REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

Site No. 97

Jathika Niwasa

Kegalle District

May 2021

Prepared for:

ASIAN INFRASTRUCTURE INVESTMENT BANK

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Abbreviations

AIIB	Asian Infrastructure Investment Bank
CEA	Central Environmental Authority
CEB	Ceylon Electricity Board
DFC	Department of Forest Conservation
DS	Divisional Secretary
DWLC	Department of Wild Life Conservation
EH & S	Environmental Health & Social
E&SU of PMU	Environmental & Social Unit of Project Management Unit
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GN	Grama Niladhari
GOSL	Government of Sri Lanka
GSMB	Geological Surveys & Mines Bureau
LHS	Left Hand Side
NBRO	National Building Research Organization
RDA	Road Development Authority
SSE & SMP	Site Specific Environmental and Social Management Plan

1. INTRODUCTION

1.1. Project Overview

The Government of Sri Lanka obtained loan from the Asian Infrastructure Investment Bank (AIIB) for mitigating/rectifying unstable slopes in high-risk areas especially in 11 districts of 06 provinces of the country. The project requires to be implemented in accordance with environmental and social safeguards and mandates of the AIIB and that of Sri Lanka. Considering the nature of project actions and its implementation, an environmental and social management framework (ESMF) has been prepared as required by the AIIB environmental and social safeguard policy.

The purpose of the environmental and social management framework (ESMF) is to provide a guide for application of AIIB safeguards and national environmental and social mandates during the implementation of project actions. The project implementing agency (NBRO) anticipate to ensure the implementation of environmental and social management plans prepared under the ESMF during all phases of project implementation so that the impacts on the environment and community are minimum.

During the scoping exercise it was revealed that the environmental & social setting, and health & safety conditions are more site specific, and require to be addressed specific to site conditions. Therefore, the ESMF has recommended a site specific environmental and social assessments followed by Site Specific Environmental and Social Management Plans (SSE&SMP) for each site. The SSE&SMP gives planning, design, construction and operation phase environmental, social, and health & safety management measures to be considered in the project Implementation.

This is the site specific environmental and social management plan for **Jathika Niwasa** landslide mitigation site. This plan has been prepared by an in-depth environmental and social assessment to:

1) Identify sensitive environmental and social elements in the project influence area.
2) Identify significant environmental and social impacts due to project actions.
3) Propose mitigation measures.
4) Decide appropriate environmental and social monitoring requirements specific to this project.
5) Study relevant environmental regulations and procedures to be followed during project implementation specific to the site.

1.2. Intended Users

This document provides an in-depth insight into site specific environmental and social issues associated with the construction work and the requirements to mitigate and minimize the adverse impacts to be used by the design team, the PMU and the contractor in executing the construction work. The SSE&SMP is published in NBRO website and can be viewed by wide range of interested parties (public, stakeholder organizations). This document can be utilized by the contractors and will form the basis of site-specific management plans that will be prepared by the contractors as part of their Site Specific Environmental and Social Management Action Plans (SS- ESMAP) prior to commencing works.

2. DESCRIPTION OF THE PROJECT AND SITE DESCRIPTION

2.1. Name of the Site

The proposed mitigation site is identified as Jathika niwasa, located along Dehiowita - Deraniyagala Road (B93) in Kegalle District.

2.2. Locational Details

The site is located at Jathika niwasa, along Dehiowita - Deraniyagala Road (B93). This site falls under Dehiovita Grama Niladari Division of Dehiovita Divisional Secretariat Division in Kegalle District of Sabaragamuwa Province.

GPS References of the site – 6.97054 °N and 80.26468 °E

Elevation – The elevation of the location is around 58 meters / 190.28 feet AMSL.

Nearest Town to the Site – The site is located 1.5 Kilometers away from Dehiovita town towards Magammana.

Accessibility to the Location – The site is located 1.5 Kilometers away from Dehiovita town via Dehiowita - Deraniyagala Road (B93). Refer below figure 01 shows the accessibility to the location.

2.3. Topography and Land Ownership

The proposed mitigation site is located in Jathika niwasa, along Dehiowita - Deraniyagala Road (B93). The site is located 1.5 Kilometers away from Dehiovita town towards Magammana. Elevation of the site is 190ft from MSL.

The extent of the land area for landside mitigation is about 12,000m^2. Land ownership of the site belongs to Land Reform Commission. Area residents revealed slope failure has occurred as the result of no drainage system available to discharge rain water.

