Initial Environmental Examination

Project Number: 49387-002
September 2019

Lao People's Democratic Republic: Second Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project

Nakasang, and Don Det, Don Khone Island Access Improvements, Champasak, Lao PDR

Detailed Design

Prepared by the Ministry of Information, Culture and Tourism for the Asian Development Bank.

CURRENCY EQUIVALENTS

(28 August 2019)

Currency Unit	=	kip K
K1.00	=	$0.00011
$1.00	=	K8,538

ABBREVIATIONS

DICT	-	Department of Information Culture and Tourism
DPWT	-	Department of Public Works and Transport
DOF	-	Department of Agriculture and Forestry
DONRE	-	Department of Natural Resources and Environment
EA	-	environmental assessment
EIA	-	environment impact assessment
ECC	-	environmental compliance certificate
EMP	-	environment monitoring plan
EA	-	executing agency
GMS	-	Greater Mekong Subregion
IA	-	implementing agency
IEE	-	initial environmental examination
IUCN	-	International Union for Conservation of Nature
Lao PDR	-	Lao People's Democratic Republic
MOF	-	Ministry of Agriculture and Forestry
MICT	-	Ministry of Information, Culture and Tourism
MONRE	-	Ministry of Natural Resources and Environment
MPWT	-	Ministry of Public Works and Transport
MRC	-	Mekong River Commission
NPA	-	national protected area
O&M	-	operation and maintenance
PIU	-	project implementation unit
PCU	-	project coordination unit
PMCES		Project management and Civil Engineering Support Consultant
REA	-	rapid environment assessment
SS	-	safeguard specialist
TIIG		Tourism Infrastructure for Inclusive Growth
UXO	-	unexploded ordnance
WREA	-	Water Resources and Environment Agency

WEIGHTS AND MEASURES

km:	kilometer
kg:	kilogram
ha:	hectare
mm:	millimeter

NOTE

In this report, "$" refers to US dollars unless otherwise stated.

I. EXECUTIVE SUMMARY

The detailed design (DED) of the subproject of the second Greater Mekong Subregion (GMS) Tourism Infrastructure for Inclusive Growth Project (TIIG) that will improve road access, port area and stormwater drainage in Nakasang and improve road access on Don Det and Don Khone islands in Champasak province, Lao PDR has been prepared. The TIIG will develop small scale infrastructure to improve tourist facilities and develop and strengthen management capacity to enhance tourism at different locations in Lao People's Democratic Republic (PDR), Cambodia, and Viet Nam.

Presented herein is the updated IEE[1] of the DED of the Nakasang-Det/Khone subproject. The updated environmental management plan for the subproject has been reported separately. The components of subproject are summarized below.

Nakasang Access Road and Port Rehabilitation	• Reconstruct 3.5 km X 6m access road with concrete & side drains including a turning area for buses; • Reinforce 45 m of existing riverbank protection with concrete; • Improve footpaths and ramps to pontoon pier for safer passenger access; • Relocate main drainage outfall 40m downriver; and • Reconstruct 60m X 3m riverside path
Don Det/Don Khone Access Improvements	• Pave the main 11 km network of 3 m wide access roads and passing bays with concrete; • Pave 780 m^2 vehicle parking area serving island ferry ports; • Improve cycle track/footpaths with gravel; and • Install public lighting and safety rails on old railway bridge linking Don Det and Don Khone islands

Subproject Benefits

Nakasang Access Road and Port Rehabilitation

The improvements to the main access road to Nakasang town and to the main tourist port to the "4000 islands" area of the Mekong river will greatly benefit tourism in the area, and access to the islands by residents. The chronic periodic flooding that blocks the road to normal traffic will end. The new concrete road surface will provide a durable surface that will greatly improve movement of local vehicles and tourist coaches. Apart from the upgraded access road, parking will be improved and a new turning circle for coaches provided at the Tourist Information Centre.

The improvements to the footpaths and embankments along the waterfront, and the improved ramps to the existing floating tourist pier will increase capacity and improve safety for tourists and residents. The realignment of the main drainage pipe downriver and away from the public shoreline area will improve significantly

[1] ADB, 2018. IEE of Lao People's Democratic Republic: Second Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project.

sanitation and aesthetics of the tourist staging area. The subproject will directly benefit 16,450 Nakasang residents, 228 boat operators, and about 100 vendors in Nakasang market

Don Det/Don Khone Island Access Improvements

The upgrades to the island's small road network and footpaths to concrete paving will relieve congestion, improve traffic safety, and reduce dusty and/or muddy seasonal conditions. The new lighting will allow safer use of the different foot and bicycle paths and small roads at night thereby expanding the scope of tourist activity, while providing a safer environment for the community. The subproject will directly benefit 1,240 Don Det and 1,345 Don Khone residents.

Potential Impacts

The Nakasang-Det/Khone subproject is confirmed as Category B for environment pursuant to the SPS (2009). The potential impacts of the subproject are restricted to the short-term disturbances and impacts of the construction phase. Negative impacts associated with the pre-construction phase of the subproject are negligible because no resettlement or land acquisition will be required.

Construction Phase

The potential short-term impacts of subproject will stem with the civil works activities (e.g., excavation, grading, retaining wall erection, material transport and truck traffic) of the individual subproject components. These include reduced or blocked public access to areas, impeded movement along the access roads that will be upgraded, disrupted business and recreation, noise and dust, soil and surface water pollution caused by equipment operation and maintenance, risk of public and worker accidents, increased traffic congestion traffic accidents, land erosion and river sedimentation, localized drainage and flooding problems, solid waste and domestic pollution from worker camps, and communicable disease and community conflict with migrant workers. Standard impact mitigations and construction good practices should be applied to minimize the temporary disturbances and impacts.
At specific parts of the road sections of the 3,5 km Nakasang road stretch, potential risks for erosion can occur in the rainy season, as the river banks and certain parts of the road sections have rather steep slopes, with only limited or no vegetation to hold on to the top soil. Measures should be taken in order to minimise this risk.

<u>Operation Phase</u>

The potential impacts of completed subproject will arise from (i) anticipated increased vehicle traffic and speeds along the upgraded access roads, and (iii) possible increased boat traffic between Nakasang and Don det and Don Khone islands. Increased vehicle traffic will increase risk of vehicle accidents, and potentially increase noise and dust. Enforced speed limits for different vehicle sizes must be clearly posted along the upgraded road section. Any increase boat traffic to/from Nakasang needs to be monitored to determine whether simple approach/departure boat lanes need to be installed. Boat owners need to be educated not to throw garbage into the Mekong river, or if possible not service boats in the river.

Water infiltratration will change with the road upgrade and consequently needs to be channelled away from the road area and houses. Water pipes from house units under the road leading to the river/slope. This is included in the DED. Don Det main road is very densely populated especially in the tourist high season, water

management procedures must be in place to avoid environmental damages and health related problems.

Pursuant to Outputs 2 and 3 of the TIIG Project, the adoption of the Asean Tourism Standards (e.g., Clean Tourist City Standard, Green Hotel Standard, & Public Toilet Standard) and capacity development for Tourism Destination Management, respectively, will specifically manage for maintaining clean tourist sites in Nakasang and on the two islands. Solid waste collection and management will be addressed which is the single most important requirement at all sites.

Climate Change

The separate Climate Vulnerability and Risk Assessment (CVRA) of the Feasibility Study (FS) design identified key climate change mitigation and resilience measures that have been addressed by the DED. The capacities of lateral and cross drainage of the upgraded access roads, and the upgraded stormwater collector and discharge into the Mekong river will be designed to accommodate projected increases in maximum rainfall with climate change. The concrete surfaces of the access roads will be resilient to projected increased maximum summer air temperatures with climate change.

Conclusions

The updated IEE concludes that the DED of the subproject combined with information on the affected environments is sufficient to identify the scope of the project's potential environmental impacts. Changes to environmental or social receptor data have not occurred, thus the subproject will remain Category B for environment and will not require further detailed environmental impact assessment (EIA).

The separate, updated EMP for the subproject in Nakasang and on Det and Khone islands provides an impact mitigation plan, environmental monitoring plan, and specifies institutional responsibilities and capacity needs for sound environmental management of the subproject. The EMP will be included with the construction package tender documents to allow contractors to development their contractor EMPs (CEMP).

Summary of potential environmental impacts and mitigations measures

Sub-project	Site – Location	Reference	Changes / Potential Impacts	Mitigation
C1: Nakasang Access road upgrading (app. 3,5 km from route 13 to Nakasang Port)	Nakasang, Khong District. Obervations made throughout the road stretch with detailing at 3 specific sites, appr. 1,700 m from port, 1,000 m from port and just before the port.	EMP table 1 + IEE p. 17 (table 2)	In general, the proposed road width (6 m + 1 meter in each side for water drains) seems appropriate given the lay-out of the road and surroundings. At the access road to Nakasang from Rout 13 (3,5 km), there are mostly paddy fields and a few villages at the road side, however with houses at least 50 meters from the road. At the existing road, side drains are established throughout most of the stretch, however, in the rainy season there is a tendency of flooding at specific	There is a risk for flooding at specific sites at the road in peak rainy season, which can be mitigated by ensuring sufficient depth of the draining canals.

			parts of the stretch. It is confirmed that the drains have the sufficient depth/width to absorb the amounts of water in the peak rainy season.	
C1: Port area, boat landing and small road to boat landings (road length appr. 200-250 meter)	Nakasang, Khong District. Observations made throughout the port and boat landing areas, with a small foot path leading the the last boat landing spot and pontoon piers.	EMP table 1 + IEE p. 17 (table 2)	The proposed road width is 3 m, which is appropriate with the current lay-out and location of buildings/shops. The Consultant agrees to the proposed reinforcement of the 45 m riverbank and diversion of the main drainage outlet 15 m downriver. A large amount of solid waste was observed along the riverside footpath, much of this directly on the public sidewalk.	Upgrading of the footpath, riverbank and drainage outlet will have a positive effect and definitely increase sanitary conditions for the site. Improved management of solid waste is necessary and must be effectively enforced by district authorities. Specific tasks and management will be included in the EMP, including to ensure regular collection of waste (by garbage trucks) and ensuring solid waste is not dumped in the public part of the area.
Number of beneficiaries calculated as: **1,641** Nakasang residents, 228 boat operators and appr. 100 vendors in Nakasang market.	Nakasang village	IEE Page 15, Para III.	The subproject will directly benefit **1,641** residents. There are no changes in boat operators or vendors.	
C2: Improve cycle track/footpaths with gravel; and Install public lighting and safety rails on old railway bridge linking Don Det and Don Khone islands	Don Det and Don Khone Islands	EMP table 1 + IEE p. 17 (table 2)	The current state of the cycle track / footpaths is of varying quality. Majority of the path is based on fine grained sand and clay material. Consequently, infiltration of rainwater is not very efficient, with large amounts of water run-off to the road side and pools of water on the path. With gravel surface infiltration will improve and absorb the water more efficient. The main access roads stretches through the main towns of both islands as well as agricultural and forested land. In the main villages, the housing is very close to the road with water and drainage pipes below the concrete leading to river bank. With new concrete the pipes must be placed appropriately, possibly beneath the road surface. The proposed reinforced concrete drain seems to have sufficient and right dimensions to handle the amount of water, even in peak of rainy season. At specific sites paddy fields are located very close to the road, with risk of flooding under cloudburst	

			situations, however with the reinforced drainage, this can be managed. Large part of the road stretch is currently unpaved and has natural infiltration. With new concrete surface/pavement, water will efficiently have to be led to the drainage canals, therefore the angle of the road must be sufficient to allow this	
C2: Pave 780 m2 vehicle parking area serving island ferry ports;	Don Det Island	EMP table 1 + IEE p. 17 (table 2)	The parking area is currently partly paved, however with large cracks and pockets of gravel/mud. Given that the pavement of the parking area will prohibit any water infiltration, the design must take into account that water can be led to the riverbank and rice fields located next to the parking area.	No effect.
C2: Pavement of 11 km X 3 m access roads and passing bays with concrete;	Don Det and Dong Khone Islands	EMP table 1 + IEE p. 17 (table 2)	The main access roads stretches through the main towns of both islands as well as agricultural and forested land. In the main villages, the housing is very close to the road with water and drainage pipes below the concrete leading to river bank. With new concrete the pipes must be placed appropriately, possibly beneath the road surface. The proposed reinforced concrete drain seems to have sufficient and right dimensions to handle the amount of water, even in peak of rainy season. At specific sites paddy fields are located very close to the road, with risk of flooding under cloudburst situations, however with the reinforced drainage for the road sections passing through the villages, this can be managed. Large part of the road stretch is currently unpaved and has natural infiltration. With new concrete surface/pavement, water will efficiently have to be led to the drainage canals, therefore the angle of the road must be sufficient to allow this.	With potential larger amounts of water being led from the road area to the river banks, these must be sufficiently secured to avoid erosion. Vegetation cover and small water canals can mitigate this.

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I. INTRODUCTION

A. Background to IEE

1. The second Greater Mekong Subregion (GMS) Tourism Infrastructure for Inclusive Growth Project (TIIG) will develop small scale infrastructure to improve tourist facilities and develop and strengthen management capacity to enhance tourism at selected locations in Lao PDR, Cambodia, and Viet Nam. In Lao PDR seven subprojects have been selected for implementation in Champasak and Vientiane Province.

The updated IEE of the subproject in Champasak are presented herein. The IEE of the Nakasang-Don Det/Don Khone access and port improvements subproject in Champasak province has been updated to meet the detailed design (DED) of the subproject[2]. The Environmental Management Plan (EMP) for the subproject has also been updated and reported separately.

2. The TIIG will improve, environmental services, urban-rural transport infrastructure, strengthen capacity to implement regional tourism standards, and strengthen tourism destination management. It will help transform towns in the Greater Mekong Subregion (GMS) economic corridors into green, inclusive and competitive international tourism nodes to boost trade in services and deepen market linkages between members of the GMS and Association of Southeast Asian Nations (ASEAN). The subprojects will build on the ongoing ADB-financed GMS Tourism Infrastructure for Inclusive Growth Project (2014–2019) in Lao PDR.

3. The impact of the subproject is sustainable, inclusive, and more balanced tourism development in the subproject area as envisaged in the *ASEAN Tourism Strategic Plan 2016–2025.* Similarly, the unchanged subproject outcome is increased tourism competitiveness with a primary project output being improved environmental services and management with secondary outputs defined by: (i) strengthened capacity to implement ASEAN tourism standards; and (ii) strengthened institutional arrangements for tourism destination management and infrastructure operation and maintenance (O&M).

4. The components of the subproject are summarized in Table 1.

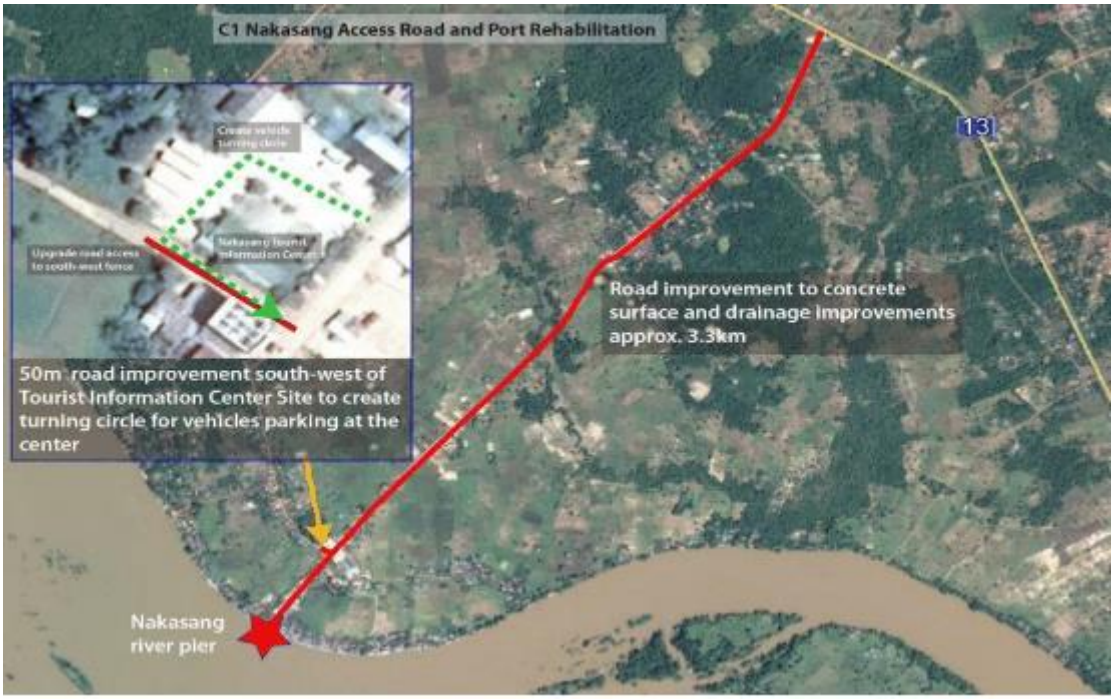
Table 1. Components of subproject in Nakasang and on Don Det/Don Khone islands

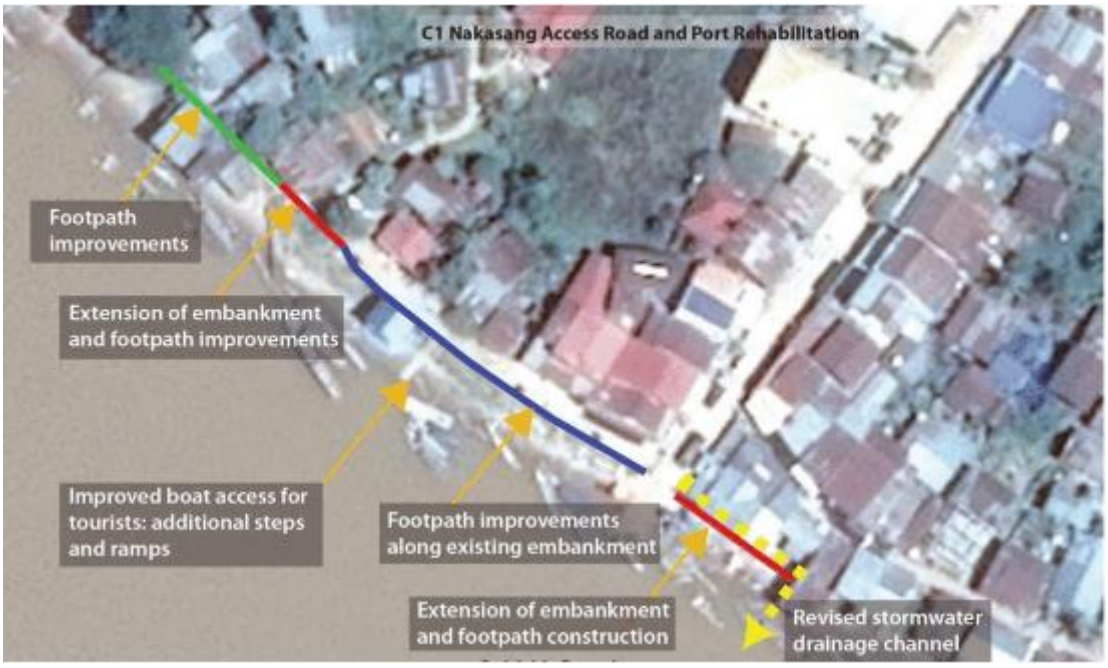
Nakasang Access Road and Port Rehabilitation	• Reconstruct 3.5 km X 6m access road with concrete & side drains including a turning area for buses; • Reinforce and extension of embankment • Improvement of footpath • Improved boat access for tourists – steps and ramps • Relocate main drainage outfall 40m downriver; and • Reconstruct 60m X 3m riverside path
Don Det/Don Khone Access Improvements	• Pave 11 km X 3 m access roads and passing bays with concrete; • Pave 780 m^2 vehicle parking area serving island ferry ports; • Improve cycle track/footpaths with gravel; and

[2] Norconsult, 2018. Detailed Engineering Design Support, Second Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project, Interim Report.

