REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

Site No. 122

Eheliyagoda-Dehiovita Road. Culvert No. 5/3

Kegalle District

December 2020

Prepared for:

ASIAN INFRASTRUCTURE INVESTMENT BANK

Prepared by:

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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 has 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 **Eheliyagoda-Dehiovita Road. Culvert no. 5/3** potential 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 located near Culvert no. 5/3 of Eheliyagoda-Dehiovita Road (B110) in Kegalle District.

2.2. Locational Details

Proposed mitigation site is located at Eheliyagoda-Dehiovita Road. Culvert no. 5/3 falls under Madagammana Grama Niladari Division of Dehiovita Divisional Secretariat Division in Kegalle District of Sabaragamuwa Province.

GPS References of the site – 6.876129°N and 80.280897°E

Elevation – The elevation of the location is around 186 meters / 610.24 feet AMSL.

Nearest Town to the Site – The site is located 6 Kilometers away from Eheliyagoda town towards Dehiovita.

Accessibility to the Location – The site is located 6 Kilometers away from Eheliyagoda town via Eheliyagoda-Dehiovita Road (B110). Refer below figure 01 for the accessibility to the location.

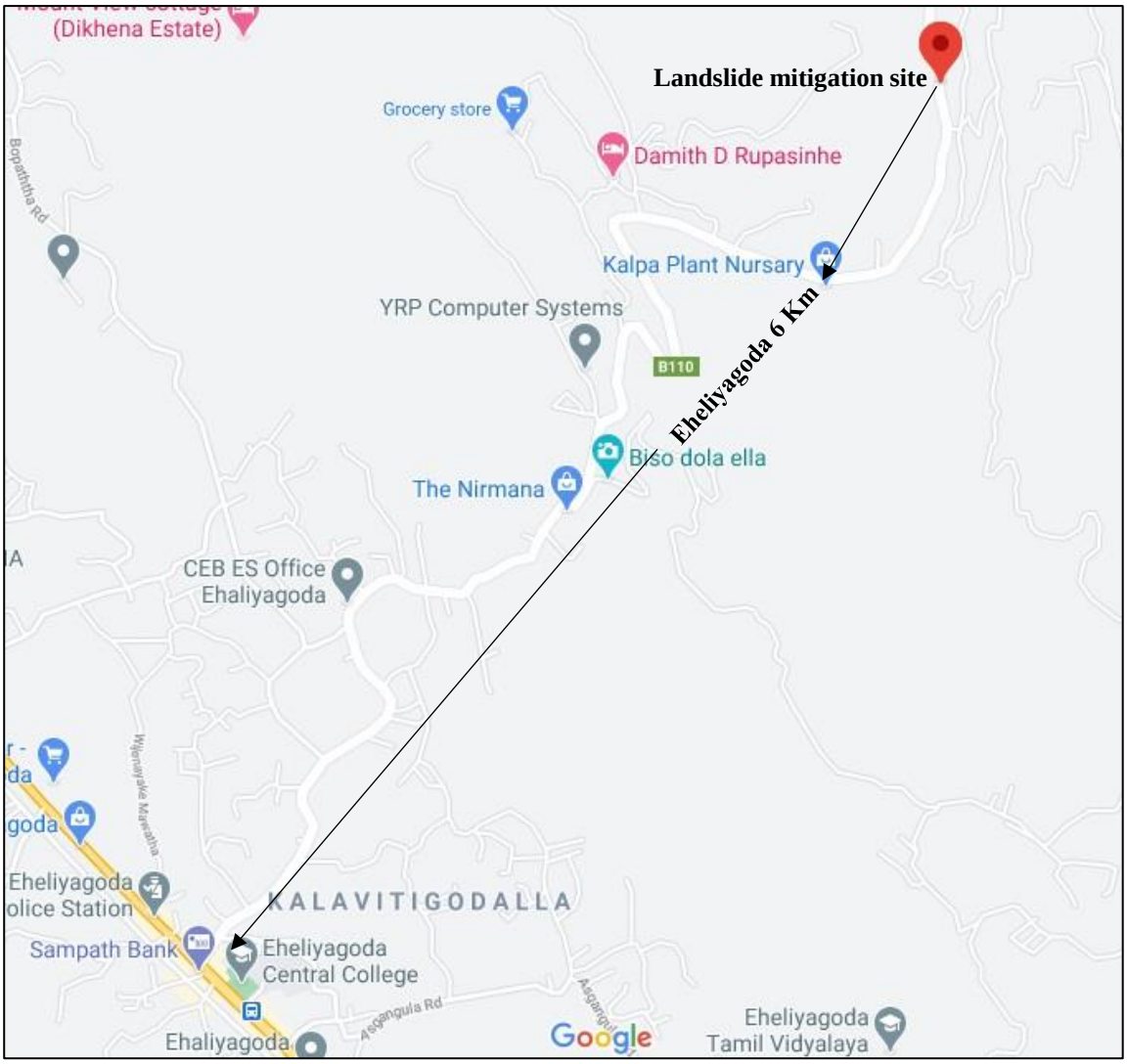

Figure 01: Accessibility to the proposed landslide mitigation site

2.3. Topography and Land Ownership

The proposed mitigation site is located near Culvert no. 5/3 of Eheliyagoda-Dehiovita Road (B110). The site is located 6 Kilometers away from Eheliyagoda town towards Dehiovita. Elevation of the site is 270ft. Upper slope above the crown is consisted of tension cracks and boulders.

The extent of the land area of the mitigation area is about 1000m^2. Land ownership is private Rubber plantation. Area residents has revealed slope failure / landslide is the result of inappropriate vertical cut for road construction.

