

SFG1855



**ENVIRONMENT AND SOCIAL MANAGEMENT FRAMEWORK  
FOR  
TRANSPORT CONNECTIVITY AND ASSET MANAGEMENT PROJECT**

**MINISTRY OF INTERNAL & HOME AFFAIRS, PROVINCIAL  
COUNCILS & LOCAL GOVERNMENT**

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## **Abbreviations**

AP	Affected person
BP	Bank Procedures
CBOs	Community Based Organizations
CEB	Ceylon Electricity Board
CE	Chief Engineer
CV	Chief Valuer
DS	Divisional Secretary
DSD	Divisional Secretariat Division
EE	Executive Engineer
ESD	Environment & Social Division
GN	Grama Niladhari (Village officer appointed by the government)
GND	Grama Niladhari Division
GoSI	Government of Sri Lanka
GRM	Grievance Redress Mechanism
GRC	Grievance Redress Committee
LAA	Land Acquisition Act
M&E	Monitoring and Evaluation
MoH	Ministry of Highways
MoL	Ministry of Lands
MLD	Member of Land Division
NGOs	Non-Governmental Organizations
NIRP	National Involuntary Resettlement Policy
OP	Operational Policy
OPRC	Output and Performance Based Road Contract
PAPs	Project Affected Persons
PD	Project Director
PMU	Project Management Unit
RDA	Road Development Authority
RE	Resident Engineer
ROW	Right of Way

# Sri Lanka: Transport Connectivity and Asset Management Project

## Environment and Social Management Framework

### CHAPTER 1: BACKGROUND

#### 1.1 Project Background

Sri Lanka's road network is dense and well laid-out providing connectivity to the country's population and centers of economic activity (Map 1). The network's density is among the highest in Asia (table 1.1), as the number of road kilometers per population exceeds the related indicators of densely populated countries in the South East Asian Countries.

*Table 1.1: Road Densities of South Asian Countries*

Country	Road Density in km/km <sup>2</sup>
Sri Lanka	1.50
Bangladesh	1.36
India	0.73
Pakistan	0.32
Nepal	0.06
Bhutan	0.05

(Source: International Road Federation, World Road Statistics (2001))

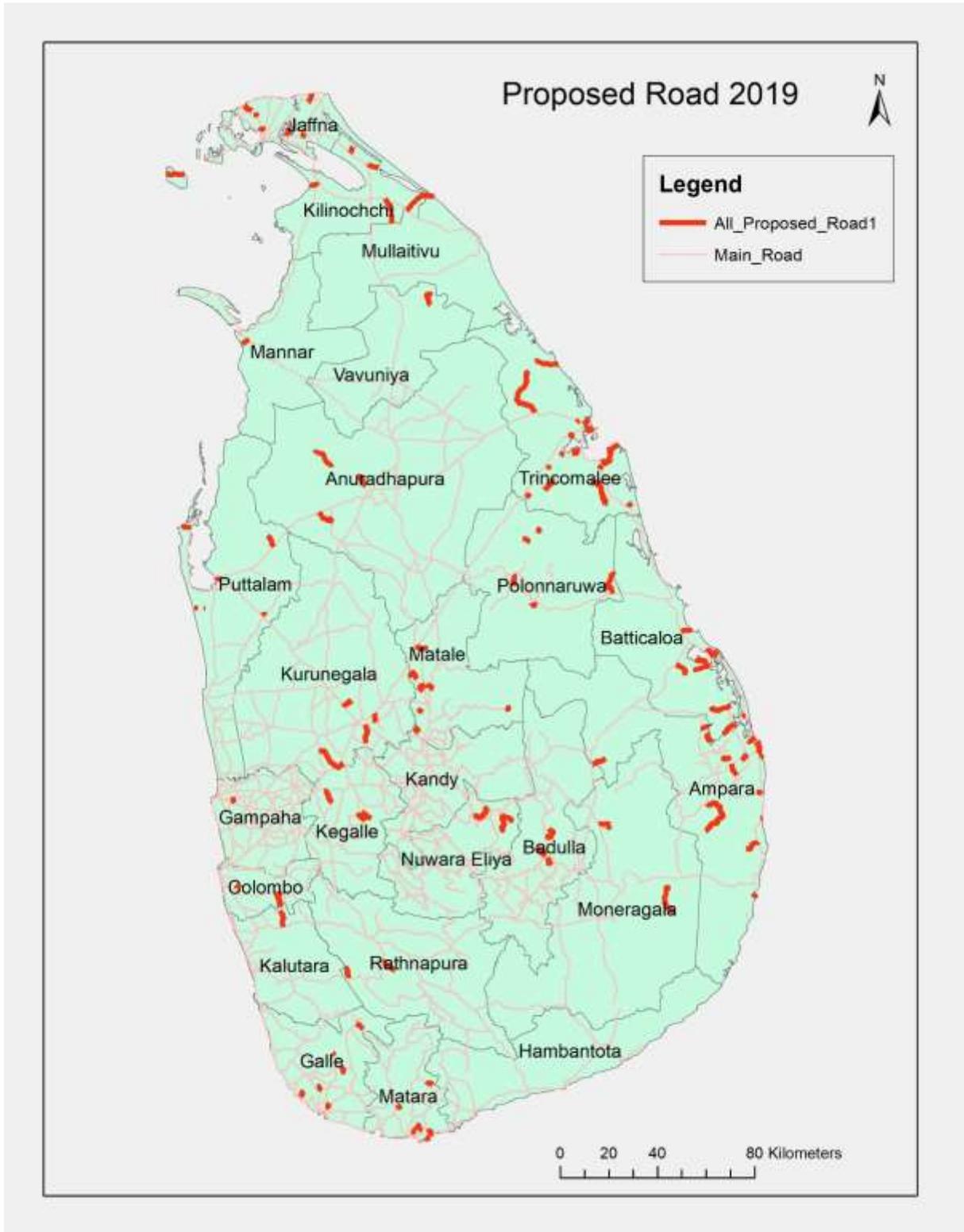
However, the present road network standards and conditions are inadequate to meet the rapidly growing freight and passenger traffic. This situation limits the contribution of roads to national development, economic growth, and poverty reduction. To cope with the constraints, the existing road infrastructure must be improved and upgraded.

