REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

Site No. 157
Rockfall site at Beragala - Haputale Road (A016) between 3.85 km and 4.2 km

Badulla District

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Prepared for:

ASIAN INFRASTRUCTURE INVESTMENT BANK

Prepared by:

National Building Research Organisation
99/1, Jawatta Rd | Colombo 05
Tel: 011-2588946, 011-2503431, 0112-2500354

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Abbreviations

AIIB	Asian Infrastructure Investment Bank
CEA	Central Environmental Authority
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
SSE&SMP	Site Specific Environmental and Social Management Plan
ESMP	Environmental and Social Management Plan
GN	Grama Niladhari
GOSL	Government of Sri Lanka
GSMB	Geological Surveys & Mines Bureau
NBRO	National Building Research Organisation
PRDA	Provincial Road Development Authority
RHS	Right Hand Side
LHS	Left Hand Side

1. Introduction

1.1 Project overview

The Government of Sri Lanka has received a loan from the Asian Infrastructure Investment Bank (AIIB) for mitigating/rectifying unstable slopes in high-risk areas especially in 13 districts of 06 provinces of the country under the Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP). 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 the application of AIIB safeguards and national environmental and social mandates during the implementation of project actions. The project implementing agency (NBRO) is expected 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 minimal.

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 specifically to site conditions. Therefore, the ESMF has recommended 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 the **Rock fall at Beragala - Haputale Road (A16) between 3.85 km and 4.2 km** selected for mitigation under RLVMMP. This plan has been prepared by an in-depth environmental and social assessment to:

i. Identify sensitive environmental and social elements in the project influence area
ii. Identify significant environmental and social impacts due to project actions
iii. Propose mitigation measures
iv. Decide appropriate environmental and social monitoring requirements specific to this project
v. Study relevant environmental regulations and procedures to be followed during project implementation specific to the site

1.2 Intended users

The document provides an in-depth insight into site-specific environmental and social issues associated with the proposed project and the mitigation measures and intends to be used by the landslide mitigation design team, the PMU, and the contractor in the implementation of the Environmental and Social Management component of the project. The SSE&SMP is published on the project website (https://rlvmmp.lk/) and can be viewed by a wide range of interested parties (public, stakeholder organizations) can be utilized by the contractors for the project 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 (SSE-SMAP) prior to commencing works.

2. Description of the project

2.1 Name of the project

Rectification of Site No. 157, Badulla District, for **Rock fall at Beragala - Haputale Road (A16) between 3.85km and 4.2km**

2.2 Location details

The proposed mitigation site falls under 157/G Viharagala GN division of Haldummulla DS division, Badulla District, Uva Province.
GPS references of the site– 6.75904444°N and 80.94681944°E

Nearest town and accessibility to the site – Haputale

Haputale town is about 3.7 km from the site. The site can be accessed via Beragala - Haputale (A16). (*Ref. fig. 1*)

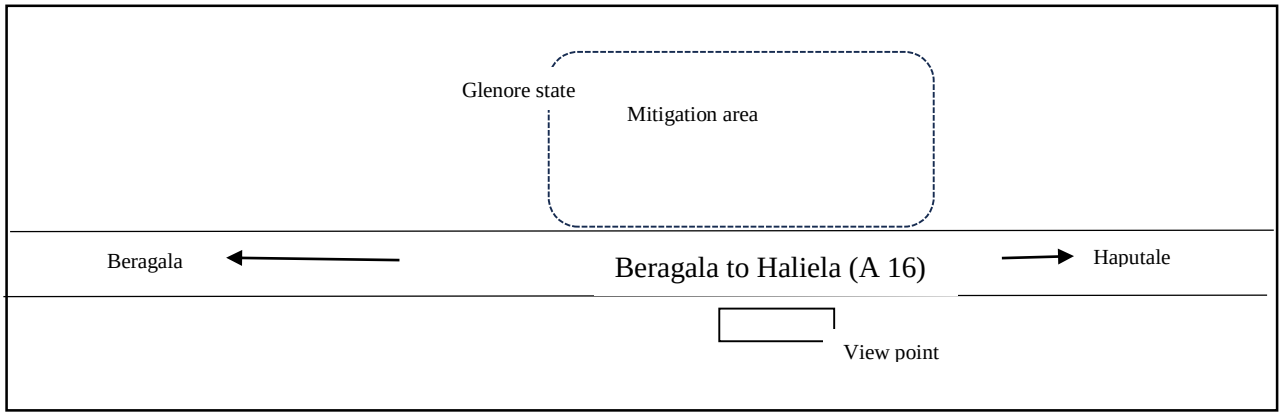

Figure 1:Road map showing the accessibility to the site

2.3 Topography and Land Ownership

The proposed mitigation site is located within a steep sloppy estate land and road reservation area. The elevation of the area is 4000 ft. The extent of the site proposed to be mitigated is about 25,000 m^2. The rock-falling risk area is located in a steep sloppy terrain where the natural slope has been cut for the road construction. The land ownership of the plantation land is Glenore Estate and the road reservation is owned by Road Development Authority. *Refer figure 2; Google images of the proposed landslide mitigation site, the surrounding environmental features and service infrastructure.*

Figure 2: Google image of the proposed landslide mitigation site, the surrounding environmental features and service infrastructure

2.4 Meteorology of the area

Annual average rainfall – 389.67 mm

Annual temperature – 23.48ºC
(Source: https://weatherandclimate.com - Haputale)

3. Rock fall hazard incident details

3.1 Account of incident

According to the Grama Niladhari, residents and vendors of the area, rock falls have occurred at this location frequently in this area, during periods of rainfall, causing obstructions to transportation. The first rock fall incident occurred due to the road reconstruction in the 2005 – 2006 period. This first rock fall occurrence was at the left-hand side (LHS) on the A016 road to Badulla. During the incident, the fallen rock boulders obstructed the traffic fleet, tourism and business activities of the area. (*Refer to Fig 3: cross sections, land use, of the location).*

3.2 Effects and consequences of Rock fall

No accidents, causalities, or physical damages to the road or nearby shops were recorded due to the rock fall incidents.

