



REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

**Site No.76 – L1
Ella – Wellawaya Road (near 23 km post)
Badulla District**

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Prepared for:



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TABLE OF CONTENT

1. Introduction	5
1.1 Project overview	5
1.2 Intended users	5
2. Description of the Project and Site Descriptions	5
2.1 Name of the project	5
2.3 Topography and Land Ownership.....	6
2.4 Meteorology of the area	7
3. Landslide hazard incident details	8
3.1 Account of incident.....	8
3.2 Effects and consequences of landslide.....	8
3.3 Description of any remedial measures already undertaken to reduce the potential risk.....	9
3.4 Evacuations	9
3.5 Resettlement (progress).....	9
4. Description of the area of the landslide/slope failure and areas adjacent to the landslide and current level of risk	11
4.1 Surrounding area of the slope failure	11
4.2 Current level of risk	11
5. Description of the works envisaged under the project	11
6. Brief description on the surrounding environment with special reference to sensitive elements that may be affected by the project actions.....	11
7. Identification of social and environmental impacts and risks related to the works.....	13
7.1 Positive impacts	13
7.2 Negative impacts	13
7.2.1 Hydrological and water Quality impacts	13
7.2.1.1 Impacts of the drainage pattern of the premises.....	13
7.2.1.2 Water pollution impacts	13
7.2.1.3 Erosional impacts	13
7.2.1.4 Open defecation and waterborne infections	13
7.2.1.5 Impacts on the downstream water uses	14
7.2.1.6 Impacts on ground water table and ground water quality	14
7.2.2 Environmental Impacts	14
7.2.2.1 Noise and vibration impacts	14
7.2.2.2 Air pollution impacts.....	14
7.2.2.3 Solid waste disposal issues.....	14
7.2.2.4 Explosive hazards and hazardous materials	14
7.2.3 Biological /Ecological Impacts.....	15
7.2.3.1 Effects on Fauna & Flora	15
7.2.4 Social and Economic Impacts.....	15
7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site.....	15
7.2.4.2 Cracks in the building due to vibration impacts.....	15

7.2.4.3	Loosing access to land and transport infrastructure	15
7.2.4.4	Impacts on livelihood/ business and income activities	15
7.2.4.5	Impacts on service provision (water supply, sewage, electricity)	15
7.2.4.6	Risks of people accessing the site during construction	15
7.2.4.7	Work camps and lay-down site requirements	16
7.2.4.8	Relations between workers and the tourist/ people living in the vicinity of the site and possibility of disputes.....	16
7.2.4.09	Workers safety during construction	16
7.2.4.10	Need for people to enter or cross the site	16
7.2.4.11	Road traffic and safety to the public from construction activities	16
8.	Significant Environmental and Social Impacts	16
8.1	Priority Health and Safety Issues. Specific H&S concerns that require measures that go beyond the standard contractual requirements for contractors.....	16
8.2	Child labour & forced labour	17
9.	Environmental Social Management Plan (ESMP)	17
9.1	Resettlement action plan	17
9.2	Evacuation of people.....	17
9.3	Procedure for removal of damaged structures, facilities infrastructure (consent from owners to remove the articles).....	17
9.4	Requirement for compensation for loss of property /uses due to project actions	17
9.5	Public awareness and education- needed for following areas.....	17
9.6	Design based Environmental/ Social Management considerations	17
9.7	Mitigation of impacts during the construction phase.....	19
9.7.1	Construction contractors' requirement to comply with environmental and social management during the construction phase	19
9.7.2	Site Specific mitigation.....	20
9.7.3	Monitoring requirements specific to the site	23
10.	Public and Stakeholder Consultation - the public consultations that have been and/or will be held.....	23
11.	Preventive Measures for Covid-19 that was issued by Sri Lankan National Health Authority	24
12.	Labor Management.....	24
13.	Clearances, no objection, consent and approvals required for the implementation of the project.....	25
13.1	Project implementation	25
13.2	Approval from the state lands owners relevant to the project.....	25
13.3	Consent/ no objection/ legally bound agreement from the private land ownerships	25
14.	Grievance redress mechanism for this site	26
15.	Information disclosure	27
Annexure I:	Images of the site condition and the consultation	28

List of Figures

Figure 1: Accessibility to the location (Not in a Scale).....	6
Figure 2: Google image of the proposed landslide mitigation site, the surrounding environmental features and service infrastructure.....	7
Figure 3: Precipitation (Rainfall) in Ella	8
Figure 4: Cross sections, land use, risk elements and the special features of the location.....	8
Figure 5: Cross Section, Land-use, Risk Elements and the spatial features of the location.....	10
Figure 6: Sensitive elements that may be affected by the project actions	12

List of Tables

Table 1: Negative impacts and their level of significance.....	13
Table 2: Design stage Environmental & Social considerations.....	17
Table 3: Contractor requirement to comply with ES & HS.....	19
Table 4: Site specific ES & HS mitigation measures	20
Table 5: Environmental and Social monitoring plan; construction phase	23
Table 6: Clearances, no objection, consent and approvals	25
Table 7: Tentative timeline for getting approvals.....	26
Table 8: Proposed scheme of information disclosure.....	27

Abbreviations

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

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 11 districts of 06 provinces of the country. The project requires to be implemented in accordance with environmental and social safeguards and mandates of the AIIB and that of Sri Lanka. Considering the nature of project actions and its implementation, an environmental and social management framework (ESMF) has been prepared as required by the AIIB environmental and social safeguard policy.

The purpose of the environmental and social management framework (ESMF) is to provide a guide for application of AIIB safeguards and national environmental and social mandates during the implementation of project actions. The project implementing agency (NBRO) 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 minimum.

During the scoping exercise it was revealed that the environmental & social setting, and health & safety conditions are more site specific, and require to be addressed specific to site conditions. Therefore, the ESMF has recommended a site specific environmental and social assessments followed by Site Specific Environmental and Social Management Plans (SSE&SMP) for each site. The SSE&SMP gives planning, design, construction & 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 **Ella – Wellawaya Road (near 23 km post)** landslide mitigation site. 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 intend to be used by landslide mitigation design team, the PMU and the contractor in the implementation of ESMP component of the project. The SSE&SMP is published in NBRO website 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 (SS- ESMAP) prior to commencing works.

2. Description of the Project and Site Descriptions

2.1 Name of the project

Rectification of Site No.76 – L1, is identified as Ella-Wellawaya Road (near 23 km post), located in Badulla District.

