REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

# Site No. 153
# Unstable Rock fall /Landslide Locations
# at Kandy – Mahiyangana road (Hunnasgiriya – Digana section)

## Kandy District

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Prepared for:

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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 |
| 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 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 sites specific, and require to be addressed specific 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 **unstable rock fall /landslide locations at Kandy - Mahiyangana (A26) road (Hunnasgiriya – Digana section)** 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 in on the project website (https://rlvmmp.lk/) and can be viewed by 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.153, Kandy District, for **unstable rock fall /landslide locations at Kandy – Mahiyangana (A26) road (Hunnasgiriya – Digana section)**

2.2 Location details

Five (5) unstable locations are identified on the road stretch from culvert No. 17/3 to 38/4 of the Kandy – Mahiyanganaya (A26). All the sites are within the Kandy district of Central Province Sri Lanka. Ref, Table 1. Administrative details of mitigation locations

Table 2. Administrative details of mitigation locations

| Location number | Culvert Number | GPS coordinates | GN Division | DS Division |
|---|---|---|---|---|
| L1 | 38/4 – 38/5 | 7.29498° N<br>80.84290° E | Rambukpotha | Medadumbara |
| L2 | 31/7 – 31/9 | 7.28132°<br>80.80752° E | Doraliyadda south | Medadumbara |
| L3 | 29/3 – 29/9 | 7.28287° N<br>80.79957° E | Meegahamaditta | Medadumbara |
| L4 | 28/1 | 7.28181° N<br>80.79048° E | Meegahamaditta | Medadumbara |
| L5 | 17/3 – 17/4 | 7.31915° N<br>80.73997° E | Maluwegama | Kundasale |

**Nearest town and accessibility to the site**

L1 is located at the Mahiyangana end of the Kandy – Mahiyanganaya (A26) road and the L5 located at the Kandy end. The nearest town to L1 is Hunnasgiriya which is 1.2 km away. Digana town is 2.6 km away from L5 (Ref. fig. 1 Road map showing the accessibility to the site)

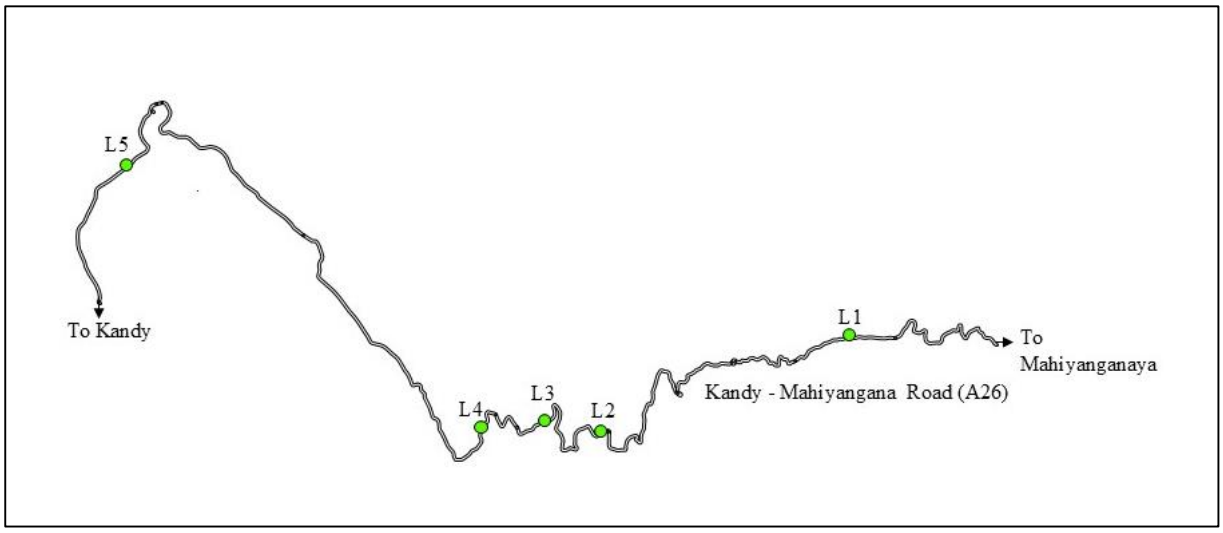



*Figure 1. Road map showing the accessibility to the site*

2.3 Topography and land ownership

The mitigation sites are located on one of the most scenic and breathtaking roads in Sri Lanka, which stretches from Kandy to Mahiyanganaya, traversing through picturesque mountains and water bodies, including Victoria Reservoir. The proposed sites; L2, L3, and L4 are located on the left-hand side (LHS) and L1 and L5 on the right-hand side (RHS) of the A26 road, from Kandy to Mahiyangana. The elevation profiles of the sites are as follows: L1 – 2822 ft, L2 – 1528 ft, L3 – 1724 ft, L4 – 1788 ft, and L5 – 1652 ft. The rock falling and landslide risk areas are located in a steep sloppy terrain where the natural slope has been cut for the road construction.