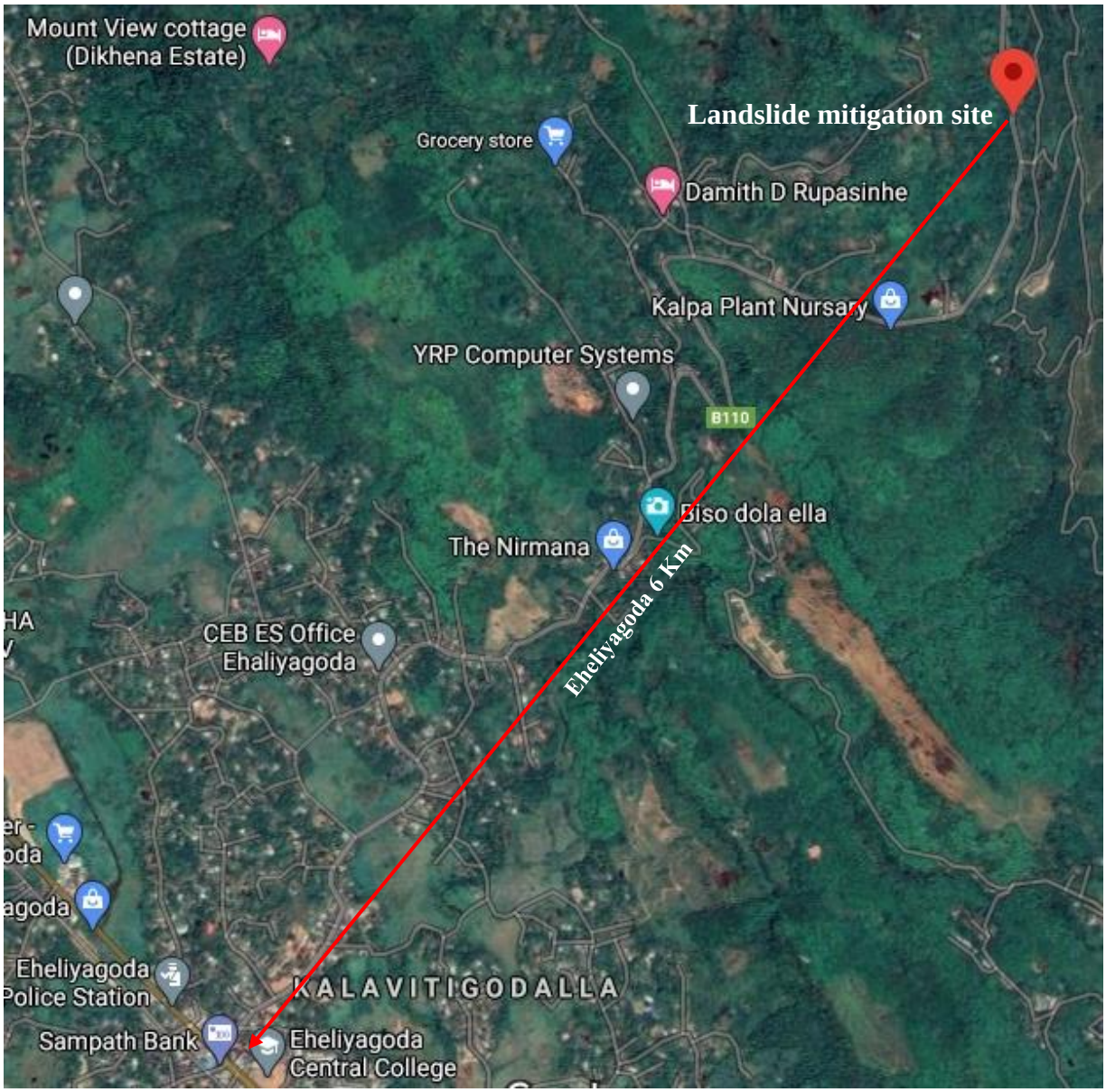

Figure 02: Satellite image shows the location of proposed landslide mitigation site

2.4. Meteorology of the area

The average annual temperature for the area is 25°C and area receive about 4460mm -5000mm rainfall in a year. Precipitation is the lowest in January-February with an average of 30 mm. In April-May, October-November the precipitation reaches its peak, with an average of 700 mm.

Figure 03: Drone image of the proposed landslide mitigation site and its surrounding environment

3. LANDSLIDE HAZARD INCIDENT DETAILS

3.1. Account of Incident

Tension cracks has been appeared near culvert no. 5/3 of Eheliyagoda-Dehiovita Road (B110). Slope failure / landslide is reported since 2017. Total area affected by the cutting failure is approximately 1000m^2. It is the result of inappropriate vertical cut for road construction. Slope failure happened time to time during rainy days. This earth cut has collapsed due to initiation of slope movement that spread its debris along the road. The damages cause to the road as the result of slope failure was temporarily rectified. 02 houses locate adjoining to the highway is identified as high risk for landslides.

This slope failure area falls under the "Modest level of landslide hazard exist" category of Landslide Hazard Zonation Maps prepared by NBRO. It is evident that slope failure / landslide has been triggered at this location because of non-engineering road cuts during the construction of the road.

3.2. Effects and Consequences of Landslide

S.P. K Bathinagoda, residing adjoining to the site has revealed that landslide activated in 2017 due to heavy rainfall received in the area. Activation of landslide is the result of no proper water management measures available. Cracks at the edge of the road is also observed.

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.

3.4. Evacuation

Residents inhabit near the landslide location 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.