2.2 Location details

The proposed mitigation site falls under Rawana Ella GN division of Ella DS division in Badulla District of Uva Province.

GPS references of the site – 6.854436°N and 81.059309°E

Elevation – The elevation ranges from 2100ft AMSL to 2500ft AMSL (640 m – 762 m)

Nearest town to the site –Ella can be recognized as the nearest administrative town, which has about 4Km away from the mitigation site.

Accessibility to the location

Mitigation site is located within the limits of Ella. Also, the mitigation site is adjacent and it can be reached directly via Wellwaya – Ella – Kumbalwela road (A23). When travel from Kumbalwela junction, which is located in Badulla – Bandarawella Rd (A16), taking towards Wellwaya – Ella-Kumbalwela road (A23). Ella town can be reached after travelling 3.2 km on the same road. Then the mitigation site is located 4 km away from Ella town.

Figure 01 shows the accessibility to the site.

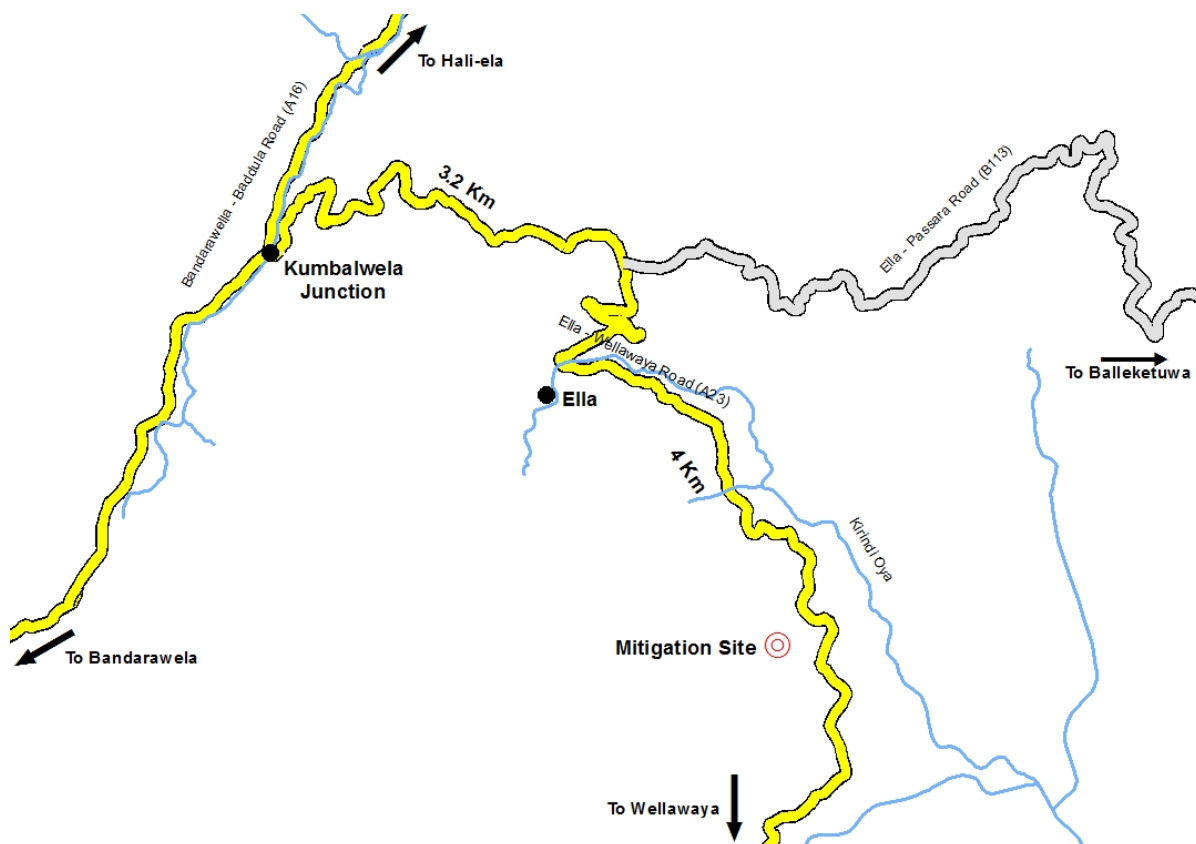


Figure 1: Accessibility to the location (Not in a Scale)

2.3 Topography and Land Ownership

The proposed mitigation site is located within the Ella-Wellwaya Road (near 23 km post). The general topography of the site is characterized by varying slopes of 45 to 60 degrees from the access way with the average cross-sectional length of 205 m towards the end slope. The major portion of the slope fluctuates between 50-60 degrees with steep slope at the topmost part, then road cut slope and at the latter part trending towards the downslope of shop come house and vegetation cover.

Slope gradient of the area is about 60 degrees to the North-East direction at the same time slope failure covers 12 m vertical height and 25 m length. Currently, the sedimented parts can be observed on the opposite side of the slope failure.

The extent of the land area of the mitigation site is about 12,000 square meters. The steep slope has been modified to construction of the road. As per Mr.Tharanga Rukshan, the Ella Range Assistant, the

land ownership belongs to Department of Wildlife Conservation. The downslope of the road comprises three privately-owned houses. Below figure 2 depicts the Google image 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

Ella is one of the most visited tourist places in Sri Lanka, and climate plays major role on tourist decisions. Accordingly, Ella enjoys an equatorial (or tropical rainforest) climate in accordance with the Kappen-Geiger classification. The yearly average maximum temperature in Ella is 27°C (ranging from 25°C in December to 28°C in April). Annual rainfall is about 4500 – 5000 mm, with the minimum in January and maximum in October (Ref figure 3 below).

The best time to visit Ella would be during Summer (March to June) and Winter (December to February) which are the two peak seasons. Monsoon (July to November) in Ella is considered as low tourist season.

(Source: <https://www.triphobo.com>).

So, while implementing the mitigation measures, two things need to be considered; firstly, off tourist seasons, secondly, low rainy period. Accordingly, making flexible schedule would reduce the impact.