#### 1.2 Project Development Objective

The overall **objective** of the project is to *improve access on selected provincial roads and strengthen the capacity of the Road Development Authority (RDA) and provincial roads authorities and departments.*

#### 1.3 Project Description

The project is designed to support modern road asset management in the road sector in Sri Lanka. It focuses on creating an enabling environment for more effective asset management and includes interventions to develop systems and capacity within the RDA and the Road Departments and Road Authorities of the Provincial Councils. With the Government of Sri Lanka's (GOSL) request to the World Bank in 2018 to assist them improve the condition of the provincial road network, Component 2 of the original project was restructured to finance the rehabilitation and improvement of selected road sections in the Provincial Road network spread across all nine provinces of the country.



*Map I: Class A and B Roads in National Road Network Sri Lanka*

Key focus of this component will be to improve accessibility of the provincial road network as well as enhance road safety. The Project will continue to support the asset management principles with the

establishment and operationalization of asset management systems across the road units in the entire country. It will in particular support the RDA in strengthening its systems and procedures to transition itself from a provider of infrastructure to a service provider in line with the ambitious needs of a middle- income country. The establishment of systems and such procedures will also include the facilitation of Public-private partnerships as well as expanding the role of safety within the RDA.

#### 1.4 Project Components

The original project has been restructured as follows:

**Component 1:** Institutional Strengthening and Capacity Building for Asset Management – This component retains key activities originally envisaged in (i) operationalizing the web-based, multiuser asset management system to improve network data collection and financing additional software, equipment, and technical support for the customization and maintenance of the computerized RAMS; (ii) establishing an asset management unit within the RDA that will be responsible for planning and implementation of asset management contracts and the implementation of the asset management system; (iii) developing a Road Sector Policy and Strategy that will provide inputs to an integrated Transport Sector Strategy; (iv) supporting the systems and procedures, standards and specification to ensure road safety ;(v) Supporting the establishment of a crash database, (vi) developing a management information system for RDA; and (vii) establishment of a grievance redress system in RDA to address public complaints.

**Component 2:** Provincial Road Improvements and Rehabilitation – The project will no longer finance the upgrading of the Ja-Ela to Chilaw section of the A003 highway and the associated land acquisition and resettlement as originally envisaged. Instead, the component will now finance the rehabilitation and improvements of provincial roads in all nine provinces of the country. The component will be implemented in two phases.