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 is near culvert no. 5/3 of Eheliyagoda-Dehiovita Road (B110). Land ownership is private. Well grown trees such as Rubber, Jack fruit, Areca nut are grown at the site. These plants are the primary or secondary income source of these families inhabit in the area. A stream runs about 30m down slope from the road.Slope modifications at the locations have not followed engineering slope stability norms. Also the drainage management at the site is poor. A stream runs through the down slope is facing the potential degradation in the event of landslide activation.

4.2. Current Level of Risk

Upper slope above the crown is consisted of tension cracks and boulders. There are about 5 families reside at the upper slope. Slop failure has to be rectified to prevent potential disaster. Possible soil mass or debris flow will directly impact the traffic movements along the Eheliyagoda-Dehiovita Road. Passengers use the road to travel between Eheliyagoda-Dehiovita face the danger of injury or loss of life. Further, life and property of occupants in the upper slope and downslope area and their source of livelihood are exposed to landslide threat.

5. DESCRIPTION OF THE WORKS ENVISAGE UNDER THE PROJECT

The proposed mitigation measures aims to ensure that the further cutting failure 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 Eheliyagoda-Dehiovita Road (B110).
- Houses at risk of slope failure and the occupants of those houses.
- Home gardens consist of valuable trees in upper slope and downslope area.

Figure 05 (a) – Natural slope has been altered as the result inappropriate vertical cut for road construction.

Figure 05 (b) – House locate at the potential slope failure location is prepared to move safer location.

	
Figure 05 (c) – Location of house with retaining wall adjascent to landslide mitigation site.	Figure 05 (d) – House locate below the road. Residents not bother about potetial above the house.

Figure 04: 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.

