



**Project Document  
of the Asian Infrastructure Investment Bank  
Sovereign-Backed Operations**

**Lao People's Democratic Republic  
National Road 13 Improvement and Maintenance Project**

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## Currency Equivalents

(As at March 14, 2019)

Currency Unit	–	Lao Kip (LAK)
LAK 1.00	=	USD 0.00012
USD1.00	=	LAK 8,583.4

## Fiscal Year

January 1-December 31

## Abbreviations

AWPB	Annual Work Plan and Budget
AiIB	Asian Infrastructure Investment Bank
ASEAN	Association of South East Asian Nations
CBA	Cost Benefit Analysis
DA	Designated Account
DBMOT	Design, Build, Maintain, Operate and Transfer Methodology
DoF	Department of Finance, MPWT
DoR	Department of Roads, MPWT
DPWT	Provincial Department of Public Works and Transport
EGEP	Ethnic Group Engagement Plan
EGPF	Ethnic Groups Policy Framework
EIRR	Economic Internal Rate of Return
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
ESS	Environmental and Social Standard
FM	Financial management
GBV	Gender-based Violence
GDP	Gross Domestic Product
GoL	Government of the Lao People's Democratic Republic
GRM	Grievance Redress Mechanism
IDA	International Development Association
IFR	Interim Unaudited Financial Reports
IRAP	International Road Assessment Program
MPWT	Ministry of Public Works and Transport
NDF	Nordic Development Fund
NPV	Net Present Value
NR 13	National Road 13
O&M	Operation and Maintenance
OHS	Occupation Health and Safety
OP/BP	Operational Policy/Bank Procedures
OPBRC	Output and Performance-based Road Contract
PCC	Portland Cement Concrete
POM	Project Operations Manual
PPP	Public Private Partnership

PPP	Policy for Prohibitive Practice
RAP	Resettlement Action Plan
RF	Road Fund
RMF	Road Maintenance Fund
RSA	Road Safety Audit
SSESMP	Site-Specific Environmental and Social Management Plan
VOC	Vehicle Operating Cost
WB	World Bank

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## 1. Summary Sheet

### Lao People's Democratic Republic Lao National Road 13 Improvement and Maintenance Project

Project No.	000066
Borrower Implementation Agency	Ministry of Finance Ministry of Public Works and Transport
Sector / Subsector	Transport / Road, Highway
Project Objectives / Brief Project Description	To improve the road condition, safety and climate resilience of critical sections of the National Road 13. The proposed project will support the improvement and maintenance of 58 km of the most critical section of the national road network through innovative contracting model. It will finance the upgrade of 19 km of the road from two lanes to four lanes, and improvement of 39 km of an existing 2-lane road. The road improvement and maintenance will be carried out through 10-year Output and Performance-Based Road Contract (OPBRC) format under Design, Build, Maintain, Operate and Transfer (DBMOT) method.
Project Implementation Period	Start Date: June 2019 End Date: May 31, 2023
Expected Loan Closing Date	May 31, 2023
Project cost and Financing Plan	Total Project Cost: USD 128.0 million AIIB Loan: USD 40.0 million World Bank: USD 40.0 million Nordic Development Fund: USD 9.5 million Counterpart Fund: USD 38.5 million
AIIB Loan (Size and Terms)	Size: USD 40.0 million Term: Final maturity of 35 years, including a grace period of 4 years, with level repayments at the Bank's standard interest rate for sovereign backed loans.
Co-financing (Size and Terms)	World Bank (IDA Credit), USD 40.0 million Nordic Development Fund (Credit), EUR 8.0 million (USD 9.5 million equivalent)
Environmental and Social Category	A
Project Risk (Low/Medium/High)	High
Conditions for Effectiveness	<ul style="list-style-type: none"> <li>• Effectiveness of the Co-financing Agreement</li> <li>• Signing of the Co-lenders' Agreement</li> </ul>
Key Covenants	Borrower to:

	<ul style="list-style-type: none"> <li>• Furnish to the AIIB, no later than November 30 of each year, an annual work plan and budget for the Project for the following Fiscal Year and implement the activities under the Project during the relevant Fiscal Year in accordance with such plan and budget.</li> <li>• Appoint, by October 15, 2019, an independent technical auditor; to furnish, not later than December 15 of each year, the reports of the independent technical auditor and thereafter take measures to address the findings and implement the recommendations of such reports.</li> <li>• Adopt, not later than twelve (12) months prior to the Closing Date, a sustainability plan, specifying actions and budget designed to ensure the continued and effective implementation of the OPBRC in the period after the Closing Date, including, inter alia, financial, institutional sustainability, and monitoring and supervision measures to be put in place by MPWT for the full period of the operation and maintenance phase of the OPBRC.</li> </ul>
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that the Bank is in compliance with the policies applicable to the project.

<b>President</b>	Jin Liqun
<b>Vice President, CIO</b>	D.J. Pandian
<b>Director General, Investment Operations-1</b>	Supee Teravaninthorn
<b>Team Leader</b>	Wenyu Gu, Senior Investment Operations Specialist
<b>Team Members</b>	Yitzhak Kamhi, Senior Transport Advisor Pajnapa Piamsilpakulchorn, Infrastructure Sector Economist Xiaowei Guo, Senior Procurement Specialist Mohammad Omar Khalid, Senior Environment Specialist Jessana A Yanuario, Finance Officer Julius Thaler, Senior Legal Counsel Wu Ning, Financial Management Specialist Michaela Bergman, Principal Social Development Specialist Xiao Zhang, Team Assistant

## 2. Strategic Context

### A. Country context

1. **Lao PDR is a lower middle-income land-locked country with a per capita GDP of USD 2,150 in 2016.** The country has a population of 7 million and is bordered by China, Vietnam, Cambodia, Thailand and Myanmar. The country has rich natural resources including mineral ores, water resources and forests. Economic growth has relied on hydropower dams on the Mekong river and its many tributaries, copper and gold mining, logging, agri-business and construction. However, as a landlocked country, the country faces the challenge of developing a more diverse and inclusive economy.

2. **Macroeconomic performance of Lao PDR has significantly improved over the past decade.** Gross domestic product (GDP) growth averaged 7.8 percent per year over the last decade, making Lao PDR the 13th fastest-growing economy globally.<sup>1</sup> The rapid economic growth has been primarily reliant on natural resources and benefits of regional integration under the Association of South East Asian Nations (ASEAN), and more recently, on expansion of services in retail, tourism and transport. Growth was at 6.9 percent in 2017 supported by strong exports, investment and electricity generation.<sup>2</sup> Growth in 2018 is projected to be maintained at 6.9 percent and will pick up slightly between 2019 and 2020.<sup>3</sup> The fiscal deficit grew to 6 percent of GDP during 2015-2016 while public debt increased to 68 percent of GDP in 2016. As the Government of Lao PDR (GoL) continues with ambitious public investment plans, including the Lao PDR section of the Kunming – Singapore railways line, the deficit is expected to remain high. The government has taken steps to consolidate its fiscal position over the medium term by removing tax exemptions, expanding the tax base and strengthening tax administration.

3. **Regional connectivity is a key part of the government's strategy.** The GoL has a vision to transform the country from landlocked to land-linked. Given its location, the country has strong potential to serve as transit link for goods transportation among Greater Mekong Sub-region (GMS) countries such as Cambodia, China, Myanmar, Thailand and Vietnam. The government has been investing in highway network expansion along the regional economic corridors, airport expansion and upgrade inland waterway transport, and new railways development. The GoL's Eighth Five-Year National Socio-Economic Development Plan (2016-2020) highlights the upgrading of transport infrastructure to ASEAN standards, couple with associated development of logistics industry to be one among its national strategic investment priorities in order to achieve the economic integration with its neighboring countries.

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<sup>1</sup> World Bank (2017). Lao PDR: Systematic Country Diagnostic

<sup>2</sup> IMF Country Report No. 18/84, March 2018 and WEO April 2018.

<sup>3</sup> World Bank (2017). Lao PDR Economic Monitor.

4. **Lao PDR is highly vulnerable to climate and disaster risks.** Historical data indicate that annual losses from adverse climatic events range between 3 and 4 percent of GDP, with the associated average annual fiscal costs being close to 2 percent of the government expenditures. Three of the five costliest natural disasters have taken place since 2009, including two floods in 2013. The 2015-16 El Niño phenomenon is one of the events with the most severe impact (lower agriculture yields, lower hydropower production and infrastructure damages from storms). Damages to road infrastructure have occurred in the past during the monsoon seasons due to flash floods and landslides. With climate change, these events are likely to intensify in the future. Climate change projections indicate further increases in temperature as well as intensity and frequency of extreme events, including increased rainfall and flooding risks. These conditions can severely impact economic activity, most importantly, hydropower, transport and agricultural production. Vulnerability and losses may be compounded if infrastructure planning does not take into consideration climate and disaster risks mitigation measures.

## B. Sectoral and institutional context

5. **As a landlocked country, Lao PDR’s connectivity with neighboring countries is of critical importance.** As the country has no port and with only 3.5 km of rail link at the Thai border<sup>4</sup>, the road network is the most important means of transportation to connect Laos with its neighbors and within the country. Road transport represents more than 90 percent of total passenger–kilometers traveled and 80 percent of freight–kilometers. As of 2017, the country had a total network of 51,600 km of which the highest share was rural roads (46 percent), followed by provincial roads (16 percent), national roads (15 percent), and the remaining 23% were district and urban roads. Around 80 percent of national roads are paved. Road network assessment in 2015 showed that the overall condition of the network could be characterized as being in good/fair condition (55 percent) with 29 percent being in poor condition.

**Table 1: Road Network in Lao PDR (KM)**

Type of Road	Concrete	Asphalt	DBST	Gravel/Earth	Total
National Road	75.82	635.35	5,146.91	1,590.38	7,448.46
Provincial Road	47.01	65.90	1,140.72	7,123.06	8,376.69
District Road	9.46	7.50	439.63	5,946.43	6,403.02
Urban Road	164.25	97.22	912.86	1,545.99	2,720.32
Rural Road	1.45	4.00	300.70	23,531.95	23,838.10
Special Road	12.63	4.33	331.42	2,462.05	2,810.43
Total Length (km)	310.62	814.30	8,272.24	42,199.86	51,597.02
Percentage (%)	0.6	1.58	16.03	81.79	100

<sup>4</sup> The 414-kilometer-long Laos-China Railway project linking its northern city of Boten, on the Lao-China border, to Vientiane, the Lao capital is under construction. The Lao–Thai railway project Phase 2 from Thanaleng to Ban Khamsavath village (7.5 km) is at the construction bidding stage. The feasibility study of the 217 km Savannakhet to Lao Bao (Lao–Vietnam border) railway has been completed.



Source: Department of Road.

6. **Government of Lao PDR realizes the importance of efficient transport infrastructure as a means to promote its economic growth, hence it has recently invested heavily to improve and expand the transport network, particularly roads.** The road sector is financed through the government budget, overseas development assistance (ODA) and the Road Fund (RF).<sup>5</sup> The road sector received a total allocation of USD107 million for the fiscal year 2017 from the national budget and the RF. Due to limited and unpredictable national budget allocations, the Government established the RF in 2002 to ensure predictable and sustainable allocations for road maintenance. According to its legal mandate<sup>6</sup>, the RF supports routine, periodic and emergency maintenance as well as rehabilitation and upgrading of the existing roads. With growing maintenance requirements and other competing needs (emergency, road safety), domestic resources are not adequate to finance capital investments. New investments for large-scale projects largely rely on external sources of fund.

7. **Maintenance remains a key issue in road sector management as life cycle of roads are shortened by the quality of construction, overloading and natural disasters (mainly floods and landslides).** The government faces the challenge of controlling the quality of construction and managing contractors as the sector saw some newly constructed roads prematurely deteriorating. Truck overloading from national and international freight transportation is increasing rapidly and affecting the rate of deterioration of the network. Roads are also frequently damaged as typhoons and unexpected rainfalls cause massive flooding and landslides. These factors call for better construction quality improvement and control as well as more resources for maintenance and rehabilitation. Funding in the road sector is however limited as a large portion of the allocation has been used to repay road sector debt, arrears to contractors and meet outstanding liabilities.