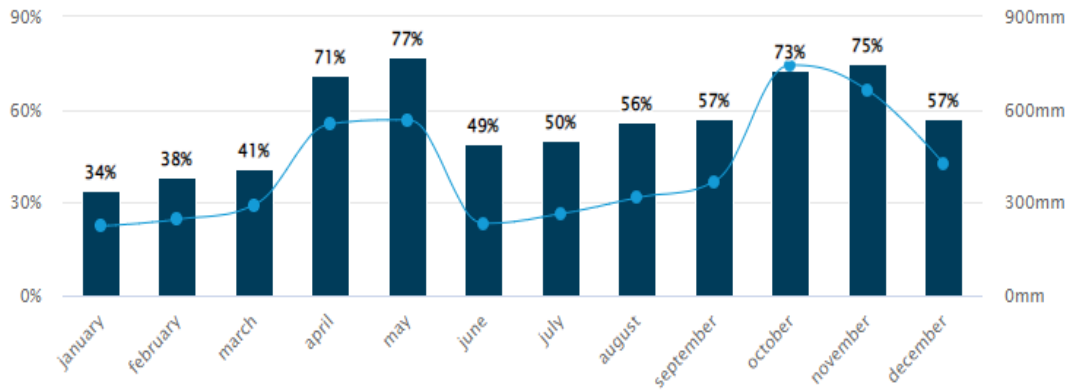


Figure 3: Precipitation (Rainfall) in Ella

(Source: whereandwhen.net: <https://www.whereandwhen.net/when/central-and-south-asia/sri-lanka/ella/>)

3. Landslide hazard incident details

3.1 Account of incident

An unstable slope located LHS/ RHS close to 23 km of Wellaway – Ella (A23) road has been identified by the at Landslide Research and Risk Reduction Division of NBRO, Badulla district office as part of the landslide hazard investigation of the area. The main cause of the cutting failure is poor drainage system along the access way on the top of the gradient. Unless the construction of a cut off drainage line at the top, the water unsurprisingly flows directly through the slope vertically. As, there are no any proper drainage system to infiltrate the rain water, the water pressure in the middle of the flow path is increasing. Further, the slope modifications have not followed engineering slope stability norms when constructing the Ella-Wellaway main road. In the year of 2020, displacement of the upper layer of soil occurred due to this improper surface runoff through the slope. During the site visit, the sedimented parts of the erosion (boulders) were visible on the opposite side of the cutting failure. Below figure 4 shows the cross sections, land use, risk elements and the special features of the location

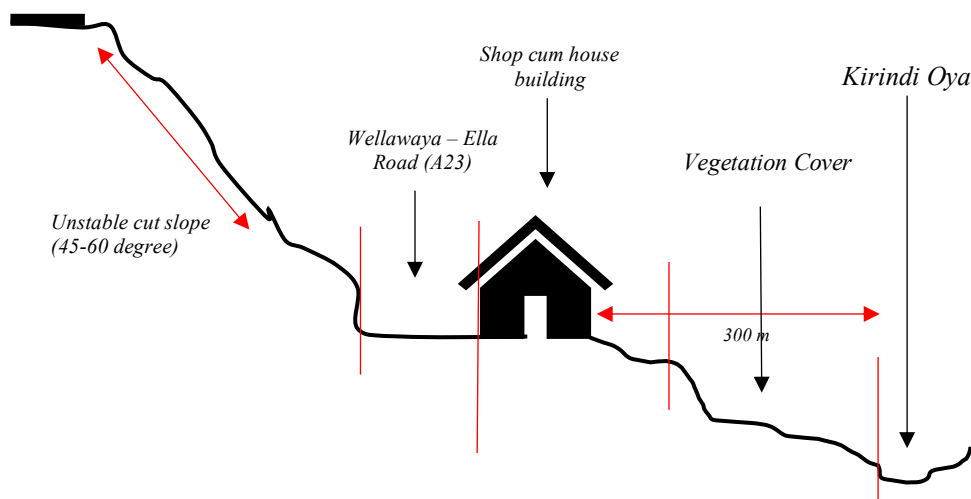


Figure 4: Cross sections, land use, risk elements and the special features of the location

3.2 Effects and consequences of landslide

During intense rainy periods dislodged soil mass through the unstable cut slope tends to fall imposing risk to the vehicle using the Ella – Wellaway Road (A23). Also, there is a residential cum shop building located opposite to cutting failure. Possibilities of losing vegetation cover is high due to debris flow of failed slope and this affects the income of families in downslope who depend on this vegetation.

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

With the occurrence of cut slope failure, NBRO had inspected the unstable slope in the Ella – Wellawaya road (near 23 km post). No any remedial measures have been implemented to reduce the potential risk. The boulders of the previous slope failure (2020) has been cleared and placed on the opposite side of the road.

3.4 Evacuations

No any building was evacuated due to the risk.

3.5 Resettlement (progress)

No any resettlement for this site.