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

None of a remedial measure has been taken to the potential risk.

3.4 Evacuations

There are no risks for houses to be evacuation.

3.5 Resettlement (progress)

There are no risk houses to be resettled.

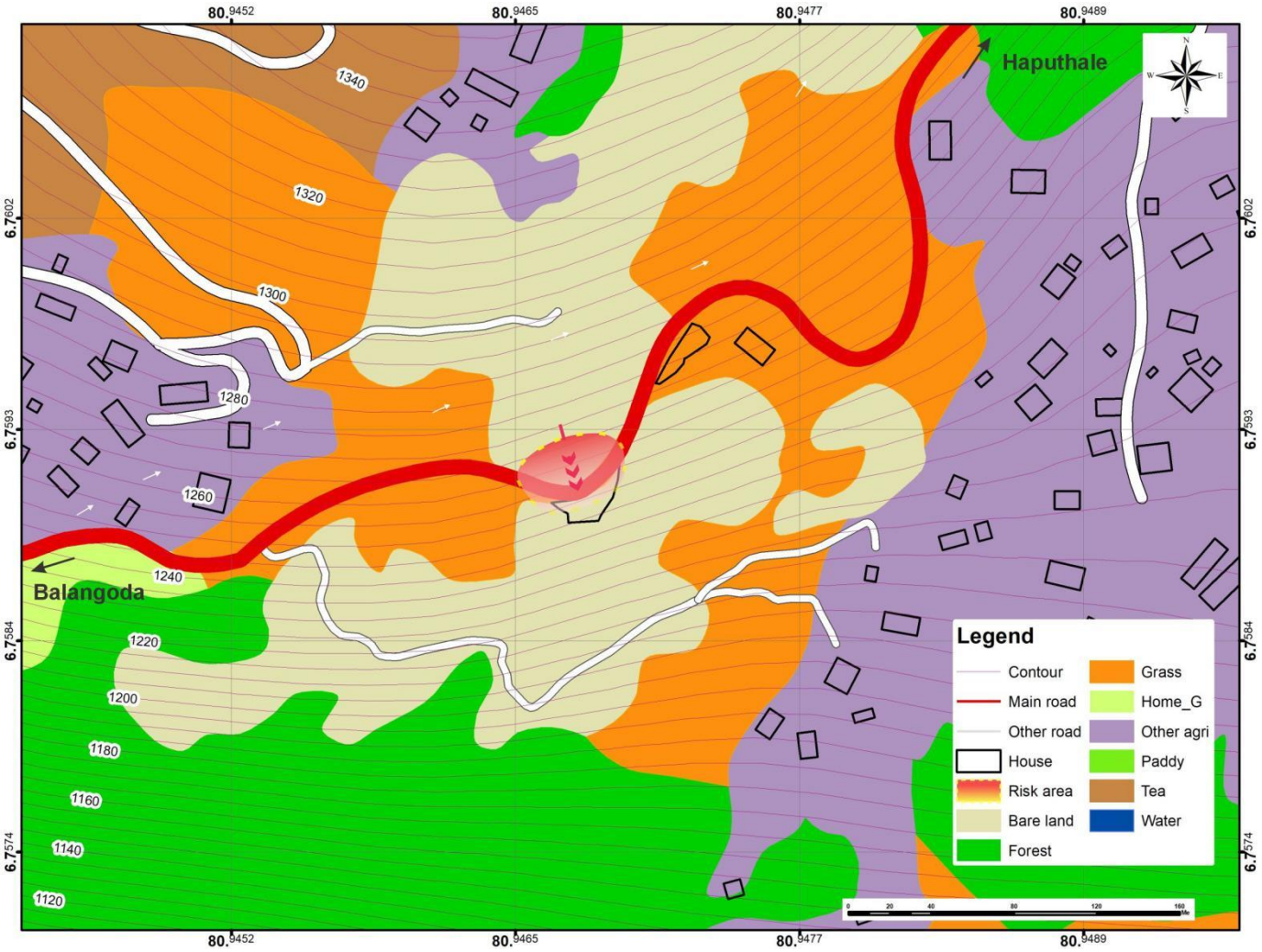

Figure 3:Land use and risk elements of the location

4. Description of the area of the rock fall and areas adjacent to the rock fall and current level of risk

4.1 Area of the rock fall

According to the report on "Rectification Proposal for Rock fall Site", the rock fall and slope instability area is located in an area where the slope had been cut to provide widened space to reconstruct the road near the 4th km post in Beragala Haputale (A016) road at the LHS towards Haputale. The section of the road is below a steep and large slope.

According to the field examination, the geologists made the following observations.

- The unstable rock slope is nearly vertical with the rock type of the area identified as Garnet gneiss.
- The exposed bedrock at the road cut is moderately weathered, with several prominent discontinuities. The orientation of these discontinuities leads the rock to break into boulders/fragments that may eventually fall or topple onto the road.
- A number of such unstable hanging boulders are seen at high elevations along the road trace.
- Several boulders in the section between 4.1 km to 4.2 km, have detached from the parent rock and remain on the slope in an unstable condition.
- Water infiltration and sudden increase of water pressure in discontinuities and surface erosion by intensive runoff might trigger future Rock falls.
- Many of the unstable boulders are connected, meaning the detachment of one boulder could destabilize the entire system.
- The rock fall will affect a road length of approximately 400 m.

The upslope area of the mitigation site is owned by the Glenore Estate of Agarapathana plantation called "Viharagala waththa". Turpentine trees, and shrubs dominate the vegetation of the upslope while ground vegetation is with grasses. The area consists of occasional rock boulders. A famous tourist viewpoint is located in front of the unstable rock and five districts (Monaragala, Ratnapura, Galle, Matara and Hambantota,) can be seen from that viewpoint remarkably.
The affected road; Beragala to Haputale is the only main access road to the Badulla area which provides the facilities and services to the people. The downslope area is also a steep slope. At the further downslope, an estate settlement called "Viharagala Colony is located.

