



**Project Document  
of the Asian Infrastructure Investment Bank**

**The Democratic Socialist Republic of Sri Lanka**

**Reduction of Landslide Vulnerability by Mitigation Measures (RLVMM) Project**

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## **Currency Equivalents**

(As of Jan. 21, 2019)

Currency Unit - Sri Lankan Rupee (LKR)  
USD1 = LKR181.6

## **Fiscal Year**

Jan. 1 – Dec. 31

## **Abbreviations**

AIIB	Asian Infrastructure Investment Bank
CBSL	Central Bank of Sri Lanka
ESH&S	Environment, Social, Health and Safety
ESMP	Environmental and Social Management Plan
ESMPF	Environmental and Social Management Planning Framework
ESP	Environmental and Social Policy
ESS	Environmental and Social Standard
ESSD	Environmental Studies and Services Division (of NBRO)
FM	Financial Management
GDP	Gross Domestic Product
GoSL	Government of Sri Lanka
GRM	Grievance Redress Mechanism
HSPTD	Human Settlement Planning and Training Division (of NBRO)
ILMP	Integrated Landslide Mitigation Program
IMF	International Monetary Fund
Km	Kilometer
MDB	Multilateral Development Bank
MoF	Ministry of Finance
MPA&DM	Ministry of Public Administration and Disaster Management
M	meter
Mm	millimeter
NBRO	National Building Research Organization
PDS	Project Delivery Strategy
PMU	Project Management Unit
PPM	Project-affected People's Mechanism
RAP	Resettlement Action Plan
RDA	Road Development Authority
SA	Social Assessment
SLCDMP	Sri Lanka Comprehensive Disaster Management Program

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## 1. Project Summary Sheet

### Sri Lanka Reduction of Landslide Vulnerability by Mitigation Measures Project

Project No.	000124
Client: Borrower(s) Executing Agency Implementing Agency	The Democratic Socialist Republic of Sri Lanka Ministry of Public Administration and Disaster Management (MPA&DM) National Building Research Organization (NBRO)
Sector(s) Subsector(s)	Other Infrastructure Disaster Management
Project Objectives/Brief Project Description	The Project objective is to reduce risk and damage from landslides through the implementation of mitigation measures and enhancement of policy and regulation associated with landslide management. The project has four components: - Implementation of mitigation measures, including civil works and associated designs and construction supervision/management; - Enhancement of policy, standards and institutional capacity; - Provision of essential facilities and laboratory equipment - Technical support and project management
Project Implementation Period (Start Date and End Date)	Indicative Start Date: July 1, 2019 Indicative End Date: June 30, 2023
Expected Loan Closing Date	Dec. 31, 2023
Project Cost and Financing Plan	The estimated cost of the project is USD110 million. Proposed financing plan: AIB Loan: USD80 million Government of Sri Lanka: USD30 million
AIB Loan (Size and Terms)	USD80 million A Sovereign-backed Loan is proposed with loan term of 30 years, including a grace period of 6 years.
Environmental and Social Category	B
Project Risk (Low/Medium/High)	Medium
Conditions for Effectiveness	A Project Implementation Manual (PIM), including the project implementation steps, procurement manual and financial management manual, should be completed, agreed by the Bank and adopted by the Borrower.

Key Covenants	No later than six months after the effective date, the Borrower shall establish a Steering Committee, consisting of representatives of the relevant government agencies, to provide overall support to the project and specifically to guide the review and support for the development of new policies and standards relating to landslide management under Component 2 of the project. The Steering Committee will review the findings and recommendations arising from the studies and will formulate official recommendations to the GoSL.
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</b>	D.J. Pandian
<b>Director General, Operations</b>	Supee Teravaninthorn
<b>Manager, Operations</b>	Gregory Liu
<b>Project Team Leader</b>	Anzheng Wei, Investment Officer
<b>Project Team Members</b>	Chongwu Sun, Senior Environmental Consultant; David Martianus Ginting, Young Professional; Jessana Ao Yanuario, Finance Officer; Jonathan Renshaw, Senior Social Development Consultant; Julius Thaler, Senior Counsel; Wu Ning, Financial Management Consultant; Xiaowei Guo, Senior Procurement Specialist; Yongxi Liu, Project Assistant; Yitzhak Kamhi, Senior Technical Advisor/Consultant, Operation.

## 2. Strategic Context

### A. Country Context

1. Sri Lanka is an island nation in the Indian Ocean, located between the Bay of Bengal and the Arabian Sea. It occupies an area of nearly 65,610 square kilometers, stretching 435 kilometers from north to south and 224 kilometers from west to east. The climate is tropical, with cooler temperatures in the central highland region. The country is influenced by the monsoons that vary according to region. Annual rainfall is 2,500-5,000 mm in the southwest, and 500-2,000 mm in the northeast of the country. Heavy rainfall makes Sri Lanka vulnerable to various hydrometeorological disasters, among which landslides are a particularly frequent hazard in the central highlands, resulting in fatalities, damage to infrastructure and impacts on the natural environment.

2. Sri Lanka is a lower-middle-income country with a total population of 22.2 million and per capita gross domestic product (GDP) per capita of USD4,163 in 2017. From 2010 to 2015, Sri Lanka's economy enjoyed rapid growth, with an average annual growth rate of 6.4 percent, although it has since decelerated to an annual rate of 4.5-5.0 percent. Services represent the largest sector of the economy, generating about 62 percent of GDP and 45 percent of employment in 2017. The current account remained in a deficit at 2.4 percent of GDP in two consecutive years (2015 and 2016), despite a strong tourism sector and remittances.

3. **Fiscal position and economic outlook.** The short-term economic outlook is challenging as the high level of public debt and low level of foreign exchange reserves continue to underscore Sri Lanka's vulnerability to external shocks. Due to a continuing, substantial fiscal deficit of over five percent of GDP per year, Sri Lanka's public debt is high compared with other emerging economies, reaching 84.2 percent of GDP in 2016.<sup>1</sup> While external debt, estimated at 56.4 percent of GDP at end-2015, remains sustainable, the trajectory of the local currency depreciation poses a significant risk. The LKR to USD exchange rate depreciated 57 percent over the past seven years, from 113.9 in 2011 to around 179 in December 2018.

### B. Sectoral and Institutional Context

4. Sri Lanka is a country prone to natural disasters with the risks of landslide one of the most acute. With global warming contributing to increased risk of both the number and intensity of climatic events, disaster risk reduction is a vital component of national planning.

5. The central region of Sri Lanka is mountainous, with highly fractured and folded basement rock overlain by residual soil and colluvium. The hilly region, known as the central highlands, is defined broadly as the terrain from an elevation of 185 m above mean sea level up to the highest peak, Pidurutalagala, at 2,717m. The steep slopes and geologically weak strata are the main natural contributors to landslides, with severe, intense rainfall, exacerbated by climate change, the main trigger. Increased human activities and development in high-risk areas, lack of appropriate or adequate

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<sup>1</sup> International Monetary Fund (IMF), 2017. Country Report No. 17/253.

regulations, together with inadequate national standards for climate resilient infrastructure, have also contributed to the increased risk. Landslides, slope failures and rock falls have become increasingly frequent and severe, seriously affecting communities in the hilly central region, causing loss of life, damage to roads and other infrastructure, destruction of property and affecting livelihoods and the local economy. Landslides can also have a significant impact on forests and ecosystems, particularly on surface water, further weakening the country's resilience to climate change.

6. Thirteen districts have been identified as landslide-prone areas. They comprise Badulla, Galle, Gampaha, Hambantota, Kalutara, Kandy, Kegalle, Kurunegala, Matale, Matara, Moneragala, Nuwara Eliya and Ratnapura. These districts make up nearly 30 percent of the total land area of Sri Lanka. The population in these districts has expanded rapidly in the past two decades, reaching over 9,014,850 in 2017, and accounting for nearly 38 percent of the national population. When the landslide hits these areas, the chance of life losing is higher because of the population density is higher than the average. The districts together contributed around 44 percent of GDP in 2017, from agriculture, including tea, rubber, coconuts, paddy and spices, as well as tourism, associated with the area's cultural heritage and natural beauty. Since the 1970s, regular monsoons and extreme weather events have led to more frequent landslides and rock falls. In response, the National Building Research Organization (NBRO) was established by the government in 1984 as the technical institute responsible for the management of landslide disasters. Since then, NBRO has conducted studies on landslide risk and has introduced measures designed to reduce landslides. The Ministry of Public Administration and Disaster Management (MPA&DM) is mandated to manage disaster-related matters. NBRO, as an institution under MPA&DM, is the focal point for landslide disaster management in Sri Lanka.

7. Government policy related to landslide includes the Sri Lanka Disaster Management Act No. 13 of 2005, which provides for the formulation of a National Policy on Disaster Management and related national programs. As per the provisions of the National Policy, the Sri Lanka Comprehensive Disaster Management Program (SLCDMP) was formulated and approved by the National Council for Disaster Management and the Cabinet of Ministers. The SLCDMP serves as the guiding document on the formulation, prioritization and implementation of projects related to disaster management. It is also aligned with the guiding principles of the United Nations Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals.

8. In line with national policies and programs, NBRO has formulated the comprehensive Integrated Landslide Mitigation Program (ILMP) which covers all proposed landslide mitigation projects in the country. NBRO has also developed strategies for landslide risk management, including risk identification, hazard zonation mapping, rainfall monitoring and an early warning system for risk of landslides, as well as landslide mitigation works, and the introduction of related policy and regulations. Nevertheless, the current requirements for development and construction activities in risk areas remain insufficient, and enforcement is weak, especially at national and provincial levels. In principle, as per the circular issued by the MPA&DM in 2011, any development activities in areas identified as being at risk from landslides must obtain a land clearance certificate from NBRO. However, due to NBRO's limited capacity for

enforcement and compliance, incidents have occurred where development has taken place in landslide-prone areas, without applying appropriate technology, thus increasing vulnerability to landslides and risks to life and property. Particularly, for planning and implementation of some large infrastructure projects in these landslide-prone areas, such as roads and railways, the communication and inter-agency coordination need to be enhanced.

### 3. The Project

#### A. Rationale

9. **Country priority.** This project is among the top priorities for the Government of Sri Lanka (GoSL), given its emergency nature and the impact of landslides on people's lives, property, infrastructure and the environment. To date, mitigation measures have been limited. According to government records, from 2003 to 2017, an estimation of 836 people were killed and over 300,000 people were made homeless by landslides. Infrastructure, including highways, dams, railway tracks, hospitals, schools and other public and private property have been destroyed or damaged. In 2016, landslides led to the loss of at least 151 lives, 110 houses and affected almost 4000 families. Moreover, over a million of people who were dependent on agriculture, trade and industries suffered a loss of income. In May 2017, more than 35 major landslides occurred leading to the deaths of 203 people.

10. The Vision 2025 Strategy Document of the MPA&DM supports building a "Safer Sri Lanka" to facilitate the prosperity and dignity of human life through the effective prevention and mitigation of disasters caused by natural and human-induced hazards. National targets include halving the annual average disaster mortality and the number of affected people per 100,000 by 2030, as compared with the annual average number in the period 2005-2015 and a 50-percent reduction of economic loss directly related to disasters in relation to GDP by 2030, compared to the annual average data for the period from 2005-2015. In this context, NBRO has been mandated to implement the ILMP as soon as possible to lower the risks associated with landslides. This project as a main component under ILMP includes stabilizing sites where landslides have already happened or are imminent and protecting high-risk sites to prevent new incidents occurring.

11. This project will address the national priority of lowering the risk of landslides and decreasing their severity in order to minimize loss of life and economic and social damage to affected communities. It will supplement government spending on rehabilitation and reconstruction of damaged buildings and infrastructure facilities, resettlement, disaster relief and emergency services. Additionally, support for enhancement of landslide-related policy and regulation will improve the sustainability of infrastructure and resilience to climate change in an area of natural beauty that is particularly important for Sri Lanka's agriculture and tourist industry.

12. **Strategic Alignment.** This project is aligned with AIIB's strategic priorities, particularly with regard to promotion of sustainable infrastructure, green investment and resilience. This project brings added diversity to AIIB's portfolio as it is the first one in the area of disaster risk mitigation. As discussed above, it is strongly aligned with



Sri Lanka's infrastructure priorities, with the GoSL providing more than 25 percent of the total financing for the project.

13. **Value Addition by the Bank.** This project clearly requires public sector financing and the Bank's long-term financing support will help reduce the project's financing uncertainty and allow the Government to move forward with the project quickly. Bank's involvement will add value in project planning and preparation, as well as to ensure the implementation of international environmental and social management practices in dealing with environmental and social impacts, especially to enhance the safety aspects during the implementation in high-risk areas. AIIB's participation will also help the implementation agency strengthen its institutional capacity and enhance the relevant regulation and policies, which will improve the overall landslide management in Sri Lanka.

14. **Value Addition to the Bank.** For AIIB, this project is an opportunity to expand the Bank's experience into new area such as disaster risk management. This is an important new area for the Bank. Through this project, the Bank will develop capacity in this area and share and enhance the knowledge of its members in the planning and implementation of major disaster prevention projects.

## **B. Objective**

15. The project objective is to reduce risk and damage from landslides through the implementation of mitigation measures and enhancement of policy and regulation associated with landslide management. The proposed results indicators for these objectives would include: (i) the number of people directly protected from landslide hazards; (ii) length of road and railway reopened or protected by the applied protection measures; (iii) the development of climate resilience standards and specifications for prevention and mitigation of landslides and (iv) enhanced land use guidelines for landslide prone areas.

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

16. **Project Scope.** According to studies carried out by NBRO, there are ten districts<sup>2</sup> within the six most landslide-prone provinces that have been identified as the highest-risk areas, with unstable slopes in need of immediate mitigation or protection measures. In total, 147 priority sites have been identified. They comprise 117 sites identified by the district offices of NBRO, 10 sites along major roads identified by the Road Development Authority (RDA) and 20 sites along the 208 km of railway line from Rambukkana to Badulla-identified by Sri Lanka Railway (SLR) as being at high risk of landslides. The identification and prioritization of these sites have been based on an analysis of the visible characteristics of the terrain, climatic conditions and the potential threats that the landslide sites would pose to life, property, transport infrastructure and to the economy of the district and the country as a whole. The 10 districts include Badulla, Kalutara, Kandy, Kegalle, Kurunegala, Matale, Matara, Nuwara Eliya, Ratnapura and Colombo.

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<sup>2</sup> Ten out of the 13 landslide-prone districts mentioned in paragraph 6 above have been identified as the highest risk areas and have been prioritized for inclusion in this project.

17. The project will include the design, construction of civil works and construction supervision/management activities for the identified landslide sites. Additionally, the project will address the longer-term risk from landslides caused or exacerbated by human activities and will support the review and strengthening of the policy and regulatory system for landslide management at local and national levels. The review will propose the necessary enhancement of the relevant policies, laws, procedures and regulations to manage the risk of landslides, including the standardization of procedures for landslide risk assessment. It will also address the system of building permits and development control and will make recommendations for updating the policies and standards for engineering design and environmental and social safeguards, including a review of the policies and procedures to address landslide-induced resettlement.

18. The project will include a program to enhance knowledge and technical capacity and will support the establishment of a landslide data management system. In addition, the project will include provision of necessary field investigation facilities and laboratory equipment, strengthening the technical capacity of NBRO to address the country's long-term needs for landslide and disaster management. The project will also include components to enhance project management. Technical Review/Audit will be carried out to provide oversight of the project implementation with lessons learned that will help implementation of the current operation and will guide similar operations in the future.

19. **Phased Approach.** The investigation, design and construction activities for the project, will be implemented in two phases. **Phase I** of the project will address emergency situations at 27 critical sites. The preconstruction activities (including field investigation, design and preparation of tender documents) for this phase have been completed by the staff of NBRO using in-house expertise and resources. The tendering process for the civil works have already commenced, as well as the procurement activities related to supervision of the construction, which will be implemented by a competitively selected consulting firm. **Phase II** of the project will cover the other 120 priority sites including 20 sites situated along the upcountry railway line. Its implementation will follow a similar pattern, i.e.. the preconstruction activities will be carried out in-house by NBRO using available resources and expertise and, as needed, engaging additional individual professionals and/or through qualified subcontractors. The supervision of construction activities will be carried out by national and/or international consulting firms through competitive selection once the designs and the tender documents have been prepared. Contractors for undertaking the civil works will be selected on a competitive basis.

20. The project comprises four components. A summary of the project components<sup>3</sup> and costs is presented below.

21. **Component 1: Implementation of Mitigation Measures**, including field investigations, detailed designs, construction and supervision/ management of construction activities for all 147 priority sites. The total cost of this component is estimated at **USD97.0 million**. The works comprise:

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<sup>3</sup> A "Component" in Project Document corresponds to a "Part" as per the terminology of Loan Agreement.

- 1.1 Investigation, design and preparation of tender documents for 27 critical sites selected for Phase I, at an estimated cost of USD0.5 million.
  - 1.2 Supervision of construction of 27 critical sites under Phase I, at an estimated cost of USD1.5 million.
  - 1.3 Civil Works for 27 critical sites under Phase I, at an estimated cost of USD17.5 million.
  - 1.4 Investigation, design and preparation of tender documents for 120 sites under Phase II, at an estimated cost of USD2.5 million.
  - 1.5 Supervision of construction of the 120 sites under Phase II, at an estimated cost of USD6.0 million.
  - 1.6 Civil Works for 120 sites under Phase II, at estimated cost of USD69.0 million.
22. **Component 2: Enhancement of Policy, Standards and Institutional Capacity**, at an estimated cost of **USD3.0 million**, comprising:
- 2.1 Review of relevant policies, laws, institutional arrangement and existing mandatory provisions, and the development of policy recommendations to strengthen the regulatory mechanisms and enhance inter-agency coordination for Landslide Risk Management, at an estimated cost of USD1.5 million.
  - 2.2 Standardization of mechanisms for the assessment of landslide risk, building permits and development control, the preparation of engineering design standards and recommendations for appropriate policies and standards for environmental and social safeguards, including landslide-induced resettlement, at an estimated cost of USD0.5 million.
  - 2.3 Enhancement of knowledge and capacity building for the Implementing Agency, including training and overseas studies, and the development of a landslide data management system, at an estimated cost of USD1.0 million.
23. **Component 3: Provision of Essential Facilities and Laboratory Equipment**, at estimated cost of **USD2.5 million**.
- 3.1 Laboratory equipment, at an estimated cost of USD1.0 million.
  - 3.2 Field equipment and facilities for investigation and monitoring, at an estimated cost of USD1.5 million.
24. **Component 4: Technical Support and Project Management**, at an estimated cost of **USD4.5 million**, including:
- 4.1 Project management and operating costs, at an estimated cost of USD2.4 million.

4.2 Project monitoring support, comprising the development of web-based program; technical/financial review and audits by a third independent party/institution; and project monitoring and evaluation, at an estimated cost of USD2.1 million.

#### D. Cost and Financing

25. The total project cost is estimated at USD110 million. The GoSL has asked the Bank to finance the Project through a Sovereign-backed Loan. Preconstruction activities carried out by NBRO, tax and duties will be solely financed by GoSL. The project cost and financing plan are shown in the table below.