- a. **Phase 1:** The first phase will cover 302.7 km of roads at an estimated cost of LKR 7,692.30 million (approximately 40 percent of the total road contracts in value). These road sections are spread across all nine provinces of the country, including 18 of the 25 districts.
- b. **Phase 2:** The second phase will cover the remaining roads covering all nine provinces.

The contracts will incorporate interventions such as road upgrading, rehabilitation, drainage structures, sidewalks and physical design features to enhance safety. The contracts will not cover any widening of road sections.

#### 1.5 Types of project activities

Following works are typical for any road rehabilitation, improvement and upgrading project that may incur during the project implementation:

- Improve the existing road within the ROW.
- Strengthen the existing pavement with asphaltic concrete (AC) and ABC (Aggregate Base Concrete) Layers
- Improve the existing pavement with micro surfacing and other sealing techniques.
- Improve the horizontal alignment at selected locations improve driving conditions.

- Widen, repair or reconstruct damaged culverts and bridges and construct new drainage structures.
- Remove any irregularities on the existing vertical profile.
- Provide cycle lanes, pedestrian footpaths, bus bays, separate bus lanes, and rest bays where necessary.
- Provide signage and markings to help promote safer driving conditions.

The above activities will lead to; a) Improve the vehicle operating speeds while ensuring safety of road users and, b) Reduce travel time and vehicle operating cost of vehicles above road sections.

## 1.6 Implementation Arrangements

Component 1: RDA and its existing PMU will remain the implementing agency for this component.

Component 2: The Ministry of Internal & Home Affairs and Provincial Councils & Local Government MIHAPCLG(MIHAPCLG) will be the implementing agency for the revised Component 2. A new project management unit (PMU) will be established in MIHAPCLG to manage and coordinate the project activities in all nine provinces.

**PMU:** The PMU will manage project funds, carry out FM and procurement, sign contracts, and make payments for all activities financed under Component 2. It will be staffed by a National Project Director, a Deputy Project Director, a Senior Project Engineer, Procurement Specialist, a Highway cum Road Safety Engineer, a Senior Project Accountant, an M&E Specialist, a Capacity Building Specialist, an Environmental and Social Safeguards Specialist, a Road Design Specialist, and support staff. The PMU will also recruit three Contract Management and Monitoring Consultants (CMMC) to overlook civil works in three provinces each grouped as follows:

Group I: Western Province, Southern Province, Sabaragamuwa

Group II: North Central Province, North Province, North Western Province Easter Province

Group III: Easter Province, Central Province, Uva Province

**Provincial Implementation units (PIUs):** PIUs will be established at each Provincial Council to carry out implementation activities of the project, in coordination with the PMU. Each PIU will be staffed by a Provincial Project Director, a Deputy Director cum Procurement Specialist, a Project Accountant, an Office Engineer, M&E & Capacity Building Officer, and support staff. The PIUs will not manage project funds.

**Project Implementation Consultant (PICs):** PICs in each province, staffed by a Chief Resident Engineer (CRE), a Resident Engineer cum Contract Management, a Provincial Assistant Quantity Surveyor, a Provincial Material Engineer, Assistant Resident Engineers, a Material Technician, numerous Technical Officers, an Environmental & Social Safeguard Officer, and various support staff. The CREs in each PIC will report to the relevant CMMC at the PMU in charge of the respective province. The CMMCs will in turn report to the Project Director of the PMU. The PICs will not manage project funds.

## CHAPTER 2: PURPOSE OF AN ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

### 2.1 Objectives and rationale for using the Framework

The project is not expected to have potential large scale, significant and / or irreversible environmental impacts. The Project has been assigned Environmental Category B because the environmental and social impacts are generic to upgrading, rehabilitation, and maintenance works of existing roads that will be predictable, localized and can be readily mitigated. The potential environmental impacts of the proposed road corridor of the project include: clearance of trees that have been planted on the road side due to realignment and safety needs (to avoid black spots), changes in drainage patterns to address current flooding issues within the road corridor and its immediate impact areas and increase in sediment load into waterways, and soil and water contamination due to spillage and leakage of oils and other toxic materials, noise, dust and air pollution from road works, health and safety issues due to operation of borrow pits, quarries, crushers and asphalt plants. If there are improvements such as widening lanes and shoulders depending on the road locality, there may be possible impacts to the environment and people where the existing roads are running through or closer to forested areas, wetlands, settlements, business premises, etc. The Project does not expect social impacts in terms of loss of land and other assets/ infrastructure /livelihood located on private land, given that improvements will be restricted to the existing right of way (ROW). However, for the enhancement of safety, the Project may have to acquire small land parcels at pre-designated places and, as a result, provisions for the voluntary donation of land has been included in this ESMF. Construction related impacts may include public inconvenience due to access restrictions, traffic congestion and labor influx related issues.