	• Install public lighting and safety rails on old railway bridge linking Don Det and Don Khone islands

Figure 1 - Nakasang Access Road Improvement / Nakasang Port Rehabilitation





B. Assessment Context

5. The project is further confirmed as category B for environment pursuant to ADB's 2009 *Safeguard Policy Statement*[3] and Good Practice Sourcebook.[4] The impact footprint of the subproject remains the same and consists of the existing access roads and port area structures that will be upgraded. The potential adverse environmental impacts will be restricted to short-term disturbances during the construction phase. Moreover, the completed subproject will improve stormwater drainage and living conditions at both tourist areas.

C. Structure of the report

6. The updated IEE of the Nakasang-Det/Khone subproject follows the format as set out in Appendix 1 of the SPS (2009). The structure of the separate EMP is modified slightly for inclusion with contractor tender documents.

II. POLICY, LEGAL, AND REGULATORY FRAMEWORK

A. National Environmental Laws, Strategies, and Policies

7. The Government of Lao PDR (GOL) has a policy to prioritize tourism sector development and that existing tourist site should be developed further, then good infrastructure will be essential to sustain the quality, economic viability and growth of Travel & Tourism. The national framework for the governance of environmental matters in Lao PDR includes a comprehensive set of environmental and natural resources related laws and regulations. Several government agencies are involved in environmental management.

8. In 2011, the Ministry of Natural Resources and the Environment (MONRE) was created by merging the Water Resource and Environment Administration (WREA) with departments of the National Land Management Authority (NLMA) and portfolios of other ministries including the Geology Department, and the Forest Conservation and Divisions within the Ministry of Agriculture and Forestry (MAF). The policies, laws relevant to environmental protection are listed below.

1. Laws

- Lao PDR Constitution, (Amended) No. 25/NA, dated 6 May 2003
- Law on Agriculture, No. 01/NA, dated 10 October 1998
- Law on Irrigation, No. 038/NA, dated 14 December 2012
- Law on Labour (Amended), No. 021/NA, dated 24 December 2013
- Law on Tourism (Amended), No. 32/NA, dated 24 June 2013
- Law on Environmental Protection as Amended No. 29/NA (2012)
- Law on Industry No. 01/99/NA (1999)
- Law on Hygiene, Prevention and Health Promotion No.01/NA (2001)
- Law on Water and Water Resources (Amended) No. 23/NA, dated 11 May 2017
- Law on Land (2003)
- Law on Roads No.203/PSD (2016)
- Law on Forestry (2007)
- Law on Cultural, Historical and Natural Heritage (2005)
- Law on Fisheries (2010)

[3] ADB. 2009. Safeguard Policy Statement. Manila.

[4] ADB. 2012. Environmental Safeguards, A Good Practice Sourcebook, Draft. Manila.

- Law on Wildlife and Aquatic Ecology (2007)

2. Decrees, Strategies, Plans, Policy

- Decree on Compensation and Resettlement Management in Development Projects, No. 84, dated 05/04/2016
- Decree on National Environmental Standards, No 81, dated 21 February 2017
- Action Plan on Climate Change (2013-2020), No. 2398/MoNRE, dated 19 April 2013
- The 8th National Social and Economic Development Plan (NSEDP) (2016-2020)
- Decree on Preservation of Cultural, Historical and Natural Heritage (1997)
- Decree on the Protection Forest (2010)
- National Forestry Strategy to 2020 (FS2020)
- National Biodiversity Strategy to 2020 & Action Plan to 2010 (NBSAP*)*
- Gibbon Conservation Action Plan 2011-2020
- Urban Master Plan (2001) No. 58/PM
- National Water Resources Strategy and Action Plan [draft]
- Strategy on Climate Change (2010)
- National Adaptation Programme of Action to Climate Change (NAPA) (2009)
- Strategic Plan on Disaster Risk Management in Lao PDR (2020, 2010) and Action Plan (2003-2005)
- Ministerial Instruction on the Process of Initial Environment Examination (IEE) of the Investment Projects and Activities No.8029/MONRE (2013)
- Ministerial Instruction on Environmental and Social Impact Assessment (ESIA) Process of the Investment Projects and Activities No.8030/MONRE (2013)
- Manual of Environmental Impact Assessment Procedures for Road Projects in the Lao PDR (1997).
- Regulation and Guidelines for the Environmental Assessment of Road Projects (1999), MPWT.
- Environmental Impact Assessment for Industry and Processing Handicraft Order No. 1222/MIH (2005)
- Regulation on EIA for Road Projects (2004)
- Decree on Compensation and Resettlement of People Affected by Development Projects (2006) and
- Technical Guideline on Compensation and Resettlement of People Affected by Development Projects (2013)

3. International Agreements

9. The Lao Government is party to international multilateral environmental agreements. Agreements pertaining to the project are listed below.

- World Heritage Convention (WHC) March 20, 1987
- Framework Convention on Climate Change (FCCC), 4 January 1995
- Agreement on The Cooperation for The Sustainable Development of The Mekong River Basin (Mekong Agreement), April 5, 1995
- Convention on Biological Diversity (CBD), September 20, 1996
- Montreal Protocol on Substances that Deplete the Ozone Layer, August 21, 1998
- Kyoto Protocol to United Nations Framework Convention on Climate Change (1998)
- Persistent Organic Pollutants (POPs), March 5, 2002
- ASEAN Agreement on Transboundary Haze Pollution, June 10, 2002
- International Plant Protection Convention (1997)

4. Environmental Standards & Criteria

10. National standards and criteria exist for drinking water quality, surface and groundwater quality, soil quality for agriculture, air quality and noise level standards, and wastewater discharge standards for BOD, NH_3-N, TSS, and pH. Specific standards are also available for certain chemical use by factories. The existing standards are found in the National Environmental Standard No 81, dated 21 February 2017. This Decree shall have to apply for the IEE in Champasack province (Nakasang, Dondet and Done Khone Access Road Improvement Sub-Projects, According to the environmental and social aspects and an appropriate mitigation measures, needs to be used during the construction and operation phases.

B. National Forest Management Types

11. Some subproject components are located adjacent to forested areas. The five primary forest types or categories with respect to forest preservation and development are defined below[5].

1. Protection Forests

12. Protection forests are forests classified for the function of environmental protection defined by water resources, river banks, road sides, preventing soil erosion, protecting soil quality, strategic areas for national defense, and protection from natural disasters.

a. Activity Restrictions

13. Protected forests are further stratified into *total protected zones* and *controlled use zones.* The *total protected zone* is usually steep sloped, contains water resources including forests along rivers, roads and other areas with high risk of environmental degradation. These areas must be protected from activities such as crop rotation, cutting, or burning, tree removal, housing construction, extraction of soil, stones, or mining.

14. The *controlled use zone* is the forest area without a perceived high risk of environment impacts. These areas must be protected like the total protection zone, but people can use wood and forest products according to the management plan. For example, Article 5 of the Forestry Law would apply which indirectly encourages the utilization of forests for research, tourism and recreational purposes.

2. Conservation or Reserved Forests[6]

15. Conservation forests are forests classified for the purposes of conserving nature, preserving plant and animal species, forest ecosystems and other valuable sites of natural, historical, cultural, tourism, environmental, educational and scientific research experiments. Conservation forests exist at the national, provincial, district and village levels.

a. Activity Restrictions

16. Like protected forests, conservation forests are divided into zones defined by *total protection zones, controlled use zones, corridor zones and buffer zones.* The *total protection zone* is the forest area that is main habitat,

[5] From Law of Forests (2007)

[6] Conservation forests commonly referred as reserved forests during discussions with agencies and village heads

feeding and breeding place for various wild animals and it is the place of diverse and dense vegetation. In this zone, it is strictly prohibited to conduct any forestry activity, to harvest any forest products, including unauthorized entry in this zone. Examples are core zones of national parks or nature reserves.

17. The c*ontrolled use zone* is the forest area adjacent or close to the total protection zone. These areas must be protected like the *total protection zone,* but people can use wood and forest products according to the local management plan.

18. The *corridor zones* are managed areas for preserving tracts of forest to provide passage for animals between two conservation forests or between a conservation forest and another category of forest to preserve existing biodiversity and to increase the general wildlife population. In this zone, it is prohibited to cut trees, conduct forestry activities or any other activity that may obstruct or destroy the passage for the animals. The *buffer zones* are managed areas for preventing any encroachment and destruction in the conservation forest.

3. Production Forests

19. Production forests are natural forests and planted forests that are actively utilized for wood production, and for wood and forestry product-related livelihoods to satisfy the requirements of national socio-economic development and people's living.

20. Two other managed forest categories which reflect the overall goal of the Government of forest restoration through community-based forest management are *Regeneration Forests* and *Degraded Forests*[7].

4. Regeneration Forest

21. Regeneration forest is young fallow forest classified to regeneration and maintenance so that it increases in maturity toward a stage of natural equilibrium.

5. Degraded Forests

22. Degraded forest has been heavily damaged to the extent that land is barren without trees. The forest is classified for tree planting and/or allocation to individuals and organizations for tree planting, permanent agriculture and livestock production, or for other purposes.

C. National Environmental Assessment Procedure & Directives

23. Pursuant to the Environmental Protection Law (2012), development projects and operations that have the potential to affect the environment shall require environmental assessment in accordance with the regulations of MONRE (previously WREA).[8] MONRE is responsible for environmental management and monitoring, and the issuance of an Environmental Compliance Certificate (ECC) as per the Ministerial Instructions on the Process of IEE of the Investment Projects and Activities No.8029/MONRE (2013) and on ESIA Process of the Investment Projects and Activities No.8030/MONRE (2013).

[7] From NAFRI, 2007
[8] WREA now incorporated in the new MONRE

24. The Project Owner in Lao PDR is the Ministry of Information Culture and Tourism (MICT). The MICT is required to conduct the initial environmental examination (IEE) in accordance with the MONRE Directive. The provincial department of MONRE (DONRE) screens the project to determine whether the project is categorized as Group 1 or Group 2. Group 1 projects require an IEE and Group 2 projects an Environment and Social Impact Assessment (ESIA). For Group 2 projects, the project owner prepares a Scoping Report and Terms of Reference to be reviewed and approved by MONRE. Group 1 projects are approved at the provincial level (DONRE) and Group 2 projects at the national level (MONRE).

25. The technical and procedural aspects of above regulations and directives were recently combined into the UNDP-UNEP supported and MONRE-sponsored Environmental Impact Assessment Guidelines for Lao PDR (2012), which has been followed by the *draft* IEE guidelines (2013).[9] The 2012 EIA and 2013 draft IEE guidelines support the recently promulgated Decree of Environmental Impact Assessment (2010). The IEE requirements of the ADB SPS (2009) satisfy the IEE guidelines for Lao PDR

26. The Lao PDR's environmental assessment process does not dictate a formal timeline for the approval process for a project IEE/EIA, only the series of process steps. MONRE confirmed that there is not a formal timeline for the preparation and approval of an IEE or EIA, but that the normal timeline for the approval of an IEE or EIA after documents submission to MONRE is approximately 45 days. The environmental assessment process is completed after detailed engineering design. Environmental Compliance Certificates (ECC) for subprojects should be obtained prior to construction contract award.

D. ADB Safeguard Policy

27. The ADB Safeguard Policy Statement (ADB 2009) clarifies the rationale, scope and content of an Environmental Assessment and is supported by ADB's Good Practices Sourcebook (2012). Projects are initially screened using a Rapid Environmental Assessment (REA) Checklist to determine the level of assessment that is required. Projects that cause significant or major environmental impacts that are irreversible, diverse or unprecedented and/or affect an area larger than the sites or facilities subject to physical works are classified as Category A, an Environmental Impact Assessment (EIA) is required; Projects which have potential adverse impacts that are less adverse than those of category A, which are site-specific, largely reversible, and for which mitigation measures can be designed more readily than for category A projects are classified as Category B (an Initial Environmental Examination (IEE) is required); and Projects that are likely to have minimal or no negative environmental impacts are classified as Category C, environmental implications need to be reviewed.

III. DETAILED DESIGN OF NAKASANG - DET/KHONE SUBPROJECT

A. Nakasang access road and port area

28. Nakasang port is about 5 km north of the Lao PDR–Cambodia border and a key entry point to the "4,000 islands" tourism area. The port and access road from National Road 13 are in poor condition and susceptible to flooding. Drainage and sanitation arrangements are also inadequate and unsustainable. The subproject will address these issues by (i) reconstructing the 3.5 km access road with concrete paving (6 m carriageway) and side drains, including a turning area for buses; (ii)

[9] MONRE 2012, 2013

reinforce 45 m of riverbank protection with concrete; (iii) improve footpaths and ramps to floating river pontoons to provide safer passenger access; and (iv) divert the main drainage outlet (1,000 mm diameter) 15 m downriver, (v) reconstruct the 60m riverside path (3m wide). The subproject will directly benefit 1,6450 Nakasang residents, 228 boat operators, and about 100 vendors in Nakasang market.

29. For the DED some basic assumptions apply for roads as follows:

1. The various types of roads in the subprojects must to maximum extent follow the existing road alignment, vertical curvature and width of the roads.
2. This is important to avoid resettlement issues that are not covered or included in the subprojects.

30. In Lao PDR the National Road Design Manual of April 2018 will apply for the public roads and for roads and drainage in general. The classification and design criteria for public roads in Lao PDR are shown in Table 2.

