REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

Site No.130

Between Ihalakotte and Balana railway stasions at CH 59+75 (RHS) (Ihalakotte Landslide)

Kegalle District

March 2022

Prepared for:

ASIAN INFRASTRUCTURE INVESTMENT BANK

Prepared by:

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

Contents

1. INTRODUCTION 1

1.1. Project Overview 1

1.2. Intended Users 1

2. DESCRIPTION OF THE PROJECT AND SITE DESCRIPTION 1

2.1. Name of the Site 1

2.2. Locational Details 2

2.3. Topography and Land Ownership 2

2.4. Meteorology of the area 4

3. LANDSLIDE HAZARD INCIDENT DETAILS 4

3.1. Account of Incident 4

3.2. Effects and Consequences of Landslide 5

3.3. Description of any remedial measures already undertaken to reduce the potential risk 5

3.4. Evacuation 5

3.5. Resettlement (Progress) 5

4. DESCRIPTION OF THE AREA OF THE LANDSLIDE/SLOPE FAILURE AND AREAS ADJACENT TO THE LANDSLIDE AND CURRENT LEVEL OF RISK 3

4.1. Surrounding area of the Slope Failure/ Cutting Failure 3

4.2. Current Level of Risk 3

5. DESCRIPTION OF THE WORKS ENVISAGE UNDER THE PROJECT 3

6. BRIEF DESCRIPTION ON THE SURROUNDING ENVIRONMENT WITH SPECIAL REFERENCE TO SENSITIVE ELEMENTS THAT MAY BE AFFECTED BY THE PROJECT ACTIONS 3

7. IDENTIFICATION OF SOCIAL AND ENVIRONMENTAL IMPACTS AND RISKS RELATED TO THE WORKS 4

7.1. Positive Impacts 6

7.2. Negative Impacts 6

8. SITE SPECIFIC RISK ANALYSIS 9

9. SIGNIFICANT ENVIRONMENTAL AND SOCIAL IMPACTS 10

9.1. Priority Health and Safety Issues. Specific H&S concerns that require measures that go beyond the standard contractual requirements for contractors 10

9.2. Child Labor and Forced Labor 10

10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN 10

10.1. Resettlement Action Plan 10

10.2. Evacuation of people 10

10.3. Procedure for removal of damaged structures, facilities infrastructure (consent from owners to remove the articles) 10

10.4. Requirement for compensation for loss of property /uses due to project actions 10

10.5. Public awareness and education- needed for following areas 10

10.6. Design based Environmental/ Social Management considerations 10
10.7. Mitigation of impacts during the construction phase 12
10.7.1. Construction contractors' requirement to comply with environmental and social management during the construction phase 12
10.7.2. Site Specific Mitigation 13
10.7.3. Monitoring requirements specific to the site 16
11. PUBLIC & STAKEHOLDER CONSULTATION - the public consultations that have been and/or will be held 17
12. PREVENTIVE MEASURES FOR COVID-19 THAT WAS ISSUED BY SRI LANKAN NATIONAL HEALTH AUTHORITY 17
13. LABOR MANAGEMENT 17
14. CLEARANCES, NO OBJECTION, CONSENT AND APPROVALS REQUIRED FOR THE IMPLEMENTATION OF THE PROJECT 18
15. GRIEVANCE REDRESS MECHANISM FOR THIS SITE 19
16. INFORMATION DISCLOSURE 19
Annexure I: Images of the site condition and the consultation 21
Annexure II: Report on the Stakeholder Consultation: 22
Annexure III: Proposed procedure for obtaining approvals from state land owners and environmental agencies. 23

List of Figures

Figure 1 - Railway Network in Sri Lanka/ Nawalapitiya Operation Area and the mitigation site. 2
Figure 2 – Accessibility to the Location 3
Figure 3 – Google image of the proposed landslide mitigation location 3
Figure 4 – Cross section of the mitigation area..... 4
Figure 5 – Remedial measures already undertaken to reduce the potential risk 5
Figure 6 - Land-use, General Information, Risk Elements and Cross Section of the location 2
Figure 7 – Sensitive elements that may be affected by the project actions..... 4
Figure 8 – Summery of the impacts which are envisage during project 5

List of Tables

Table 1 - Negative impacts and their level of significance 6
Table 2 - Site specific Risk Analysis 9
Table 3 - Social and Environmental Consideration in Design Stage 11
Table 4 - Contractor requirement to comply with ES and HS 12
Table 5 - Site Specific ES and HS Mitigation Measures 13
Table 6 - Environmental and Social Monitoring Plan – Construction Phase..... 16
Table 7 - Clearances, No Objections, Consent and Approval..... 18
Table 8 - Tentative Timeline for getting approval 19
Table 9 - Proposed scheme of information disclosure 20
Table 10 - Level of Information gathered through consulting institutions 20

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 obtained 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 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 **Between Ihalakotte and Balana railway stasions at CH 59+75 (RHS) (Ihalakotte Landslide)** landslide threat 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 DESCRIPTION

2.1. Name of the Site

Rectification of Site No.130, Between Ihalakotte and Balana railway stations at CH 59+75 (RHS) (Ihalakotte Landslide), Mawanella, Kegalle District.

2.2. Locational Details

The proposed mitigation site falls under Makehelwala GN division of Mawanella DS division in Kegalle District of Sabaragamuwa Province.

GPS References of the site – 7.284167°N and 80.477090°E

Elevation – The elevation of the location is around 1230ft (375m) AMSL.

Nearest Town to the Site – Mawanella town located around 9km away from the site. The mitigation site is situated around 1km away from the Ihalakotte Railway station towards Kandy along the rail line. This area is operated by Kadugannawa IPW operational area.

Accessibility to the Location –

The distance to the location from Colombo fort is 97 km through railway lines.

By road, the site can be accessed via Colombo – Kandy road. Mawanella town is located about 90 km distance from the Colombo. When travel around 5km from Mawanella town (Bo-sevana Junction) by Mawanella – Rambukkana road can be found Makehelwala junction. The Ihalakotte railway station is located around 4km distance from Makehelwala junction and when travel around 1km along the railway track towards Kandy, the mitigation site can be found.