8. **In terms of institutional management, the road sector is under the overall jurisdiction of the Ministry of Public Works and Transport (MPWT).** MPWT is responsible for policy making, strategic planning, financing, oversight and overall management of the sector, including not only road, but also railway, aviation and inland waterway transportation etc. While it has progressively delegated maintenance and operations for local roads to the provincial level, MPWT retains the responsibility for the maintenance and operation of the national road network. MPWT has considerable experience in applying International Financial Institutions' (IFI), specifically the World Bank's guidelines and procedures for both fiduciary (procurement and financial management) and safeguards (environmental and social) policies.

### 3. The Project

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<sup>5</sup> The RF was formerly called the Road Maintenance Fund or RMF.

<sup>6</sup> Decree of the Prime Minister on Road Maintenance Fund (No.09/PM), issued on January 15, 2001 and replaced by RMF Decree No. 130/PM issued by the Prime Minister on June 1, 2016, and Decision Number 1870 of the Minister of MPWT dated November 25, 2011.

## A. Rationale

9. **The National Road 13 (NR 13) North-South corridor (1,500 km) is the backbone network of the country, linking the northernmost province of Luang Namtha (bordering China) through the capital city of Vientiane and all the way to the southernmost province of Champasak (bordering Cambodia).** It traverses 10 out of 17 provinces<sup>7</sup> of Laos. The road comprises the NR13 North section (671 km) from Vientiane Capital to Boten at the Chinese border and the NR13 South section from Vientiane Capital to the Cambodian border (829 km). At the Capital Vientiane, there is a 19 km of road branching out to Thailand through the Friendship Bridge over Mekong River. Therefore, the road basically links Lao PDR with three of its neighboring countries, China, Thailand and Cambodia. The main sections of the road were completed in 1997 and have not been rehabilitated since then, receiving only periodic and emergency maintenance. Its upgrade, rehabilitation and maintenance will result in better connectivity for the country and the region and serve the growing demand of road users.

10. **While other transportation modes are being developed in the North-South corridor of the country, NR 13 will remain to be an important backbone to serve the growing domestic and international transport demand.** To strengthen the transit role of the country, the government has concluded an agreement with China to build the China-Lao PDR railway starting from the Mohan-Moten border and running over 414 kilometers to Vientiane. This railway line will link China with countries in Southeast Asia through Lao PDR. In addition, there have been discussions on a proposed tolled expressway to connect Vientiane and Vangvieng and extend to the border of China. However, these will require significantly higher investments compared to the full rehabilitation of the existing NR 13 corridor for improving north-south connectivity. Besides connectivity with other provinces, as NR 13 passes through densely populated sub-urban areas and serves a high share of urban traffic, NR 13 also plays a key role in relieving congestion in and around the Vientiane capital.

11. **Strong economic growth and trade expansion have led to rapid increase in traffic volume on NR 13.** A detailed feasibility study and traffic study carried out in 2015 projected that some sections of the road are expected to reach their full design capacity in the next 5 years and identified several critical sections on NR13 requiring improvement and widening works. Traffic increase is evident near Vientiane Capital driven by rapid urbanization. MPWT has prioritized the 58-km section near Vientiane Capital (from km 12 to km 70) which serves the highest traffic volume on the national road network; up to 22,100 Annual Average Daily Traffic (AADT) in the urban section. Results of the traffic study indicated that the km 12 to km 31 section will be heavily congested in the next 5 years if no measures are undertaken to improve capacity. The km 31 to km 70 section serves less traffic but is in worse physical condition compared to the first section due to pavement deterioration. MPWT will adopt a phased approach to improve NR13. The

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<sup>7</sup> Luang Namtha, Oudomxay, Luang Prabang, Vientiane Province, Vientiane Capital, Bolikhamsai, Khammoune, Suvannakhet, Salavan, Sekong.

improvement of other sections is in preparation stage. The proposed project will finance road improvement in the priority sections of NR 13 to expand capacity, serve growing demand and provide better quality road services.

12. **The NR 13 section to be supported by the project is located in the central part of the country which is flood-prone.** The project road has been periodically affected by seasonal flooding with various degrees of severity during the monsoon season. Typhoon Haima in 2011 severely affected sections of the project road. Looking forward, climate modelling forecasts increases in rainfall of about +10-30 percent, particularly in the eastern and southern part of Lao PDR. The project will help ensure climate-resilient design of road improvement and during operation period.

13. **It is critical to address sustainability of investment in the road sector in the face of funding shortages.** As discussed, funding for the road sector is constrained due to competing needs, including the repayment of debt. Increasing efficiency in road investment and management is vital to achieve long-term sustainability. The proposed project will employ modern form of contracting using long-term OPBRC and DBMOT methodology instead of traditional input-based approach to improve efficiency of road asset management and provide best value-for-money outcomes.

14. **Fatalities from road accidents are of national concern especially on NR 13.** Road fatalities at the national level has been reported to have more than doubled between 2000 and 2010 (from 358 to 790) and continuously increased to 1,054 in 2014. The World Health Organization places Lao PDR third behind Thailand and Vietnam – countries with significantly higher motorization rates – in terms of the share of GDP loss from road crash fatalities (2.7 percent in 2010). The existing NR 13 lacks any form of road safety measures and pedestrian protection. Consultations during project preparation highlighted that women and children, who use the road as pedestrians for daily short trips, face serious safety risks. The project will improve road safety for NR 13 for both motorists and pedestrians by incorporating road safety measures in the road design.<sup>8</sup>

15. **MPWT has identified truck overloading as a significant contributor to pavement damage on roads that serve the bulk of transit transport, including NR13.** Most of the main roads in Lao PDR, including NR13, were originally designed and built for 8.2-tonne standard axle loads while the current ASEAN standard is 11-tonne. The actual loads of trucks, particularly along the major freight corridors, are significantly higher. The proposed project will address truck overloading by adopting ASEAN standard for the rehabilitation works and installing a weigh station. The use of long-term output and performance-based contract will also help address this

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<sup>8</sup> The feasibility study on NR13 indicated that investment in road improvement could help reduce the fatality rate by about 20 percent and serious accident rate by 15 percent on the NR13 project sections (including northern and southern sections).

through the assignment of appropriate risks and responsibilities for overloading control between government and the contractors who implement the road.

16. **Alignment with AIB's Strategic Priorities.** The project is strategically aligned with the Bank's key thematic priority on *sustainable infrastructure*. It will increase sustainability by raising the road design standard of 8.2-tonne axle load to meet the ASEAN standard of 11-tonne axle load. By adopting the same standard, it will reduce damage on NR 13 which currently serves overloaded trucks from neighboring countries (e.g. Thailand, Vietnam and China). The project will also enhance sustainability by raising the selected road profile and increasing drainage capacity in the flood-prone sections of NR 13 which will extend the life cycle of the road and reduce maintenance needs.

17. **Value addition by the Bank.** The key value additions to the project resulting from the Bank's participation are as follows:

- (i) Bridging the financing gap of the proposed project as the World Bank's International Development Association (IDA) envelope is limited.
- (ii) Providing experience and technical contributions in the innovative method of road contracting through applying OPBRC/DBMOT concept.

18. **Value addition to the Bank.** The key value additions to the Bank by participating in the project are as follows:

- (i) Lao PDR is a new client country, so the project will diversify the Bank's portfolio.
- (ii) Value of partnership with the World Bank as the Bank resources blended with concessional fund (IDA credit, Nordic Development Fund or NDF credit) make our involvement in low-income country possible.
- (iii) The project provides an opportunity for staff to enhance and apply in practice the innovative method of road contracting and management.

## **B. Objective**

19. The proposed **Project Objective (PO)** is to improve the road condition, safety and climate resilience of critical sections of National Road 13.

20. **Project Beneficiaries.** The main direct beneficiaries of the project include approximately 502,100 people. Of this, 239,300 are women, living in 471 villages and 11 districts in Vientiane Capital and Vientiane Province. The project road provides access for the beneficiaries to nearby markets, jobs and services. In addition, the project will benefit a larger share of the population, including both private and commercial road users who need to travel to and from the eight northern provinces of Lao PDR as well as to Vietnam, Thailand and China. The project will also benefit freight transit. MPWT will benefit through improved capacity in the use of output and performance-based contract modalities that can extend road lifecycle, and pave way for increased private sector participation in the road sector.

21. **Results Indicators.** The proposed results indicators of the project are:

- (i) Road condition: Improved road condition resulting in reduction in vehicle operating cost on the project road;
- (ii) Road safety: Improved road safety resulting in increase in average International Road Assessment Program (IRAP) star rating of the project road;
- (iii) Climate resilience: Improved road design resulting in project road upgraded and improved with climate resilience measures.

22. Results indicators and results monitoring framework are provided in **Annex 1**.

### **C. Project Description and Components**

23. The project will comprise three components as described below. AIIB loan will finance sub-component 1.1 and sub-component 2.3. The Special Fund preparatory grant of USD 995,000 has financed consultancy services, including: (a) preparation and implementation of the RAP; (b) conceptual design of National Road 13 South section.

24. **Component 1: Road Improvement, Maintenance and Operation (USD 120.5 million).** This component will finance road widening, improvement, maintenance and operation works and land acquisition required for road works. Component 1 will include the following two sub-components:

25. **Sub-component 1.1: Road Improvement, Maintenance and Operation (USD 100 million).** This sub-component will support implementation of 58 km of road improvement, operation and maintenance works on the following road sections:

- (i) 19 km of road section from Sikeut to Songpeuay Market (km 12 to km 31), which will be upgraded from 2 to 4-lane Portland cement concrete road; and
- (ii) 39 km of road section from Songpeuay Market to Phonhong (km 31 to km 70), which will be improved along the existing 2-lane road to Portland cement concrete pavement.

The road improvement and maintenance will be carried out through the implementation of a long-term OPBRC using a DBMOT methodology. The sub-component will be financed by AIIB, the World Bank and government counterpart funds.

26. **Sub-component 1.2: Land Acquisition (USD 20.5 million).** This sub-component will support the acquisition of land needed for road works. This sub-component will be financed by the GoL and NDF. Counterpart funds from the Road Fund totaling about 120 billion Kip (USD 14.5million) for land acquisition has been approved by Ministry of Planning and Investment, of which 80 billion Kip has been allocated for 2018 and 40 billion Kip for 2019. The RF has confirmed that NR 13 N is a high priority project and the GoL will allocate more funds if needed. AIIB Special Fund is funding a consulting firm to support MPWT in the management of the Resettlement Action Plan (RAP) to enhance project readiness.

27. **Component 2: Technical Assistance and Supervision (USD 4.8 million).** This component will support MPTW to manage the implementation of the OPBRC, traffic safety activities, overloading control, and enhance environmental and social monitoring and supervision. The component will also support preparation of studies for future investments on other sections of NR 13. The component will include the following sub-components.

28. **Sub-component 2.1: Traffic Safety, Overloading Control and Safeguards Monitoring (USD 0.7 million).** This sub-component will support implementation of traffic safety campaigns and other traffic safety enhancement measures, overloading control and environmental and social monitoring. The sub-component will be financed solely by IDA.

29. **Sub-component 2.2: Management and Supervision of the OPBRC Implementation (USD 3.0 million).** This sub-component will support MPWT to manage and supervise OPBRC/DBMOT contract implementation through financing the consultancy for supervision of road improvement works during the construction period and supervision of the initial post-construction maintenance and operation until project closure. This sub-component will be financed solely by NDF.

30. Sub-component 2.3: Preparation of Future Investments (USD 1.1 million). This sub-component will finance technical assistance to prepare future investments on other selected sections of NR13. AIIB will finance preparation of conceptual design and related technical studies and NDF will finance preparation of related environmental and social documents. AIIB special fund grant was allocated to support the initial preparatory works of this sub-component. During project preparation, one of the sections identified to be supported by the project is Sikeut-Sikhai section of NR 13 North (about 6 km).