Table 2. Road design classification and criteria for Lao PDR

GoL/MPWT Standard

Item	Road Design Class	I			II			III			IV			V			VI		
1	Traffic (ADT)	>8000			3000-8000			1000-3000			300-1000			100-300			50-100		
2	Terrain	F	R	M	F	R	M	F	R	M	F	R	M	F	R	M	F	R	M
3	Design Speed (KM / hour)	100	80	60	100	80	60	80	60	40	80	60	40	60	40	20	60	40	20
4	Carriageway (m)	18	16	14	12	10	7	9	8	7	7	6.5	6	6.5	6	5.5	5	4.5	4
	Number of lanes	4			2			2			2			2			1		
	Lane Width (m)	3.75	3.75	3.5	3.75	3.75	3.5	3.5	3.5	3.0	3.0	3.0	3.0	2.75	2.75	2.5		3.5	
	Paved Shoulder (m)	2x0.5	2x0.5	2x2	2x0.5	2x0.5	2x2	2x2	2x2	2x1	2x1	2x1	2x.5	2x0.75	2x0.75	2x0.5	2x0.75	.2x0.75	2x0.5
	Island width at road centerline (m)	3	3	2															
	Island divided between paved shoulder and low traffic	2x3	2x3	-	2x3	2x3													
5	Max. Gradient (%)	5	6	7	5	6	7	6	7	8	6	7	8	7	8	9	7	8	9
6	Min. Horizontal. Curve (m)	400	250	130	400	250	130	250	130	60	250	130	60	130	60	20	130	60	20
7	Min. Vertical Curves:																		
	Crest																		
	Length of curve for visibility safety (m)	620	370		420	260		370	820	.	260	150	.	100	60	.	50	.	.
	Stopping sight distance (m)	170	120		140	100		170	80	.	100	60	.	60	40	.	40	.	.
	Sag																		
	Sight Distance for overtaking (m)	130	90		100	50		90	50	20	50	40	.	30	25	.	25	20	.
8	Super Elevation (%)	3-10																	
9	Cross Fall (%)	2-3																	
	Paved Shoulder (%)	>3																	
10	Road Reserve (m)	30			20												15		
11	Bridge Design Live Load	HS-20-44+25%																	
12	Max. Axle Load (ton)	9.1																	
13	Surface Type	Paved															Paved/Unpaved		

F = Flat, R = Rolling, M = Mountainous

Sourced from GoL/MPWT

From Norconsult, Footnote #2

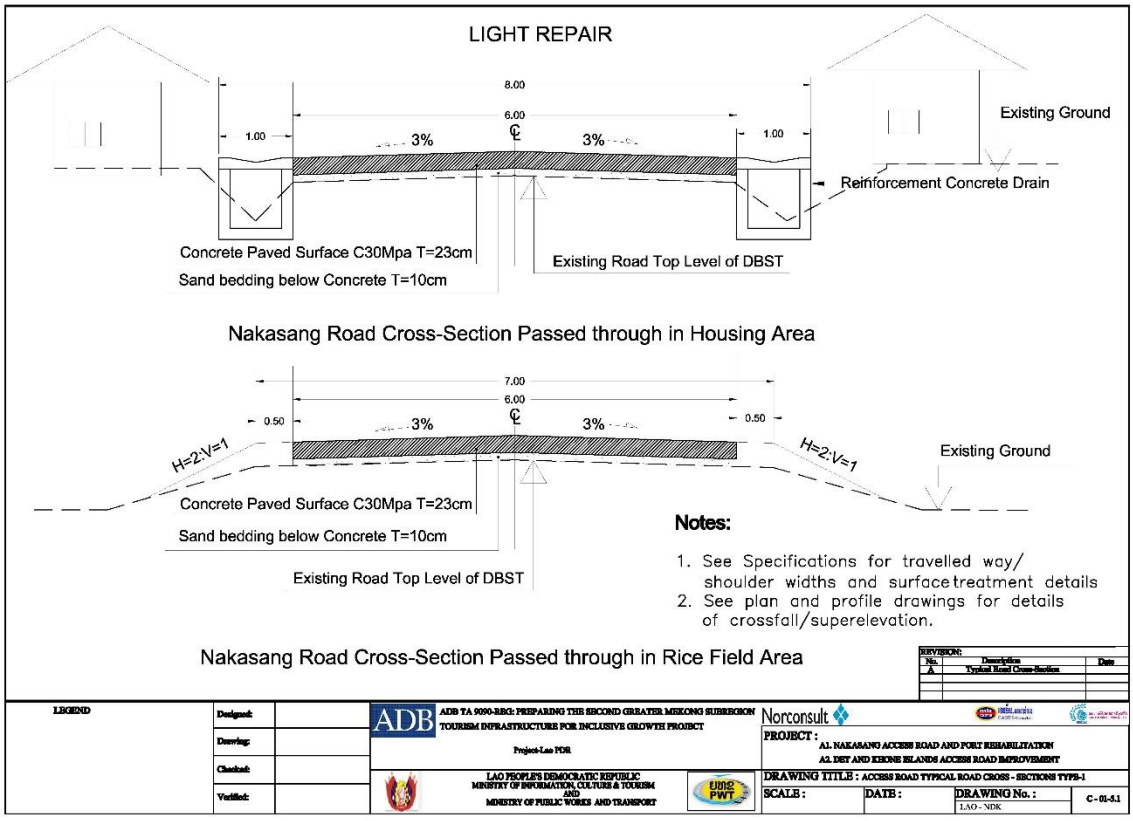
31. The DED of the upgrades to the Nakasang access road and port area generally follows the FS designs (Table 2) with minor revisions. The Nakasang access road will continue to be a public road with relatively moderate traffic providing access to Nakasang town/port and Don Det/Don Khone islands. It will be a type F5 road (Table 2) but will maintain the existing Right of Way (ROW) with 6m carriageway.

32. Repair of some road sections along the Mekong riverside has been included in addition to improved sidewalks. An improved parking area with concrete surface and footpath by the port is also included. For the main access road from NR-13, a combination of light repair (Figure 1) will occur to intact road surfaces with full repair (Figure 3) of damaged road sections with a new concrete surface the whole length.

Table 3. Components of subproject in Nakasang

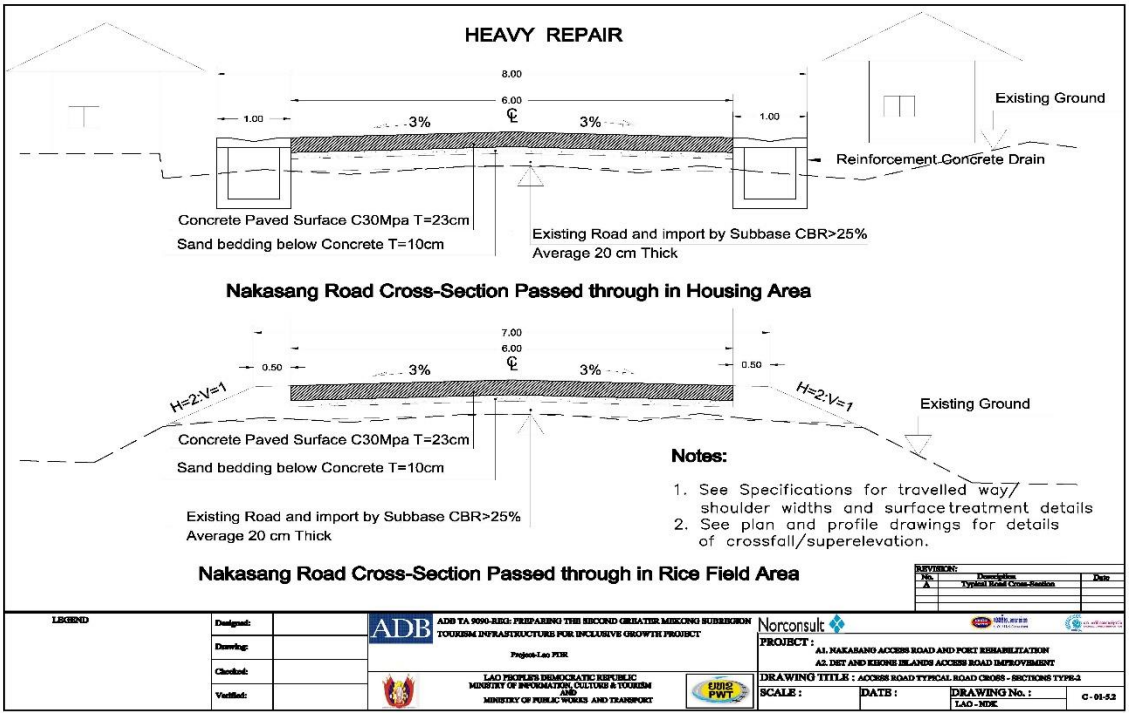
Nakasang Access Road and Port Rehabilitation	• Reconstruct 3.5 km X 6m access road with concrete & side drains including a turning area for buses; • Reinforce and extension of embankment • Improvement of footpath • Improved boat access for tourists – steps and ramps • Relocate main drainage outfall 40m downriver; and • Reconstruct 60m X 3m riverside path

Figure 2: Cross Section of light repair of Nakasang access road



From Norconsult, Footnote #2

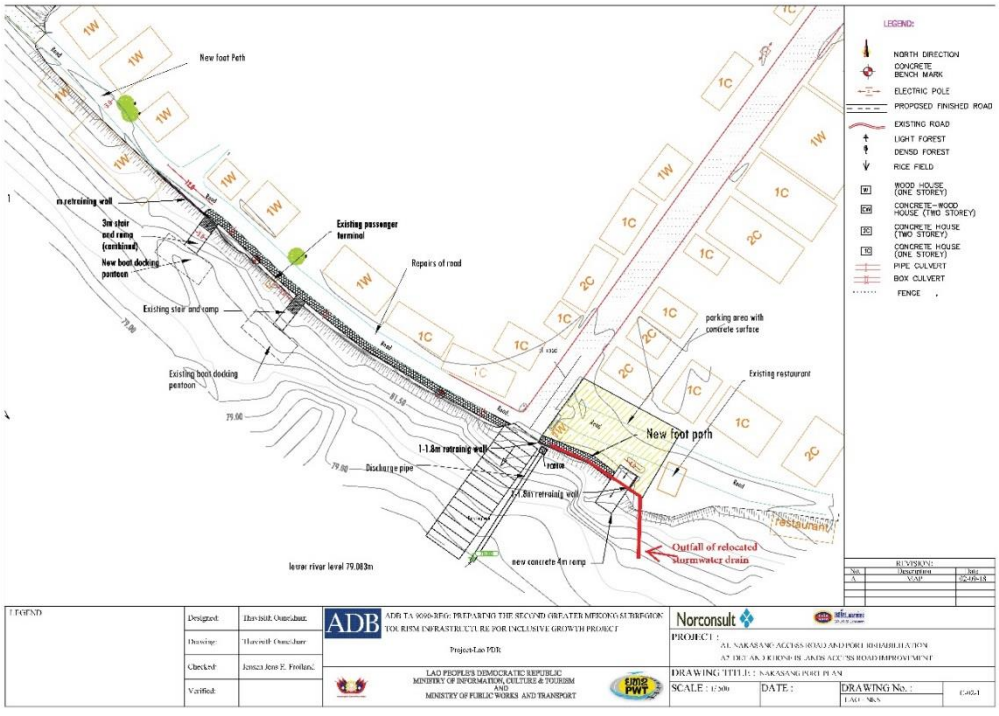
Figure 3: Cross section of manor repair of Nakasang access road



From Norconsult, Footnote #2

33. Figures 3 and 4 show the plan and cross-sectional views of the upgraded riverside road, retaining wall, steps down to floating passenger pier, and the relocated stormwater drainage outfall. Relocated stormwater drain will follow retaining wall.

Figure 4: Upgraded riverside road/retaining wall, steps to pier and stormwater outfall



From Norconsult, Footnote #2

B. Roads and footpaths on Don Det and Don Khone islands

34. Det and Khone islands are part of the 4,000 islands, located 145 km south of Pakse. The island's narrow gravel/dirt roads are dusty during the dry season and become muddy, unsanitary tracks in the rainy season. The subproject will improve the situation by (i) paving the main 11 km network of 3 m wide access roads and passing bays with concrete; (ii) pave the 780 m^2 vehicle parking area that serves the island ferry ports; (iii) improve 1.5m wide cycle track/footpaths with gravel; and (iv) install public lighting and safety rails on the old railway bridge linking Det and Khone islands. The subproject will directly benefit 1,240 Don Det and 1,345 Don Khone residents and improve visitor access and experience.

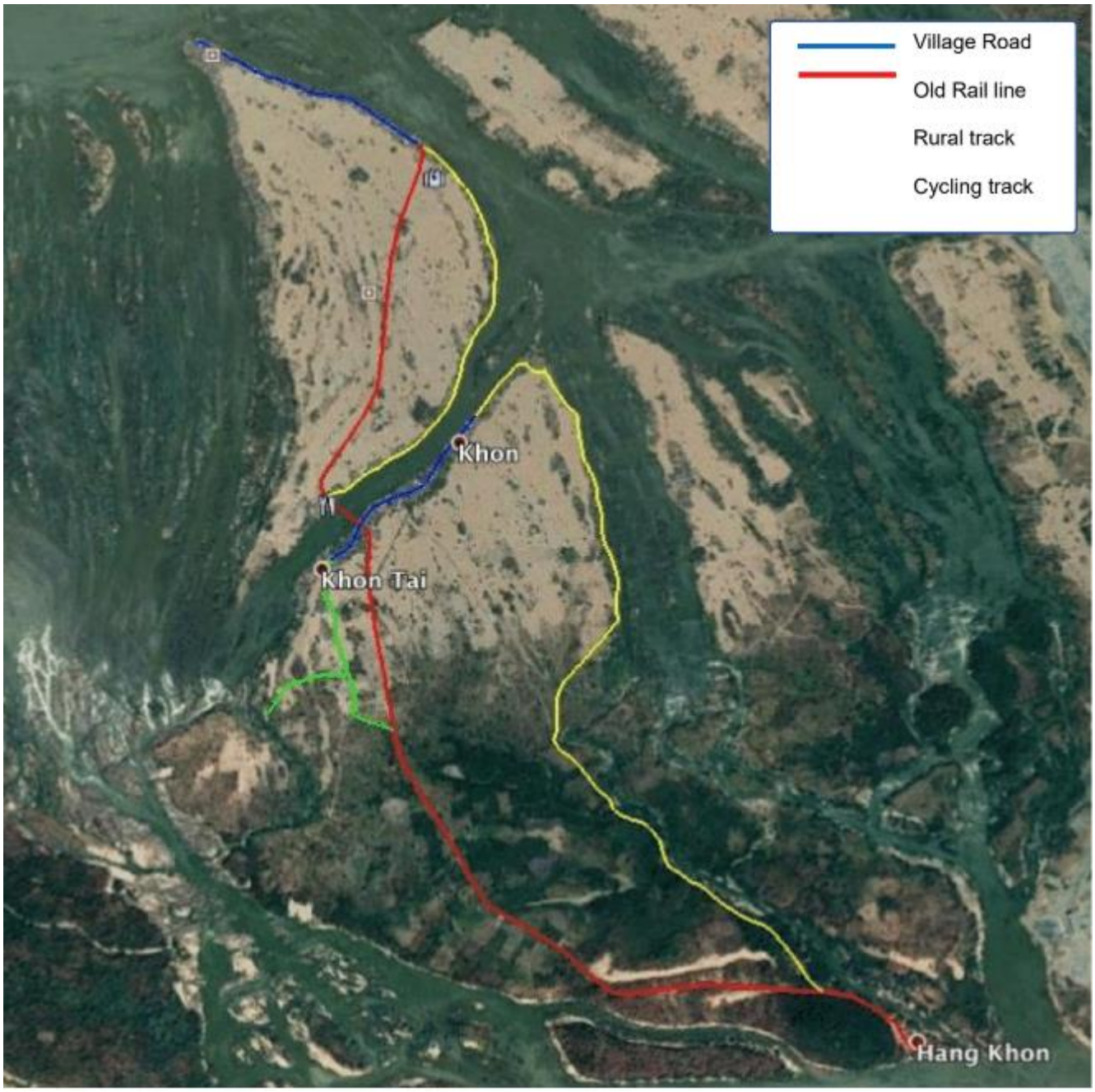
35. The DED of the upgrades to roads and footpaths on Det and Khone islands follows the FS designs (Table 4) with minor revisions. Similar to Nakasang access road the road and footpath upgrades will strictly follow the vertical and horizontal alignments of the existing roads and footpaths. The main island and village roads will have special conditions. They will have low traffic loads, and heavy trucks will not be allowed on the islands. They will be classified as class VII with maximum single axle loads 6.8 tons. The speed limit proposed 40 km/h on the main island road and 25 km/h on the village roads.

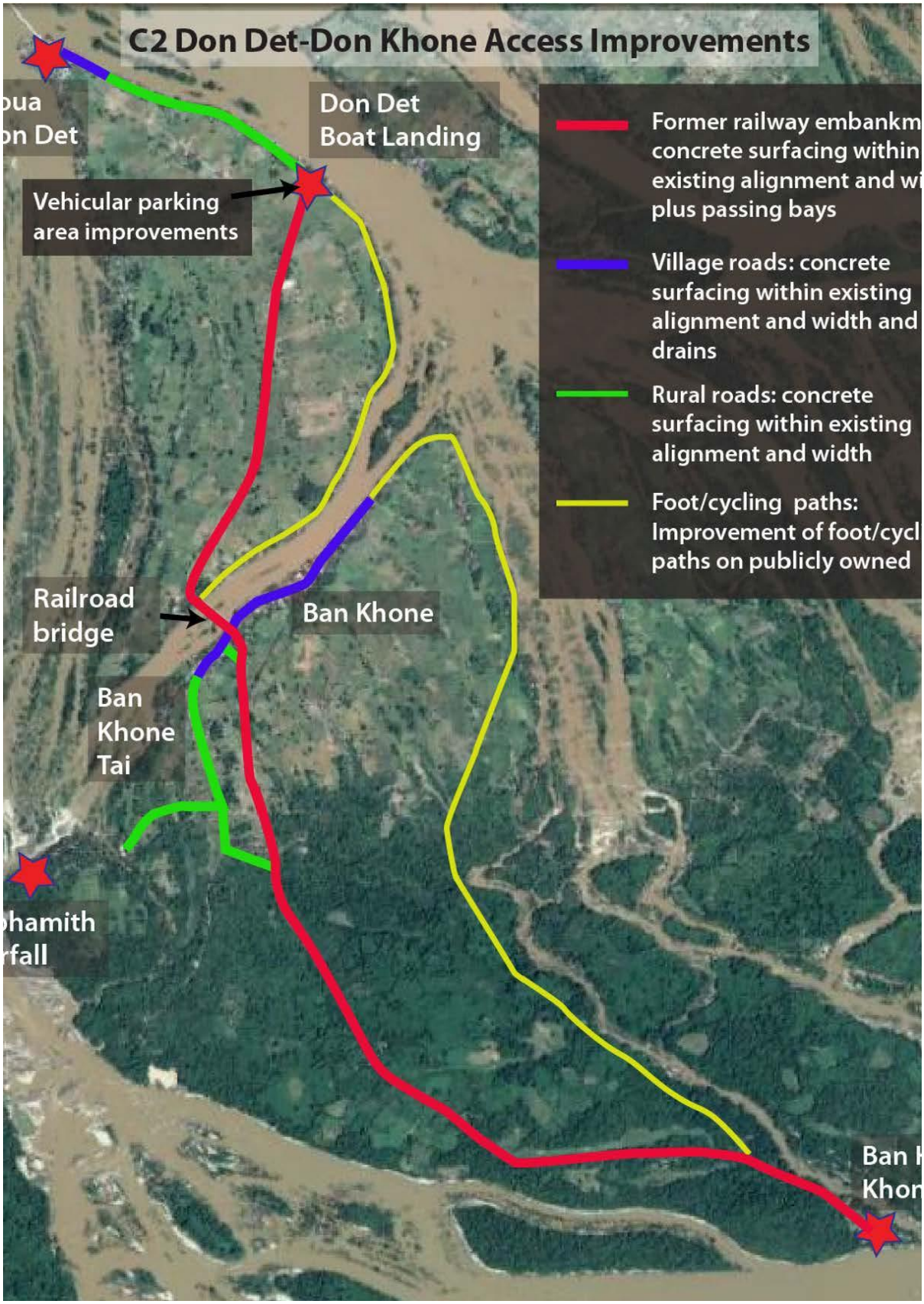
Table 4. Components of subproject on Det and Khone islands

Don Det/Don Khone Access Improvements	• Pave 11 km X 3 m access roads and passing bays with concrete; • Pave 780 m^2 vehicle parking area with concrete serving island ferry ports; • Improve cycle track/footpaths with gravel; and • Install public lighting and safety rails on old railway bridge linking Don Det and Don Khone islands

36. The footpaths will also have very low traffic loads, and trucks and cars will not use them. They will have normal drainage (e.g., culverts) and speed limit of 20 km/hr should bear 6.8 tons loading. For some sections without inhabitants such as the east side of Don Khone island special considerations may apply, particularly regarding 3 necessary bridges. Normal or box culverts and backfill will be used instead of existing light/wood bridges. Figure 5 shows the plan and cross sectional DED views of the network of roads with the cross sectional DED of the roads shown in Figure 6.