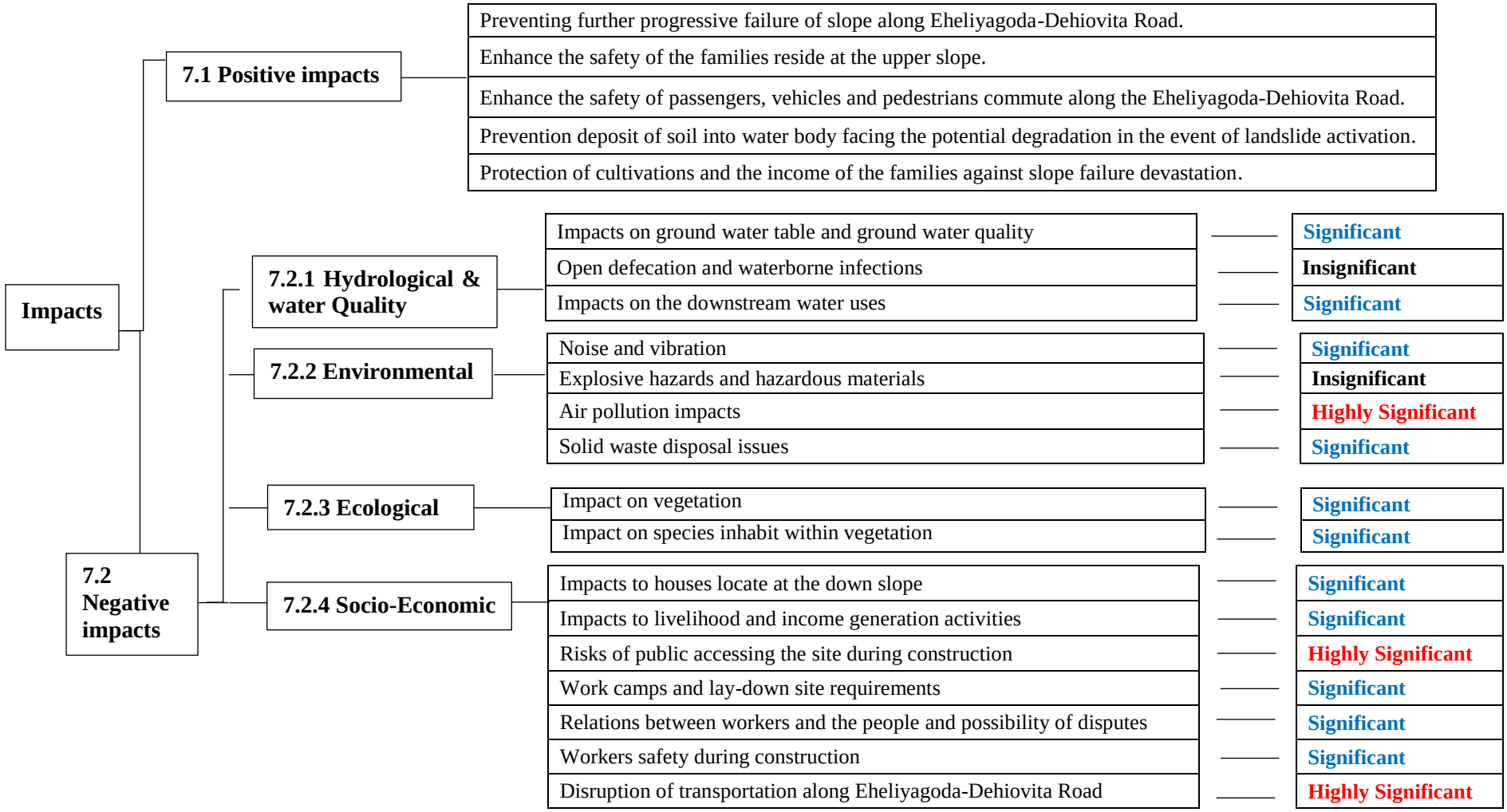

Figure 06: Summary of positive and negative impacts of the project execution and significance of those impacts

7.1. Positive Impacts

The proposed measures aims at mitigating the slope failure. Below are the positive impacts of executing slope mitigation measures.

- Preventing further progressive failure of slope along Eheliyagoda-Dehiovita Road.
- Enhance the safety of the families reside at the upper slope.
- Enhance the safety of passengers, vehicles and pedestrians commute along the Eheliyagoda-Dehiovita 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.