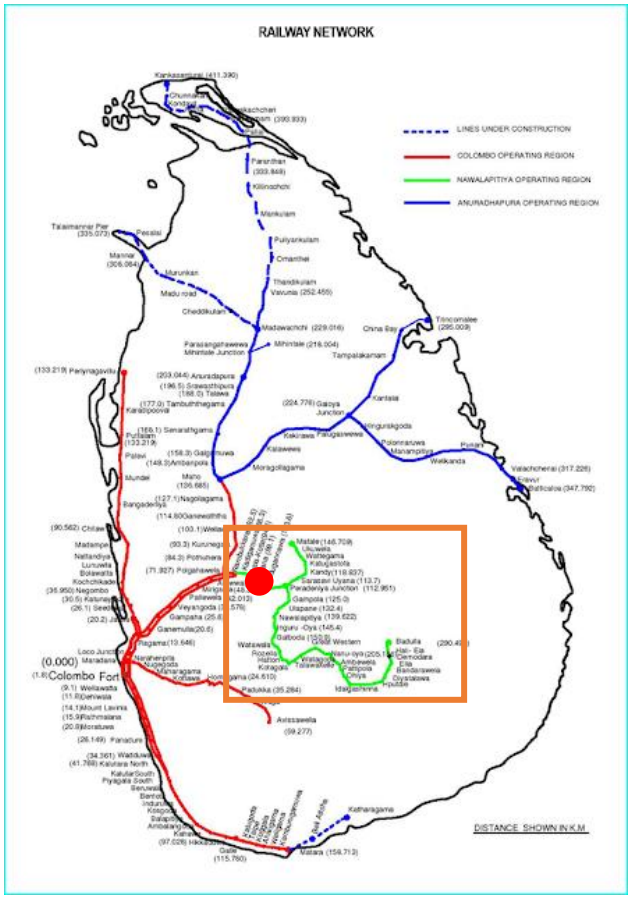

Figure 1 - Railway Network in Sri Lanka/ Nawalapitiya Operation Area and the mitigation site.

2.3. Topography and Land Ownership

The general topography of the site is characterized by varying slopes of 30 to 60 degrees from the upper part of the site with average cross-sectional length of 200m towards the down slope. The major portion of the slope fluctuates between 50-60 degrees. Different sized boulders were scattered unevenly across the mountainside, and the sudden soil movements caused by surface runoff caused larger sized boulders to move to the lower part of the slope. Currently, the sedimented parts of those boulders can be observed everywhere on the bottom.

The extent of the land area of the mitigation site is about 11000 square meters. The site is in a hilly terrain where the natural slope has been disturbed and several terraces have been modified to make space for railway line.

The land ownership of this area is belongs to the Railway Department of Sri Lanka and the privet lands.

