems are there on the market, pricing, advantages and disadvantages. Prepare a comparison table

Activity 1.12 Provide what communications equipment is needed to ensure network connectivity from the AIS base station to the Marine Department office local networks.

Activity 1.13 Investigate whether there any interference/electromagnetic radiation with any Lao and Thai government frequency regulations requirements?

Activity 1.14 Detail what the capital costs are.

Activity 1.15 Detail what the maintenance of the system hold, and what would be the cost?

² This output will give answers to what is required to actually undertake (carried out) this new development, given the effective costs compared to the benefits.
Activity 1.16 Define the cost of having a transponder on board.

Activity 1.17 Define exactly what the added value/benefits would be of an AIS system, for the Government, for the vessels and for the port.

Activity 1.18 Make a cost-benefit comparison. Take into consideration that benefits could be expressed in terms of reducing accidents, avoiding loss of life and limb, less smuggling, tracing of ships which cause oil spills, etc.

B/ Specifically for a Radio Communication System

Activity 1.19 Check what the power supplies for booster antennas could be, including where the antennas could be located. Calculate the Range coverage for selecting a potential site; combination of the Central Communication Center station and repeaters to achieve the required coverage.

Activity 1.20 Make distinction between ship-ship and ship-shore communication. How can the ports be part of the communication system?

Activity 1.21 Detail which radio-communication equipment would be required.

Activity 1.22 Define which vessels should have a radio.

Activity 1.23 Define what could be the radio communication’s functionality.

Activity 1.24 Define what personnel would be required to man the system.

Activity 1.25 Provide what brands and systems are there on the market, pricing, advantages and disadvantages. Prepare a comparison table.

Activity 1.26 Is there any interference/electromagnetic radiation with any Lao and Thai government frequency regulations requirements?

Activity 1.27 Detail what the capital costs are.

Activity 1.28 Detail what the maintenance of the system hold, and what would be the cost.

Activity 1.29 Define the cost of having a radio on board.

Activity 1.30 Define exactly what the added value/benefits would be of a navigational aids system for the Government, for the vessels and for the port.

Activity 1.31 Make a cost-benefit comparison.

C/ Specifically for the Low Water Level Gauges and Alert

C1: Visual Low Water Alert Gauges installed at navigation chokepoints to provide guidance to the skippers.

Activity 1.32 Decide where to locate the low water gauges suitable sites should be identified for the location of visual hydraulic gauges approximately 1km³ upstream and 1km downstream from important rapids.

These distances are a guide only however and the final sites should take into consideration both the suitability for construction of the river gauges, whilst allowing sufficient manoeuvring area for vessels that will elect not to traverse the rapids based on the level of water observed at the gauges.
Activity 1.33 The maximum draught required for traversing the rapids for both the deepest draught and shallowest draught commercial type vessels operating in this stretch of river should be ascertained in consultation with local vessel operators and waterway authorities. It is important to note that the gauges must still be numerically calibrated to the chart datum.

Activity 1.34 The final design and construction material of the gauge will be at the discretion of the planners, however all proposed designs should serve to provide immediate visual assistance to vessels intending to traverse the rapids. These gauges should be legible from the opposite bank, be designed to require little or no maintenance, and utilise reflective and extra durable paint to ensure that they remain visible at night time and during periods of restricted visibility. There is no requirement for the gauge to be illuminated at night.

Activity 1.35 Make the plans for the gauges in a way like they have been installed in the Chinese sections of waterway. These gauges should ideally adhere to the Chinese design previously utilised upstream, and in line with the ones prepared in the Lao PDR.

Activity 1.36 Detail what the capital costs are.

Activity 1.37 Detail what the maintenance of the system hold, and what would be the cost.

Activity 1.38 Define exactly what the added value/benefits would be of gauges, for the Government, for the vessels and for the port.

Activity 1.39 Make a cost-benefit comparison.

C2: Installation of Automatic Low Water Alert Station in the Mekong River between Chiang Khong\Houei Sai and Golden Triangle

Activity 1.40 Check what the possibility would be on having an automatic water level monitoring system that is based on the Hydrographic zero. Please note that the MRC has an automatic reader at Chiang Saen but the gauge is based on the Hydrological zero which is different than the Hydrographic zero. However, the difference is fixed so the Chiang Saen station could be used. So identify the operation system of this station to investigate if combined with MRC Mekong-HYCOS Hydrometeorological Network Low Water Alerting would be possible.

Activity 1.41 Suitable sites should be identified for the location of automatic water level recorder.

Activity 1.42 final detailed designs and construction of station, however all proposed designs should serve to provide real time data to assist to vessels intending to pass the rapids and shallow water areas. This automatic station should be designed to require little civil works and low cost maintenance. Chose the best location of the center based on what is available to make it running well.

4It is important to note that these values are NOT intended to provide an absolute determinant of a vessels ability to traverse the dangerous area, but rather a means of calibrating a safety indicator that will be attached to the gauges to serve as a cautionary indicator for vessels not equipped with charts or the skills to interpret a hydrological measurement in relation to chart datum.
such as available expertise, available know-how, topography, regional context, etc.

Activity 1.43 Detail what the capital costs are.
Activity 1.44 Detail what the maintenance of the system hold, and what would be the cost.
Activity 1.45 Define exactly what the added value/benefits would be of gauges, for the Government, for the vessels and for the port.
Activity 1.46 Make a cost-benefit comparison.
Activity 1.47 Combine all reports on the 3 navigational aids systems A/, B/ and C/ into one Feasibility Study Report.
Activity 1.48 Discuss and finalise the Feasibility Study Report among all stakeholders involved, including TNMCS, LNMCS and MRCS, through the Steering Committee.
Activity 1.49 Submit a copy of the Draft Final Feasibility Study Report to the MRCS, MD, WD, LNMCS and TNMCS (by the consultants). Finalisation can only be done after an agreement is reached by the Steering Committee of this Project.