Mitigation sites of L2, L3, L4, and L5 are situated on private property up slope to the road, While L1 falls under the jurisdiction of the Forest Department (FD). The road reservation area is owned by the Road Development Authority.

*Refer figure 2; Google images of the proposed rock fall and landslide mitigation site, the surrounding environmental features and service infrastructure.*


*Figure 2. Google image of the proposed rock-fall/ landslide mitigation site, the surrounding environmental features and service infrastructure*

2.4 Meteorology of the area (Theldeniya)

Annual average rainfall – 244.88 mm
Annual average temperature – 27.89 °C.
(Source: https://en.climate-data.org/asia/sri-lanka/uva/mahiyanganaya-717199/)

## 3. Rock falls/ Landslides hazard incident details

3.1 Account of incident

There have been multiple incidents of rock falls and slope failures, particularly during the monsoon seasons, which have caused significant disruptions, including roadblocks, on the Kandy-Mahiyanganaya Road. These events typically occur in areas located up slope of the road. When a rock fall occurs, the entire road can be blocked and closed for several hours or even days until the debris is cleared. During these incidents, fallen boulders and soil masses obstruct traffic, negatively impacting tourism and business activities in the area. Additionally, certain locations (i.e. L3) have been identified that require mitigation measures to prevent disasters before they occur.

3.2 Effects and consequences of Rock falls/ Landslides

No accidents or causalities were recorded due to the rock fall and slope falling incidents. Cracks on the road and road subsidence were observed as the physical damages to the road. Some small-scale landslides have occurred, with debris falling onto the road, creating hazards for travelers.

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

Relevant Government Authorities have implemented rock barriers and warning signs to reduce risks. Despite these measures, the identified stretch of A26 road remains a risky area, especially during heavy rains, and drivers are advised to exercise caution when traveling through this scenic yet hazardous route.

According to the verbal request made by the District Secretary - Kandy, a preliminary field study was conducted by the Scientists of the National Building Research Organisation. Accordingly, considering the risk situation and the emergency at the place, the site investigation report has recommended long-term and short-term Rectification measures for the site to maintain slope stability and design to prevent rock falling.

3.4 Evacuations
No evacuations have been undertaken to reduce the potential risk.

3.5 Resettlement (progress)
No resettlement or relocation is proposed for this site.

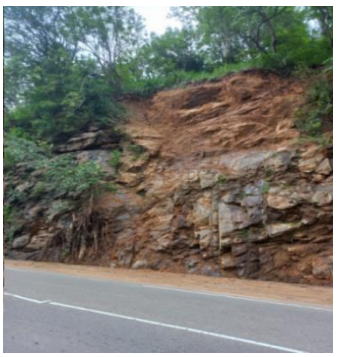
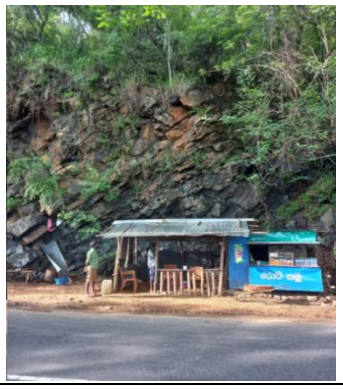
## 4. Description of the area of the rock fall, areas adjacent to the rock fall and current level of risk

4.1 Area of the rock falls / slope failures

At all locations large block of soil/rock mass moved down towards the road during previous rock falls can be be seen resting close to road edges. These impinging loose weathered rock and fractured pieces of rocks posing high risk on the vehicles, commuters, pedestrians, boutiques, and the people obtained the services obtained from these boutiques.

The table 2 below shows the important environmental features and Geo-morphological characteristics of the locations (Source: Preliminary investigation report, NBRO)

Table 3. Important environmental features and Geo-morphological characteristics of the locations

| Location No. | Culvert / Bend | Important Environmental Features | Geo-morphological characteristics |
|---|---|---|---|
| L1 | Culvert No: 38/4 to 38/5 RHS |  | • A rock slide occurred on a rocky face.<br>• The rocky slope is highly inter-banded and follows the dip direction.<br>• Previously constructed drain was demolished due to the slope failure. |
| L2 | Culvert No: 31/7 to 31/9 LHS |  | • A highly fractured rocky slope cut is observed.<br>• Slope is an escarpment slope. |
| L3 | Culvert No: 29/3 to 29/9 LHS |  | • Highly interbedded rock. |

| | | | |
|---|---|---|---|
| L4 | Culvert No: 28/1 LHS |  | • Planer sliding failure was observed. |
| L5 | Culvert No: 17/3 to 17/4 RHS |  | • Unstable rock blocks are present at the top.<br>• Slope is an escarpment slope. |

Site L1, located within the Knuckles Mountain Range, is predominantly covered with *Megathyrsus maximus* (Maana grass). Across these sites, common tree species include: *Ficus arnottiana* (Kaputubo), *Carmona retusa* (Katakela), *Ficus benghalensis* (Banyan), and *Lantana camara* (Hinguru), etc. The region's fauna primarily consists of wild boars, macaques, leaf monkeys, squirrels, and other common species.