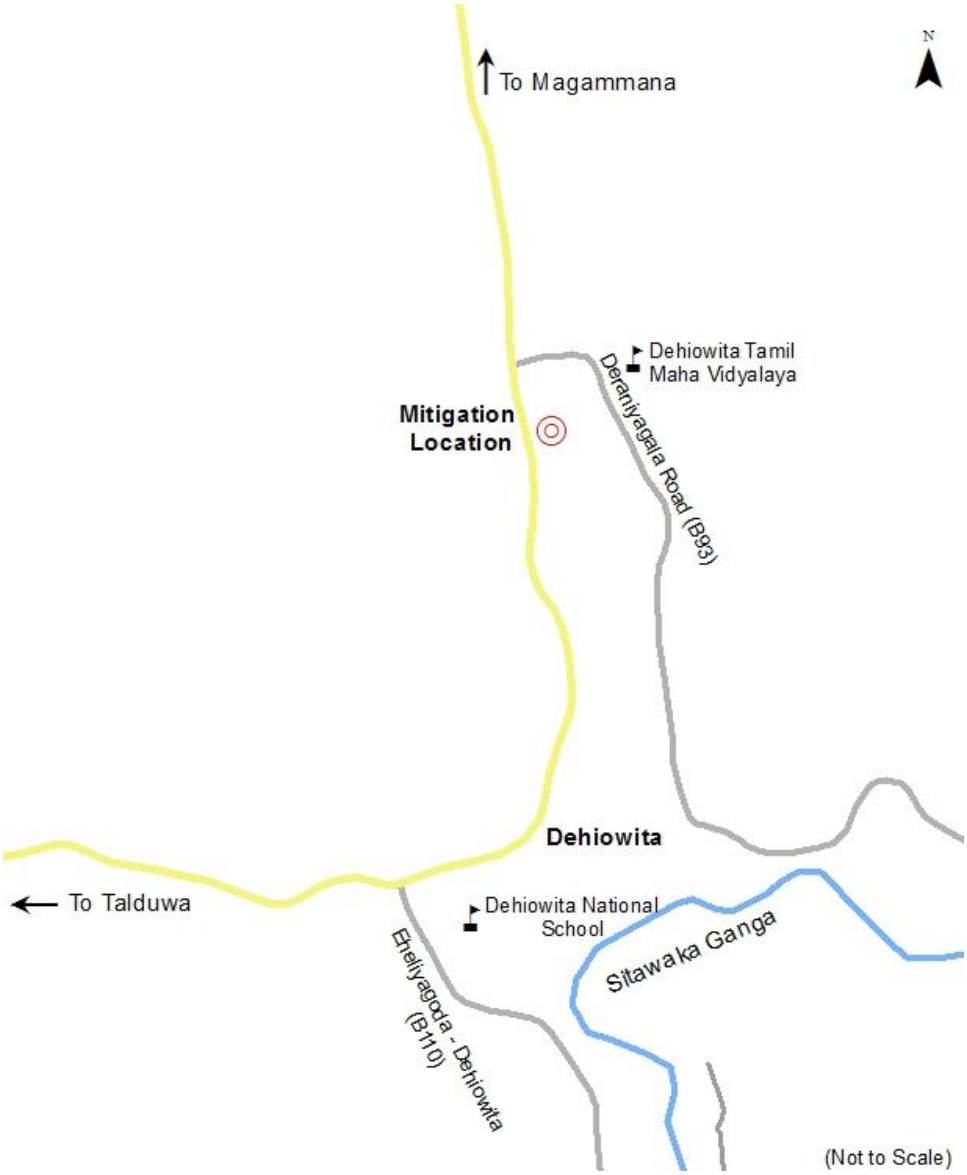


Figure 01: Accessibility to the proposed landslide mitigation site

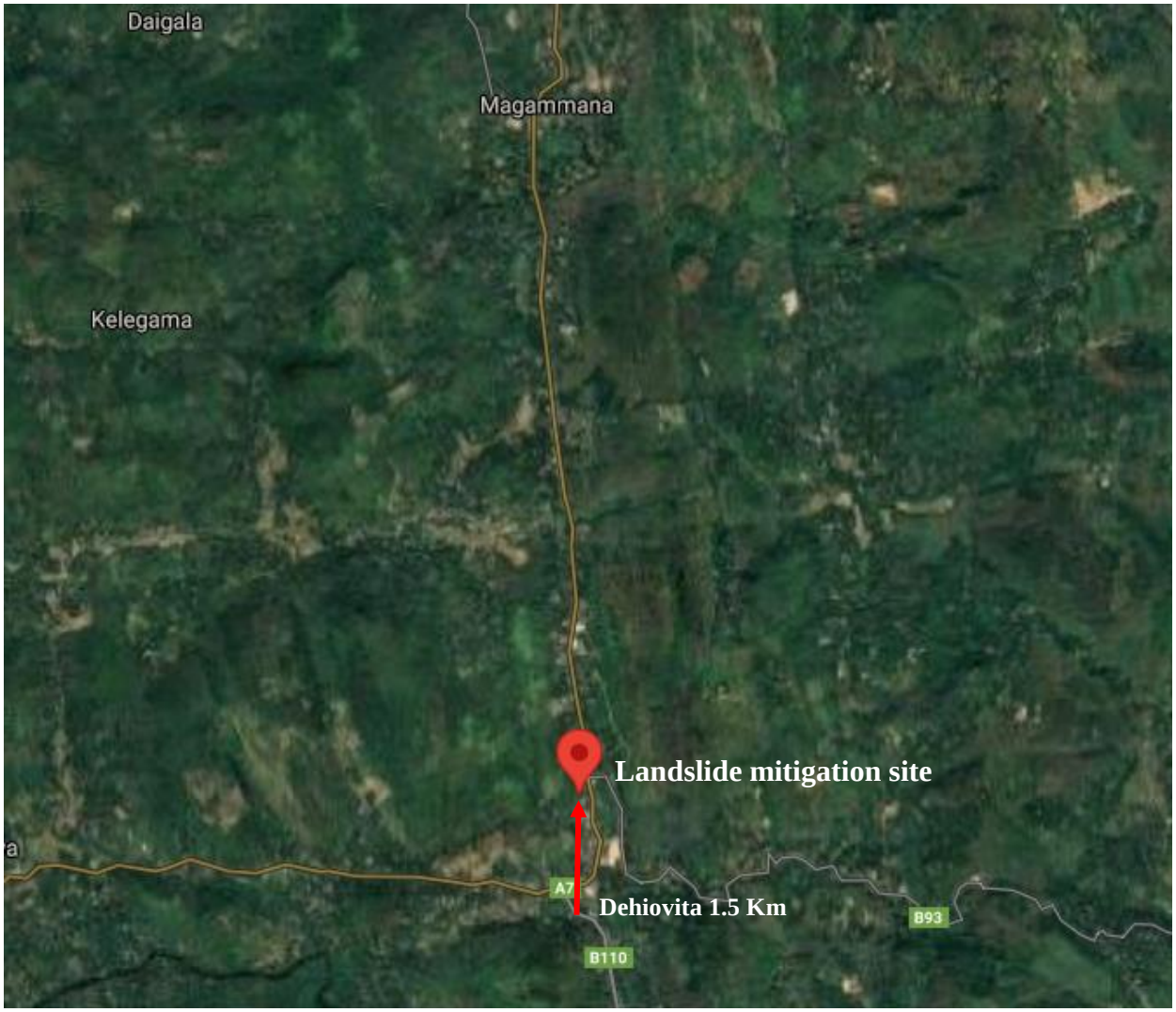


Figure 02: Location of the proposed landslide mitigation site

2.4. Meteorology of the area

The average annual temperature of the area is 25°. The area receives about 3500 mm - 5000 mm rainfall in a year. Precipitation is the lowest during January-February with an average of 230 mm. In April-May, October-November the precipitation reaches its peak, with an average of 650 mm. (Source: Dehiovita Divisional Secretariat - http://www.dehiovita.ds.gov.lk/index.php/en/overview.html)

3. LANDSLIDE HAZARD INCIDENT DETAILS

3.1. Account of Incident

The site is identified as slope failure since 2016. Total area affected by the slope failure is approximately 12,000m^2. It is the result of none availability of drainage system accompany with weak soil. Slope failure happened time to time during rainy days. During the past, damages caused to the Dehiowita – Deraniyagala road as the result of slope failure were temporarily rectified. 10 houses locate within the site demarcated for mitigation. Already **Dehiowita Tamil Maha Vidyalaya** damaged by slope failure has been relocated to another location. This slope failure area falls under the **"Landslides are to be expected and Modest level of landslide hazard exist zones"** category of Landslide Hazard Zonation Maps prepared by NBRO.