4.2 Areas adjacent to the rock fall

The surrounding area of the unstable rock fall slope section contains mostly grass and small tree species and the area is mountainous with steep slopes. A small vegetable stall and a roadside hut are located adjacent to the rock fall slope. The land ownership of the downslope area is LRC. Around 60 families are living at Viharagala Colony in the downslope settlement area, the houses are at very low risk.

Many famous natural scenic places and tourist attractive places are located around the unstable area. Both local and foreign tourists visit these places through the Beragala- Haputale main road. The viewpoint of the five districts is one of the most popular destinations and tourist attraction viewpoints among all who pass this road. There are also many tourists' attractions around the area where people use Beragala Haputale road to visit these places. Some of these tourist attractions are Adisham Bungalow in Haputale, Liption's Seat, Ravana Falls, Ella, Badulla, and Nuwaraeliya etc.

4.3 Current level of risk

The geological features in the road section indicate a high potential for further Rock fall. If the site is not rectified to prevent future rock falls, it will disturb all functions of vehicle transportation between Beragala and Haputale. The commuters, pedestrians, tourists, shop owners, downslope community, and their livelihood activities would be at risk due to this unstable rock fall slope section. The obstruction

of accessibility may pose a significant impact on the tourism sector of the country, lifeline facilities, services, and related economic activities including transactions.

Since the area depends on agriculture and tourism, and national roads are highly important in terms of transporting agricultural produce to the market and transporting tourists, the temporary closure of the road due to rock falls causes significant damage to the local economy. They want to engage in agriculture and tourism in a safe environment without the risk of disasters.

5. Description of the works envisaged under the project

Based on preliminary investigations, NBRO has carried out detailed investigations and designed suitable rectification measures to minimize the risk posed by this unstable rock fall section to ensure the safety of the commuters, and tourists, and the continued and uninterrupted function of this main road. The proposed design proposal addressed the following

- Avoidance of sudden increase of water pressure in the discontinuities
- Removal of unstable rock fragments by chemical/ control blasting techniques based on the location-specific situation

6. Brief description of 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;

i. Beragala to Haputale road near 4 km post
ii. Commuters and pedestrians
iii. Viewpoint, local and foreign tourists
iv. Downslope settlement and residents
v. Small vegetable stall and other small boutique
vi. Current services, economic and tourism activities of the area

(Ref. Fig.5 Sensitive elements that may be affected by the project actions

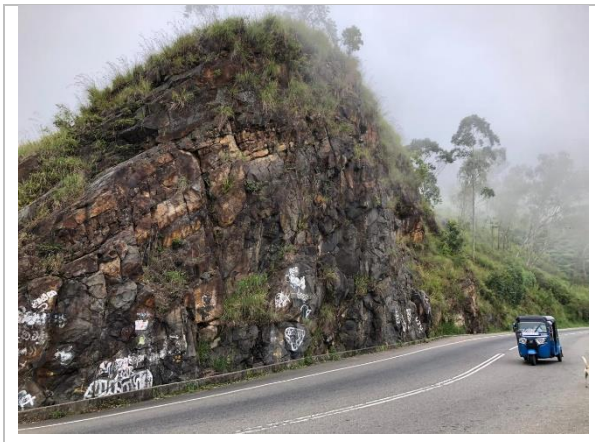

Figure 5a: View of Upslope with loose rock boulders

Figure 5b: Downslope area

Figure 5c: Downslope viewpoint tourists and merchants

Figure 5d: Rock boulders rest at the downslope

Figure 5e: Unstable rock boulders located at upslope

Figure 5f: Roadside hut

Figure 5g: Small Vegetable stall, owned by Mr. T.Ringasami

Figure 5h: 5 Beragala Haputale road (RHS)

Figure 5: Sensitive elements that may be affected by the project actions

7. Identification of social and environmental impacts and risks related to the works

7.1 Positive impacts

- The objective of this project is to ensure that further occurrences of rock falls are prevented at an acceptable level the remediation may secure the cost of road rehabilitation from future rock falls in the area. This area is considered by many to be one of the most scenic areas in Sri Lanka. This area has population centers such as Badulla and Haputale and many tourist

destinations. The Colombo Badulla Road passes through the tea estates, pine forests, waterfalls, bridges, etc. The proposed project will significantly enhance the safety of the road for commuters, tourists, pilgrims, and pedestrians during the rainy season and will allow keeping the road open throughout the year.

- Small scale business activities related tourism in the area will benefit largely from this mitigation.
- Downslope community and settlements will be prevented from rock falls of future slope failures.

7.2 Negative impacts

The mitigation works are generally confined to already rock-fall areas. Therefore, negative impacts are much localized and also limited to the 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 of the drainage pattern of the area Disruption to existing surface and sub-surface drainage patterns in the area is envisaged with the project implementation. During the rainy season, a heavy flow of water is expected to be generated and accumulated between the road and the slope. The water inundation of the existing drainage may be expected. An increase of water through the unstable slope may intensify the risk of rock fall in the unstable section.	**Significant**
7.2.1.2 Water pollution and impacts on surface water quality During the slope excavation, the removal of debris and rocks can generate high sediment-laden runoff during rains, there could be a possibility that contaminated runoff may pollute the water. Improper disposal of oils and other harmful substances/contaminants from machinery, leakages from temporary storage tanks, solid waste, and wastewater disposal/dumping could occur causing adverse impacts on the quality of the water. However, during the rainy season, the rainwater running through the disturbed slope tends to pick up sediment, oil, and other pollutants generated during construction can contaminate the water. As there is no stream nearby, the water pollution impact is insignificant.	**Insignificant**
7.2.1.3 Open defecation and waterborne infections As the site is located close to the road, the possibility of open defecation is low.	**Low Significant**
7.2.1.4 Impacts on the downslope water users The construction activities will be carried out on steep slopes consisting of unstable rocks. As there is no water stream in the downslope area, the rock or sediment loading impact is insignificant.	**Insignificant**
7.2.1.6 Impacts on groundwater table and groundwater quality Addition or mixing of construction materials including cement, grout materials 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, wastewater from the construction activities, and discharge of waste matter from onsite septic systems would cause adverse impacts on the groundwater quality as the water downstream may be used by the residents. Due to the mitigatory activities carried out in the slope area, the groundwater quality or water table draw-down impacts will not be significant because there are no groundwater sources in that area.	**Insignificant**