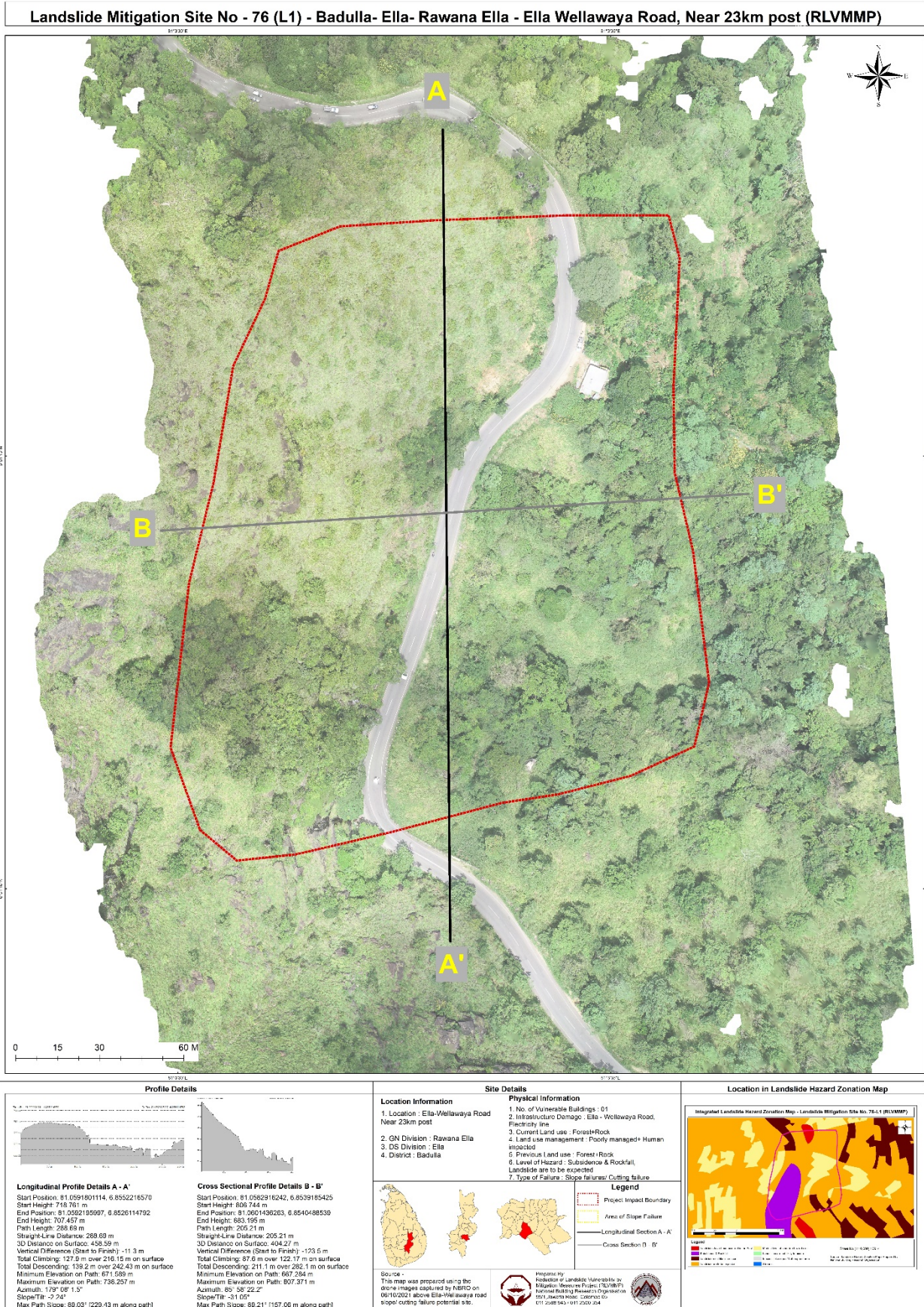


Figure 5: Cross Section, Land-use, Risk Elements and the spatial features of the location

4. Description of the area of the landslide/slope failure and areas adjacent to the landslide and current level of risk

4.1 Surrounding area of the slope failure

The affected site is located at the Ella-Wellawaya Road (near 23 km post). At the premises, a cut slope area could be identified. Several cutting failures can be identified along the road due to not following proper engineering guidelines and poor drainage management. The cut slope would impact on elements of the Ella – Wellawaya Road (A23), the shop cum house building and the home garden located in the down-slope area. There were no any other important monuments located within the nearby mitigation site. There is a water pipe laid from a spring water source situated far away to the shop cum house. Pipe is not buried underground, and could be seen on the ground.

The mitigation site is located in a very low dense built environment. As the site is belongs to wildlife conservation area, very few built-up areas could be seen within approximately 500 m distance and those are spa, hotels and restaurants. The most important aspect is Ella-Wellawaya Road (A23) is the main access path to the Rawana Falls. As per the resident of the shop cum house cum shop Mrs.Soma Herath's statement, during the seasonal peak time, Ella-Wellawaya (A23) road sides is highly congested with parked vehicles to experience the natural beauty of Ella. Kirindi Oya is running nearly 300 m distance in the downslope to the mitigation site.

4.2 Current level of risk

The almost vertical non-engineered slope cut will be at risk of future failure due to recurring extreme precipitation events. Due to this the Ella-Wellawaya Road (A23), shop cum residential building and the home gardens located in the down slope will be at risk due to the cutting failure.

As this is the connectivity road between Ella (Badulla District) and Wellawaya (Monaragala District) the obstruction to traffic fleet may pose a significant impact on life line facilities, services and related tourism and economic activities of the areas.

5. Description of the works envisaged under the project

The proposed project aims to combat further progressive failure of cut slope. Preventive measures such as construction of a retaining wall, drainage improvement, reshaping and laying mesh to prevent rock falling will be implemented. Environmentally friendly mitigation measures are highly encouraged in this site as it is located in an environmental sensitive and tourism area. It is better to allocate a space from the mitigation place to implement/construct future potential uses.

6. Brief description on the surrounding environment with special reference to sensitive elements that may be affected by the project actions

The affected site is located Ella-Wellawaya Road (near 23 km post). There is a variation on elevations within the site.

Following sensitive elements will be at risk due to project actions;

- i. Ella-Wellawaya Road
- ii. Shop cum house
- iii. Home gardens located in the downslope
- iv. The water supply line located in front of the mitigation site

Below figure 5 shows the sensitive elements that may be affected by the project actions.



Figure 6a: Ella-Wellawaya (A23) road located adjacent to the cutting failure



Figure 6b: Shop cum house building located in front of the mitigation site and the water supply line



Figure 6c: Home Garden located in the down slope

Figure 6: 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 project will reduce further cutting failures at the upslope section close to 23 km in Ella – Wellawaya (A23) Road. Therefore, the proposed project will significantly enhance the safety for commuters, tourists and pedestrians during rainy seasons. It will allow to keep the road open throughout the year.
- This location is highly tourist attract destination in the country. Therefore, tourism will not be interrupted during rainy season while the safety of commuters will be ensured.
- If the mitigation measures implemented to the site, it will support to enhance the safety of the home gardens located in the down-slope. The family living in shop cum house partly depends on the home garden income will be safeguarded.
- Implementation of mitigation measure will ensure to minimize the soil degradation and siltation from future landslide and slope failure. This will enhance the home garden production which is currently in the downslope.

