

**Site Specific Environmental and Social Management Plan
(SSE & SMP)**

**Site No.03
Ayagama town, Ratnapura District - Package 2**

September 2018

Prepared for:

**Sri Lanka Landslide Mitigation Project
Asia Infrastructure Investment Bank
(AIIB)**

Prepared by:

**Environmental Studies and Services Division
National Building Research Organization
99/1, Jawatta Rd
Colombo 05**



Tel: 011-2588946, 011-2503431, 011-22500354

Table of Contents

1. Introduction	1
2. Location details and site description	1
3. Landslide hazard incident details	2
4. Description of any remedial measures already undertaken to reduce the potential risk.....	4
5. Description of the area of the landslide, areas adjacent to the landslide and current level of risk	4
6. Brief description on the surrounding environment with special reference to sensitive elements that may be affected by the project actions.....	5
7. Description of the works envisaged under the project	5
8. Identification of social and environmental impacts and risks related to the works.....	6
8.1 Positive impacts.....	6
8.2 Negative impacts	6
8.2.1 Loosing access to land and future development activities	6
8.2.2 Ecological, biological impacts, and fauna and flora.....	6
8.2.3 Impact on the drainage pattern of the area	6
8.2.4 Erosional impacts and stream bed alterations	7
8.2.5 Water pollution impacts from construction activities	7
8.2.6 Open defecation and waterborne infections spread during construction phase.....	7
8.2.7 Impacts on the downstream water uses	7
8.2.8 Solid waste disposal issues.....	7
8.2.9 Air pollution impacts	7
8.2.10 Noise pollution, Vibration, blasting, impacts during construction, potential damage to buildings, infrastructure	8
8.2.11 Relations between workers and the people living in the vicinity of the site and possibility of disputes	8
8.2.12 Work camps and lay-down sites requirement	8
8.2.13 Risks of public accessing the site during construction.....	8
8.2.14 Explosive hazards and hazardous materials	8
8.2.15 Safety to the public from construction activities: High risk for commuters.....	8
8.2.16 Workers safety during construction	8
9. Public and Stakeholder Consultations that have been held and/or will be held	9
9.1 Stakeholders involved in the consultations, recommendations or agreements reached in the consultations (Ref: annexure III).....	9
10. Significant Environmental and Social Impacts.....	9
10.1 Impacts on water or wetlands (issues relating to changes or contamination of streams, rivers and other bodies of water, typically downstream from the site) Long-term impacts and potential impacts and risks during construction/remediation of the landslide site:.....	9
10.2 Erosional impacts and stream bed alterations.....	9
10.3 Impacts on transport infrastructure (especially temporary loss of road or rail access, risks of traffic congestion).....	9
10.4 Impacts on downstream service provision (water supply, sewerage, electricity, etc.)	9

10.5 Households living in high-risk or medium-risk areas adjacent or near to the site (up-slope, down-slope, downstream, etc.)	9
10.6 Areas used for businesses, agriculture or other within the area to be remediated	10
10.7 Areas used for businesses, agriculture or other immediately to the site	10
10.8 Need for people to enter or cross the site	10
10.9 Priority Health and Safety Issues. Specific H&S concerns that require measures that go beyond the standard contractual requirements for contractors.....	10
10.10 Child labour & forced labour.....	10
11. Clearances, no objection, consent and approvals required for the implementation of the project	10
11.1 Project implementation.....	10
11.2 Approval from state land owners to implement the project in state lands of the site	10
11.3 Approval from Central Environmental authority, Department of Forest, Department of Wildlife Conservation.....	11
11.4 Other approvals.....	11
11.5 Consent/ no objection/ legally bound agreement from the private land ownerships	11
12. Environmental Social Management Plan (ESMP).....	12
12.1 Resettlement action plan.....	12
12.2 Evacuation of people	12
12.3 Procedure for removal of damaged structures, facilities infrastructure	12
12.4 Requirement for compensation for loss of property /uses due to project actions	12
12.5 Public awareness and education- needed for following areas	12
12.6 Design based environmental/ social management considerations	13
12.7 Mitigation of impacts during the construction phase	14
12.7.1 Construction contractors' requirement to comply with environmental and social management during the construction phase	14
12.7.2 Site specific mitigation.....	15
12.7.3 Monitoring requirements specific to the site	17
13. Grievance redress mechanism for this site.....	18
14. Information disclosure	18

List of Annexure

Annexure I: Drone image of the project area	i
Annexure II: Images of the site condition and the consultation	ii
Annexure III: Report on the Stakeholder Consultation: Ratnapura District	iii
Annexure IV: Proposed procedure for obtaining approvals from state land owners and environmental agencies	v
Annexure V: Study team	vi
Annexure VI: List of references	vi

List of Figures

Fig 1: Google image of the proposed landslide mitigation site	2
Fig 2a:Upslope of the road (failed slope and debris resting on the road reservation).....	3
Fig 2b: Downslope area of the road with deposited debris.....	3
Fig 2c: Large rock boulders deposited on downslope area	3
Fig 2d:Building damaged due to landslide	3
Fig 3: Diagrammatic interpretation of affected slope area and the houses currently at risk.....	4

List of Tables

Table 1: Tentative timeline for getting approvals	Error! Bookmark not defined. 11
Table 2: Design stage Environmental & Social considerations	13
Table 3: Contractor requirement to comply with ES & HS	14
Table 4: Site specific ES & HS mitigatory measures	16
Table 5: Environmental and Social monitoring plan; construction phase	17
Table 6: Proposed scheme of information disclosure	18
Table 7: Level of information gathered through consulting institutions.....	19

Abbreviations

AIIB	Asian Infrastructure Investment Bank
CEA	Central Environmental Authority
DFC	Department of Forest Conservation
DS	Divisional Secretary
DWLC	Department of Wild Life Conservation
EH & S	Environmental Health & Social
ES & HS unit of PMU	Environmental & Social & Health & Safety Unit of Project Management Unit
ESMF	Environmental and Social Management Framework
ESMP	Environmental Social Management Plan
GN	Grama Niladhari
GOSL	Government of Sri Lanka
GSMB	Geological & Mines Bureau
IUCN	International Union for Conservation Nature
LRC	Land Reforms Commission
NBRO	National Building Research Organization
NDRSC	National Disaster Relief Services Center
RDA	Road Development Authority
SSE & SMP	Site Specific Environmental and Social Management Plan

1. Introduction

The Government of Sri Lanka intends obtaining 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 has been (ESMF) 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, National Building Research Organization (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 Ayagama Town landslide mitigation site. The 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 regulation and procedures to be followed during project implementation specific to the site

2. Location details and site description

Site reference: Site No. 03, package-2, Ratnapura District, Ayagama Town

Site Details

- i. The site is administratively falls under Ayagama Grama Niladhari (GN) division of Ayagama Divisional Secretariat (DS) Division, Ratnapura District of Sabaragamuwa Province. The landslide section is located at Ayagama - Gawaragiriya road. The collapsed slope is in the mountainous range located between Ayagama District Hospital and Ayagama Police station.
- ii. The nearest town is Ayagama, about 500 m from the site.
- iii. GPS reference of the site is 6°40'05.1"N, 80°30'54.7"E. Ref Fig 1. Google image of the location
- iv. Current land ownership: RDA reservation and privately owned lands