7.2.1.7 Impacts on water or wetlands Improper disposal of oils and other harmful substances/contaminants from machinery, leakages from temporary storage tanks, solid waste, and wastewater disposal/dumping from workers' sites could occur causing adverse impacts on the quality of the water. This impact may not be significant as there are no water streams nearby.	**Insignificant**
7.2.2 Environmental Impacts	
7.2.2.1 Noise and Vibration Impacts Noise and vibration are expected from construction equipment. The vendors, pedestrians, and commuters on roads will also be affected by noise and vibration. The commuters, and tourists at the viewpoint will be exposed to high noise during heavy noise-generating activities, such as operating loading, and unloading of materials, movement of machinery in addition to above mentioned construction works.	**Highly Significant**
7.2.2.2 Air pollution impacts Construction activities that contribute to air pollution include land clearing, operation of diesel engines, demolition, and burning. Operating vehicles at high speed under dry weather conditions can increase such pollution. Improper handling and transferring of materials can also generate dust. Improper storage of materials can potentially generate dust if not properly covered. During construction, it generates high levels of dust typically from concrete, cement, wood, stone, and silica. The road is used heavily for vehicles moving (buses, bicycles, lorries, trucks, tippers, three wheels). The air pollution may have a significant impact on the tourists on the view point, commuters, and pedestrians. The air pollution impacts from the construction are locally significant during dry periods for commuters, vendors and tourists.	**Highly Significant**
7.2.2.3 Solid Waste Disposal Issues Haphazard disposal of solid waste; various types of waste such as litter, food waste, and construction waste will be generated and may be stored or disposed of site. The littering and haphazard storage and disposal of solid waste in and around the site will create inconveniences to commuters, pedestrians, tourists on the viewpoint, and nearby vendors. It can block the drainage to make breeding grounds for waterborne diseases. Waste can pollute the soil, and leave various environmental impacts if a proper disposal mechanism is not in place during the construction period.	**Highly Significant**
7.2.2.4 Explosive hazards and hazardous materials Since the affected area has many rock boulders, explosives may be used if the rock blasting is envisaged. This may pose a risk due to unsafe use. As these operations are to be done on affected slopes the risk of improper use of explosives and accidents from rock fragments are highly significant.	**Highly Significant**
7.2.3 Biological /Ecological Impacts	
7.2.3.1 Effects of Important Wildlife Habitats There are no forested/ wild-life reservation areas within the project influence area with high biodiversity.	**Insignificant**
7.2.3.2 Effects on Fauna & Flora Majority of the trees found in the area are not endemic, threatened, and identified in the red list of IUCN.	**Insignificant**
7.2.4 Social and Economic Impacts	

7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site There is no cultivation immediately adjacent to the rock fall slope area. During the construction period, the land use pattern may not be affected.	**Insignificant**
7.2.4.2 Cracks in the road/houses due to vibration and blasting impacts The unstable rock fall land is located adjacent to a road. Vibrations can create cracks in the road . Rock falls can create damages to the road.	**Highly Significant**
7.2.4.3 Loosing access to land and future development activities The land where the project activities are envisaged belongs to Glenore Estate and the road reservation of RDA and the mitigation works will be concentrated on the upslope of the road. There is no requirement to access the upslope area as it consists of exposed bedrock at the road cut is moderately weathered rock. Hence there will be no impacts to the landowners about losing access to the land (during construction) and loss of valuable use of the land. In the contrary, remediation works in the upslope will increase the stability of the boundary and protect the land from future rock falls.	**Insignificant**
7.2.4.4 Impacts on livelihood/ business and income activities The tourism activities related to the viewpoint immediately adjacent to the unstable rock fall site would be affected during the construction period. Both local and foreign tourists, small business owners, and vehicle parking facilities	**Highly Significant**
7.2.4.5 Impacts on service provision (water supply, sewage, electricity) The road, electricity, and water supply lines running through the mitigation area will be impacted.	**Significant**
7.2.4.6 Effect due to loss of infrastructure and safety During the construction phase, the main road from Beragala to Haputale Road will be obstructed by frequently moving machinery, loaders, trucks, etc. as the road is very narrow and bending. Therefore, most of the heavy machinery, trucks, and loaders can obstruct the pedestrian passage, and viewpoint parking area and cause traffic during the construction period.	**Significant**
7.2.4.7 Work camps and lay-down site requirements The camps site will be selected in the neighbourhood of community. If proper camp management is not in place, it may result several labour issues, social issues with community, conflicts for shared resources with the community, nuisances, and management of waste etc. If temporary camps are built in the close proximity of the site, management of solid waste and sewage will be an issue.	**Significant**
7.2.4.8 Relations between workers and people living in the vicinity of the site and possibility of disputes The construction workers at this site will be from different social backgrounds and from different geographical areas often in poverty. Usually, they are from poor educational and social backgrounds. Such communities may have a wide range of social issues to cause distress to the neighboring community and the workers of the project. Although the workers who would engage in such issues will be rare, even a few possibilities cannot be ignored.	**Highly Significant**
7.2.4.9 Workers safety during construction The workers may be exposed to the risk of falling. Fatal injuries may occur if the rock falls. The risk of rock fall is aggravated during the rainy season. This risk is highly significant. The risk of hazard from vehicle and construction machinery accidents is highly significant at this site. Contractors may engage underage workers (children) in construction work, which is risky and can result in serious accidents and injuries.	**Highly Significant**