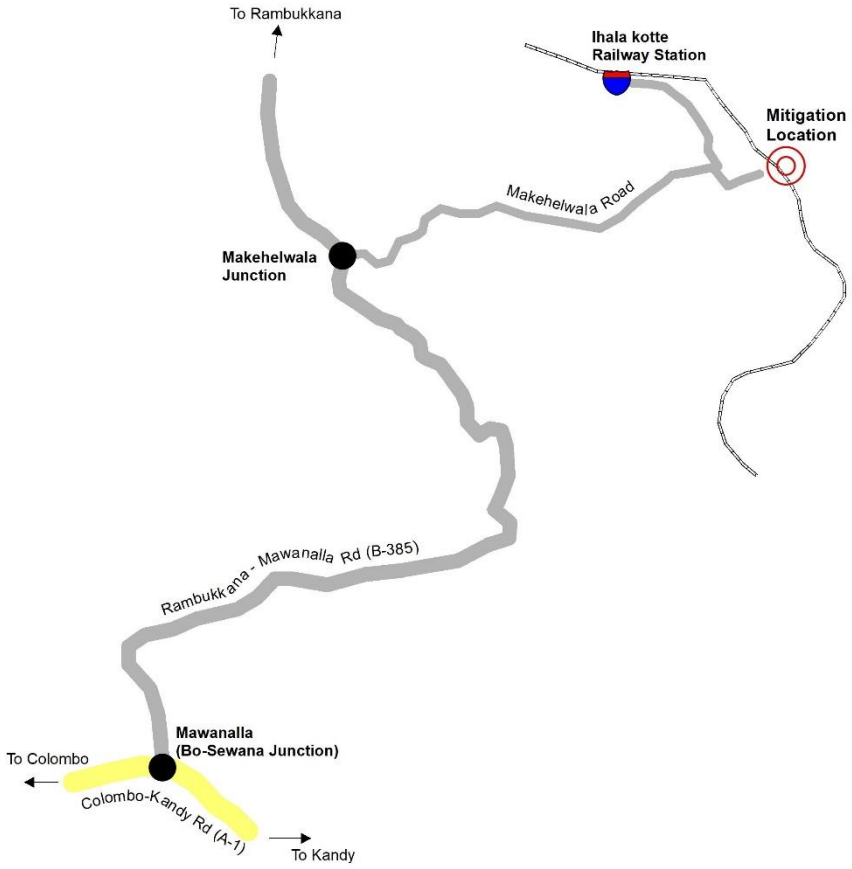

Figure 2 – Accessibility to the Location

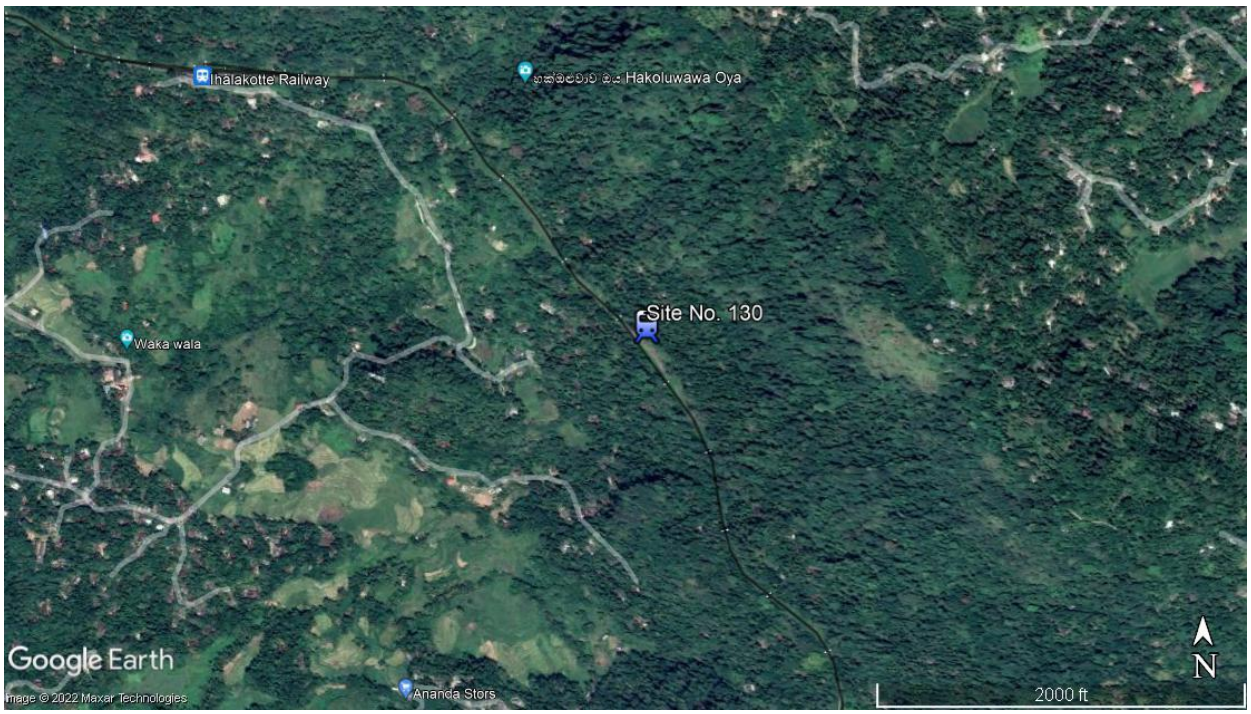

Figure 3 – Google image of the proposed landslide mitigation location

2.4. Meteorology of the area

The average annual rainfall lies between 2500 and 4500 mm, and temperature of the region ranges between 22 degrees and 30 degrees Celsius. It receives most of the rain from Southwest Monsoon.

3. LANDSLIDE HAZARD INCIDENT DETAILS

3.1. Account of Incident

The mitigation site is located on a sloping terrain in Makehelwala Kanda and the natural slope has been altered to accommodate the railway line. The slope modifications have not followed engineering slope stability norms. As well as, this area falls under the "Landslide are to be expected" category of Landslide Hazard Zonation Maps prepared by NBRO.

These cumulative impacts had resulted to create a massive landslide of this area in May 2016 and total affected area from the landslide is around 11000 m^2. The main cause of the landslide is poor drainage system on the top of the gradient. Since there was no proper mechanism to clear the cut off drainage line at the top, the water unsurprisingly flows directly through the slant vertically. During the site visit, the sedimented parts of the erosion (boulders and soil sediments) were visible on the surface closer to the railway line. The railway line and one house (W.G. Pathmakumara) has been totally damaged due to this landslide incident.

According to the station master of Ihalakotte railway station, heavy rainfall caused another failure in this area and 06 other locations up to Balana in 2021.

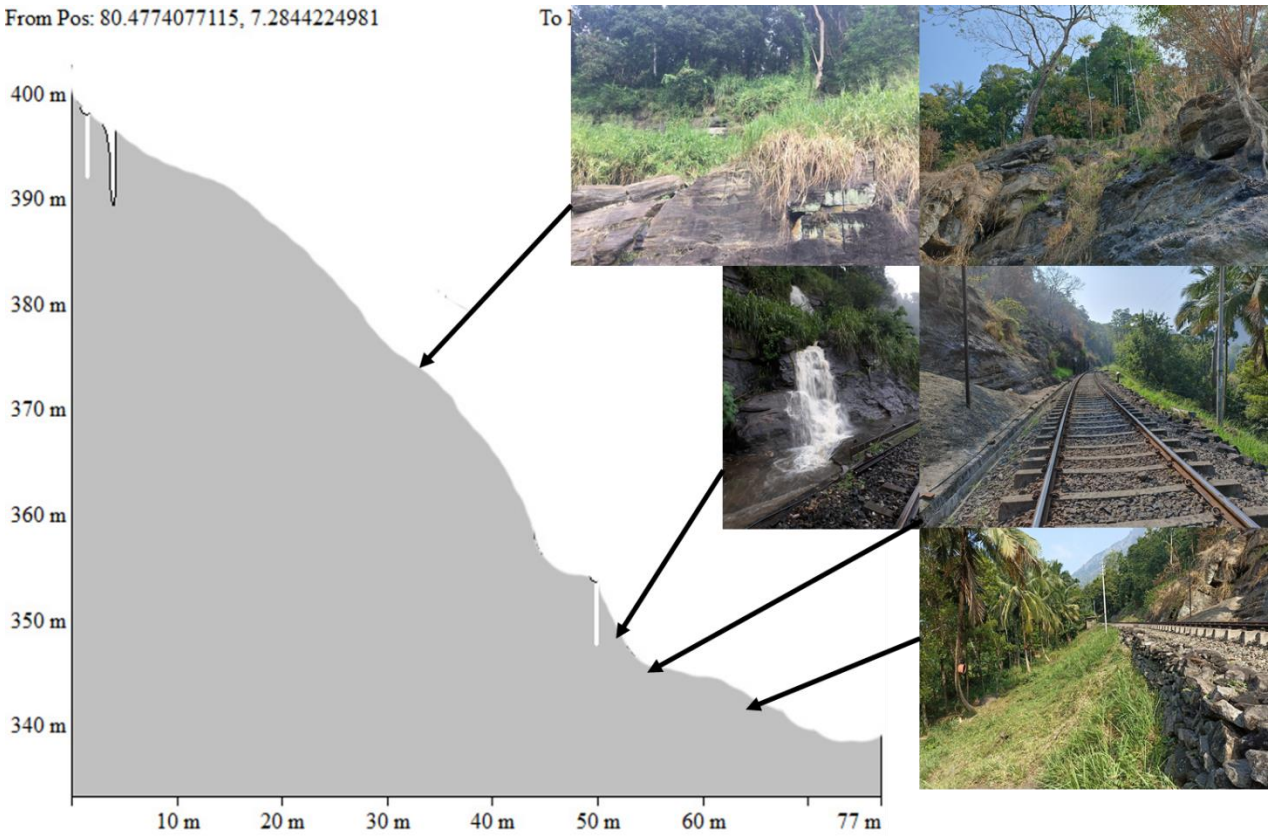

Figure 4 – Cross section of the mitigation area

3.2. Effects and Consequences of Landslide

During intense rainy periods the unstable slope and debris tends to fall imposing risk on the railway line, and there is a high risk of occurring an accident when passenger trains and trains transporting goods travels on this rail. Further, it would be impacted to the houses and home gardens located downslope of the site.