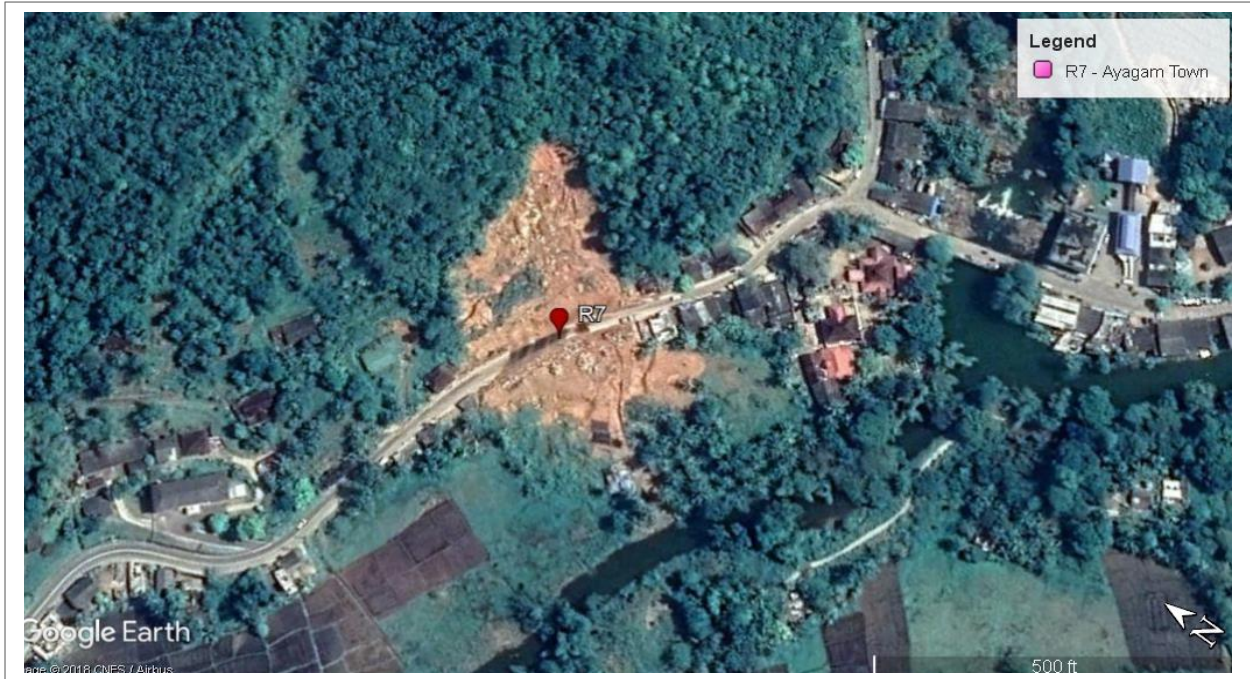


Fig 1: Google image of the proposed landslide mitigation site, Ref. Annex 1. Drone image for details

3. Landslide hazard incident details

A landslide had been occurred in this mountain range in the year 2003. The slope instability had started at the site as a result of mainly slope excavation for road expansion, non-engineered road cuts and construction of buildings and houses. During 24, 25, 26 May 2017, a precipitation of >300 mm had triggered a relatively large collapse at this site. A large block of soil/rock mass had moved down and collapsed soils/debris had extended towards the road obstructing completely its passage for commuters on 26.05.2017. At present, a large block of moved soil mass is resting over the upslope and down slope of road reservation area.

The slope where the instability occurred was part of a rubber cultivation. The NBRO report (Ref.NBRO/31/3500/06/RDO (L1)/M1/AW/12/275 revealed that the land use pattern of the area had triggered this landslide occurrence. The report says construction of buildings at South West direction had cut the slope and that had reduced the toe support of the slope. Further, the slope cut also has created instability by the road, and building construction at the boundaries of the Southern, East and South East directions. Moreover, the failed section was a cultivated rubber. A rubber plantation can be seen at the North East direction while a natural forest consisting of trees such as “waldel” and shrubs like cane can be seen at the mountain crest area.

During the same period the Ayagama town had flooded by the river “Heen Ganga” flowing across the town. The floods have inundated the low lying sections of town, the buildings and continued to be there for about 3 days. Landslides, floods and heavy rains have created tremendous hardships to people, completely cutting off of movement from West, evacuations to occupants, damage to buildings and valuables, destruction to life line services and even interrupted access routes of relief from ground.

The damages occurred due to incident

Damage to houses at down slope.

The area where the landslide had occurred is very close to the town centre of the Ayagama which has the town infrastructure, buildings and the services. Addition to settlements retail and business shops occupy either sides of the road. Due to this hazard 14 houses and are at high risk. (Ref. Report No. NBRO/31/3500/06/RDO (L1)/M1/ (AW)/17/275. Out of these 14 houses, 09 houses are fully or partially damaged. Also, several business places (15) are damaged and marked as high risk category by the NBRO.

The incident has no casualties, according to the people, police has announced immediate evacuation to the people and hence there were no casualties.

The hazard had caused damage the road and filling of debris resulting road to closure. During the incident, the damaged road had obstructed the traffic fleet, cutting- off of access to houses, community services (schools, community center, health care, religious places etc.) for several days. Part of the rubber cultivation had damaged due to this incident. Ref. Fig 2: Images of the project area

Damage to road and road closure

At this event, the debris from the collapsed slope had moved across the road up to nearby stream (downslope), “Heen Ganga” forming a debris flow path depositing soil and boulders on the road while damaging the buildings either sides of the road. The incident has completely obstructed the movement of traffic and caused temporary minor inundation situation in the Heen Ganga. The road is the access route for Ayagama town, a business and administration town. The Road Development Authority closed the road for several days causing temporary obstruction for commuters who used the road. During this period the people in the area underwent tremendous hardships due to landslides, road closure, floods and heavy rain.

Damage to natural vegetation and streamlet

Due to the slide the natural vegetation strip (stream riparian vegetation) and the stream ecosystem have completely damaged as the debris flow had continued up to the stream. Refer Fig 2a, 2b , 2c and 2d.