**Table 1: Project Cost and Financing Plan (USD million)**

Items	Cost Amount <sup>4</sup>	Financing Sources			
		AIIB		GoSL	
Component 1: Implementation of Mitigation Measures	97.0	70.5	73%	26.5	27%
Component 2: Enhancement of Policy, Standards and Institutional Capacity	3.0	2.4	80%	0.6	20%
Component 3: Provision of Essential Facilities and Equipment	2.5	2.0	80%	0.5	20%
Component 4: Technical support and Project Management	4.5	2.1	47%	2.4	53%
<b>Project Cost (Including Taxes):</b>	<b>107.0</b>	<b>77.0</b>	72%	<b>30.0</b>	28%
Capitalized Front-end Fee, Commitment Fees and Interest During Construction:	<b>3.0</b>	<b>3.0</b>			
<b>Total:</b>	<b>110.0</b>	<b>80.0</b>	73%	<b>30.0</b>	27%

#### E. Implementation Arrangements

26. **Implementation Period.** The proposed project implementation period will be from July 1, 2019 to June 30, 2023.

27. MPA&DM will be the Executing Agency. NBRO under MPA&DM is the Implementing Agency that will implement the project. The Project Management Unit (PMU) has been established by MPA&DM and NBRO to manage the day-to-day implementation of the project.

28. **Project Management Unit.** Given the complexity and technical challenges, the project requires a dedicated unit to provide day-to-day oversight and technical guidance. A Project Management Unit (PMU) has been established.

29. The PMU will be staffed with dedicated, qualified staff and consultants that have the necessary professional experience and proven expertise in the technical aspects of the project including procurement, financial management, environmental

<sup>4</sup> Inclusive of tax and duties (15 percent).

and social safeguards and health and safety issues. This will help ensure that the project can be implemented on time and within budget and meets AIB's technical, procurement, environmental, social and health and safety requirements. The PMU will be responsible for the following oversight activities:

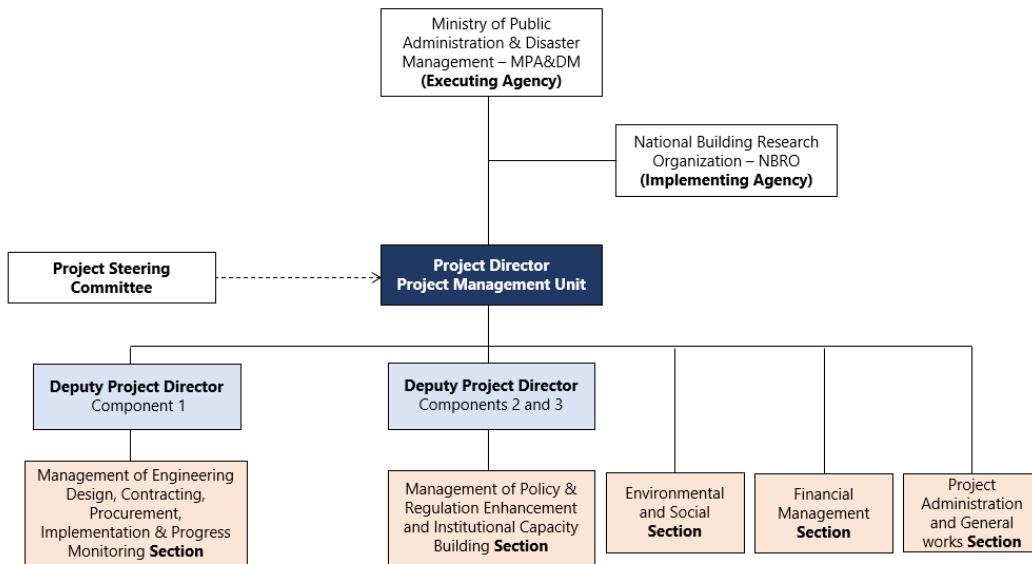
- Field investigations, designs (including environmental, social and health and safety aspects) and preparation of tendering documents.
- Procurement for all associated services (individual consultants and consulting firms), works (contractors) and goods related to the project, including the issuing, evaluation and recommendations for the award of contractors for the bids.
- Implementation, quality assurance and control, the management of consultants and contractors, and the monitoring and evaluation of outputs.
- Financial management of the project, including disbursement.
- Monitoring and policy compliance with national and Bank environmental, social and health and safety laws, regulations, policies and standards.
- Coordination with other involved agencies, including the Roads Development Authority (RDA), Sri Lanka Railway Department and local authorities, etc. and acting as their technical and administrative representatives, in order to have all the landslide sites included and treated under a single management structure, providing consistency and integrity to the project's physical subcomponents.

30. The PMU will be "lean," focused on the management aspects and dedicated to implementation of the project. NBRO as implementing agency will manage the project through the PMU and be responsible for the overall technical aspects of project implementation. MPA&DM, as the executing agency, will provide guidance, general assistance to support project implementation and will manage project funds. There will be no transfer of loan proceeds to NBRO. Fund flows and disbursements are explained in paragraphs 59-61 below.

31. In addition, GoSL will establish a Steering Committee to provide overall support to the project and specifically to guide the review and support for the development of new policies and standards relating to landslide management (Component 2). The Steering Committee will review the findings and recommendations arising from the studies and will formulate official recommendations to the GoSL. The Steering Committee will be chaired by the MPA&DM and will include representatives from the key government stakeholders currently involved in the response to landslides, including District Secretaries, Road Development Authority, Railway Department, Department of External Resources, other relevant departments of Ministry of Finance (MoF), and the line agencies responsible for services such as CEB, the Water Supply & Drainage Board, Ministry of Education and Local Governments, as needed.

32. The Governance structure of the project is shown in Figure 2.

**Figure 2: Governance Structure**



33. **Project Oversight and Supervision.** In addition to the outsourced supervision of construction activities for the 147 sites by local and foreign consultants, a robust and transparent oversight system will be established. This will be based around a user-friendly, web-based program to be developed and updated at weekly intervals to provide the client and AIIB with a real-time picture of project implementation at each site. Data will be aggregated at the package, district and project level.

34. In addition, one or more consulting firms will be engaged to provide a third-party validation mechanism for independent evaluation of the physical and financial implementation of the project. This additional level of scrutiny will provide assurance that the project is being implemented in a way that complies with the procurement, environmental, social and health and safety policies and standards agreed between the client and AIIB and to draw out lessons for potential improvements.

35. **Monitoring and evaluation.** A Results Framework has been developed, including baseline data, for the project (see Annex 1). The Results Framework provides the basis for the monitoring and evaluation (M&E) of project progress and results. NBRO/PMU will be responsible for collecting data and reporting on the progress of implementation for each indicator in the Results Framework. Progress will be evaluated by comparing the actual results against the planned target values. The Results Framework, with the relevant data and evaluations, will be incorporated into the project's annual progress reports.

36. **Procurement.** All procurement for the project will be carried out in accordance with the Bank Procurement Policy of January 2016 and the Interim Operational Directive on Procurement Instructions for Recipients, dated June 2, 2016. A Project Delivery Strategy (PDS) including the procurement plan has been completed by the NBRO/PMU, in line with the Bank's procurement instructions (Annex 4). The PDS has been reviewed and agreed by the Bank.

37. Civil works will include landslide mitigation work comprised of improvements in drainage, slope modifications and landslide control measures at the 147 landslide sites. The procurement of goods will include essential field facilities and laboratory equipment to support the necessary technical analysis and design work by NBRO. The procurement of consultancy services will cover construction supervision, additional support to NBRO for field investigation and design, policy review and enhancement, and for project management and technical support, etc.

38. **Procurement Approach.** National Competitive Tender (NCT) will be applied for most of the procurement of civil works given that they are geographically dispersed and the relatively small scopes of work at each site is unlikely to attract good-quality international competition. Local contractors have the capacity to undertake majority of civil construction (retaining walls, gabion walls, drains, etc.). International Open Competitive Tender (IOCT) will likely be required for some of the more specialized work, which local contractors may have little or no experience, such as soil nailing and rock netting. Request for Quotation (RFQ) will be used for smaller contracts procurement. Direct contracting may also be used for specific circumstances. IOCT, NCT and RFQ as well Direct Contracting will be used for Goods procurement as appropriate. Quality Cost-based Selection (QCBS), Quality-based Selection (QBS), Fixed Budget-based Selection (FBS), Consultant's Qualification-based Selection (CQS) and Individual Consultant procurement, as well as the Single-source selection, may be applied for the procurement of consulting services. Details will be set out in the procurement plan for Phase I and Phase II, which will be reviewed, and updated if necessary, at least annually. Any update of the plan will be subject to the Bank's prior review and no-objection. The Bank will conduct its prior review for the first contract of IOCT and NCT under works and goods and QCBS for consultants. Contracts not subject to prior review will be subject to post review. The Bank will carry out procurement post reviews on an annual basis with an initial sampling rate of 20 percent. This will be adjusted periodically during project implementation based on the performance of the project.

39. **Procurement Documents.** NBRO has experience in working with WB in other projects and familiar with WB's Standard Bidding Documents. Since the procurement policies of the AIB and WB are very close in principle, it is agreed that the latest version of the WB's Standard Bidding Documents with the proper modifications to suit the Bank's provisions and tendering will be used for works and goods. The Bank's Standard Procurement Documents will be used for procurement of consulting services.

40. **Advance Procurement and Retroactive Financing.** Given the urgent nature of 27 Phase I sites, the client has started the procurement process. Advance procurement and retroactive financing will be considered as eligible expenditures up to an aggregate amount not to exceed 20 percent of the loan amount in line with the Bank's policy for retroactive financing. All procurement activities considered for retroactive financing will have to be implemented in accordance with the Bank's safeguard and procurement requirements.

41. **Financial Management.** NBRO has developed a financial management system for the project that incorporates NBRO's financial management arrangements and satisfies the Bank's financial management requirements. This project financial

management system is set out in the project financial management manual (FMM), which covers staffing, budgeting, internal control, accounting, reporting, and auditing.

42. At least three financial staff will be assigned to the PMU, including a head of finance, accountant, and assistant accountant. They will be responsible for the financial management of the project, including budget preparation and implementation, accounting, reporting, and disbursement. The project budget will be formulated in September each year in parallel with NBRO's planning and budgeting system based on the project workplan and procurement plan. The annual budget for the project will be sent to the Bank for review before submission to MAP&DM for approval. The implementation of the annual budget will be reviewed quarterly and a revised budget, if needed, will be sent to the Bank for information.

43. NBRO's own accounting system, rules and procedures and internal control measures will be applied to the project. The interim financial statements of the project will be submitted to the Bank on a quarterly basis. Internal auditor unit for the project will be set up in PMU and the internal audit report will be submitted to the Bank for review as part of the monitoring report. A Government external auditor will be engaged to audit the project accounts in accordance with Sri Lanka's Standards of Auditing including opinions on the project's financial statements, the designated account, and the statement of expenditures, as well as a management letter on internal controls. The TOR for the external audit will be discussed and agreed by the Bank. The auditor's report will be submitted to the Bank within six months after the end of each fiscal year in accordance with Bank's FM policies.



## 4. Project Assessment

### A. Technical

44. Mitigation measures will be implemented based on appropriate field investigations and design. Depending on the site and the inherent risks, these measures could include the improvement of surface and sub surface drainage, slope modification, and landslide control measures, including construction of gabions, retaining walls, and soil nailing to improve the safety and stability of sites. Potential environmental impacts will be assessed per site so that any necessary measures to minimize and rectify negative impacts related to project implementation can be addressed.

45. The project will undertake three major categories of works as set out below. For specific examples of how these technical solutions will be implemented, see Annex 2.

- **Category 1. Improvement of Drainage** to drain water away from the slide area: (i) through provision or improvement of surface drainage using peripheral drains, step drains made of concrete/rubble masonry/other, appropriately provided with lining and flexible joints; and/or (ii) the development of subsurface drainage system using collection wells and lateral drains to enhance the stability of the slope by lowering the groundwater table.
- **Category 2. Slope Modifications** to increase the stability of the slope: (i) slope terracing, with appropriate soil breaks and surface drainage; (ii) soil removal at the head of the slope and loading at the toe area, along with suitable surface drainage and (iii) protection of modified slopes with appropriate vegetation, concrete cribs or geotextiles.
- **Category 3. Landslide Control Measures** for long term stabilization of the slope: (i) retaining walls built to support the slope; (ii) earth reinforcement with soil nailing or geotextiles; (iii) control piles driven deep into the hard stratum below; (iv) introduction of intercepting drainage channels/canals to prevent rainfall from penetrating under upper layers of ground; and (v) introduction of various climate resilience measures to reduce the impacts of unexpected natural phenomena.

46. Due to the size, scope and timetable of the activities envisaged under Component 1, the project will be implemented in two phases as presented below.

- **Phase I.**<sup>5</sup> Covers the 27 critical sites. NBRO has used its in-house professional staff to carry out the preconstruction activities (including field investigation, designs, environmental and social impact assessments and the preparation of tender documents for the civil works). By the end of December 2018, the design of all 27 sites had been completed. Procurement of the supervision consultant for Phase I is on-going with the REOI issued on Jan. 18, 2019. The civil works

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<sup>5</sup> The cost of phase I is estimated at around USD19.5 million.

for the 27 sites have been divided into four construction packages. The tendering document of Package 1, 2 and 3 (consisting of 14 sites) have been issued on Jan. 25, 2019. The tendering document of Package 4 is under AIIB's review and the tender will be issued shortly thereafter.

- **Phase II.**<sup>6</sup> Covers the other 120 prioritized sites. NBRO has prepared a comprehensive technical and financial submission related to implementation of preconstruction activities, which has been reviewed and accepted to the Bank. Consideration was given to whether the preconstruction activities should be bid out or conducted in-house by NBRO. It was determined that the relatively large number of sites, the difficulty in reaching all the areas and the range of assessments including field investigation, design, environmental and social impact assessment and preparation of the tender documents would make it unlikely that good quality, experienced international or national consultants would be able to mobilize the necessary resources and expertise quickly enough. Especially, the required field investigation equipment was assessed as scarce and/or is unavailable in the country which would increase the uncertainty of procurement. At the same time, NBRO had demonstrated its capacity and expertise by successfully completing the same activities for 27 critical sites in only five months (from August-December 2018). Therefore, it was decided to have NBRO carry out the preconstruction activities in-house supported by additional professional staff hired on an individual consultancy basis or, if needed, through a subconsultant firm. Given the size of Phase II, it is envisaged that the 120 sites will be divided into 4-5 groups of civil work packages. Each group would include several civil works packages and each package will include several landslide sites, all geographically close. The field investigation, designs, environmental and social assessment and the preparation of the tender documents for the first group will be completed before the project is presented to AIIB's Board, in April 2019. The supervision of construction works will be carried out by competitively selected consulting companies. Each consulting company will supervise the construction of one or two groups. It is envisaged to have one civil work contract per group in principle, which will be subject to further fine tuning based on the real demand during the implementation.

47. Considering the scale of NBRO's commitment of staff and equipment in preconstruction activities, these efforts will be valued in monetary terms and included as part of GOSL's contribution to the project. The hiring of additional individual consultants or consulting firms will also be considered as the GOSL's contribution. The loan proceeds will not be used to finance any activities carried out by NBRO and/or other government agencies.

## **B. Economic and Financial**

48. A cost-benefit analysis was conducted to calculate the EIRR of the project. The major economic benefits of the project are prevention of losses that would result from landslides, including (i) loss of human lives; (ii) destruction of value of the

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<sup>6</sup> The cost of phase II is estimated at around USD77.5 million.

infrastructure, such as roads, railway tracks and buildings; (iii) the cost of disaster relief services, including clearance of debris and replacement of the facilities, such as electricity lines, water supply pipelines and the drainage system at the sites; (iv) additional cost of travelling via alternative routes because of the traffic interruption caused by the landslide; (v) loss of commercial activities, including loss of income from the sale of railway tickets while traffic is interrupted; and (vi) the loss of forest in specific project areas. It is assumed that the economic benefits from avoiding these losses will be amortized over the 15-year life of the mitigation schemes. The economic costs include the CAPEX-investment of the project Component 1 and the OPEX-the maintenance cost for the landslide mitigation schemes once the construction has been completed.

49. A sample-based approach was adopted in this analysis. A detailed review and data collection was carried out for 50 sites, including all ten provinces covered by the project. This sampling amount covered approximately one-third of the sites, investment cost and affected population. The surveys and data collection were carried out using drones and associated computer programs and models. The social survey and data collection are based on site visits and consultations in the field. From the detailed assessment of the economic benefits for these 50 sites, the economic benefits of 147 sites have been projected.

50. The cost-benefit analysis model indicates an EIRR of 21.7 percent, which demonstrates the economic viability of the project. Sensitivity analysis has been carried out and tested two extreme scenarios: (i) a 20-percent increase in construction costs, and (ii) delays that would extend the construction period from four to six years. Even under these extreme scenarios, the investment would still provide a minimum EIRR of 14.5 percent, which is higher than the expected return of 10 percent. Please refer to the detailed analysis in Annex 3.

51. FIRR is not relevant for this type of project. However, a financial analysis focused on affordability of the maintaining the works was undertaken and showed that the annual maintenance cost for the landslide mitigation schemes was relatively low, with the average maintenance cost for each site estimated at around USD1,023 per year over 15 years. This indicates that it will be cost effective for local authorities to maintain project schemes after project close. In addition, NBRO will continue to monitor and provide necessary support through its district offices in order to enhance the sustainability of the schemes.

### **C. Fiduciary and Governance**

52. The PMU will be established under MPA&DM and NBRO. The PMU will be responsible for the overall management of all project components and activities. It will be staffed with qualified experts. As noted above, NBRO was the first institution established in Sri Lanka to carry out landslide management works. Since 1990, NBRO has been actively involved in addressing the impact of many of the country's landslides, including: rehabilitation of the rail track in Watawala, rehabilitation of the national highways in Beragala, Koslanda and Nawalapitiya, and rectification and mitigation of the landslides in Garandiella, Mahawewa, Padiyapallela, Peradeniya and Punchratthota. NBRO has also carried out slope stabilization projects to address slope

failures covering all landslide-prone districts. NBRO has experience working directly with both multilateral and bilateral development agencies, providing consultancy and engineering services in the field of landslide mitigation. This included the provision of engineering services for rectification of failed slopes at Ginigathena, Hakgala, Kandy–Mahiyangana Road, Kuthulgala and also at 18 schools in Kandy District under the Climate Resilience Improvement Project funded by the World Bank. Services were also provided to the landslide mitigation project in Welipenna along the Southern Highway supported by the Japan International Cooperation Agency.

53. While NBRO has the knowledge and experience to undertake the required works, including identification, design and supervision management, as well as the associated environmental and social requirements, the agency's capacity could be further enhanced by providing additional professional staff and in-house laboratory equipment. Moreover, NBRO's experience in these other projects was primarily in a consultancy or technical role, rather than as the implementing agency itself. In this project, NBRO would be taking on a much greater role to manage the project under MPA&DM. Therefore, the project will be providing support to NBRO to build its capacity to handle a project of this complexity and scale.