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

Following remedial measures have been taken to reduce the potential risk

- Drainage improvement closer to the railway line
- Install Piezo meters for continuous monitoring the ground water level of the area.
- Install horizontal drain lines to drain the excess ground water in the area
- Constructed a gabion wall, uplift the railway line and reshape the downslope are with turfing.

Figure 5 – Remedial measures already undertaken to reduce the potential risk

3.4. Evacuation

There is no requirement of project based evacuation for this site.

3.5. Resettlement (Progress)

There is no requirement of project-based resettlement programme for this site. Only one house is identified as high risk to this incident and he has already resettled in a safer location.

Figure 6 - Land-use, General Information, Risk Elements and Cross Section 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/ Cutting Failure

The proposed mitigation site is located about 1km distance to the Ihalakotte railway station towards Kandy. The main railway line, signal line, temporarily/ semi-permanent buildings of railway department and home gardens are located within the premises. The area include 100m from the railway line are belongs to railway department on both sides. Around 50-60 trains running through the site daily.

When consider about the surrounding area of the site, scattered settlement, home gardens and areas with dense trees could be observed within 500m radius from the site. It is not observed any commercial or administrative area in close proximity. This site is located in Makehelwala Kanda which is in Alagalla mountain range. The Hakoluwawa Oya and Dekinda ella are located about 500 – 700m from the mitigation site. The Meeyan Ella and the Tunnel, a major tourist hotspot on the main railway line, are located at a distance of about 1.5 km from the mitigation site.

Following features and land-use pattern could be observed closer to area of the slope failure.

- The area proposed for mitigation is a sloping landscape and large boulders and rock debris can be seen at the crest of the slope.

- The upper slope and down slope areas of the site consist with houses and their home gardens.

- Temporary / Semi Permanent structures belonging to Railway Departments can be observed located close to the mitigation site.

4.2. Current Level of Risk

If the site is not rectified to prevent future landslide, soil mass or debris of the future landslide can directly affect the operations of trains of the main railway line in between Ihalakotte and Balana. The raiway line, railway passengers, local and foreign travelers, houses and their home gardens at downslope area would be at risk due to this unstable ground section and their smooth functioning will be disrupted.

5. DESCRIPTION OF THE WORKS ENVISAGE UNDER THE PROJECT

The proposed project aimed to ensure that the further landslide is prevented. The proposed mitigation works will be largely concentrated on unstable land area. Therefore, construction of a cut off drain above the upper slope and diversion of water to the adjacent culverts, reshaping entire slope with proposing suitable angles for each rock and soil surface with proposed toe excavation for the platform will be implemented as the mitigation.

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

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

- Current services and activities of the main railway line
- Railway passengers.
- Home gardens of the area and livelihood of neighboring houses
- Water source of surrounding people
- Houses located in the downslope area of the mitigation site
- Current services, economic and tourism activities of the area

(Ref. Fig.7 Sensitive elements that may be affected by the project actions)

Figure 7a: current services of main railway line

Figure 7b: Home gardens at down slope area

Figure 7c:Water sources

Figure 7d: Railway line

Figure 7 – Sensitive elements that may be affected by the project actions

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

Chart below summarizes the positive and negative impacts which are envisaged during project actions and their significance.

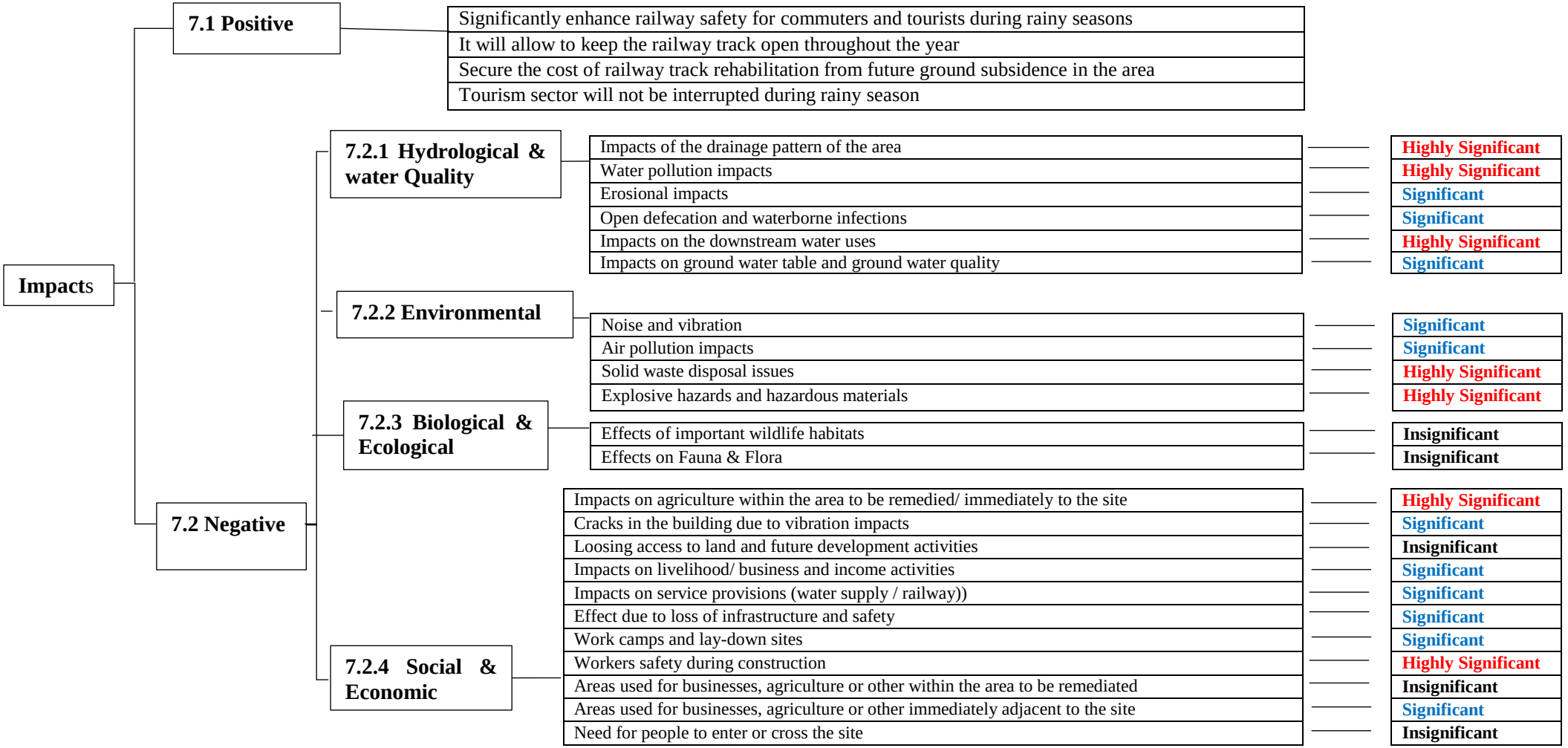

Figure 8 – Summery of the impacts which are envisage during project

7.1. Positive Impacts

- The project will reduce further propagation of slope failures at the upslope section in main railway line between Ihalakotte and Balana stations. Therefore, the proposed project will significantly enhance railway safety for commuters and tourists during rainy seasons. It will allow to keep the railway track open throughout the year.