Fig 2: Images of project area

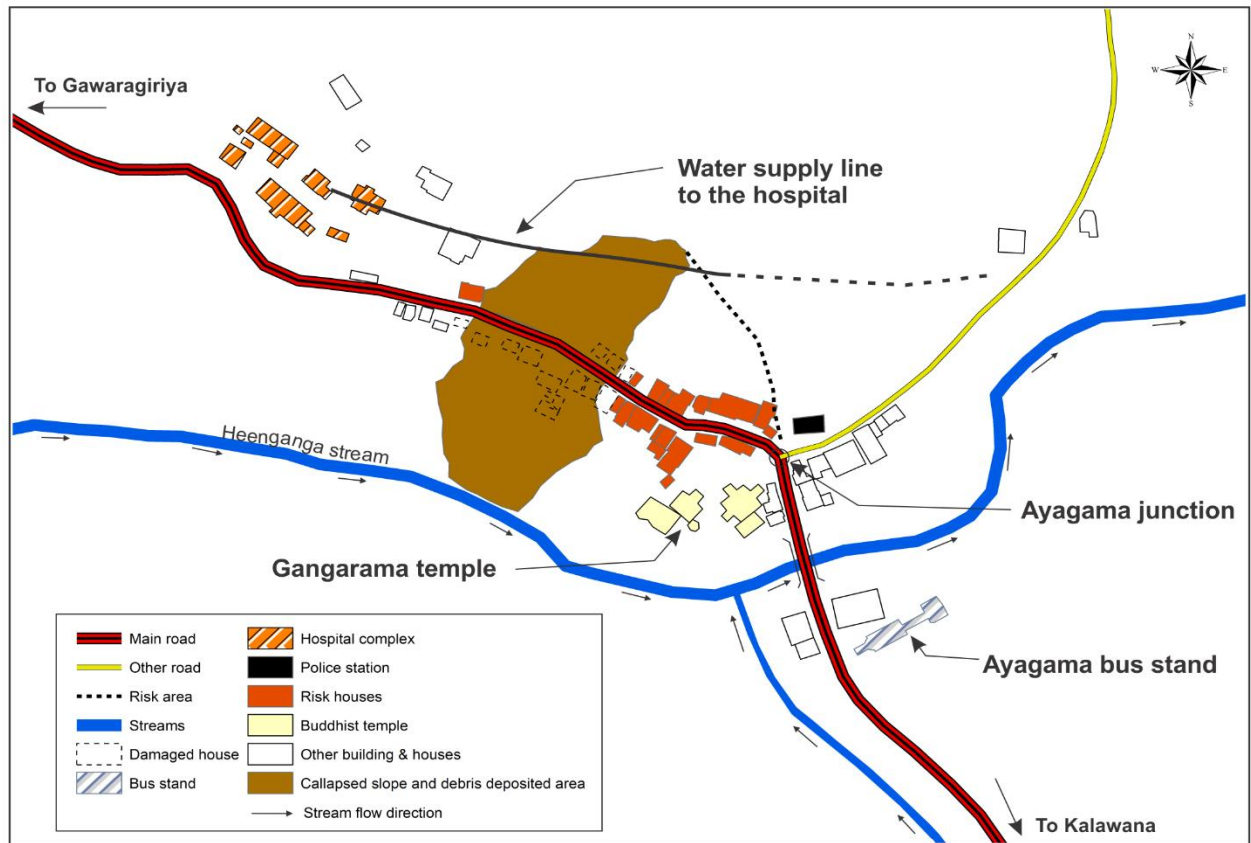


Fig 3: Diagrammatic interpretation of affected slope area and the houses currently at risk

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

The RDA had immediately closed the road for traffic. The road had been closed for traffic for about several weeks according to the information. The debris mass on the road was removed and deposited on the down slope area (fig 2a). On the subsequent inspection of NBRO, the occupants of houses which are partially damaged and re-occupying the houses (ref. fig 3) were asked to evacuate.

Evacuations: With the support of the District Secretariat office, the families who are at high risk were settled in a temporary evacuation camp at the temple (Gangaramaya Temple) during the hazard period; landslide and floods. NBRO has indicated following precautionary measures to occupants at business places which are marked as risk but not damaged in the landslide until the landslide area.

- People to be alert and evacuate if rainfall is $> 75\text{mm/ hour}$ or $>150\text{ mm/ day}$ respectively.
- To avoid soil cults, and filling haphazardly
- To clear obstructions and improve the drainage on the unstable cut slope adjoining the houses.

5. Description of the area of the landslide, areas adjacent to the landslide and current level of risk

At present the failed slope on the upslope is exposed with impinging soils and rock fragments. No actions were taken to improve the drainage. The houses at downslope had damaged beyond repair and occupants have already evacuated the houses. The surrounding area of the failed section is rubber. A rubber plantation can be seen at the North East direction while a natural forest dominated with trees such as “wadel” and shrubs like cane can be seen at the mountain crest. . The down slope is home gardens and settlements and business places can be seen either side of the road. The immediate area of the failed slope and adjacent lands are partly RDA road reservation and privately owned lands. The commuters on the road will be at high risk from currently active slope under repeated minor failures.

The water supply line to Ayagama District hospital is laid across the failed slope and this water line is currently at risk from future slope failures. The water to this line is obtained from the uphill stream from a

protected forest catchment name Rathmalltehna hill. According to hospital management (Dr Susil Kumar and Sister Sudharma Wijewickrama) the hospital has 64 beds and a labour room. There is no operation theatre. OPD patients per day is 100-120 and **normally the hospital has warding patients of 10-15. The estimated** current water consumption is on average about 3-5m³/day, and the water supply from this source is uninterrupted throughout the year. An alternative to this supply in case of interruption is available. However, that supply has inadequate yield in the dry season.

Due to this hazard the houses belong to below named owners are at high risk.

Mr M. A Ghanasena, .Mr APNN Sarath kumara, .Mr A K Susantha Janaka Kumara,Mr A,K Y Padmalatha , Mr A .K Lalith Premarathna,, Mr A K Kasun Rangana Premarathan , Mr Sanjeewa Ranaweeraarachchi, Mr K A Jayakody, Mr P.D Dhanapala, Mr Arjun Abegunwardena , Mrs Thamara Priyangani, . Mr U A Padmasiri, Mr K Sunil Shantha.

Further, following business places are also at risk due to the landslide.

Dahamsa Shoe Palace	Shan Engine Repair
W.Gunaprema	Minara Enterprises & Ayagama Pharmacy
Gamini Stores	Dispensary & Sanure Saloon
Gamini Hardware	Renuka Business Place
Nisshaka Tyre	Jayasuriya shop
Siyarata Grinding Mills	Ayagama Rubber shop
DSI Ayathanaya	Hematha Business Place
Sudu Yakada Wedpala- (Wijebandara)	Steel workshop

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

The environmental and social elements that may be at risk due to project implementation area:

- i. The water supply line to Ayagama District hospital
- ii. The Road activities and the commuters
- iii. The hospital emergency service and patients using the road. (Hospital is located about 200m from the site)
- iv. People who come to the Ayagama town for Administration, Social commercial, activities and patients who come to the hospital will be affected. (The Ayagama Police, Ayagama DS Office and boutiques of purchasing agricultural products; tea leaves, coconut, are located closes to the site)
- v. The river water quality and the river ecology of the downslope area will be affected by the project actions
- vi. The people who have not still evacuated in the downslope and their livelihood activities
- vii. The houses and buildings in the risk area
- viii. Transportation of tea leaves, rubber products

As natural terrestrial ecosystems in the area is replaced by tea plantations, there is no direct impact on natural ecosystems by the project actions.

7. Description of the works envisaged under the project

The proposed mitigation works will be largely on the removal of loose debris and boulders, changing slope geometry, slope reinforcement, improvement to the drainage such as permanent structures to convey the runoff to existing drain system and surface erosion control measures etc. The project actions involve

excavation of debris and the slope, horizontal drilling, concrete works, shot creating, gabion structures, erosion control and construction of horizontal drains etc.

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

8.1 Positive impacts

- i. The mitigation will make currently unstable slope at the road side stable, securing safety of commuters. Ensure good connectivity between the cities; Ayagama and Gawaragiriya. The road traverses an ecologically sensitive aesthetically impressing landscapes which give scenic entertainment to commuters who include both local and foreign eco-tourists. The project will ensure the safety on road for the tourists. Also the transportation of tea and rubber products will be secured.
- ii. The land, the buildings and houses currently at risk will be safe for development. As the land are in the proximity of the Ayagama town the lands has a high value and a higher development demand, the future development opportunities will be ensured
- iii. The mitigation work will ensure uninterrupted traffic flow and road connectivity throughout and will increase the safety of commuters during rainy season. As indicated earlier Ayagama town and residential buildings in the low-lying areas east of the project site is flood prone requiring evacuation and flood relief during floods. The road will become safe as a route for evacuation and relief.
- iv. The mitigation will secure the water supply line with proper installation ensuring water safety of the Ayagama District Hospital

Therefore this project can be considered environmentally and socially highly beneficial.