31. **Component 3: Project Management (USD 2.7 million).** This component will support project management, including technical and operational assistance for the day-to-day management of project activities including training on output and performance-based contracting, project planning and execution, financial management, procurement, monitoring and evaluation, and technical and financial audits. The sub-component will be financed by IDA.

## D. Cost and financing

32. The total project cost is USD 128.0 million, of which USD 40.0 million will be financed by the Bank. Of the total AIIB loan amount, USD 39.4 million will finance sub-component 1.1 and USD 0.6 million will finance sub-component 2.3. The project cost and financing are shown in Table 2.

**Table 2: Project Cost and Financing Plan (USD million)**

Item	Cost	Financing				
		AIIB*	IDA	NDF	GoL**	
Base Cost						
<b>Component 1: Road and Maintenance</b>	<b>120.50</b>	<b>39.40</b>	<b>36.60</b>	<b>6.00</b>	<b>38.50</b>	
Sub-component 1.1: Road Improvement and Maintenance	100.00	39.40	36.60	-	24.00	
Sub-component 1.2: Land Acquisition	20.50	-	-	6.00	14.50	
<b>Component 2: Technical Assistance and Supervision</b>	<b>4.80</b>	<b>0.60</b>	<b>0.70</b>	<b>3.50</b>	<b>-</b>	
Sub-component 2.1: Traffic Safety, Overloading Control and Safeguards Monitoring	0.70	-	0.70	-	-	
Sub-component 2.2: Management and Supervision of OPBRC	3.00	-	-	3.00	-	
Sub-component 2.3: Preparation of Future Investments	1.10	0.60	-	0.50	-	
<b>Component 3: Project Management</b>	<b>2.70</b>	<b>-</b>	<b>2.70</b>	<b>-</b>	<b>-</b>	
<b>Total Base Cost</b>	<b>128.00</b>	<b>40.00</b>	<b>40.00</b>	<b>9.50</b>	<b>38.50</b>	
A. Contingencies***	-	-	-	-	-	
B. Financing charges during project implementation****	-	-	-	-	-	
<b>Total</b>	<b>128.00</b>	<b>40.00</b>	<b>40.00</b>	<b>9.50</b>	<b>38.50</b>	

Note: \*In addition, USD 995,000 of AIIB Special Fund grant is funding project preparation until loan effectiveness.

\*\*Counterpart fund will come from Road Fund and annual budget allocations.

\*\*\*Contingencies are already embedded in project cost. Any additional contingencies will be covered by the government.

\*\*\*\*Estimated financing charges which includes all financiers during project implementation of USD 12.14 million will be paid by the government budget.

33. **Co-financing arrangements.** AIIB and the World Bank will jointly co-finance the project, with the World Bank as the lead co-financier. NDF will parallel co-finance the project. The co-financing arrangements for the project between the World Bank and AIIB will follow the Co-financing Framework Agreement signed by the two

institutions in April 2016 (and amended in 2018). The World Bank's policies and procedures on safeguards, procurement, financial management, disbursement, project monitoring, and reporting will be used for the project activities to be financed in whole or in part out of the loan proceeds (including activities to be financed by AIB).

34. **Financing Terms.** Financing terms are final maturity of 35 years, including a grace period of 4 years, with level repayments at the Bank's standard interest rate for sovereign-backed loans.

#### **E. Implementation arrangements**

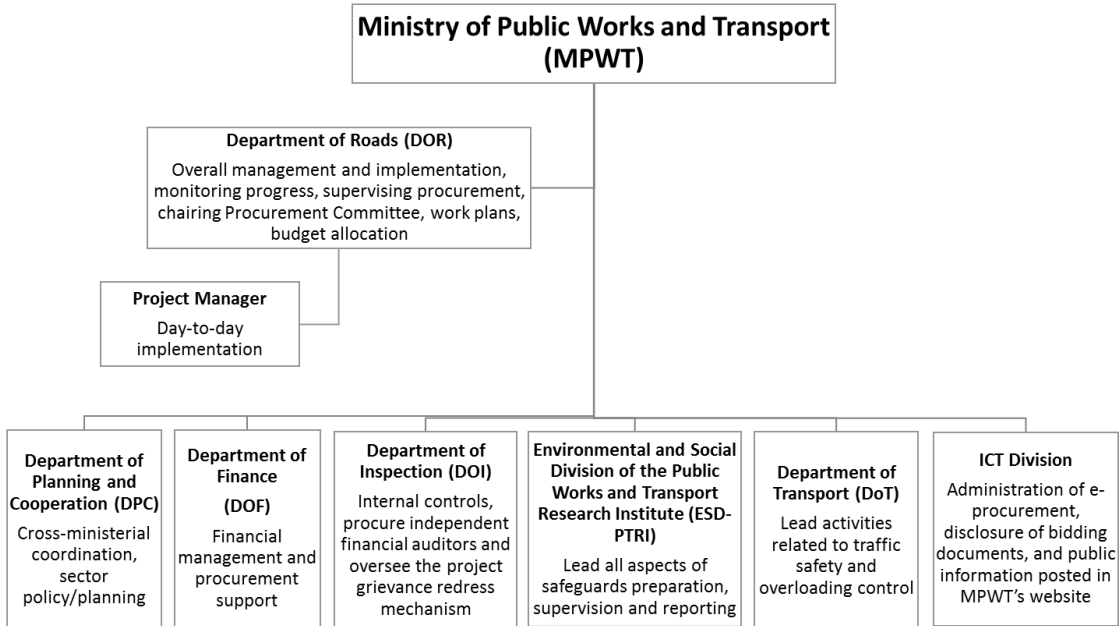
35. **Implementation period.** The project will have a 4-year implementation period, from May 2019 until May 31, 2023. AIB and the World Bank will finance the construction phase of road improvement in the first three years of the 10-year OPBRC/DBMOT contract. NDF will finance the supervision contract for construction phase and the initial O&M phase (i.e. until project closure) of the OPBRC/DBMOT contract. The GoL will continue to finance and manage the remaining period of the OPBRC/DBMOT contract after the project closing date.

36. **Project Implementation Management.** The project will be implemented through the existing government structures. The project will receive overall policy and strategic guidance from the Project Steering Committee chaired by the Minister of MPWT and comprise of the Vice-Governors of Vientiane Province and Vientiane Capital, representatives from other ministries involved in the implementation of the project, and MPWT's Department Directors directly involved in project implementation. The Project Steering Committee will be supported by a secretariat led by the Deputy Director General of MPWT's Department of Roads (DoR) and comprising representatives of related departments.

37. MPWT is the Project Implementing Agency. MPWT's DoR is responsible for the overall management and implementation of the project. This includes monitoring progress, supervising the procurement processes, and chairing the Procurement Evaluation Committee, reviewing works plans and allocating funds to road improvement and operation and maintenance works during post-construction period. DoR has established Project Management Unit (PMU) led by a Project Manager with responsibilities for management of day-to-day implementation. Other departments and divisions in MPWT will be responsible for project implementation as per their official mandates as further described in the figure below.



**Figure 1: Implementation Arrangement**



38. The PMU is familiar with International Financial Institutions' (IFI) guidelines, specifically the World Bank's guidelines and procedures for both fiduciary (procurement and financial management) and safeguards (environmental and social) policies. The PMU will be supported by an OPBRC/DBMOT monitoring supervision consultant during construction and initial O&M period.

39. **Procurement Committee.** A Procurement Committee has been established. DoR is the Chair of the Committee, which comprises representatives from Department of Finance (DoF), Department of Transport (DoT), Department of Planning and Cooperation (DPC), Department of Public Works and Transport (DPWT) of Vientiane Capital and DPWT of Vientiane Province, Ministry of Planning (MPI), Ministry of Finance (MOF), and the Project Manager.

40. **Resettlement Committee.** Two Resettlement Committees have been established, one for each project section. The Vice-Governor from Naxaythong District in Vientiane Capital chairs the Resettlement Committee for the section km 12 to km 44, and the Vice-Governor of Phonhong District in Vientiane Province chairs a similar Committee for the section km 44 to km 70. The Resettlement Committees are composed of representatives from DPWT, Department of Natural Resource and Environment (DONRE), Department of Forest and Agriculture (DOFA), district Lao National Front for Construction, and district Lao Women's Union.

41. **Project Operations Manual.** The Project will be implemented following a Project Operations Manual (POM), which contains detailed information on the project implementation arrangements and processes, including procurement,

financial management, disbursement and safeguards. WB, AIIB and NDF will use the same POM for all co-financed and parallel co-financed project activities.

42. **Implementation Support Supervision.** The World Bank will be the lead co-financier and will supervise the project and administer the AIIB loan on behalf of the AIIB, in accordance with the World Bank's applicable policies and procedures, and a Project Co-lenders' Agreement, to be signed between AIIB and the World Bank, in accordance with the Co-financing Framework Agreement between AIIB and the World Bank. The World Bank staff will carry out implementation support missions and site visits to the project sites, as needed, to monitor progress. The Bank will also participate in these missions with the World Bank. Adequate resources will be provided to match the frequency of the World Bank's implementation support supervision visits.

43. The Bank has decided to use the applicable World Bank's Operational Policies (OP) and Business Procedures (BP), including OP/BP 4.01 Environmental Assessment, OP/BP 4.04 Natural Habitats, OP/BP 4.10 on Indigenous People, OP/BP 4.11 Physical Cultural Resources, and OP/BP 4.12 Involuntary Resettlement; the World Bank's Procurement and Consultant Guidelines, and the World Bank's sanctions policies and procedures, including the World Bank's Anti-Corruption Guidelines, as they are consistent with the Bank's articles of Agreement and materially consistent with the provisions of the Bank's Environmental and Social Policy and relevant Environmental and Social Standards (ESS1, 2 and 3). In addition, the monitoring procedures that the World Bank has in place to ascertain compliance with its ESSP are appropriate for the Project. AIIB will rely on the World Bank's determination of compliance with the above World Bank policies and procedures applicable to the project. Project monitoring and reporting, as well as financial management, will also be carried out in accordance with the World Bank's requirements. The World Bank's Grievance Redress Service (GRS) is consistent with the provisions of the AIIB's Project-affected People's Mechanism (PPM). Therefore, World Bank's Management-led GRS and Inspection Panel will be used in place of PPM. This approach ensures that one set of policies will apply to the project activities to be financed in whole or in part out of the loan proceeds. It will also provide a single point of contact for the Borrower and therefore facilitate a more efficient and seamless approach to Project Implementation.

44. **Procurement.** Procurement under the project will be carried out in line with the World Bank's Procurement Regulations for Investment Project Financing (IPF) Borrowers of July 2016, revised November 2017, which is materially consistent with the AIIB Procurement Policy. The World Bank's planning and tracking system, Systematic Tracking of Exchanges in Procurement (STEP), will be used. Currently, the OPBRC contract bidding evaluation is in progress, the contract will be signed by May 30, 2019. The supervision consultant contract will be signed by April 25, 2019.

45. **Annual Work Plan and Budget (AWPB).** MPWT will prepare AWPB covering all sources of project financing. The AWPB will clearly indicate sources of financing (WB, AIIB, NDF and GoL) for activities under each component and sub-component. AIIB and WB will review and provide no objection to the AWPB prior to implementation.