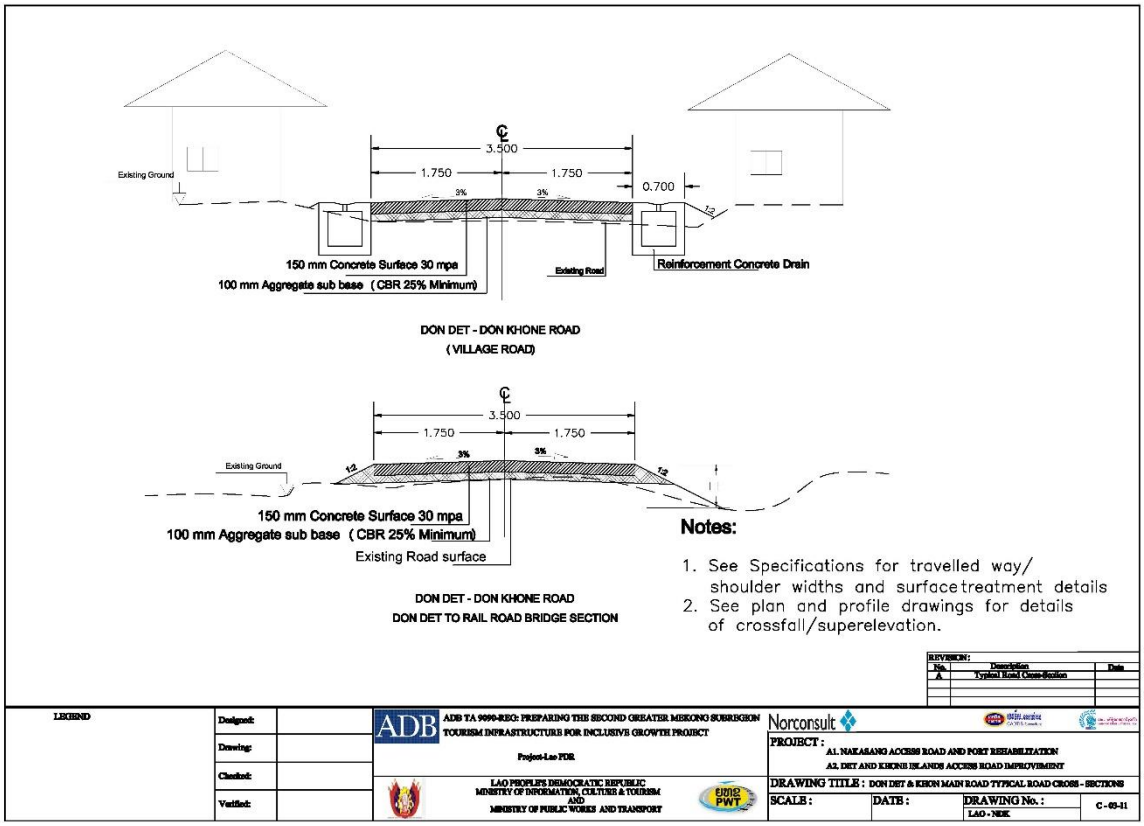
Figure 5: Plan view of Don Det / Don Khone Islands





From Norconsult, Footnote #2

Figure 6: Cross Section of Road Designs on Don Det / Khone Islands



From Norconsult, Footnote #2

C. Climate Change Mitigation and Resilience

37. The objective of the DED was to provide cost effective, climate-resilient measures for the Nakasang-Don Det/Don Khone subproject by adapting the infrastructure to the impacts of climate change and climate variability. The climate resilience activities fall under two outputs:

Output 1: Infrastructure adapted to extreme weather conditions due to climate change,

Output 2: Increased resilience of project infrastructure to long term climate change.

38. The detailed designs of the Improvements to Nakasang access road and port area, and the roads and footpaths on Det and Khone islands have addressed the key required climate change resilience and mitigation measures that were identified by the Climate Risk and Vulnerability Assessment[10] (CRVA) of the FS of this subproject of the TIIG.

39. The key climate change resilience measures were adequate drainage and resilience to flood levels of the Mekong river. Mitigation of climate change focused on an insignificant anticipated increase in vehicle traffic and thus GHG production along Nakasang access road.

[10] ADB 2018, Supplementary Appendix of TA9090: Climate Risk and Vulnerability Assessment (CRVA) of TIIG subprojects in Lao PDR and Cambodia.

1. Caveat

40. Factors considered in making engineering adjustments for the subproject for climate change included cost-effectiveness, current climate variability and potential future risk. It is important to note that existing climate change impact assessments are insufficient to provide a scientific probability of future climate change, and therefore, the civil engineering adjustments based on expected future changes are difficult to calculate quantitatively. A margin of safety risk factor is therefore applied instead.

41. The following are relevant: (i) climate change trends and projections; (ii) impacts of climate change on hydrology, ecology, and soil; (iii) natural environment including topography, geology, land use, and climate hazards; (iv) social environment including poverty levels and population density; (v) built environment; and (vi) hazards risk mapping.

42. Engineering designs, standards and guidelines are selected to withstand climate change along with proposed amendments. The Lao PDR Ministries currently use a set of standards and guidelines for engineering design which may not fully consider long-term implications of climate change. Available materials and studies of climate change scenarios and consequences in the "4000 islands" region have been assessed and conclusions and recommendations addressed.

2. Climate change resilience for subproject

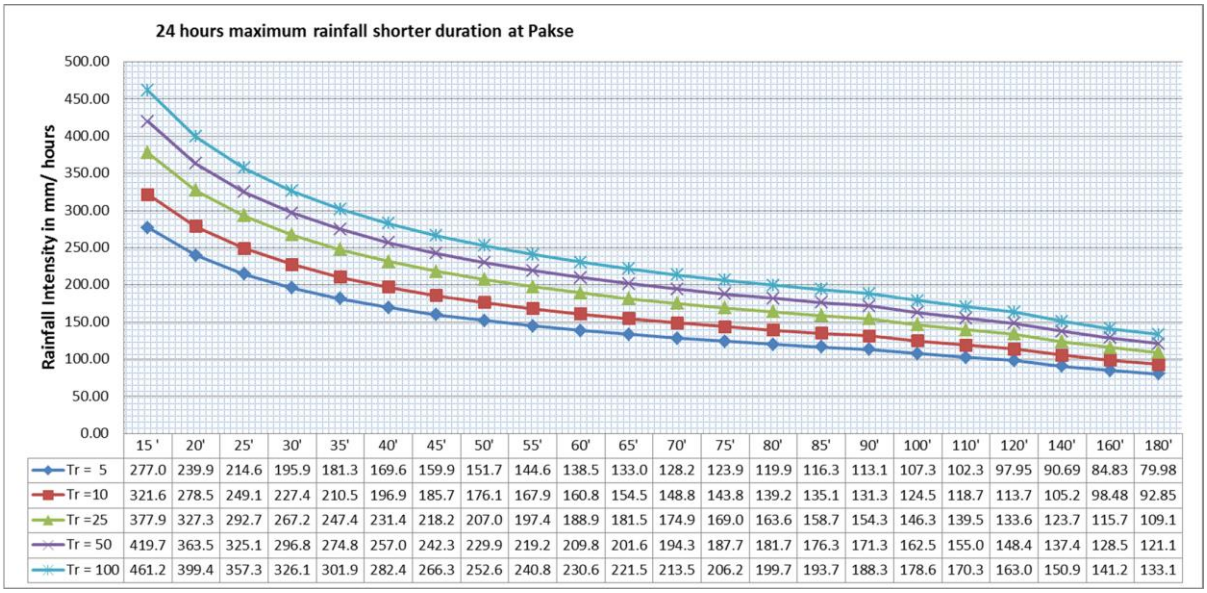
43. The subproject considers climate resilience adaptation measures to reduce adverse impact of climate risk through the improvement and upgrading of storm water drainage and riverside structures resilient to Mekong flood levels. As a summary, adaptation of climate change for the storm drainage has been designed according to the following criteria:

- An increase of annual precipitation of 5% (climate change portion)
- Flooding of structures for 50year return period + a freeboard of 50cm (dependent on local conditions) reflecting an increase of annual precipitation of 5% (climate change portion)
- Design of storm water culverts for 10 year return period
- All infrastructure should have a lifespan of minimum of 100 years

i. Rainfall

44. Intensity, Frequency, and Duration (IFD) rainfall curves derived for Pakse (Figure 16) were applied as an indicative guideline for the subproject. The curves are to be used only for designing of drainage and road culverts for intense short rainfall events.

Figure 7: IDF curve for Pakse



	15 '	20'	25'	30'	35'	40'	45'	50'	55'	60'	65'	70'	75'	80'	85'	90'	100'	110'	120'	140'	160'	180'
Tr = 5	277.0	239.9	214.6	195.9	181.3	169.6	159.9	151.7	144.6	138.5	133.0	128.2	123.9	119.9	116.3	113.1	107.3	102.3	97.95	90.69	84.83	79.98
Tr =10	321.6	278.5	249.1	227.4	210.5	196.9	185.7	176.1	167.9	160.8	154.5	148.8	143.8	139.2	135.1	131.3	124.5	118.7	113.7	105.2	98.48	92.85
Tr =25	377.9	327.3	292.7	267.2	247.4	231.4	218.2	207.0	197.4	188.9	181.5	174.9	169.0	163.6	158.7	154.3	146.3	139.5	133.6	123.7	115.7	109.1
Tr = 50	419.7	363.5	325.1	296.8	274.8	257.0	242.3	229.9	219.2	209.8	201.6	194.3	187.7	181.7	176.3	171.3	162.5	155.0	148.4	137.4	128.5	121.1
Tr = 100	461.2	399.4	357.3	326.1	301.9	282.4	266.3	252.6	240.8	230.6	221.5	213.5	206.2	199.7	193.7	188.3	178.6	170.3	163.0	150.9	141.2	133.1

From Norconsult, Footnote #2

45. Rainfall data for Champasak have been collected for a selection of years between 1929 and 2002. The average annual rainfall was 2555 mm/year and the extreme maximum was 1381 mm/month (July 2000).

ii. Computation of storm water drainage flow

46. The Rational Method is used for the calculation of peak discharges for the design of the road drainage for the subproject. The Rational Method is the most commonly method used internationally for calculation of run-off in urban and rural areas.

47. The Rational Method Equation is defined as: Q=c*I*a*k,

where,

Q = peak discharge, l/sec
c = runoff coefficient
I = rainfall intensity (l/sec/ha
a = area of contributing basin (ha)
k= climate factor for future increase in precipitation.

48. The future annual increase in precipitation is assumed to be 5% (k=1.05) according to Appendix 7 of ADB CTDP4: Climate Proofing of Infrastructure.

iii. Computation of storm water drain sizes

49. The Manning Formula is used for calculation of storm water drain sizes. The Manning's Formula is one of the most commonly method used internationally as follows:

$$V = \frac{1}{n} R^{2/3} S^{1/2}$$

where,

V = mean velocity (m/sec)
N = Manning coefficient
R = hydraulic radius (m)
S = friction slope (m/m)

iv. Design Criteria

50. The lifetime of the culverts, canals, buildings and infrastructure should not be less than 100 years. The following design parameters for stormwater have been applied:

i) Monthly average temperature 24ºC
ii) 10-year return period for precipitation to be used to calculate the required capacity of the peripheral storm water drainage canals.
iii) Minimum slope of 0.5 per cent for gravity transfer as a general requirement

IV. DESCRIPTION OF ENVIRONMENT

51. The environmental baseline information was obtained primarily from existing reports and available data provided by the provincial environment agencies including the provincial Department of Natural Resources and Environment (DONRE), and Department of Agriculture and Forestry (PAFOs). Discussions with national counterpart agencies in Pakse also provided additional information where relevant. In addition to applying available data/information, and intelligence obtained in meetings with provincial and national agencies, the subproject area in Nakasang and on Det and Khone islands was visited to inspect the specific environments that will be affected by the subproject components.

52. The description of affected environment is defined by natural features, and land use, and cultural features. While focus is on the subproject area, regional information is included where necessary for important context. The potentially affected social, economic, and demographic features of the subprojects are provided in detail in separate social impact reporting.

53. Lao PDR is 236,800 km^2 and situated in the centre of the South East Asian peninsula between 13°54' and 22°30'N and between 100°05' and 106°38'E. The landlocked country which extends approximately 1,000 km at its longest length in a northwest to southeast direction is bordered by Cambodia in the south, Thailand and Myanmar in the west, the Peoples Republic of China (PRC) in the north, and Viet Nam to the east. Champasak Province in which the subproject is located is one of 17 provinces forming Lao PDR.

1. Location

54. The Nakasang access road/port rehabilitation the Det and Khone islands road access improvements subproject is located in Khong District, Champasak Province. The province covers an area of 15,415 km^2 and is bound in the north by Salavan Province, Sekong and Attapeu provinces to the east, Cambodia to the south and Thailand to the west. The subproject area is on the flat flood plains of the Mekong river and Siphandone (4,000) islands.

55. The subproject is bounded to the north by GPS 14º,01',22" N, 105º,56',19E, and to the south by 13º,51',80" N, 105º,54',46" E. The area influenced[11] by the subproject is delimited by the access road into Nakasang and, and Nakasang port on the eastern shore of the Mekong

[11] SPS (2009), Appendix 1, para 6

river which is just north of Det and Khone islands. The influence of the subproject will be restricted to Nakasang town and both islands, and the impact of the subproject on the future residential and tourism enterprise community. There are no associated facilities (SPS 2009) with the subproject. The direct impact of increased tourist activity on solid waste production in Nakasang town and on Det and Khone islands will need to be managed as part of the destination management planning for the subproject. Solid waste pollution is currently increasing at the tourist port area in Nakasang town.

56. The land area of Nakasang is comprised agricultural lands and scattered plantation forest through which the road to Nakasang town traverses. The primary agricultural crops are rice and vegetables. Nakasang supports residential areas, and small business and markets. Det and Khone islands are dominated with plantation/scrub forest, some agriculture land. The Mekong river supports fishing and boat transportation livelihoods. Tourism services are the dominant activity on the islands which consist of water recreation in the Mekong river, walking tours, and spectacular vistas of the unique cataracts in the Mekong river on western and eastern sides of Khone island.

2. Climate

57. The local climate is dominated by the monsoon regime with a southwest monsoon (humid, hot) from late March to October and the northeast monsoon (dry and cooler) from November to early March. The climate of the area is humid with average temperature at around 28^{o}C and minimum temperature of 23.2^{o}C and highest temperature at 32.2^{o}C. Average annual rainfall is 889mm and average number of days of rain is 107 per year. Annual average evaporation rate is 1,285mm. Annual humidity rate is 70%.

3. Topography

58. As indicated above the subproject area lies on the flat flood plain of the Mekong river between 103m and 115m above sea level (masl).

4. Water resources

59. The dominant and most important water resource in the area is the Mekong river into which the nearest major tributary - the Xedon River flows. Most of the local people rely on the Mekong as the sole source of water for cleaning and disposal of solid and liquid wastes. Bottled drinking water is used especially by tourists. Island residents use bottled water and well water. Consequently, the waters of Siphandone channels of the Mekong river as the river breaks up and surrounds the reported 4000 islands in the river commonly show signs of river pollution (foam development and solid waste flotsam), while local health authorities report a variety of health hazards caused by faecal contamination and vector borne diseases resulting from general lack of sanitation coupled with the high (and increasing) population density.