8.2 Negative impacts

The mitigation works are generally confined to an area which is already disturbed by a slope failure. Therefore, negative impacts are much localized and also limited mostly to construction period.

8.2.1 Loosing access to land and future development activities

The land where the project activities are envisaged belongs to private person (a person called Mr. Bandarawatta) and the road reservation of RDA. Which is at the boundary of a rubber plantation. There is a damaged house at the periphery of project site. This house is owned by Ms Thamara Priyanganee. She has evacuated the house and is yet to seek permanent resettlement. That may require to be removed. As the site is now free from any form of occupation there will be no impact of the project on accessing the land or any future developments.

8.2.2 Ecological, biological impacts, and fauna and flora

The mitigation slope consists of rubber plantation and a natural forest at the crest of the mountain. However, most of the mitigation works are expected to be concentrated on the rubber plantation lands. Depending on the type of mitigation works a narrow strip of natural vegetation on the crest of the failed slope may require to be removed. However, the impacts on this terrestrial ecosystems are localized as many project actions will be taking place on already failed or disturbed slopes.

8.2.3 Impact on the drainage pattern of the area

The drainage (surface and sub-surface) will be affected by the mitigation works as increase to surface runoff and draw down of water table will be a part of mitigation.

8.2.4 Erosional impacts and stream bed alterations

The mitigation works in this will focus on the drainage improvement. Therefore, during rainy season heavy flow of water is expected to enter the nearby natural stream etc. This will result increased stream discharge causing stream bank erosion, stream bed scouring, and increased river load in the downstream area. The impacts on environmental flow and aquatic ecosystems will be locally significant.

8.2.5 Water pollution impacts from construction activities

Sedimentation to existing watercourses and siltation in the downstream channels can be expected during the removal and debris soil produced from earlier slide and during the process of landscaping/reshaping of slopes. Improper disposal of oils and other harmful substances/contaminants from machineries, leakages from temporary storage tanks, solid waste and wastewater disposal/dumping from workers' sites could occur causing adverse impacts on surface quality of the stream running in the toe area. Intentional and careless disposal of construction waste may result addition or mixing of construction materials (cements/other grout materials used for soil strengthening) with surface water to cause temporary water quality degradation and accumulation of unwanted substances in the downstream.

These discharges may increase the pollution load in the river with high Biochemical Oxygen Demand, Chemical Oxygen Demand, Suspended Solids, Oils and Greases etc. The emissions will exceed the ambient water quality standards prescribed for designated uses such as drinking bathing aquaculture and may violate even the minimum standards for water quality. The water quality impacts from discharge of wastewater and pollutants to environment during construction phase is therefore is **locally highly significant**.

8.2.6 Open defecation and waterborne infections spread during construction phase

Faecal contamination of down slope water stream can be expected during construction due to open defecation by contractor's labour force. If open defecation is practiced it can cause unhealthy sanitation conditions posing risk of gastro intestinal infections through flies and stray animals and may pose risk to health conditions of the hospital located about 200m from the site. Therefore, the risk infectious diseases on hospital environment due to this project during construction phase is **highly significant**.

8.2.7 Impacts on the downstream water uses

The contaminated water in the streams may exceed the ambient water quality standards prescribed for designated uses such as drinking, bathing, and aquaculture and may violate even the minimum standards for water quality. This will make water unsuitable for human use and aquatic life. The water quality impacts from discharge of wastewater and pollutants to environment during construction phase is **therefore is highly significant**.

8.2.8 Solid waste disposal issues

Haphazard disposal of solid waste can pollute water and soil, and leave various environmental impacts if proper disposal mechanism is not in place during the construction period. Further, unhealthy waste disposal can create vector borne and pathogenic diseases which may pose health risks on the Hospital Environment as the hospital is located in the proximity to the site. The effect is significant unless a proper solid waste disposal mechanism is used during the construction period.

8.2.9 Air pollution impacts

Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, excavations, burning, and transportation disposal of construction materials, construction waste and working with toxic material (blasting chemicals). During construction, it generates high levels of dust typically from concrete, cement, wood, stone, and silica. The direct exposure risk of residents to air pollution is significant as there are still houses and business shops alongside the road which have been informed to evacuate by the NBRO. Further, air pollution may have an impact on the pedestrian/ commuters of the road also.

8.2.10 Noise pollution, Vibration, blasting, impacts during construction, potential damage to buildings, infrastructure

Blasting may be used to remove several impinging rock fragments. Forced excavation to remove hard weathered rock, drilling for horizontal drains and rock bolting etc. may produce high noise and ground vibration. The impacts will be significant for the occupants live close to the site. Vibration can cause cracks in the houses located at the toe of the landslide area. The commuters on the road will be exposed to high noise during heavy noise generating activities, such as operating machinery, loading and unloading of materials, movement of vehicles in addition to above mentioned core construction works.

8.2.11 Relations between workers and the people living in the vicinity of the site and possibility of disputes

There may be disputes with the workers of construction site and the communities living nearby (villagers).

8.2.12 Work camps and lay-down sites requirement

The solid waste, sewage removal in worker camps if not properly designed will be a nuisance to the surrounding community.

8.2.13 Risks of public accessing the site during construction

The site may have machinery with high hazard risk such as drilling, boring and excavation machines etc. Only skilled workforce will be safe working in this environment. If unauthorized persons access the site there may be a risk of being subjected to accidents by the heavy machinery.

8.2.14 Explosive hazards and hazardous materials

Explosives will be used for rock blasting. This may pose risk due to unsafe use. As these operations are to be done on unstable slopes the risk of improper use of explosive and accidents from rock fragment are highly significant.

8.2.15 Safety to the public from construction activities: High risk for commuters

During construction phase, the road will be obstructed by the frequently moving machinery, loaders, trucks etc. As most of the mitigation works are to be carried out in limited space on slopes the heavy machinery, the trucks and loaders etc. can obstruct the commuter /pedestrian passage and may pose high risk on their life. There is a risk of falling loose rocks on the road during excavations and removal of rocks posing risk on the commuters.

The hospital emergency service is in operation for 24 hours. The ambulances and patients with critical conditions may take this route 24 hours of the day. Obstruction to traffic may be a significant concern especially during crowded times and in night. The delay during traffic times and accidents during night can be possible for patients, and the safety on road of patients are highly significant.

The same risk at a high level will be there for the community living close to the site as they will be exposed to a longer duration to this risk during the construction phase. Therefore the risk on them is highly significant.

8.2.16 Workers safety during construction

The heavy construction machinery may be used in limited work spaces. Risk of hazard from vehicle and construction machinery accidents is highly significant. Further, even now the site is unstable with falling debris and rock fragments time to time. This risk may be increased during the slope modifications. Further, workers may have to work on scaffoldings to climb on this slope. Therefore, risk on workers from possible fall, slope failures (even a minor scale) should be considered highly significant for this site. Contractor may engage under age workers (children) for construction work, which is risky results serious accidents and injuries.

9. Public and Stakeholder Consultations that have been held and/or will be held

Following people who were the occupants of high risk buildings were consulted during field visit; Mr PD Dhanapala, and his wife. According to them, the occupants at risk houses were given Rs.9000.00 monthly rental until December 2017. However, the payment was curtailed afterwards. There are families still live in houses which are categorised as high risk. Further, according to Mrs Dhanapala it is difficult to find lands for resettlement and they are still live their original places.

Mr. Muditha Madhushanka NDRSC officer and Mr. Ghanathilaka Hettiwatta.GN Officer were consulted during field visit of NBRO staff. According to them, the occupants of the houses which are categorized by NBRO as high risk and indicated it is difficult to find a suitable lands for building houses. They further stated several lands were found and they were rejected by NBRO.