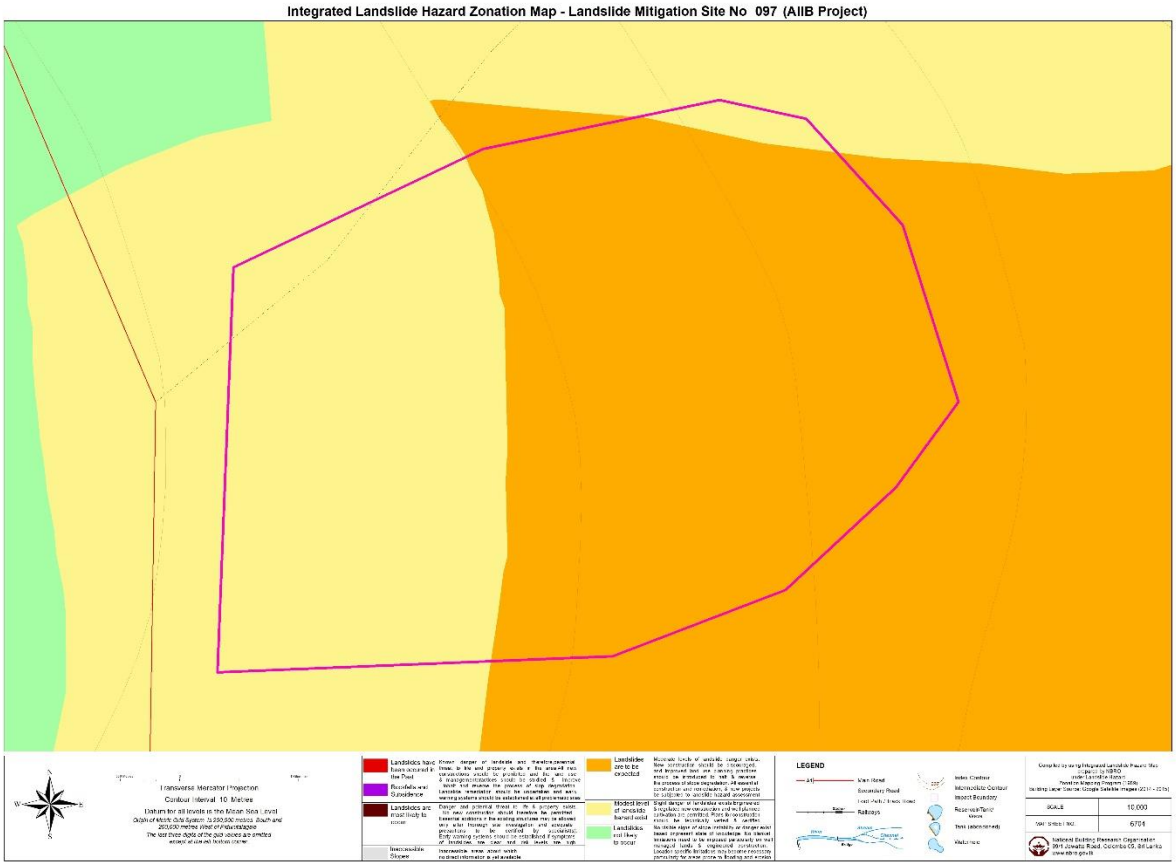


Figure 03: Landslide Hazard Zonation Map of the mitigstion area

3.2. Effects and Consequences of Landslide

The families are living nearly 25 years above the slope failed location in houses built with semi-permanent structures. The resident has stated "Activation of landslide is the result of non-availability of drainage system to discharge water flow from upper slope". It is observed that water seeps through the unstable slope.

3.3. Description of any remedial measures already undertaken to reduce the potential risk

So far, no remedial measures have been taken to mitigate landside risk. This site is highly potential for slope failures; therefore, it is planned to execute preventive measures such as soil nailing, reshaping, turfing, surface and subsurface drainage management at the location.

3.4. Evacuation

Residents inhabit above the slope are instructed to temporarily evacuate the area during rainy days. However, no evacuation is required to execute the landslide risk reduction measures at the site. The school of Tamil Maha Vidalaya was already relocated.

3.5. Resettlement (Progress)

No resettlement requirements to execute the landslide risk reduction measures.

4. DESCRIPTION OF THE AREA OF THE LANDSLIDE/SLOPE FAILURE AND AREAS ADJACENT TO THE LANDSLIDE AND CURRENT LEVEL OF RISK

4.1. Surrounding area of the Slope Failure

Landslide location in Jathika niwasa, near to Dehiowita - Deraniyagala Road (B93). Land ownership belongs land reform commission. Well grown trees such as Rubber, banana, mango, and "Kitul" nut are grown at the site. These plants are the primary or secondary income source of these families inhabit in the area. The drainage management at the site is poor.

4.2. Current Level of Risk

Slope failure has to be rectified to prevent potential disaster. Possible soil mass or debris flow will directly impact the traffic movements along the Dehiowita - Deraniyagala Road. Passengers use the road to travel between Dehiowita - Deraniyagala face the danger of injury or loss of life due to slope failure. Further, life and property of occupants in the upper slope and downslope area and their source of livelihood are exposes to landslide threat.

5. DESCRIPTION OF THE WORKS ENVISAGE UNDER THE PROJECT

The proposed mitigation measures aim to ensure that the further subsidence of soil is prevented. The proposed mitigation works will be largely concentrated on unstable land area. Measures expect to undertake are;

- Lowering the water table of the slope by introducing subsurface drains
- Improve the surface drainage system by constructing proper drainage system within whole area
- Soil nailing, reshaping, turfing

6. BRIEF DESCRIPTION ON THE SURROUNDING ENVIRONMENT WITH SPECIAL REFERENCE TO SENSITIVE ELEMENTS THAT MAY BE AFFECTED BY THE PROJECT ACTIONS

The elements and services at risk during the project implementation are;

- Passengers and vehicles travel along the Dehiowita - Deraniyagala Road (B93).
- Houses at risk of slope failure and the occupants of those houses.
- Home gardens consist of valuable trees in upper slope and downslope area.
- School buildings (Dehiowita Tamil Maha Vidyalaya)

	
Figure 04 (a) – Failed slope as the result of no drainage available to discharge rain water.	Figure 04 (b) – Houses locate at the potential slope failure location.
	
Figure 04 (c) – Abandoned School building due to landslide threat.	Figure 04 (d) – Slope failure impact the school building.

Figure 05: Elements and services may be affected by the project actions

7. IDENTIFICATION OF SOCIAL AND ENVIRONMENTAL IMPACTS AND RISKS RELATED TO THE WORKS

Chart below summarizes the positive and negative impacts which are envisaged during project implementation and significance of those impacts.