46. **Fund Flow and Disbursement Arrangements.** Applicable disbursement methods are advance, direct payment and reimbursement. In the case of Advance Method, a pooled Designated Account (DA) in USD will be opened at the Bank of Lao PDR, managed by the National Treasury, MOF, which will be used for both the World Bank and AIIB financing of the project. Funds advanced from the IDA Credit and AIIB Loan will be transferred to the pooled DA. The ceiling for the DA will be variable and will be based on six months planned eligible expenditures. Reporting of expenditure will be based on Interim Unaudited Financial Reports (IFR), prepared semi-annually, and submitted to World Bank and AIIB no later than 45 days after the end of the period. The AIIB loan may also be disbursed using the Reimbursement and Direct Payment methods for eligible expenditures in USD. The individual minimum application size will be equivalent to USD 250,000. Two separate applications will be prepared, one for AIIB and one for the World Bank, and submitted to the World Bank for processing. The World Bank will inform AIIB when to disburse. Payments made by MPWT to its contractors and consultants eligible for the World Bank and AIIB financing will form the basis for disbursement from the Bank, for which AIIB is financing USD 39.4 million, the WB is financing USD 36.6 million, and Gol is financing USD 38.5 million for sub-component 1.1, and AIIB is financing USD 0.6 million for sub-component 2.3.<sup>9</sup> The World Bank and AIIB will coordinate the disbursement process according to the project Co-lenders' Agreement.

47. **Retroactive Financing.** Retroactive Financing is not envisaged under the project.

48. **Monitoring and Evaluation.** A semi-annual Monitoring and Evaluation (M&E) report will be submitted by MPWT to the World Bank, AIIB and NDF as per agreed dates. The World Bank, AIIB and NDF staff will carry out joint implementation support missions and site visits to the project sites, as needed, to monitor progress. The progress reports will also include information on compliance with safeguards, citizen engagement and grievance redress. Annual independent financial audits and technical audits will be carried out. The World Bank will conduct a midterm review of the project within 30 months after project effectiveness to assess the status of project implementation, as measured against the performance indicators. Implementation Completion and Results Report will be prepared within six months after the closing date of the project.

## 4. Project Assessment

### A. Technical

49. **Road characteristics.** The project road is a relatively simple semi-urban type of arterial road with appropriate horizontal/vertical alignments and relatively good soil conditions. The road crosses through characteristically flat terrains with about 800-1000 mm rainfall annually. Only one section with sharp horizontal curve

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<sup>9</sup> at approximately 52:48 ratio between AIIB and the World Bank financing for sub-component 1.1 and 100 percent AIIB financing for sub-component 2.3

needs realignment to meet the minimal design criteria and associated designed travel speed. The current traffic is medium light and is a mixed traffic with significant non-motorized traffic.

50. The required road civil works will follow the existing alignment. The first section of the project road is located in densely populated areas which will involve substantial resettlement of communities. It should be noted that about 6 km of the NR 13 section starting from Vientiane capital toward Phonhong is currently not included in the scope of this project, but will be rehabilitated at a later stage. This section of NR 13 will require design and preparation of bidding documents and this work is included under sub-component 2.3 of this project.

51. **Technical design.** MPWT has prepared a conceptual engineering design for the project, taking into consideration the ASEAN standards, structural strength, traffic characteristics and volume, road safety, and climate and disaster risks. This design will be used as a minimum technical requirement in the bidding documents for OPBRC/DBMOT civil works contract together with other parameters and performance indicators.

52. Key design features are as follows:

- 2 to 4 lanes upgrading to cement pavement (km 12 to km 31) – to a total width of 23 meters including 4 lanes, median, shoulder, and pedestrian sidewalks.
- 2-lane rehabilitation involving cement pavement structure (km 31 to km 70), at total width of 15 meters (community section) and 12 meters (not community section) including shoulder widening as a safety lane for motorcycles and bicycles, sidewalks in populated areas.
- The road embankment will include climate resilient features. The slope of bridges and approach road strengthened to be sufficiently climate resilient.
- Rehabilitation of 7 bridges, adding 3 new “twin bridges” (widened sections).
- 3 Major at-grade intersections, 4 u turns, 6 overpass bridges for pedestrians.
- Several bus stops for communities, escape bays, etc.
- For the cement pavement design, the American Association of State Highway and Transportation Officials (AASHTO) Method will be used.

53. **OPBRC contracting method.** Different contracting options including tolled road Public Private Partnership (PPP) were considered during project preparation for the rehabilitation of the NR 13 to enable increased participation of the private sector. However, market conditions, regulations, and political acceptance remain key constraints for increasing private sector financing in the sector. Nevertheless, MPWT sees the benefits of increasing the role of the private sector to participate in road construction, operation and maintenance to lower life-cycle cost, and to increase quality and sustainability of investment. The GoL has decided that an OPBRC using DBMOT method is appropriate at this stage.

54. The proposed OPBRC contract format involves DBMOT of the road. This enables greater participation of the private sector in financing of the road

investments and efficient allocation of risks between the government and private sector to achieve higher quality results and services. Under the OPBRC/DBMOT concept, the contractor is paid by the government through periodic performance-based lump-sum payments for completed milestones for rehabilitation and improvement works provided that all performance requirements are met and then for maintaining the infrastructure at an agreed quality level for a relatively long O&M period. The role of MPWT (the Employer) would be to enforce the contract by verifying compliance with the specified service levels and with all applicable national legislation and regulations. The OPBRC/DBMOT approach is expected to improve efficiency in road investment and maintenance by transferring design, construction, operations and maintenance risks to the contractor. Payments based on meeting performance indicators will provide incentives for the contractors to better manage the transferred risks and deliver agreed service levels. This will result in a lower lifecycle cost to the government and higher quality road services.

**55. Main features of the OPBRC/DBMOT contract.** The main elements of OPBRC/DBMOT contract structure and financing are summarized below:

- (i) The project OPBRC/DBMOT contract will have a 10-year implementation period, including 3-year road improvement and 7-year O&M phases.
- (ii) The implementation period of the proposed project financed by AIIB, NDF and the World Bank is an initial 5 years period, hence, the O&M phase of the project will continue after the closure of the project, which will be financed by the GoL. This will support sustainability of the project investment beyond the project period by providing continuous coverage of maintenance requirement.
- (iii) AIIB and the World Bank will cover the 3-year road improvement phase during project implementation, excluding deferred amount for civil works, which will be financed by the contractor and refunded by the government during the O&M phase. The government has formally confirmed its financing through the RF to cover the full cost of the 7-year O&M phase, including the deferred repayments to the contractor.
- (iv) The payments to the contractors for road improvement works will be based on completed construction milestones according to defined performance criteria. During the O&M phase, the contractors will receive quarterly payments, including deferred amount of payments for construction of civil works based on achievement of service level performance requirements. The performance milestones for road improvement/upgradation/construction and service level requirements for O&M will be specified in the bidding documents.
- (v) Bidders will be assessed on their technical and financial proposals. The bidding documents will include a conceptual design for road improvement works and the contractor, through the contractor's associated qualified consultant, will be required to prepare the detailed design.
- (vi) Service levels include performance indicators related to road roughness, skid resistance, status of joints of cement pavement blocks, vegetation control, visibility of road signs and markings, response times to rectify safety related

defects, attendance to road accidents, clearance of drainage sedimentation, and pavement strength, etc.

56. **Market sounding.** To assess market readiness for OPBRC/DBMOT in Lao PDR, MPWT carried out a market sounding assessment. The market sounding took place in two phases starting in August 2017. During the first phase, the request for information document was distributed to potentially interested local and international private sector consulting and contracting industry. The second phase included two workshops with participation of a wide range of the private sector. The results of the market sounding indicated broad support for the OPBRC/DBMOT concept. Feedback from the market included consideration of a 3-month period for the preparation of bid proposals, limiting the up-front funding commitment of the contractor to contractors' profit margin and indicating clearly the minimum design requirements, performance milestones and service levels in the bidding documents. Feedback received has been incorporated into the OPBRC/DBMOT contract structure and bidding documents.

57. **Climate resilience aspects in technical design.** The technical design of roads and associated facilities is focused not only on the engineering aspects but also on the possible influence of climate change in the region and the potential for faster than anticipated deterioration of the road conditions. Such considerations in technical design enhance the resilience of the road structure, road furniture in general and road pavements in specific, to the possible impacts of climate change. The project has taken into consideration increased rain impacts in the future and has translated that into the design criteria, considering 50 years' flood data for roads and 100 years' flood data for major structures. Increased rainfall intensity of 25 percent has been considered. Consequently, appropriate hydrological calculations have been applied in the conceptual design (which has been provided as part of the bidding documents).

58. **Drainage system.** The project will improve drainage systems with the construction of additional and larger culverts, appropriate inlet-outlet of culverts, side ditches, and canals to drain water out from the side ditches. The design will ensure that water can flow smoothly to the natural reservoirs minimizing the impact to the road and adjacent fields. The road profile will be raised in flood-prone sections. Bio-engineering solutions will be used as much as possible for improved road slope protection, including grasses and tree planting. Clearance of drainage sedimentation and drainage of the pavement are included as part of the service level requirements under OPBRC/DBMOT contract. These design measures will make the roads climate resilient and reduces the road asset's vulnerability to flood risk.

59. **Road safety.** The technical design has incorporated findings from a road safety audit (RSA) conducted following the standard methodology and check-list for RSA. Road safety measures include road furniture, reflectors, and improvements in driving vision, sidewalks or traffic shoulders, pedestrian bridges, and street lighting in highly populated areas. The assessment of the traffic safety condition following the rehabilitation and during the O&M period will be based on the IRAP Star Rating

methodology. Traffic safety aspects will be further strengthened through education and awareness campaigns and enforcement to be supported by the World Bank.

60. **Overloading control.** The project design has incorporated measures to strengthen truck overloading control including: (i) designing the road in compliance with the ASEAN standards of 11-tonne axle load of axle load; (ii) implementation of measures to strengthen axle load enforcement; and (iii) assignment of appropriate risks and responsibilities between the government and the contractor for overloading control under the OPBRC/DBMOT contract.

## B. Economic and Financial

61. **Traffic forecast.** A traffic survey was carried out as part of the feasibility study conducted in 2015. Traffic volume of road sections under the project and vehicles composition are provided in Table 3. Annual average daily traffic including motorcycles reached 8,100 vehicles per day in 2015 and is forecasted to grow around 5-8 percent in the first 7 years and will grow at slower rate (3-4 percent) from 2025 onward based on GDP forecast. More information on traffic is provided in Annex 4.

**Table 3: Annual Average Daily Traffic (AADT) (vehicles/day), 2015**

Road Sections	Motorcycle	Car	Bus	Truck	Total
Section 1 (Sikeut-Naxaithong)	7,000	12,900	600	1,600	22,100
Section 2 (Naxaithong-Nadi)	1,300	5,000	400	700	7,400
Section 3 (Nadi-Phonghong)	1,100	3,400	200	400	5,100
Weighted average for entire project section of NR 13 North (58 km)	1,900	5,200	300	700	8,100

Source: LeighFischer, PPP Project Traffic Study 2015.

62. **Economic analysis.** The economic analysis was conducted based on a standard methodology for appraisal of road investments. The economic benefits quantified are reduction in vehicle operating costs (VOCs) due to improved road conditions, travel time saving for passengers and freight carriers due to improved speed, avoided emergency maintenance costs, and reduction in road accidents. The project costs comprise of capital and O&M costs. The financial costs are converted to economic costs at standard conversion factor of 0.92 and 0.87 for construction and O&M costs, respectively.

63. The economic internal rate of return (EIRR) of the project is 25.1 percent and net present value (NPV) is USD 117.46 million. The sensitivity of the EIRR was also tested against different cost and traffic scenarios, which has confirmed the robustness of economic returns. The results of the cost-benefit and sensitivity

analyses are illustrated in Table 4. Details of the economic analysis are provided in Annex 4.

**Table 4: Cost Benefit Analysis (CBA) Results and Sensitivity Analysis**

	Scenarios	EIRR	NPV (US\$ million)
1	Base case	25.1%	117.46
2	Maintenance cost increases by 20%	24.96%	116.28
3	Construction cost increases by 20%	22.31%	104.98
4	Both construction and maintenance costs increase by 20%	22.03%	102.22
5	No generated traffic	23.11%	95.96
6	Traffic moves to railway and/or expressway by 20% starting 2023	22.63%	87.05
7	Worst Case Scenario (4+5+6)	18.16%	55.52

64. **Financial analysis.** As the project road will not be tolled and will be wholly financed by the public sector during construction and O&M, financial analysis has not been conducted.