54. Government's approval procedures. The procurement of civil works and/or consulting services need a relatively prolonged process within the government system, especially for the procurement that have to go to the Cabinet for approval. Considering the emergency nature of the project, the GOSL will look into it and try to abbreviate certain procedures or give special priority to this project in government approval procedures.

55. **Procurement.** A procurement assessment has been conducted. Through their past investment, NBRO has experience with international standard procurement requirements of other MDBs, such as the World Bank and Japan International Cooperation Agency (JICA), and qualified staff has been assigned to the PMU responsible for project preparation and the procurement of civil works, goods and consultants during the implementation. The assessments of the strategic elements and operational factors that may affect achievement of the procurement objectives, identification of fiduciary weaknesses and the proposal for mitigation measures to address these deficiencies is set out in PDS (Annex 4). In addition, the internal governance measures and reporting line in the PMU are identified in its project implementation manual. The procurement risk is categorized as moderate. This risk category may be subject to change during project implementation.

56. **Financial Management (FM).** Since NBRO will be the Implementation Agency for the proposed project, the project financial management assessment was carried out for NBRO.

57. NBRO has a sound financial management system covering staffing, planning and budgeting, accounting policies and procedures, internal controls, financial reporting and monitoring, and internal and external audits. Most of their financial staff are certified accountants, although they lack experience of implementing projects financed by multilateral development banks (MDBs). NBRO prepares the annual workplan and financial budget and submits it to MPA&DM for review and approval.

NBRO follows international accounting standards and is using computerized accounting software for bookkeeping entries, analyzing transactions, and producing financial reports. Internal controls are in place for the preparation and approval of transactions and for the duty segregation. Management accounting reports are well developed in NBRO and provide information on physical and financial progress of activities, analysis of the variations between budgeted and actual expenditures, and conclude with action plans. NBRO has an internal audit unit that reports directly to the Director General of NBRO. The government auditor conducts an annual audit of the financial statements of NBRO in accordance with Sri Lanka Auditing Standards, which are consistent with the International Standards of Auditing.

58. The PMU will be responsible for the financial management of the project, including: (i) requests for budgetary allocations for the funds, (ii) collecting supporting documents, (iii) preparing and sending Project Financial Statements to AIIB and (iv) preparing requests for withdrawals.

59. NBRO's financial management system will be used for the project. Qualified financial staff will be assigned to the PMU and will be responsible for the project's financial management. The annual project work plan and budget, particularly the budget for funds required from the Bank loan, will be prepared by PUM/NBRO and will be approved by the MPA&DM. The computerized accounting system used by NBRO will be customized to accommodate the accounting requirements for management of the project funds. The internal audit unit of the project will carry out internal audit annually. The government auditor will carry out annual auditing of the project account and will provide opinions and a management letter. A financial management manual is being prepared and will be reviewed and agreed by AIIB.

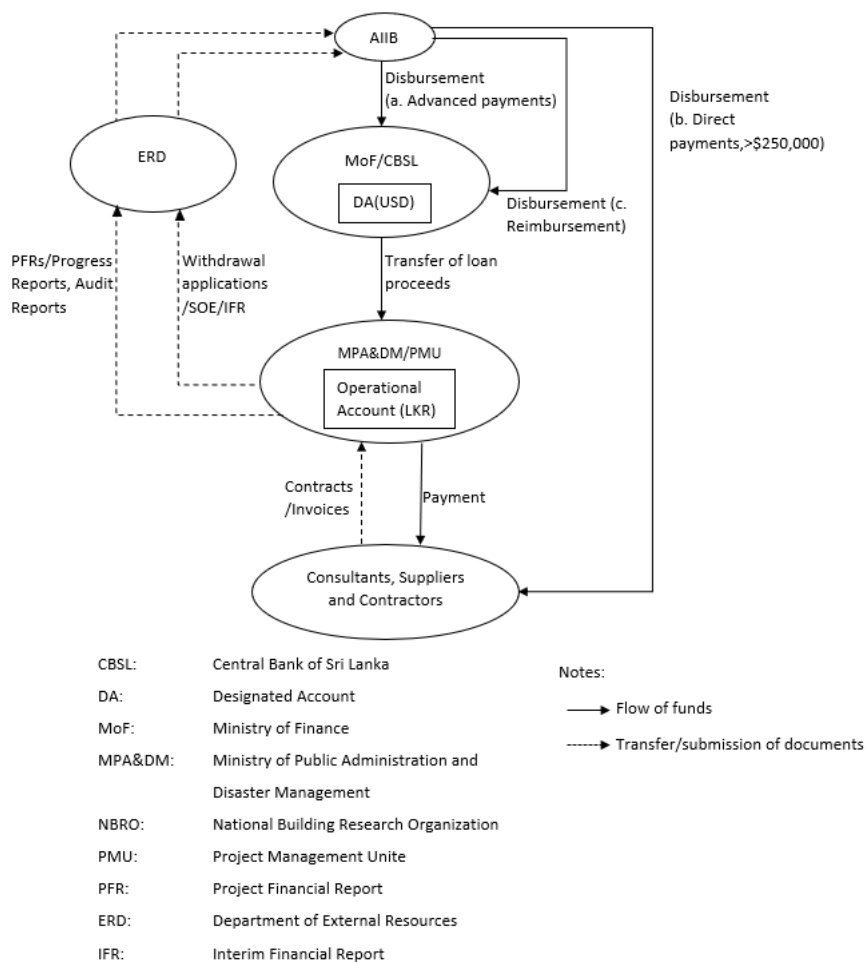
60. **Funds Flow and Disbursement.** The proceeds from the AIIB loan will be disbursed in accordance with the arrangements and instructions contained in the disbursement letter.

61. Disbursements under the loan will be made primarily using the Direct Payment method. Withdrawal applications under this method will be supported by adequate evidence of the eligible expenditures and will be disbursed directly from the loan account to the specified contractor or supplier. The payment will be made in either USD or the local currency. Disbursements may also be made using the Advance method. A US Dollar designated account will be maintained by the MoF with the Central Bank of Sri Lanka (CBSL) to receive advances from the loan account. The advances will be further transferred to an LKR operating account (subaccount) maintained by PMU under the supervision of the MPA&DM with a commercial bank acceptable to the Bank for payments to contractors, suppliers and consultants. There will be no direct transfer of loan proceeds to NBRO. The required supporting documents for the use of Advance method will be included in the disbursement letter.

62. The Reimbursement method may be used under the project for other small eligible expenditures, which will be supported by a statement of expenditures subject to a ceiling specified in the disbursement letter. Supporting documents and records for these expenditures should be maintained and made readily available for review by the Bank.

63. MPA&DM and NBRO through the PMU will be responsible for preparing the disbursement plan/schedule, requesting budgetary allocations for the AIIB loan and counterpart funds, collecting supporting documents, and submitting withdrawal applications. After review by MPA&DM of withdrawal applications, ERD will be responsible for approving and signing the withdrawal applications for submission to the Bank. The fund flow and disbursement are shown in Figure 3.

**Figure 3: Funds Flow and Disbursement**



#### D. Environmental and Social

64. The AIIB's Environmental and Social Policy (ESP), including the Environment and Social Standards (ESSs), will be applicable to the proposed project. They cover the environmental and social screening, project categorization and due-diligence. In accordance with the ESP, the project has been classified as Category B, considering that: (i) the general environmental and social impacts of the landslide mitigation works are localized, and the impacts are not irreversible; (ii) there are mature engineering technologies for mitigation and protection (iii) there is solid in-house expertise and management capacity for environmental and social issues in NBRO and (iv) NBRO has experience working on similar projects funded by the national government and other MDBs.

65. NBRO has prepared an Environmental and Social Management Planning Framework (ESMPF) and a Social Management and Resettlement Planning Framework (SMRPF) for the project as a whole, since not all the sites had been identified when project preparation was initiated, and it is expected that some sites may be subject to change, depending on the findings of the initial analysis of the specific subprojects. The ESMPF addresses national and Bank policy requirements, the methodologies used for environmental and social screening, survey, sampling and analysis and assessment and sets out the proposed general environmental and social mitigation measures, including labor management, occupational health and safety; procedural and review requirements; public consultation and information disclosure requirements, along with the institutional arrangements, training, monitoring and reporting requirements. The ESMPF and the SMRPF for the project in English and in national languages (Sinhala and Tamil) were disclosed in-country on Nov. 16, 2018 on the NBRO websites: [http://nbro.gov.lk/index.php?option=com\\_content&view=article&id=179&lang=en](http://nbro.gov.lk/index.php?option=com_content&view=article&id=179&lang=en). These were also disclosed on Bank's website on Nov. 22 2018: <https://www.aiib.org/en/projects/proposed/2018/landslide-mitigation.html>.

66. Site specific Environmental and Social Management Plans (ESMPs) have been prepared for the 27 sites under Phase I that will be implemented in the first and second years of project implementation and have been translated in national languages (Sinhala and Tamil). The English and national languages (Sinhala and Tamil) versions of all 27 ESMPs have been completed and uploaded to the NBRO website [http://nbro.gov.lk/index.php?option=com\\_content&view=article&id=179&lang=en](http://nbro.gov.lk/index.php?option=com_content&view=article&id=179&lang=en). The anticipated environmental impacts will mainly occur in the construction stage, e.g., dust, noise and interruption to local traffic and local businesses, which can be managed and controlled through properly designed mitigation measures and adequate implementation during construction. The health, safety and working conditions of workers involved both in the construction and implementation phases of the project will have to be carefully assessed and managed, since some of the landslide sites are potentially hazardous. The ESMPs for the 120 sites of Phase II will be prepared by NBRO using in-house expertise and will be completed and disclosed before the tender of the relevant civil work packages.

67. The landslide mitigation project is unlikely to require much, if any, involuntary resettlement. However, a Social Management and Resettlement Planning Framework (SMRPF), has been prepared in parallel with the ESMPF. The SMRPF addresses potential damage to houses and crops during construction and proposes measures to mitigate potential adverse impacts on landowners and others living in the vicinity of the landslide sites and sets out principles for consultation with people living in or adjacent to the landslide sites. It also requires formal agreements to be signed with the landowners and other residents before any construction work can take place. It also provides a brief outline of the measures that would apply should it be necessary to acquire land or resettle any families in order to carry out the landslide mitigation works required by the project.

68. The SMRPF includes an annex (the Resettlement Implementation Framework) that sets out the current policies and procedures that apply to people that are resettled because of the landslides. Although the AIIB's Environmental and Social Standard 2 (ESS2) does not apply in these cases, since the resettlement is caused by a natural

disaster and is not an impact of the project, it could affect project implementation, since some people may try to use the project to claim access to benefits above and beyond the compensation due under the current government schemes. Moreover, from the site visits undertaken during project preparation, various cases were observed of households that remained in areas at high risk from landslides. It should be emphasized that the remediation program will reduce the risk to some of these households but will not completely eliminate all risks to life and property.

69. The ESMPs for the subproject sites cover social issues and identify any potential land acquisition or project-related resettlement impacts. If land acquisition or resettlement are identified, a resettlement action plan (RAP) will have to be prepared in line with ESS2 on Involuntary Resettlement and disclosed before any civil works start. The RAP would have to give particular consideration to ensuring that women are fully involved in the planning process and directly receive any compensation due to them.

70. NBRO will be responsible for implementation, through the PMU, of the ESMPF, SMRPF and site-specific ESMPs, as well as any RAPs that may be required. The ESMPF, the SMRPF and annexes have been translated in Sinhala and Tamil and have been disclosed on the websites of the client and Bank. In accordance with the Bank's ESP, a project-level Grievance Redress Mechanism has been proposed that will allow any complaints or concerns to be registered and reviewed. If a complaint cannot be resolved at the local level, it will be passed to a district-level committee, chaired by the Additional District Secretary (Land). If the complaint cannot be resolved at the district level it will be referred to an independent panel.

71. The Project-affected People's Mechanism (PPM) has been established by AIIB to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement its Environmental and Social Policy in situations when their concerns cannot be addressed satisfactorily through Project-level Grievance Redress Mechanisms or AIIB Management's processes. For information on how to make submissions to the PPM, please visit <https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html>

72. **Environmental, Social, Health and Safety Supervision Plan.** The PMU will be responsible for supervision and monitoring of the environmental, social and health and safety aspects of the project. In accordance with the recommendations set out in the Social Management and Resettlement Planning Framework (SMRPF) and the Environmental and Social Management Framework (ESMF), an Environment, Social and Health and Safety (ESH&S) Cell will be set up in the PMU. It will be staffed by a Senior Social Safeguard Expert, a Senior Environmental Safeguard Expert and a Senior Health and Safety Expert. The experts will be responsible for:

- Oversight and review of the ESMPs that will be prepared by NBRO's Environmental Studies and Services Division (ESSD) and the Human Settlement Planning and Training Division (HSPTD).
- Review of ESH&S aspects of the tenders for construction and supervision.



- Review of contractor ESH&S method statements (for the construction contracts).
- Oversight and review of the environmental, social and health and safety aspects of the supervision contracts.
- Oversight of the ESH&S monitoring system/s.
- Review and resolution of outstanding ESH&S issues and complaints relating to the project.
- Management of the project-level Grievance Redress Mechanism (GRM).

73. Given the expected workload, sufficient Social Development and Environmental Safeguard Officers will have to be contracted to work at district level. It is envisaged that a total of 5-6 Social Development Officers (SDOs) and 5-6 Environmental Safeguard Officers (ESOs) will be hired for the project. They will be based in the district offices of NBRO and will report to the PMU. Districts having few subprojects will be covered by an SDO and ESO from a neighbouring district.

74. The monitoring of occupational health and safety is in principle covered under the engineering supervision contract. Given the potentially dangerous nature of the landslide sites and the likelihood that some packages may be awarded to relatively small or inexperienced local contractors, it will be essential to ensure regular H&S inspections by the PMU. This would be the primary responsibility of the Senior H&S Expert in the PMU. The SDOs, ESOs and other NBRO officers working at district level should immediately report any concerns about occupational H&S or community H&S to the Senior H&S Expert. If serious or consistent failings are identified during project implementation, and cannot be rectified under the engineering supervision contracts, the alternative would be to contract additional H&S inspectors who would be assigned to the project at district level.

## E. Risks and Mitigation Measures

75. The project has been categorized as having a “medium” risk rating. The risks have been largely identified, analyzed and the related mitigation measures have been developed.

**Table 2: Risk Assessment and Mitigation Measures**

<b>1. Contractual Management Risks</b>	<b>Current Assessment: Medium</b>
<p><b>Description:</b> 1.1 There are 147 sites (including 20 sites along a 208 km upcountry railway track) identified as high-risk landslide areas, which need to implement landslide mitigation measures under this project. The major challenge is related to number and composition of the procurement package and</p>	<p><b>Mitigation Measure:</b> Fewer procurement packages have been designed. Twenty-seven sites under Phase I have been packaged into four civil works contracts under full-time site construction supervision of one consulting firm.</p>

<p>management of the contracts, in a timely and orderly manner.</p> <p>1.2 A large number of small contracts would raise the risk of local collusion, potential problems in ensuring the quality of materials and work, and adequate management of environmental, social and health and safety issues.</p>	<p>One hundred and twenty sites of Phase II are packaged into 4-5 groups each including several construction packages and each construction package includes several landslide sites. The entire Phase-II will involve: one group related only to railways landslide sites; three groups of other landslide sites civil works, and another potential group for sites that need longer investigation period given the nature of the land and surrounding environment. Each group will be supervised by one consulting firm.</p> <p>Comprehensive contract clauses providing adequate guarantees and robust quality and quantity supervision have been incorporated in the civil works contracts. Additionally, two project's monitoring tiers have been designed to ensure the integrity and quality of the project outcomes: (i) web-based computer program providing real-time situation of each site/work, easy to check and control and (ii) third-party review/audit validation mechanism providing an independent on-site and in-office review of physical and financial implementation of the project's components and assurance on compliance with procurement, financial, social and environmental policies.</p>
<p><b>2. Capacity Risk</b></p> <p><b>Description:</b></p> <p>2.1 NBRO has considerable experience in providing consultancy services for the design and supervision for the landslide management components supported by other development agencies. However, it is the first time the agency will implement a project of this scale. NBRO will have to enhance its capacity, taking on additional professional staff and acquiring additional laboratory equipment.</p>	<p><b>Current Assessment:</b> Medium</p> <p><b>Mitigation Measure:</b></p> <p>A dedicated PMU has been established for the project. It will include staff that is trained for management of large numbers of parallel works, supplemented by engagement of individual specialists and firms on time basis, per assignment.</p> <p>A detailed Project Implementation Manual will be developed and will be strictly followed. The PIM will include: (i) project organization structure, verification and control mechanisms,</p>

	reporting/accountability mechanisms; (ii) detailed implementation process and work flow; (iii) procurement manual; and (iv) financial management manual.
<b>3. Procurement Risk</b>	<b>Current Assessment:</b> Medium
<b>Description:</b> It is not clear whether there are sufficient firms in the country that would be interested in the engineering supervision services and civil work contracts.	<b>Mitigation Measure:</b> A Contractors/Consulting Firms Awareness Conference has been organized in Colombo on Jan. 18 for this project and has provided to national and international firms detailed explanations on opportunities in the landslide operation. Overall interest of the participants indicates on high interest in undertaking the project implementation.  PDS has been well developed and Bank will work with PMU proactively to support and adjust the procurement strategy and plan during the implementation. A number of small civil work contracts have been provided targeting smaller size national contractors, while some higher value civil work contracts have been planned aiming to attract larger national and international contractors.  Given the scale of the project, the implementation of the works will be staggered. The tendering of civil works and consulting services for the first set of sites will provide additional experience which will be used in fine tuning of the procurement strategy for the majority of remaining sites.
<b>4. Environmental and Social Risks</b>	<b>Current Assessment:</b> Medium
<b>Description:</b> Anticipated environmental impacts occurring in the construction and the potential land acquisition and resettlement impacts during the project implementation.	<b>Mitigation Measure:</b> Environmental and social management frameworks have been developed during the project preparation. Each landslide site will be the subject of a detailed, site-specific Environmental and Social Management Plan that will include detailed consultation with landowners and people living in or adjacent to the landslide sites.

<b>5. Sectoral Policy Risks</b>	<b>Current Assessment:</b> Medium
<p><b>Description:</b> The current sectoral policies and procedures are insufficient and need to be enhanced to support efficient and effective landslide risk management.</p>	<p><b>Mitigation Measure:</b> Component 2 of the project is designed to support a consulting firm to review all policies and regulations related to landslide risk management and to recommend a practical mechanism and measurable milestones for implementation. A Steering Committee will be established for this project, to enhance communication and coordination among the stakeholder government agencies at the management level, and to propose and agree to put forward the recommendations developed under Component 2 to the government for endorsement.</p>
<b>6. Climate Change Risks</b>	<b>Current Assessment:</b> Medium
<p><b>Description:</b> The project will be exposed to climate change risks from time to time during implementation.</p>	<p><b>Mitigation Measure:</b> NBRO has the experience to implement mitigation measures in extreme weather conditions. Component 2 will support development of climate resilience standards and specifications related to landslide mitigation, which will be adopted in the project as well as other landslide mitigation implementation actions in the future.</p>

## 5. Next Steps

76. The major milestone is projected as follow:

April 2019

Board Consideration

### Annex 1: Project Results Framework

**Project Objective:** Reduce risk and damage from landslides through the implementation of mitigation measures and enhancement of policy and regulation associated with landslide management.