7.2 Negative impacts

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

Table 1: Negative impacts and their level of significance

Impacts during the construction period	Level of Significance
7.2.1 Hydrological and water Quality impacts	
7.2.1.1 Impacts of the drainage pattern of the premises Disruption of existing surface and sub-surface drainage pattern in the area is envisaged due to the reshaping of the unstable slopes, removal of soils, and diversions of existing drainage and surface runoff flow paths. The mitigation works in this site will focus largely on the drainage improvement. Due to diversions, cut-off drains and increased sub-surface drainage, the premises will have increased flows at higher velocities in rainy periods. Also, while excavations and land clearings during the construction will cause continuous runoff of the surface water with mud downward the slope in rainy days.	Significant
7.2.1.2 Water pollution impacts “Kirindi Oya” is located within 300 m distance of the site, so, the direct water pollution impacts are less significant. During rainy season fines, sediments, soil particles can contaminate the downstream. Also, during slope excavation, removal of debris can generate sediment laden runoff and there could be a possibility that contaminated runoff may enter the water body to pollute the water.	Moderate significant
7.2.1.3 Erosional impacts The mitigation works in this site will focus largely on the drainage improvement. Therefore, during rainy season heavy flow of water is expected to be generated and move through the exposed surface. So, if proper mitigation/ covering method is not followed, it will be accelerating the erosional impacts.	Significant
7.2.1.4 Open defecation and waterborne infections There is only one building (Mrs. Soma Herath’s shop cum house) located adjacent to the landslide mitigation site. So, there is a possibility for open defecation, because of labors at the construction site may use the site for open defecation as there is no much houses.	Significant

<p>7.2.1.5 Impacts on the downstream water uses</p> <p>“Kirindi Oya” is running in the down slope area. There could be people live based on the Kirindi Oya water source; in the downstream. The water uses may be impacted due to erosional impacts if construction is done during rainy periods.</p>	Less significant
<p>7.2.1.6 Impacts on ground water table and ground water quality</p> <p>Dewatering during construction could lead to lowering groundwater table when the aquifer is over drained. Mixing of construction materials including cements and other grout materials use for soil strengthening with sub-surface water flows will cause temporary water quality degradation and accumulation of unwanted substances.</p> <p>During the construction period, the hazardous waste from chemical substances, waste water from the construction activities and discharge of waste matter from onsite septic systems would cause adverse impacts on the ground water quality. Due to the construction activities at the slope area, the ground water table tends to draw down causing water seepage close to the road to dry out.</p>	Less significant
7.2.2 Environmental Impacts	
<p>7.2.2.1 Noise and vibration impacts</p> <p>Construction noise are expected from machinery in site preparation and landscaping. Impact is significant as the construction is carried out in the wildlife conservation area. The noise generated from the machinery will disturb the wildlife Also, the tourists are coming to enjoy the natural beauty of Ella in calm and quiet environment. So, this machinery could disturb the tourists as well as the commuters using the Ella- Wellawaya (A23) Road.</p> <p>If heavy machinery is operated, the vibration can affect the shop cum residential building at close proximity. As a result, structural deformations such as cracks and collapse of walls etc. may can be taken place. Therefore, crack survey should be done before and after the mitigation work.</p>	Significant
<p>7.2.2.2 Air pollution impacts</p> <p>Potential impacts on the air quality will be due to the fugitive dust and the exhaust gases generated in and around the construction site due to vehicular movement and site clearance, storage and handling of construction materials such as sand, cement, etc.</p> <p>The wildlife habitats are highly sensible for pollutions which are living in an around the Ella wildlife conservation area. At the same time the shop cum house located near to the mitigation location, commuters and the tourists who are visiting during the construction will be affected due to the pollution particles.</p>	Highly Significant
<p>7.2.2.3 Solid waste disposal issues</p> <p>Poor management of solid waste such as litter, food waste, construction waste during the construction phase may lead to create inconveniences to people, can block the drains to make breeding grounds for water borne refection vectors and pathogens peril. Waste can pollute the soil, and leave various environmental impacts specifically in the wildlife conservation area, if proper disposal mechanism is not in place during the construction period. Since the mitigation work take place in environmental sensitive area, solid disposal place should be placed external to the premises.</p>	Highly Significant
<p>7.2.2.4 Explosive hazards and hazardous materials</p> <p>Since the affected area has some rock boulders, explosives may be used if the rock blasting is envisaged. This may pose risk to Mrs.Soma Herath’s house, commuters of Ella – Wellawaya road, tourists of Ella and surrounding and construction workforce due to unsafe use.</p>	Significant

7.2.3 Biological /Ecological Impacts	
<p>7.2.3.1 Effects on Fauna & Flora</p> <p>Majority of the trees found in the area are not endemic, threatened or identified in the red list of IUCN. Still as per the Director General of Wildlife Conservation statement “Hunting, shooting, killing, capturing of any wild animals or setting instrument to kill or capture of any wild animals, taking or destroy eggs or nest of birds or reptile, damage to breed place of animals are forbidden” So, while implementing the mitigation measures there could be intentionally or unintentionally can causes damage to the breeding places due to several reasons, such as explosive hazards materials, air pollutions, noise and vibration effects. So before implementing the mitigation measures the wildlife conservation approval is mandatory.</p>	Highly Significant
7.2.4 Social and Economic Impacts	
<p>7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site</p> <p>There are no agricultural practices within the area to be remedied or immediately to the site.</p>	Insignificant
<p>7.2.4.2 Cracks in the building due to vibration impacts</p> <p>There is only one building, Mrs. Soma Herath’s shop cum house building located close to the unstable slope. During the construction heavy machinery will be used and the vibration can cause cracks in these buildings and it can affect the stability of the nearby buildings immediate to the slope as well.</p>	Highly Significant
<p>7.2.4.3 Loosing access to land and transport infrastructure</p> <p>Most of the construction activities will be focused on unstable slope area adjacent to Ella-Wellawaya (A23) road. Hence, during construction phase, this road function will be temporary obstructed. Loosing access impact is affect only for the construction phase. The traffic due to full/partial road closure may obstruct the smooth flow of vehicles. This will cause nuisance to pedestrians and commuters.</p> <p>As per Mrs. Soma Herath’s Statement, during the seasonal time, part of the road is used to park the vehicles to enjoy the scenery. During the construction phase tourism activities will be highly affected. So, having proper time and project management is highly important.</p>	Significant
<p>7.2.4.4 Impacts on livelihood/ business and income activities</p> <p>Mrs. Homa Herath’s income is based on the shop, which is located in front of the mitigation site and her home garden is located in the down slope. Only one family is going to impact through this mitigation work still the impact is highly significant as the distance between cutting failure incident area and the Mrs.Soma Herath shop cum house is approximately 13 m distance.</p>	Significant
<p>7.2.4.5 Impacts on service provision (water supply, sewage, electricity)</p> <p>During the construction works and when moving machinery water lines and the Ella-Wellawaya (A23) road can be disturbed and damaged. There are no electricity lines, water supply, sewage lines to be impacted.</p>	Significant
<p>7.2.4.6 Risks of people accessing the site during construction</p> <p>Excavation machineries, loaders, trucks etc. will be used in this premises where people and pedestrian are moving. Site may use high voltage power for operation of certain machinery. Construction may use materials such as metal aggregates, steel etc. which can be injurious under improper storage and handling. Since the site is located adjust to Ella-Wellawaya (A23) road, ignorance of entry of people, especially tourist with careless operation of machinery can cause fatal injuries and accidents to them.</p>	Significant