7.2.4.10 Safety to the public from construction activities: High risk for commuters/tourists During construction phase the road will be obstructed by the 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 commuter /pedestrian passage/tourists/vendors and may pose high risk on their life. There is a risk of falling loose rocks on the road during excavations and removal of rocks posing risk on the commuters.	**Highly Significant**
7.2.4.11 Impacts on transport infrastructure (especially temporary loss of road, risks of traffic congestion) The traffic due to full/partial road closure may obstruct the smooth flow of vehicles during the week days, in office hours, school times, on holy days. This will cause nuisance to pedestrians and commuters	**Significant**
7.**2.4.12 Areas used for businesses, agriculture or other immediately adjacent to the site**	**Less Significant**
7.2.4.13 Need for people to enter or cross the site Excavation machinery, loaders, trucks etc. will be used in the area used to access in to the unstable slope area. There is no special need for commuters and neighbouring community to enter the site for other purposes. Construction may use materials such as metal aggregates, steel etc. which can be injurious under improper storage and handling. However, unauthorized entry of ordinary people may occur due to intentional or unintentional purposes and they may be at risk due to operating machinery, vehicles, electricity, and may be blasting materials.	**Highly Significant**

8. Site Specific Risk Analysis

Table 2: Site specific risk analysis

Risk	Affected group	Risk level
1. Facing accidents when working close to the road (as there is a large bend close to the site)	Workers	Very high
2. Transporting materials and machinery	Workers/ businessmen	Very high
3. Throw out disposals (litter, bottles, and food) to the construction site from the commuters.	Workers/tourists/ businessmen / commuters	Very high
4. Facing accidents during construction at night time	Workers	Very high
5. Accidents from the construction activities and materials placed close to the road	Workers/tourists/ businessmen /Commuters	Very high
6. Injuries due to rock particles due to explosions/ blasting	Workers/tourists/ businessmen /Commuters	Very High
7. Rock fall from the unstable area	Workers/tourists/businessmen/Commuters	High
8. Work with electrified supply lines	Workers	High
9. Site Working – Working in poor visibility	Workers	High
10. Lone Working	Workers	High
11. Emergency evacuation	Workers	High

12. Extreme weather conditions (wind, rain, mist, fog etc.)	Workers	High

9. Significant Environmental and Social Impacts

Environmental, and social impacts or risks that will require special attention on the part of NBRO.

9.1 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 unstable slope with a risk of falling. Such common E & HS 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.

9.2 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 Social Management Plan (ESMP)

Measures to manage and or mitigate the impacts and risk. Especially the significant impacts and risks identified in sections 7 & 8. This section will include the specific recommendations and requirements of the ESMP for design stage, construction phase and maintenance operation phase.

10.1 Resettlement action plan

There is no project-based resettlement in this site.

10.2Evacuation of people

Project based evacuations are not required for this site.

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

This risk may not be triggered in this site.

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

This risk may not be triggered in this site.

10.5 Public awareness and education- needed for following areas

i. Programs to inform and educate people in the vicinity and the business community related view point about the risks posed by unstable rock land section.
ii. Requirement for special awareness for tourists, commuters and the people passing through the area using the road with potentially high-risk during construction phase and early warning.

10.6 Design based Environmental/ Social Management considerations

The site is located in an aesthetically beautiful, environmentally sensitive natural environment in the rural setup. Hence, following environmentally and socially significant design considerations are recommended.

Table 3: Design stage Environmental & Social considerations

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.	Very High
ii. Site Planning During site planning, it is necessary to be cautious about possible re-activation of rock falls. Also, the site is located in a very limited space of a slope with a road. The vehicle parking sites, material storage temporary shelters etc. should not be installed in the danger zones of the rock falls. It is very necessary to keep a trained flagman or safety officer during the construction period and proper communication between contractor's workforce and the other responsible officials should be maintained.	Very 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, 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 impacts are localized.	Moderate
iv. 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 .	Low
v. 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.	Low
vi. 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. Greening could be used in construction activities to develop the area as a tourist attraction. Service of landscape architect may be important for the design of suitable mitigation structures.	Very High for upslope area
vii. Consideration of green environmental features As many of the mitigatory works are carried out in ecologically sensitive habitats, it is recommended to consider green environmental designs as much as possible in the designs e.g.: use of local vegetation species for erosion control, combination of plants to sustain species diversity in the environment, avoiding inclusion of potentially invasive species & etc.	Very High for upslope area
viii. Conservation of environmental, social and cultural features The local cultures and heritages are strengthened by their close connections to the natural environment that sustains them. The area of RHS of the Beragala to Haputale road section is gazetted under the gazette number 1773 dated 24th of August 2012 titled "The view from Beragala Junction to Uda Viharagala" as the most beautiful view point in the Asia. Five districts can be seen at one view point. Any constructions of closing this view is prohibited under the gazette. Therefore, the project actions should be carried out considering this gazette announcement of the government, providing opportunities to reinforce the tourism during the project actions.	Very High

ix. Workers/ commuters and community safety Due to the close proximity to the roads people may face accidents specially the workforce during the construction phase. Unauthorized entry and ignorance may cause severe accidents around the site. Activation of slides or ground subsidence may occur during construction phase and may pose threat to workers of RDA, tourists, businessmen, passengers and commuters. Therefore, design-based safety consideration such as beams, safety nets etc. should be considered.	Very high
x. Erosion control structures During rainy season the flow of drainage structures can be significantly high and this may cause stream bed erosion. Hence the design should adequately consider flow speed breakers to reduce erosive flows entering natural streams. This should be an inclusive part of the design if there are streams and culverts in the proximity of the mitigation site.	Low
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 summarized below (Table 4) indicating the degree of relevancy for this site. For details ESMP for construction contractors should be referred.