Indicator Name	Baseline	Cumulative Target Values				End Target	Frequency	Responsibility
		YR1	YR2	YR3	YR4			
<b>Project Objective Indicators:</b>								
1. Aggregated number of direct project beneficiaries (of which female number)	0	2,000 (1,000)	6,000 (3,000)	10,000 (5,000)	15,000 (7,500)	15,000 (7,500)	Yearly	NBROP/PMU
2. Area of road protected by implementation of mitigation measures (square meters)	0	3,000	8,000	18,000	35,000	35,000	Yearly	NBRO/PMU
3. Length of railway protected by implementation of mitigation measures (meters)	0	0	500	1,000	2,280	2,280	Yearly	NBRO/PMU
4. Adopted Climate resilience standards and specifications related to landslide mitigation has been adopted	Not Available	Draft design standards (testing)	Final design standards (testing)	Final design standards (Adopted)	Adopted	Adopted	Yearly	NBRO/PMU
5. Land use guidelines in landslide prone area has been reviewed and recommendations have been submitted by the Steering Committee to the government for endorsement process (Yes/No)	No	Reviewed	Draft Guidelines Developed	Draft Guidelines Developed	Final Guidelines Developed	Final Guidelines submitted	Yearly	NBRO/PMU
6. Aggregated number of the planned resettlements to be avoided. (Number of households)	0	500	1500	3000	5000	5000	Yearly	NBRO/PMU

Indicator Name	Baseline	Cumulative Target Values				End Target	Frequency	Responsibility
		YR1	YR2	YR3	YR4			
<b>Intermediate Results Indicators – measured during implementation support</b>								
1. Landslide mitigation schemes constructed to protect homes, agricultural land and economic activities using improved designs and standards.	0	20	50	90	147	147	Yearly	NBRO/PMU
2. Grievances registered related to delivery of project benefits has been resolved. (Percentage)	0		50		80	80	Midterm & Completion	NBRO/PMU

## Annex 2: Project Description

1. This project will be a significant milestone in the context of landslide risk mitigation in Sri Lanka. It addresses not only the structural mitigation of potential high-risk areas, but also will help establish an improved policy and regulatory system in the country including its implementation setup, which would prevent further expansion of landslide risk in the future. The project includes four components:

2. **Component 1: Implementation of Mitigation Measures**, including field investigations, detailed designs, construction and construction supervision/management activities for 147 affected sites. The total cost of this components is estimated at **USD97.0 million**. The works comprise:

2.1 Investigation, design and bidding documents preparation for 27 critical sites under Phase I, at estimated cost of USD0.5 million.

2.2 Construction supervision for 27 sites under Phase I, at estimated cost of USD1.5 million.

2.3 Civil Work for 27 critical sites under Phase I, at estimated cost of USD17.5 million.

2.4 Investigation, design and bidding documents preparation for 120 sites under Phase II, at estimated cost of USD2.5 million.

2.5 Construction supervision consultant firms for 120 sites under Phase II will be engaged once the designs and tender document are ready. The cost is estimated at USD6.0 million.

2.6 Civil Work for 120 sites under Phase II are tentatively packaged into around 4-5 civil works packages, at estimated cost of USD69.0 million.

3. **Component 2: Enhancement of Policy, Standards and Institutional Capacity**, at an estimated cost of **USD3.0 million**, comprising:

3.1 Review of relevant policies, laws, institutional set up and mandatory provisions and proposal for policy recommendations for strengthening the regulatory mechanisms for Landslide Risk Management and enhancing the inter-agency coordination, at estimated cost of USD1.5 million. Main deliverable and final outcome of this subcomponent will be the formulation of policy and regulatory instruments (for providing legal authority to fulfill different policy related functions functions) and development of an institutional framework (providing composition, role of NBRO as the mandated institution, functions and operational modalities of other institutions included in the proposed framework: coordination arrangements with other stakeholders, and mechanisms for engaging communities and private sector stakeholders in the proposed framework).

- 3.2 Standardization of mechanisms for the assessment of landslide risk, building permits and development control, preparation of engineering design standards and recommendations for appropriate policy and standards for Environment and Social safeguards, including a structured approach for landslide hazard induced resettlement, at estimated cost of USD0.5 million. Specifically, this subcomponent will (i) streamline the process for issue of Land Clearance Certificates (LCC) and building permits for development projects to make it more beneficiary friendly and cost effective; (ii) mainstream the building and construction control process in landslide prone areas; (iii) formulation of design standards, which could involve development of practice manuals, development of some specific courses etc.to build the capacity of stakeholders and (iv) complete a report containing a set of recommendations for formulating policies and practices related resettlement of vulnerable people living in high hazard areas into safer area.
- 3.3 Capacity and knowledge enhancement for NBRO, including training and study trips, as well as development of a landslide data management system, at estimated cost of USD1.0 million. One of the main outcomes of this subcomponent will be a Landslide Data Management System containing metadata that will allow NBRO to organize, manage, analyze and provide a visual display opportunity for metadata (including geospatial data) for increased security, efficiency, productivity, and management and sharing with external parties when necessary. It is necessary to develop data sharing protocols under the task so that NBRO will be able to share necessary data with external parties. In the same way it is necessary to consider providing necessary instruments or fee-based systems to meet the cost implications when providing data to external agencies.

**4. Component 3: Provision of Essential Facilities and Laboratory Equipment, at estimated cost of USD2.5 million, including:**

- 4.1 Provision of essential laboratorial equipment for NBRO, at estimated cost of USD1.0 million.
- 4.2 Provision of essential field equipment for NBRO, at an estimated cost of USD1.5 million, including vehicles for project monitoring).

**5. Component 4: Technical Support and Project Management, at estimated cost of USD4.5 million, including:**

- 5.1 Project management and operating cost, at estimated cost of USD2.4 million, including: salaries of the PMU, space, office facilities, equipment, transport and software for the PMU office and operating, and the other consultancy and advisory service.
- 5.2 Project Monitoring support, comprising the development of web-based program; technical/financial review/audit by third party institution; and project monitoring and evaluation, at estimated cost of USD2.1 million.



6. **Technical-Readiness-Component 1: Phase I (27 critical sites).** NBRO has used in-house professional staff to carry out the preconstruction activities involving field investigation, designs, environmental and social impact assessments and the preparation of tender documents for the civil works. The design of all 27 sites had been completed at end of December 2018. Procurement of the supervision consultant for Phase I is ongoing with the REOI issued on Jan. 18, 2019. The civil works for the 27 sites have been divided into four construction packages, each including several landslide sites. The Tender Documents for Package 1, 2 and 3 (consisting of 14 sites) have been issued on Jan. 25, 2019. The Tender Document of Package 4 is currently under Bank's review and the tender will be issued shortly thereafter.

7. **Technical-Readiness-Component 1: Phase II. (120 prioritized sites).** NBRO has prepared a comprehensive technical and financial submission related to planning and implementation of the required preconstruction activities involving all aspects of required field investigations, designs and Tender Documentation. The submission has been reviewed and accepted by the Bank. In depth analysis have been conducted to determine whether the preconstruction activities should be carried out by externally engaged consulting Firms/s or by in-house staff of NBRO, similarly like the same activities carried out and successfully completed by NBRO for Phase I 27 sites. The analysis indicated that the large number of sites, the difficulty in reaching all affected areas and the range of assessments involving field investigation, design, environmental and social impact assessment and preparation of the tender documents, would possible result in doubtful quality of outputs, since experienced international or national consultants would be not able to mobilize the necessary resources and expertise, timely and orderly. Moreover, there is lack of renting or purchasing of the required equipment necessary for field investigations. Required importation of all required equipment, will take considerable time, effort and involve considerable cost, while NBRO has already demonstrated its capacity and expertise by successfully completing the same activities for 27 critical sites in only five months (from August-December 2018). Therefore, it was decided that NBRO is best suited and qualified to undertake the required preconstruction activities, supported by additional professional staff as and when required, hired on short term individual consultancy basis or if needed, through a subconsultant firm.

8. Given the size of Phase II, 120 sites will be divided into 4-5 groups of civil work packages. Each group would include several civil works packages and each package will include several landslide sites, all geographically close. The field investigation, designs, environmental and social assessment and the tender documents for the first group will be completed before the project is presented to the Bank's Board, in March 2019. The supervision of construction works will be carried out by competitively selected consulting companies. Each consulting company will supervise the construction of one or two groups.

9. **Technical-Readiness-Component 2:** TOR, REOI and RFP for proposed consulting service for enhancement of policy and standards related to landslide management, operating and monitoring is under Bank's review.

10. **Technical-Readiness-Component 3:** Request for No Objection for purchase of the first batch of urgent equipment in value of less than USD100,000 (inclusive of

taxes and duties), has been prepared and submitted to the Bank in January 2019, which is proposed to use shopping method. The remaining equipment need has been agreed upon, including their technical specifications and estimated net cost. The equipment must be imported as they are not available in the country. The remaining equipment in value of about USD2.4 million (inclusive of taxes and duties) will be segregated in accordance to their purpose, namely for: geotechnical investigations, monitoring equipment and field investigations equipment. Each such package will be in value of about USD800,000 (inclusive of taxes and duties) and they are proposed to be procured using STD for procurement of goods and installation. The procurement methods and formalities will be subject to Bank's procurement review and confirmation.

11. The project cost estimation and financing plan are summarized in the table below.

**Table A2.1: Cost Estimate and Financing Plan**

Component	Net Project Cost <sup>7</sup>	AIB	GOSL
<b>Component 1: Implementation of Mitigation Measures</b>			
1.1. Field Investigation, design & bidding document preparation for 27 critical sites of Phase I	0.43	0.00	0.43
1.2. Construction Supervision for 27 critical sites of Phase I	1.30	1.13	0.18
1.3. Civil Work for 27 critical sites of Phase I	15.22	13.13	2.09
1.4. Field Investigation, design & bidding document preparation for 120 sites of Phase II	2.17	0.00	2.17
1.5. Construction Supervision for 120 sites of Phase II	5.22	4.50	0.72
1.6. Civil Work for 120 sites of Phase II	60.00	51.75	8.25
<b>Component 1 Subtotal</b>	<b>84.35</b>	<b>70.50</b>	<b>13.85</b>
<b>Component 2: Enhancement of Policy, Standards and Institutional Capacity</b>			
2.1. Review and enhancement of relevant policies, laws, institutional set up and regulatory mechanism.	1.30	1.20	0.10
2.2. Standardization of standards for risk assessment, engineering design and Environment and Social safeguards.	0.43	0.40	0.03
2.3 Capacity enhancement and knowledge buildup for Implementing Agency	0.87	0.80	0.07
<b>Component 2 Subtotal</b>	<b>2.61</b>	<b>2.40</b>	<b>0.21</b>
<b>Component 3: Provision of Essential Facilities and Equipment</b>			
3.1. Laboratorial Equipment	0.87	0.80	0.07
3.2. Other field equipment, (including vehicles for project monitoring)	1.30	1.20	0.10
<b>Component 3 Subtotal</b>	<b>2.17</b>	<b>2.00</b>	<b>0.17</b>
<b>Component 4: Technical Support and Project Management</b>			
4.1. Project management and operating cost	2.40	0.00	2.40
4.2. Technical support, including the development of web-based program; technical/financial review/audit by third party; project monitoring and evaluation.	2.10	2.10	0.00
<b>Component 4 Subtotal</b>	<b>4.50</b>	<b>2.10</b>	<b>2.40</b>
<b>NET PROJECT COST (Exclusive of taxes and duties)</b>	<b>93.63</b>	<b>77.00</b>	<b>16.63</b>
<b>Estimated Taxes and duties (15%)</b>	<b>13.37</b>		<b>13.37</b>

<sup>7</sup> Exclusive of the taxes and duties.

Capitalized Front-end Fees, commitment fee and interests	3.00	3.00	
<b>TOTAL PROJECT COST / FINANCING REQUIRED</b>	<b>110.00</b>	<b>80.00</b>	<b>30.00</b>