- The remediation may secure the cost of railway track rehabilitation from future ground subsidence in the area.

- This area is highly tourism attraction destination in the country. Therefore, tourism will not be interrupted during rainy season while the safety of commuters will be ensured.

- Additional cost for the safety measures (Ex – permanent watchman, rainfall/ ground water level monitoring) will be reduced.

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 area It is observed that heavy water flow is generated during the rainy season through the slope failure area. Disruption to existing surface and sub-surface drainage pattern in the area is envisaged with the project implementation. The mitigation works in this site will focus on the drainage improvement. Therefore, during rainy season heavy flow of water is expected to be generated and would be accumulated between the railway tracks. The water inundation of the railway tracks may be expected. Increase of water through the railway line may intensify the risk of slope failures of the unstable section.	**Highly Significant**
7.2.1.2 Water pollution impacts Seasonal stream/spring could be observed closer to the mitigation site and the surrounding people use the stream water for domestic purposes. Washout of fines, sedimentation in existing watercourses can be expected during the removal of debris and boulders and during the process of landscaping the of land area. Improper disposal of oils and other harmful substances/contaminants from machineries, leakages from temporary storage tanks, solid waste and wastewater disposal/dumping could occur causing adverse impacts on quality of the water.	**Highly Significant**
7.2.1.3 Erosional impacts The project area has a steep slope. The project may envisage clearing of surface vegetation exposing soils during rainy period. The exposed surfaces can get eroded if proper covering is not maintained. The existing surface and sub-surface drainage pattern in the area will be disrupted during construction phase. However, as the area exposed is confined to a smaller plot, the erosional impacts are localized but significant.	**Significant**
7.2.1.4 Open defecation and waterborne infections As site is located within isolated land area, possibility of open defecation is high.	**Significant**

7.2.1.5 Impacts on the downstream water uses Construction activities will be carried out on already disturbed area with high seepages. Therefore, the area will be prone to erosion during the early construction phase. This may increase the sediment load in the water sources adjacent to the unstable land which have clean water. This water is used by downslope occupants for their day today activities and for drinking purposes. The possibility of contamination of water is very high due to construction activities especially during rainy season. Impacts on water quality of this water source will be high as the emissions will exceed the ambient water quality standards prescribed for designated uses such as drinking, bathing, and aquaculture and may violate even the minimum standards.	**Highly Significant**
7.2.1.7 Impacts on ground water table and ground water quality Dewatering during construction could lead to lower groundwater table when the sub surface water bearing zone is over drained. Addition or mixing of construction materials including cements/other grout materials used for soil strengthening with sub-surface water flows may cause temporary water quality degradation and accumulation of unwanted substances in the sub surface water bearing zone system.	**Significant**
7.2.2 Environmental Impacts	
7.2.2.1 Noise and vibration impacts Noise and vibration are expected from construction equipment. Noise and vibration impacts are significant as the constructions are carried out closer to the rural settlement area. Also, the day time noise generated from the movement of machinery and vehicles during construction phase will disturb the activities of the households as there are houses with occupants within the 100m influential limit of the proposed mitigation site.	**Significant**
7.2.2.2 Air pollution impacts Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, demolition, burning, from storage, transportation & disposal of construction materials, construction waste and working with toxic materials. During construction, it generates high levels of dust typically from concrete, cement, wood, stone, and silica. As the houses are located close to the site the effects from dust generated activities during the construction phase. The air pollution from the construction activities would affect the railway commuters and households during dry periods.	**Significant**
7.2.2.3 Solid waste disposal issues Since the mitigation area is located in the isolated rural settlement area, there is a high potential for disposal of solid waste generated by construction activities in the surrounding areas. Various types of waste such as litter, food waste, construction waste will be generated and may store or dispose on site. The littering and haphazard storage and disposal of solid waste in and around the site will create unaesthetic appearance to the railway commuters. Littering can block the water seepages and will make breeding grounds for mosquitoes. Waste can pollute the soil, and leave various environmental impacts if proper disposal mechanism is not in place during the construction period. The water sources which are used by downslope occupants might be polluted.	**Highly Significant**
7.2.2.4 Explosive hazards and hazardous materials Since the affected area has some rock boulders, explosives may be used if the rock blasting is envisaged. This may pose risk on commuters and construction workforce due to unsafe use. As these operations are to be done on unstable slopes the risk of improper use of explosive and accidents from rock fragments are highly significant**.**	**Highly Significant**
7.2.3 Biological /Ecological Impacts	
7.2.3.1 Effects of important wildlife habitats There are no forested/ wild-life reservation areas within the project influence area with high biodiversity, or habitat fragmentation.	Insignificant