Besides these adverse impacts, the project is also expected to have positive impacts with the most significant benefits perceived by the affected HHs being improvement of the quality of environmental conditions, high demand for land, and prospect of appreciating the value of land. Other notable advantages include improvement of road safety, a perceived reduction in the cost of living, development of business premises, work place and social infrastructure.

This ESMF will need be consistent with (a) the national requirements that governs the sector and environmental and social management according to, specifically, the National Environmental Act, Land Acquisition Act and other related Acts and Policies that that may be of relevance; and (b) the World Bank's operational policies on environmental and social safeguards.

Purpose of the Environmental and Social Management Framework (ESMF) is to provide guiding principles for assessment and management of environmental and social impacts of all physical works targeted under this project. The Framework will: (i) articulate the criterion and due diligence processes based on risks; (ii) time-bound action plans to assure compliance; and (iii) guidance for public consultation process and disclosure of safeguard documents. It also included institutional capacity assessment to manage safeguard risks and impact and develop a budgeted capacity building plan for safeguard management. The framework also provides numerous applicable guidelines and best practices to be adopted.

Overall, consistent with existing national legislation and the World Bank policies, the objective of the Framework is to help ensure that activities under the proposed project will:

- (i) Prevent adverse environmental and social risks and impacts;

- (ii) Enhance positive environmental and social outcomes;
- (iii) Ensure protection of environment, health and safety;
- (iv) Ensure compliance with applicable national environmental and social policies and legislation; and
- (v) Ensure compliance with applicable World Bank environmental and social safeguard policies.

The ESMF will serve as a template to undertake appropriate environmental and social analysis of sub-projects under this project. It will be made available for public review and comment in appropriate locations in Sri Lanka and in IDA's Public Information Center in accordance with BP 17.50 requirements of disclosure. Detailed EAs for individual sub-projects will be carried out (in accordance with the ESMF) by the implementing agency and will be reviewed and cleared by the designated Project Approving Agency (PAA), as applicable, under prevailing national environmental legislation in Sri Lanka and by IDA prior to the approval of disbursement of funds. Similarly, specific social safeguards requirements such as Social Impact Assessments will be prepared and approved prior to project activities takes place.

## **2.2 Applicability of the ESMF to the project activities**

The objective of the project is to provide financing to support modern management of road assets of Sri Lanka. It will be developing systems and capacity within the RDA and the Road Departments Authorities of the Provincial Councils to improve accessibility of the provincial road network as well as enhance road safety.

Under Institutional Strengthening and Capacity Building for Asset Management the project will operationalize the web-based asset management system, support the RDA units, develop new policies and support existing standards, as well as management information system and grievance redress system.

Under the provincial road improvements and rehabilitation, the project will finance the rehabilitation and improvements of provincial roads in all nine provinces of the country. The contracts will incorporate interventions such as road upgrading, rehabilitation, drainage structures, sidewalks and physical design features to enhance safety. The contracts will not cover any widening of road sections.

Given the detailed engineering designs are to be carried out in the future, a framework approach (ESMF) has been adopted based on the conceptual design available. The road-specific specific Environmental and Social Management Plans will be prepared based on the screening processes in parallel to completing the detailed road designs.

## CHAPTER 3: ENVIRONMENTAL & SOCIAL BASELINE CONDITION IN SRI LANKA

This chapter describes the overall baseline condition of Sri Lanka in terms of bio-physical environment, as well as the socio-economic environment. It also includes the sector backgrounds for the key sectors covering the 65 potential PPPs and current status of operationalizing environmental management in these sectors.

### 3.1 Bio-Physical Environment

#### 3.1.1 Geography and climate

Sri Lanka is a tropical island in the Indian subcontinent. It covers an area of about 65,610 km<sup>2</sup> and lies between 6° and 10°N latitude and 80° and 81°E longitude. A central mountainous massif with an altitude of more than 2500 m and a vast plain surrounding it describe the topography of the island (Figure 2.1).