### C. Fiduciary and Governance

65. **Anti-corruption.** The Bank is committed to preventing fraud and corruption in the projects that it finances. It places the highest priority on ensuring that Projects that it finances are implemented in strict compliance with the Bank's Policy on Prohibited Practices or PPP (2016). The Bank will monitor the work related to tender document preparation and tender/proposal evaluation and award under Bank financing. Implementation will also be monitored rigorously and regularly by Bank staff. The Bank reserves the right to investigate, directly or indirectly through its agents, any alleged Prohibited Practices relating to the Project and to take necessary measures to prevent and redress any issues in a timely manner, as appropriate. To the extent that WB's Anti-Corruption Guidelines are similar to the Bank's PPP, the WB's Anti-Corruption Guidelines will apply to the Project activities financed in whole or in part by the proceeds of the proposed AIB and WB Loans. Detailed requirements will be specified in the Loan Agreement, the Co-Lenders' Agreement and the Project tender documents.

66. **Financial Management.** A Financial management (FM) assessment of the project was carried out by the World Bank. The assessment concluded that overall FM arrangements are acceptable and meet the World Bank requirements. The processes, procedures and controls as documented in MPWT's Financial Management Manual (FMM) are acceptable. MPWT's DoF will have overall responsibility for financial management. DoF has experience in managing International Financial Institutions (IFI) projects and current capacity of DoF staff is considered adequate. FM risks were identified, and proper mitigation measures proposed. The Bank verified that the World Bank's assessment is acceptable, and the risk is rated as Medium by the Bank.



67. An annual financial audit, covering all sources of financing, will be required. The audit will be carried out by qualified independent external auditors, with terms of reference acceptable to the World Bank and AIIB. The annual audited report together with management letter will be submitted to the World Bank and AIIB no later than six months after the end of each fiscal year. The audited financial statements will be subject to public disclosure in accordance with the World Bank's Policy on Access to Information.

68. During implementation, the World Bank will review the continuous adequacy of the FM arrangements, progress with FM capacity building activities, adequacy and timeliness of preparation of IFR and progress in the implementation of agreed FM actions and recommendations from project audits. The World Bank will inform AIIB of any FM issues that may arise from that review and provide assurance that AIIB funds are being used for the intended purposes, in accordance with the Project Co-lenders' Agreement.

69. **Procurement.** The World Bank conducted a Procurement Capacity and Risk Assessment (PCRA) of MPWT and concluded that MPWT has obtained sound procurement experience through the implementation of previous World Bank-funded projects. PMU has adequate organizational structure and relatively qualified staff to manage and implement the project. Procurement risks are identified, and the mitigation measures are proposed. The Bank verified that the World Bank's assessment is acceptable, and the risk is rated as Medium by the Bank.

70. The Project Procurement Strategy for Development (PPSD) prepared by the MPWT and agreed by the World Bank identified the following major activities under the project: (i) works including improvement, widening, operation and maintenance of 58 km (from km 12 to km 70) of NR13; and (ii) consultant services including consultant(s) for preparation of future investments to be financed by AIIB and administered by the World Bank.

71. Considering the market conditions and other factors, road works are packaged into two contracts as follows: (i) Contract #1 covering the four-lane widening section of the road (19 km) and bridges; and (ii) Contract #2 covering the two-lane improvement section of the road (39 km) and bridges, using a "slice and package" arrangement which allows bidders to bid for one or both contracts. Given that the technical nature of road works is not complex and does not require special technology or method to execute, the Request for Bids (RFB) method will be applied. Standard Procurement Documents (SPD) of the World Bank for OPBRC will be customized for this project. The procurement approach for these contracts is international competitive bidding with a two-envelope process.

72. The market analysis demonstrated that MPWT has a good opportunity to select contractors/consultants which have good capacity to successfully execute the works and perform the supervision consulting services.

73. An initial procurement plan for the project was prepared by MPWT and agreed by the World Bank at negotiation. The procurement plan will be updated at least annually by MPWT to: (a) reflect project implementation; (b) accommodate changes that should be made; and (c) add new packages as needed for the project.

#### **D. Environmental and Social**

74. The Bank has decided to use the applicable World Bank Environmental and Social Safeguard Policies (Safeguard Policies) since i) they are consistent with the Bank's Articles of Agreement and materially consistent with the provisions of the Bank's Environmental and Social Policy and relevant Environmental and Social Standards and ii) the monitoring procedures that the World Bank has in place to ascertain compliance with its Safeguard Policies Statement are appropriate for the Project. The proposed project has been classified as Category A, in accordance with the World Bank Operational Policy 4.01.

75. **Environment.** The project triggers the following environmental safeguard policies of the World Bank: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04) and Physical Cultural Resources (OP/BP 4.11).

76. The project is expected to create positive impacts on the environment by improving climate resilience of the road (particularly through drainage system) and reducing Green House Gas (GHG) emissions from traffic per kilometer traveled. Negative environmental impacts during the construction phase are likely to include noise, vibration and air emission caused by batching plants and heavy machinery use, siltation of water bodies, and water contamination caused by effluent and debris discharges from construction sites and construction camps, blockage of drainage, construction noise and dust, disposal of solid and hazardous wastes, removal of vegetation, contractor camp and site management issues related to influx of workers (e.g. hygiene and sanitation, public safety and security), traffic disruption and traffic safety during construction, and occupational health and safety (OHS) risks for the construction workers. Similarly, air and noise emissions due to increased traffic flows, waste generation from road users, traffic safety, and OHS risks for workers among the potential environmental impact during the O&M phase. Pollution or contamination may also be induced by incidents or accidents. These impacts are likely to be site-specific and limited to the project areas and surroundings.

77. To address these impacts, MPWT has prepared an Environmental and Social Impact Assessment (ESIA), which includes an Environmental and Social Management Plan (ESMP). The Site-Specific Environmental and Social Management Plan (SSESMP) will be prepared by the construction contractors before commencement of construction works, once the location of auxiliary facilities such as batching plants and borrow pits is determined. This requirement together with the ESMP have been included in the bidding documents. The draft ESIA was consulted with stakeholders during two rounds of public consultation and was disclosed on MPWT's website in English and Lao on January 3, 2018, and the World Bank external website ([www.worldbank.org](http://www.worldbank.org)) on January 10, 2018. The final ESIA

has been disclosed on MPWT's website and the World Bank website on February 8, 2018. It is also available at:

- (i) <http://documents.worldbank.org/curated/en/788931518804279824/pdf/Laos-NR-13-ES-v2-02122018.pdf>; or
- (ii) <http://www.mpwt.gov.la/en/projects-en/0201-projectnr13-en/safe-guard-nr13-menu-en>

78. The World Bank policy on Natural Habitats (OP/BP4.04) is triggered since landscape of the areas along the proposed road includes marshy areas (with flood plains and riverine forest vegetation) combined with small hilly zones. The ESIA concluded that impacts to natural streams from widening of existing bridges and construction of a new bridge are expected to be minimal and mitigation measures were included in the ESIA. The project area does not intersect with any protected area.

79. The World Bank policy on Physical Cultural Resources (OP/BP4.11) is triggered due to the presence of village temples and graves observed near the road. However, none of the temples or graves will be impacted by the project nor is needing to have any portion of their properties removed. Necessary measures such as chance findings procedure to minimize and mitigate potential impacts have been included in the ESIA.

80. An Initial Environmental Examination (IEE) has been developed based on the ESIA for submission to the environmental authorities as required by Lao legislation. Its review and approval process is expected to conclude in March 31, 2019.

81. **Social.** The proposed project is expected to generate largely positive social benefits for the local population, including improved travel conditions and road safety, reduced transportation costs, travel time and congestion, in addition to improved health outcomes due to long-term reduction in noise and pollution. Productivity gains for agricultural businesses, increased competitiveness and contribution to the growth of the local economies are expected, together with increased access to markets and social services - particularly with respect to education. Other benefits include improved connectivity between rural and urban centers, and between the northern provinces and Vientiane Capital.

82. The social assessment conducted as part of the ESIA included data collection from households in 44 villages along the alignment, and the completion of over 60 focus group discussions in all villages. This assessment as well as public consultations have confirmed that there is widespread support for the project among key stakeholders, including residents, road users, district and provincial authorities, and ethnic groups present in the area.

83. Adverse social impacts and risks were identified: these include business disruption (due to land closure or restricted access), temporary restriction of access to houses, shops, temples and graves, disruption of the water and electricity supplies, impacts on schools, in terms of safety and access as many are located along the project road, and potential labor influx and the conduct of road workers during construction. Negative social impacts will be, for the most part, temporary during the construction phase. These impacts on the local population will be addressed and managed according to the provisions of the ESMP, RAP and Ethnic Group Engagement Plan (EGEP). Furthermore, the project includes a strong emphasis on improving community health and safety during construction, cooperation with village authorities to manage worker conduct, the use of village mediation committees to resolve conflicts, community awareness raising, and the establishment of a contractor grievance focal person.

84. **Involuntary Resettlement.** The World Bank's OP/BP 4.12 Involuntary Resettlement is triggered as the project will result in land acquisition, the disruption of agricultural and livelihood activities, and the displacement of residential and commercial structures, primarily due to the upgrade of the section of the road from 2 to 4-lanes. This will require acquisition of 1.5 m of land along each side of the current alignment. The RAP prepared by MPWT indicates that over 2,398 households will be affected by some form of land acquisition or disruption of commercial activities because of the project, and 8 households and commercial structures will be displaced, primarily due to the works on Houay Xon Bridge.

85. The RAP has been prepared based on a comprehensive socio-economic census as well as inventory of losses. Consultation on the Plan was undertaken with project affected people (PAPs) and households. Resettlement committees have been established at the provincial and district levels to review and approve the resettlement plan, and to oversee its implementation. These committees will be supported to implement the RAP in accordance with the WB policy provisions by a consulting firm financed by the AIIB Special Fund grant. The timeframe for completion of RAP implementation is estimated at 12 months, and its successful completion will be a requirement for the commencement of civil works. Due to the challenge of the large volume of transactions involved in the resettlement process, the scope of work of the consulting firm carrying out the RAP implementation includes other areas of expertise; namely project management, accounting and the setting up of a simple IT based system that would enable progress tracking, support scheduling and facilitate transparency.

86. The draft RAP was disclosed on the MPWT website in English and Lao on January 3, 2018 and the World Bank external website on January 10, 2018. The final RAP has been disclosed on MPWT's website and the World Bank website on February 7, 2018. It is also available at:

- (i) <http://documents.worldbank.org/curated/en/249361515587199487/pdf/SFG3923-REVISED-RP-P163730-PUBLIC-Disclosed-2-7-2018.pdf>; or
- (ii) <http://www.mpwt.gov.la/en/projects-en/0201-projectnr13-en/safe-guard-nr13-menu-en>

87. **Indigenous Peoples.** The World Bank's OP/BP 4.10 on Indigenous Peoples is triggered due to the presence of a Hmong Ethnic Community in the Project area that will be impacted by the project. MPWT has prepared an EGEP for the project based on a social assessment of potential impacts, and a process of free, prior and informed consultation leading to broad community support. The draft EGEP was disclosed on the MPWT website in English and Lao on January 3, 2018 and the World Bank external website on January 10, 2018 and the final EGEP has been disclosed on MPWT's website and the World Bank website on February 7, 2018. It is available at:

- (i) <http://www.mpwt.gov.la/en/projects-en/0201-projectnr13-en/safe-guard-nr13-menu-en>; or
- (ii) <http://documents.worldbank.org/curated/en/648151515582231951/pdf/SFG3922-REVISED-IPP-P163730-PUBLIC-Disclosed-2-7-2018.pdf>

88. **Gender.** The World Bank conducted a gender gap analysis and the project design has included gender actions which built on key findings of the analysis and consultations carried out during project preparation. These findings indicate a low participation of women in the labor force in the road transport and logistic sector in Laos, particularly in formal paid-jobs. The share of women employed in the sector is only 9.1 percent, and participation of women in management positions and business ownership is about 9.6 percent. Consultations also indicated very little participation of women, if any, in the road operation and maintenance activities. One of the main concerns of women, that was articulated, in the project area is road safety due to the lack of basic pedestrian safety facilities around the adjacent markets where most traders are women from local communities. To address these specific issues, actions included in the ESMP are: (i) enhancing employment opportunities for women from local communities in paid jobs for project related road works; (ii) training female staff of MPWT on management and supervision of OPBRC/DBMOT so as to support their future leadership role in the planning and decision-making process in the road sector; and (iii) improving quality and safety of pedestrian facilities.