Only L2 contains a house within the property, located up slope from the unstable slope. However, the house is situated at the far end of the land, at a considerable distance from the affected area, and is accessed from the opposite side. To date, the house has not experienced any risk from the land failure, and no structural cracks have been observed. L1 features minor seepage at the unstable slope, indicating potential groundwater movement in the area. In L2, the Galmal Oya flows approximately 200 meters down slope, near the temple located in front of the unstable slope.

The immediate down slope of the sites, the Kandy-Mahiyanganaya Road (A26) is located. This road is a renowned route in Sri Lanka, famous for its sharp hairpin bends (18 bends), steep gradients, and breathtaking scenery. This challenging yet rewarding drive passes through some of the island's most picturesque landscapes. Several sections of the road traverse one of Sri Lanka's key biodiversity hotspots, the Knuckles Forest Reserve. The surrounding area is also well-known for camping spots and waterfalls, making the journey even more worthwhile.

However, certain locations along the road pose significant safety risks to a large portion of road users and nearby residents. For instance, Location L2, situated directly in front of Shree Dharmapala Temple, endangers pilgrims, devotees attending Bodhi Pooja, bus passengers waiting nearby, and three-wheeler drivers stationed at the base of the unstable slope. Similarly, temporary roadside boutiques at Locations L3 and L5 place vendors at heightened risk due to their proximity to unstable rock formations. The boutique at the base of L3 serves as a major rest point for commuters, offering refreshing snacks such as corn and Sri Lanka's famous delicacy, rotti with chili paste. Likewise, the boutique at Location L5 primarily sells king coconut water, a refreshing natural electrolyte that helps treat the exhaustion of long drives for many travelers.

4.2 Areas adjacent to the rock falls / slope failures

The areas adjacent to the rock falls / slope failures feature lush greenery, part of the Knuckles Mountain Range (L1). The area is famous for Scenic Viewpoints. The route offers stunning views of the Mahaweli River valley, paddy fields, and aesthetic landscapes. The Geological Features of the area is the soil and rock formations vary, with rocky outcrops in higher areas and alluvial plains towards Mahiyanganaya. Considering the areas weather condition, the upper parts of the road (Hunnasgiriya end) can be misty and cool, while the lower parts are warmer due to their elevation. This road is historically and geographically significant, serving as a crucial link between the Central Highlands and the Eastern regions of Sri Lanka. It has been modernized in recent years to improve safety, but it remains a thrilling drive.

Both local and foreign tourists visit famous places taking this road. Meemure – Lakegala adventurous site, Sorabora Wewa, Dambana – Indigenous Veddah Village, Ulhitiya Reservoir & Forest Reserve, Mapakada Wewa, Mahiyanganaya Raja Maha Viharaya, Rathna Ella Waterfall, Victoria-Randenigala-Rantembe Sanctuary are the most popular destinations who can visit while pass this road. These locations, combined with the scenic drive through the 18 Bends, make this region a perfect getaway for nature lovers, adventure seekers, and cultural explorers.

In between Locations L1, L2 and L3, failed/ potential rock fall/ slope failure sites mitigated under Climate Resilience Improvement Project (CRIP) can be seen.

4.3 Current level of risk

The identified sites of Hunnasgiriya – Digana section of the Kandy - Mahiyanganaya Road is highly prone to landslides and rock falls due to its steep terrain, heavy rainfall, and unstable geological formations. This area has experienced multiple incidents over the years, affecting road safety. The rock falls and slope failures will occur again with the upcoming rains, and the road will be blocked. During the rainy season, it poses a high risk to commuters and vehicle transportation on the road.

The situation of rock falls along the Kandy-Mahiyanganaya Road (A26) in Sri Lanka has been an ongoing concern due to the mountainous terrain and frequent heavy rainfall. The road is prone to landslides, rock falls, and debris accumulation, particularly during the monsoon season. These events often disrupt traffic flow, causing delays, accidents, and sometimes road closures.

While safety measures have been improved, the road remains a high-risk area, and travelers should exercise caution, especially in the rainy season. If the site is not rectified to prevent future rock falls and landslides, it will disturb all functions of vehicle transportation between Kandy & Mahiyanganaya. The commuters, pedestrians, tourists, nearby residents, and their livelihood activities would be at risk due to this unstable rock falls and debris falls of the slope sections. The obstruction of accessibility may pose a significant impact on tourism sector of the country, lifeline facilities, services, and related economic activities including transactions.