7.2.3.2 Effects on Fauna & Flora Majority of the trees found in the area are not endemic, threatened and identified in the red list of IUCN.	Insignificant
7.2.4 Social and Economic Impacts	
7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site The privately owned cultivation area is located immediately to the mitigation site at down slope and it is the main income source of this family. It was observed that coconut, Areca nut, jackfruit and Kitul were cultivated in this land. The mitigation measures would be concentrated on this areas and therefore, any damage to these cultivation activities would impact negatively on their livelihood and income source.	**Highly Significant**
7.2.4.2 Cracks in the building due to vibration impacts There are several buildings located within 100m buffer zone from the mitigation site. During the construction heavy machinery will be used and the vibration can cause cracks in these buildings.	**Significant**
7.2.4.3 Loosing access to land and future development activities The mitigation works will be concentrated on the railway reservation. Hence there will be no significant impact to the land owners with regard to loosing access to the land or loss to valuable uses.	Insignificant
7.2.4.4 Impacts on livelihood/ business and income activities The cultivation area (Coconut, Areca nut, Jackfruit, Kithul) immediately adjacent to the unstable land would be affected during the construction period. This would affect the income of the downslope household. The activities of the households and their gardens in the downslope would be interrupted during construction phase.	**Significant**
7.2.4.5 Impacts on service provision (water supply) The drinking water source and supply lines to the houses located in downslope area are running through the mitigation location (Source: Stream and Springs). The construction works, moving machinery will certainly damage these lines. The construction work will certainly involve drainage improvement of the slope by constructing cut off drains, horizontal drains etc. This will lower the groundwater table and as a result the water level of the downslope well would be reduced.	**Significant**
7.2.4.6 Effect due to loss of infrastructure and safety There is no direct access road to this mitigation site. Therefore, it is necessary to use railway track to transport goods and equipment. During construction phase, the railway tracks from Ihalakotte to Balana will be obstructs vice versa by frequently moving machinery, loaders, trucks etc.	**Significant**
7.2.4.7 Work camps and lay-down site requirements There are sufficient space to lay-down the working camps closer to the mitigation site. There are some temporary building closer to the site owned by railway department which can be used with the approval of SLR. 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 Workers safety during construction The constructions are carried out in a very limited space and therefore workers may be exposed to risk of facing railroad accidents. They also may face risk of falling from the unstable slope. Fatal injuries may occur due to the ignorance of workers and overstepping the moving dimensions resulting into train accidents. The heavy construction machinery may be used in limited work spaces. Risk of hazard from vehicles and construction machineries accidents is also highly significant at this site. Contractor may engage under	**Highly Significant**

age workers (children) for construction work, which is risky and can results serious accidents and injuries.	
7.2.4.9 Areas used for businesses, agriculture or other within the area to be remediated There are no areas used for business, specific agriculture practices or other within the area to be remediated.	Insignificant
7.2.4.10 Areas used for businesses, agriculture or other immediately adjacent to the site There is a cultivation area in the downslope area immediately adjacent to the site cultivated by the occupants of the downslope household.	**Significant**
7.2.4.11 Need for people to enter or cross the site The mitigation site is located in isolated areas where people do not travel much across the railway line. Therefore, impact is insignificant.	Insignificant

8. SITE SPECIFIC RISK ANALYSIS

Table 2 - Site specific Risk Analysis

Risk	Affected group	Risk level
1. Facing railway accidents when working / shifting in between railway tracks	Workers	Very high
2. Transporting materials and machineries	Workers	Very high
3. Facing railway accidents during constructions at night time	Workers	Very high
4. Accidents from the construction activities and materials placed on the platform	Railway commuters Employees of SLR	Very high
5. Injuries due to rock particles due to explosions/ blasting	Workers Railway commuters	High
6. Rock fall from the unstable area	Workers Railway commuters Employees of SLR	High
7. Work with electrified supply lines	Workers	High
8. Site Working – Working in poor visibility	Workers Railway commuters	High
9. Lone Working	Workers	High
10. Emergency evacuation	Workers	High
11. 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 almost vertical unstable slope with a risk of falling and slope/rock collapse. The health and safety issues of workers 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.

9.2. Child Labor and Forced Labor

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

10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

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 not required for this site.

10.3. Procedure 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
It may require to compensate for any property/ elements belongs to railway department losses or damages due to project actions.

10.5. Public awareness and education- needed for following areas
Programs to inform and educate about the risks posed by rock fall to specially the people in downslope of the location.

10.6. Design based Environmental/ Social Management considerations
The site is located in aesthetically beautiful, environmentally sensitive natural environment in the rural setup. Hence, following environmentally and socially significant design considerations are recommended.

Table 3 - Social and Environmental Consideration in Design Stage

Design feature	Recommended level of consideration for this site
i. Natural resource management and resource optimized designs Project specific designs should be considered to eliminate mass clearing of vegetation and minimum number of removals of grown tree species. Sufficient emphasis should be made to consider conservation of trees if important tree species are found.	Low
ii. Site Planning During site planning it is necessary to be cautious on possible re-activation of slope failure. Also, the site is located in a very limited space within a railway tracks. The material storage and temporary shelters etc. should not be installed in the danger zones of the slides. It is very necessary to keep trained flagman or safety officer of SLR during the construction period and proper communication between contractor's workforce, railway station and PMU must be built.	Very High
iii. Habitat connectivity and animal trails If large fractions of vegetation are required to be cleared in ecologically fragile habitats as for permanent structures or for access, or if deep drains etc. are to be made the designs should include habitat connectivity features, animal trails and vegetation strips and etc. even if the impacts are localized.	Low
iv. Conservation of water resources If extraction of water is involving as a mitigation measure, as the extracted water is in a good quality and yield it can be considered as a source of water for downslope houses who are currently depending on less reliable local water sources.	High
v. Aesthetically compatible design considerations The designs in aesthetically sensitive environments should consider structures that blend with natural environment to keep the visual pollution to minimum. As the tourism industry is one of the major economic growth points for the project area, 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.	High
vi. Consideration of green environmental features As many of the mitigatory works are carried out in ecologically sensitive habitats, it is recommended to consider green environmental designs as much as possible in the designs e.g.: use of local vegetation species for erosion control, combination of plants to sustain species diversity in the environment, avoiding inclusion of potentially invasive species & etc.	High
vii. Workers and community safety Due to the close proximity to the railway tracks people may face railroad accidents specially the workforce during the construction phase. Unauthorized entry and ignorance may cause severe accidents around the site. Activation of slides or ground subsidence may occur during construction phase and may pose threat to workers, and commuters. Therefore, design-based safety consideration such as berms, safety nets etc. should be considered.	Very high

viii. 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.	Very high
ix. 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.	High

10.7. Mitigation of impacts during the construction phase

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

Measures to manage and to mitigate the environmental and social impacts are generally common to all landslide mitigation sites. Such impacts are largely attributed to activities in the construction phase. The mitigation of impacts therefore becomes an obligation of construction contractor. NBRO has prepared a comprehensive document on ***"contractors' requirement to comply with Environmental and Social Health and Safety (ES & HS) management during the construction phase"*** to be included in construction contractors' bid document. The main sections are summarised below (Table 4) indicating the degree of relevancy for this site. For details ESMP for construction contractors should be referred.