The consultation with officers in the Landslide Studies Division, NBRO revealed that many lands proposed by the landslide affected parties are landslide prone and not suitable for development. Also they indicated the difficulty in finding suitable lands for housing in the area.

9.1 Stakeholders involved in the consultations, recommendations or agreements reached in the consultations (Ref: annexure III)

10. Significant Environmental and Social Impacts

Social or Environmental impacts or risks that will require special measures on the part of NBRO and the contractor; Indicative significant impacts

10.1 Impacts on water or wetlands (issues relating to changes or contamination of streams, rivers and other bodies of water, typically downstream from the site) Long-term impacts and potential impacts and risks during construction/remediation of the landslide site:

Washout of fines, sedimentation to existing watercourses and siltation in the downstream channels can be expected during the removal of debris and soil produced during the process of landscaping/reshaping of slopes. Improper disposal of oils and other harmful substances/contaminants from machineries, leakages from temporary storage tanks, solid waste and wastewater disposal/dumping from workers sites could occur causing adverse impacts on surface quality of the river runs at the landslide toe area.

10.2 Erosional impacts and stream bed alterations

The impacts on environmental flow, stream banks/ bed and aquatic ecosystems will be locally significant.

10.3 Impacts on transport infrastructure (especially temporary loss of road or rail access, risks of traffic congestion)

The traffic due to full/partial road closure may obstruct the smooth flow of vehicles during the week days, in office hours, school times. This will cause nuisance to pedestrians and commuters.

10.4 Impacts on downstream service provision (water supply, sewerage, electricity, etc.)

The water supply lines to Ayagama District hospital is laid across the failed slope. The water in the line flows under gravity and directed to an overhead tank in the hospital. There are no other alternative water sources in the hospital. The mitigation works will damage the line and will cause problems for the hospital management and the water users.

10.5 Households living in high-risk or medium-risk areas adjacent or near to the site (up-slope, down-slope, downstream, etc.)

The construction poses high risk on public safety, noise and vibration impacts, and cracks in buildings of the houses previously demarcated as high risk.

10.6 Areas used for businesses, agriculture or other within the area to be remediated

There are small shops near the site, there may be some impacts during construction by noise and vibration activities. No specific agriculture practices or other immediately adjacent to the site hence has no significant impact.

10.7 Areas used for businesses, agriculture or other immediately to the site

There are small shops, near the site. However, the impacts during construction is not significant. There are no agriculture practices or other immediately adjacent to the site hence has no significant impact on agricultural uses.

10.8 Need for people to enter or cross the site

There is no special need for people to enter the site for other purposes. However, unauthorised entry of the people may occur due to intentional or unintentional purposes, they may be at risk due to operating machinery, and vehicles, electricity, and may be blasting materials.

10.9 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 worker have to work on almost vertical unstable up slope with a risk of slope collapse. The 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.

10.10 Child labour & forced labour

Child labor is not very common in construction sites of this nature as projects are closely monitored. However, possibility may exist for indirect from child labor. Child labor & Forced labor is detailed under 2003.3 under section 2003: Working conditions and community health and safety in the Bidding document

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

11.1 Project implementation

i. Approval from the District Secretariat

The approvals will require to be obtained from the District secretary for the implementation of project where 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. This issues will be discussed, the recommendation at this meeting will be considered in the implementation of the ESMP

ii. Approval from the planning committee

The project will obtain the approval from the planning committee of the Ayagama Urban council

11.2 Approval from state land owners to implement the project in state lands of the site

- i.** The relevant agencies are RDA as part of the project actions are taking place on the road reservation. Necessary agreement will be made between NBRO and the RDA to access the land, carry out construction work, remove materials (trees, soils, rocks and boulders), erect structures, and continue with operation and maintenance works.
- ii.** Approvals from regional office of Ceylon Electricity Board will be required for power supply for site operation.

11.3 Approval from Central Environmental authority, Department of Forest, Department of Wildlife Conservation

- i. As project site is located in environmentally sensitive areas approval from the district Central Environmental Authority is required. (refer Annexure 1V for the procedure)

11.4 Other approvals

- i. Approval from regional Geological Surveys and Mines Bureau will be obtained for transportation and disposal of earth, rocks and mineral debris
- ii. Approval for extraction of materials - Approval from Geological & Mines Bureau (GSMB) is needed (if necessary only).
- iii. Approvals from Ratnapura Urban Council will be obtained for the disposal of waste and plant litter
- iv. Approval through the Divisional Secretary from the district office of Ministry of Defense will be obtained for the sites if requiring rock blasting.

11.5 Consent/ no objection/ legally bound agreement from the private land ownerships

Signing a legally bound agreement between the ownership of the land and the project implementation authority allowing no objection to do the project.

The tentative timeline for getting approval is given in the table 1.

Table 1: 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 state land owners Provincial Eng: Office & CEA</i>								
Submission of application		—						
Respond to comments			—	—				
Approvals				—				
<i>Approval from DFC, DWLC</i>								
Submission of application		—						
Respond to comments			—	—				
Approval				—				
Other approvals								
GSMB		—						
Ministry of Defense (Depends on the requirement)		—	—	—				
Consent/ no objection from the private land ownership			—	—				

12. Environmental Social Management Plan (ESMP)

Measures to manage and or mitigate the impacts and risks, especially the impacts and risks identified in Sections 8 & 10. This will be included in the specific recommendations and requirements of the ESMP.

12.1 Resettlement action plan

Will not be applicable to this site as there is no project based resettlement.

12.2 Evacuation of people: Arrangements to move people from the site or areas immediately adjacent to the site, or from high-risk areas up-slope/down-slope or downstream from the site

There are occupied houses in the hazard zone instructed to evacuate, but continue to live in the same location. These houses may have a life threatening impact during the construction due to form of structural damage to buildings. As possible activation of slide during the construction phase may occur, and also as the mitigation work has a strong influence to the aggravation of slope failure risk, it is logical to consider that the risk is linked with project works. Therefore, a temporary evacuation system is strongly recommended to this site.

Also, the Environmental, Social and Health and Safety unit of PMU should pay special attention to implement the warning systems and ensure evacuations of people at this site. Further, measurers should be taken to minimize all possible risks on the community from the boulder fall, debris flows and etc. (refer designed based safety considerations).

12.3 Procedure for removal of damaged structures, facilities infrastructure

There is a house (Ms Thamara Priyanganee) in the periphery of the project site may requiring removal. Project planning should consider to avoid intervening with this housing structure, or the house owner as much as possible. As the built house even if damaged should not be removed without full approval of the owner. Meaningful consultation should be done to get the landowner agreed for removal if the house needs demolition. The owner may require removal of the structure at the project cost as it has no future value. But, signing a legally bound agreement between the land owner and the project implementing authority allowing no-objection to remove the structures is mandatory. During this process following is recommended as a minimum

- i. Thorough consultation with the land owner to get his consent
- ii. Allow land owner to extract/ or extraction by the contractor on behalf of the land owner any valuable items from the structures
- iii. Project bear the cost of removal of the structure

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

There can be cracks forming in the buildings at roadside due to high ground vibration generation from various project actions mentioned above. It is imperative that necessary control measures are taken to reduce the ground vibration. Also, allocations should be in place for compensations if project based cracks and structural damage occur.