## 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 and slope failure sections to ensure the safety of the commuters, tourists, and the continued and uninterrupted function of this main road. Further rock falls are possible at this location, especially with the heavy rain continuing, and therefore the following recommendations are given to reduce the immediate risk.

Table 4. Summary of the works envisaged under the project

| Location | The works envisaged under the project |
|---|---|
| Location 1 | Sealing the joints, rock bolting wherever necessary, is recommended. |
| Location 2 | It is recommended to strengthen in situ by using the rope hooking technique or by inserting rock bolts. |
| Location 3 | It is recommended to remove unstable rock fragments. |
| Location 4 | Recommended to remove the debris and improve the drainage. |
| Location 5 | Recommended to remove the debris and improve the drainage. |

## 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;

i. Commuters and pedestrians
ii. Three-wheel Park, and bus stop at the toe area of L2
iii. Shree Dharmapala temple (L2)
iv. Water seepages and streams
v. Boutiques near the sites (L3, L5)
vi. Houses and residents near the locations (L2, L5)
vii. Current services, economic and tourism activities of the area

*(Ref. Fig.3 Sensitive elements that may be affected by the project actions*

*Figure 3a: Mitigation location - L1*

*Figure 3b: Debris on the A26 Road (L1)*

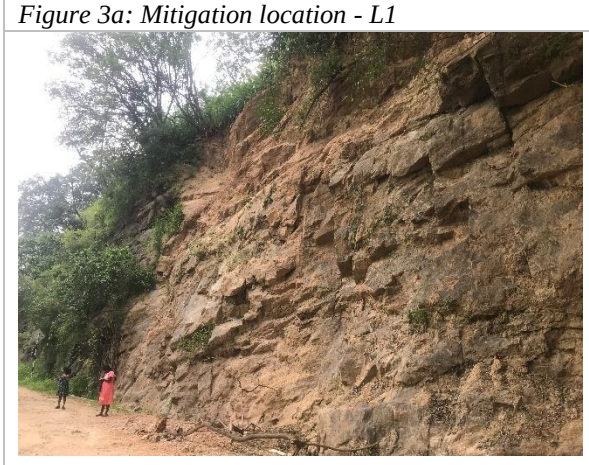


*Figure 3c: People waiting for the bus at the toe area of L2.*

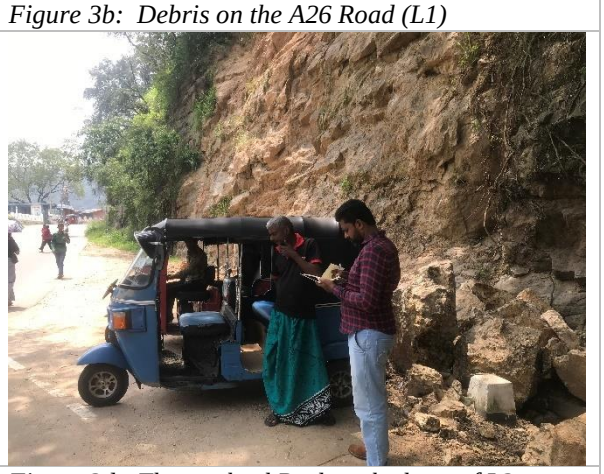


*Figure 3d: Three-wheel Park at the base of L2*

*Figure 3e: Shree Dharmapala temple at the opposite side of the road (L2)*

*Figure 3f: Unstable rock fragments (L3)*

*Figure 3g: Small shops at the base of L3*

*Figure 3h: Debris on the road L4*

*Figure 3i: Mitigation location – L5*

*Figure 3j: Small boutiques at the toe of L5*

Figure 3. 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 occurrence of rock falls and landslides to be prevented at an acceptable level. The remediation may secure the cost of road rehabilitation from future rock fall in the area.
- Both local and foreign tourists visit famous places through this road. Sorabora Wewa, Dambana – Indigenous Veddah Village, Ulhitiya Reservoir & Forest Reserve, Mapakada

Wewa, Mahiyanganaya Raja Maha Viharaya, Rathna Ella Waterfall, Victoria-Randenigala-Rantembe Sanctuary are the most popular destinations who can visit while pass this road. These locations, combined with the scenic drive through the 18 Bends, make this region a perfect getaway for nature lovers, adventure seekers, and cultural explorers.