Table 4 - Contractor requirement to comply with ES and HS

Reference No. as per construction contractors obligation to ESMP	Item	Relevant to the project
2002. Environmental and Social Monitoring		
2002.2 1)	Storage on site	Relevant (Railway tracks)
2002.2 2)	Noise and Vibration	Relevant (Commuters/ Houses)
2002.2 3)	Cracks and damages to the buildings	Relevant (Houses)
2002.2 4)	Disposal of waste	Highly Relevant
2002.2 5)	Disposal of refuse	Relevant
2002.2 6)	Dust control	Relevant
2002.2 7)	Transport of Construction materials and waste	Highly Relevant
2002.2 8)	Water	Relevant
2002.2 9)	Flora and Fauna	Relevant
2002.2 10)	Physical and cultural resources	Not Relevant
2002.2 11)	Soil Erosion	Relevant
2002.2 12)	Soil Contamination	Relevant
2002.2 13)	Borrowing Earth	Relevant
2002.2 14)	Quarry Operations	Relevant

2002.2 15)	Maintenance vehicles and Machinery (pollution)	Relevant
2002.2 16)	Disruption to public	Relevant (Commuters)
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 (unsafe slope, heavy machinery)
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***		

10.7.2. Site Specific Mitigation

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

Table 5 - Site Specific ES and HS Mitigation Measures

Mitigation item	Project implementation phase	Responsibility
i. Avoid train accidents / possible emergency situations during construction Safety officers and flag men of SLR are highly recommended to this mitigation location. At least three flagmen should be kept in a site. Flag man or the safety officer has all the responsibilities of the train schedules and stop train in emergency situations. Always be alert on the signals and instructions given by the safety officers of SLR. An awareness and training programme on railway safety for the construction workforce, railway station staff and users are compulsory. Already, there is a watchmen in this location for safety of commuters during rainy season.	Site preparation & construction	PMU Construction Contractor Railway Department
ii. Traffic management and safety Traffic management system should be in place day and night. A good traffic management plan should be prepared with the concurrence of Sri Lanka Railway Department. Proper rail road safety measures should be included with warning signs and permanent trained	Construction	Construction Contractor and Railway Department

watchmen, luminous sign boards indicating instability risk and road obstruction signs, night lamps etc. are strongly recommended at this site. Flagman of the Railway Department is responsible signaling the in and out trains through the stations according to the requirements of the construction activities. This should be approved by the PMU.		
iii. Priority Health and Safety Issues As the workers in the site have to work in high risk conditions, it is imperative to implement recommendations given in section 2003 of contractors' obligation on ESMP under "working conditions and community health and safety". These recommendations should be followed carefully in a proper organization and safety monitoring system. • Prepare a special Occupational Health and Safety Management Plan prior to commencement of construction activities • A good warning system, watchman and fulltime flagman of the Railway Department is highly recommended for this site for both worker and commuter safety. • Adoption of standard worker safety methods • Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle etc. • Provision of trainings and awareness programs to employees • Conducting hazard analysis and plan/provide adequate mitigation measures for such hazards identified, prior to carrying out major construction activities • 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 Construction Contractor Railway Department
iv. Transporting materials and machineries There is no direct road access to transport materials and machineries for this site and therefore railway line has to use for transporting heavy materials and machineries from Ihalakotte station. Hence, it is necessary to inform and take permission from the authorized person of SLR before any material and machineries transportation through / along the railway tracks. The train drivers and staff of SLR should be informed about the material and machineries transportation schedule and it should be prepare with the assistance of station master of the Ihalakotte station. The railway platforms or the railway trucks must not be damage due to the material and machineries transportation.	Construction	PMU Construction Contractor Railway Department
v. Inundation of the railway tracks Excessive water flow can be observed during the rainy season through the mitigation area. During the construction, the water inundation of the railway tracks will be expected. To mitigate this impact, contractor should construct temporary surface and sub surface drainage network directing excess water to nearby stream or canal before start of the construction.	Site preparation & construction	Construction Contractor

vi. Minimize erosional impacts during construction The site is located on an unstable slope with large and medium size boulders. 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 slope mitigation are carried out in the dry season and avoid such activities on slope area in the wet season as much as possible. This should be considered in project planning stage. Silt traps should be introduced to cut down sediment laden runoff.	Site preparation & construction	Construction Contractor
vii. Invasive species Native plants in the local environment should be chosen for vegetative control. The species used for vegetative control measures need approval from the relevant authorities.	Construction	Construction Contractor
viii. Noise and vibration control There are houses located closer to the mitigation site. Vibration generating activities should be done within the prescribed limits to avoid possible damages to the houses. Cracks in the houses 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.	Construction	Construction Contractor
ix. Disposal of construction waste The contractor should pay special attention with respect to disposal of construction waste. This site is located within pleasing environment. Water seepages are available in between railway tracks. Therefore, such waste if generated should store properly without getting washed off and dispose according to approved procedures by the PMU. Construction waste should not dispose along railway tracks.	Site preparation & construction	Construction Contractor
x. Onsite sanitary facilities for the workers The contractor should prepare temporary sanitary facilities for the workforce within the site, to mitigate open defecation of the workers.	Site preparation & construction	Construction Contractor
xi. Dust and aerosol control screens Dust particles generated during the construction period can influence the occupants, commuters and tourists. Special screens etc. should be used if heavy dust or aerosol generating activities are envisaged.	Site preparation & construction	Construction Contractor
xii. Water for construction There are some streams running through the site and water is available during the rainy season. Water for construction works should be obtained only from the approved sites.	Construction	Construction Contractor
xiii. Working hours The construction activities can be carried out at both day and night time. Working after 6.p.m. could be done after with the consent from Station Master due to safety issues.	Construction	Construction Contractor Railway Department
xiv. During construction good housekeeping should be maintained to minimize visual pollution	Site preparation & construction	Construction Contractor
xv. Workers code of conduct Possible disputes between the labor force and the villagers and commuters should be prevented by maintaining the agreed code of conduct by the contractor. The site is located within SLR premises. Therefore, it has separate regulations maintaining by railway department, declaring high risk	Construction	Construction Contractor

zone and prohibited unauthorized entry zones etc. Hence, the workers should adhere to the rules and regulations of this premises.		
xvi. Emergency management plan for accidents/ snake bites etc. There is no direct road access to this mitigation site and workers has to use railway tracks or foot paths to reach this area. Hence, there should be a special plan to deal with any accident or emergency situation with the assistance of staff of railway station. Further, Proper emergency management unit for other accidents (first aids facilities, safety items, hospitalization facilities and transportation facilities) should be maintained for this site. Further, 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.	Construction	Construction Contractor

10.7.3. Monitoring requirements specific to the site

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

Table 6 - Environmental and Social Monitoring Plan – Construction Phase

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

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

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

The station master of the Ihalakotte railway station Mr. A.M.A.W.S. Amandakoon was consulted and made aware of the mitigation project and the funding mechanism. He stated that the mitigation works are appreciable and expressed his willingness to the project with the full support of the staff. Currently there is a watchman at this place to monitor the re-activation of landslide and inform to the trains before passing the area.