89. **Labor Influx.** The World Bank conducted a risk assessment of labor influx. Based on the risk classification defined by the World Bank's 2016 Guidance Note on managing the risks of labor influx<sup>10</sup>, the risk associated with the labor influx under the project is moderate. This is based on the expected size of the labor influx population in relation to the absorption capacity of the area experiencing influx. The works will be in a peri-urban area with high absorption capacity. The size of labor influx will be moderate with around 200 workers, most of whom can be recruited locally.<sup>11</sup> The POM specifies responsibilities of the implementing agency, contractor

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<sup>10</sup> Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx, World Bank, December 2016.

<sup>11</sup> According to the Lao National Survey on Women's Health and Life Experiences (2014), 5.1 percent of women interviewed had experienced physical violence by a non-partner in their lifetime from the age of 15 and 5.3 percent report a variety of types of sexual violence (forced intercourse, attempted forced intercourse, or other unwanted sexual acts). This is slightly lower than that the global lifetime

and supervision engineer to mitigate and manage negative impacts of labor influx and potential risks related to sexual exploitation, gender-based violence.

90. Principles and guidelines for contractor Codes of Conduct and management of worker health and safety, have been incorporated in the bidding documents and will be regularly monitored by the supervision consultant during the execution of works. Contractors will be required to train all workforce on regular basis on the Workers Code of Conduct to ensure clear definition of obligations of contractors' staff and workers with regard to implementing the project's environmental, social, health and safety (ESHS) and occupational health and safety (OHS) requirements; help prevent, report and address gender-based violence (GBV) within the work site and in its immediate surrounding communities; and inform workers about national laws that make gender-based violence a punishable offence which is prosecuted. Labor camps will be constructed for those workers coming from outside the community and will be regularly monitored by the supervision consultant. The ESIA, RAP and EGEP provide details on a comprehensive grievance redress mechanism (GRM) that will also be used to manage potential grievances related to worker conduct, including monitoring timely resolution of grievances received from women. Communities will be trained in the use of the GRM. Intermediate results indicators have been included in the project results framework, which will help track timely and due resolution of grievance and monitoring of mandatory training of all contractor staff on GBV, ESHS and OHS Codes of Conduct.

91. **Citizen Engagement and Project-Level Grievance Redress Mechanism.** As discussed above, local communities and stakeholders were extensively consulted during project preparation. The project has in place a Grievance Redress Mechanism (GRM) that will be monitored on an ongoing basis and include an online grievance reporting system via the MPWT website. During project implementation, grievances arising due to project financed activities will be handled by the relevant village mediation committee, working in collaboration with the grievance focal person appointed by the contractor, or the environmental/social safeguards specialist of the MPWT. Those project related issues (including land acquisition and resettlement) which cannot be resolved at the community level, will be referred to the district resettlement committee. The project, through the MPWT's DoI (Department of Inspection, MPWT), will track grievances and provide to the World Bank a quarterly report on project grievances received with gender disaggregate data and information on how grievances were addressed. Consultations with local communities and stakeholders will continue throughout the implementation of the project.

92. **Use of World Bank Corporate Grievance Redress Service (GRS) and Inspection Panel (IP).** The AIIB's PPM will not have oversight for this Project and the WB's GRS and independent IP will be used. Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the

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prevalence of non-partner sexual violence (7.2 percent) reported by the World Health Organization in 2013.

World Bank's Grievance Redress Service. The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).

93. **Disclosure.** The Project Summary Information (PSI) has been disclosed on AIIB's website, which include a summary of environmental and social risks and impacts, as well as key mitigation measures. It is available at: <https://www.aiib.org/en/projects/proposed/2019/download/lao/Lao-National-Road-NR.pdf>

## E. Risks and Mitigation Measures

94. Based on the review of information, project document of the World Bank, and the Bank's assessment, the Bank assigns a High-risk rating to the project.

95. **Governance.** Lao PDR has made some progress in strengthening governance, but there are still weaknesses related to accountability, control of corruption, and regulatory quality. An Anti-Corruption Law was passed in 2012, including the National Anti-Corruption Action Plan to 2020. The State Inspection Authority has been empowered to prevent and counter corruption. Nonetheless, impacts have been limited and governance mechanisms remain weak. Hence, political and governance risks remain significant. At the country level, this risk is partly mitigated by the World Bank's ongoing support to the government to improve governance in the sectors that the World Bank engages in. Specifically, in the road sector, the World Bank is mitigating this risk under the ongoing road project (and under the proposed project) by supporting MPWT in the implementation of the government's Anti-Corruption Action Plan, improvement of the budgeting systems, accountability, procurement and financial management, monitoring and evaluation and transparency. Political commitment for the project is strong and stated in national and sectoral policy, which will help mitigate political risk.

96. **Macroeconomic risk.** The country's macroeconomic situation is very challenging, with high fiscal and current account deficits and debt levels, keeping the macroeconomic risk high. The high deficits and debts are driven by increased public spending in infrastructure and in the power sector coupled with revenue shortfall. The tight fiscal space limits the ability of the government to fund maintenance of public assets, including roads. In addition, arrears in the road sector, though declining, persist. Risks are partly mitigated by a recently announced fiscal

consolidation plan and the approval of the public debt management law in June 2018 which will help MOF strengthen public finance and debt management. Moreover, around a quarter of external public debt is for projects in the energy sector, which are expected to be economically viable and self-financing. With regards to the project, macroeconomic risks are not expected to pose risks to repayment of loans. The government has already allocated the budget for land acquisition in FY 2018. Part of government contributions for the project will come from the RF which has clear source of revenue and under management of the Ministry of Public Works and Transport, which partially alleviate concerns on financing availability of counterpart fund.

97. **Sector strategies and policies risk.** Implementation of sector policies is slow and continue to be a challenge. While the focus of government investments in the sector has been on road construction and improvement works, funding for road maintenance is low compared to the needs of the sector, which undermine the sustainability of road assets. At the sector level, this risk is mitigated by the government's own effort to strengthen its policies including through the implementation of Prime Minister Decree 60/PM/2015 restricting investment to projects that demonstrate a high rate of return. The World Bank is also providing policy support to MPWT to develop policy and financing frameworks. At the project level, the project is designed to mitigate the sector risk of short life-cycle of construction and inadequate maintenance. The project, designed using OPBRC/DBMOT approach, is helping MPWT to advance policy based on value for money principle, timely maintenance and sharing of construction risk in equitable manner between the private and public sector.

98. **Technical/OPBRC.** The road improvement is relatively simple from the technical standpoint as the road will be upgraded on the existing alignment. In terms of OPBRC/DBMOT design, the risk is that the contracting entity may pay less attention to maintenance works if they can make their profits from construction period which may lead to the road not properly maintained. Such risk is mitigated by the structuring of the Financial and Payment models for OPBRC/DBMOT contract so that a substantial share of capital investment will be retained and paid over time as part of the quarterly availability payment during the O&M period.

99. Another risk related to OPBRC/DBMOT contract is the government's commitment to implement a long-term contract. The government must continue to meet payment obligations during the 7-year O&M period of the total 10-year OPBRC/DBMOT contract period after the construction period is complete. Given the history of arrears and budget shortfalls in the road sector, the financial risks is whether the government can fully meet contractual obligations after the project closes. The government has formally confirmed its financing to cover the full cost of 7-year O&M phase through the Road Fund. The World Bank and AIIB Financing Agreement will require MPWT to develop a sustainability plan before the project closes. This plan will specify actions and budget to ensure continuous and effective implementation of the O&M phase of OPBRC/DBMOT contract.



**100. Implementation capacity.** MPWT has limited experience in OPBRC/DBMOT contract design and management which may cause potential delays during procurement and implementation. In the short-term, the project will provide technical support to MPWT to manage the OPBRC/DBMOT contract. NDF will finance the monitoring and supervision consultant. The World Bank and AIIB will provide additional support and practical international experiences in implementing similar road contracts. In the medium to longer term, the risk will be mitigated by developing in-house capacities of DoR to carry out supervision and monitoring of the maintenance and operation works after the project closure. This has been included in the terms of reference of the monitoring and supervision consultant.

**101. Environmental and social.** The large number of people who will be affected by land acquisition (2,398 affected people, 2,625 plots of land, and 3,297 built structures) and the displacement of commercial activities could lead to delays in construction commencement. This risk will be mitigated by ensuring the budget for compensation is available in a timely manner. Government budget and NDF funding which will be used for compensation has been made available for fiscal year 2018 and 2019. Another mitigation measure is by engaging a consulting firm to support the resettlement committees and MPWT in implementing the RAP, which is financed by AIIB Special Fund. The consultant is providing expertise in project management and the use of an appropriate IT-based tracking tool to manage the high number of small transactions to reduce delays in the land acquisition process. Currently, the draft unit rates have already been approved by the Provincial and District Resettlement Committees (PRCs and DRCs), and it will be approved by both assemblies (provincial and capital levels) by end of January 2019. Successful completion of the RAP implementation will be a requirement for the commencement of civil works. MPWT will coordinate construction plan and resettlement plan so that the sites will be ready without disturbances at the time of handover to the contractor. Other safeguards instruments have been included in the bidding documents and terms of reference of the OPBRC/DBMOT monitoring consultant to mitigate other environmental and social risks.

**102. Fiduciary.** The OPBRC/DBMOT contracting concept is new to Lao PDR, and experiences from other countries have shown this may impact on bidder participation and result in lengthy bidding periods. This risk will be mitigated through technical support and capacity building to strengthen procurement and contract management capacity to MPWT to avoid lengthy bidding periods. Cases related to fraud and corruption have been identified under previous donor-funded projects, which led to sanction of some firms. To mitigate fraud and corruption risks, the government has enhanced its procurement information disclosure on the MPWT's website and all staff involved in procurement decisions are required to sign disclosure of their interest.

**103.** Risk assessment and the mitigation measures are summarized in Table 5. The implementation of the mitigation actions will be monitored by the Bank during implementation.

**Table 5: Risk and Mitigation Measures**

<b>Risk Description</b>	<b>Bank's Current Assessment</b>	<b>Mitigation</b>
<b>Governance</b>	High	WB is supporting MPWT to strengthen implementation of the government's Anti-Corruption Plan and other measures to improve governance.
<b>Macroeconomic Risk</b>	High	The government contributions will come from the Road Fund which will partly mitigate the risk of budget availability.
<b>Sector Strategies and Policies Risks</b>	Medium	Mitigated with project design by using OPBRC/DBMOT to increase sustainability of road investment, and WB will support MPWT to strengthen sector policies.
<b>Technical</b>	Medium	Mitigated with the design of the Financial and Payment models in OPBRC/DBMOT contract to provide incentives to contractor to carry out quality construction.
<b>Implementation Capacity</b>	Medium	A monitoring supervision consultant to be hired under the project will assist MPWT to manage OPBRC/DMOT contract in the first five years of contract implementation and provide training to develop MPWT's in-house capacity to manage the contract in the long-run.
<b>Environmental and Social</b>	High	Funding for land acquisition has been made available for FY 2018 and 2019. Consulting firm has been hired to provide support to RAP implementation. Completion of the RAP implementation will be a requirement for the commencement of civil works.
<b>Fiduciary</b>	Medium	WB will provide technical support and capacity building to strengthen procurement and contract management capacity to MPWT.