- The proposed project will significantly enhance safety of the road for commuters, tourists, and pedestrians during 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 and landslides 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 5. 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**<br>Disruption to existing surface and sub-surface drainage patterns in the area is envisaged with the project implementation. During the rainy season 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 falls and landslides of the unstable sections. | **Significant** |
| **7.2.1.2 Water pollution and impacts on surface water quality**<br>During the slope excavation, the removal of debris and rocks can generate high sediment-laden runoff 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 occurred 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. | **Highly Significant** |
| **7.2.1.3 Open defecation and waterborne infections**<br>As the mitigation locations are located close to the road, the possibility of open defecation is low. | **Insignificant** |
| **7.2.1.4 Impacts on the downslope water users**<br>The construction activities will be carried out on steep slopes consisting of unstable rocks. Therefore, the slope will be prone to rock falls during the rock removal phase. This may increase the risk of rock falling into the downslope area. As natural water springs are in the mitigation areas (i.e., L2), the rock or sediment loading impact to the water resource is highly significant. | **Highly Insignificant** |

| | |
|---|---|
| **7.2.1.5 Impacts on groundwater table and groundwater quality**<br>Mixing construction materials, such as cements and grout, with subsurface water flows can lead to temporary degradation of water quality and the accumulation of unwanted substances. During the construction period, hazardous waste from chemical substances, wastewater from construction activities, and discharges from onsite septic systems can adversely affect groundwater quality. Additionally, the mitigation activities carried out in the slope area may significantly impact groundwater quality and contribute to water table drawdown. | **Highly Significant** |
| **7.2.1.6 Impacts on water or wetlands**<br>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 quality of the water. This impact may be significant as the area is rich of ground water springs. | **Significant** |
| **7.2.2 Environmental Impacts** | |
| **7.2.2.1 Noise and vibration impacts**<br>Noise and vibration are expected from construction equipment. The tourists, vendors, the pedestrians and commuters on roads will also have an effect from noise and vibration. The residents nearby, commuters, tourists on the road 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**<br>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 significant impact on the nearby residents, tourists, commuters and pedestrians. The air pollution impacts from the construction are locally significant during dry periods for commuters, nearby residents, and tourists. | **Highly Significant** |
| **7.2.2.3 Solid waste disposal issues**<br>Haphazard disposal of solid waste; various types of waste, such as litter, food waste, construction waste, will be generated and may be stored or disposed on site. The littering and haphazard storage and disposal of solid waste in and around the site will create inconveniences to the nearby residents, commuters, pedestrians, and tourists. 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**<br>Since the affected areas feature 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 explosive and accidents from rock fragments is highly significant. | **Highly Significant** |
| **7.2.3 Biological /Ecological Impacts** | |

| | |
|---|---|
| **7.2.3.1 Effects of Important Wildlife Habitats**<br>The project influence upslope of the L1 mitigation site lies within the Knuckles Forest Reserve. Despite the area's rocky terrain, the construction activities, particularly high noise and vibrations, may impact the fauna and flora in this area. | **Significant** |
| **7.2.3.2 Effects on Fauna & Flora**<br>Majority of the trees found in the area are not endemic, threatened, and identified in the red list of IUCN. But there may be some species within the forest reserve. These species may be impacted. | **Significant** |
| | |
| **7.2.4 Social and Economic Impacts** | |
| **7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site**<br>There are no any cultivation immediately adjacent to 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/shops due to vibration and blasting impacts**<br>The unstable rock fall locations are located adjacent to the road. The road is running through the site. Vibrations can create cracks on the road. The down slope houses (L5), and a temple (L2) are located within the both side of the road to the proposed mitigation sites. Therefore, vibration and rock blasting impacts on the residents and buildings are highly significant. During the construction, heavy machinery and chemicals for blasting will be used, and the vibration can widen the cracks and may create new ones in the downslope establishments. | **Highly Significant** |
| **7.2.4.3 Loosing access to land and future development activities**<br>The land where the project activities are envisaged belongs to the road reservation of RDA and the mitigation works will be concentrated on upslope of the road. This area is a mainly a sloppy land, there will be no impacts to the land owners with regard to loosing access to the land (during construction) and loss to valuable use of the land. In 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**<br>The tourism activities related to the view of the area immediately adjacent to the unstable rock fall sites would be affected during the construction period. Both local and foreign tourists, small business owners, vehicle parking facilities would be highly interrupted during construction phase. This would affect the income of the nearby community. | **Highly Significant** |
| **7.2.4.5 Impacts on service provision (water supply, sewage, electricity)**<br>The road, electricity, water supply lines running through the mitigation area will be impacted. | **Significant** |
| **7.2.4.6 Effect due to loss of infrastructure and safety**<br>During the construction phase, frequent movement of machinery, loaders, and trucks will obstruct the main road from Kandy to Mahiyanganaya. This will significantly impact pedestrian passage, parking areas, and overall traffic flow, causing major disruptions. | **Highly Significant** |