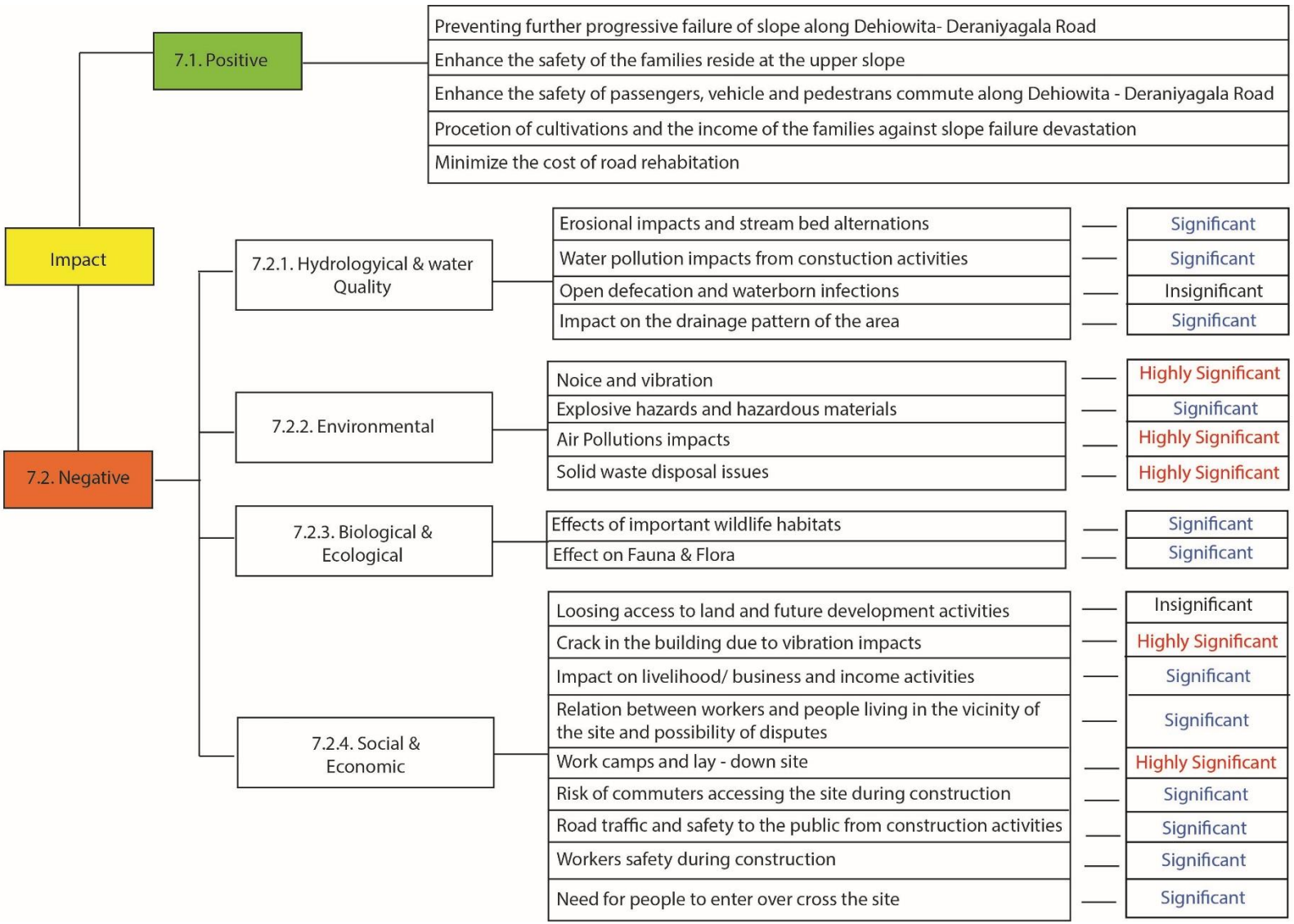


Figure 05: Summary of positive and negative impacts of the project execution and significance of those impacts

7.1. Positive Impacts

- The proposed measures aim at mitigating the slope failure. Below are the positive impacts of executing slope failure mitigation measures.
- Preventing further progressive failure of slope along Dehiowita - Deraniyagala Road.
- Enhance the safety of the families reside at the upper slope.
- Enhance the safety of passengers, vehicles and pedestrians commute along the Dehiowita - Deraniyagala Road.
- Prevention deposit of soil into water body facing the potential degradation in the event of landslide activation.
- Protection of cultivations and the income of the families against slope failure devastation.
- Minimize the cost of road rehabitation.

7.2. Negative Impacts

The mitigation works are generally confined to an area which is already unstable and highly potential for slope failures. Therefore, negative impacts are much localized and also limited to construction period.

Table 1: Negative impacts and their level of significance

Impacts during the construction period	Level of Significance
7.2.1 Hydrological and water Quality impacts	
7.2.1.1 Erosional impacts The mitigation works in this site will focus largely on the drainage improvement. Therefore, during rainy season heavy flow of water is expected to be generated to enter the natural stream either through a culvert or directly the streams through step drains etc. and also the exposed surface can get eroded if proper covering is not maintained. As there are no streams close by the site impact to aquatic ecosystems are less significant.	**Significant**
7.2.1.3 Open defecation and waterborne infections Faecal contamination of down slope water stream will not be expected during construction due to open defecation as the slope is located close to the road and there are residents in the downslope area.	Insignificant
7.2.1.4 Impact on the drainage pattern of the area There was no proper drainage pattern in this area. Disruption of existing surface and sub-surface drainage pattern in the area is envisaged due to reshaping of the unstable slopes, removal of soils and diversions of existing drainage and surface runoff flow paths. The mitigation works in this site will focus largely on the drainage improvement. Due to diversions, cut-off and increased subsurface drainage, the premises will have increased flow at higher velocity in rainy periods. So, proper action during the rainy days is highly necessary to this site.	**Significant**
7.2.2 Environmental Impacts	