Table 4: Contractor requirement to comply with ES & HS

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 reservation)
2002.2 2)	Noise and Vibration	Highly relevant (commuters, tourists, pedestrians)
2002.2 3)	Cracks and damages to the buildings	Relevant
2002.2 4)	Disposal of waste	Relevant (commuters, tourists, pedestrians)
2002.2 5)	Disposal of refuse	Highly relevant (road reservation)
2002.2 6)	Dust control	Highly Relevant (commuters, tourists, pedestrians)
2002.2 7)	Transport of Construction materials and waste	Relevant
2002.2 8)	Water	Relevant
2002.2 9)	Flora and Fauna	Relevant
2002.2 10)	Physical and cultural resources	Relevant
2002.2 11)	Soil Erosion	Relevant
2002.2 12)	Soil Contamination	Relevant
2002.2 13)	Borrowing Earth	Relevant

2002.2 14)	Quarry Operations	Relevant
2002.2 15)	Maintenance vehicles and Machinery	Relevant
2002.2 16)	Disruption to public	Highly relevant (community, tourists nearby)
2002.2 17)	Utilities and roadside amenities	Highly relevant (road)
2002.2 18)	Visual environment enhancement	Highly relevant (Aesthetically sensitive, gazetted road section)
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 (unsafe slope, commuters, tourists, pedestrians, 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 that the project is expected to implement during the construction period.

Table 5: Site specific ES & HS mitigation measures

Mitigation item	Project implementation phase	Responsibility
i. Minimize erosional impacts during construction It is recommended that mitigation works involved with site clearance, slope reshaping, removal of rocks, etc. are avoided during the rainy season. Therefore, it is imperative that site works in upslope mitigation are carried out in the dry season and avoid such activities on upslope areas in the wet season as much as possible. This should be considered in the project planning stage. safety nets should be introduced to the removal of rock boulders.	Site preparation & construction	Construction Contractor
ii. Invasive species Should be avoided in using vegetative erosion control structures. Native plants in the local environment should be chosen for vegetative control. The species used for vegetative control measures need approval from Project Management Unit.	Construction	Construction Contractor
iii. Impacts on transport infrastructure (especially temporary loss of road access, risks of traffic congestion) A good traffic control should be implemented in the construction stage. As there is a bend on the road and the tourist viewpoint adjacent to the site proper road safety measures should be included with warning signs and permanently trained watchmen, luminous sign boards indicating slope instability risk and road obstruction signs, night lamps etc. are strongly recommended at this site.	Construction	Construction Contractor and
iv. 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 B 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. A good warning system and full time watchman is highly recommended for this site for workers, tourists, businessmen and commuter safety. iii. Safety barriers and safety nets should be installed at places of risk to protect workers and commuters from boulder falling risk adoption of standard worker safety methods iv. Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle etc. v. Provision of training and awareness programs to employees vi. Conducting hazard analysis and plan/provide adequate mitigation measures for such hazards identified, prior to carrying out major construction activities vii. If the wasp nest is in the vicinity, it is mandatory to use Evacuation Centers for ensure of workers' safety viii. Additionally, work should be discontinued for sufficient time period during rainy period and foggy times as working on unstable land will be highly risky in the rainy season	Construction	PMU Construction Contractor

v. Throw out disposals (litter, bottles, and food) to the construction site from the commuters. Put up the safety sign boards prior to the construction site indicating people at work. The commuters should be aware about the construction activities through notices erected before reaching the proposed mitigation site.	Site preparation & construction	Construction Contractor
vi.Noise from Blasting or Pre splitting Operations Blasting shall be carried out during fixed hours (preferably during mid-day), as permitted by the Engineer. The timing should be made known to all the people within 500 m (200 m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200 m (50 m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting. Use chemical blasting where rocks have to be removed for landslide mitigation measures	Site preparation & construction	Construction Contractor
vii.Minimize erosional impacts during construction It is recommended that mitigation works involved with site clearance, slope reshaping, removal of rock boulders etc. are avoided during rainy season. Therefore, it is imperative that site works in slope mitigation are carried out in the dry season and avoid such activities on slope area in the wet season as much as possible. This should be considered in project planning stage.	Site preparation & construction	Construction Contractor
viii.Disposal of construction waste The contractor should pay special attention with respect to disposal of construction waste. This site is located close to a main road in a very attractive tourist destination (view point) with a pleasing environment. All the tourists are stopped here during passing this location. Therefore, such 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 the road or into the drainage.	Site preparation & construction	Construction Contractor
ix. Onsite sanitary facilities for the workers The contractor should prepare temporary sanitary facilities for the workforce within the site, to mitigate open defecation of the workers.	Site preparation & construction	Construction Contractor
x. Dust and aerosol control screens Dust particles generated during the construction period can influence commuters and tourists. The commuters traveling on this main road especially tourists could be affected by generated dust particles. Special screens etc. should be used if heavy dust or aerosol-generating activities are envisaged.	Site preparation & construction	Construction Contractor
xi. Water for construction Water for construction works should be obtained only from the approved sites.	Construction	Construction Contractor
xii. Working hours The construction activities should be restricted to daytime only. Working after 6. p.m. is not recommended for any reason due to safety issues. Strictly careful in construction during weather conditions like high wind, high rainfall, and fog. Ref. xvii. safety especially in challenging weather conditions like fog.	Construction	Construction Contractor
xiii. safety especially in challenging weather conditions like fog. **Visibility**: Ensure that all workers have high-visibility clothing and reflective gear. Use appropriate lighting and markers to make equipment and work zones visible.	Construction	Construction Contractor