*Figure 2.1 Locality of Sri Lanka*

The climatic pattern of Sri Lanka is determined by the generation of monsoonal wind patterns in the surrounding oceans. Four basic seasons based on rainfall exist. These are, the south - west monsoonal period during May to September; an inter-monsoonal period during October– November; the north-east monsoonal period from December to February; and another inter monsoonal period lasting from March to April.

For administrative purposes, the country is divided into nine provinces: Central, Eastern, North Central, Northern, North Western, Sabaragamuwa, Southern, Uva and Western and 25 districts (Figure 2.2).



*Figure 2.2. Provinces and districts of Sri Lanka*

On the basis of the rainfall regimes, the country is divided into three broad climatic zones. These are designated as the Wet Zone, Dry Zone and the Intermediate Zone. Sri Lanka is further divided into 24 agro-ecological regions based on rainfall expectancy, altitude, soil class, and landform. (Figure 2.3)

The physiography of Sri Lanka comprises of three pen plains or erosion plains made up of a central highland massif, rising in tiers from a low gently undulating plain surrounding it and extending to the sea, (the lowest peneplain). Rising from the inner edge of the lowest pen plain, in a steep step of about 300 meters is the middle pen plain with a maximum elevation of about 800 m above sea level. Within it and rising from it in another step of 1000 to 1300 m is the highest peneplain at a general level of about 2000 m above mean sea level, but rising in places to 2300 to 2700 m.

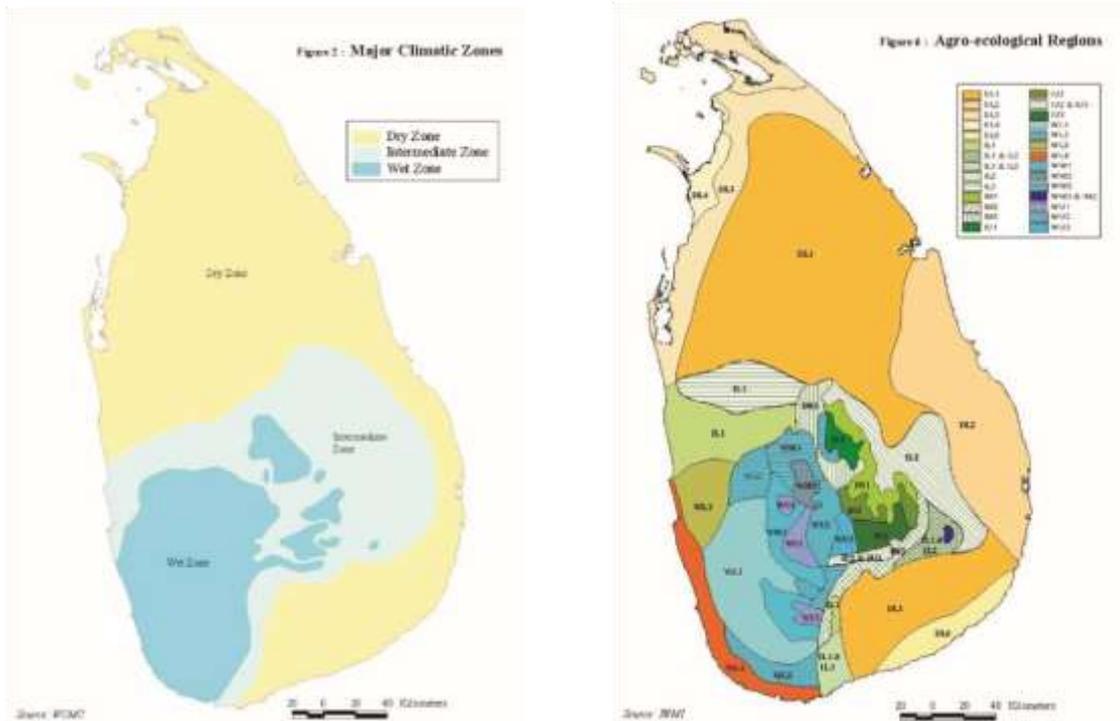


Figure 2.3. Major climatic zones and agro-ecological regions in Sri Lanka

A major part of the country is made up of Precambrian crystalline rocks, which constitute 90% of the land area (i.e., the Highland Complex, Vijayan Complex and Wannu Complex), with Miocene limestone sedimentary deposits extending from Puttalam to the Jaffna Peninsula. There are Jurassic deposits in Tabbowa and Andigama of the North-western province, and quaternary deposits in the coastal area (i.e., sand, sandstone, clay and gravels, and coral reef). Inland deposits of coral debris and gem-bearing gravels are mainly found in Sabaragamuwa Province.