7.2.2.1 Noise pollution, vibration, blasting, impacts during construction, potential damage to buildings, infrastructure Noise and vibration are expected from construction equipment. Noise impact is significant as there are houses with occupants closes to the site, within 100m from the site. Hence the project will have noise impacts on neighboring community. The pedestrians and commuters on roads will also have an effect from noise and vibration pollution. Further, vibration can affect the stability of buildings (houses) at downslope during construction and cracks may occur in the buildings.	**Highly Significant**
7.2.2.2 Explosive hazards and hazardous materials Since the affected area has some rock boulders, explosives may be used if the rock blasting is envisaged. This may pose risk on people living in the area, commuters and construction workforce due to unsafe use. As these operations are to be done on unstable slopes the risk of improper use of explosive and accidents from rock fragments are highly significant.	**Significant**
7.2.2.3 Air pollution impacts Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, demolition, burning, from storage, transportation disposal of construction materials, construction waste and working with toxic materials. During construction, it generates high levels of dust typically from concrete, cement, wood, stone, and silica. The air pollution impacts from the construction is locally significant during dry periods for commuters and households.	**Highly Significant**
7.2.2.4 Solid waste disposal issues Haphazard disposal of solid waste can pollute water and soil, and leave various environmental impacts if proper disposal mechanism is not in place during the construction period. The effect is significant unless proper solid waste disposal mechanism is used during the construction period.	**Highly Significant**
7.2.3 Ecological Impacts	
7.2.3.1 Ecological, biological impacts, and fauna and flora The impacts on terrestrial ecosystems are minimum because i) many project actions will be taking place on already failed or disturbed slopes. ii. There are no annual crops within the project area. iii) There are no forested/ areas within the project influence area with high biodiversity, or sensitive ecosystems, iv) habitat fragmentation is minimal. v) None of the trees found in the site are endemic, threatened and identified in the red list of IUCN. During the project implementation there will be requirement of cutting/ uprooting trees. In such cases necessary approval is required. Valuable timber species may be removed from the system intentionally/unintentionally if proper supervision is not done by the Environmental and Safety Officer with relevant knowledge on these species.	**Less Significant**
7.2.4 Socio-Economic Impacts	
7.2.4.1 Loosing access to land and future development activities The mitigation works will be concentrated on steep upslope of the road. Since this area is a small plot of already degraded land, there will be no impact to the land owner with regard to loosing access to the land or loss to valuable uses. In contrary, remediation works in the upslope will increase stability of the land and protect the land from future failures.	Insignificant

7.2.4.2 Cracks in the building due to vibration impacts Vibration can affect the stability of the house in slope. Therefore, vibration impact on these houses is highly significant as it can create cracks on the buildings.	**Highly Significant**
7.2.4.3 Impacts on livelihood/ business and income activities Not relevant	Insignificant
7.2.4.4 Relations between workers and the people living in the vicinity of the site and possibility of disputes There may be disputes with the workers of construction site and the villagers as the people are living nearby.	**Significant**
7.2.4.5 Work camps and lay-down sites requirement The solid waste, sewage removal in worker camps if not properly designed will be a nuisance to the surrounding community.	**Highly Significant**
7.2.4.6 Risks of public accessing the site during construction The site may have machinery with high hazard risk such as drilling, boring and excavation machines etc. Only skilled workforce will be safe working in this environment. If unauthorized persons access the site, there may be a risk of being subjected to accidents by the heavy machinery.	**Significant**
7.2.4.7 Road traffic and safety to the public from construction activities During construction phase the road will be obstructed by frequently moving machinery, loaders, trucks etc. As most of the mitigation works are to be carried out in limited space on slopes the heavy machinery, the trucks and loaders etc. can obstruct the pedestrian passage and may pose high risk on their lives. There is a sharp bend on the road to the Eastern side, many vehicles driving high speed on this road may not be able to see the mitigation site from far hence possible risk of accidents is very high	**Significant**
7.2.4.8 Workers safety during construction The workers may be exposed to risk from falling. Fatal injuries may occur if the slope fails. The risk of slope failure is aggravated during the rainy season. This risk is highly significant. The heavy construction machinery may be used in limited work spaces. Risk of hazard from vehicle and construction machinery road accidents is highly significant at this site. Contractor may engage under age workers (children) for construction work, which is risky and can results serious accidents and injuries.	**Significant**
7.2.4.9 Need for people to enter or cross the site As the construction process involves heavy machinery, and vehicles, electricity, and may be blasting materials the entry by unauthorised personnel if occur may have very high risk.	**Significant**

8. PRIORITY HEALTH AND SAFETY ISSUES. SPECIFIC H&S CONCERNS THAT REQUIRE MEASURES THAT GO BEYOND THE STANDARD CONTRACTUAL REQUIREMENTS FOR CONTRACTORS

The health and safety issues pertinent to this site is significant as the workers have to work on a road with frequently travelling vehicles up and down. The health and safety issues of workers safety is highly significant at this site. Such common Health and Safety issues have been discussed in the **ESMF**. Worker

safety requirement in the construction site is more detailed under 2003 5: Safety equipment and clothing in the section 2003: Working conditions and community health and safety in the Bidding document.

9. CHILD LABOUR & FORCED LABOUR

Child labor & Forced labor is detailed under 2003.3 under section 2003: Working conditions and community health and safety in the Bidding document.

10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

10.1 Resettlement action plan

There is no project-based resettlement in this site.

10.2 Evacuation of people

Project based evacuations may be required for this site because of location of two houses adjacent to landslide mitigation location.

10.3 Procedure for removal of damaged structures, facilities infrastructure (consent from owners to remove the articles)

Consent from owners to remove the articles is required because of landslide mitigation location belongs to Land Reform Commission and the location of houses adjacent to landslide mitigation site.

10.4 Requirement for compensation for loss of property /uses due to project actions

It may require to compensate if any damages happen to the houses, infrastructures or any other element of the area during constructions.

Public awareness and education- needed for following areas

i. Programs to educate people in the vicinity about the risks posed by slope failure specially the people access the surrounding area near the construction site.
ii. Awareness for the road users on the potential risk during construction.

10.6 Design based Environmental/ Social Management considerations

Following environmental and social design considerations are recommended for this site depending on its environmental and social relevance.

Table 02: Environmental & Social considerations at Design stage

Design feature	Recommended level of consideration for this site
i. Natural resource management and resource optimized designs Project specific designs should be considered to eliminate mass clearing of vegetation and minimum number of removals of grown tree species. Sufficient emphasis should be made to consider conservation of trees if important tree species are found.	High
ii. Habitat connectivity and animal trails If large fractions of vegetation are required to be cleared in ecologically fragile habitats as for permanent structures or for access, or if deep drains etc. are to be made the designs should include habitat connectivity features, animal trails and vegetation strips and etc. even if the impact are localized	Low/Moderate