60. Contrastingly, the recent EIA for Don Sahong Hydro Power Project (HPP) reports the Mekong river at the subproject area to be clean and unpolluted. The water quality data for the Mekong River at Pakse generally falls within acceptable limits for both drinking water and ambient surface water quality.

5. Community Fisheries

61. Fishing is one of the main sources of income to the community in the subproject area. During the rainy season, many types of fish (Table 5) are caught and sold at Pakse market through middlemen. Pakse market are usually flooded with a variety of fish from the region with prices ranging from 25,000 Kip/kg to 100,000 Kip/kg depending on the type of fish. Several tones are caught daily. The most common fish species caught are *Cirrihinus microlopis, Bengana behri, Hemibagrus wyckiodes, Micronema spp, Cf. barbatula* and *Henichorychus lobatus.* In the rainy season, many fish species are caught with the traditional

method using bamboo fish traps (Figure 9A). None of the fishes in Table 5 are protected or of particular conservation significance.

Table 5: Common Fishes found in Khong District

Lao PDR Name	Scientific Name	Common Name
Dry Season Upstream Migration – 4 Months December to April		
	Cyprinidae	
ปาปຽน	*Scaphogenus bandanesis*	Pa Pien 9
ปาปຽน	*Scaphogenus steinegri*	Pa Pien 13
ปาพอน	*Cirrihinus microlopis*	Pa Pawn
ปาเกยๆ	*Cirrihinus nolitrrella*	Pa Geng
ปาหอ้าสีๆ	*Labeo erythropterus*	Pa Wa Soong
ปาหอ้าหน้านໍ	*Bengana behri*	Pa Wa Na Noor
ปาสะลิ	*Erythopterus melangira*	Pa Sree
ปาปากนุด	*Hysibarbus sp.*	Pa Pak Nout
ปาสะอิอ	*Numerous Small Cyprinids*	Pa Saew
Wet Season Upstream Migration – 3 Months – mid-May to mid-July		
	Pangasidae	
ปาเพ้ย	*Cf. barbatula*	Pa Phia
ปาเปาะ/กิ	*Pangasius conchophilus*	Pa Por / Gae
ปาบึ๊	*Pangasius larnaudii*	Pa Beung
ปาฉ้อยหางเหลืองๆ	*Pangasius krempfi*	Pa Sooai Hang Leuang
ปาหนู	*Heicophagus waandersii*	Pa Noo
ปายอน	*Pangasius macronema*	Pa Nyawn
ๆๆปายอนหางก๋ม	*Pangasius pleurotaenia*	Pa Nyawn Tawng Khom
	Bagnidae	
ปาก๊ด	*Hemibagrus filamentosous*	Pa Kot
ปาเคิง	*Hemibagrus wyckiodes*	Pa Kung
	Siluridae	
ปาค๊บ	*Belodonthicthys dinema*	Pa Khop
ปานางเดง	*Hemisilurus mekongensis*	Pa Nang Deng
ปานาง	*Micronema spp*	Pa Nang
ปาปิกใหย่	*Kryptopterus spp.*	Pa Peekgai 1 & 2
ปาปิกใหย่	*Ompok hypothalamus*	Pa Peekgai 3
ปาเฉือม	*Ompok bimaculatus*	Pa Seum
	Sisoridae	
ปาเคะใหย่	*Bagarius yarrelli*	Pa Khe Yai
ปาเคะน้อย	*Bagarius*	Pa Khe Noi
	Cyprinidae	
ปาใน	*Cyprinus carpio*	Pa Nai
Downstream Migration - 6 Months – June to December		
	Cyprinidae	
ปาส้อยห่อเฮม	*Henichorychus lobatus*	Pba Soi Hua Lem
ปาส้อยห่อโบ	*Henichorynchus siamensis*	Pba Soi Hua Bo
ปาลางก๋ม	*Labiobarbus spp.*	Pba Lang Khon

Lao PDR Name	Scientific Name	Common Name
ปาแตบ	*Paralabuca spp.*	Pba Dtep
ปากยง	*Lobocheilus melanotaenia*	Pba Kiang
ปาตอกต้อย	*Crossocheilus sp*	Pba Tok Toi
ปาเอิน	*Probarbus jullieni*	Pba Eun

(from Don Sahong HPP EIA)

Figure 8. Fishing in the subproject area

Figure 8A: Children harvesting fish from fish traps at Hang Khone island

Figure 8B: Large fish species sold at Pakse market

Figure 8C: Fish species sold in Nakasang market

6. Agriculture

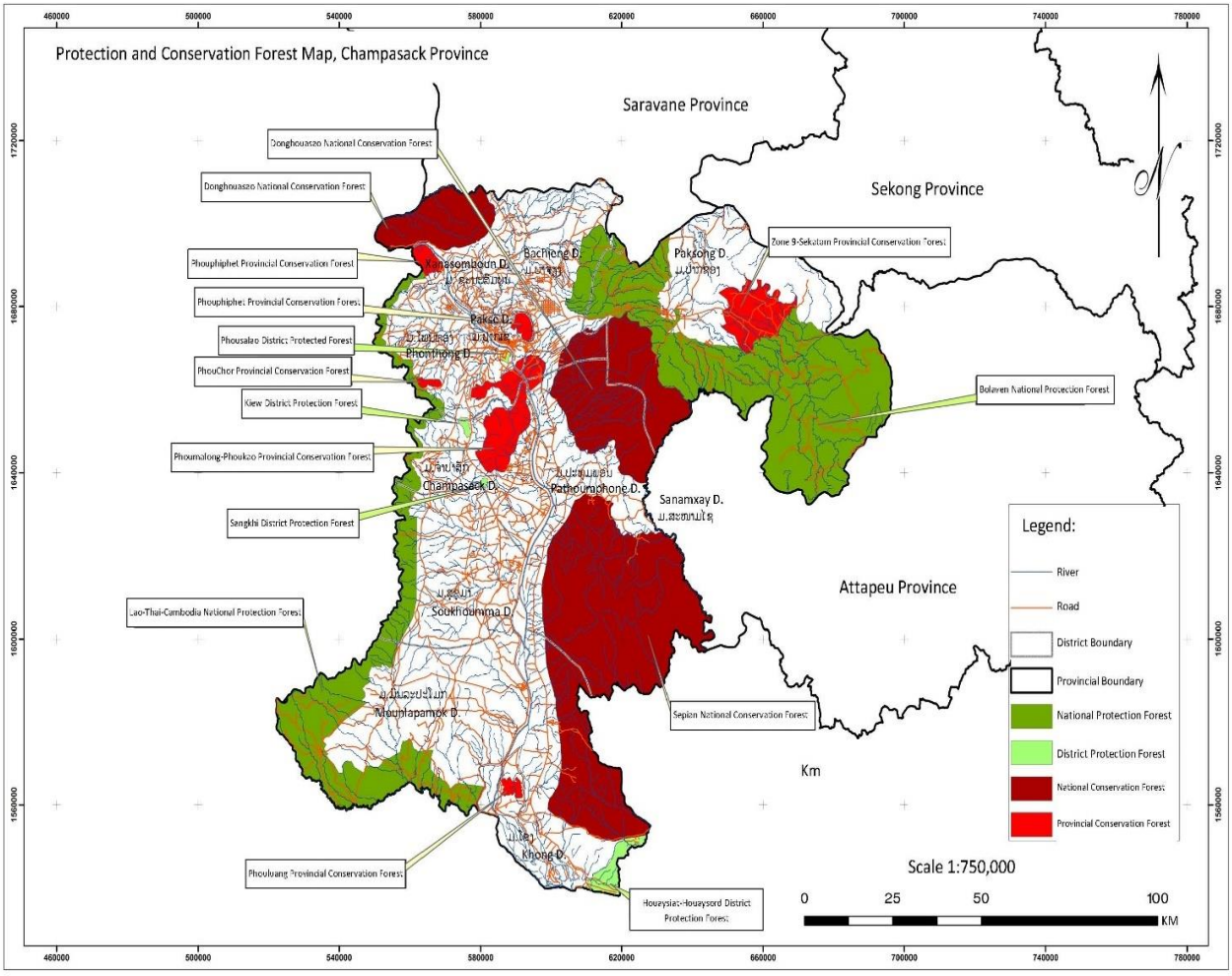
62. In addition to fishing, agriculture is another major source of income for the community in the subproject area. Much of the local land area of Nakasang and along the access road, and on Det and Khone islands is rice paddy. Khone island is the biggest rice production area within the subproject area. Rice growing occurs primarily during the wet season and only the glutinous variety. Rice yields are averaged at around 3-5 tones / ha.

7. Forest Resources

63. In Champasak there are three national conservation forests (Dong Houa Sao, Xepian, and Phou Xieng Thong), and two national protected forests (Phouphieng Bolevens, Lao-Thai-Cambodian protected forest). There are also five provincial conservation forests, namely Phou Phiphed, Phou Chor, Phou Malong-Phou Khao, Phoulouang and Zone 9 Xekatam, and four district protected forests namely Phou Saloua, Kiew, Sangkhi, and Houay Siat-Houay Sord (Figure 10).

64. However, the subproject areas do not lie within any of the conservation or protected forests. The closest is the protected forest of Houay Siat-Houay Sord which lies about 10 km to the east and the Xepian National Conservation Forest, about 12 km to the north-east. The alignment of access road, and port area of Nakasang and road alignments on Det and Khone islands contain scrub-non valued trees, grasses, and shrubs.

Figure 9: Champassak conservation and protected areas



8. Biodiversity

65. The Mekong river and tributaries are rich in species diversity. More than 481 fish species out of 924 species in the Lower Mekong Basin have been identified in the Lao PDR as reported by Mekong River Commission (MRC). At least 35 major species have been identified within the Siphadone area (Table 5). Other aquatic animals including mussels, snails, turtles, frogs, shrimps and crabs are also commonly consumed in the area. The only species of conservation significance near the project area is the endangered Irawaddy dolphin (*Oracaella brevirostris*) which occupies the Mekong river south of Khone Island and the subproject area. However, the subproject will not affect the river habitats of this species. The only shoreline subproject work is at Nakasang town which is located well upstream of the range of the dolphin, and north of the large rapids of the Mekong river which form a natural physical barrier to migration of any aquatic animals above Khone Island. The analysis of biodiversity values of the two subproject areas with IBAT software supports the absence of protected areas (Appendix A). The Siphandon island archipelago and cataracts of the Mekong river identified by IBAT is the nearest unique landform that will not be affected by both subprojects.

9. Provincial Heritage

66. There are 60 cultural sites (29 temples) and 40 historical heritage sites in the province. Three heritage sites are within the subproject area which are French colonial infrastructures as identified by the Provincial Information Culture and Tourism Department. The main cultural/historical heritage within the province is the Vat Phu World Heritage Site which lies some 100 km north of the subprojects. Nakasang has schools, hospitals, and temples. The access road and port area runs through and is situated in the centre of town.

10. Features of Nakasang Access Road and Port Rehabilitation

67. The access road to be upgraded, and stormwater pipe and outfall to be relocated, and boat ramp for upgrading are shown in Figure 11.

Figure 10: Components of Nakasang sub-projects

Figure 11a: Relatively good section of Nakasang access road to be upgraded (Dec. 2018)

	Close to the same section, relatively good state (August 2019)
	Figure 11b: Stormwater drainage pipe and outfall to Mekong to be relocated downriver

	Figure 11c: Existing floating pier & pedestrian ramp to be improved.
	Figure 11d: Turning road at rear of tourist information centre to be upgraded.

V. TENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIONS

A. Subproject Benefits

a. Nakasang Access Road and Port Rehabilitation

69. The improvements to the main access road from NR#13 to Nakasang town and to the main tourist port to the "4000 islands" area of the Mekong river will greatly benefit tourism in the area, and access to the islands by residents. The access road traverses mostly rice paddy with low areas prone to flooding. The new concrete road surface will provide a durable surface that will greatly improve movement of local vehicles and tourist coaches. The upgraded access road will be on an embankment, and lateral and cross drainage will enable stormwater runoff off the road, reducing risk of road flooding and year-round access. Apart from the upgraded access road will be improved parking and a new turning circle for coaches at the Tourist Information Centre.

70. The improvements to the footpaths and embankments along the waterfront, and the improved ramps to the existing floating tourist pier will increase the capacity and improve safety for tourists and residents. The realignment of the main drainage pipe away from the public shoreline area will improve significantly sanitation and aesthetics of the tourist staging area. The subproject will directly benefit 1,641 Nakasang residents, 228 boat operators, and about 100 vendors in Nakasang market.

b. Don Det/Don Khone Access Improvements

71. The upgrades to the island's small road network and footpaths to concrete paving will relieve congestion, improve traffic safety, and reduce dusty and/or muddy seasonal conditions. The new lighting will allow safer use of the different foot and bicycle paths and small roads at night thereby expanding the scope of tourist activity. The subproject will directly benefit 1,240 Don Det and 1,345 Don Khone residents.

B. Subproject Impacts and Mitigation

72. The assessment of potential impacts of the seven subprojects in Lao PDR is structured around the three main phases of implementation defined by *Pre-construction Phase, Construction Phase*, and *Operation Phase*.

1. Pre-construction phase

73. The potential social impacts of the DED were reviewed. The second series of public consultations confirmed that no resettlement or land acquisition compensation will be required for the subproject. The only remaining pre-construction environmental due diligence activities are UXO screening and removal by the military producing UXO clearance certificate. The separate environmental management plan (EMP) for subproject has been updated to meet the DED accordingly.

2. Construction Phase

74. The impacts of the construction of the port and stormwater improvements in Nakasang and road access improvements in Nakasang and on Det and Khone islands are restricted to the short-term disturbances created by the required civil works activities (e.g., excavation, grading, forming erection, material transport & storage and truck traffic) for the improvements. The potential short-term environmental impacts will consist of dust, noise, contamination of soil and the Mekong river from heavy equipment maintenance, erosion and sedimentation of the Mekong river, solid and liquid construction waste, increased risk of traffic and risk of traffic accidents, reduced local access to affected areas, increased risk of public and worker injury,

and periodic local drainage and flooding events. The road upgrades on Det and Khone island will use the existing borrow pit on Khone island. Use of the existing or development of a new borrow pit for the Nakasang access road will be approved by DONRE.

a. Mitigation measures

75. Measures to mitigate and manage potential construction impacts identified above are summarized below. The regulations on construction in Lao PDR are not well developed. The construction guidelines developed by the MOF[12], and when necessary appropriate regulations or guidelines of the IFC/World Bank Environment, Health, and Safety Guidelines (2007) should be followed.

76. The mitigation measures provided below have been articulated in the separate environmental management plan (EMP) for the subproject in Nakasang and on Det and Khone islands. The EMP will be appended to the construction package tender documents for the contractor(s) to prepare their site-specific construction EMPs (CEMPs) which will be submitted to the project management and civil engineering support consultant (PMCES) and the PIU in Pakse/Nakasang for review and approval prior to construction. Monitoring will be overseen by the PIU and PMCES during the construction period.

77. **Air pollution control**. Contractors shall include all necessary measures to prevent or minimize air pollution and dust development by implementing the following air quality control measures. These mitigation measures are applicable to all construction activities of the subproject and are also described in the EHS guidelines similar to ADB's, i.e. World Bank.

(i) Assign daily haulage schedules along all roads to be upgraded to avoid high local traffic times.
(ii) Spray wetting agents such as water or calcium chloride ($CaCl_2$) regularly on Nakasang access and roads on Det and Khone island when needed to suppress dust. A water truck should be on site in Nakasang and on Det and Khone islands every day for this purpose;
(iii) Cover all material aggregate stockpiles with dust shrouds or tarpaulins.
(iv) Minimize the storage time of construction and excavation wastes on site by regularly removing them off site on a weekly frequency.
(v) Site concrete batching stations at least 300 m downwind of all individual houses in Nakasang and Det and Khone villages.
(vi) Have wheel washing equipment or conduct wheel washing manually in Nakasang and on both islands to minimize trucks from transporting throughout the subproject areas.
(vii) Keep construction vehicles and machinery in good working order with monthly scheduled service events, and turn off engines when not in use.
(viii) Vehicles with an open load-carrying case, which transport potentially dust-producing materials, shall have proper fitting sides and tail boards. Dust-prone materials shall not be loaded to a level higher than the side and tail boards, and shall always be covered completely with a tarpaulin.
(ix) In periods of high wind, dust-generating operations shall not be permitted within 200 m of all residential areas. Special precautions need to be applied in the vicinity of schools, kindergartens and hospitals in Nakasang and on Det and Khone islands.
(x) Burning of construction and demolition waste material and refuse should be prohibited.

78. **Construction and Solid Waste.** Contractors will be responsible for handling and transporting the construction generated solid waste to the nearest dumpsite/landfill, as identified by DoNRE. This concerns both war material from soil and sand excavation, as well as specific construction materials and residues. An existing dumpsite serving Nakasang and

[12] (MOF, 2009) School Construction Guidelines

surrounding villages is located appr. 22 km from Nakasang town, however DoNRE will ensure to confirm if this one will be receiving the construction waste, or alternative identify an alternative site.

79. PIU and DoNRe will be responsible for ensuring and enforcing that solid waste (from households, shops and construction) is not dumped in public areas, river or river slope, in accordance with national environmental regulations.

80. **Construction noise**. Contractors will be required to implement the following mitigation measures for construction activities to meet Lao PDR and IFC/WHO recommended environmental noise standards and to protect local villages. Some measures are generic and are applicable to all construction sites and activities. They represent good practice and are effective measures and are in line with the EHS guidelines.