Fourteen Great Soil Groups are found in Sri Lanka. Reddish-brown earth and low humic clay soils are mostly found in the dry zone and drier parts of the intermediate zone. Non-calcic brown soil, red-yellow latosols and alluvial soils are found in the flood plains of larger rivers. Old alluvium, solodized solonetz and regosols are found in more arid areas of the island. Grumusols and rendzinas exist in small extents. The wet parts of the intermediate zone and wet zone consist of red yellow podzolic soils and reddish brown latosolic soils. Immature brown loam and bog and half-bog soils are found mainly in tidal marshes.

The mean annual temperature is approximately 27.5° C in most parts of the island's low-lying areas, while it is around 18° C in the higher altitudes of the central part of the country. The average relative humidity varies from 70% during day to 95% in the night. Rainfall is monsoonal, convectional and depressional. 55% of the island's rainfall comes from the monsoons. The mean annual rainfall ranges between 900 mm to 6000 mm, with an island wide average of about 1900 mm, which is about two and a half times more than the world annual mean of 750 mm. The average rainfall varies from below 1000 mm in the arid regions of the dry zone (north west area and the southeast corner of the island), to over 5000 mm in the wet season in south west of the country.

### 3.1.2 Terrestrial Water Resources

There are 103 natural *river basins* with catchments ranging from 9 to 10,448 sq. km (Figure 2.4). Seventeen river basins have catchment areas of over than 1000 sq. km. 103 distinct river basins covering 90 percent of the island. The southwestern part of the island has seven major basins with catchment areas ranging from 620 to 2 700 km<sup>2</sup>. They are, from north to south: Maha river (1 528 km<sup>2</sup>), Attanagalu river (736 km<sup>2</sup>), Kelani river (2 292 km<sup>2</sup>), Kalu river (2 719 km<sup>2</sup>), Bentota river (629 km<sup>2</sup>), Gin river (932 km<sup>2</sup>) and Nilwala river (971 km<sup>2</sup>). An exception to the radial pattern is the largest basin, that of the 335 km long Mahaweli river, which has a catchment area of 10 448 km<sup>2</sup>. After leaving the central highlands, it runs almost north for 90 km from Minipe to Manampitiya and then a further 70 km through several distributaries as far as Verugal and Mutur on the east coast. Most Sri Lankan river basins are small. Only 17 of the 103 basins exceed 1 000 km<sup>2</sup>. Besides the Mahaweli basin, four others exceed 2 500 km<sup>2</sup>. Three of these (Deduru river, Kalu river and Malvathu river) have their entire catchment area in the dry zone, and only Kalu river is in the wet zone. The total runoff in Sri Lanka is an estimated 52 km<sup>3</sup>/year. Considering 75% and 50% dependability rainfall, annual runoff estimates are 42 and 49 km<sup>3</sup> respectively.

There are six types of *aquifers*: the shallow karstic aquifer of the Jaffna Peninsula, deep confined aquifers, coastal sand aquifers, alluvial aquifers, the shallow regolith aquifer of the Hard Rock Region and the southwestern lateritic (cabook) aquifer. Sri Lanka's largest aquifer extends over 200 km in the northwestern and northern coastal areas. The internal renewable groundwater resources are an estimated 7.8 km<sup>3</sup>, most (estimated as 7 km<sup>3</sup>/year) returning to the river systems and being included in the estimate for surface water resources. Therefore, the total renewable water resources are an estimated 52.8 km<sup>3</sup>/year.