iii. Conservation of water resources If involves extraction of water both surface and sub-surface, the water extracted is in relatively good quality. In a well thought design this extracted water can be conveyed in such a manner that the water can be accessed by wild fauna as well as the neighboring communities for bathing and other domestic purposes even as drinking water for the people living in the downslope area whose drinking water sources are located much away from their settlements.	Very High
iv. Interruption to water supplies If the water in the mitigated slope is used as a source for individual or community water supply, the chance the water source can be affected by the mitigation work is high due to water table draw down. In such instances the design should include alternative source of water for the community (temporary/or permanent).	Low
v. Aesthetically compatible design considerations The designs in aesthetically sensitive environments should consider structures that blend with natural environment to keep the visual pollution to minimum. Service of landscape architect may be important for the design of suitable mitigation structures.	High for slope area
vi. Consideration of green environmental features It is recommended to consider green environmental designs as much as possible in the designs such as nature based mitigation measures, combination of plants to sustain species diversity in the environment, avoiding inclusion of potentially invasive species & etc.	High
viii. Conservation of social and Cultural features The local cultures and heritages are strengthened by their close connections to the natural environment that sustains them. Therefore, the project actions should be carried out considering local culture and social aspects, providing opportunities to reinforce them during the project actions.	Low
ix. Workers/ commuters and community safety Activation of landslide occur during construction phase and may pose threat to workers, and the community. Therefore, design-based safety consideration such as berms, safety nets, safety fencing etc. should be considered specific to safety of community.	High
x. Erosion control structures During rainy season the heavy flow of surface runoff can be expected through the unstable slopes. This water should be conveyed to nearby storm water drains to prevent the water pollution of the area and "Kahanawita Ela". Hence the design should adequately consider flow speed breakers to reduce erosive flows of slopes.	High
xi. Low post maintenance and operation designs The mitigation should consider passive techniques such as gravity drains for drainage management. Correct pipe diameters, pore diameters and laying angles should be considered to avoid clogging of drains. Low maintenance structures and designs such as designs to withstand erosive forces, sediment trapping systems etch should be considered if drain water is expected be directed to natural streams. The materials used for structures and should be chosen carefully so as to withstand weather conditions with high durability. Designs should specially consider corrosion prevention techniques if steel structures are used.	Very High

10.7 Mitigation of impacts during the construction phase

10.7.1 Construction contractors' requirement to comply with environmental and social management during the construction phase

Measures to manage and to mitigate the environmental and social impacts are generally common to all landslide mitigation sites. Such impacts are largely attributed to activities in the construction phase. The mitigation of impacts therefore becomes an obligation of construction contractor. NBRO has prepared a comprehensive document on "***contractors' requirement to comply with Environmental and Social Health and Safety (ES & HS) management during the construction phase"*** to be included in construction contractors' bid document. The main sections are summarised below (Table 03) indicating the degree of relevancy for this site.

Table 03: Contractor requirement to comply with Environmental and Social Health and Safety Management

Reference No. as per construction contractor's obligation to ESMP	Item	Relevant to the project
2002. Environmental and Social Monitoring		
2002.2 1)	Storage on site	Highly Relevant (road, neighbouring houses)
2002.2 2)	Noise and Vibration	Highly relevant (road, neighbouring houses)
2002.2 3)	Cracks and damages to the buildings	Highly relevant (neighbouring houses)
2002.2 4)	Disposal of waste	Relevant (road, neighbouring houses)
2002.2 5)	Disposal of refuse	Highly relevant (road, neighbouring houses)
2002.2 6)	Dust control	Highly relevant (road users, occupants of neighbouring houses)
2002.2 7)	Transport of construction materials and waste	Highly relevant (road)
2002.2 8)	Water	Relevant
2002.2 9)	Flora and Fauna	Relevant
2002.2 10)	Physical and cultural resources	Not relevant
2002.2 11)	Soil Erosion	Relevant
2002.2 12)	Soil Contamination	Relevant
2002.2 13)	Borrowing Earth	Relevant
2002.2 14)	Quarry Operations	Not relevant
2002.2 15)	Maintenance vehicles and machinery	Relevant
2002.2 16)	Disruption to public	Highly relevant (occupants of neighbouring houses)
2002.2 17)	Utilities and roadside amenities	Highly relevant (houses)
2002.2 18)	Visual environment enhancement	Relevant
	Baseline surveys (air, water, noise, vibration, crack surveys)	Highly relevant

2002-5. Environmental Monitoring	Surveys during construction (air, water, noise, vibration, crack surveys)	Highly relevant
	Surveys during operation phase	Refer site specific monitoring plan
	Reporting and maintenance of records	Relevant
2003. Working Conditions and Community Health and Safety		
2003.2	Safety organization and communication	Highly relevant (heavy machinery)
2003.3	Child Labor and Forced Labor	Relevant
2003.4	Safety reports and notification of accidents	Highly relevant
2003.5	Safety Equipment and Clothing	Highly relevant
2003.6	Safety inspections	Highly relevant
2003.7	First Aid Facilities	Highly relevant
2003.8	Health and safety information and training	Highly relevant
2003.9	Plant equipment and qualified personnel	Relevant

Relevant: *The section is relevant to the site as a common ESMP applicable to any site*
Highly relevant: *The contractor should pay special emphasis in the preparation of environmental method statements to ensure that the relevant ESMP is implemented specific to the site*
Possibly relevant: *This ESMP will be triggered if the site come across with relevant aspect during project implementation*
Not relevant: *The section may not be relevant to this site under disclosed conditions*
Optional: *Require to be implement if needed only*
Refer site specific monitoring plan*: Contractor is obliged to carry out monitoring as specified in the site-specific monitoring plan*
Reference: Contractors Obligation for implementation of ESMP

10.7.2 Site Specific mitigation

Given below are the site-specific mitigation measures expected to execute during construction.

Table 04: Site specific Environmental and Social Health and Safety mitigation measures

Mitigation item	Project phase	Responsibility
i. Traffic management and safety Traffic management system should be in place day and night. A good traffic management plan should be prepared with the concurrence of Road Development Authority since the landslide mitigation location is situated close to main road. Proper road safety measures should be included with warning signs and permanent trained watchmen, luminous sign boards indicating instability risk and road obstruction signs, night lamps etc. are strongly recommended at this site.	Construction	• Contractor • PMU • Road Development Authority

ii. Priority Health and Safety Issues As the workers in the site have to work in high-risk conditions, it is imperative to implement recommendations given in section 2003 of contractors' obligation on ESMP under "working conditions and community health and safety". These recommendations should be followed carefully in a proper organization and safety monitoring system. i. Prepare a special Occupational Health and Safety Management Plan prior to commencement of construction activities. ii. Adoption of standard worker safety methods. iii. Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle, fire extinguishers etc. iv. Undertake trainings and awareness programs for employees. v. Conducting hazard analysis and plan/provide adequate mitigation measures for such hazards identified, prior to carrying out major construction activities vi. Work should be discontinued for sufficient time period during rainy period as working on unstable land will be highly risky in the rainy season. vii. Contractor should prepare temporary sanitary facilities for the workforce within the site.	Construction	• PMU • Contractor
iii. Transporting materials and machineries Inform and obtain permission from the authorized person of RDA/ Local Authority before transporting any material and machineries along the road. It should not be obstructed the people who are living in downslope by using the road and transporting material and equipment.	Construction	• PMU • Contractor
iv. Safety structures/ sign boards During construction phase adequate safe fencing should be established to prevent potential falling risk of workers from upslope areas. Warning sign board indicating rock fall risk should be displayed at the down slope area; at the road side as the road is occupied by the public for various reasons (pedestrians and residents etc.). As the risk is high during the rainy season where there is no construction work it is mandatory that safety signs boards are displayed even during the no project period as well.	Construction	• PMU • Contractor
v. Minimize erosional impacts during construction It is recommended to avoid works involve with site clearance, slope reshaping, removal of debris etc. during rainy season. Therefore, it is imperative that works in upslope mitigation are carried out during dry season and avoid such activities on unstable area during wet season as much as possible. This should be considered in project planning stage. Silt traps should be introduced to cut down sediment laden runoff.	Site preparation & construction	• PMU • Contractor
vi. Planning project activities As the contractor has to operate adjacent to Dehiowita - Deraniyagala Road contractor should carefully prepare a plan for management of construction activities without obstructing vehicle movement. It includes careful selection of material storage, vehicle parking, mixing of concrete, cleaning activities etc. which considering the safety and optimization of space.	Site preparation & construction	• Contractor