Communication: Maintain clear communication among team members. This is crucial in low visibility conditions. **Reduced speed for the vehicles**: Slow down equipment and vehicles to adjust for reduced visibility. Use fog lights and headlights, and maintain a safe following distance. **Warning signs**: Place warning signs and cones to alert approaching traffic and pedestrians to the construction site. **PPE**: Provide workers with fog-resistant safety goggles or face shields to maintain clear vision. Ensure workers wear appropriate respiratory protection if needed. **Non-slip footwear**: Ensure workers have proper footwear with good traction to prevent slips and falls on slippery surfaces. **Equipment maintenance**: Regularly check and maintain construction equipment, especially their lighting and safety features. **Weather updates**: Stay informed about changing weather conditions. Suspend work if fog becomes too dense or dangerous. **Training**: Train the team on fog-specific safety procedures and ensure they understand the importance of these precautions. **Emergency response**: Have a well-defined emergency plan in case of accidents or incidents during foggy conditions.		
xiv. Impact on service infrastructure Telecommunication, electricity, and community water lines should be relocated before construction starts as per the approval of PMU.	Construction	Construction Contractor
xv. 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	Construction Contractor
xvi. During construction good housekeeping should be maintained to minimize visual pollution	Site preparation & construction	Construction Contractor
xvii. Worker's code of conduct Possible disputes between the labor force and the commuters and tourists should be prevented by maintaining the agreed code of conduct by the contractor. Possible disputes between workforce and commuters should be avoided especially when using shared resources such as common bathing and washing places etc.	Construction	Construction Contractor

xviii. Snake bites, toxic insect bite management and emergency management by accidents Proper emergency management system for snake bites and toxic insect bite (include awareness on snake bites, safety shoes while at work, first aid on a snake bite, hospitalization and admission to correct hospital where snake bite management facilities are available) should be introduced. Accidents are common in these kinds of sites. Proper emergency management unit for other accidents (first aids facilities, safety items, hospitalization facilities and transportation facilities) should be maintained for this site.	Construction	Construction Contractor
xix.Injuries due to rock particles due to explosions/ blasting Minimize all blasting activities during peak times and making awareness announcements through the blasting period. Establish an emergency accidents preparedness plan for their injuries due to rock particles due to explosions/ blasting. Rock blasting activities should not be done during foggy time in any case. A flagman / watcher should employ during rock blasting and to control vehicle movement. Explosives may be used if the rock blasting is envisaged. This may pose risk 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 fragment are highly significant	Construction	Construction Contractor

10.7.3 Monitoring requirements specific to the site

Following monitoring plan is strongly emphasized 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. The 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 construction contractor and to be approved by the PMU unit.

Table 6: Environmental and Social monitoring plan; construction phase

Monitoring requirement	**Parameter**	**Frequency**
i. Baseline monitoring	Water quality	-
	Pre-construction crack survey of the houses in the immediate area	-
	Ground vibration (Road)	Once*
	Air quality: particulate matter	Once*
	Background noise measurement	Once*
ii. During construction	Water quality -	-
	Crack survey for the risk buildings	-
	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 National Environmental (ambient water quality) regulations, No.01 of 2019 **Pre-construction crack survey of the high-risk buildings**-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.Labour management

Sound worker-management relationships, treating workers in the project fairly and providing safe and healthy working conditions is required. Responsibility is lies with the PMU and the construction contractor.

The Objectives are;

- To promote safety and health at work.
- To promote the fair treatment, nondiscrimination and equal opportunity of project workers.
- To protect project workers, including vulnerable workers such as women, persons with disabilities, children and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.
- To prevent the use of all forms of forced labor and child labor.
- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national laws.
- To provide project workers with accessible means to raise workplace concerns.

12.Preventive measures for COVID-19 that was issued by Sri Lankan national health authority (this is applicable if Notification on Covid -19 epidemic/ endemic is issued by Health Authorities Sri Lanka)

COVID-19, the novel corona virus 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.Public and Stakeholder Consultations -the public consultations that have been and/or will be held

13.1 Public Consultations

Mr. V. Jayaraj, Administrative Officer of Glananore Estate was informed about the project works. He stated that the mitigation works are appreciable and expressed their willingness to the project. Mr, T. Ringasami, the owner of the nearby vegetable stall, was consulted during the field visit and made him aware of the mitigation project and the funding mechanism. He stated that the mitigation works are appreciable and expressed their willingness to the project.

13.2 Stakeholders involved in the consultations any recommendations or agreements reached in the consultations (Refer to Annexure II)

Mr. K.R. Niranjan, the GN Officer of the Viharagala GN Division, divisional secretariat and Mr. P.M. Indrajith, Technical Officer of the RDA-Bandarawela was informed as they are the stakeholders of this project were informed about the project and obtain their concerns (Ref. Annexure II)

14.Clearances, no objection, consent and approvals are required for the implementation of the project

Table 7: Clearances, no objection, consent and approvals

Requirement / Approval / Institution	Relevance to the project
14.1 Project implementation	
Approval from the District Secretariat	The approvals will be required and the proposals need to be presented at the District Coordinating Committee, in 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 arrived will be addressed in the ESMP, the 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 Haldummulla Pradeshiya Sabha.
14.2 Approval from the state lands owners relevant to the project	
Central Environmental Authority	Consent from District Central Environmental Authority is required as Badulla District is under the sensitive area under Soil Conservation Act 25 of 1951.
Department of Forest Department of Wildlife Conservation	As there is 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 extraction of materials, transportation and disposal of earth, rocks and mineral debris. (If necessary, only).
Haldummulla Divisional Secretariat	Approvals from Haldummulla Divisional Secretariat will be obtained for the disposal of waste and plant litter.
Ceylon Electricity Board	Approvals from regional office of Ceylon Electricity Board will be required for power supply for site operation.
National Plant Quarantine Service	Approval from Additional Director National Plant Quarantine Service Katunayake for Director General of Agriculture under the Plant Protect Act No. 35 of 1999 Plant or seed if needed for bio–Project Managed slope mitigation shall be imported into Sri Lanka under the authority and in accordance with the conditions, of a plant importation permit issued.
14.3 Consent/ no objection/ legally bound agreement from the private land ownerships	
Land owner (RDA & Glananore Estate)	Signing a legally bound agreement between the land owner and the project implementing authority allowing no-objection to remove the structures, access the land, implement construction works, and engage in long-term maintenance works

The tentative timeline for getting approval is given in the table 8.