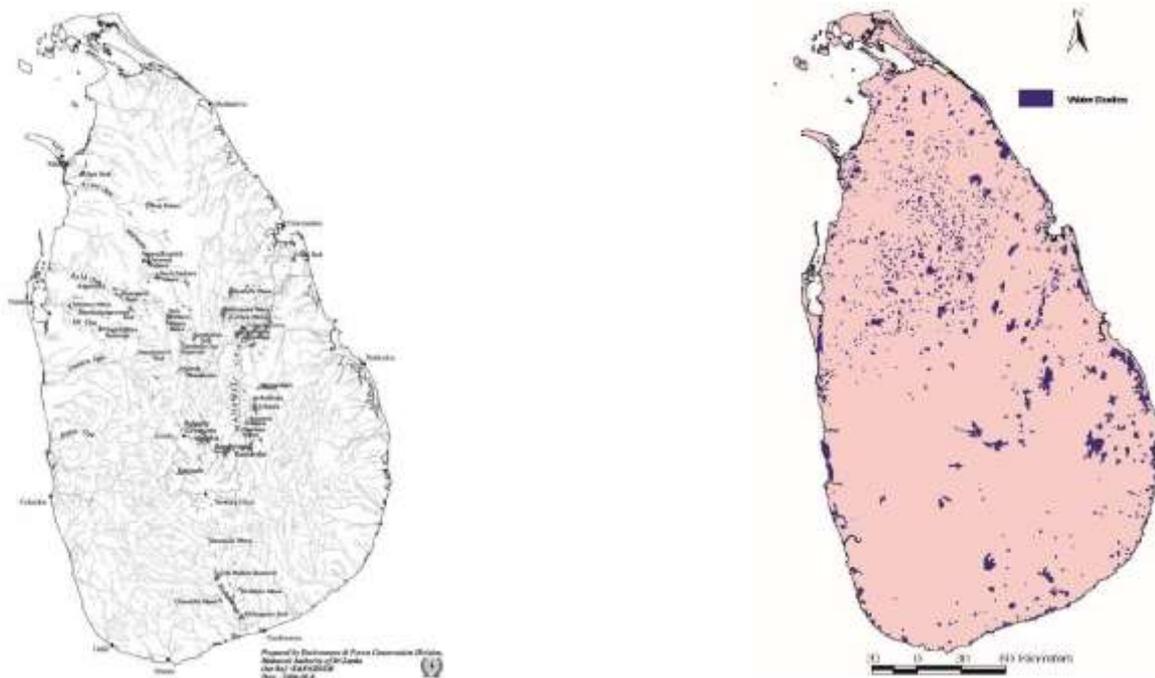
The Kalu, Kelani, Gin, Bentota, and Nilwala river basins cover only 13 percent of the land area, but are where 30 percent of the population live and where 38 percent of the total renewable water resources (TRWR) are located. The basin of the Mahaweli river, the longest river, covers 17 percent of the total area of the country, supports 17 percent of the population and carries 19 percent of TRWR. The basin of the eastward flowing Gal river, known for its irrigated rice production, covers 3 percent of the land area and has 2 percent of TRWR.

Most of the studies on *water scarcity* assessment rank Sri Lanka as a country with either little or no water scarcity or moderate water-scarcity conditions, but they do not consider the spatial and temporal variation of water availability. Sri Lanka experiences high seasonal and spatial variations in rainfall as a result of the bi-monsoonal climatic pattern (northeast monsoon from October to March and southwest monsoon from April to September). Large areas of the country are drought prone. Droughts occur to different degrees in both semi-arid and humid zones. Dryzone districts, comprising 75 percent of the country, contribute to only 49 percent and 29 percent of the maha and yala season runoff. Thus, storing water for irrigation in the yala season (April to September) is essential in many river basins. Large-scale development of water resources for irrigation and hydropower has progressed rapidly in the last 50 years. The Eastern, North-Western, and North-Central provinces and Hambantota in the Southern Province account for 76 percent of the total withdrawals.

*Groundwater resources* are widely used for domestic, commercial and industrial purposes, and small-scale irrigation. About 80 percent of rural domestic water supply needs are met by groundwater from dug wells and tube wells. In many areas, where surface water systems are not fully reliable, groundwater provides industrial and commercial users with a margin of safety. Most industries in the country depend heavily on deep wells where groundwater is safe and of good quality, and can be self-managed. The demand for groundwater in Sri Lanka is steadily increasing, especially for urban and rural water supplies, irrigated agriculture, industries, aquaculture, small and medium enterprises and

urban housing schemes. The rapid expansion of these projects is exerting much pressure on available groundwater resources.

Sri Lanka is covered with a network of thousands of artificial lakes and ponds, known locally as '*tanks*' (after *tanque*, the Portuguese word for reservoir) (Figure 2.4). Some are truly massive, many are thousands of years old and almost all show a high degree of sophistication in their construction and design. A recent study undertaken by the International Water Management Institute in Sri Lanka's dry zone, where groundwater use for farming is greatest, highlighted a significant rise in the numbers of water pumps and 'agro-wells' (wells used mainly for agriculture) sunk over the past few decades. Researchers estimated that there are close to 50 000 agro-wells in the dry zone. The number of pumps is higher, around 100 000, as it includes those used to pump water from rivers, irrigation canals and tanks, and not just those fitted to agro-wells. This boom in agro-well construction occurred partly because a government subsidy program for brick and concrete-lined wells was introduced in 1989, but also because many aquifers are quite close to the surface, which makes digging shallow wells and drilling tubewells relatively cheap.