| | |
|---|---|
| **7.2.4.7 Work camps and lay-down site requirements**<br>The camp site will be selected in the neighbourhood of the community. If proper camp management is not in place, it may result several labour issues, social issues with the 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**<br>The construction workers at this site will be from different social backgrounds and different geographical areas, often under poverty. Usually, they are with poor educational and social background. Such communities may have a wide range of social issues to cause distress on the neighbouring community and the workers of the project. Although the workers who would engage in such issues will be rare, even few possibilities cannot be ignored. | **Highly Significant** |
| **7.2.4.9 Workers safety during construction**<br>The workers may be exposed to risk from 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. Risk of hazard from vehicle and construction machinery accidents is highly significant at this site. Contractor may engage under-age workers (children) for construction work, which is risky and can result serious accidents and injuries. | **Highly Significant** |
| **7.2.4.10 Safety to the public from construction activities: High risk for commuters/tourists**<br>During the construction phase, the road will be obstructed by the frequent movement of machinery, loaders, and trucks. As most mitigation works are to be carried out in limited space on slopes, heavy equipment may obstruct commuters, downslope residents, and tourists, posing a significant safety risk. Additionally, excavation and rock removal may cause loose rocks to fall onto the road, further increasing the hazard. The risk is even greater for upslope residents and houses, as they will be exposed to these dangers for a prolonged period during construction. Therefore, the overall risk to them is highly significant. | **Highly Significant** |
| **7.2.4.11 Impacts on transport infrastructure (especially temporary loss of road, risks of traffic congestion)**<br>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 holidays. 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**<br>The machinery movement and material transportation would have an impact for the tourism related business activities. For the construction activities some spaces of them needed to be occupied and this will have an impact on the income of the nearby community. However, considering the rock fall risk, the income losses for short period will be minimal. | Significant |
| **7.2.4.13 Need for people to enter or cross the site**<br>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, tourists or other neighbouring community to enter the site for other purposes. 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 6. Site specific risk analysis

| Risk | Affected group | Risk level |
|---|---|---|
| 1. Facing accidents when working close to the road (as there are large bends close to the sites) | Workers | Very high |
| 2. Transporting materials and machinery | Workers/ tourists | Very high |
| 3. Throw out disposals (litter, bottles, and food) to the construction site from the commuters. | Workers/tourists/ commuters | Very high |
| 4. Facing accidents during constructions at night time | Workers | Very high |
| 5. Accidents from the construction activities and materials placed close to the road | Workers/tourists/ Commuters | Very high |
| 6. Injuries due to rock particles due to explosions/ blasting | Workers/tourists/ /Commuters | Very High |
| 7. Rock fall from the unstable area | Workers/tourists/ 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 etc.) | Workers | High |

## 9. Significant Environmental and Social Impacts

Environmental, 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 an unstable slope with a risk of rock 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.

10.2 Evacuation of people

Project based evacuations are required for this site. The boutiques, at the immediately at the down slope to be evacuated during construction.

The bus stop and three wheel parking area need to be shifted beyond the project affected area.

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 nearby residents, shop owners 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 7. Design stage Environmental & Social considerations

| Design feature | Recommended level of consideration for this site |
|---|---|
| **i. Natural resource management and resource optimized designs**<br>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**<br>During site planning it is necessary to be cautious on possible re-activation of rock falls. Also, the locations are located in a very limited space of slops with high risk bending road. The vehicle parking sites, material storage and temporary shelters etc. should not be installed in the danger zones of the rock falls. It is very necessary to keep 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**<br>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. | High |
| **iv. Conservation of water resources**<br>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 | Very High |

| | |
|---|---|
| **v. Interruption to water supplies**<br><br>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. | Very High |
| **vi. Aesthetically compatible design considerations**<br><br>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 |
| **vii. Consideration of green environmental features**<br><br>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 |
| **viii. Conservation of environmental, social and cultural features**<br><br>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. | Very high |
| **ix. Workers/ commuters and community safety**<br><br>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 rock falls may occur during construction phase and may pose threat to workers, 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**<br><br>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. | High |
| **xi. Low post maintenance and operation designs**<br><br>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.<br>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 8. 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) |
| 2002.2 3) | Cracks and damages to the buildings | Relevant |
| 2002.2 4) | Disposal of waste | Relevant (commuters, tourists) |
| 2002.2 5) | Disposal of refuse | Highly relevant (road reservation) |
| 2002.2 6) | Dust control | Highly Relevant (commuters, tourists) |
| 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 |
| **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 9. Site specific ES & HS mitigation measures

| Mitigation item | Project implementation phase | Responsibility |
|---|---|---|
| I. **Minimize erosional impacts during construction**<br>It is recommended that mitigation works involved with site clearance, slope reshaping, removal of rocks etc. are avoided during 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 area in the wet season as much as possible. This should be considered in project planning stage. Safety nets should be introduced to removal of rock boulders. | Site preparation & construction | Construction Contractor |
| II. **Invasive species**<br>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 the Department of Wildlife Conservation & Department of Forest. | Construction | Construction Contractor |
| **III. Damage forest resource and wild life**<br>i. Illegal poaching and extraction of protected specimens should be strictly controlled<br>ii. Intentional and unintentional Setting of fire to forest area should be strictly controlled | Construction | Construction Contractor |
| **IV. Impacts on transport infrastructure (especially temporary loss of road access, risks of traffic congestion)**<br>A good traffic control should be implemented in the construction stage. As there are high-risk bends on the road and the tourist attractive places adjacent to the sites and a temple, proper road safety measures should be included with warning signs and permanent 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 |