<p>7.2.4.7 Work camps and lay-down site requirements</p> <p>The camps site will be selected in the close proximity to the mitigation site. If proper camp management is not in place, it may result several labour issues, social issues with the commuters and tourists, 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 since the site is located very closer to wild-life conservation area. In order to provide water and other facilities require for workers from the premises, permission must be obtained from relevant parties.</p>	<p>Significant</p>
<p>7.2.4.8 Relations between workers and the tourist/ people living in the vicinity of the site and possibility of disputes</p> <p>Construction workers at this site will from different social backgrounds and from different geographical areas often under poverty. Usually, they are with poor educational and social background. So, there may be disputes with the workers of construction site and the people residing and people visiting the area. As there is only 1 house is located adjacent to the mitigation location the level of disputes is compatibility low.</p> <p>Further, the site is located in one of the prominent tourist spots and it is important to consider the tourist perspective as well. Tourists could be locals and foreigners. Locals may have overall understanding about the construction site situation but foreigners may not. So, the relevant officers should take the responsibilities in order overcome/resolve the disputes.</p>	<p>Significant</p>
<p>7.2.4.09 Workers safety during construction</p> <p>The workers may be exposed to risk from falling. Fatal injuries may occur if the slopes fail. The heavy construction machinery may be used in limited work spaces. Risk of hazard from vehicles and construction machineries accidents is significant at this site. Contractor may engage under age workers (children) for construction work, which is risky and can results serious accidents and injuries.</p>	<p>Significant</p>
<p>7.2.4.10 Need for people to enter or cross the site</p> <p>There will be an issue regarding entering or crossing the site during construction since the site is located adjacent to Ella – Wellawaya (A23) road.</p>	<p>Significant</p>
<p>7.2.4.11 Road traffic and safety to the public from construction activities</p> <p>During the construction phase, the road will be obstructed by frequently moving machinery, loaders, trucks etc. As most of the mitigation works are to be carried out from the road, the heavy machinery, the trucks and loaders etc. may pose high risk on commuter’s and tourist’s lives. There is a sharp bend on the road, many vehicles driving high speed on this road may not be able to see the mitigation site from far. Hence possible risk of accidents is very high.</p>	<p>Highly Significant</p>

8. Significant Environmental and Social Impacts

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

8.1 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 almost vertical unstable slope with a risk of slope collapse. The health and safety issues of workers safety is highly significant at this site. 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.

8.2 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.

9. 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.

9.1 Resettlement action plan

There is no project-based resettlement in this site. Mrs.Soma Herath's shop cum house building may have some impacts in the form of structural damage during the project actions due to ground vibration induced by heavy machinery operation. (The scheme of compensation, in case of damage to structures due to project should be arranged, (Refer 2002.2.17) utilities and roadside amenities in contracts requirement to ESMP.

9.2 Evacuation of people

During the construction period of the project, it may require to evacuate Mrs.Soma Herath shop cum house located in front of the mitigation area. Also, the area in the downslope (part of Ella-Wellawaya Road) should be named as a "No Entry Zone" for the construction period. To reduce the risk to public properties, it is better, not to allow the vehicle to park on the both side of the road in front of the mitigation site.

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

There is no any damaged structure near to the site.

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

It may require to compensate or rectify if any damages happen to the shop cum house building, infrastructures or any other element of the road during constructions.

9.5 Public awareness and education- needed for following areas

Programs to inform and educate about the risks posed by landslide.

9.6 Design based Environmental/ Social Management considerations

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

Table 2: Design stage Environmental & Social considerations

Design feature	Recommended level of consideration for this site
<p>i. Natural resource management and resource optimized designs Project specific designs should be considered to eliminate mass clearing of the area 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. As per the statement of Director General of Wildlife conservation "On any state land felling, collecting, damaging, or removing any plant, constructing any building, road or path, cleaning, cultivation, mining, filling, disposing, garbage is forbidden". So, the consideration level should be high.</p>	Very High

<p>ii. Site Planning During site planning it is necessary to be cautious on possible re-activation of slope failures and movements of soil masses. Hence, vehicle parking sites, material storage and temporary shelters etc. should not be installed in the danger zones of the slides.</p>	High
<p>iii. Habitat connectivity and animal trails If large fractions of home garden/ forest patches 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.</p>	High
<p>iv. Conservation of water resources If extraction of water is involving as a mitigation measure, as the extracted water is in a good quality and yield it can be considered as a source of water for usage such as gardening and sanitary activities.</p>	Low
<p>v. Interruption to water supply lines Water lines supplying water to the downslope runs through the unstable slope.</p>	High
<p>vi. Aesthetically compatible design considerations The designs in aesthetically sensitive environment should consider structures that blend with natural environment to keep the visual pollution to minimum. Service of landscape architect may be important for the design of suitable mitigation structures.</p>	High
<p>vii. Consideration of green environmental features As this site is located very closer to the Rawana Ella Sanctuary area and the mitigation works are carried out in well maintained premises, 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.</p>	Very High
<p>viii. Workers and community safety Activation of landslide may occur during construction phase and may pose threat to workers, and the community. Therefore, design-based safety consideration such as berms, safety nets, safety fencing etc. should be considered specific to safety of community.</p>	Very high
<p>ix. Erosion control structures During rainy season the flow in the drainage structures can be significantly high. During rainy season the heavy flow of surface runoff can be expected through the unstable slopes. This water should be conveyed to nearby storm water drains. Hence the design should adequately consider flow speed breakers to reduce erosive flows of slopes.</p>	High
<p>x. 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 etc 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.</p>	High

9.7 Mitigation of impacts during the construction phase

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

Measures to manage and to mitigate the environmental and social impacts are generally common to all landslide mitigation sites. Such impacts are largely attributed to activities in the construction phase. The mitigation of impacts therefore becomes an obligation of construction contractor. NBRO has prepared a comprehensive document on “*contractors’ requirement to comply with Environmental and Social Health and Safety (ES & HS) management during the construction phase*” to be included in construction contractors’ bid document. The main sections are summarised below (Table 3) indicating the degree of relevancy for this site. For details ESMP for construction contractors should be referred.