12.5 Public awareness and education- needed for following areas

- i. The Environmental health and safety unit of PMU should pay a special educational and awareness programs to make the community in down slope area responsive to the risk management measurers to be developed during the implementation of the project
- ii. Meaningful consultation and awareness should be made to the community regarding disputes, abuse, drugs, illegal liquor , prostitution etc. that may be link with project workforce

12.6 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 vegetation and minimum number of removal of tree species. Sufficient emphasis should be made to consider conservation of trees if important tree species are found</p>	High
<p>ii. Habitat connectivity and animal trails If large fraction of vegetation is required to be cleared in ecologically fragile habitats 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 impact are localized.</p>	High
<p>iii. Conservation of water resources This involves extraction of water both surface and sub-surface. The water extracted is in relatively good quality. In a well thought design this extracted water can be conveyed in such a manner that the water can be accessed by wild fauna as well as the neighboring communities for bathing and other domestic purposes even as drinking water. The community consultation indicated water scarcity during dry season in this area, the extracted water can be used as an alternative water source for community</p>	Very high
<p>iv. Interruption to water supplies The design should include a permanent installation facilities for water supply line of Ayagama base hospital which is crossing the slope to be mitigated</p>	very high
<p>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.. There is natural streamlet currently disturbed by the slope failure flowing from the upslope area. The design consider natural stream features to this location. Inputs of landscape architect may be important for the design of suitable mitigation structures</p>	High
<p>vi. Consideration of green environmental features As many of the mitigations 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 use of excavated materials for construction & etc.</p>	High (As the site is located in an ecologically sensitive hill country watersheds)
<p>vii. Workers/ commuters and community safety Activation of slide may occur during construction phase and may pose threat to workers and commuters. Therefore safety consideration such as berms, safety nets etc. should be considered (temporary measurers restricted only for the construction phase)</p>	Very High

<p>viii. Erosion control structures In drainage management, water is extracted and conveyed to nearby streams often through culverts. During rainy season the flow in these drainage structures can be significantly high and this may cause stream bed and bank erosion. Hence the design should adequately consider flow speed breaker to reduce erosive flows entering natural streams. This should be an inclusive part of the design if there are streams and culverts in the proximity of the mitigation site.</p>	<p>Very high</p>
<p>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 to be directed to natural streams. The materials used for structures should be chosen carefully so as to withstand local weather conditions with high durability. Designs should specially consider corrosion prevention techniques if steel structures are use and geotextiles if fine sediments are prone to enter sub drains.</p>	<p>Very high</p>

12.7 Mitigation of impacts during the construction phase

12.7.1 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 indicating the degree of relevancy for this site. For details, ESMP for construction contractors should be referred.

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 3: Contractor requirement to comply with ES & 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	Highly Relevant
2002.2 2)	Noise and Vibration	Relevant
2002.2 3)	Cracks and damages to the buildings	Highly Relevant
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	Relevant
2002.2 8)	Water	Highly Relevant
2002.2 9)	Flora and Fauna	Relevant

2002.2 10)	Physical and cultural resources	Possibly 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	Not Relevant
2002.2 15)	Maintenance vehicles and machinery	Relevant
2002.2 16)	Disruption to public	Highly Relevant
2002.2 17)	Utilities and roadside amenities	Highly Relevant
2002.2 18)	Visual environment enhancement	Highly Relevant
2002-5. Environmental Monitoring	Baseline surveys (air, water, noise , vibration, crack surveys)	Refer site specific monitoring plan
	Surveys during construction (air, water, noise , vibration, crack surveys)	Refer site specific monitoring plan
	Surveys during operation phase	Relevant
	Reporting and maintenance of records	Relevant
2003. Working Conditions and Community Health and Safety		
2003.2	Safety organization and communication	Highly Relevant (Unstable Upslope)
2003.3	Child Labor and Forced Labor	Relevant
2003.4	Safety reports and notification of accidents	Highly Relevant (Unstable Upslope)
2003.5	Safety Equipment and Clothing	Highly Relevant (Unstable Upslope)
2003.6	Safety inspections	Highly Relevant (Unstable Upslope)
2003.7	First Aid Facilities	Highly Relevant (Unstable Upslope)
2003.8	Health and safety information and training	Highly Relevant (Unstable Upslope)
2003.9	Plant equipment and qualified personnel	Highly Relevant (Unstable Upslope)
<p>Relevant: The section is relevant to the site as a common ESMP applicable to any site</p> <p>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</p> <p>Possibly relevant: This ESMP will be triggered if the site come across with relevant aspect during project implementation</p> <p>Not relevant: The section may not be relevant to this site under disclosed conditions</p> <p>Optional: require to be implement if needed only</p> <p>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</p> <p>Reference: Contractors Obligation for implementation of ESMP</p>		

12.7.2 Site specific mitigation

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

Table 4: Site specific ES & HS mitigatory measures

Mitigation item	Project implementation phase	Responsibility
<p>i. Minimize erosional impacts during construction 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.</p>	Site preparation and construction	Construction Contractor
<p>ii. Disposal of construction waste The contractor should pay special attention with respect to disposal of construction waste. Such waste if generated should store properly without getting washed off and dispose according to approved procedures by the PMU. Under no circumstances that construction waste should be disposed to nearby stream or its riparian zone.</p> <p>iii. Recoverable materials: The project should consider use of rock material for construction. If not suitable for this work, the rock material should be allowed to recover by interested parties to be used as a construction material</p>	Site preparation and construction	Construction Contractor
<p>iv. Open defecation and onsite sanitation for workers The contractor should pay special attention to maintain proper onsite sanitation for workforce. The land opposite to the failed slope or the stream riparian areas should never be used for defecation or other unhealthy sanitation purposes as the Ayagama district hospital is located close to this land.</p>	Site preparation and construction	Construction Contractor
<p>v. Dust and aerosol control screens Special screens etc. should be used at the road side if heavy dust or aerosol generating activities are envisaged</p>	Site preparation and construction	Construction Contractor
<p>vi. Water for construction Water for construction works should be obtained only from the approved sites</p>	and construction	Construction Contractor
<p>vii. Working hours The construction activities should be restricted to day time only. Working after 6.p.m. is not recommended for any reason due to safety issues.</p>	Construction	Construction Contractor
<p>viii. Workers health and safety As the workers in the site have to work in high risk conditions, it is imperative to implement recommendations given in section B of contractors' obligation on ESMP under "working conditions and community health and safety". These recommendations should be followed carefully in a proper organization and safety monitoring system. Additionally, working should be discontinued for sufficient time period during rainy period as working on unstable slopes will be highly risky in the rainy season. A good warning system and fulltime watchmen is strongly recommended for this site for both worker and commuter safety. Safety barriers and safety nets should be installed at places of risk to protect workers, commuters and the community in the downslope from boulder/debris falling risk</p>	Construction	Construction Contractor

	Onsite sanitary facilities should be made available for the workers, and sanitary waste should be properly disposed.		
ix.	<p>Water supply line</p> <p>The water line currently running across the failed upslope need to be installed properly without being affected during the construction works. The water recipient (District Medical Officer- Ayagama hospital should be consulted during project mobilization to inform about the mitigation work and requirement to shift the waterline to a safe location. As the line is conveying water under gravity the re-positioning should be done carefully not to interrupt the flow during low flow times. However, the line can be re-position across the same location when the mitigation works are completed. In this situation a competent technical personnel should assess the situation and provide suitable solution to provide water without interruption..</p> <p>Alternative water supply arrangement (sources with required quality and quantity and treatment) should be investigated and arranged standby in case of supply interruption during the construction phase.</p>	Construction	Construction Contractor
x.	<p>Disruption to public (Road traffic and safety on road at night)</p> <p>Special attention should be made for road traffic management concerning traffic management in day time during crowded hours, and in night including traffic management for ambulances of the hospital. During crowded hours obstructions to traffic due to project actions should be minimal and reliable night lamps are mandatory. Watchman including night is compulsory at this site as the site is located near the hospital.</p>	Construction	Construction Contractor

12.7.3 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.