vii. Invasive species Should be avoided in using vegetative erosion control structures. Native plants in the local environment should be chosen for vegetation control. The species used for vegetative control measures need approval from the relevant authorities.	Construction	• Contractor
viii. Noise and vibration control Noise and vibration are expected emanate from machinery during construction. Noise and vibration generate from the machinery can cause adverse effects on the surrounding environment and to those residents adjacent to the mitigation site. Thus, vibration generating activities should be done within the prescribed limits to avoid damage to structures. Cracks in the buildings should be monitored before, during and after completion of the project. Suitable compensation should be made if damage or cracks appear in the buildings due to construction work.	Construction	• Contractor
ix. Disposal of construction waste The contractor should pay special attention with respect to disposal of construction waste. This site is located along Dehiowita - Deraniyagala Road. There is resident's close proximity to site. Therefore, construction waste if generated should store properly without getting washed off and dispose according to approved procedures by the PMU. Construction waste should not dispose along road sides, home gardens or into the wells. Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery must be collected in holding tanks and removed from site by a specialized oil recycling company for disposal at an approved hazardous waste site. Appropriate communication and training programs must be put in place to prepare workers to recognize and respond to workplace chemical hazards.	Site preparation & construction	• Contractor
x. Dust and aerosol control screens Houses are located close proximity to site. Therefore, dust particles generated during the construction can influence the occupants. Also, commuters and pedestrians passing through the unstable area could be affected from generated dust particles. Dust filtering screens should be used if heavy dust or aerosol generating activities are envisaged.	Site preparation & construction	• Contractor
xi. Water for construction Water for construction works should be acquired only from approved sources.	Construction	• Contractor
xii. Impact on Home Garden System The residents of this area have their home gardens closer to the mitigation site. Contractor should pay attention not disturbing these vegetation moving vehicles, parking areas, material dumping etc.	Site preparation & construction	• Contractor
xiii. Working hours, working in extreme weather conditions and working in poor visibility Construction activities can be carried out during both day and night time. Working after 6.p.m. could be possible with the consent of the Road Development Authority and area police due to safety issues.	Construction	• Contractor
xiv. Impact on service infrastructure Telecommunication, electricity, water supply lines should be relocated before construction begins.	Construction	• Contractor

xv. Worker's code of conduct Possible disputes between the labor force and the neighboring community should be prevented by maintaining the agreed code of conduct by the contractor. Possible disputes between workforce and villagers should be avoided especially when using shared resources such as common bathing and washing places etc.	Construction	• Contractor
xvi. Need for people to enter or cross the site Possible unauthorized access to the site should be avoided by awareness, warning signs and vigilance by the contractor's full-time watchmen.	Construction	• Contractor

10.7.3 Monitoring requirements specific to the site

Monitoring plan in table 05 strongly emphasize the parameters should be measures during the construction phase specific to this site. In addition to this, monitoring procedure indicated in the contractors' obligation to ESMP should also be implemented by construction contractor. Contractor is expected to indicate in the bid the ESMP procedure to be implemented along with relevant proofs of his competency. The cost for ESMP will require to be indicated as a separate pay item. The environmental and social management method statement is expected to be submitted by the selected contractor and to be approved by the Project Management Unit.

Table 05: Environmental and Social monitoring plan; construction phase

Monitoring requirement	Parameters	Frequency
i. Baseline monitoring	Water quality	Once*
	Pre-crack survey for the neighbouring households	Once*
	Ground vibration	Once*
	Air quality: particulate matter	Once*
	Background noise measurement	Once*
ii. During construction	Water quality	Once*
	Crack survey for the neighbouring households	If noticeable displacement is observed during construction **
	Ground vibration	During operation of drilling machinery, boring works, or any works that generate ground vibrations*
	Construction noise	Once a month during heavy noise generation times *
	Air quality particulate matter	Once a month *
iii. Vehicular Emission	All machinery/vehicles operational should have the emission control test certificate as applicable - should be checked by the site ES officer of the consultant	
iv. Monitoring agency	* A competent independent monitoring agency with registration of Central Environmental Authority for all parameters except crack surveys **Crack surveys should be conducted by competent agency acceptable to PMU	

v. Reporting requirements	**Stream water quality** – Comparison with ambient water quality standards published by the CEA, 2017 **Pre-crack survey of the neighbouring houses**-Professional report **Ground vibration**-as per the interim standards on vibration for the Machinery, Construction activities and Vehicular movements, CEA **Background noise measurement** –Extraordinary Gazette No.924.1, May 23,1996, CEA **Air quality particulate matter**- The National Ambient Air Quality standards stipulated under the Extraordinary Gazette, No. 1562/22 August 15, 2008 - Central Environmental Authority of Sri Lanka.

11. PUBLIC AND STAKEHOLDER CONSULTATION - the public consultations that have been and/or will be held

11.1. Public Consultation

The occupants living closer to the mitigation site were consulted during the field visit. They have built their house in lands belong to the land reform commission. People living surrounding the mitigation site stated that they were aware of landslide mitigation project and the funding mechanism. The occupants expressed their willingness to the project and to give full support to the project.

12.1. Stakeholders/ Institutional Consultation

As per the occupants' statements, the Grama Niladari of Dehiovita GN Division Mr. M.J. Weerasinghe has been initially consulted to verify the land ownership. Grama Niladari has been verified that even though people living for 25 years, still the land belongs to Land Reform Commission.

Accordingly, it has been consulted to Mr. Udayasiri Rajapaksha Director, Legal Division of LRC. As per his statement they are agree with the mitigation activities but before the construction/ mitigation activities initiate, pre-approval or consent from LRC is required.