Table 8: 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 state land owners RDA Submission of application Respond to comments Approvals								
Other approvals GSMB Ministry of Defense (Depends on the requirement)								
Consent/ no objection from the land ownership (Glananore Estate)								

15.Grievance redress mechanism for this site

The PMU ES officer is responsible for establishing the grievance redress mechanism for this site for impact communities. *(Reference: Environmental and Social Management Framework for recommended procedure for establishment of grievance redress mechanism).*

16.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 9: Proposed scheme of information disclosure

Information	**Proposed agencies**	**Mode of information disclosure**
i. Project plan (site details, design, implementation arrangements)	District CEA, District Secretariat, Divisional secretary, RDA, Other district levels 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, AIIB,	Meetings, District Coordination Committee, submission of relevant report to sign agreements, approvals and consents
iii. Monitoring reports (baseline and during construction)	District CEA, 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, RDA, Divisional secretary, Police, State Land Owners, 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, RDA, Divisional secretary, Police, State Land Owners, 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

Table 10: Level of information gathered through consulting institutions

Date	**Institution**	**Person contacted for information**
11/11/2024	Glananore Estate	Mr. V. Jayaraj, Administrative officer (0768752400) Glananore Estate Haputale
11/11/2024	Grama Niladhari – Viharagala GN division, Haldummulla divisional secretariat office	Mr. K.R. Niranjan 0728888828
12/11/2024	RDA office - Bandarawela	Mr. P.M. Indrajith, Technical Officer

Annexure I: Images of the site condition and the consultation

Consultation with Mr. T. Rangasami, vegetable stall owner

Consultation with Mr. K.R. Niranjan, the GN Officer of the Viharagala GN Division

Consultation with Mr. P.M. Indrajith, Technical Officer of the RDA-Bandarawela

Consultation with Mr. V. Jayaraj, Administrative officer of Glananore Estate

Annexure II: Report on the Stakeholder Consultation: Badulla District

Institution	**Name and designation of the contact officer**	**Concerns raised**
Central Environmental Authority	Provincial Director, Central Environmental Authority Central Province.	✓ Under the Soil Conservation Act 25 of 1951 of National Resource Management Centre, Badulla District has been gazetted as a sensitive area. ✓ Under this gazette any development is not allowed irrespective of the magnitude of the project. ✓ In a disaster this is not needed. ✓ Landslide mitigation projects are not considered projects prescribed in the Gazette. ✓ The Basic Information Questionnaire (BIQ) is needed to fill for the project and submit the application ✓ As the proposed project (mitigation) intends to reduce the risk from landslide for an emergency action CEA approval is not needed considering the priority of the project. ✓ Before project commence a request indicating the mitigation sites need. ✓ If the project is carried out in a sensitive area, even not within a prescribed project, consideration of sensitive area will govern the process.

Road Development Authority	Chief Engineer	✓ This area is under the jurisdiction of Bandarawela District RDA office ✓ The RDA has no objection and states the mitigation is very much needed. ✓ Other concerns raised • A proper handing over of the project is required after the mitigation • RDA will do the maintenance after mitigation • It is emphasized that during the construction the contractor should use Personal Protective Equipment • At all times, the contractor shall provide safe and convenient passage for vehicles, pedestrians, and traffic safety measures, barricades, flagmen and for the night work, lights and illumination should be provided. ✓ It is also stated that Construction waste/ excavated materials should not be a nuisance to public/commuters
Divisional secretariat office, Haldummulla	Grama Niladhari – Viharagala GN division	✓ This area is under the jurisdiction of Haldummulla Divisional secretariat office ✓ No any objection and states the mitigation is very much needed. ✓ Other concerns raised ● The area of RHS of the Beragala to Haputale road section is gazetted under the gazette number 1773 dated 24th of August 2012 titled "The view from Beragala Junction to Uda Viharagala" as the most beautiful view point in the Asia. Five districts can be seen at one view point. Any constructions of closing this view is prohibited under the gazette.

Annexure III: Proposed procedure for obtaining approvals from state land owners and environmental agencies.

1. **Proposed procedure by RDA for approval for implementation of landslide mitigation projects in RDA reservation areas**
   i. The design to be accepted by the RDA: The project implementing agency should submit a detailed design report to RDA with a formal request on nature of approvals required. PMU should prepare the above documents and should submit the documents to RDA regional office.
   ii. RDA regional office will evaluate the proposal and may call for a project briefing. The PMU should provide the necessary briefing as appropriate
   iii. On the approval by RDA an agreement will be signed between RDA and the Project implementing agency to access the site, erect structures, and implement mitigation works.
   iv. A condition that would include is
      - A proper handing over of the project is required after the mitigation
      - RDA will do the maintenance after mitigation
      - It is emphasized that during the construction the contractor should use Personal Protective Equipment
      - At all times, the contractor shall provide safe and convenient passage for vehicles, pedestrians, and traffic safety measures, barricades, and flagmen and for the night work, lights and illumination should be provided.
      - Construction waste/ excavated materials should not be a nuisance to public/commuters

Annexure IV: Study team

Name	Designation	Position in the study
SAMS Dissanayake	Senior Scientist/ESSD/NBRO	Senior Environmental Scientist
Prabath Liyanaarachchi	Scientist/ ESSD/NBRO	Environmental scientist, GIS/ Demographic data collection /survey, Report preparation
Asanka Sanjaya	Field Assistant	Assistant - data collection for the SSESMP
Ranil Jayawardhana	Field Assistant	Assistant - data collection for the SSESMP

Annexure: List of references

1. Contractor's obligations for Generic Environmental and Social Management Plan- Sri Lanka Landslide Mitigation Project-AIIB
2. Environmental and Social Management Framework-Sri Lanka Landslide Mitigation Project - AIIB
3. Resettlement Planning Framework- Sri Lanka Landslide Mitigation Project -AIIB
4. Felling Trees (Control) Act by Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation and Fisheries and Aquatic Resources Development
5. Census and Statistical Report (2012), Department of Census and Statistics