12. A few maps of the project are as below.

**Figure A2.1: Map of Landslide Potential Area of Sri Lanka**

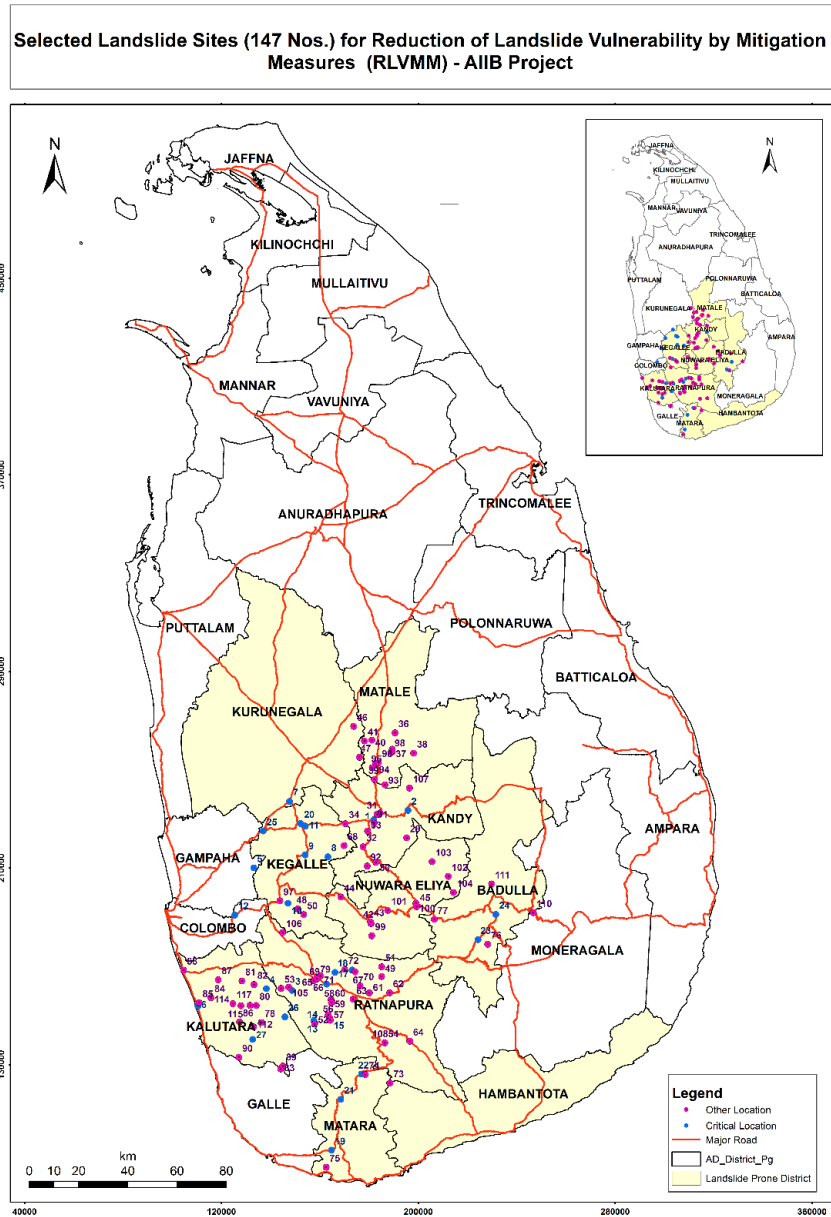


Figure A2.2: Map for 27 sites (Phase I)-sites No.1-27

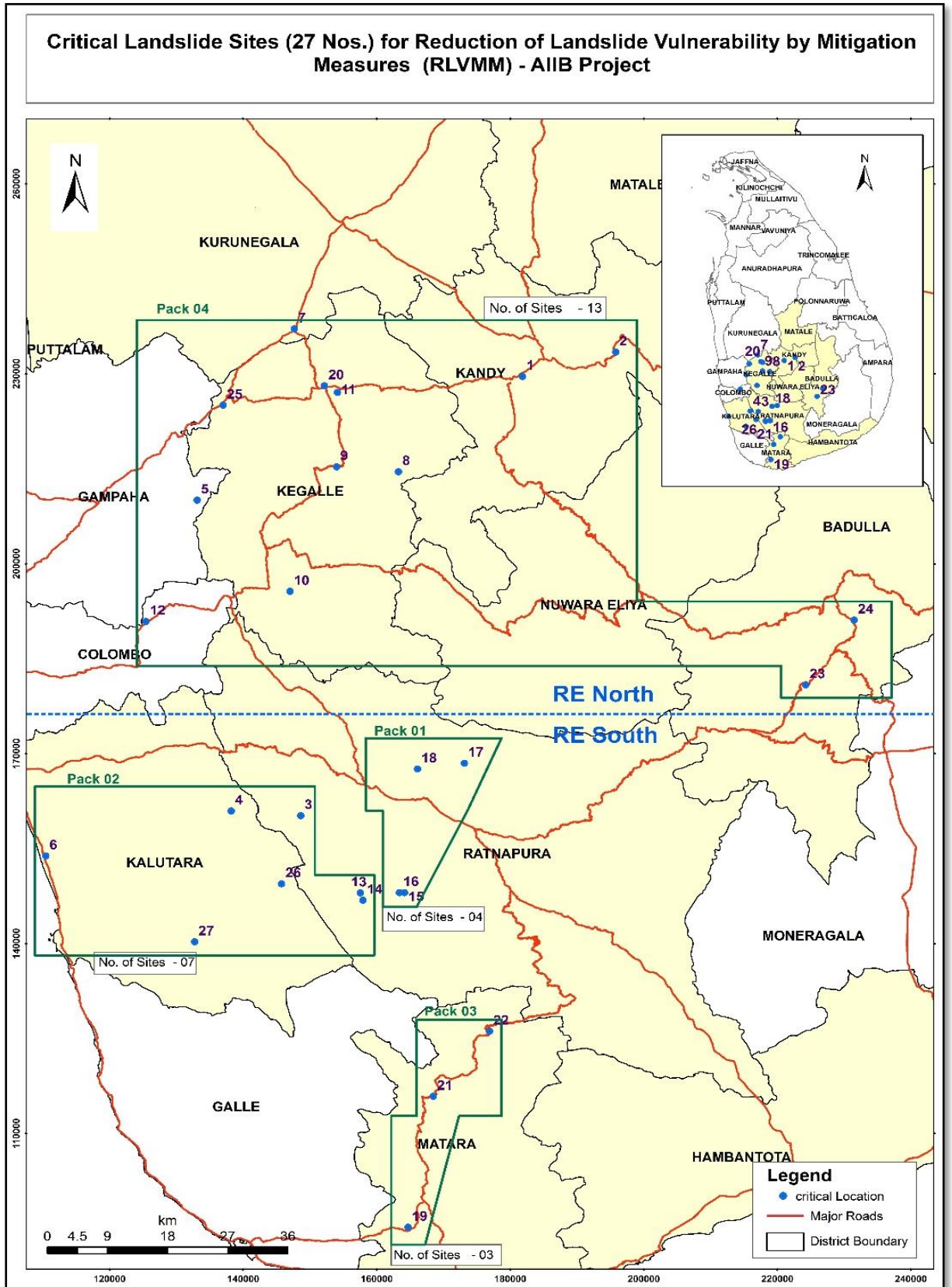
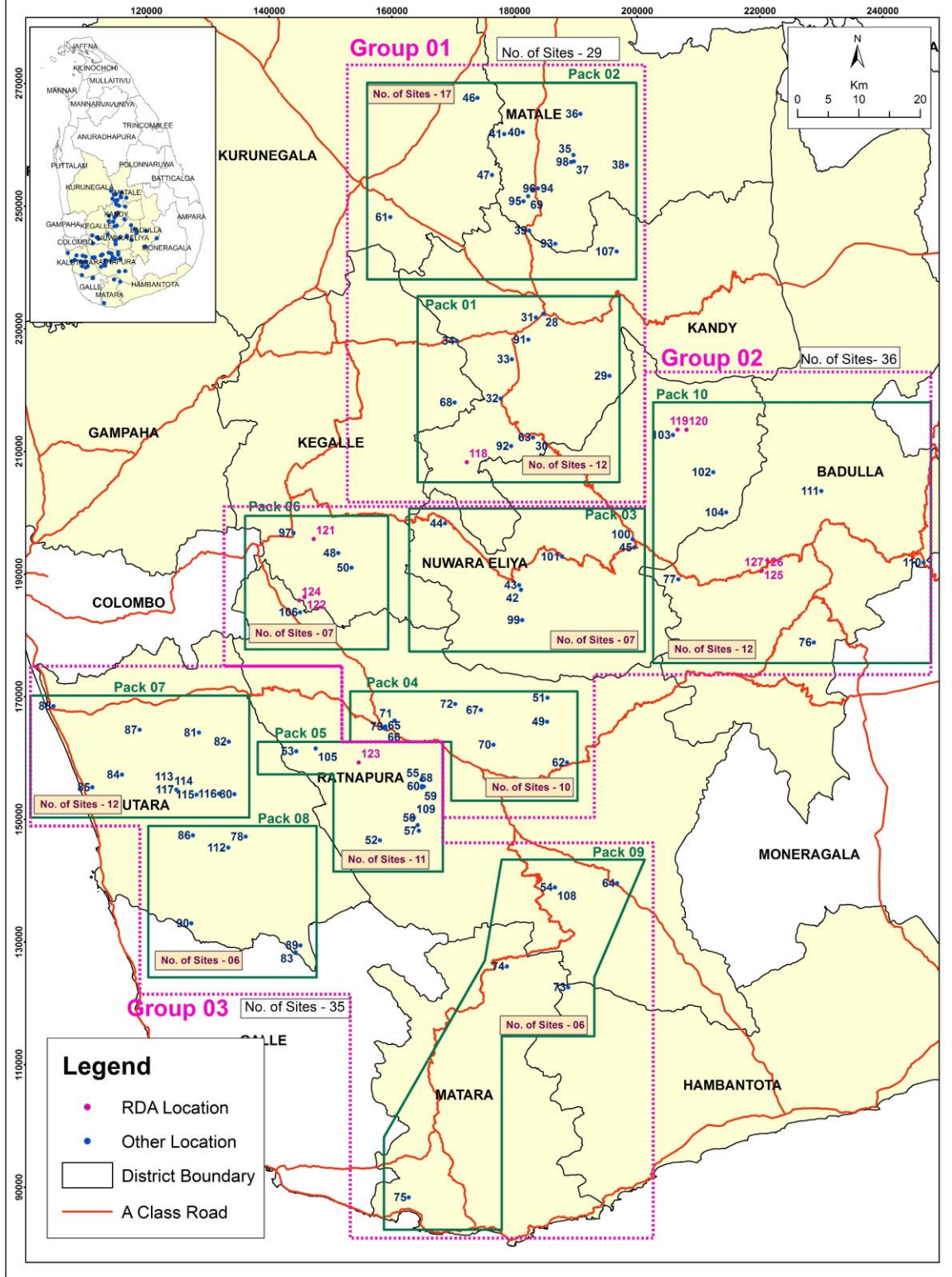


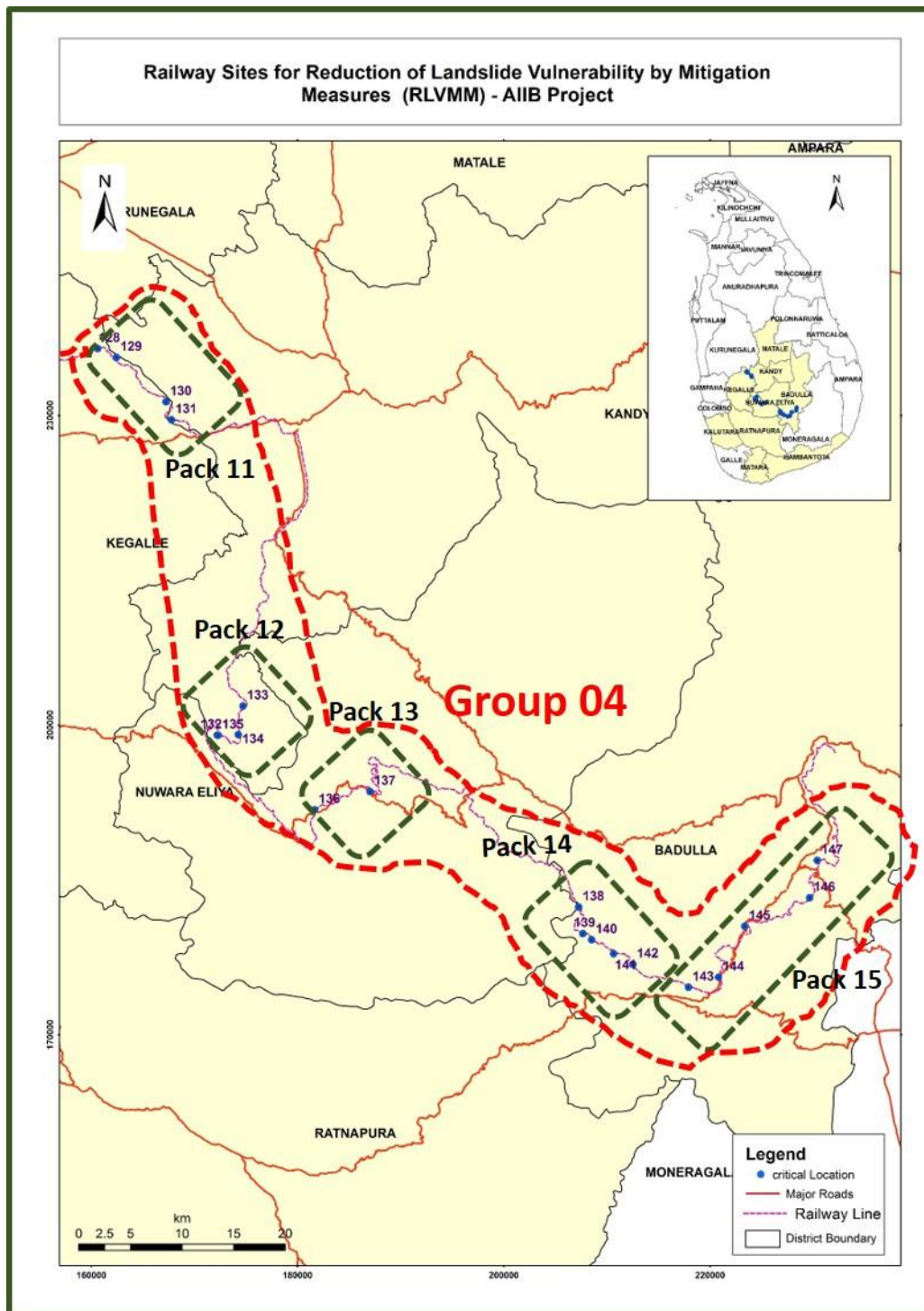
Figure A2.3: Map 1 for 120 sites (Phase II)-sites No.28-127

**Other Sites (28 -127 Nos.) for Reduction of Landslide Vulnerability by Mitigation Measures (RLVMM) - AIIB Project**





**Figure A2.4:** Map 2 for 120 sites (Phase II)- site No. 128-147



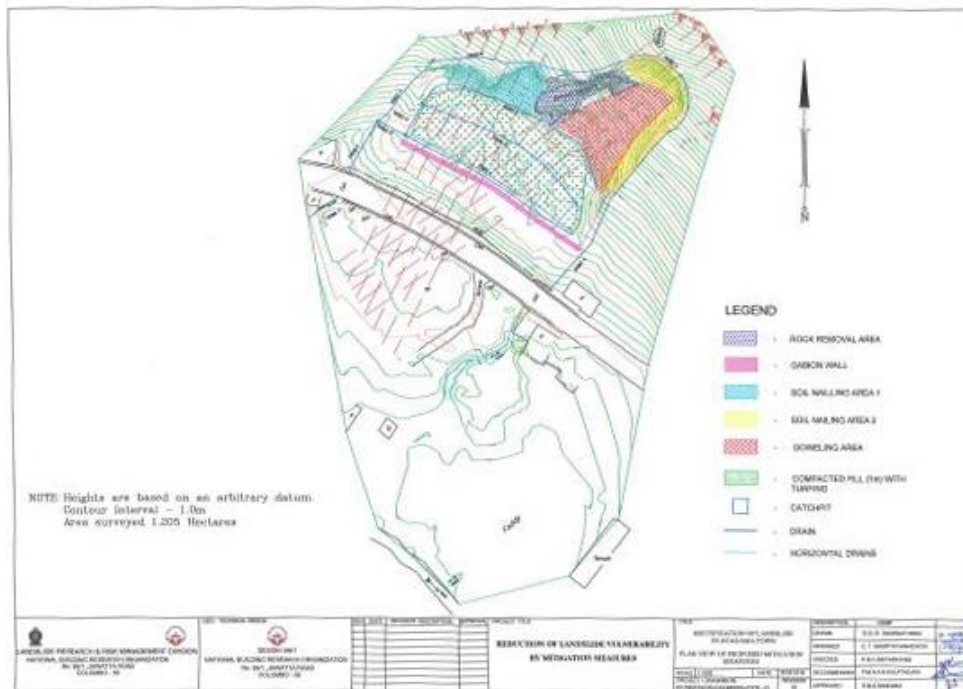
13. Examples of sites and technical solutions.

Example 1: Ayagama town landslide site, which is a happened landslide in Ratnapura District requiring immediate mitigation actions. The following figures are the drone picture of the site and the design of the mitigation measures.

**Figure A2.5:** Picture of Ayagama Town Landslide Site



**Figure A2.6:** Mitigation Designs for Ayagama Town Landslide Site



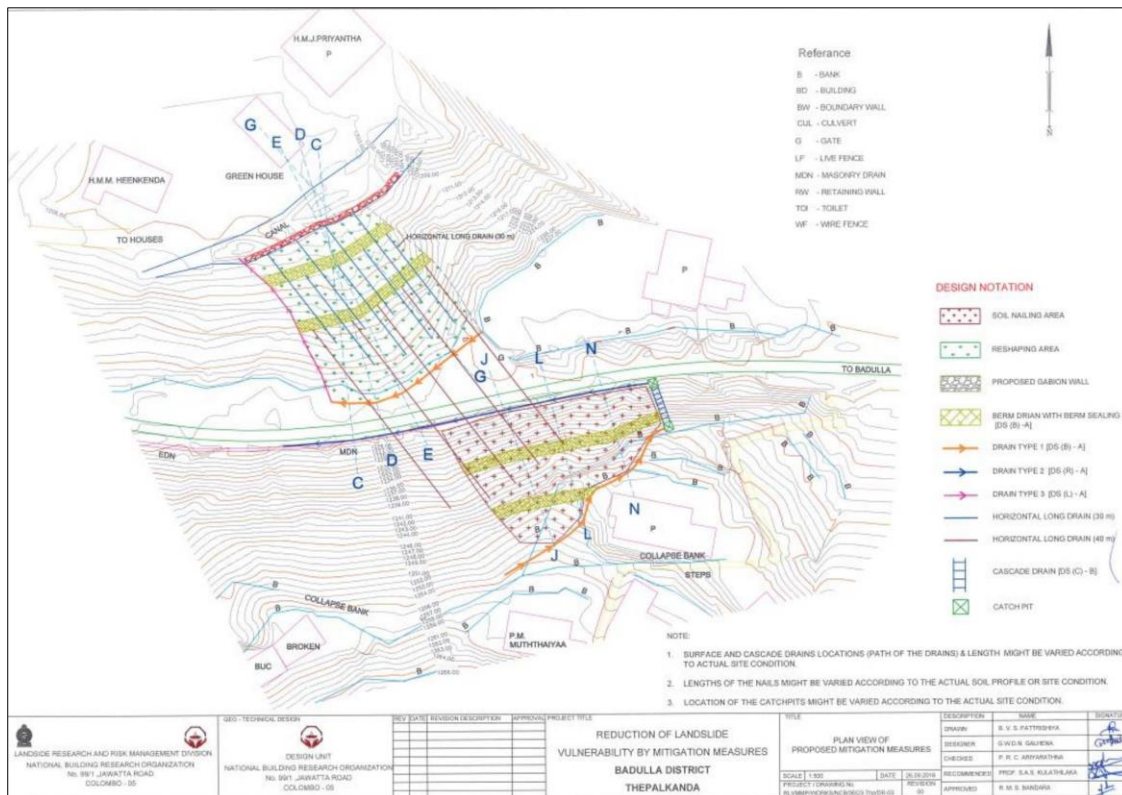


**Example 2:** Thapalkanda site in Badulla District, where the landslide is imminent to happen if without any proper mitigation measure implemented. The following figures are the drone picture of the site and the design of the mitigation measures.

**Figure A2.7:** Picture of Thapalkanda Landslide Site



**Figure A2.8:** Mitigation Designs for Thapalkanda Landslide Site





14. Examples of typical structures for landslide mitigation measures of the project.

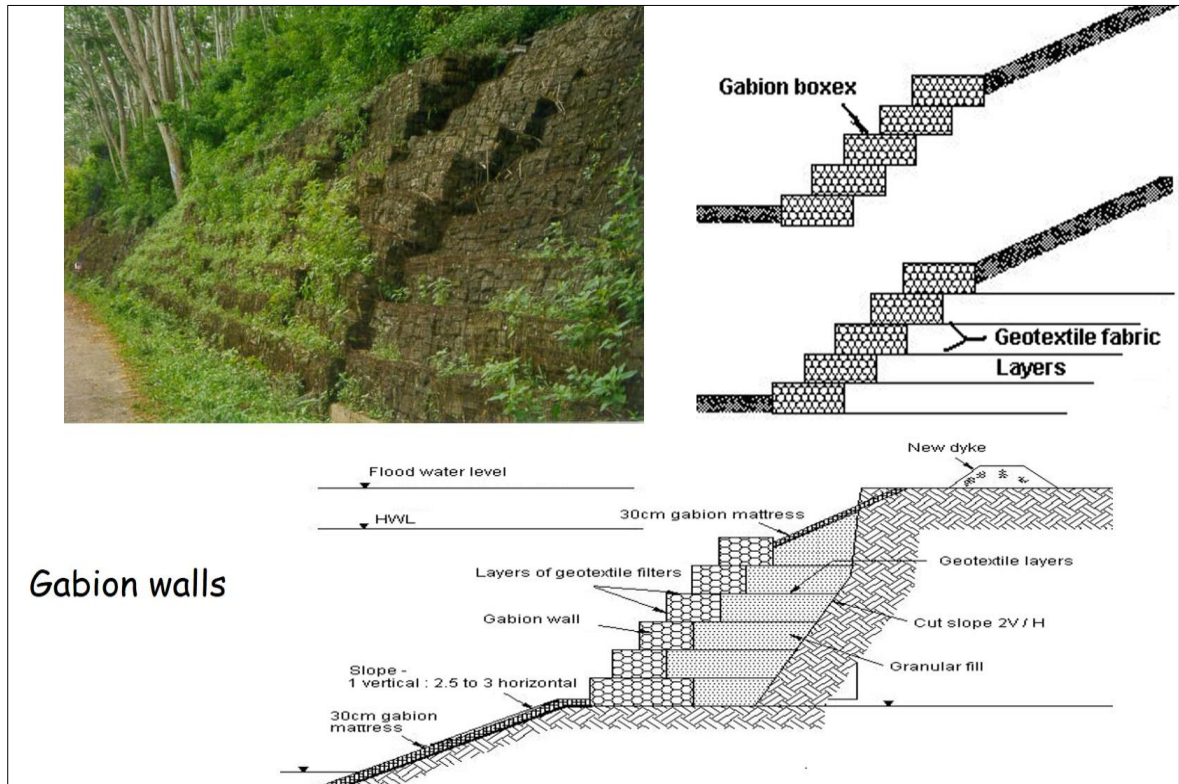
**Figure A2.9: Cement Masonry Wall**



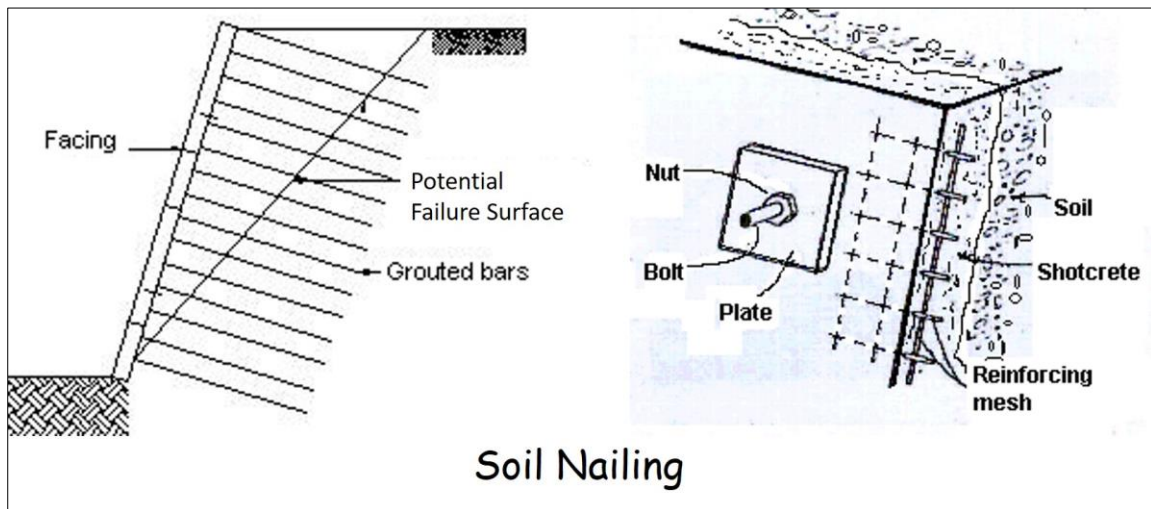
**Cement Masonry Walls**



**Figure A2.20: Gabion Wall**



**Figure A2.21: Soil Nailing**







**Figure A2.22: Surface Drainage**



## Annex 3: Economic and Financial Analysis

### Introduction

1. The investment of the project aims to reduce risk and contingent damages to infrastructure, property and human lives by landslides in Sri Lanka through implementation of physical mitigation measures based on investigation/assessment, improved planning and regulation associated with landslide management, operation and monitoring, with immediate benefits for the affected households and communities as well as medium- and long-term economic impacts from climate resilient infrastructure. This analysis aims to evaluate the economic impacts from the key project component: Component 1: Implementation of Landslide Mitigation Measures.