13. PREVENTIVE MEASURES FOR COVID-19 THAT WAS ISSUED BY SRI LANKAN NATIONAL HEALTH AUTHORITY

COVID-19, the novel coronavirus infection has not been totally eradicated in the world. Therefore, to prevent/ control of the spread of infection also to prevent panic situations in the event of detecting a suspected case, all contractors are required to develop a COVID-19 Preparedness plan and need implementing in the site as per the "Health and Safety Guidelines for Sri Lankan Construction Sites to be adopted during COVID 19 outbreak" Guidelines given by Construction Industry Development Authority CIDA 29th April 2020.

14. CLEARANCES, NO OBJECTION, CONSENT AND APPROVALS REQUIRED FOR THE IMPLEMENTATION OF THE PROJECT

Table 06: Clearances, no objection, consent and approvals

Requirement / Approval / Institution	Relevance to the project
13.1 Project implementation	
Approval from the District Secretariat	Approvals will be required and the proposals need to be presented at the District Development Coordinating Committee, to which chief minister and stakeholder agencies in the district will also participate. The Officer of PMU will present the project, disclose the project details and various concerns including environmental and social issues will be discussed at this meeting. The issues highlighted at the meeting will be addressed in the ESMP. Decisions and recommendations taken up at this meeting will be considered in the ESMP.
Approval from the planning committee	The approval from the planning committee of the Dehiovita Pradheshiya Sabha.
13.2 Approval from the state lands owners relevant to the project	
Central Environmental Authority	Consent from District Central Environmental Authority is required as Kegalle District is under the sensitive area under Soil Conservation Act 25 of 1951.
Department of Forest Department of Wildlife Conservation	As there are no forest reservations and wildlife habitats; Department of Forest and Department of Wildlife Conservation approvals are not needed.
Geological Surveys and Mines Bureau	Approval will be obtained for for extraction of materials, transportation and disposal of earth, rocks and mineral debris. (if necessary, only).
Dehiyovita Pradheshiya Sabha	Approvals from Dehiyovita Pradheshiya Sabha will be obtained for the disposal of waste and plant litter.
Ceylon Electricity Board	Approvals from Regional Ceylon Electricity Board will be required for power supply related operations.
Land Reform Commission	Since the land is owned by Land Reform Commission, the consent and approval is required prior to commence the mitigation works
13.3 Consent/ no objection/ legally bound agreement from the private land ownerships	
Land owner – Land Reform Commission	Signing a legally bound agreement between the land owners and the project implementing agency allowing no-objection to enter the land, removal of the structures, undertake construction, and engage in long-term maintenance works.

The tentative timeline for getting approval is given in the table 07.

Table 07: Tentative timeline for getting approvals

Approvals	Month 1				Month 2			
	W1	W2	W3	W4	W1	W2	W3	W4
Project implementation ***Approval from the District Secretariat*** Submission of application Project briefing Respond to comments Approvals								
Approval from planning committee Submission of application Project briefing Respond to comments Approvals								
Approval from Road Development Authority Submission of application Respond to comments Approvals								
Other approvals GSMB								
Consent/ no objection from the land owners								

14. GRIEVANCE REDRESS MECHANISM FOR THIS SITE

The PMU is responsible for establishing the grievance redress mechanism to address the grievances of the affected parties; occupants of the neighbouring houses, users of Dehiowita - Deraniyagala Road *(Reference: Environmental and Social Management Framework for recommended procedure for establishment of grievance redress mechanism).*

15. INFORMATION DISCLOSURE

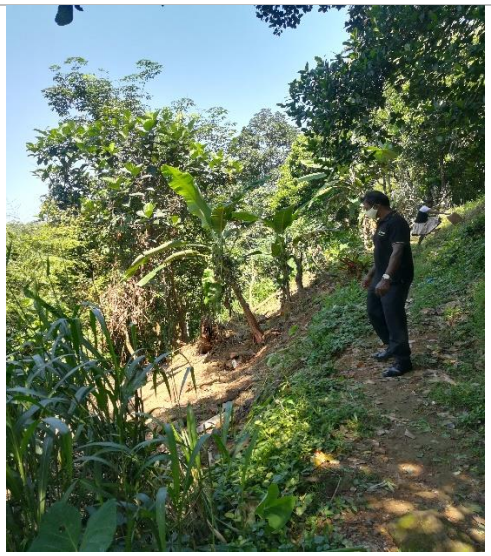
It is the responsibility of the PMU to disclose the ES information to following agencies and organizations by indicated modes as a minimum as given in the following table.

Table 8 – Proposed scheme of information disclosure

Information	Proposed agencies	Mode of information disclosure
i. Project plan (site details, design implementation arrangements)	District Secretariat, Divisional secretary, Road Development Authority, Other district level Agencies, NBRO district office, AIIB	Meetings, District coordination committee, submission of relevant report to sign agreements, approvals and consents.
ii. Environmental and Social Management plan	District CEA, Road Development Authority, AIIB	Meetings, District Coordination Committee, submission of relevant report to sign agreements, approvals and consents

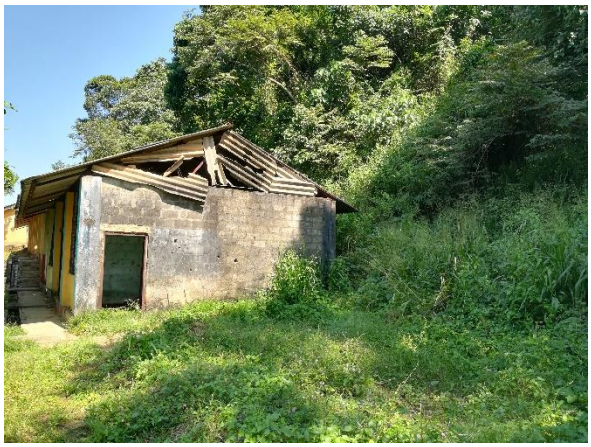
iii. Monitoring reports (baseline and during construction)	AIIB and relevant parties as appropriate	Progress meetings, special meetings, submission of relevant reports
iv. Site inspections for environmental conformance workers health and safety	District CEA, Divisional secretary, Police, Road Development Authority, Grama Niladhari, District Office NBRO, AIIB and relevant parties as appropriate	Written and verbal communications, submission of relevant reports
v. Decisions taken and progress review meetings pertinent to ES matters	District CEA, Divisional secretary, Police, Road Development Authority, Grama Niladhari, District Office NBRO, AIIB and relevant parties as appropriate	Meetings, submission of relevant reports
vi. Grievance redress mechanism	Relevant parties, AIIB	Meetings, written and verbal communications

Annexure I: Images of the site condition and the consultation



Mitigation area

Consultation with occupants



The damaged school due to landslide