(i) During daytime construction, the contractor will ensure that: (1) noise levels from equipment and machinery conform to the IFC EHS Standards, and properly maintain machinery to minimize noise; (2) equipment with high noise and high vibration are not used near village or township areas and only low noise machinery or the equipment with sound insulation is employed; (3) sites for concrete-mixing plants and similar activities will be located at least 300 m away from the nearest noise protection target; and (4) temporary noise barriers such as high sheet metal fences will be installed around the equipment to shield local villages.
(ii) No construction activities are allowed between the hours 20:00 and 06:00.
(iii) Regularly monitor noise levels with a meter at construction site boundaries when noise is being generated. If noise standards are exceeded by more than 3 dB, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation.
(iv) Provide the construction workers with and enforce the use of suitable hearing protection (ear muffs) according to the worker health and safety requirements of Lao PDR.
(v) Control the speed of bulldozer, excavator, crusher and other transport vehicles travelling on site, adopt noise reduction measures on equipment, step up equipment repair and maintenance to keep them in good working condition.
(vi) Limit the speed of vehicles travelling on site (less than 8 km/h), forbid the use of horns unless absolutely necessary, minimize the use of whistles.
(vii) Maintain continual communication with the villages and communities near the construction sites, and avoid noisy construction activities during school examination periods.

81. **Mekong river pollution**. The contractors will implement the following measures to prevent pollution of the Mekong river at Nakasang.

(i) Portable toilets that are provided for construction workers will be placed not closer than the top of the riverbank on the slope away from the road.
(ii) Construction machinery and equipment will be repaired and washed no closer than the riverbank that slopes away from the river.
(iii) Material stockpiles will be covered to prevent wind and or runoff erosion to the river.
(iv) Dedicated fuel storage areas must be established on concrete pads at least 300m away from the river. Contractors should be required to have an emergency plan to handle fuel and oil spillage.
(v) Earthen berms or silt curtains should be constructed between the river and all civil earthworks activities for the riverbank retaining wall and steps to floating pier to minimize erosion and sedimentation of the river.

82. **Earthworks & soil erosion mitigation**. The contractor(s) will implement the following measures related to earthwork management. Note that existing borrow pit on Khone island

will be used for the island subproject components, and the use of an existing borrow pit near Nakasang or development of a new pit will be approved by DONRE.

(i) Construct intercepting ditches and drains at sites to prevent runoff entering construction sites, and diverting runoff from sites to existing drainage.
(ii) Construct temporary sedimentation ponds at sites to contain soil loss and runoff from the earthworks activities.
(iii) Limit construction and material handling during rainfall and wind events.
(iv) All aggregate stockpiles shall be short-term, placed in sheltered and guarded areas near the actual construction sites, covered with tarpaulins, and sprayed with water during dry and windy weather conditions.
(v) Immediately restore, level and plant landscape on temporary occupied land upon completion of construction works.

83. **Ecological impacts**. The contractors will implement the following measures to prevent ecological impact during construction:

(i) Preserve existing vegetation where no construction activity is planned.
(ii) Protect existing trees and grasses during construction; where a tree has to be removed or an area of grassland disturbed, replant trees and re-vegetate the area after construction.
(iii) Remove trees or shrubs only as the last resort if they impinge directly on the permanent works or necessary temporary works.
(iv) Prior to commencement of construction, tag and conspicuously mark all the trees to be preserved to prevent damage to these trees by construction workers.
(v) Construction workers are prohibited from capturing any wildlife and fishing in the project areas.

84. **Occupational health and safety**. The construction industry is considered hazardous due to the many potentially hazardous operations that are conducted. The contractor will implement adequate precautions to protect the health and safety of construction workers, and the public in Nakasang and on Det and Khone islands. Contractors will manage occupational health and safety risks by applying the following measures:

(i) To prevent or minimize injury of construction workers and the public, directives of the Lao PDR National Occupational Safety & Health (OSH) Programme (2010) that the Ministry of Labour and Social Welfare (MLSW) established with the OSH model program developed by the International Labour Organization (ILO). The IFC/World Bank Environment, Health, and Safety Guidelines (2007) that govern the safe and orderly operation of civil works should be added as supplementary guidance if needed. The specific EHS guidelines are Construction and Decommissioning, and Toll Roads
(ii) Additional care following pre-construction UXO clearing must be taken to ensure that sites for all earthworks (e.g., excavations, trenches) that are suspected to have unexploded ordnance (UXO) are surveyed again by the military prior to construction. If such ordnance is detected clearing work will need to be commissioned prior to undertaking civil works.
(iii) Construction site sanitation: (1) Contractor shall provide adequate and functional systems for sanitary conditions, toilet facilities, waste management, and worker living and cooking facilities as part of temporary workers camps. Disinfection of toilets and refuse piles and removal of solid waste must occur weekly; (2) Extermination of rodents at worker camp(s) must occur at least every 3 months, and extermination of mosquitoes and flies when they become a problem; (3) Provide public toilets in accordance with the requirements of labor management and sanitation departments in the living areas on construction site, and appoint designated staff responsible for cleaning and disinfection; (4) Work camp wastewater shall be discharged into a septic tank which is emptied regularly as

needed.

(iv) Occupational safety: (1) Provide safety hats and safety shoes to all construction workers; (2) Provide safety goggles to workers doing concrete paving of access road; (3) Provide ear plugs to workers operating or working near noisy equipment.

(v) Food safety: Inspect and supervise food hygiene in canteen on site regularly. Canteen workers must have valid health permits.

(vi) Disease prevention, health services: (1) All contracted workers for subproject shall undergo a medical examination which should form the basis of any obligatory health/accident insurance and welfare provisions that may be included in worker contracts. The contractors shall maintain records of health and welfare conditions for each person contractually engaged; (2) Establish health clinic at location where workers are concentrated, which should be equipped with common medical supplies and medication for simple treatment and emergency treatment for accidents; (3) Specify the person(s) responsible for health and disease prevention, and for creating awareness and understanding of worker population.

(vii) Social conflict prevention: No major social risks and/or vulnerabilities are anticipated as a result of the project. As much as possible, the project construction workers will be engaged locally. Contractors be required prioritize: (1) employ local people for construction; (2) ensure equal opportunities for women and men, (3) pay equal wages for work of equal value, and to pay women's wages directly to them; and (4) not employ children or forced labor.

85. **Community health and safety**. The contractors will implement the following measures:

(i) Temporary traffic management: A traffic control and operation plan for Nakasang access road, port area and for roads on the two islands road should be prepared with the local traffic police prior to initiation of construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid peak traffic hours, regulating traffic along Nakasang access road with an emphasis on ensuring public safety through clear signs, and controls.

(ii) Information disclosure: Residents and businesses in Nakasang and of the two island villages in which the second round of public consultations were conducted will be informed in advance through media of the construction activities, given the dates and duration of expected traffic disruption.

(iii) Nakasang and island access roads: Clearly marked signs will be placed on all affected roads to warn people of potential dangers such as moving vehicles, hazardous materials, excavations etc. and raising awareness on safety issues. Heavy machinery will not be used after day light on access road and all such equipment will be returned to its overnight storage area/position before night. Open excavations along access roads should be fenced, and trenches covered where local public walk or vehicles must cross.

Special subproject sensitivity

86. The upgrading of footpaths and the existing island road network on Det and Khone island will potentially hinder use of these conduits for tourists and residents. Construction should be sequenced to avoid road closure and scheduled to move equipment out of the way to not block these routes during specific scheduled times of the day. Sufficient clear signage should be installed to warn tourists and residents of the construction activities.

87. The upgrades to the embankment/road, and realigned stormwater drain in Nakasang will potentially impact the Mekong river. The concern is damage to aquatic habitat of the river, degraded water quality from pollution and sedimentation, and disruption of boat traffic and fishing or aquaculture.

88. The three subprojects are similar with respect to the potential magnitude of potential impacts on the aquatic environment, and the sensitivity of the affected aquatic environments.

Thus, the mitigation measures listed for roads/footpaths and parking lots apply as appropriate, along with the following specific mitigation measures:

- Shoreline berms or in-water silt curtains should be placed between the civil works activities for the retaining wall/road and realigned stormwater drain in Nakasang town and the Mekong river to minimize erosion and sedimentation of the river.
- No vehicles or heavy equipment should be operated in the water if possible.
- No vehicle or equipment maintenance should occur on the riverbank of the Mekong river.
- All construction materials, machinery fluids (gas, oil), and construction waste must be kept away from the river.
- The civil work areas near the water must be clearly marked to warn the public, boaters, and fisherman of the construction activities.
- All worker camps, fuel depots, construction material and aggregate storage areas must be rehabilitated to original state after construction is completed.

3. Operation phase

89. The potential impacts of the operation of the upgraded access road into Nakasang, and to a lesser extent the upgraded access roads on Det and Khone islands will arise from increased vehicle traffic along the roads. The anticipated increased vehicle traffic along Nakasang access road will increase risk of vehicle accidents and potentially increase noise and dust. Enforced speed limits must be posted along the access road as well as along all upgraded island roads. Wetting agents (such as water and calcium chloride) should be periodically applied to the road to control dust when necessary.

90. Boat use of the Nakasang port should follow well defined arrival-departure schedules that distinguish tourist traffic from commercial traffic. Rules of no contaminated bilge water/sewage/oil discharge or solid waste discharge from all tourist boats should be put in place and enforced.

91. The above mitigation should support the comprehensive IFC EHS guidelines (2007) for Construction and Decommissioning, and Toll Roads

C. Induced and Cumulative Impacts

92. A potential induced spatial or temporal cumulative impact of the increased tourism development at the subproject sites is increased consumption of natural resources, and pollution from solid waste and poorly managed septic systems. Don Det / Don Khone may be most susceptible to solid waste pollution given they are islands without modern landfills.

D Climate Change

93. The DED responded to the issues of climate change mitigation and resilience of the subproject that were identified in the separate Climate Vulnerability and Risk Assessment (CVRA) that was prepared for the FS of the subproject.

VI. INFORMATION DISCLOSURE AND PUBLIC GRIEVANCE MECHANISM

94. As presented in Chapter V, the DED of the improvements to road access, the port, and stormwater drainage in Nakasang and on Det and Khone islands was introduced to affected stakeholders during the second series of public consultations on the subproject. Similar to the first public consultations on the FS of the subproject, verbal and visual presentations of the DED were provided to the same key stakeholders ahead of the facilitated consultation discussions.

95. The formal disclosure of information of the subproject in the Lao language to affected persons and stakeholders that occurred for the FS and now the DED of the subproject confirms the intention of continued information disclosure and stakeholder involvement as the project is implemented. As part of the project's stakeholder communication strategy, regular information exchange with stakeholders is required throughout construction and operation phase of the subproject.

96. The updated IEE provided here and separate EMP will be easily available to stakeholders in written form and translated into Lao when updated. The updated IEE will be available on provincial Department of Information Culture and Tourism (DICT) web sites, DICT offices, and at Department of Public Works and Transport (DPWT) offices. Similarly, all project reporting with specific reference to stakeholder consultation minutes, environmental monitoring, and reports on EMP implementation released by the EA/PIU should be available at the same offices and web sites. The updated IEE will also be available on the ADB web site. At the start of construction of the subproject the public consultation and information disclosure process will continue. After implementation of the subproject begins, all environmental and EMP reporting submitted by the EA/PIU will also be available on the ADB web site.

97. The well-defined grievance redress and resolution mechanism will be implemented to address any affected stakeholder's grievances and complaints regarding environment or social issues in a timely and satisfactory manner. All stakeholders will be made fully aware of their rights, and the detailed procedures for filing grievances and an appeal process will be published through an effective public information campaign. The grievance redress mechanism and appeal procedures will also be explained in a project information booklet (PIB) that will be distributed to all stakeholders.

98.. Stakeholders or persons affected by the subproject are entitled to lodge complaints regarding any environmental or social issue. Stakeholder complaints can be made verbally or in written form.

99. A Grievance Committee will be organized in Nakasang and in Khone and Det villages on both islands comprising local leaders designated for such tasks. The designate officials shall exercise all efforts to settle affected stakeholder issues at the village level through appropriate community consultation. All meetings shall be recorded by the grievance committee and copies shall be provided to affected stakeholders. A copy of the minutes of meetings and actions undertaken shall be provided to the DICT, PIU, DONRE, and ADB upon request.

100. The procedures for grievance redress are set out below. The procedure described below applies to both social and environmental issues and is consistent with the legal process for resolution of disputes in Lao PDR, and exemplifies the desired collaboration among the different levels of government as recently described by Decision 7536/MONRE (2012). The PMU will have overall responsibility of ensuring the GRM is active and successful at the subproject level. Individual affected persons will be able to enter the GRM at a construction site by simply using the telephone hotline that is clearly posted at each construction site. Conversely, an affected person can contact the PIU directly at the PIU office, or annexes established at the subproject areas. The EA with assistance from the PIU is responsible to

ensure that the government grievance system is successfully applied, and if needed, modified to integrate with the context of the individual subprojects.

i) Stage 1: Complaints from affected stakeholders for the first time shall be lodged verbally or in written form with the village head or commune leader. The complaints shall be discussed with the affected stakeholder and the designated Head of Grievance Committee or members of the committee. It will be the responsibility of the Head of Grievance Committee to resolve the issue within 15 days from the date the complaint is received. All meetings shall be recorded and copies of the minutes of meetings will be provided to affected persons (AP)s.

ii) Stage 2: If no understanding or amicable solution can be reached or if no response is received from the grievance committee within 15 days from filing the complaint, the affected stakeholder can elevate the case to the District Grievance Committee. The District Grievance Committee is expected to respond within 15 days upon receiving the affected stakeholder's appeal.

iii) Stage 3: If the affected stakeholder is not satisfied with the decision of the District Office, or in the absence of any response, the APs can appeal to the Provincial Grievance Committee (PGC). The PGC will review and issue a decision on the appeal within 30 days from the day the complaint is received.

iv) Stage 4: If the affected stakeholder is still not satisfied with the decision of the PGC or in the absence of any response within the stipulated time, the affected stakeholder's, as a last resort may submit his/her case to the provincial court. The court will address the appeal by written decision and submit copies to the respective entities which include the DICT, DONRE, DGC/PGC and the affected stakeholder. If, however, the affected stakeholder is still not satisfied the court's decision, the case may be elevated to the provincial court. If, however, the decision of the provincial court is still unsatisfactory to the affected stakeholder, the affected stakeholder may bring the complaints to the Higher Court.

101. The PIU with support from the PMCES will be responsible for checking the procedures and resolutions of grievances and complaints. The PIU must have expertise and experience in social and environmental issues associated with infrastructure developments. The PIU may recommend further measures to be taken to redress unresolved grievances. The Project Management & Civil Engineering Support Consultant (PMCES) will provide the necessary training to improve grievance procedures and strategy for the grievance committee members when required.

102. The executing agency (Ministry of Information, Culture and Tourism (MICT)) will shoulder all administrative and legal fees that will be incurred in the resolution of grievances and complaints if the affected stakeholder wins the case. Other costs incurred by legitimate complaints will also be refunded by the project if the affected stakeholder wins their case.

103. In cases where affected stakeholder do not have the writing skills or are unable to express their grievances verbally, the affected stakeholder can seek assistance from civil society organizations, DONRE staff, or other family members, village heads or community chiefs to have their grievances recorded in writing, and to have access any environmental or social surveys or valuation of assets, to ensure that where disputes do occur, all the details have been recorded accurately enabling all parties to be treated fairly. Throughout the grievance redress process, the responsible committee will ensure that the concerned affected stakeholder is provided with copies of complaints and decisions or resolutions reached.

104. If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, affected stakeholder has the right to directly discuss their concerns or problems with the ADB Southeast Asia Department through the ADB Lao PDR Resident

Mission (LRM). If affected persons are still not satisfied with the responses of LRM, they can directly contact the ADB Office of the Special Project Facilitator (OSPF).

VII. PUBLIC CONSULTATION

105. Stakeholder consultations were repeated for the DED of the subproject in line with the requirements of meaningful consultation as stipulated by the SPS (2009). The consultation strategy embodied the principles of transparency, participation, and inclusiveness to ensure that affected and marginalized groups such as women, and the poor, were given equal opportunities to participate in the design of the project. The stakeholder consultations on environment issues in Nakasang and on Det and Khone islands were conducted via the following two avenues of inquiry and data collection:

1. As part of the household and village leader interviews conducted by the social development team with provincial agencies and other stakeholders conducted by social development team; and
2. Separate interviews of provincial and national environmental management agencies conducted by the international environmental specialist.

A. Identification of Stakeholders

106. Stakeholders were identified and engaged with a participatory manner. Stakeholder communication to date has focused on institutional stakeholders, affected communities, and persons directly affected by proposed subproject interventions. Project stakeholders include:

- Institutional stakeholders including the (i) project implementing unit (PIUs) (ii) provincial and national agencies, and villages business leaders;
- Communities living in the subproject areas who will benefit or be adversely affected, and who have an interest in the identification and implementation of measures to avoid or minimize negative impacts; and
- Vulnerable and/or marginalized groups who have an interest in the identification and implementation of measures that support and promote their involvement and participation in the project.

B. Discussion Guide

107. Five general open-ended questions (Table 6) guided stakeholder discussions.

Table 6. Guiding Questions and Information Requests for Stakeholder Consultations

1. What will be the benefits of the improved road access and port area in Nakasang and on Det and Khone islands?
   Please list benefits of project.

2. Do you have any environmental concerns with the subproject?

   Please list environmental concerns about subproject.

3. Do you any have environmental concerns with the **construction activities** of the subproject?

   Please list environmental concerns of construction phase activities.