Output 2: A Detailed Procurement and Implementation Plan based on the results of the F/S

Activity 2.1 Based on the results of the F/S and the recommendations, decide which components will be implemented, where and when.
Activity 2.2 Prepare a draft detailed Procurement Plan.
Activity 2.3 Prepare a draft detailed Implementation Plan.
Activity 2.4 Submit all the documents -Procurement Plan and Implementation Plans- as an annex to the Final F/S Report. Finalisation of all Draft plans and Draft reports can only be done after an agreement is reached by the Steering Committee of this Project.

Output 3: Detailed Documents for Government Approval, and Request for human and financial resources to implement the feasible components of the Project

Activity 3.1 Prepare a draft document for Government Approval.
Activity 3.2 Prepare a draft document for requesting for human and financial resources to implement the feasible components of the Project.
Activity 3.3 Submit the draft documents, also as an annex, to the F/S Report.

MRCS is expected to add Sections on reporting, deliverables and timeline, QA/QC, risk and risk management, etc.

(Regarding the F/S Reports, although they should be prepared in English, translation into Thai and Lao for the Executive Summary and other related materials should be made for practical uses of the Marine Department and Waterway Department, the recipient agencies. In view of the increasing need for the aids to navigation under consideration, the F/S should start at an earliest possible date, preferably in Q1/2015.)
5. IMPLEMENTATION ARRANGEMENTS

The MRC Secretariat is the main Executing Agency for the Study. The Study shall be carried out by a team of consultants to be selected and engaged by the Thai Marine Department, following the TOR described in this document. Two officials from the Lao PDR WD will be involved at important steps during the project to receive capacity buildings and assist in coordination. The key parties to be involved include the following:

5.1 NATIONAL AGENCIES

A. MARINE DEPARTMENT

The Marine Department (MD), as the main Implementing Agency, shall serve also as the Co-Executing Agency or Implementing Agency that shall assist in performing technical supervision and providing necessary advices to ensure that the project outputs meet with the specific requirements. As appropriate and when required, the Department shall help facilitate the work of the consultants in the territory of Thailand.

The Department is under Ministry of Transport (MOT) responsible for safety of navigation in waterways, emergency and oil spill response in ports and terminals and therefore, most appropriate to assist the MRCS in supervising the technical aspect of the project.

B. THAI NATIONAL MEKONG COMMITTEE SECRETARIAT (TNMCS)

TNMCS is the Coordinating Agency.

C. WATERWAY DEPARTMENT

The Waterway Department (WD) will take part in the project for data sharing, capacity building and assist coordination by assigning two Officials.

In addition, three Officials nominated by the Waterway Department shall be involved in the Steering Committee as observers. Practical arrangements for the involvement of the two Officials of the Lao WD will be handled and covered by the Thai company.

The Department is under the Ministry of Public Work and Transport (MPWT) is responsible for river works, waterborne transport, navigation, waterways, port and therefore, most appropriate to assist in looking at the technical aspect of the project. All costs related to their involvement is to be covered by the Project budget, as stated in these ToR.

5.2 REGIONAL COORDINATION

Since coordination with the Thailand Marine Department and the Lao PDR Waterway Department is crucial for the success of the Study, MRCS, also as the Executing Agency, can coordinate between the countries if required.

5.3 PROJECT STEERING COMMITTEE
The project shall set up a Steering Committee consisting of 4 representatives from Thailand, 2 representatives from MRCS, and 3 representatives from Laos PDR as observers.

The representatives from Thailand and Lao PRD should come from operational level. The Steering Committee shall supervise and organise specific meetings. The Committee will also be responsible in considering and approving all Draft Reports based on NAP representatives' recommendations.
6. PROJECT BUDGET

The Project budget is estimated at US$116,600 (see below).

The terms of payment shall be arranged and settled in accordance with the MRCS’s rules and regulation which are to be elaborated as necessary by the MRCS. The proposed terms of payment is as below.

1) Upon contract signing: 20% of the total contracted amount
2) After the delivery of output 1: 25% of the total contracted amount
3) After the delivery of output 2: 25% of the total contracted amount
4) After submission of final report: 30% of the total contracted amount
   Total 100%

Estimated budget for the overall Study:

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<th>Item</th>
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<tr>
<td>1</td>
<td>Project experts (consultants)</td>
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<td>2</td>
<td>Field visits / traveling costs of project staff</td>
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<td>Meetings / Workshops with relevant parties</td>
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<td>Traveling costs for Steering Committee (8-9 persons for 2 trips; one trip to Chiang Saen, one to Bangkok)</td>
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In word: One hundred sixteen thousand US dollar only

7. SCHEDULE

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<th>Activities / Outputs</th>
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<th>Month 2</th>
<th>Month 3</th>
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<th>Month 5</th>
<th>Month 6</th>
<th>Month 7</th>
<th>Month 8</th>
<th>Month 9</th>
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<tr>
<td>Preparations, selection of the company, and contract arrangement</td>
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<td>Output 1: Economic and Technical Viability Report and Recommendations clearly showing which components of the Project are feasible from a technical and economical perspectives</td>
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<td>Output 2: A Detailed Procurement and</td>
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<td>Implementation Plan based on the results of the F/S</td>
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<td>Output 3: Detailed Documents for Government Approval, and Request for human and financial resources to implement the feasible components of the Project</td>
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- Preparations
- Conducting the Study
- Follow-up Actions

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