| | | |
|---|---|---|
| **V. Priority Health and Safety Issues**<br>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.<br>i. Prepare a special Occupational Health and Safety Management Plan prior to commencement of construction activities<br>ii. A good warning system and full-time watchman is highly recommended for this site for workers, tourists, businessmen and commuter safety.<br>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<br>iv. Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle etc.<br>v. Provision of training and awareness programs to employees<br>vi. Conducting hazard analysis and plan/provide adequate mitigation measures for such hazards identified, prior to carrying out major construction activities<br>vii. If the wasp nest is in the vicinity, it is mandatory to use Evacuation Centers for ensure of workers' safety<br>viii. Additionally, work should be discontinued for sufficient time period during rainy period as working on unstable land will be highly risky in the rainy season | Construction | PMU<br>Construction Contractor |
| **VI. Throw out disposals (litter, bottles, and food) to the construction site from the commuters.**<br>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 |
| **VII. Injuries due to rock particles due to explosions/ blasting**<br>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. | Construction | Construction Contractor |
| **VIII. During the construction phase, adequate safe fencing should be established to prevent potential falling risks for households in upslope areas**<br>Warning signs indicating the risk of slope instability should be placed in areas where the public gathers for various reasons, such as waiting for buses, parking three-wheelers, or idling. The risk is particularly high during the rainy season, even when there is no construction work taking place. Therefore, it is essential to display these safety signs continuously, even during periods without active projects. | Construction | PMU<br>Construction Contractor |
| **IX. Shifting bus halt, three-wheel parking area and boutiques at down slope area**<br>The bus halt, three wheeler parking area, and boutiques at the immediately down slope area/ project influence are to be shifted to beyond the project influence area before commencing construction | Construction | PMU<br>Construction Contractor |

| | | |
|---|---|---|
| **X. Disposal of construction waste**<br>The contractor should pay special attention to the proper disposal of construction waste. This area is a highly attractive sightseeing location with a pleasing natural environment, frequently visited by tourists. Improperly managed waste could negatively impact the scenic beauty. Therefore, any waste generated should be properly stored to prevent it from being washed away and must be disposed of according to the procedures approved by the PMU. Construction waste should not be discarded along the road or into drainage systems. | Site preparation & construction | Construction Contractor |
| **XI. Impact on down slope water users**<br>The construction activities may pollute the water flowing downstream (i.e., L2), which would significantly impact the water users below. | Site preparation & construction | Construction Contractor |
| **XII. Onsite sanitary facilities for the workers**<br>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 |
| **XIII. Dust and aerosol control screens**<br>Dust particles generated during the construction period can influence the nearby residents, commuters and tourists. The commuters traveling through the main road specially tourists could be affected from generated dust particles. Special screens etc. should be used if heavy dust or aerosol generating activities are envisaged. | Site preparation & construction | Construction Contractor |
| **XIV. Water for construction**<br>Water for construction works should be obtained only from the approved sites. | Construction | Construction Contractor |
| **XV. Working hours**<br>The construction activities should be restricted to day time only. Working after 6.p.m. is not recommended for any reason due to safety issues. Additionally, misty conditions should be carefully considered and monitored to avoid potential accidents. | Construction | Construction Contractor |
| **XVI. Impact on service infrastructure**<br>Telecommunication, electricity, water lines should be relocated before construction starts as per the approval of PMU. | Construction | Construction Contractor |
| **XVII. Need for people to enter or cross the site**<br>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 |
| **XVIII. During construction good housekeeping** should be maintained to minimize visual pollution | Site preparation & construction | Construction Contractor |
| **XIX. Worker's code of conduct**<br>Possible disputes between the labor force and the commuters and tourists should be prevented by maintaining the agreed code of conduct by the contractor.<br>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 |

| | | |
|---|---|---|
| xx. **Snake bites, toxic insect bite management and emergency management by accidents**<br>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.<br>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 |

### 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 10. Environmental and Social monitoring plan; construction phase

| **Monitoring requirement** | **Parameter** | **Frequency** |
|---|---|---|
| i. Baseline monitoring | Water quality | Once* |
| | Pre-construction crack survey of the houses | Once* |
| | Ground vibration | Once* |
| | Air quality: particulate matter | Once* |
| | Background noise measurement | Once* |
| ii. During construction | Water quality | Once* |
| | Crack survey | If required |
| | 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<br>**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<br>**Pre-construction crack survey of the high-risk buildings**-Professional report<br>**Ground vibration**-as per the interim standards on vibration for the Machinery, Construction activities and Vehicular movements, CEA<br>**Background noise measurement** –Extraordinary Gazette No.924.1, May 23,1996, CEA<br>**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.