4. Do you have environmental concerns about the **completed operation phase** of the completed subproject?

Please list environmental concerns about the operation of completed subproject. 5. Do you think the subproject design or operation should be changed to prevent negative environmental, or community impacts? Please list changes to subproject that you think will prevent or reduce negative environmental, or community impacts?

108. To help guide the discussions on environmental issues and concerns of subprojects a list of environmental components (Table 7) was introduced to the stakeholders ahead of the question and answer period.

Table 7. Example environmental components to guide stakeholder discussions.

• drinking water quality & availability • surface water quality and quantity • groundwater quality & quantity • air quality • climate • land and soil quality • Rivers, réservoirs, • trees, other vegetation, • terrestrial resources e.g., minerals, salt beds, geology	• terrestrial & aquatic animals, e.g., fish, birds, small mammals ecological protected areas (e.g., national parks, wildlife sanctuaries), • land uses (e.g., agriculture, fisheries, forestry, navigation, aquaculture, commercial, other), • public safety, • public movement & access • physical cultural values (e.g., pagodas, cemeteries, monuments)

C. Summary of Public Consultation

109. A summary of the key concerns and issues that were identified during the stakeholder consultations for the subproject in Nakasang and Det and Khone islands are summarized in Table 8. The list of meeting participants are reproduced in Appendix B.

110. The stakeholder consultations showed overall positive support for the project. The follow-up stakeholder consultations that may be required during detailed design phase will begin with a review of the issues and mitigations initially identified by the stakeholders.

Table 8. Key views of subproject of stakeholders of Nakasang and Det & Khone

October 10-14, 2018

Phase	Issues/concerns	
	In Nakasang	**On Det and Khone islands**
Perceived Project benefits for local people	- Improved the parking area - Better transportation along the road to the port - Increasing local income from the agricultural product export and tour service - Increasing local economic development in the villages - Less traffic problems along the road - Better access to the village area - Better support of tourist service, increasing the tourist number, improve the village infrastructure which	- Better access and travel within the villages - Increasing the tourist numbers - Increasing the income and economic of the villages - Improve the beautiful vistas and more make more attractive to travel in the villages - Improved facilities support the villagers - Local authorities and villagers are willing to see the project happen and will fully support.

Phase	Issues/concerns	
	In Nakasang	**On Det and Khone islands**
	conforms to the district socio-economic plan. - Local authorities and villagers are willing to see the project happen and will fully support.	
Pre-construction project design &, impact assessment	- Attention needed on port improvements and to provide a proper design. - Focused attention needed on details of finalized designs. - Need to consider natural water flow through each drainage culvert particularly at the low areas along Nakasang road - Turn the outlet of the drainage pipeline at Nakasang boat dock 45 degree, and ensure pipeline and outfall are submerged during dry season low river flows. - The draft final DED should be distributed and be presented to the local authorities before final approval.	- Increase the island roads to 4m from 3m instead of periodic passing points on road. - Must consider river flow at each box culvert and pipeline in both dry and rainy season, - Do not use previous contractors for subproject - Careful attention is needed for selection of the contractor, temporary materials storage, worker camp location, and required vehicle and pedestrian detours. - Borrow pit on Khone island can be used - Prioritize existing natural environment during the detail design. - The final draft of the DED should be distributed and be presented to the local authorities before the final approval.
Construction phase	- Borrow pit will be approved by DONRE, which should be monitored for proper management during construction. - Provide an initial introduction of the contractor to local authorities and villages. - Must disclose and share construction plans, activities, and schedule with community and local businesses. - Selection of the contractor for construction requires special care and input from community. - Technical supervision and monitoring during construction phase is needed - Safety for both workers and local people must be considered carefully - Detours along access road must be established and identified before construction commences - Dust emissions must be managed -	- Contractor must follow the impact mitigation measures of EMP - Initial public information on the project policy, activities, selected new contractor should be shared with local authorities and community. - Existing detours, and detours planned for construction must be reviewed and clarified before construction commences. - Consider conducting construction during the dry season. - Use of existing borrow pit on Khone island is authorized, which should be monitoring for proper management during construction. - Careful attention must be taken for selection of contractor. - Technical supervision and monitoring of contractor and construction - Safety for both workers and local people during construction is critical. - to find the detour road before construction commence, - Prevent or minimize dust emission
Operation phase	- The quality of the completed upgraded road and port improvements must be checked carefully. - A Maintenance and Operation Management Plan (MOMP) should be provided to project owner before at	- The quality of the completed upgraded island roads must be checked carefully - A good practical operation and maintenance (O&M) plan for village participation in management of operations is needed.

Phase	Issues/concerns	
	In Nakasang	**On Det and Khone islands**
	least 6 months before construction is completed. - MOMP must include waste management and waste collection along the river bank and foot path. - The project and provincial authority must clearly specify regulations, roles and responsibilities in the MOMP - A guaranteed budget of at least 10% of the total project budget cost must be in place and road quality checked before 100% handover of road. -	- O&M plan must clearly specify roles and responsibilities - Provide training to the villagers for waste collection and management. - Ensure that all road facilities receive final inspection before hand-off. - Establish a guaranteed budget (10% of the total budget cost) and time for checking the road quality before handover 100%. - The MOMP for the roads and footpaths must define village level participation and responsibility, and t include the awareness program for waste collection and management.
Other suggestion	- Consideration must be given to cleaning riverbank and port area of garbage before construction commence. - Extend new riverbank upriver to little bridge. No compensation will be required of temporary houses. - In stall waste trap or/and sediment traps at the port drainage pipe before discharge to river.	- Need a development plan for riverbank protection - Consider improving access to houses. - Consider backfilling the village pond using existing borrow pit. - Consider adding another 2 roads: 1) from Ban Khone Tai to the white beach; and 2) west of the railroad/boat landing, - Consider building new dumpsite - Consider electric light poles along the road

APPENDIX A: RESULTS OF IBAT ANALYSES OF SUBPROJECT AREAS

Proximity report generated by the Integrated Biodiversity Assessment Tool

Site name	Nakasong Boat Terminal
Latitude/Longitude	14° 0' 4" North, 105° 55' 9" East
Date generated	14th November 2017
Generated by	asiandb
Company	ADB

Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

Priority Sites for Biodiversity		
Key Biodiversity Area	Siphandon CR/EN, VU, endemic, migratory birds/congregations	37,320 ha

Features within 5 km

There are no additional features within 5 km.

Features within 15 km

National-level protected areas		
IUCN Category V-VI	Xe Pian	2,617 ha
Protected areas designated under regional or international conventions and agreements		
Ramsar	Middle Stretches of the Mekong River north of Stoeng Treng	317 ha
Priority Sites for Biodiversity		
Key Biodiversity Area	Chhep CR/EN, VU, migratory birds/congregations, other	243,661 ha
Key Biodiversity Area	Mekong River from Kratie to Lao PDR CR/EN, VU, endemic	83,501 ha
Key Biodiversity Area	Xe Pian CR/EN, VU	243,100 ha

Proximity report generated by the Integrated Biodiversity Assessment Tool

Site name	Don Det Old French Port
Latitude/Longitude	13° 58' 55" North, 105° 55' 26" East
Date generated	14th November 2017
Generated by	asiandb
Company	ADB

Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

Priority Sites for Biodiversity		
Key Biodiversity Area	Siphandon CR/EN, VU, endemic, migratory birds/congregations	37,320 ha

Features within 5 km

There are no additional features within 5 km.

Features within 15 km

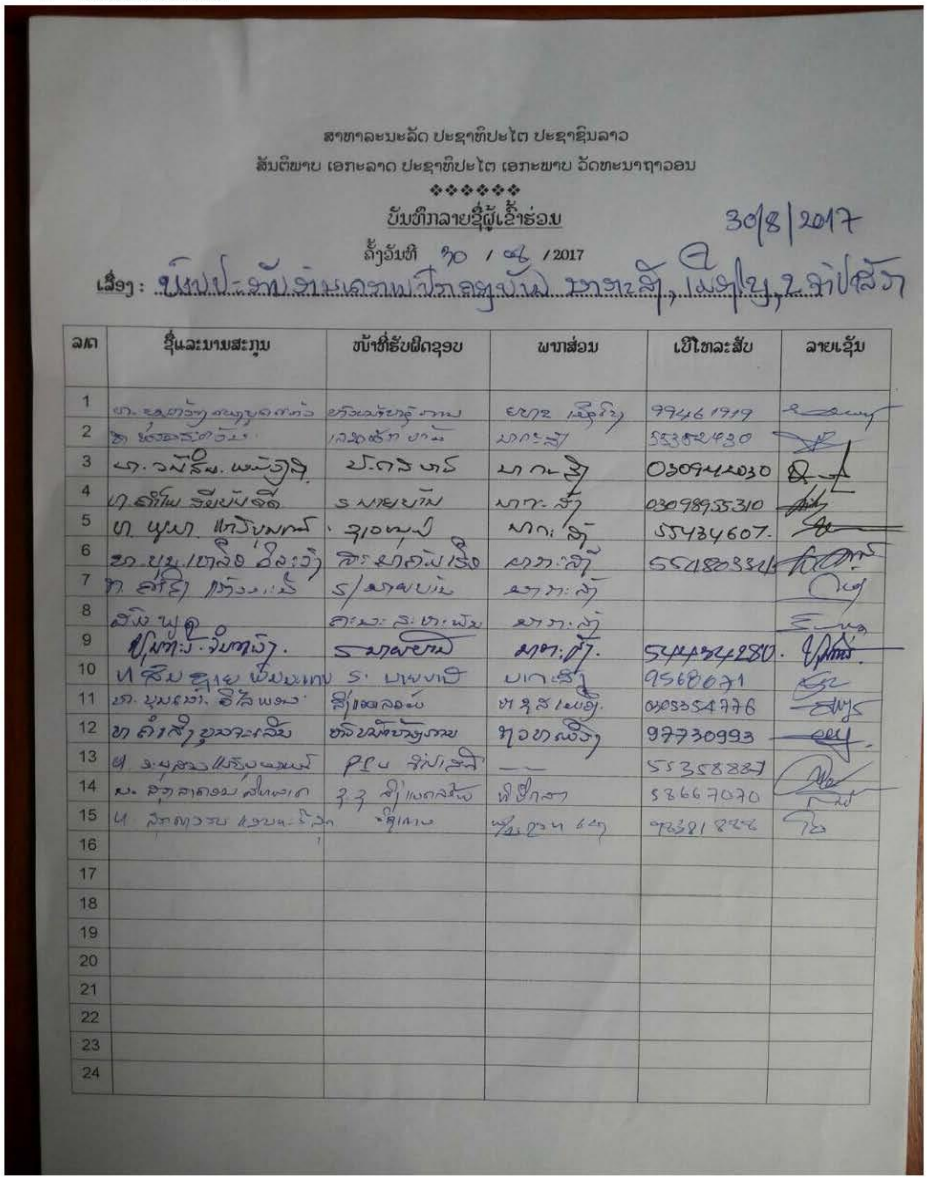
National-level protected areas		
IUCN Category V-VI	Xe Pian	2,617 ha
Protected areas designated under regional or international conventions and agreements		
Ramsar	Middle Stretches of the Mekong River north of Stoeng Treng	317 ha
Priority Sites for Biodiversity		
Key Biodiversity Area	Chhep CR/EN, VU, migratory birds/congregations, other	243,661 ha
Key Biodiversity Area	Mekong River from Kratie to Lao PDR CR/EN, VU, endemic	83,501 ha
Key Biodiversity Area	Xe Pian CR/EN, VU	243,100 ha

APPENDIX B: PARTICIPANTS OF PUBLIC CONSULTATIONS

Consultations carried out during updated IEE and EMP process – August – Sept. 2018.

List Participant of Public Consultation Meeting, Champasack Province

1. **Nakasung Village**



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ບັນທຶກລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ

ຄັ້ງວັນທີ ... / ... /2017

30/8/2017

ເລື່ອງ : ...

ລ/ດ	ຊື່ແລະນາມສະກຸນ	ໜ້າທີ່ຮັບຜິດຊອບ	ພາກສ່ວນ	ເບີໂທລະສັບ	ລາຍເຊັນ
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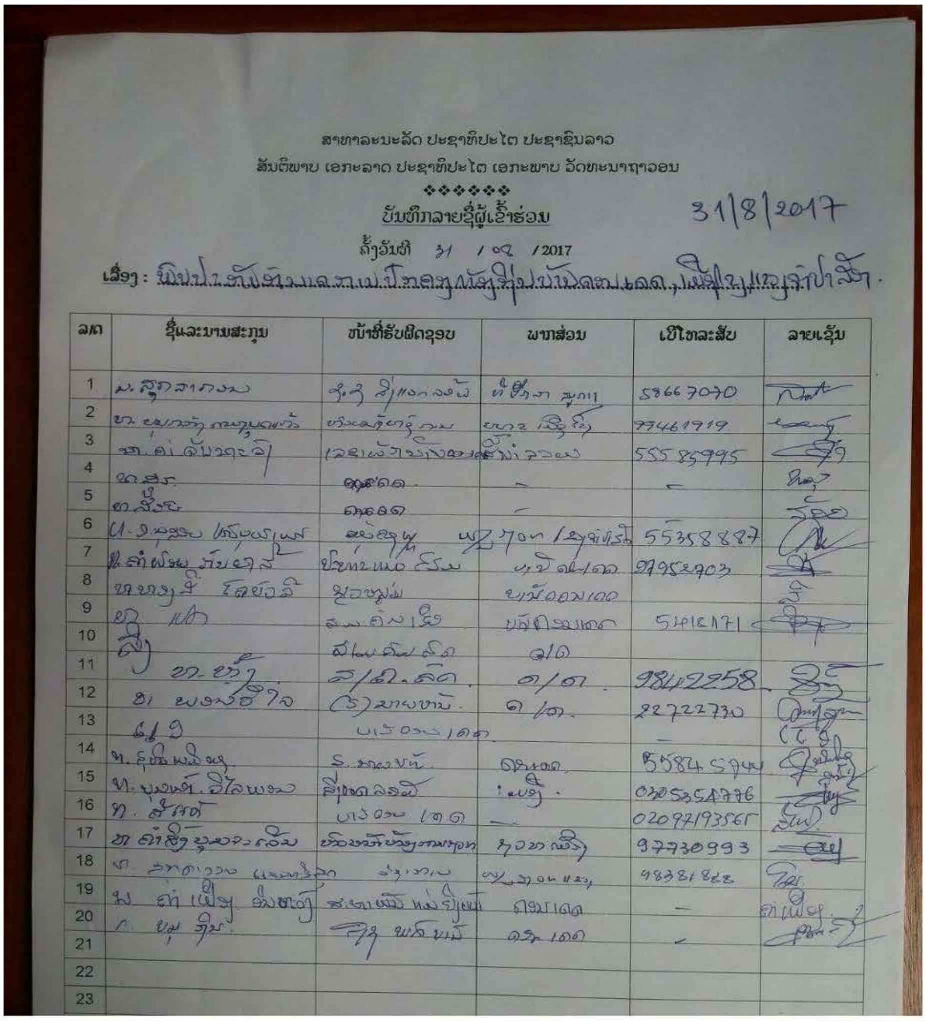
2. Don Det Village



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ບັນທຶກລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ 31/8/2017
ຄັ້ງວັນທີ 31 / 08 / 2017
ເລື່ອງ: [illegible]

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2	[illegible]	[illegible]	[illegible]	77461919	[illegible]
3	[illegible]	[illegible]	[illegible]	55585995	[illegible]
4	[illegible]	[illegible]	–	–	[illegible]
5	[illegible]	[illegible]	–		[illegible]
6	[illegible]	[illegible]	[illegible]	55358887	[illegible]
7	[illegible]	[illegible]	[illegible]	97952703	[illegible]
8	[illegible]	[illegible]	[illegible]		[illegible]
9	[illegible]	[illegible]	[illegible]	54161171	[illegible]
10	[illegible]	[illegible]	[illegible]		
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17	[illegible]	[illegible]	[illegible]	97730993	[illegible]
18	[illegible]	[illegible]	[illegible]	98381868	[illegible]
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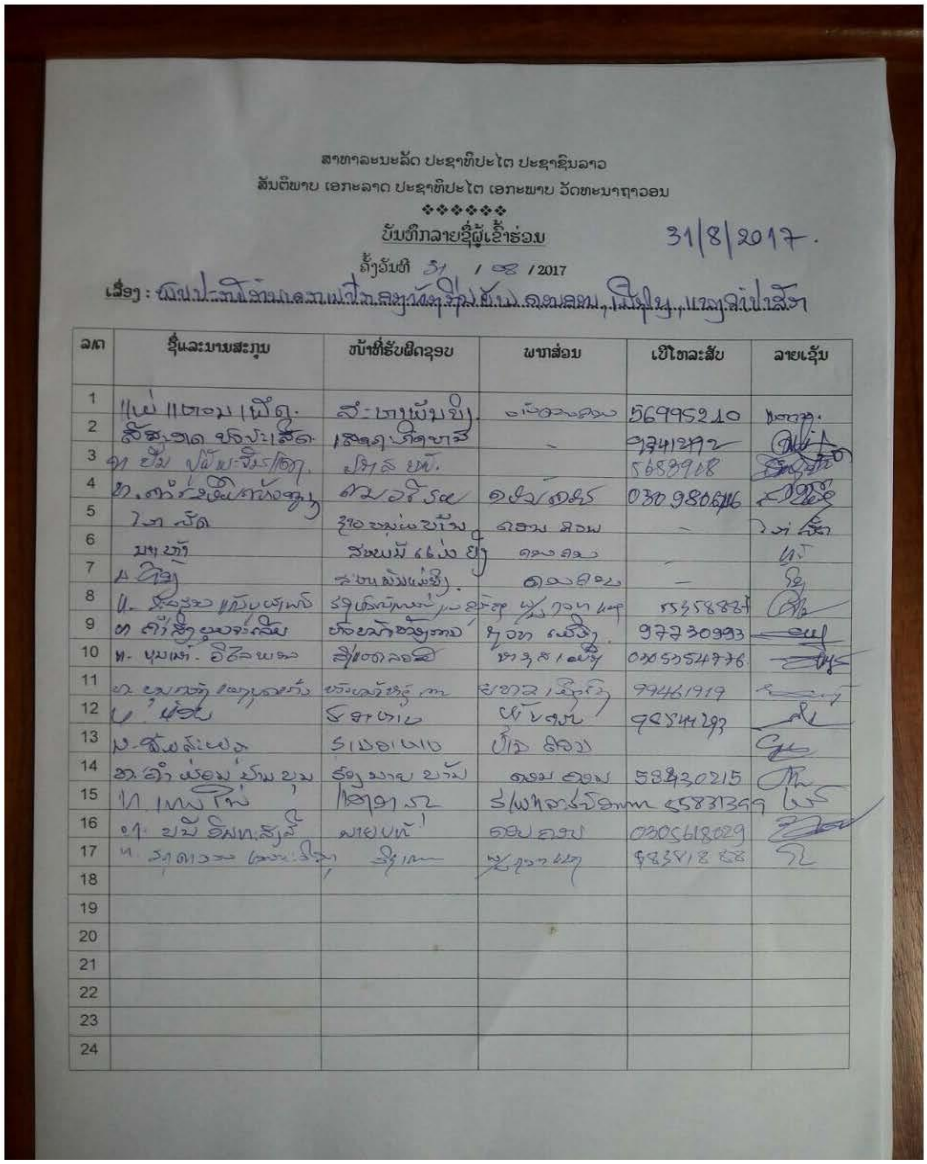
3. Don Khone Village



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ບັນທຶກລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ 31/8/2017.