Table 3: 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
2002.2 2)	Noise and Vibration	Highly Relevant
2002.2 3)	Cracks and damages to the buildings	Relevant (buildings)
2002.2 4)	Disposal of waste	Highly Relevant
2002.2 5)	Disposal of refuse	Highly Relevant
2002.2 6)	Dust control	Highly Relevant
2002.2 7)	Transport of Construction materials and waste	Highly Relevant
2002.2 8)	Water	Relevant
2002.2 9)	Flora and Fauna	Low Relevant
2002.2 10)	Physical and cultural resources	Low Relevant
2002.2 11)	Soil Erosion	Highly 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 (pollution)	Highly Relevant
2002.2 16)	Disruption to public	Highly Relevant
2002.2 17)	Utilities and roadside amenities	Relevant
2002.2 18)	Visual environment enhancement	Relevant
2002.5. Environmental Monitoring	Baseline surveys (air, water, noise, vibration, crack surveys)	Refer site specific monitoring plan
	Surveys during construction (air, water, noise, vibration, crack surveys)	Refer site specific monitoring plan
	Surveys during operation phase	Refer site specific monitoring plan
	Reporting and maintenance of records	Relevant
2003. Working Conditions and Community Health and Safety		
2003.2	Safety organization and communication	Highly Relevant
2003.3	Child Labor and Forced Labor	Highly 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	Highly 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 in addition to monitoring requirement indicated in contractors ESMP

Reference: Contractors Obligation for implementation of ESMP

9.7.2 Site Specific mitigation

Given below are the site-specific mitigation measures that the project is expected to implement during the construction period.

Table 4: Site specific ES & HS mitigation measures

Mitigation item	Project implementation phase	Responsibility
<p>i. Minimize erosional impacts during construction</p> <p>The mitigation site is located in a steep slope area. It is recommended that mitigation works involved with site clearance, slope reshaping, removal of debris 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. Silt traps should be introduced to cut down sediment laden runoff.</p>	Site preparation & construction	Construction Contractor
<p>ii. Invasive Species</p> <p>It is recommended to avoid using invasive species as vegetative erosion control structures since the site is located very closer to wild-life conservation area. 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.</p>	Construction	Construction Contractor
<p>iii. Planning project activities inside the sites</p> <p>As contractor has to operate mitigation actions along the Ella – Wellawaya (A23) road side, he should carefully prepare a plan for management of construction activities inside the premises. This should include careful selection of material storage, mixing of concrete, cleaning activities etc. which considering the safety and optimization of space.</p>	Site preparation & construction	Construction Contractor
<p>iv. No Entry Zone</p> <p>The PMU should make a detailed assessment on possible risk of slope destabilization in the site during construction phase. “No entry zone” may require to be declared.</p> <p>Also mitigate the risk of accidents from moving vehicles operational machinery construction activities, electrical leakages etc. should be given high priority in the health and safety management plan. Sign boards indicating slope instability risk are strongly recommended at this site.</p>	Construction	E & S Unit of PMU contractor

<p>v. Machinery and material transportation</p> <p>The Ella -Wellaway (A23) road will require to use for machinery, materials and vehicle transportation during construction phase. Therefore, extreme care should be taken as possible accidents and damages to the road are high.</p> <p>Alternative parking facility for the tourist should be arranged nearby to the high scenic viewpoints which fallen under cutting failure location.</p>	Construction	E & S Unit of PMU Contractor
<p>vi. Noise and vibration control</p> <p>The noise and vibration generating activities may disturb the smooth flow of activities of insects, birds and animals living in an around Ella sanctuary area as well as the tourists and commuters passing the site. Vibration generating activities should be done within the prescribed limits to avoid damage to structures. Cracks in the buildings should be monitored before, during and after completion of the project. Suitable compensation should be made if cracks from the damages or cracks enlarge due to construction work.</p>	Construction	Construction Contractor
<p>vii. Disposal of construction waste</p> <p>The contractor should pay special attention with respect to disposal of construction waste. Waste if generated should store properly without getting washed off and dispose according to approved procedures by the PMU. Construction waste should not dispose within the sanctuary premises, along the road-side or anywhere else close by the mitigation site.</p>	Site preparation & construction	Construction Contractor
<p>viii. Dust and aerosol control screens</p> <p>The dust particles generated during the construction period can influence the occupants of Mrs.Soma Herath house, commuters, and tourists. Special screens should be used if heavy dust or aerosol generating activities are envisaged.</p>	Site preparation & construction	Construction Contractor
<p>ix. Water and Electricity for construction</p> <p>Water for construction should be obtained only from approved places. If the Contractor intends to use water from Mrs. Soma Herath, they should be informed and the required permission should be taken.</p> <p>Also, there is no any electricity line going through the site and separate electricity providing system should be arranged with consultation of CEB. So, proper mechanism and permission should be get from relevant authority prior to implementing the mitigation measures.</p>	Construction	Construction Contractor
<p>x. Priority Health and Safety Issues</p> <p>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.</p> <ol style="list-style-type: none"> i. Additionally, work should be discontinued for sufficient time period during rainy period as working on unstable slopes will be highly risky in the rainy season. ii. A good warning system and fulltime watchmen is highly recommended for this site for both worker and public’s safety. iii. Safety barriers and safety nets should be installed at places of risk to protect workers and community from boulder falling risk 	Construction	E & S Unit of PMU contractor

iv. Proper emergency management unit for other accidents (first aids facilities, safety items, hospitalization facilities and transportation facilities) should be maintained for this site.		
xi. Safety structures/sign boards During construction phase adequate safe fencing should be established to prevent potential falling risk of workers from upslope areas. Warning sign boards indicating slope instability risk should be placed at the unstable slope area. As the risk is high during the rainy season where there is no construction work it is mandatory that safety signs boards are displayed even during the no project period as well.	Construction	E & S Unit of PMU contractor
xii. Interruption to water lines Necessary arrangements should be taken to provide alternative water supply in case of an interruption to water supply. The water users should be consulted during project mobilization to inform the requirement to shift the water lines to a safe location if water lines are running through the project site.	Construction	Construction Contractor
xiii. Use of sanitary facilities of contractor's workforce Separate sanitary facilities should be arranged for the workforce.	Construction	Construction Contractor
xiv. Working hours Construction activities are best done during the day or at night.	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 community should be prevented by maintaining the agreed code of conduct by the contractor.	Construction	Construction Contractor
xviii. Snake bites management and Emergency management by accidents Proper emergency management system for snake bites (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	E & S Unit of PMU Contractor
xix.		