2. The cost-benefit analysis was conducted to calculate the EIRR of the project. The major economic benefits of the projects considered are to prevent the potential loss caused by the landslide after the mitigation measure under the project has been implemented. To be conservative and due to lack of data, the long-term economic impacts from climate resilient infrastructure and the benefit from the policy and regulation improvement are not considered under this analysis.

### Methodology and Key Assumptions

3. **Methodology.** There are 147 sites identified under the project. These sites are scattered in 10 districts. Due to the time constraint and the urgency nature of the project, it is difficult to conduct detailed review and data collection of all the sites one by one. Therefore, a sample-based approach has been adopted in the economic analysis. We have conducted detailed review and data collection for 50 sites, which cover all 10 districts and account for more than one third in terms of the site number, 30 percent of the investment cost and 31 percent of the affected population. After the detailed assessment of the economic benefits of these 50 sites, we projected the result of 147 sites through the number of affected population. Although it is a rough estimation in terms of the benefit estimation for the 147 sites, it is believed that the 50 sites sample has shown a good representativeness and it is the most cost-efficient and fit-for-purpose methodology for this specific project.

4. **Detailed review and data collection for 50 sites.** Drone survey and detail data collection have been done for the 50 sites. Drone provide a quick, safe and superior means of inspecting large scale, remote and difficult to access landforms with significant cost benefits compared to traditional inspection methods. Drone survey had been proceeded to develop Orthomosaic images, Keyhole Markup Language (kml) and Digital Surface Model (DSM) of the location. With these outputs its help to develop mosaic image, 3D model, contours and cross sections to demarcate the clear representation of the site. Simple applications of UAV involve real time or post viewing of footage and still photographs of the study area. In addition to drone survey, the social survey and data collection has been done through the site visit and various types of consultations in the field. The primary data had been collected and maintained by using online application "AppSheet," which is an app maker easier for everyone to develop custom Android and iOS apps even without any coding experience. An example of the analysis for each site are shown below.

5. **Economic Benefits and assumptions.** The key economic benefits assessed include: human lives protected; value of the infrastructures protected, such as road, railway track, buildings and other properties; cost of disaster relief services; additional cost of travelling through alternative routes; loss of commercial activities if the landslides occur; and the value of a piece of forest protected in the identified project area. It is assumed that these economic benefits will be averagely amortized in the 15 years after the completion of mitigation schemes. The benefits and costs are monetized at base year price levels, and all values estimated are net of inflation duties, and taxes. The analysis assumes that the market prices of goods and wages do not vary much from their economic value. Therefore, there is no adjustment or conversion in market prices for shadow prices.

6. **Human Lives Protected.** According to the experienced data, nine percent is assumed as the mortality rate for the people lives in these identified high-risk areas. Averaged Years Loss of Life (YLL) is estimated as 25 years and the GDP per Capita of 2017 has been applied in the calculation.

7. **Buildings Protected.** The average value of building is assumed as LKR 2.5 million per unit. It is a conservative estimation, which assume all buildings located in project area is in a same type with unique features.

8. **Benefits related to Road.** The repairing cost of the damaged roads in the proejct area has been assessed as the economic benefits. The unit cost for road repairing is sourced from Road Development Authority. The cost landslide debris clearance on the road is sourced from local authority. The average days of transport interruption caused by landslide is 10 days. Once the landslide occurs, all the traffic on the road has to take the alternative route. The analysis assessed the additional distance and additional travelling cost of taking the nearest alternative route during the transport interruption period caused by landslide.

10. **Benefits related to other Infrastructure facilities.** Majority of other infrastructure facilities along the road need to be repaired after the landslide occurs, including electricity lines, water supply pipelines and drainage facilities. The unit cost of repairing these infrastructures are sourced from the local authorities.

11. **Impacted Commercial Activities.** The number and type of business activities in the project area has been identified, including, shops, fuel stations, banks and tea factories. The loss of their income during the traffic interruption days coursed by the landslide have been assessed.

12. **Benefits related to Railway.** The repairing cost of the damaged railway tracks in the proejct area has been assessed as the economic benefits. The unit cost for railway track repairing is sourced from Sri Lanka Railway Department. The loss of tickets income during the traffic interruption period has also been assessed as the benefit of the proejct.

13. **Economic Cost.** The capital expenditure is the investment of the project Component 1, comprising the investigation and design of the project, and the civil work for the implementation of the mitigation measures. The operating expenditure is the maintenance cost every year for the landslide mitigation schemes during its life period of 15 years.

### Conclusion

14. **Cost-Benefit Analysis Result.** Based on the valuation of these identified economic costs and benefits, the analysis model has been established in spreadsheet and the result of the cost-benefit analysis is shown in Table A3.1 below.

**Table A3.1: Cost Benefit Analysis**

*Units: USD million*

Year #	Year end	Eco Costs-CAPEX	Eco Costs-OPEX	Total Eco Costs	Eco Benefit	Total Eco Benefits	Net Eco Benefits
1	31-Dec-19	15.9	0.0	15.9	0.0	0.0	(15.9)
2	31-Dec-20	22.6	0.0	22.6	0.0	0.0	(22.6)
3	31-Dec-21	22.6	0.1	22.6	7.6	7.6	(15.0)
4	31-Dec-22	22.6	0.1	22.7	15.2	15.2	(7.5)
5	31-Dec-23	9.0	0.2	9.2	22.3	22.3	13.1
6	31-Dec-24	0.0	0.2	0.2	22.3	22.3	22.1
7	31-Dec-25	0.0	0.2	0.2	22.3	22.3	22.1
8	31-Dec-26	0.0	0.2	0.2	22.3	22.3	22.1
9	31-Dec-27	0.0	0.2	0.2	22.3	22.3	22.1
10	31-Dec-28	0.0	0.2	0.2	22.3	22.3	22.1
11	31-Dec-29	0.0	0.2	0.2	22.3	22.3	22.1
12	31-Dec-30	0.0	0.2	0.2	22.3	22.3	22.1
13	31-Dec-31	0.0	0.2	0.2	22.3	22.3	22.1
14	31-Dec-32	0.0	0.2	0.2	22.3	22.3	22.1
15	31-Dec-33	0.0	0.2	0.2	22.3	22.3	22.1
16	31-Dec-34	0.0	0.2	0.2	22.3	22.3	22.1
17	31-Dec-35	0.0	0.2	0.2	22.3	22.3	22.1
18	31-Dec-36	0.0	0.1	0.1	14.7	14.7	14.6
19	31-Dec-37	0.0	0.0	0.0	7.1	7.1	7.1
<b>Total</b>		<b>93</b>	<b>2</b>	<b>95</b>	<b>334</b>	<b>334</b>	<b>239</b>

EIRR	21.7%
Discount rate	<b>10.0%</b>
ENPV	62

15. **Sensitivity Analysis.** The two most sensitive influence factors are the construction cost overrun and the prolong of the construction period. This analysis tested two extreme scenarios: (i) 20 percent increase of the construction cost and (ii) extend the construction period from four years to six years. In these scenarios, the investment would still provide the minimum EIRR of 14.5 percent, which is higher than the expected return of 10 percent.



**Table A3.2: Sensitivity Analysis (Extreme Scenario)**

*Units: USD million*

Year #	Year end	Eco Costs-CAPEX	Eco Costs-OPEX	Total Eco Costs	Eco Benefit	Total Eco Benefits	Net cash flow
1	31-Dec-19	19.1	0.0	19.1	0.0	0.0	(20.7)
2	31-Dec-20	27.1	0.0	27.1	0.0	0.0	(29.3)
3	31-Dec-21	27.1	0.1	27.1	3.0	3.0	(26.4)
4	31-Dec-22	27.1	0.1	27.2	7.6	7.6	(21.9)
5	31-Dec-23	10.8	0.2	11.0	12.1	12.1	0.2
6	31-Dec-24	0.0	0.2	0.2	16.7	16.7	16.5
7	31-Dec-25	0.0	0.2	0.2	22.3	22.3	22.1
8	31-Dec-26	0.0	0.2	0.2	22.3	22.3	22.1
9	31-Dec-27	0.0	0.2	0.2	22.3	22.3	22.1
10	31-Dec-28	0.0	0.2	0.2	22.3	22.3	22.1
11	31-Dec-29	0.0	0.2	0.2	22.3	22.3	22.1
12	31-Dec-30	0.0	0.2	0.2	22.3	22.3	22.1
13	31-Dec-31	0.0	0.2	0.2	22.3	22.3	22.1
14	31-Dec-32	0.0	0.2	0.2	22.3	22.3	22.1
15	31-Dec-33	0.0	0.2	0.2	22.3	22.3	22.1
16	31-Dec-34	0.0	0.2	0.2	22.3	22.3	22.1
17	31-Dec-35	0.0	0.2	0.2	22.3	22.3	22.1
18	31-Dec-36	0.0	0.1	0.1	19.3	19.3	19.2
19	31-Dec-37	0.0	0.0	0.0	14.7	14.7	14.7
20	31-Dec-38	0.0	0.0	0.0	14.7	14.7	14.7
21	31-Dec-39	0.0	0.0	0.0	14.7	14.7	14.7
<b>Total</b>		<b>111</b>	<b>2</b>	<b>114</b>	<b>348</b>	<b>348</b>	<b>225</b>

EIRR (FCF)	14.5%
<b>Discount rate</b>	<b>10.0%</b>
ENPV	33

**16. Financial Analysis.** This is a disaster management project and no direct financial revenue are expected to be generated of the project. The financial analysis focuses on the affordability of the operating and maintenance cost after the project is completed. Due to the specific feature of the proejct, the required maintenance cost per year for landslide mitigation scheme is little (averagely around USD1,023 per site per year), which is affordable to the responsible local authorities, physically and fanatically. In addition, NBRO will continuously monitor and provide necessary support through its district offices to ensure the sustainability of these infrastructure schemes.

**17. Conclusions.** Based on the assumptions and estimations above and economic modelling formulated, the EIRR is around 21.7 percent, which shows that the proposed investments are economic viable. Sensitivity analysis has been carried out and proves that the investments are robust economically. The analysis also assessed that the invested infrastructure is financially sustainable.

## Attachment 3.1 to Annex 3: Key Assumptions and Calculations

<b>Assumptions for Economic Benefit (Unit Price):</b>	Unit	Cost
<b>Human Lives:</b>		
1. GDP per Capita (2017)	USD	4,162.600
1. Average Years loss of life	year	25.000
<b>Probability of mortality of affected people by Landslide</b>	%	9
<b>Buildings:</b>		
2. Cost of the Buildings in dangerous	LKR per unit	2,500,000.000
<b>Probability of buildings to be damaged by Landslide</b>	%	80
<b>Roads:</b>		
3. Vehicle fuel efficiency	km per liter	10.000
4. Fuel rate	LKR per liter	150.000
5. A Class Road (15 meter wide)	Vehicles per day	30,000.000
6. B Class Road (10 meter wide)	Vehicles per day	30,000.000
7. C&D Class Road (3 meter wide)	Vehicles per day	1,000.000
8. Average No. of days to clear the debris on road (once Landslide occurs)	Days	10.000
9. Cost of debris clearance on the Road/Railway	LKR per sq. m	1,200.000
10. Cost of Road repairing (carpet)	LKR per sq. m	15,000.000
11. Cost of Road repairing (tar)	LKR per sq. m	2,000.000
<b>Probability of road repairing</b>	%	80
<b>Other Infrastructure (electricity, water supply and drainage):</b>		
13. Replacement cost of electricity line damaged by landslide	LKR per m	10,000.000
14. Replacement cost of Water supply infrastructure damaged by landslide	LKR per m	3,000.000
15. Replacement cost of drainage line infrastructure damaged by landslide	LKR per m	7,000.000
<b>Probability of replacement of other infrastructure</b>	%	80
<b>Impacted Commercial Activities:</b>		
17. No. of days of service disturbed by landslides	Days	15.000
18. Average loss of business income per day-Bank	LKR per day	250,000.000
19. Average loss of business income per day-Fuel Station	LKR per day	105,840.000
20. Average loss of business income per day-Tea Factory	LKR per day	33,333.330
21. Average loss of business income per day-Other Commercials	LKR per day	200,000.000
<b>Railway:</b>		
22. Cost of Repairing/Reconstruction of damaged Railway track	LKR per m	480,000.000
<b>Probability of railway repairing/reconstruction</b>	%	80
23. Ticket Price (Colombo-Kandy line)	LKR per passenger	500.000
24. Ticket Price (Colombo Nanuoya, Elle, Badulla line)	LKR per passenger	1,250.000
25. Average No. of passengers travel on the railway line per day	Passenger per day	1,000.000
26. Average No. of days to clear the debris on railway (once Landslide occurs)	Days	10.000
27. Railway Station replacement cost (once Landslide occurs)	LKR per Station	20,000,000.000
<b>Nature-Forest:</b>		



Value of the Forest

LKR per ha

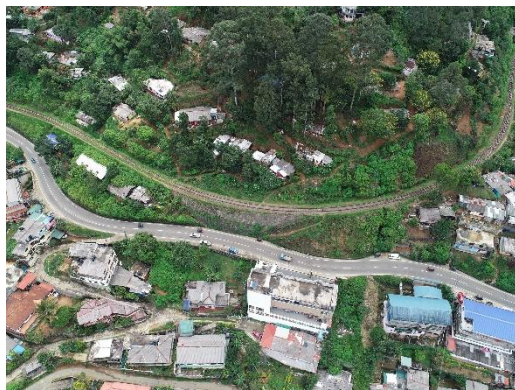
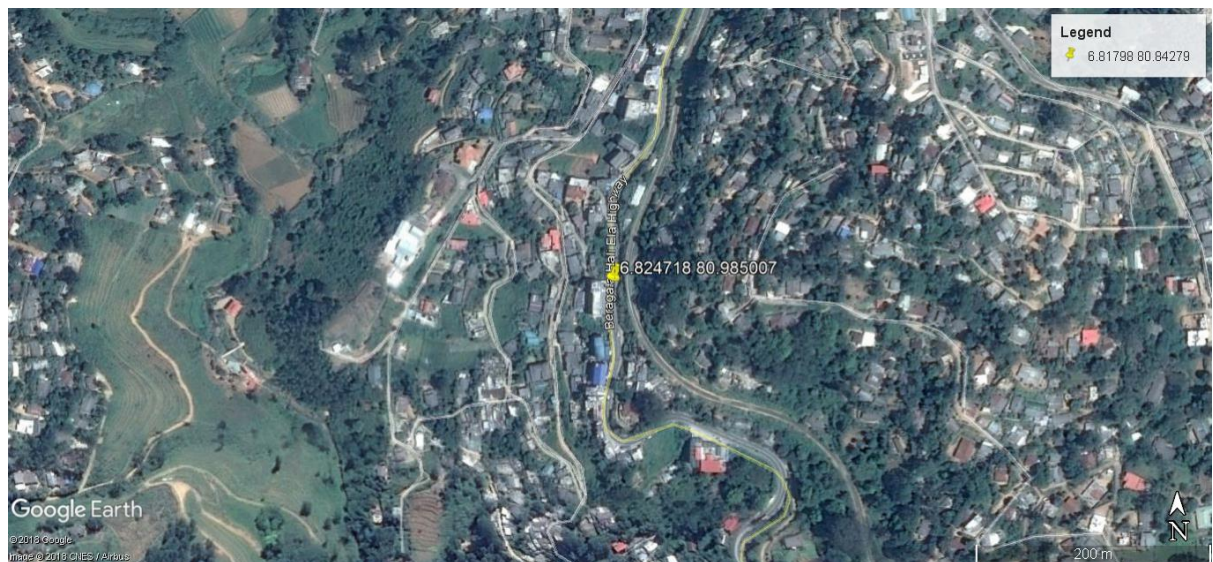
1,000,000.00

<b>Calculation of Economic Benefit for 50 sites:</b>	<u>Unit</u>	<u>Quantity</u>	<u>Amount (LKR)</u>
<b>Human Lives:</b>			
- No. of people affected	No.	4633	
1. Value of Human Lives protected			7,315,888,342.23
<b>Buildings:</b>			
2. Value of the Buildings protected	No.	779	1,558,000,000.00
<b>Lands of affected area:</b>			
- Area of land affected	perch	77,566	
3. Value of land after the mitigation measure implemented			3,412,965,200.00
<b>Roads:</b>			
- Additional Distance to pass by the alternative routes	km	684	
3. Additional cost of traveling by alternative routes			3,892,500,000.00
- Area of roads to be affected by landslides	sq. m	60,765	
- Area of roads (carpet) to be affected by landslides	sq. m	53,525	
- Area of roads (tar) to be affected by landslides	sq. m	7,240	
4. Cost of debris clearance on the Road			72,918,000.00
5. Cost of Road repairing			653,884,000.00
<b>Other Infrastructure (electricity, water supply and drainage):</b>			
- length of the electricity line affected	m	6,625	
6. Replacement cost of electricity line damaged by landslide			53,000,000.00
- length of the water supply pipeline affected	m	4,585	
7. Replacement cost of Water supply infrastructure damaged by landslide			11,004,000.00
- length of the drainage line affected	m	2,485	
8. Replacement cost of drainage line infrastructure damaged by landslide			13,916,000.00
<b>Impacted Commercial Activities:</b>			
- No. of days disturbance	no.	15	
Average loss of Commercial Activities			19,587,599.95
<b>Railway:</b>			
- Area of railway to be affected by landslides	sq. m	11,850	
9. Cost of debris clearance on the railway			14,220,000.00
- length of the railway track affected	m	790	
10. Repairing/Reconstruction of damaged Railway track			303,360,000.00
11. Loss of the rail ticket due to the landslide disturbance			85,000,000.00
<b>Nature-Forest:</b>			
- Area of Forest protected	ha	1.01	
Value of the Forest			1,010,000.00
<b>Total Eco Benefits for 50 sites</b>	<b>LKR</b>		<b>17,407,253,142.18</b>

### Attachment 3.2 to Annex 3: Example of a detailed survey of Site No. 145.

#### Location

Province : Uva  
District : Badulla  
DSD : Bandarawela  
GND : Inikambedda  
Village/Location : Between Diyawannawa and Demodara 9156/54 - 160/36)  
Site ID : 145  
GPS Coordinates (Lat/Lon) : 6.824718 80.985007