## 11. 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.

## 12. Public and Stakeholder Consultations -the public consultations that have been and/or will be held

13.1 Public Consultations

Shop owners and residents nearby were consulted and made aware of the mitigation project during the field visit. They 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 Annexure II)

Mr. Nuwan C. Hemakumara, Divisional Secretary of Medadumbara DS Division, and Miss K.G. Dhananjani Chathuri Dissanayaka, Assistant Divisional Secretary of Kundasale DS Division, along with Mr. Amila Dharmadasa, Range Forest Officer of Hunnasgiriya, were informed about the project activities. They were briefed on the mitigation project and its funding mechanism. They acknowledged the value of the mitigation efforts and expressed their support for the project.

## 13. Clearances, no objection, consent and approvals required for the implementation of the project

Table 11. 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, 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 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 Medadumbara Pradeshiya Sabha and Kundasale 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 Kandy District is under the sensitive area under Soil Conservation Act 25 of 1951. |
| Department of Forest<br>Department of Wildlife Conservation | Since the L1 site is located within the Knuckles Forest Reserve, approvals from the Department of Forest Conservation is required. |
| Geological Surveys and Mines Bureau | Approval will be obtained for extraction of materials, transportation and disposal of earth, rocks and mineral debris. |
| Medadumbara and Kundasale Pradeshiya Sabha | Approvals from Medadumbara and Kundasale Pradeshiya sabha 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 and Forest Department) | 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 11.

Table 12. Tentative timeline for getting approvals

| Approvals | Month 1 | | | | Month 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | W1 | W2 | W3 | W4 | W1 | W2 | W3 | W4 |
| **Project implementation**<br>***Approval from the District Secretariat***<br>Submission of application<br>Project briefing<br>Respond to comments<br>Approvals | | | | | | | | |
| ***Approval from planning committee***<br>Submission of application<br>Project briefing<br>Respond to comments<br>Approvals | | | | | | | | |
| ***Approval from state land owners RDA***<br>Submission of application<br>Respond to comments<br>Approvals | | | | | | | | |
| ***Approval from Forest Department***<br>Submission of application<br>Respond to comments<br>Approvals | | | | | | | | |
| ***Other approvals***<br>GSMB<br>Ministry of Defense (Depends on the requirement) | | | | | | | | |
| Consent/ no objection from the land ownership | | | | | | | | |

## 14. 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).*

## 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 13. 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, Forest Department, 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, DFC | 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, DFC, 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 14. Level of information gathered through consulting institutions

| **Date** | **Institution** | **Person contacted for information** |
|---|---|---|
| 06.03.2025<br>(Over the phone) | Medadumbara DS Division | Mr. Nuwan C Hemakumara,<br>Divisional Secretary<br>Medadumbara |
| 07.03.2025<br>(Over the phone) | Kundasale DS Division | Miss.K.G. Dhananjani Chathuri Dissanayaka<br>Assistant Divisional Secretary<br>Kundasale |
| 05.03.2025<br>(Over the phone) | Range Forest Office - Hunnasgira | Mr. Amila Dharmadasa (0717676438),<br>RFO - Hunnasgiriya |

Annexure I: Images of the site condition and the consultation

*Consultation with landowners at the L2 mitigation site*

*Consultation with three-wheeler drivers at the base of the L2 mitigation site*

*Consultation with shop owners at the base of the L3 mitigation site*

*Consultation with households at the L5 mitigation site*

Annexure II: Report on the Stakeholder Consultation: Kandy District

| **Institution** | **Name and designation of the contact officer** | **Concerns raised** |
|---|---|---|
| Central Environmental Authority | Mr. M.M.A.I Janaka (Director - cover-up), Central Environmental Authority Central Province. | ✓ Landslide mitigation projects are not considered projects prescribed in the Gazette.<br>✓ The Basic Information Questionnaire (BIQ) is needed to fill for the project and submit the application<br>✓ 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.<br>✓ Before project commence a request indicating the mitigation sites need.<br>✓ 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 | Mr. A. G. P. B.Deshapriya Chief Engineer - Kandy | ✓ This area is under the jurisdiction of Kundasale RDA office<br>✓ The RDA has no objection and states the mitigation is very much needed.<br>✓ Other concerns raised<br>• A proper handing over of the project is required after the mitigation<br>• RDA will do the maintenance after mitigation<br>• It is emphasized that during the construction the contractor should use Personal Protective Equipment<br>• 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.<br>✓ It is also stated that Construction waste/ excavated materials should not be a nuisance to public/commuters |

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 detailed design report to RDA with a formal request on nature of approvals required. PMU should prepare above documents and should submit the documents to RDA regional office.
   ii. RDA regional office will evaluate the proposal and may call for project briefing. The PMU should provide necessary briefing as appropriate
   iii. On the approval by RDA an agreement will be signed between RDA and 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, 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 |
| Thilina Dissanayake | Project Assistant | Demographic data collection /survey, Report preparation |

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