ຄັ້ງວັນທີ 31 / 08 / 2017

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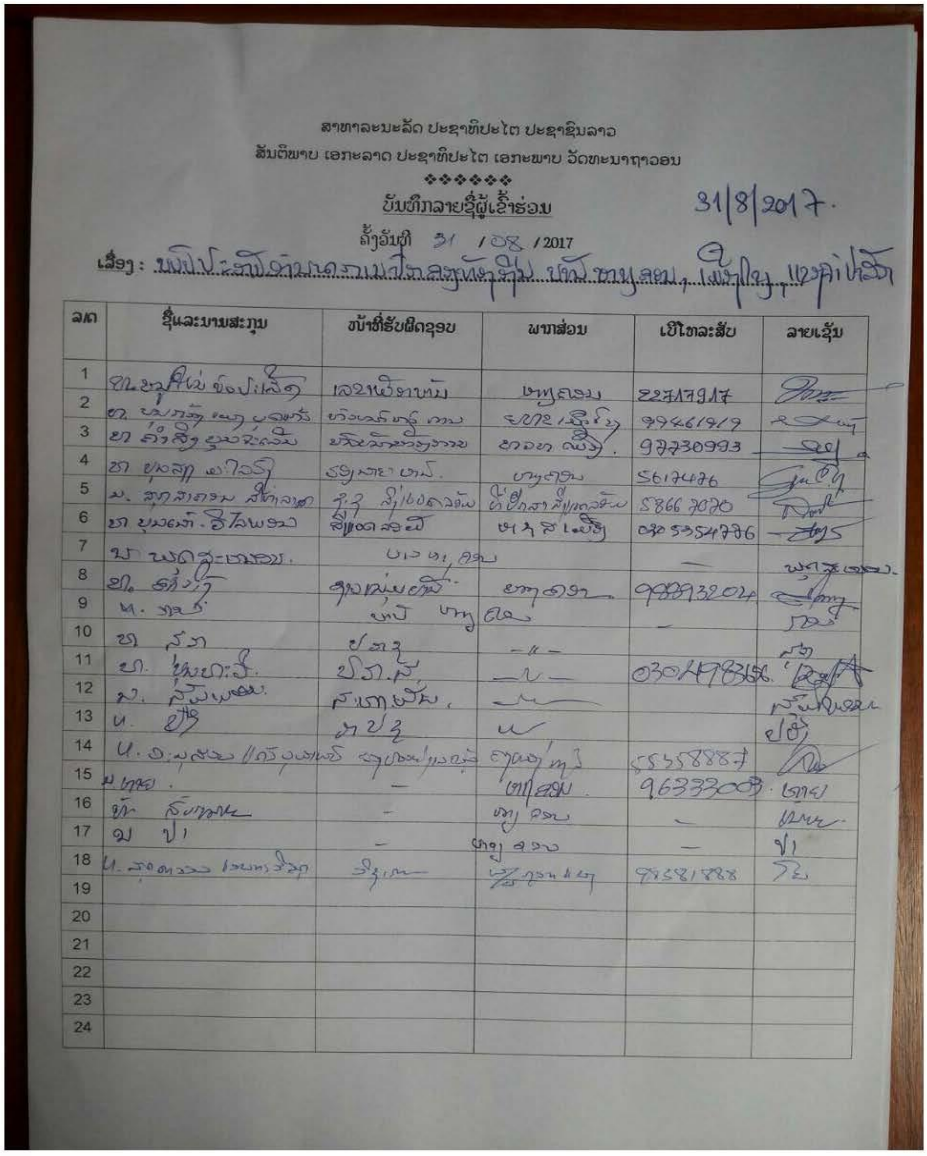
4. Hang Khone Village



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ບັນທຶກລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ 31/8/2017.

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ລ/ດ	ຊື່ແລະນາມສະກຸນ	ຫ້ວໜ້າຮັບຜິດຊອບ	ພາກສ່ວນ	ເບີໂທລະສັບ	ລາຍເຊັນ
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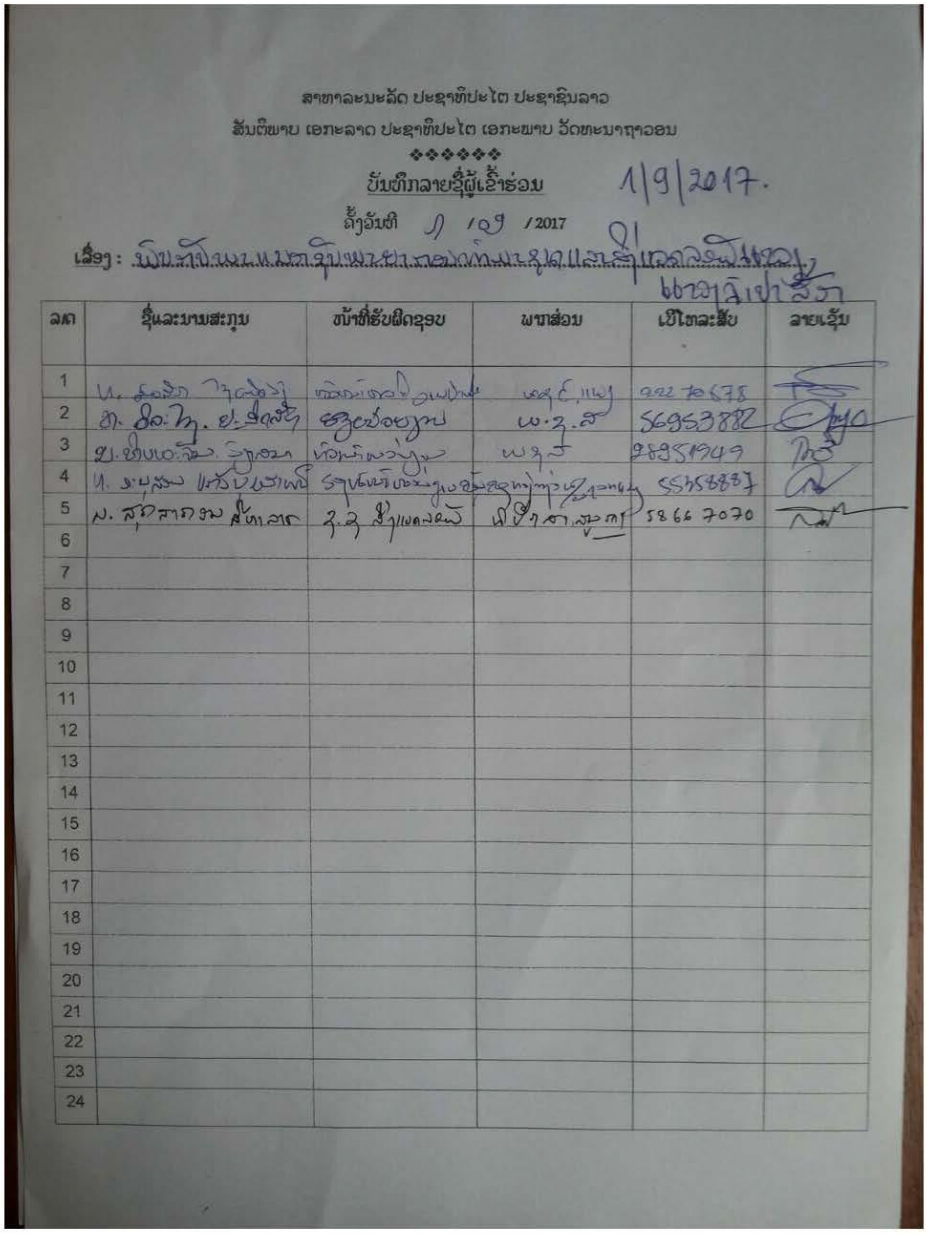
5. Department of Natural Resource and Environment



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ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນາຖາວອນ

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ບັນທຶກລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ 1/9/2017.

ຄັ້ງອັນທີ 1 /09 /2017

ເລື່ອງ: ...

ລ/ດ	ຊື່ແລະນາມສະກຸນ	ໜ້າທີ່ຮັບຜິດຊອບ	ພາກສ່ວນ	ເບີໂທລະສັບ	ລາຍເຊັນ
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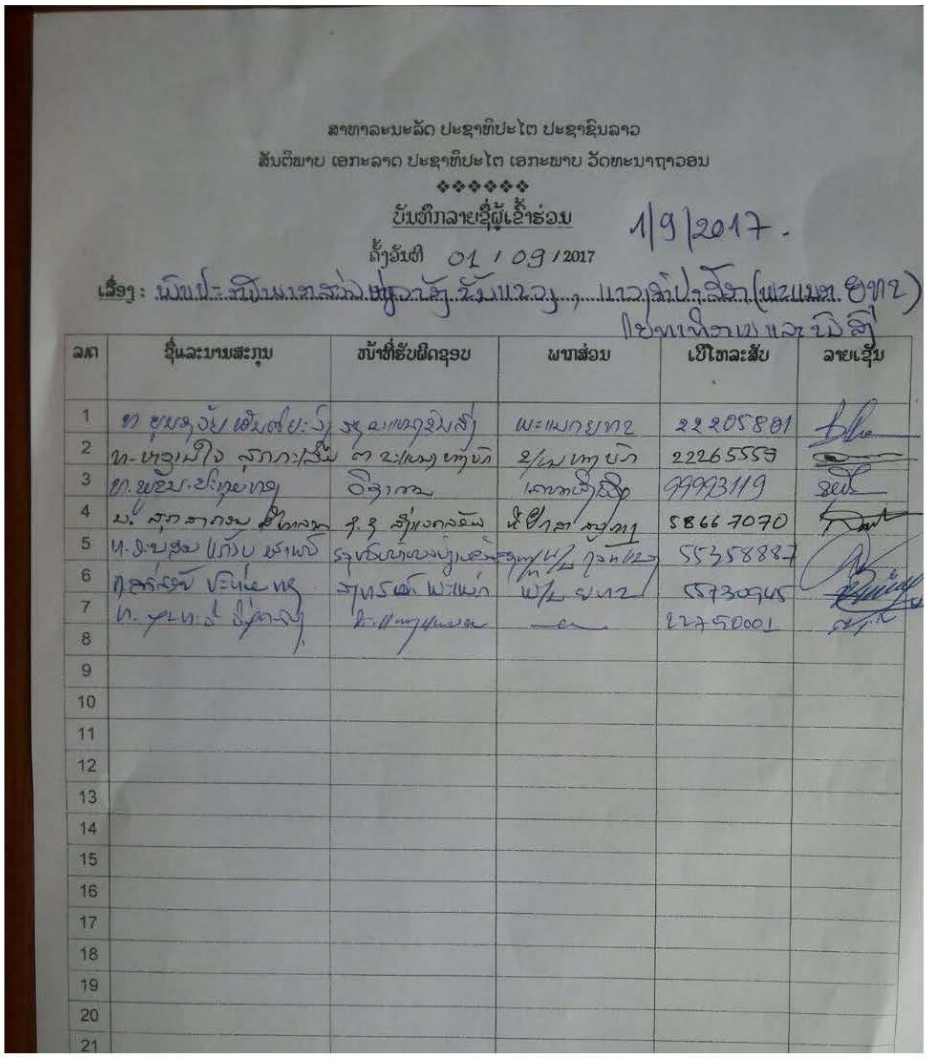
6. Department of Public Work and Transpiration



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ບັນທຶກລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ 1/9/2017.

ຄັ້ງອັນທີ 01/09/2017

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Appendix B.2

Participants at review mission public consultations – August 2019

Meeting at PIU Champassack – 15 August 2019:

No	Name of stakeholder	Organisation	Position
1	Mrs.Mala CHANTHALA	PIU/ Champasack	Project Director
2	Mr.Anousone KEOBUPHAPHAN	PIU/CPS	Project Finance
3	Cherlotte SEIDENBERG	PMCES-Ramboll	Environment
4	Mr.Bounheuang PHANTHASIT	PMCES-Ramboll	Environment
5	Mr.Basy PHONEKHEO	DPWT/ CPS	Head of Department
6	Mr.Pongbida MELART	PoNRE (Champassack)	Engineer

Consultation with Don Det Stakeholders – 15 August 2019:

No	Name of stakeholder	Organisation	Position
1	Mrs.Mala CHANTHALA	PIU/ Champasack	Project Director
2	Mr.Anousone KEOBUPHAPHAN	PIU/CPS	Project Finance
3	Charlotte SEIDENBERG	PMCES-Ramboll	Environment
4	Mr.Bounheuang PHANTHASIT	PMCES-Ramboll	Environment
5	Mr.Boun XAYYAVONG	DPWT, Khone District	Director
6	Mr.Chanpaseuth	PoNRE	Technical Manager
7	Mr.Pon	Ban Don Det	Village staff
8	Mr.Sone KHANTHALART	Ban Don Det	Owner of Guesthouse
9	Ms.Khammone	Lao Womens union	Member
10	Mr.Soithong	Ban Done Det	Member of Committee
11	Mr.Mo	Ban Don Det	Owner of Guesthouse
12	Mr.Khamfouy KANPHASEE	Ban Don Det	Member of Committee
13	Mr.Lar	Ban Don Det	Owner of taxi/tuk-tuk
14	Mis.Khamfueag INTHAVONG	Lao Womens Union	Member
15	Mr.Xayyaphone	Ban Don Det	Dept of H village
16	Mr.Khamdeng BOUNYAVONG	Don Khone District	Engineering
17	Mr.Somhak THEPBOUASEE	DPWT	Head of Department
18	Mr.Kham CHANTHAVONG	Ban Don Det	Head of village
19	Mr.Anousone	PIU/ CPS	Finance

Consultation in Nakasang Village – 16 August 2019

No	Name of stakeholder	Organisation	Position
1	Mrs. Mala CHANTHALA	PIU/ Champasack	Project Director
2	Mr. Anousone KEOBUPHAPHAN	PIU / CPS	Project Finance
4	Mr. Khamsing BOUNCHALERN	Khone District	Office Employee
5	Mr. Khamdeang BOUNYAVONG	Khone District	Engineering
6	Mr. Somhak THEPBOUASEE	District PWT	Dept employee
7	Mrs. Peng THAVISOUK	Nakasang Village	Lao Women's Union
8	Mr. Khampho SOMBUNDID	Nakasang Village	Head of Village
9	Mr. Khamphone	Private vendor	Shop-owner
10	Mr. Bounmark	Boat association	Boat operator
11	Mr. Bounong	Nakasang Market	Shop owner
12	Mr. Khammun MANEEVONG	Young village group	Member
13	Mr. Khamsing KEOMANEE	Nakasang Village	Member of village council
14	Mr. Lewphan VONGPATHOUM	Young village group	Member
15	Mr. Sysaward BOUAPASEUTH	Kong District	Head of Tourism
16	Ms. Soutsakone	Nakasang Market	Shop owner
17	Ms. Vilayphone	Nakasang Market	Shop owner
18	Mr. Bounhueang PHANTHASIT	PMCES/Ramboll	Environment
19	Mrs. Charlotte SEIDENBERG	PMCES/Ramboll	Environment

Appendix C: Photos from project sites August 2019

Meeting at PIU Office – Pakse

Travel to Don Det island by boat

Consultation Meeting at Don Deth




Walking along the rural road within existing alignment and side drains from Houa Don Deth to the site of Vehicular Parking Area (an approximately 2 km)




The access improvement road connect to Somphamith Waterfall




The access improvement road connect to Hang Khone Village


Meeting with communities and village authorities at Ban Khone



Site survey along the access alignment road improvement in Ban Khone


Meeting with communities and village authorities at Nakasang


Site survey along the access alignment road improvement from the existing main road to Nakasang