#### Observations

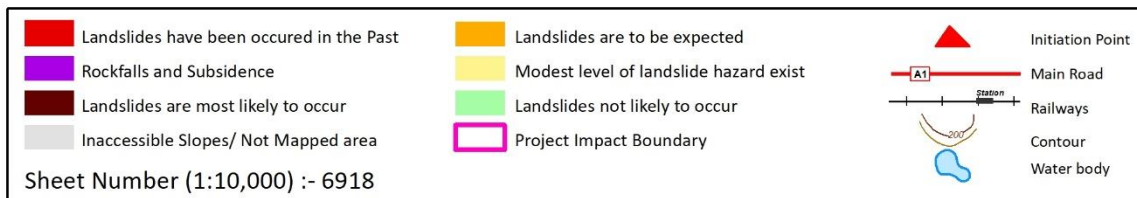
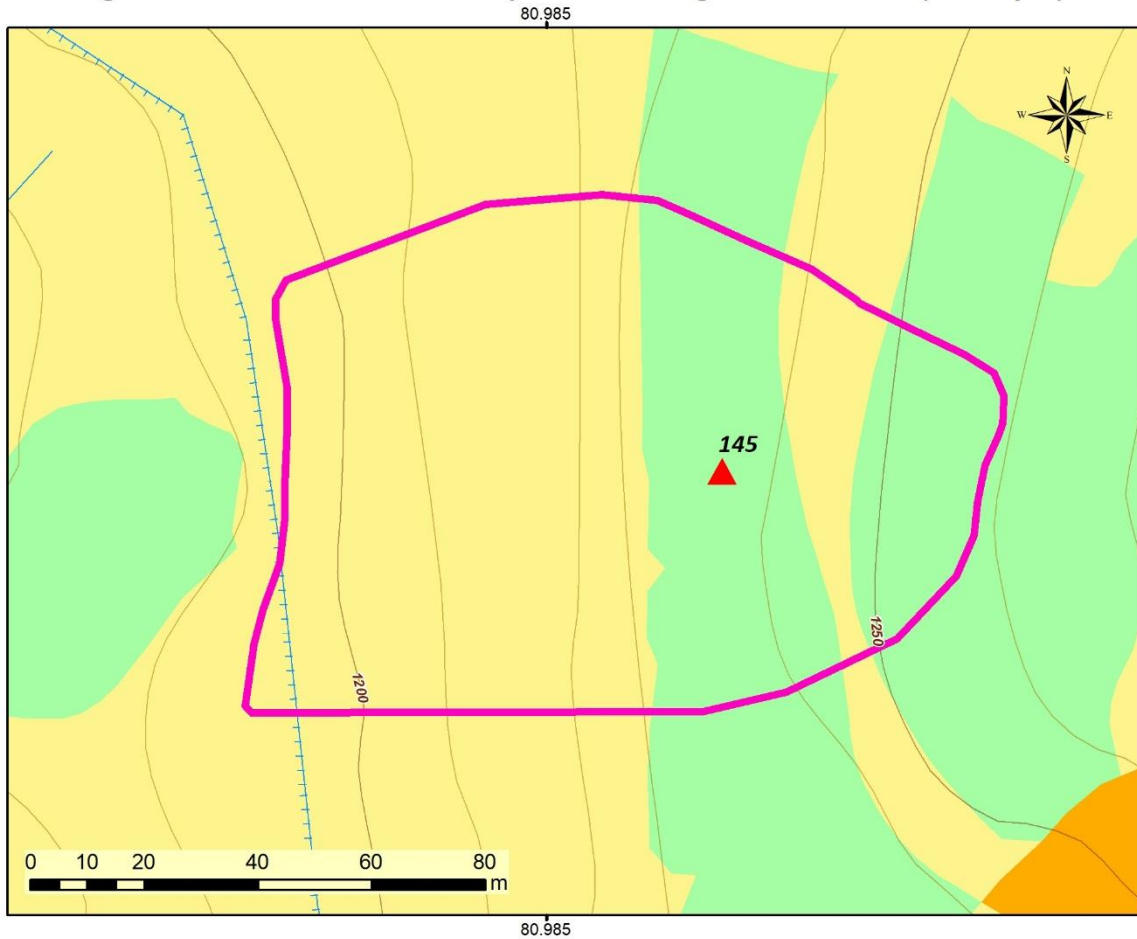
- Height of the failure is around 8m and the length is about 20m
- Location is in an urban area

#### Major Issues

- Damage to Bandarawela-Colombo road
- Damage to the railway track

#### Landslide Mitigation Location Overlay on Landslide Hazard Map

**Integrated Landslide Hazard Zonation Map - Landslide Mitigation Site No 145 (AIIB Project)**

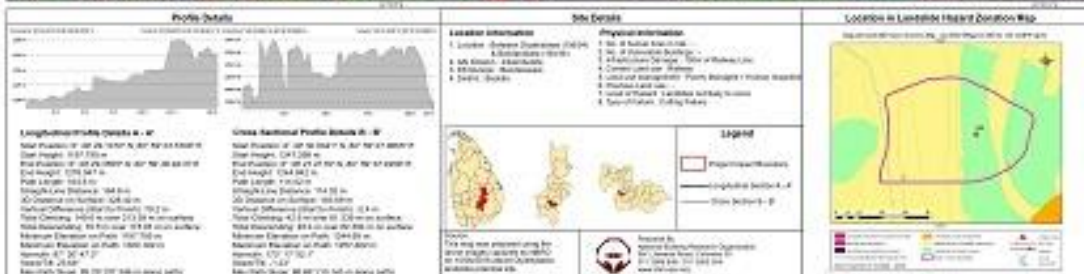


**Proposed Mitigation Plans**

- Retaining wall
- Surface and subsurface drainage control
- Soil nailing (if necessary)



Landslide Mitigation Site No - 145 - Badulla Bandarawela - Diyathalawa - Bandarawela Road (AIIB Project)



## Annex 4: Project Delivery Strategy

### A. Strategic Assessment

1. This project delivery strategy (PDS) relates to the procurement of works, goods and selection of consultants for Reduction of Landslide Vulnerability by Mitigation Measures Project (the Project). Procurement will be conducted in accordance with the requirements of the AIIB's/ Government of Sri Lanka's policies for both Procurement and Prohibitive Practices.

2. The main objective of the Project is to reduce risk and damage from landslides in Sri Lanka through implementation of physical mitigation measures based on investigation/assessment and improvement of planning, regulation and instruments associated with landslide management. The tentative estimated value of the activities under the Project is around USD110 million, of which AIIB will finance approximately 73 percent of total estimated value. Preconstruction activities carried out by NBRO, tax and duties will be solely financed by GoSL.

3. The project outcomes are:

**Component 1: Civil Works and associated designs and construction supervision/management activities, at an estimated cost of USD97 million.**

Landslide mitigation works for total 147 sites total rough cost is estimated at USD97 million. Twenty-seven sites have been identified as at critical stage requiring urgent mitigation action (phase I) and 120 sites are identified as requiring protection works (phase II). These sites include 10 sites that were prioritized by the RDA and 20 spots has identified along the railway from Rambukkana to Badulla.

This component will sustain the infrastructure by stabilizing the slopes in high risk areas especially in Badulla, Kandy, Matale, Kegalla, Ratnapura, Nuwara Eliya, Kalutara, Colombo, Galle, Matara, Hambantota and Kurunegala districts. Mitigation of landslides will directly reduce the national expenditure on repair and reconstruction of damaged buildings and infrastructure facilities, resettlement, and expenditure on disaster relief services and emergency operation services. Therefore, mitigation of these 147 sites may directly results in positive impacts on the national economy as well as help the government in creating a disaster-resilient built environment.

For civil works contracts, 27 critical sites will be packaged to four contracts and 120 sites will also be packaged to four contracts.

The selection of one Consultant for construction supervision for critical 27 sites in Phase 1 and selection of four consultants for construction supervision for phase 11 will be procured based on the quality-and-cost based selection (QCBS 80:20) through International Open Competitive Selection (IOCS)/ National Competitive Selection (NCS).

The National Building Research Organization, Implementing Agency and Engineer of this Project will undertake the preconstruction activities, including Investigation, Surveying, Design works and Procurement of this component.

**Component 2: Enhancement of Policy, Standards and Institutional Capacity, at an estimated cost of USD3 million.**

- i. Review of relevant policies, laws, institutional arrangement and existing mandatory provisions, and the development of policy recommendations to strengthen the regulatory mechanisms and enhance inter-agency coordination for Landslide Risk Management, at an estimated cost of USD1.5 million.
- ii. Standardization of mechanisms for the assessment of landslide risk, building permits and development control, the preparation of engineering design standards and recommendations for appropriate policies and standards for environmental and social safeguards, including landslide-induced resettlement, at an estimated cost of USD0.5 million.
- iii. Enhancement of knowledge and capacity building for the Implementing Agency, including training and overseas studies and the development of a landslide data management system, at an estimated cost of USD1.0 million.

**The consulting services would be procured to achieve above objectives.**

**Component 3: Provision of Essential Facilities and Laboratory Equipment, at an estimated cost of USD2.5 million.**

**This component is expected to enhance technical instrumentality in the sustainable continuation of the landslide mitigation works in National Building Research Organisation (NBRO). Goods procurement for essential laboratorial equipment and other field equipment would be conducted.**

- i. Laboratory equipment, at an estimated cost of USD1.0 million.
- ii. Field equipment and facilities for investigation and monitoring, at an estimated cost of USD1.5 million

**Component 4 - Technical Support and Project Management, at an estimated cost of USD4.5 million.**

This component is to support the project management cost and technical reviews.

- i. Project management and operating costs, at an estimated cost of USD2.4 million;
- ii. Project monitoring support, comprising the development of web-based program; technical/financial reviews/ audits by a third independent party/institution; and project monitoring and evaluation, at an estimated cost of USD2.1 million.

## Project Cost

Items	Cost Amount	Financing Sources			
		AIB		GoSL	
Component 1: Implementation of Mitigation Measures	97.0	70.5	73%	26.5	27%
Component 2: Enhancement of Policy, Standards and Institutional Capacity	3.0	2.4	80%	0.6	20%
Component 3: Provision of Essential Facilities and Equipment	2.5	2.0	80%	0.5	20%
Component 4: Technical support and Project Management	4.5	2.1	47%	2.4	53%
<b>Project Cost (Including Taxes):</b>	<b>107.0</b>	<b>77.0</b>	<b>72%</b>	<b>30.0</b>	<b>28%</b>
Capitalized Front-end Fee, Commitment Fees and IDC:	<b>3.0</b>	<b>3.0</b>			
<b>Total:</b>	<b>110.0</b>	<b>80.0</b>	<b>73%</b>	<b>30.0</b>	<b>27%</b>

4. A detailed statement of requirements is contained in [Table 1 of this PDS](#).

5. The details of the current procurement and project implementation arrangements are as follows:

1). Current procurement arrangement: the procurement plan for Phase I and Phase 2 has been agreed by AIB in which eight works contracts and five consultant contracts have been indicated, the procurement will be started within 2018.

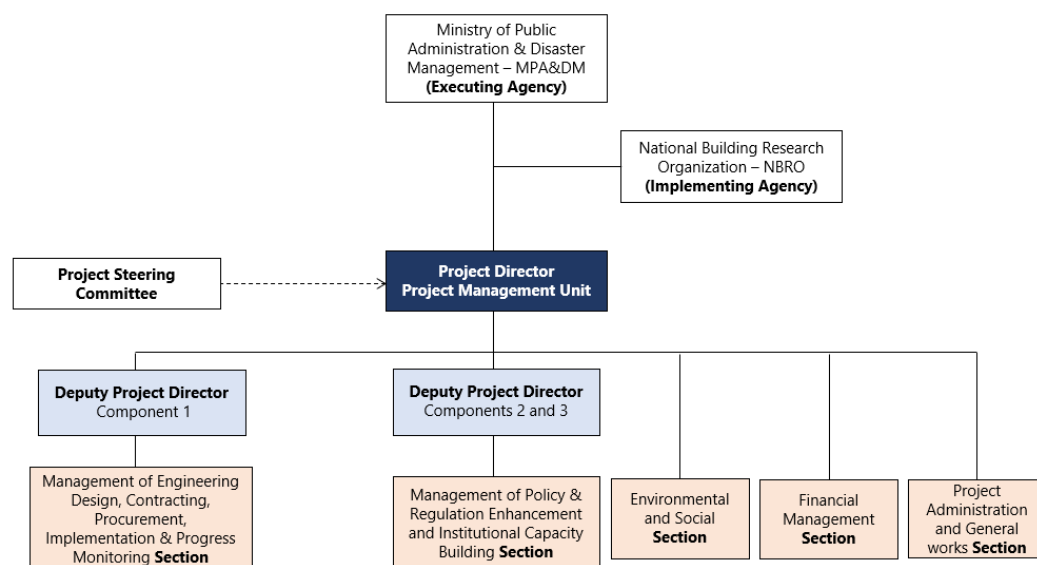
2). Implementation arrangement are as follows:

- a) Ministry of Public Administration and Disaster Management (MPA&DM.) will be the executing agency of the Project having overall responsibility for the implementation of project components.
- b) The Project will be managed by Project Management Unit (PMU) established under the MPA and DM.
- c) NBRO will be both Implementing Agency and the Engineer to the project and Consultancy Firms (05 Nos) will support the Engineer to supervise the activities of Component 1 of this project. Overall project activities will be coordinated and managed by the PMU.
- d) Consultancy Firms/ Individual Consultants will support PMU to implement the component 2. Technical Support individual consultants will be contracted to provide support to the PMU, for carrying out tasks including but not limited to Geotechnical Designs, Quantity Surveying and finance, as necessary.
- e) Advance Contracting and Retroactive Financing: All retroactive financing will be undertaken in conformity with clause 8.2 of AIB's Interim Operational Directive on Procurement Instructions for Recipients (June 2016).
- f) Project Implementation Organizations and Roles and Responsibilities

<b>Organization</b>	<b>Roles and Responsibilities</b>
MPA &DM (Executing Agency)	Guides and supports the overall project implementation; (Secretary) chairs the Project Steering Committee; makes key policy level decisions to facilitate project implementation; ensures adequate counterpart funding; liaise with Ministry of Finance and other ministries on matters under their jurisdictions; confirms reform plans and subprojects.
Project Steering Committee (PSC)	(chair: Secretary- MPA&DM; members: Director General of NBRO, Project Director- RLVMMMP, Senior representative nominated by Secretary to the External Resources Department, National Planning Department and any other relevant departments from MoF; Senior representatives of the Stake Holders - Road Development Authority, Ministry of Education, Provincial Ministry of Education, Railway Department and Local Authorities. The Project Steering Committee (PSC) will oversee the activities of PMU and will be the final decision-making body regards to policy and overall project implementation issues. It will also provide guidance on setting project priorities and approve the work plans and budgets of project works.
National Building Research Organisation (NBRO) (Implementing Agency)	National Building Research Organisation (NBRO) will be the Implementing Agency of the Project having overall responsibility for the implementation of project components; Oversee of Project Implementation and act as the “Engineer” for Landslide mitigation works.
Project Management Unit	Coordinates and manages overall project implementation and activities; Oversee of Contract administration, management and Quality control & Quality Check ;Provide technical assistance, in terms of guidance, review and appraisal of work pertained; Planning, coordination, budgeting, reporting and monitoring; All procurement actions and project delivery strategy planning and implementation; Ensuring timely delivery of all contractual obligations; Interim, mid-term and project completion reporting; Budget control/Cost Control; Logistical support; All internal and external communication, Creation of visual identity for the Project-management Information System; Also conduct the periodic field visit, review the direct progress being made within the project, give feedback and suitable recommendations; Serves as point of contact with AIIB; Selection of consultants; reviews documents submitted by Engineer/Engineer’s Representative/Consultants to ensure they are in order.
Asian Infrastructure Investment Bank (AIIB)	Supervises the overall project implementation; Reviews procurement and disbursement documents and acts accordingly; Undertakes project review.



## Project implementation Structure



### g) Project Readiness Activities

Project readiness activities are undertaken by the NBRO with the assistance of MPA&DM. Accordingly, selection of landslide sites, investigation, designing of mitigation measures, procurement will be done by the NBRO for critical 147 sites. Further, Project Management Unit will be established and required core staff will be recruited.

Item	Activity	Responsibility
1	Selection of 147 sites	NBRO
2	Investigation, Designing and Procurement of 147 sites	NBRO
3	Obtaining necessary approval from the Cabinet and other relevant Departments for establishment of PMU	NBRO, MPA &DM
4	Establishment of PMU and assignment of core staff for PMU	NBRO, MPA &DM
5	Appointment of required Committees (Procurement Committees and Technical Evaluation Committees) for procurement process.	NBRO, MPA &DM
6	Selection of Consultants for phase 1 and phase 2 of this project.	NBRO, MPA &DM, AIIB
7	Loan signing	ERD, MFMM,, AIIB

### 6 Staffing.

The PMU will be adequately resourced with professional staff that has suitable previous experience of procurement under GOSL and foreign funded projects.

Proposed Project Staff for Project Management Unit

Item	Position	Proposed Numbers			
		2018	2019	2020	2021
1	Project Director	1	1	1	1
2	Deputy Project Director	-	2	2	2
3	Finance Manager	1	1	1	1
4	Project Coordinator	-	1	1	1
5	Procurement Specialist/Snr Contract Engineer	1	1	1	1
6	Snr Geotechnical Engineer	1	2	2	2
7	Snr Geologist	1	2	2	2
8	Manager-Environmental & Social	1	1	1	1
9	Snr Environmentalist	1	1	1	1
10	Snr Sociologist	1	1	1	1
11	Snr. Land Administrative Officer	1	1	1	1
12	QA/QC Engineer	-	1	1	1
13	Geotechnical Engineer	-	2	2	2
14	Procurement/Project Engineer	1	4	4	4
15	Quantity Surveyor	2	2	2	2
16	Geologists	1	1	1	1
17	Project Accountant	1	1	1	1
18	Administrative Officer	-	1	1	1
19	IT Specialist	1	1	1	1
20	Internal Auditor	-	1	1	1
21	Environmental Officer	1	1	1	1
22	Sociologist	1	1	1	1
23	Land Administrative Assistants	-	4	-	
24	Administrative Assistant	1	1	1	1
25	Project Secretary	1	1	1	1
	<b>Total Key Staff</b>	<b>19</b>	<b>36</b>	<b>32</b>	<b>32</b>
26	Account Clerks	-	2	2	2
27	Management Assistant	2	4	4	4
28	Office Assistant	2	4	4	4
29	Driver	2	6	6	6
30	Labour		1	1	1
	<b>Total Staff</b>	<b>25</b>	<b>53</b>	<b>49</b>	<b>49</b>

\*In addition to above, individual consultants will be recruited to PMU when necessary.

**7** Potential project risks:

- a) Procurement failure, or delay, due to non-compliance with the required tendering procedures, such as unfair tender evaluation, E & S issues and no effective contract management.
- b) Poor market response to invitation to tenders in terms of price and quality of firms.
- c) Procurement process strives to avoid prohibited practices, waste and abuse of public resources.

## **B. Timelines**

Procurement activities during the project readiness period will take place until March 31, 2019.

The balance tendering activities under the Project will take place during 14 months period between April 1, 2019 and May 31, 2020. The contracts implementation will need additional 25 months period until June 30, 2022 (including the defect liability period).