## 5. Next steps

The proposed next step is as follows:

- Board consideration

April 2019

### Annex 1: Results Framework and Monitoring

<b>Project Objective (PO)</b> is to improve the road condition, safety and climate resilience of critical sections of National Road 13.							
Results Indicators	Unit	Baselines	Yearly Cumulative Targets			End Targets	
			Y1	Y2	Y3	Y4	
<b>Objectives Indicators</b>							
Road condition	Reduction in vehicle operating costs on the project road	Percentage	0	0	0	20	20
Road safety	Increase in average IRAP star rating of the project road	Number	1	1	1	3	3
Climate resilience	Project road sections upgraded and improved, with climate resilient measures	Yes/No	No	No	Yes	Yes	Yes
<b>Intermediate Results Indicators</b>							
Component 1: Road Improvement and Maintenance	Reduction in average International Roughness Index (IRI) for finished sections	Number	7	3	3	3	3
	Kilometers of road upgraded from 2 to 4 lanes, with climate resilient measures	Km	0	5	10	19	19
	Kilometers of road improved on 2 lanes, with climate resilient measures	Km	0	10	20	39	39
	Roads constructed or rehabilitated	Km	0	15	30	58	58

	Kilometers of roads transferred to performance-based O&M phase under OPBRC	Km	0	0	0	58	58
Component 2: Technical Assistance and Supervision	Grievances registered related to delivery of the project addressed, with disaggregated data by gender	Percentage	0	90	90	90	90
	Total number of MPWT staff received training on OPBRC and related topics	Number	0	10	25	40	40

Note: \*The implementation period of the World Bank project is 5 years starting from May 2018 to May 2023. The project implementation period for AIIB will be 4 years and will correspond with the above results framework as follows: Year 1 (June 2019 – May 2020), Year 2 (May 2020-May 2021), Year 3 (May 2021-May 2022), and Year 4 (May 2022-May 2023).

## Annex 2: Map of the Project Area

Figure 2: Lao PDR National Road 13 Map



Figure 3: Project Area KM 31-70 (2-lane rehabilitation section)

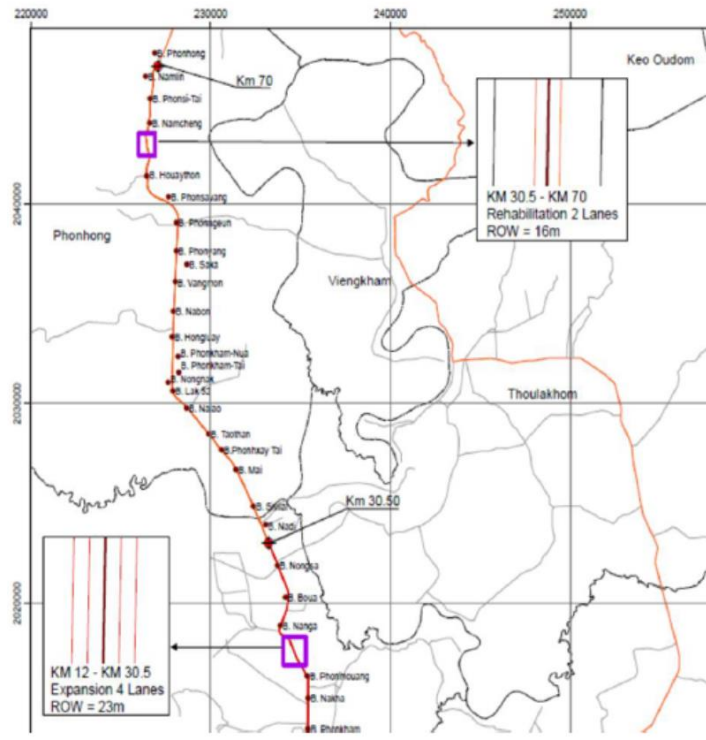
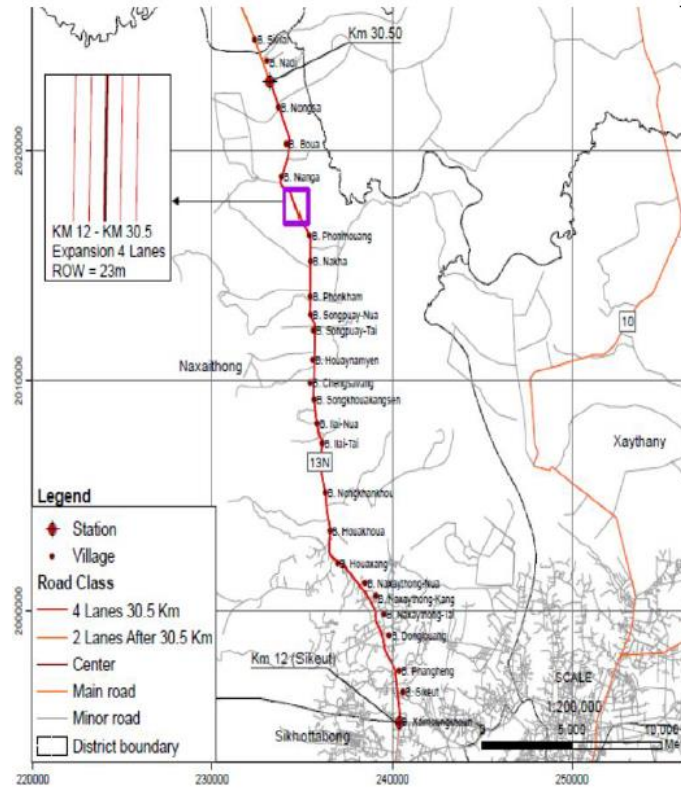


Figure 4: Project Area KM 12-31 (4-lane section)



### Annex 3: Sovereign Credit Fact Sheet

#### A. Recent Economic Development

1. Lao PDR is a lower-middle income economy with a GNI per capita of \$2,150 in 2016. GDP growth averaged 7.8 percent over the last decade, with the use of the country's natural resources – mostly water, minerals and forests – contributing around one third of this growth.

2. Real GDP growth moderated from 7.0 percent in 2016 to 6.8 percent in 2017 due to a tighter credit conditions and fewer tourist arrivals. Inflation remained low at 0.2 percent in December 2017, reflecting a decline in food prices. Though Lao PDR recorded healthy headline GDP growth, this was accompanied by a structurally large current account deficit. The current account reached -27 percent of GDP in 2013, before gradually improving to about -13 percent in 2017. Gross international reserves remained low at about 1 month of prospective imports. External debts are projected to reach 100 percent of GDP in 2017. The currency has continued to weaken since 2013.

#### B. Economic Indicators

**Table 6: Selected Macroeconomic Economic indicators (2015-2020)**

<b>Economic Indicators</b>	<b>2015</b>	<b>2016</b>	<b>2017*</b>	<b>2018*</b>	<b>2019*</b>	<b>2020*</b>
National income and prices (change %)						
Real GDP Growth**	7.3	7.0	6.8	6.8	7.0	7.0
CPI (change %, average) **	1.3	1.6	0.8	2.3	3.1	3.3
Central government operations (% of GDP)						
Overall balance	-4.5	-4.6	-4.8	-4.3	-4.1	-4.2
External debt (% of GDP)	102.7	104.5	113.7	119.8	122.1	120.5
Gross external financing need (Billion \$)	1.7	1.6	2.1	2.7	3.0	3.1
Public sector debt (% of GDP)	57.7	58.5	61.1	65.3	65.9	66.2
Public gross financing needs (% of GDP)	7.8	10.0	10.1	9.9	11.1	11.9
Money and credit						
Broad money (M2, % annual change)	14.7	10.9	12.9	22.8	22.0	--
Gross reserves (months imports)	1.7	1.2	1.3	1.3	1.5	1.7
Current account balance (% of GDP) **	-18.0	-12.0	-13.0	-14.9	-13.7	-12.7
Exchange rate (Kip/\$, end period)	8,119	8,231	8,297	--	--	

Note: \* denotes projected figures. \*\* denotes figures from WEO April 2018

Source: IMF Country Report No. 18/84, March 2018 and WEO April 2018.

#### C. Economic Outlook and Risks



3. Looking ahead, IMF has projected growth to rise marginally to around 7 percent in medium-term, supported by a resumption of resource-related FDI (mainly hydropower).<sup>1</sup> Domestic downside risks stem from high public debt and deficits, pockets of weakness and high dollarization in the banking sector, a vulnerable external position with low gross international reserves, and extreme weather shock. External downside risks include tighter global monetary conditions, capital flight and deterioration in terms of trade, and slowdown in trading partners.

4. On debt outlook, IMF has projected that Lao PDR faces a high risk of debt distress. Its public and publicly guaranteed external debt increased from 45.4 percent of GDP in 2015 to 49.1 percent in 2017, due partly to higher borrowing from Thailand and China and sovereign bond issuance in the Thai market. The rise in debt was in part driven by heavy investment in power generation projects, which is part of the strategy to tap on the country's abundant hydropower resources to export energy to the rapidly growing neighborhood. For public debt, the present value of public sector debt as a percentage of GDP is projected to breach the benchmark for several years, and this indicator remains sensitive to any large, abrupt exchange rate depreciation and the realization of contingent liabilities. To reduce debt burden, external borrowing should be contracted on concessional terms as much as possible.<sup>2</sup>

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<sup>1</sup> This assessment was made before the collapse of the XePian Xe-Namnoy dam in July 2018. The accident could have an impact on investment in hydroelectric dam and the wider economy.

<sup>2</sup> International Monetary Fund (IMF), 2018. Country Report No. 18/84, 2017 Article IV Consultation—Press Release; Staff Report; and Statement by the Executive Director for Lao P.D.R., March 2018

## Annex 4: Economic Analysis<sup>3</sup>

### A. Introduction

1. A Cost-Benefit Analysis (CBA) was conducted to calculate the EIRR and NPV of the road improvement based on a standard methodology for appraisal of road investments. The scope of the Project investment includes 58 km of road improvement which will be upgraded to Portland Cement Concrete (PCC). The investment will cover the following road sections: (i) 19 km of road section from Sikeut to Songpeuay Market (km 12 to km 31), which will be upgraded from 2 to 4-lane; and (ii) 39 km of road section from Songpeuay Market to Phonhong (km 31 to km 70), which will be improved along the existing 2-lane road. The road improvement will increase road capacity to serve growing demand, improve road safety and build the road sections to be more climate resilient.

### B. Methodology and Key Assumptions

2. The analysis covers the period of 27 years in line with the life cycle of the Portland Cement Concrete (PCC) road and it is assumed that the road maintenance will continue over the full study period. The road improvement will occur over the first three years. The operating period will continue for 24 years. The standard conversion factor of 0.92 for construction and 0.87 for maintenance were used to convert financial costs to economic costs. The costs and benefits are incremental. The without-project scenario assumes no major rehabilitation of the project road section will take place. The construction cost and annual operation and maintenance cost were estimated by the design consultant based on the conceptual design report. The social discount rate used is 12 percent. The analysis was carried out using 2018 constant price.

### C. Estimating Economic Benefits

3. **Traffic forecast.** The economic analysis started with analyzing current traffic demand and making traffic forecast during the project life. The Annual Average Daily Traffic (AADT) was estimated based on traffic surveys carried out in 2015 which included 11 traffic count locations in the study area<sup>4</sup>. The road network model at the regional and corridor scales was then used to evaluate the existing and future mobility pattern.

4. Based on the traffic analysis, the Annual Average Daily Traffic or AADT for year 2015 on NR 13 North was 8,100 vehicles per day in 2015. This comprises of 5,200 cars/day (64% of total traffic), 1,900 motorcycles/day (23% of total traffic), and 1,000 heavy vehicles (buses and trucks)/day (13% of total traffic). The traffic pattern is characterized by heavy traffic volumes of around 22,000 vehicles per day at Sikeut, which is the start of the project road and is adjacent to Vientiane city where there is dense urban area. High level of traffic continues to be observed around Ban Don area with more than 10,000 vehicles per day. However, the traffic dropped to around 4,000 vehicles per day in the area northward of Ban Dong but increased to around 6,000 vehicles per day in Phonhong which is towards the end of the NR 13 project section. The traffic

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<sup>3</sup> Based on the World Bank economic analysis of the same project.