Table 5: Environmental and Social monitoring plan; construction phase

Monitoring requirement	Parameters	Frequency
i. Baseline monitoring	*Stream water quality	Once*
	**Pre crack survey of the high risk houses	Once*
	Ground vibration	Once
	Background noise measurement	Once
	Air quality: particulate matter	Once
ii. During construction	Stream water quality	During slope excavations, ground soil boring works (every month) *
	Ground vibration	During operation of drilling machinery, boring works, or any works that generate ground vibrations*
	Crack survey of the high risk houses	If noticeable displacement is observed during construction **
	Construction noise	Only during noise generation times *
	Air quality particulate matter	Once a month *

	Re-positioning of the water supply line to Ayagama Hospital and its performance during the construction phase	Daily
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 *** Contractors , Environmental Health and safety officer	
v. Reporting requirements	<p>Stream water quality – Comparison with ambient water quality standards published by the CEA, 2017</p> <p>Pre crack survey of the high risk houses-Professional report</p> <p>Ground vibration-as per The interim standards on vibration for the Machinery, Construction activities and Vehicular movements, CEA</p> <p>Background noise measurement –Extraordinary Gazette No.924.1, May 23,1996, CEA</p> <p>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.</p> <p>Micro habitat and ecosystem richness: As per the instructions of DWC</p> <p>Rainfall: Reports to be analysed by the ES & HS unit of PMU to be vigilant on the potential risk of slope failure and to develop response mechanism</p>	

13. Grievance redress mechanism for this site

The consultants ES officer is responsible for establishing the grievance redress mechanism for this site **with special consideration for following impact communities** a) community in the downslope, b) District Medical Officer- Ayagama hospital District , c) Land owner (Reference: Environmental and Social Management Framework for recommended procedure for establishment of grievance redress mechanism).

14. 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 6: Proposed scheme of information disclosure

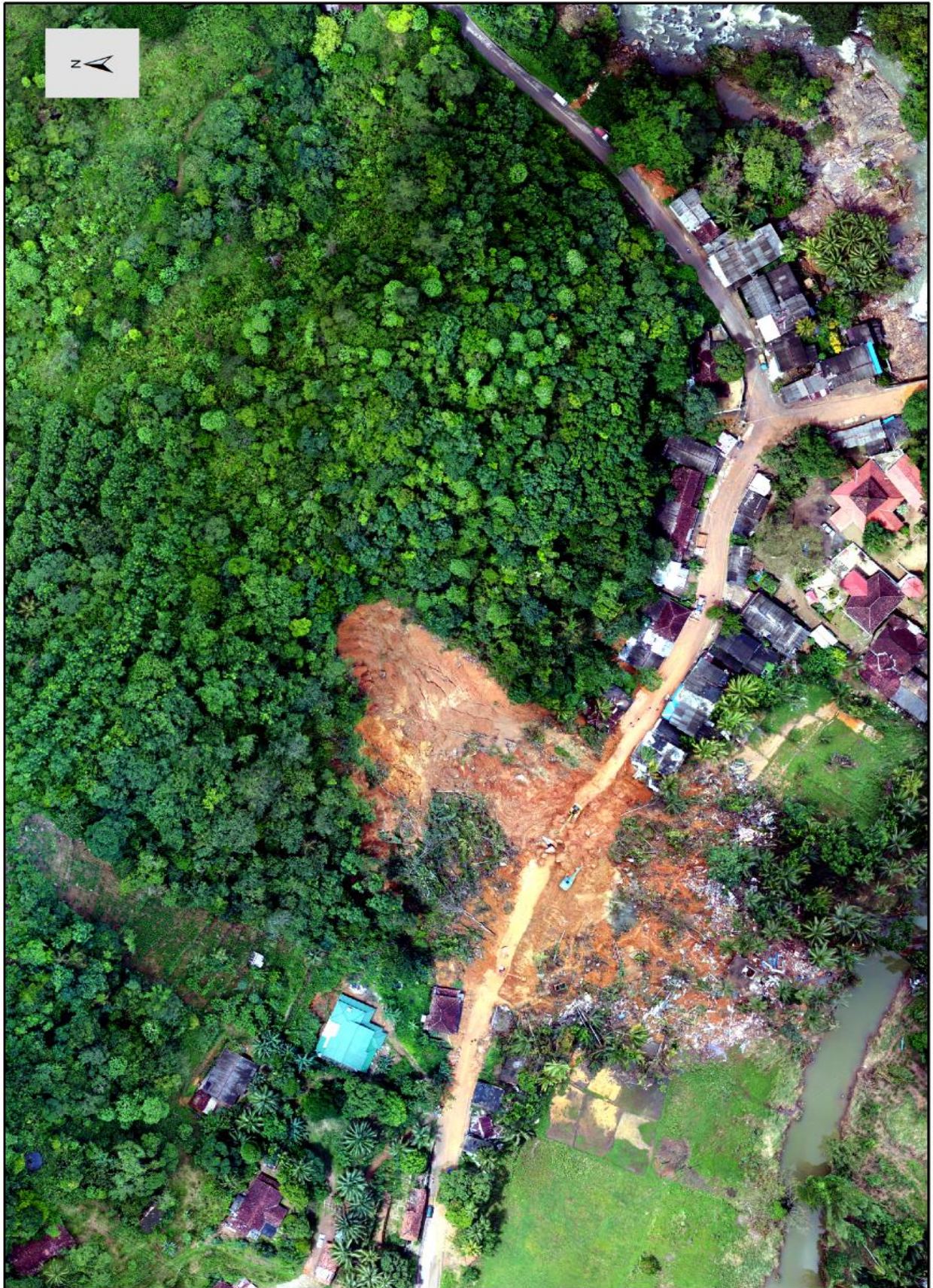
Information	Proposed agencies	Mode of information disclosure
i. Project plan (site details, design , implementation arrangements)	District CEA, DFC, DWLC, District Secretariat, Divisional secretary, RDA, State land owners, Other district levels Agencies, NBRO district office, AIIB	Meetings, District coordination committee, submission of relevant report to sign agreements, approvals and consents.
ii. Environmental and Social Management plan	District CEA, DFC, DWLC, AIIB,	Meetings, District Coordination Committee, submission of relevant report to sign agreements, approvals and consents
iii. Monitoring reports (baseline and during construction)	District CEA, DFC, DWLC, 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, DFC, DWLC, RDA, Divisional secretary, Police, State Land Owners, Grama Niladhari, District Office NBRO, AIIB and relevant parties as appropriate	Written and verbal communications, submission of relevant reports

v. Decisions taken and progress review meetings pertinent to ES matters	District CEA, DFC, DWLC, RDA, Divisional secretary, Police, State Land Owners, Grama Niladhari, District Office NBRO, AIB and relevant parties as appropriate	Meetings, submission of relevant reports
vi. Grievance redress mechanism	Relevant parties	Meetings, written and verbal communications
vii. Other (performance /condition of water supply line) Ayagama hospital	MOH (Ayagama District Hospital)	Written /Verbal communications