9.7.3 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 5: Environmental and Social monitoring plan; construction phase

Monitoring requirement	Parameters	Frequency
i. Baseline monitoring	Water quality	-
	Pre-crack survey for the administrative buildings	Once*
	Ground vibration	Once*
	Air quality: particulate matter	Once*
	Background noise measurement	Once*
ii. During construction	Water quality	-
	Crack survey for the administrative buildings	Once*
	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	During high air pollution generating times *
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	Pre-crack survey of the 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.	

10. Public and Stakeholder Consultation - the public consultations that have been and/or will be held

10.1 Public Consultation

Mrs. Soma Herath, who is the occupant living closer to the mitigation site was consulted during the field visit. The land is belonging to Department of Wildlife Conservation but Mrs. Herath was living in that location for several generation, accordingly she felt it's her own land. She had been instructed about landslide mitigation project and the funding mechanism. The occupant expressed her willingness to the project and to give full support to the project.

10.2 Stakeholder/ Institutional Consultation

The Department of Wildlife Conservation, Ella Ranger Officer, Mr. Tharanga Rukshan stated, this area is under Wild-life conservation Department (DWC) and therefore prior approvals from Director General

of the department is needed before implementing the mitigation activities. According to him there is no any endemic fauna and flora closer to the mitigation area. However, once request received with the accurate location, and project details including project duration, the officers of the DWLC will arrange a field visit to the site and according to the site condition, forest reservations in the area, and plant and animal species found, site-specific recommendations will be provided considering the extent of the project.

As the site comes under the RDA reservation area, consent from RDA is very important. As per the Provincial Director of RDA (Uva Province) Mr. Galappaththi, RDA has no objection and states the mitigation is very much needed. Further he stated that he is not aware about the accurate locations of the mitigation sites. Hence, the project implementing agency should submit the accurate locations and a detailed design report to RDA with a formal request on the nature of approvals required. Then, RDA regional office will evaluate the proposal and give the recommendation and approval to access the site, erect structures, and implement mitigation works.

11. Preventive Measures for Covid-19 that was issued by Sri Lankan National Health Authority

COVID-19, the novel coronavirus infection has not been totally eradicated in the world. Therefore, to prevent/ control of the spread of infection also to prevent panic situations in the event of detecting a suspected case, all contractors are required to develop a COVID-19 Preparedness plan and need implementing in the site as per the “HEALTH AND IMMUNITY ENHANCEMENT GUIDELINES FOR COVID -19 and DENGUE, CIDA Health Guidelines for Construction Industry Version 4(Revised) CIDA, January 2021”.

12. Labor 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.

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

Table 6: Clearances, no objection, consent and approvals

Requirement / Approval / Institution	Relevance to the project
13.1 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 Ella Pradeshiya Sabha
13.2 Approval from the state lands owners relevant to the project	
Central Environmental Authority	Consent from District Central Environmental Authority is required as the area belongs to a sensitive area as per the Gazette of the Democratic Socialist Republic of Sri Lanka, Extraordinary No.1550/9 dated 28.05.2008 Soil Conservation Act (Chapter 450).
Department of Forest Department of Wildlife Conservation	As the mitigation site is belongs to Department of Wildlife Conservation, approval form Department of Wildlife Conservation is needed. Also, there are no forest reservations, so the Department of Forest approval is no needed.
Geological Surveys and Mines Bureau	Approval will be obtained for for extraction of materials, transportation and disposal of earth, rocks and mineral debris. (If necessary, only).
Ella Pradeshiya Sabha	Approvals from Ella Pradeshiya Sabha will be obtained for the disposal of waste and plant litter.
Ceylon Electricity Board	Approvals from the regional office of Ceylon Electricity Board will be required as there is no electricity supply near to the mitigation site.
13.3 Consent/ no objection/ legally bound agreement from the private land ownerships	
Land owner (Department of Wildlife Conservation)	Signing a legally bound agreement between the land owners (Department of Wildlife Conservation) 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 7.

Table 7: Tentative timeline for getting approvals

Approvals	Month 1				Month 2			
	W1	W2	W3	W4	W1	W2	W3	W4
Project implementation								
<i>Approval from the District Secretariat</i>								
Submission of application	—							
Project briefing		—						
Respond to comments			—	—				
Approvals					—	—		
<i>Approval from planning committee</i>								
Submission of application		—						
Project briefing			—					
Respond to comments				—				
Approvals					—			
<i>Approval from Road Development Authority</i>								
Submission of application		—						
Respond to comments			—					
Approvals				—	—			
<i>Other approvals</i>								
Department of Wildlife Conservation		—	—					
Central Environmental Authority								
GSMB (if required)								
Consent/ no objection from the land ownership (Department of Wildlife Conservation)	—							

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*).

All complaints regarding social and environmental issues are received either orally/ telephone communication or in writing by the following person/ location.

- Project Director/ RLVMMMP

Tel : +94 112 559 869

Fax : +94 112 502 611

Email : pd.rlvmmmp@gmail.com

Web : rlvmmmp.lk

- District Offices/ NBRO or
- Site Offices/ RLVMMMP
- Online Grievance Redresses Mechanism System (<https://rlvmmo.lkgrms>)

15. Information disclosure

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

Table 8: Proposed scheme of information disclosure

Information	Proposed agencies	Mode of information disclosure
i. Project plan (site details, design implementation arrangements)	District CEA, District Secretariat, Divisional secretary, 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, Divisional secretary, District Office NBRO, AIIB and relevant parties as appropriate	Written and verbal communications, submission of relevant reports
v. Decisions taken and progress review meetings pertinent to ES matters	District CEA, Divisional secretary, District Office NBRO, AIIB and relevant parties as appropriate	Meetings, submission of relevant reports
vi. Grievance redress mechanism	Relevant parties, AIIB	Meetings, written and verbal communications

Annexure I: Images of the site condition and the consultation



Unstable slope area



Unstable slope and the Ella-Wellawaya (A23) road



Consultation with Ella Range Assistance Mr. Tharanga Rukshan



Public consultation – Mrs. Soma Herath's Shop cum house building