The downslope of the mitigation area consist with cultivation and the land owner was consulted during the site visit. She agreed with the mitigation works if there is not any impact to her cultivations.

Mr. H.M.K.W. Bandara, Deputy Chief Engineer (Project), Mr. E.M.S.P.K. Deegala, Deputy Chief Engineer (Track) and Mr. D.W.N.Amarasena, Superintend Engineer (Design) of Way and Works Railway Department were consulted during the group discussion about the project activities of the railway sites. They highlighted the procedures to be followed during the construction phase and how to carry out without disturbing the railway transportation.

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

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

13. 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.

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

Table 7 - Clearances, No Objections, Consent and Approval

Requirement / Approval / Institution	Relevance to the project
10.1 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 Mawanella Pradeshiya Sabha
10.2 Approval from the state lands owners relevant to the project	
Central Environmental Authority	Approval from the Central Environmental Authority is required as the project should comply with National Environmental Regulations
Department of Forest Department of Wildlife Conservation	As there are not forest area or wildlife habitat in this area, approvals are not needed.
Department of Railway/ Road Development Authority	As the site is located within Railway Department land and closer to railway line, the construction activities might impact to their operations. Hence, the approval from Railway Department is needed.
Geological Surveys and Mines Bureau	Approval will be obtained for extraction of materials, transportation and disposal of earth, rocks and mineral debris. (if necessary, only).
Mawanella Pradheshiya Sabha	Approvals from Mawanella Pradheshiya 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.
10.3 Consent/ no objection/ legally bound agreement from the private land ownerships	
Land owners	Signing a legally bound agreement between the Department of railway and the project implementing authority allowing no-objection to remove the structures, access the land, implement construction works, and engage in long-term maintenance works

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

Table 8 - Tentative Timeline for getting approval

Approvals	Month 1				Month 2			
	W1	W2	W3	W4	W1	W2	W3	W4
Project implementation ***Approval from the District Secretariat*** Submission of application Project briefing Respond to comments Approvals								
Approval from planning committee Submission of application Project briefing Respond to comments Approvals								
Other approvals CEA Railway/ RDA GSMB Ministry of Defense (Depends on the requirement)								
Consent/ no objection from the land ownership (Temple)								

15. GRIEVANCE REDRESS MECHANISM FOR THIS SITE

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

16. INFORMATION DISCLOSURE

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

Table 9 - Proposed scheme of information disclosure

Information	Proposed agencies	Mode of information disclosure
i. Project plan (site details, design implementation arrangements)	District CEA, District Secretariat, Divisional secretary, 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, Railway station master, Inspector of permanent ways, 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, Grama Niladhari, Railway station master, Inspector of permanent ways, 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, Railway station master, Inspector of permanent ways, Grama Niladhari, District Office NBRO, AIIB and relevant parties as appropriate	Meetings, submission of relevant reports
vi. Grievance redress mechanism	Relevant parties, AIIB	Meetings, written and verbal communications

Table 10 - Level of Information gathered through consulting institutions

Date	Institution	Person contacted for information
22/02/2022 @ 10.00 hrs	Ihalakotte railway station	Mr. A.M.A.W.S. Amandakoon Station Master Ihalakotte railway station
03/02/2020 @ 13.00 hrs	Way and Works Railway Department	Mr. H.M.K.W. Bandara, Deputy Chief Engineer (Project) Mr. E.M.S.P.K. Deegala, Deputy Chief Engineer (Track) Mr. D.W.N.Amarasena, Superintend Engineer (Design)

Annexure I: Images of the site condition and the consultation

	
Consultation with station master - Ihalakotte	*Discussion at the Way and Works Railway Department*
	
Consultation with railway staff	*Mitigation Area*
	
Water flow during the rainy season	*Safety Lights*

Annexure II: Report on the Stakeholder Consultation:

Institution	Name and designation of the contact officer	Concerns raised
Way and Works Railway Department	Mr. H.M.K.W. Bandara, Deputy Chief Engineer (Project) Mr. E.M.S.P.K. Deegala, Deputy Chief Engineer (Track) Mr. D.W.N.Amarasena, Superintend Engineer (Design)	✓ This area is under the jurisdiction of the Department of Sri Lanka Railway. ✓ The SLR has no objection and states the mitigation is very much needed. ✓ Detailed work plan and time schedules must be provided to the SLR by contractor before starting construction activities and keep good relationship between contractor, PMU and SLR. ✓ Other concerns raised • A safety officer or flag man of SLR is provided to each mitigation location by SLR. • At least three flagmen should be kept in a site. • Safety structures and sign boards will be provided by SLR. • Flag man or the safety officer has all the responsibilities of the train schedules and stop train in emergency situations. • Workers must be followed his advices and guidance for safety issues. • Material transportation for locations which haven't other road access will be done according to the requests of the contractor • All the cost including railway material transportation, wages of the flagman and other resources from SLR should be bear by the construction contractor. • A proper handing over of the project is required after the mitigation. • SLR will do the maintenance after mitigation. • It is emphasised that during the construction the contractor should use Personal Protective Equipment • At all times, the contractor shall provide safe and convenient passage for train transportation, traffic safety measures, barricades, flagmen and for the night work, lights and illumination should be provided. • The contractor should use temporary toilet facilities • The service infrastructure should be relocated under the supervision of SLR. ✓ 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 SLR for approval for implementation of landslide mitigation projects in SLR reservation areas**
   i. The design to be accepted by the SLR: The project implementing agency should submit detailed design report to SLR with a formal request on nature of approvals required. PMU should prepare above documents and should submit the documents to Way and Works of Railway Department.
   ii. Way and Works Railway Department will evaluate the proposal and may call for project briefing. The PMU should provide necessary briefing as appropriate
   iii. On the approval by SLR an agreement will be signed between SLR and Project implementing agency to access the site, erect structures, and implement mitigation works.