Table 7: Level of information gathered through consulting institutions

Date	Institution	Person contacted for information
08/08/ 2018 @ 10.30 hrs	Road Development Authority	Mr. WPGL Werajeewa –Executive Engineer
08/08/2018 @ 13.00 hrs	Forest Department	Mr Nimal S Dewage – Range Forest Officer
09/08/2018 @ 10.00 hrs	Central Environmental Authority	Mr.K G.D.N Kiriella Director –CEA Ratnapura District
09/08/2018 @ 13.00 hrs	Department of Wildlife & Conservation (DWLC)	Mr Manjula Vidyathna / Wild Life Rangw Officer Ratnapura
09/08/2018 @ 14.00 hrs	Land Reforms Commission	MS. Dulmini Patabadiarachchi Staff Assistant
Interview by telephone	Ayagama District Hospital	Dr Sisira Kumara and Sister Sudharma Wijewikkrama

Annexure I: Drone image of the project area



Annexure II: Images of the site condition and the consultation



Fig a: Meeting with NDRSC officer



Fig b: The water supply line crossing the failed upslope



Fig c: present situation of the Gavragiriya road(24.08.2018)



Fig d. Damage buildings located at up slope area



Fig e: Rock boulders and mud deposited on down slope area.



Fig f: Damage building located at down slope area

Annexure III: Report on the Stakeholder Consultation: Ratnapura District

Date: 08/08/2018 and 09/08/2018

Institution	Name and designation of the contact officer	Concerns raised
Road Development Authority	Mr WPGL Werajeewa – Executive Engineer	<ul style="list-style-type: none"> ✓ This area is under the jurisdiction of Ratnapura-Awissawella RDA regional office ✓ The RDA has no objection and states the mitigation is very much needed. ✓ Other concerns raised <ul style="list-style-type: none"> • A proper handing over of the project is required after the mitigation • RDA 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 vehicles, pedestrians, and traffic safety measures , barricades, flagmen and for the night work, lights and illumination should be provided. ✓ It is also stated that Construction waste/ excavated materials should not be a nuisance to public/commuters
Forest Department	Mr Nimal S Dewage – Range Forest Officer	<ul style="list-style-type: none"> ✓ The Forest Department has no objection on the project <p>Following matters were emphasized.</p> <ul style="list-style-type: none"> ✓ There are Forest reservation in the Ratnapura district. However, some large portions of land still remain without clear boundaries and many of them are under jurisdiction of LRC. Currently the surveying of forested area is in progress. ✓ However, all lands under forest, private or under LRC and any other if cleared require approval from Forest Department ✓ Private/LRC/Forest land require approval from forest Department for complete clearance of land as in the case of boundaries are still not clear. ✓ Role of Forest Department is that they examine the plot to be cleared, measure the breadth of trees to be removed and specific habitat significance of the area to be cleared. The plot will be surveyed by the FD and report will be submitted to Timber Cooperation. The tree can be cut by the land contractor, however, removal will be done by the Timber cooperation. All trees dbh of > 18 cm will be taken by the Timber Cooperation. ✓ Regarding the project implementation, he said that mitigation proposal with draft layout should be submitted to Conservator Forest and approval to be obtained. ✓ This does not apply only forested areas but isolated any location in the proximity of forest ✓ As Ratnapura is having lot of forest areas, therefore project are required to obtain consent for project implementation with the services of conditions such as; <ul style="list-style-type: none"> • No entry of forest reserves, extraction of forest species, timber for project work, any other • Chemical blasting should be done in a manner not harmful to fauna • Structural mitigation measures should essentially followed environmentally friendly aesthetically comparable designs. • If plants are used for remediation prior approval should be obtained

		<ul style="list-style-type: none"> • Early informing the project, the Forest Department can support the project by providing good quality trees for planting. • Prior approval for suitable species for reforestation should be obtained from Forest Department. <ul style="list-style-type: none"> ✓ The Central Environmental Authority (CEA) will directly intervene for removal of forested area of > 1ha in the lands of LRC or private lands ✓ The Central Environmental Authority (CEA) and forest Department will intervene removal of forested area of < 1ha in the lands of LRC or private lands ✓ The clearance process may demand baseline studies for certain sites in which aquatic and terrestrial habitat surveys may be recommended. Similar reports may be demand by CEA during the project implementation.
Central Environmental Authority	Mr.K G.D.N Kiriella Director –CEA Ratnapura District	<ul style="list-style-type: none"> ✓ Under the Soil Conservation Act 772/22 of 1996. of National Resource Management Centre, Ratnapura District has been gazetted a sensitive area except the Embitipitiya area ✓ Under this gazette any development is not allowed irrespective of the magnitude of the project. ✓ In a disaster this is not needed. ✓ The Basic Information Questionnaire (BIQ) is needed to fill for the project and submit the application ✓ Since the waterway is located downslope in the area it is needed to keep the Environmental flow ✓ There may be endemic species, special habitats (niches) , fauna flora study are needed ✓ This Environmental assessment may be required to see their difference after mitigation ✓ The CEA will grant approval with recommendations.
09/08/2018		
Institution	Name and designation of the contact officer	Concerns raised
Department of Wildlife & Conservation (DWLC)	Mr Manjula Vidyarthna / Wild Life Rangw Officer Ratnapura	<ul style="list-style-type: none"> ✓ No objection on the project ✓ A report to be submitted to DWLC for approval ✓ Removal of Fauna & Flora is needed under Wild Life Ordinance ✓ Removal of flora & fauna; endemic, threatened, identified under Red List needed approval from DWLC.
Land Reforms Commission.	MS. Dulmini Patabadiarachchi Staff Assistant	<ul style="list-style-type: none"> ✓ If the land tenure is Land Reforms Commission an approval should be requesting from Commissioner –Land Reforms Commission through a letter

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

1. Proposed procedure by RDA for approval for implementation of landslide mitigation projects in RDA reservation areas

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

2. Proposed approval procedure for Environmental Clearance form District Central Environmental Authority

- i. In the project preparation phase, the ES & H&S unit of PMU study the Site specific ESMPs and should submit the project proposal to district office of CEA with details of the Aerial extent that would be influenced by the project actions with spatial reference to sections of site specific ESMP relevant to the project.
- ii. A basic information questioner (BIQ) should be completed and submitted along with the above details
- iii. CEA may call for project briefing and further information on ESMP that should be provided by the PMU
- iv. Approval will be granted subjected to site specific conditions that should be adhered by the project

Annexure V: Study team

Name	Designation	Position in the study
TDSV Dias	Director/ ESSD/NBRO	Team leader
SAMS Dissanayake	Senior Scientist/ESSD/NBRO	Senior Environmental Scientist
Prabath Liyanaarachchi	Scientist/ ESSD/NBRO	Environmental scientists
Abheetha Wanasundara	Officer in charge / Ratnapura District	Geotechnical Engineer
Indu Upamali	Scientist/ LRRMD/NBRO	Geologist
H Kusalasiri	Technical Officer/ESSD/NBRO	GIS/Demographic data /survey support

Annexure VI: List of references

1. NBRO site investigation report on landslide disaster at Ayagama – (NBRO/31/3500/06/RDO (L1)/M1/ (AW)/17/275 dated 14.12.2017 and NBRO/LRRMD/RT/L117/31/32155 dated June 2017
2. Contractor’s obligations for Generic Environmental and Social Management Plan- Sri Lanka Landslide Mitigation Project-AIIB
3. Environmental and Social Management Framework-Sri Lanka Landslide Mitigation Project _AIIB
4. Resettlement Planning Framework- Sri Lanka Landslide Mitigation Project _AIIB