## **C. Operational Factors Affecting Procurement**

As the Procurement arrangements are generally time-sensitive hence it is required to strive to avoid delays. Procurement related issues, complaints and promptly respond to any concerns during the procurement process will be resolved; All the procurement actions are done following AIB and GOSL procurement guidelines and starting from publishing the Tender notice to awarding the Tender is done precisely through predefined methodology and systematic approach.

The procurement process is open, fair, and nondiscriminatory and provides equitable opportunity and treatment for Tenderers and consultants in their submission of tenders and proposals. The procurement process is aligned with principles of good governance.

The procurement process enables the PMU to obtain optimal benefits with the resources utilized. This may include not only the initial costs, but also costs over the economic life of the procured item, the quality of the output, fitness-for-purpose, timeliness, and the achievement of other socio-economic and environmental development objectives of the Project.

Transparency through appropriate review of the procurement activities will be maintained, supported by appropriate documentation. Relevant procurement information would be made publicly available to all interested parties in a consistent and timely manner, through readily accessible and widely available sources. All the registered Tenderers / participants have access to the information published time to time including status of their technical and financial proposals. Reporting and appraisal of all appropriate procurement activities. Use of confidentiality provisions in contracts in justified areas.

It is required to ensure that all the parties involved in the procurement process (Tenderers, Consultants, Contractors and Suppliers, any sub-Contractors, sub-Consultants, service providers or suppliers, any agents, and any of their personnel) observe the highest standard of ethics during the procurement process.

Issues relating to delays in the procurement process has occurred under previous GOSL and WB financed projects, such as too many review and approval layers; Environmental & Social issues; lacking of enough human resources to conduct supervising and monitoring, etc. The Implementing Agency will apply suitable mitigation measures based on the lessons learnt from these projects (see F. Risk Mitigation).

## **D. Supply Market Analysis**

There is only a limited number of local contractors (around 5 to 6) capable of stabilization of landslides using soil nailing in the country. Required past experiences and financial capability of bidders depends on the size of the contract and the technology to be applied. In Sri Lanka, few local contractors are available to undertake financial limit up to LKR 400M for specialized works of Soil nailing and many civil works contractors except soil nailing works are available to undertake different financial limits (up to LKR 3000M and above).

However, landslide mitigation includes other civil works also such as construction of surface drains, retaining walls, gabion walls, subsurface drains etc. and many of civil works contractors in the country have enough past experiences. Major Contractors are multi-disciplinary construction giants who do highways, main roads, bridges, water supply and sewerage, irrigation, mega buildings, civil works in various projects. These companies can involve for landslide mitigation works except soil nailing and stabilization of rock falling. Therefore, joint ventures can be created between the large companies and small specialized companies by enabling smaller companies to deliver large projects by combining their landslide expertise and resources.

Sri Lanka has registration and grading process for local contractors to determine their general ability to undertake different types and sizes of projects. Registration and grading will be determined by evaluating a contractor mainly on his financial capability, the technical ability with staff and plant and machinery, and the experience gained in relevant fields. At present, the civil contractors have been classified under 11 grades (not apply to foreign tenderers).

If any special technology has to be applied for mitigation of landslides (Ex: protection of rock falling), it requires the project to be contracted to a single contractor who is responsible for design, procurement, and construction (design & build). Accordingly, suitable contractors shall be selected through IOCT or NCT depending on size and nature of the works.

The supplies are available both nationally and internationally for the equipment and goods to be procured under component 1, component 3 and component 4 of the project.

A team of local and international consultants will be engaged to provide services under component 1 and 2. Individual Consultants and Constancy firms shall be selected based on the nature of services by following approved guidelines by AIIB. National and international consultants are available to undertake the required services for each component.

Project will engage the consultants through firms using mainly the quality and cost based selection method applying a quality cost ratio depending on the nature of the assignment. Other selection methods shall also be considered according to the availability of market and nature of service.

## **E. Key Stakeholders**

The key procurement stakeholders under the project are:

**NBRO:** Responsible for overall project planning and implementation including procurement of works, services and goods/equipment's under component 1,2 and 3.

**Ministry of Public Administration & Disaster Management of Government of Sri Lanka (GOSL):** Responsible for overseeing project implementation.

**Ministry of Finance and Mass Media of GOSL:** Responsible for preparing Loan Agreement and authorizing disbursements under the loan. Responsible for local funding component and approval for carder position of the project.

**AIIB:** Responsible for loan disbursement and carrying out the fiduciary oversight of procurement activities under the project. Primary line of communication will be with NBRO  
**Contractors/Suppliers/Consultants:** Responsible for contractual delivery.

**Road Development Authority, Ministry of Education, Provincial Ministry of Education, Railway Department and Local Authorities:** NBRO will implement the project coordinating

and linking with these stakeholder government agencies. These agencies shall responsible clearance for Land acquisition during implementation of the project.

## **F. Risk Mitigation**

Proposed procurement risk mitigation measures to be employed by the PMU during project implementation are as follows:

- i. Design the procurement packages in a manner that will both reduce the number of packages to be tendered and increase the size of a package without compromising competitiveness. This will enhance the ability to undertake adequate due diligence and control by both the implementing agencies and the AIIB.
- ii. Inclusion in the tender evaluation committees of a suitably qualified procurement expert and/or a technical expert.
- iii. The PMU will prepare, in agreement with AIIB, detailed terms of reference of the tender evaluation committees including a time bound action plan to ensure strict confidentiality of the tender evaluation process, and timely completion of the evaluation.
- iv. The Complaint Handling system in NBRO will be strengthened.
- v. The tender evaluation is to be conducted in a suitable separate location to that of the office of the PMU to ensure minimal interruption and leakage of information. The AIIB's debarment list will be followed by PMU.
- vi. Nomination of a procurement focal person in the PMU to help on day-to-day procurement follow-up and preparation of periodic procurement reporting.
- vii. Records and documents regarding procurement (including correspondences with the potential Tenderers as well as complaints/clarification requests) to be preserved to facilitate smooth procurement audit or post-review.
- viii. Contract award information disclosed on the NBRO, MPA&DM and PMU's websites within two weeks of contract award.

## **G. Recommended Procurement Approach**

All contracts listed in Table 1 will be procured in accordance with the requirements of the AIIB's Procurement Policy and Procurement Instructions for Recipients. The procurement approach is described in below **is considered to fulfil the value for money and fit for purposes for the project**, the table attached with this section is the summarized information of the section:

### *Procurement Methods:*

1). Except as AIIB may otherwise agree, goods and works shall be procured on the basis of following procurement methods: i) International Open Competitive Tender (IOCT), ii) National Competitive Tender (NCT), iii) Request for Quotations (RfQ), iv) Direct Contracting (only under exceptional circumstances). Procurement under NCT as agreed with the AIIB will be carried out **in accordance with national regulations including Procurement Manual & Procurement guidelines 2006 goods and works published by National Procurement Agency, Sri Lanka**. The Conditions for use of such procedures will be stipulated in the procurement plan (PP).

2). The selection of the Consultants will be mainly procured based on the quality-and-cost based selection through International Open Competitive Selection and /or National Competitive Selection. Quality Based Selection (QBS), Selection under a Fixed Budget (FBS), Least Cost Selection (LCS), Selection Based on Consultant's Qualification (CQS), Single Source Selection (SSS) would also be used. The Conditions for use of such procedures

will be stipulated in the procurement plan (PP). The procurement operations, as agreed with AIIB, will be carried out in accordance with National Regulations, including Consulting Services Manual and Guideline for Selection and Employment of Consultants, August 2007.

*Procurement Plan (PP):*

A Procurement Plan (PP) has been prepared (refer to section H of the PDS). The PP was reviewed by AIIB during appraisal. It will be updated annually or as required to reflect implementation needs and improvements in institutional capacity.

*Procurement Review:*

Prior review of AIIB should be (i) the first contract for works and goods under IOCT, NCT; (ii) the first consulting service contract under QCBS, QBS. The other contracts shall be subject for AIIB's post review.

*Procurement documents:*

Use of appropriate WB 'Standard Bidding Documents' (SBDs) and suitably amended to reflect the requirements of the AIIB's Procurement Policy and Prohibitive Practices Policy. For all contracts under Component 1 the newest version of WB's Standard Procurement Document (SPD) for Works shall be used. For procurement of Goods under NCT, Standard Tender Documents National NPA/Goods/SBD 1 of Government of Sri Lanka shall be used. The AIIB's standard REOI, RFP and the template of evaluation report will be applied for consulting services procurement.

*Contract Management*

A plan for contract administration and supervision will also be developed by the PMU with support from AIIB. The contract supervision consulting firms will be hired to support NBRO for strengthening the contracts management.

## H. Procurement Plan

The procurement plan for the Project indicating method, review procedure, and tender invitation date is provided below. The choice of appropriate procurement method for each contract is related to the nature, size, complexity, likely impact of the assignment, technical and financial consideration, particularly the objective and scope of the contract. **Detail Procurement plan is given in Annex- 1 (PP-Version 20190120)**

Table 1: Packages to be financed under AIIB Financing

### A) CIVIL WORKS

Item	Civil Works- Phase 1									
	Package No.	General Description	Unit	Quantity	Tentative Estimated Value	Fund Source	Method	Prior Review	Tender Invitation	Date of Awarding
					(USD Mn)					
1	RLVMMP/WO RKS/01	Land slide Mitigation Works in between Culvert No.26/8& 26/10 in Thiriwanaketiya - Agalawatta Road(Pabotuwa), in between Culvert No. 105/3 & 105/4(Katandola) in Rathnapura-Palmadulla Road, at ch +11 km (Durrekkanda ) & at ch +12 km (Galabada) in Rathnapura-Wewalwatta Road in Rathnapura District.	No	1	2.6	AIIB-75% and GOSL-25%	NCB	YES	January 25, 2019	May 30, 2019
2	RLVMMP/WO RKS/02	Landslide Mitigation Works at Rathnapua and Kalutara Districts.	No	1	2.9	AIIB-75% and GOSL-25%	NCB		January 25, 2019	May 30, 2019

3	RLVMMP/WO RKS/03	Landslide Mitigation Works at i) Semidel gowipala kanda at Akurassa,ii) Galle-Madampe road at 57/4 culvert at Pitabeddara iii) Galle – Deniyaya – Madampe Road at 77+ 050 - 77+450 at Kotapola in Matara District.	No	1	1.9	AIIB- 75% and GOSL- 25%	NCB		January 25, 2019	May 30, 2019
4	RLVMMP/WO RKS/04	Landslide Mitigation Works at Kegall, Kurunagala,Colombo,Kandy and Badulla Diastriacts.	No	1	9.8	AIIB- 75% and GOSL- 25%	IOCT	YES	February 14, 2019	June 10, 2019

**17.2**

Item	Civil Works- Phase 2									
	Package No.	General Description	Unit	Quantity	Tentative Estimated Value	Fund Source	Method	Prior Review	Tender Invitation	Date of Awarding
					(USD Mn)					
10	RLVMMP/W ORKS/05	Landslie Mitigation Works in Kandy, Kegalle,Matale,Kurunagal a Districts.	No	1	14.8	AIIB- 75% and GOSL- 25%	IOCT	YES	October 3, 2019	February 20, 2020
11	RLVMMP/W ORKS/06	Landslide mitigation works in Nuwaraeliya,Rathnapura,K egalle & Badulla Districts	No	1	27.1	AIIB- 75% and GOSL- 25%	IOCT		December 31, 2019	May 19, 2020
12	RLVMMP/W ORKS/07	Landslie Mitigation Works in Rathnapura,Kalutara, and Matara Districts.	No	1	17.7	AIIB- 75% and	IOCT		April 4, 2019	August 22, 2019



						GOSL-25%				
13	RLVMMP/W ORKS/08	Landslide mitigation works in Kegalle, Kandy, Nuwaraeliya & Badulla Districts.	No	1	9.5	AiIB-75% and GOSL-25%	IOCT		July 11, 2019	November 28, 2019

69.0

#### B) CONSULTANCY

Item	Package No.	General Description	Unit	Quantity	Tentative Estimated Value	Fund Source	Method	Prior Review	Tender Invitation	Date of Awarding
					(USD Mn)					
2.1		<b>Consultancy Services- Critical 27 Sites (Phase -1)</b>								
1	RLVMMP/C ONSUL/01	Consultancy Services for Construction Supervision and Contract Administration of Landslide Mitigation Works for Critical 27 Sites of Phase-1 of Reduction of Landslide Vulnerability by Mitigation Measures Project.	No	1	1.5	AiIB-75% and GOSL-25%	IOCS	YES	March 2, 2019	May 25, 2019
2.2	<b>Consultancy Services - 120 Sites (Phase - 2)</b>									

2	RLVMMP/C ONSUL/02 Group 1	Consultancy Services for Investigation, Design and Construction Supervision and Contract Administration of Landslide Mitigation Works for Critical 29 Sites of Phase-2 of Reduction of Landslide Vulnerability by Mitigation Mesures Project at Kandy, Kegalle, Kurunagala & Matale Districts .	No	1	1.5	AiIB-75% and GOSL- 25%	IOCS		October 5, 2019	February 12, 2020
3	RLVMMP/C ONSUL/03 Group 02	Consultancy Services for Construction Supervision and Contract Administration of Landslide Mitigation Works for 36 Sites of Phase-2 of Reduction of Landslide Vulnerability by Mitigation Mesures Project at Rathnapura, Newaraeliya, Kegalle & Badulla Districts.	No	1	1.6	AiIB-75% and GOSL- 25%	IOCS		January 3, 2020	May 12, 2020
4	RLVMMP/C ONSUL/04 Group 3	Consultancy Services for Construction Supervision and Contract Administration of Landslide Mitigation Works for Critical 35 Sites of Phase-2 of Reduction of Landslide Vulnerability by Mitigation Mesures Project at Rathnapura, Kalutara & Matara Districts.	No	1	1.5	AiIB-75% and GOSL- 25%	IOCS		April 7, 2019	August 15, 2019

5	RLVMMMP/C ONSUL/05 Group 4	Consultancy Services for Construction Supervision and Contract Administration of Landslide Mitigation Works for Critical 20 Sites of Phase-2 of Reduction of Landslide Vulnerability by Mitigation Measures Project along the railway track from rukkana to badulla in Kegall, Kandy, Nuwaraeliya and Badulla Districts.	No	1	1.4	AIIB-75% and GOSL- 25%	IOCS		June 29, 2019	November 6, 2019
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7.5

**C) GOODS (to be updated with the discussion of design team)**

Item	Package No.	General Description	Unit	Quantity	Tentative Estimated Value	Fund Source	Method	Prior Review	Tender Invitation	Date of Awarding
					(USD Mn)					
1	RLVMM/GOODS/0 1	Procurement of Equipment & Instruments for Geotechnical, Material and Environmental Testing Laboratories of NBRO and Software for Geotechnical Engineering Designs.			1.0	AIIB-80% and GOSL- 20%	NCT	YES	May 10, 2019	August 2, 2019

1.0

## Annex 5: Sovereign Credit Fact Sheet

### A. Recent Economic Developments

Sri Lanka is a lower middle-income country. The Sri Lankan economy grew at an annual average of 6.4 percent over 2010-2015, reflecting a peace dividend and a determined policy thrust toward reconstruction and growth. However, economic growth moderated to 3.1 percent in 2017, the lowest in 16 years, from 4.5 percent in 2016, due to a contraction in agriculture from large-scale floods and lingering effects of a drought. Inflation increased to 6.6 percent in 2017 from 4 percent in 2016, driven by spikes in food inflation caused by domestic supply shortages following the floods and drought. The current account deficit widened to 2.6 percent of GDP in 2017 from 2.2 percent in 2016, driven by weather-related imports of food and fuel.

The IMF approved a three-year Extended Fund Facility (EFF) program agreement in June 2016 to support Sri Lanka's economic reform through six aspects including fiscal consolidation, revenues mobilization, public financial management reform, state enterprise reform, transition to flexible inflation targeting under a flexible exchange rate regime and reforms in the trade and investment regime.

### B. Economic Indicators

**Table 2:** Selected Macroeconomic Economic Indicators (2015-2020)

Economic Indicators	2015	2016	2017	2018*	2019*	2020*
National income and prices (change %)						
Real GDP	5.0	4.5	3.1	4.0	4.5	4.7
Inflation (average)	2.2	4.0	6.6	4.8	4.8	4.9
Central government operations (% of GDP)						
Central government balance	-7.0	-5.4	-5.5	-4.6	-3.6	-3.5
External debt (% of GDP)	56.4	57.4	59.3	58.9	58.5	56.7
Gross external financing need (% of GDP)	15.3	15.5	14.7	12.7	13.6	12.8
Nominal gross public debt (% of GDP)	82.2	84.7	84.6	83.7	81.8	79.5
Public gross financing needs (% of GDP)	21.1	17.5	18.1	18.6	15.9	15.2
Money and credit						
Broad money (% change, end of year)	17.8	18.4	16.7	14.0	13.7	13.3
Gross reserves (months of imports)	3.7	2.8	3.6	3.9	3.9	3.9
Current account balance (% of GDP)	-2.4	-2.2	-2.6	-2.5	-2.5	-2.4
Exchange rate (LKR/USD, end period)	131.1	144.1	153.4	--	--	--

Note: \*denotes projected figures.

Source: IMF Country Report No. 18/175, June 2018.

### C. Economic Outlook and Risks

Looking ahead, the Sri Lanka economy is expected to recover in the near term as the agricultural sector recovers from weather-related shocks. Growth is projected to increase to four percent in 2018 and five percent over the medium term, driven by robust service growth and recovery in agriculture. Inflation is projected to decline to below 5 percent as agriculture production increases and food prices stabilizing.

Nevertheless, the Sri Lankan economy remains highly vulnerable given its high level of public debt, large financing needs and weak external position. Its public debt reached 84.6 percent of GDP in 2017 and external debt stood at 59.3 percent of GDP. A reversal of the sizeable portfolio inflows could raise domestic borrowing costs and slow the buildup of foreign reserve. The external downside risks are tighter global financial liquidity condition and a further slowdown in China. Internal risks include new weather-related disruptions and uncertainty in the run-up to the presidential and parliamentary elections scheduled for late 2019 and 2020.

On the debt look, IMF indicates a high risk to debt sustainability in Sri Lanka. Under the EFF program, the envisaged fiscal consolidation is projected to reduce the ratio of public debt to GDP to 72.5 percent in 2023, which still exceeds the benchmark of 70 percent of GDP. IMF's stress tests show a high risk arising from a delay in fiscal consolidation and materialization of contingent liabilities. The external debt is projected to decrease to around 53 percent of GDP in 2023 but remains vulnerable to exchange rate depreciation. Nevertheless, risks to external debt sustainability are mitigated by long maturities and Sri Lanka's access to international financial markets.<sup>8</sup>

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<sup>8</sup> International Monetary Fund. 2018. Country Report No. 18/175—2018 Article IV Consultation and Fourth Review Under the Extended Arrangement Under the Extended Fund Facility—Press Release; Staff Report; and Statement by the Executive Director for Sri Lanka, June 2018.