<sup>4</sup> This includes automatic classified counts, 7 days x 24 hours, 2 ways) and 3 road-side interview locations.

volume on the key project sections and average traffic flows on the project road are provided in the table below.

**Table 7: Annual Average Daily Traffic (AADT) (vehicles/day), 2015**

Road Sections	Motorcycle	Car	Bus	Truck	Total
Section 1 (Sikeut-Naxaithong)	7,000	12,900	600	1,600	22,100
Section 2 (Naxaithong-Nadi)	1,300	5,000	400	700	7,400
Section 3 (Nadi-Phonghong)	1,100	3,400	200	400	5,100
Weighted average for entire project section of NR 13 North (58 km)	1,900	5,200	300	700	8,100

Source: LeighFischer, PPP Project Traffic Study 2015.

5. To forecast future traffic, traffic growth rates were adopted taking into consideration GDP real growth rates, historical traffic trends and other socio-economic drivers including population, registered vehicles and GDP per capita. GDP has been growing at over 7 percent in Lao PDR since 2015. Real GDP growth was forecasted to be 6.85 percent in 2020-2025 and gradually taper down and reach 3.65 percent in 2035-2040.<sup>5</sup> The average traffic growth rate on NR 13 during 2003-2013 has been just above 10 percent. Traffic growth rates adopted are shown in Table 8.

**Table 8: Forecasted Annual Traffic Growth Rates (%), 2015-2040**

Period	Motorcycle	Car	Truck/Bus
2015-2020	1.4%	8.3%	6.0%
2020-2025	1.4%	5.7%	5.4%
2025-2030	1.3%	4.5%	4.7%
2030-2035	1.2%	3.7%	3.9%
2035 onward	1.0%	3.7%	3.9%

Source: LeighFischer, PPP Project Traffic Study 2015.

6. The project is expected to generate several economic benefits. The economic benefits which have been quantified in the economic analysis include VOC savings, passenger travel time savings, freight travel time savings, emergency road maintenance cost avoided, and avoided cost of accidents. These are discussed in further details below.

7. **Vehicle Operating Cost (VOC) savings.** Savings in VOC is one of the most important benefits of the project. The project is expected to reduce VOC by approximately 10 percent due to improved road condition and widening of project road from 2- to 4-lane in congested area, which will result in increase in traffic speed from approximately 40 km/hr to 70 km/hr. VOC per vehicle-km for each type of vehicle in the with- and without-project scenario is derived from HDM modelling as shown in the table below. The total vehicle kilometer per day was calculated based on forecasted number of vehicles per day and trip length on the project road sections.

**Table 9: VOC (USD per Vehicle-KM)**

	Without Project	With Project	VOC saving
Motorcycle	0.0915	0.0901	0.0013
Car	0.2229	0.2052	0.0177
Bus	0.6504	0.5525	0.0979
Truck	0.6848	0.6059	0.0790
Average	0.3681	0.3298	0.0383

Source: the World Bank.

8. **Passenger travel time savings.** Passenger travel time savings is another main benefit of road improvement project especially in the urban section where there is growing congestion. With improved speed, the journey time of the project road is estimated to reduce by approximately 0.0107 hour per vehicle-km. The average passenger load factor assumed is 2 passengers per vehicle. The value of time for passengers is estimated using the proxy of average wage rate of the project road users which is estimated at USD0.82 per hour according to the survey conducted on the project road. This is a weighted average of the wage rates of the three passenger groups (USD0.61 per hour for motorcycle passenger, USD1.07 per hour for car passenger and USD0.80 per hour for heavy vehicles).<sup>6</sup> The monthly salary of the road users by vehicle type based on the result of the survey is provided below.

**Table 10: Monthly Salary of Road Users by Vehicle Type in LAK**

LAK	Motorcycle	Car	Truck/Bus
10,000,000	1%	7%	4%
5,000,000	8%	11%	9%
3,000,000	14%	19%	14%
500,000	46%	45%	51%
100,000	20%	5%	3%

Source: Leigh Fischer, PPP Project Traffic Study 2015.

9. **Freight travel time savings.** In addition to passenger time saving, saving in travel time for freight traffic also has commercial value related to truck operations and logistics management. To estimate this commercial value of time savings for freight, the economic analysis adopted the Value of Delays (VOD) which is the value of time to commercial vehicles due to highway congestion. As VOD estimate is not available for Lao PDR, the VOD based on a study conducted in the US was used as proxy to estimate VOD in the context of Lao PDR. VOD in the US was estimated to be around USD 54.98 per vehicle per hour in 2014.<sup>7</sup> This value was then adjusted to 2018 price and also adjusted to the context of Lao based on the difference in the national per capita income between the US and Lao PDR. The VOD in the project context was estimated at USD 4.39 per vehicle per hour.

<sup>6</sup> Leigh Fischer, PPP Project Traffic Study 2015.

<sup>7</sup> Florida Department of Transportation (2014) *Assessing the Value of Delay to Short-Haul Carriers; and The Impact of Freight Delay to Economic Productivity*. Also see Qi Gong, Qing Miao, Bruce X. Wang and Teresa M. Adams (2012) *Assessing Public Benefits and Costs of Freight Transportation Projects*; Q. Miao, X. B. Wang and T. M. Adams (2014) *Measuring Shippers' Value of Delay on the Freight System*;

10. **Emergency road maintenance cost avoided.** Another benefit quantified is avoided cost for emergency road maintenance. As noted that the project road has been periodically affected by seasonal flooding with various degrees of severity during the monsoon season. Thus, without the project, MPWT will need to spend more budget to carry out emergency maintenance to repair damages after flooding events. By improving the project road to be more climate resilient, the project will result in avoided budget MPWT needs for emergency maintenance compared to without project case and the budget saved could be spent elsewhere to maintain the road network. The avoided cost of emergency maintenance is estimated from the average emergency maintenance budget which is currently being spent by MPWT at USD 70,000 per km.<sup>8</sup> As flooding event is periodic and its occurrence cannot be predicted with certainty, the economic analysis assumed that the probability of disaster is once every three years. The average emergency maintenance cost is then annualized accordingly.

11. **Avoided costs of accidents.** Another key benefit of the project is to improve road safety for both pedestrians and road users which will result in avoided fatalities on the project road and other injuries related costs. To quantify this benefit, the economic analysis first derived the baseline accidents rate which was based on Vientiane's road accident statistics. According to the statistics, during 2015-2016, there are 1,928 accidents in Vientiane capital, of which 266 resulted in fatalities. It was estimated that 15 fatalities and 108 injuries occurred on the NR 13 north project road section. The project is assumed to reduce traffic accidents both in terms of fatalities and injuries by 10 percent each year compared to without project case. The value of a fatality and an injury is then estimated based on the Value of Statistical Life (VSL) using Willingness-to-pay approach according to formula published by iRAP, which recommends the ratio of VSL to GDP per capita at 70 and the reasonable value of serious injury of 25 percent of the value of fatality.<sup>9</sup>

#### **D. Estimating Economic Costs**

12. The capital expenditure used in the economic analysis are the cost estimates from the conceptual design report in 2018. The cost of construction included cost of civil works for upgrading road to PCC and excluding land acquisition and contingencies. The financial cost of construction is USD84.7 million. The financial cost of annual O&M is USD1.2 million. These financial costs are converted to economic costs at the conversion factor of 0.92 and 0.87 for construction and maintenance costs, respectively. No additional overlay cost for concrete road is assumed during project period.

#### **E. Summary of Results and Sensitivity Analysis**

13. Based on available data and assumptions adopted, in the base case, the project has an EIRR of 25.1 percent and NPV of USD117.46 million at 12 percent discount rate. The EIRR is well above the hurdle rate of 12 percent and the project is considered economically viable. The results of economic analysis are shown in table 11 and 12.

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<sup>8</sup> World Bank Lao Road Sector Project 2.

<sup>9</sup> iRAP (2007), The True Cost of Road Crashes: Valuing Life and the Cost of a Serious Injury.

14. Sensitivity analysis has been conducted to test the robustness of EIRR to different variations in market and project-specific parameters. Sensitivity analysis was conducted in six scenarios including: (i) 20 percent increase in maintenance cost; (ii) 20 percent increase in construction cost; (iii) both maintenance and construction costs increase by 20 percent; (iv) no generated traffic; (v) traffic moves to railway (under construction) and/or expressway (where proposal is being made) by 20 percent starting 2023; and (vi) worst case scenario which combined construction and maintenance cost increase, no generated traffic and diverted traffic to railway and/or expressway. The analysis suggests that construction cost increase and traffic diversion to other alternative routes (Vientiane-Vangvieng Expressway and Vientiane-Khunming High Speed Rail) along the same corridor will have the most significant impact on EIRR. In all scenarios, the EIRR is well above the hurdle rate of 12 percent which shows that the project investment is robust to withstand variations in both cost and demand side parameters. The results of the sensitivity analysis is shown in table 11.

**Table 6: CBA Results and Sensitivity Analysis**

	<b>Scenarios</b>	<b>EIRR</b>	<b>NPV (US\$ million)</b>
1	Base case	25.1%	117.46
2	Maintenance cost increases by 20%	24.96%	116.28
3	Construction cost increases by 20%	22.31%	104.98
4	Both construction and maintenance costs increases by 20%	22.03%	102.22
5	No generated traffic	23.11%	95.96
6	Traffic moves to railway and/or expressway by 20% starting 2023	22.63%	87.05
7	Worst Case Scenario (4+5+6)	18.16%	55.52

**Table 12: Costs and Benefits Stream**

Year	<b>Benefits</b>					<b>Costs</b>		<b>Net Benefits</b>
	VOC Savings	Passenger Travel Time Savings	Freight Travel Time Saving	Avoided Costs of Accidents	Avoided Costs of Emergency Road Maintenance	Construction Costs	O&M Costs	
2018						(25.97)		(25.97)
2019						(25.97)		(25.97)
2020						(25.97)		(25.97)
2021	7.25	7.49	1.22	1.00	0.82		(1.07)	16.72
2022	7.65	8.53	1.29	1.05	0.82		(1.07)	18.28
2023	8.08	9.72	1.36	1.11	0.82		(1.07)	20.01
2024	8.52	11.07	1.43	1.16	0.82		(1.07)	21.93
2025	8.99	12.61	1.51	1.21	0.82		(1.07)	24.08
2030	11.25	23.17	1.90	1.51	0.82		(1.07)	37.57
2040	16.30	49.22	2.78	2.12	0.82		(1.07)	70.17

Note: ( ) = negative.

15. In addition, the switching analysis was also conducted to further analyze the sensitivity of EIRR and NPV to key project parameters and to identify the switching values which will turn the

EIRR of the project to below the hurdle rate of 12 percent and render the project not economically viable. The results of the switching values are provided in the table below.

**Table 13: Switching Values of Key Parameters**

	<b>Parameter Impact on EIRR</b>	<b>Baseline Value</b>	<b>Switching Value</b>
1	Construction cost overruns	USD84.7 million	USD245.63 million
2	Reduction in traffic demand growth	0%	145% reduction from assumed growth rates
3	Reduction in VOC and travel time savings	0%	68% reduction in VOC per vehicle km and passenger travel time savings per vehicle km
4	Average trip length	19.3 km per trip	6.38 km per trip

16. In addition, an alternative pavement design, asphalt concrete (AC) pavement, was also considered and analyzed for the project investment. The estimated capital cost of this alternative pavement design is lower than that of PCC while its expected life cycle of around 13 years is about half of the life cycle of PCC. The EIRR for this alternative is calculated as 27.3 percent with NPV of USD90.71 million. Although the EIRR of the alternative is slightly higher due to its lower upfront investment cost, NPV for the selected PCC option is significantly higher than the AC option. The PCC option will also require lower maintenance cost throughout the road life cycle. Given that the project road is periodically affected by flooding events and truck overloading, the PCC option is a more resilient solution to address climate change and truck overloading impacts.