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 Impacts on ground water table and ground water quality Dewatering during construction could lead to lowering groundwater table when the aquifer is over drained. Mixing of construction materials including cements and other grout materials use for soil strengthening with sub-surface water flows will cause temporary water quality degradation and accumulation of unwanted substances. During the construction period, the hazardous waste from chemical substances, waste water from the construction activities and discharge of waste matter from onsite septic systems would cause adverse impacts on the ground water quality. This is important when the downslope water users in the area rely on those groundwater sources for uses such as a drinking, bathing and washing. Due to the construction activities at the slope area, the ground water table tends to draw down causing water seepage close to the road to dry out.	**Significant**
7.2.1.2 Open defecation and waterborne infections There are occupied houses within the landslide mitigation site. The site is located adjacent to Eheliyagoda-Dehiovita Road. Therefore, possibility for open defecation is low.	**InSignificant**
7.2.1.3 Impacts on the downstream water uses The construction activities will be carried out on already disturbed slope. Therefore, the area is prone to erosion during the construction phase. This may increase the sediment load in the stream flowing adjacent to the unstable land having clean water. Possibility of water contamination is high due to construction activities especially during rainy season. Impacts on water quality will be high as the emissions will exceed the ambient water quality standards prescribed for designated uses such as drinking, bathing, and aquaculture and may violate even the minimum standards.	**Significant**

7.2.2 Environmental Impacts	
7.2.2.1 Noise and vibration impacts Noise and vibration are expected emanate from machinery during construction. Noise and vibration generate from the machinery can cause adverse impacts to those residing within slope mitigation site. Noise will disturb the activities of those households as well.	**Significant**
7.2.2.2 Explosive hazards and hazardous materials Since the affected area has no rock boulders, explosives may not be used and the rock blasting is not envisaged.	**Insignificant**
7.2.2.3 Air pollution impacts Potential impacts on the air quality is possible due to fugitive dust and the exhaust gases generated in and around the construction site due to vehicular movement and site clearance, storage and handling of construction materials such as sand, cement, etc. Air pollution impacts from construction is highly significant during dry periods. Occupants of the neighboring houses, workers, commuters and pedestrians will face the impacts of air pollution as the proposed site is located adjoining to Eheliyagoda-Dehiovita Road.	**Highly Significant**
7.2.2.4 Solid waste disposal issues Poor management of solid waste such as litter, food waste, and construction waste may cause inconveniences to road users, occupants of the neighboring houses and the workers. Also, waste can block the water seepages in the area to create breeding grounds for water borne refection vectors. Waste can pollute soil, and leave various environmental impacts if proper disposal mechanism is not in place during the construction period.	**Significant**
7.2.3 Ecological Impacts	
7.2.3.1 Impact on vegetation Majority of the trees found in the surrounding environment is not endemic, threatened and identified in the red list of IUCN. However, the dominant trees such as Rubber, Jack fruit, Areca nut are grown at the location. Construction will lead to removal of these vegetation and will have impact on income earning of the planters.	**Significant**
7.2.3.2 Impact on species inhabit within vegetation Because of the slope mitigation area is covered with vegetation species inhabit within the vegetation. Construction will lead to removal of vegetation at the site that will have negative impacts on the species.	**Significant**
7.2.4 Socio-Economic Impacts	
7.2.4.1 Impacts to houses locate within mitigation location There are about 5 families reside at the upper slope. Upper slope above the crown is consisted of tension cracks. Machinery will be used during the construction. As the result of vibration generate by the machineries may cause cracks on adjoining buildings. Vibration can affect the stability of the nearby houses.	**Significant**

7.2.4.2 Impacts on livelihood and income generation activities Rubber, Jack fruit, Areca nut are grown at the location. Construction may lead to removal of these trees or limit the access to engage in cultivation. This will have impact on income earning of the planters.	**Significant**
7.2.4.3 Risks of public accessing the site during construction Machineries will be used for the construction at the site where commuters, residents will access the site. Construction may use hard materials such as metal aggregates, steel etc. which can be injurious under improper storage and handling. Children of the neighboring residents may be attracted to these machineries and materials may enter the site without the knowledge of site staff. Ignorance of entry of public and careless operation of machinery can cause fatal injuries and accidents to children.	**Highly Significant**
7.2.4.4 Work camps and lay-down site requirements The camps site will be selected at the neighborhood of the residents. If proper camp management is not in place it may result several labour issues, social issues with community, conflicts for sharing resources with the community, nuisances, and management of waste etc. If temporary camps are built in close proximity of the site, management of solid waste and sewage will be an issue.	**Significant**
7.2.4.5 Relations between workers and the people and possibility of disputes Construction workers will be from different social backgrounds and from different geographical areas. Usually, laborers are with poor in educational and social background. Laborers may have a wide range of social issues to cause distress to commuters and the residents in nearby houses. Although workers who would engage in such issues will be rare, even few possibilities cannot be ignored.	**Significant**
7.2.4.6 Workers safety during construction The workers may be exposed to risk from facing road accidents. Fatal injuries may occur due to the ignorance of workers. Heavy construction machineries may be used within limited work spaces. Risk of hazard from vehicles and construction machineries accidents is also highly significant at this site. Contractor may engage child labors for construction work, which is risky and can results serious accidents and injuries. Use of fire around the site may cause explosions with the close proximity to fuels creating a hazard zone for workers.	**Significant**
7.2.4.7 Disruption of transportation along Eheliyagoda-Dehiovita Road Material and machinery transportation to the site may block the transportation along Eheliyagoda-Dehiovita road and may cause impact on daily activities of the commuters.	**Highly 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 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 private 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 during constructions.

10.5 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. Site Planning During site planning it is necessary to be cautious on possible slope failure along Eheliyagoda-Dehiovita Road. Vehicle parking sites, material storage and temporary shelters etc. should not be installed in the danger zones. Road reservation areas may be utilized for construction work under authorization of the Road Development Authority.	High
iii. 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 etc. Designs should include habitat connectivity features, animal trails and vegetation strips and etc.	Low
iv. Conservation of water resources If extraction of water is involving as a mitigation measure, as the extracted water is in a good quality and yield it can be considered as a source of water for houses in the surrounding area.	High
v. 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
vi. 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
vii. Workers/ commuters and community safety As the construction activities are carried adjoining to road people may face accidents during the construction phase. Slope may fail during construction phase and may pose threat to workers, individuals access the site from neighboring houses and commuters. Therefore, design based safety consideration such as berms, safety nets etc. should be considered.	High
viii. Erosion control structures During rainy season possibility of erosion from the slope is high. Hence the design should adequately consider soil erosion and pollution of water sources. This should be an inclusive part of the design.	High
ix. Low post maintenance and operation designs 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. Materials use for structures should be chosen carefully to withstand weather conditions with high durability. Designs should specially consider corrosion prevention techniques and low cost maintenance.	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 contractors 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 (railway passengers, occupants of neighbouring houses)
2002.2 17)	Utilities and roadside amenities	Highly relevant (houses, railway lines)
2002.2 18)	Visual environment enhancement	Relevant
2002-5. Environmental Monitoring	Baseline surveys (air, water, noise, vibration, crack surveys)	Refer site specific monitoring plan
	Surveys during construction (air, water, noise, vibration, crack surveys)	Refer site specific monitoring plan
	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 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. If the wasp nest is in the vicinity, it is mandatory to use Evacuation Centers for ensure of workers' safety vii. Work should be discontinued for sufficient time period during rainy period as working on unstable land will be highly risky in the rainy season. viii. Contractor should prepare temporary sanitary facilities for the workforce within the site.	Construction	• PMU • Contractor
iii. 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
iv. Planning project activities As the contractor has to operate adjacent to Eheliyagoda-Dehiovita 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
v. 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

vi. 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
vii. Disposal of construction waste The contractor should pay special attention with respect to disposal of construction waste. This site is located along Eheliyagoda-Dehiovita Road. There are residents 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 in home gardens or into the wells.	Site preparation & construction	• Contractor
viii. 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
ix. Water for construction Water for construction works should be acquired only from approved sources.	Construction	• Contractor
x. 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 • Road Development Authority
xi. Impact on service infrastructure Telecommunication, electricity, water supply lines should be relocated before construction begins.	Construction	• Contractor
xii. Workers 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

10.7.3 Monitoring requirements specific to the site

Monitoring plan in table 05 strongly emphasize the parameters should be measured 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 rubber plantation (private). S.P. K Bathinagoda stated that he is 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. 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.

13. 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 Dehiyovita 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.
13.3 Consent/ no objection/ legally bound agreement from the private land ownerships	
Land owner (Rubber Plantation)	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, staff and users of Eheliyagoda-Dehiovita 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

Consultation with occupants

House located close to the mitigation site

Mitigation area