*Figure 2.4 Rivers and lentic waters in Sri Lanka*

**Irrigation** activities in Sri Lanka date back 2 500 years. Initially, these activities started with a small-scale village tank and a simple channel system. Later, from the fourth to the end of the twelfth century, these systems were developed. Dams were built to intercept river flows across shallow valleys, or water flowing down perennial rivers was diverted by weirs and it conveyed through long excavated canals to be impounded in large reservoirs at appropriate locations to supply large areas. Given the state of irrigation development and the present level of technology in agriculture and in construction engineering, since the mid-1990s little economic potential is left to be exploited by new irrigation construction. Hence, it is reasonable to assume that the country has reached its irrigation potential, but there is large scope for improvement of the existing areas.

In the wet zone, flood control and drainage schemes have been incorporated into the irrigation system mainly in the lower reaches of rivers. In the coastal areas, saltwater exclusion schemes have been commissioned where water salinity affects agriculture. Flood bunds and pumps are the main features in flood protection schemes, whereas gated regulators are adopted in saltwater exclusion schemes.

### 3.1.3 Marine and Coastal Resources

Sri Lanka has a coastline of about 1620 km. Sri Lanka and the southern tip of India stand on the same continental shelf and are separated by a shallow sea, the Palk Strait, which is barely 30 m deep. However, the shelf ends more abruptly in the south and east of Sri Lanka, averaging 22.5 km in width and rarely extending beyond 40 km. Within the shelf area, estimated to cover about 30,000 sq. km., the mean water depth is about 75 m, but the submarine elevations drop abruptly to 900 m within 3 km and 1800 m within about 15 km of the shelf's edge. Beyond this there is a steep descent of over 5500 m bringing it to the general bottom level of the Indian Ocean.

The seas around Sri Lanka are micro-tidal and predominantly semi-diurnal. The rise and fall of the tides is within 0.7 m at spring tides and 0.05 m at neap tides. The highest tidal range is generally around Colombo (west coast), while the lowest is around Delft and Trincomalee (east coast). Due to the small tidal range, there is little change in the level of water in most river mouths, leading to the formation of sand and mud banks blocking the entrances to rivers.

Under the *Maritime Zones* Law No. 22 of 1976, Sri Lanka has proclaimed several areas of national maritime jurisdiction, in conformity with the provisions of the United Nations Convention on the Law of the Sea (Figure 2.5). The maritime jurisdiction of Sri Lanka cover the following major areas:

- Internal waters – Defined as waters in the landward side of the baseline from which the limits of the territorial sea are measured. Internal waters include numerous embayment and areas of coastal sea, as well as all of Sri Lanka's inland waters, and are treated as integral parts of Sri Lanka's national territory.
- Historic waters - Include the Palk Bay, Palk Strait, and Gulf of Mannar areas claimed on the basis of traditional use by Sri Lankans. The Historic waters in the Palk Bay and Palk Strait are considered to form part of Sri Lanka's internal waters, while those in the Gulf of Mannar form part of the territorial sea.
- Territorial sea extends to a distance of 12 nautical miles. Sri Lanka asserts its sovereign rights over this area, including the right to control movement of foreign ships and aircraft through the water and air spaces of the territorial sea. The extent of the Territorial Sea is reported to be 21,500 km<sup>2</sup>.
- Contiguous zone extends to a distance of 24 nautical miles, within which Sri Lanka asserts its rights to take measures necessary to secure the enforcement or prevent the contravention of its laws relating to security, immigration, health, sanitation, customs or other revenue matters.
- Exclusive Economic Zone (EEZ) extends to a distance of 200 nautical miles from the baseline. Within this zone Sri Lanka asserts, among others, sovereign rights to explore, exploit, conserve and manage natural resources, both living and non-living and, exclusive rights to authorize regulate and control scientific research. The area enclosed by the EEZ is reported as 517,000 km<sup>2</sup>, which is 7.8 times the total land area of the country.

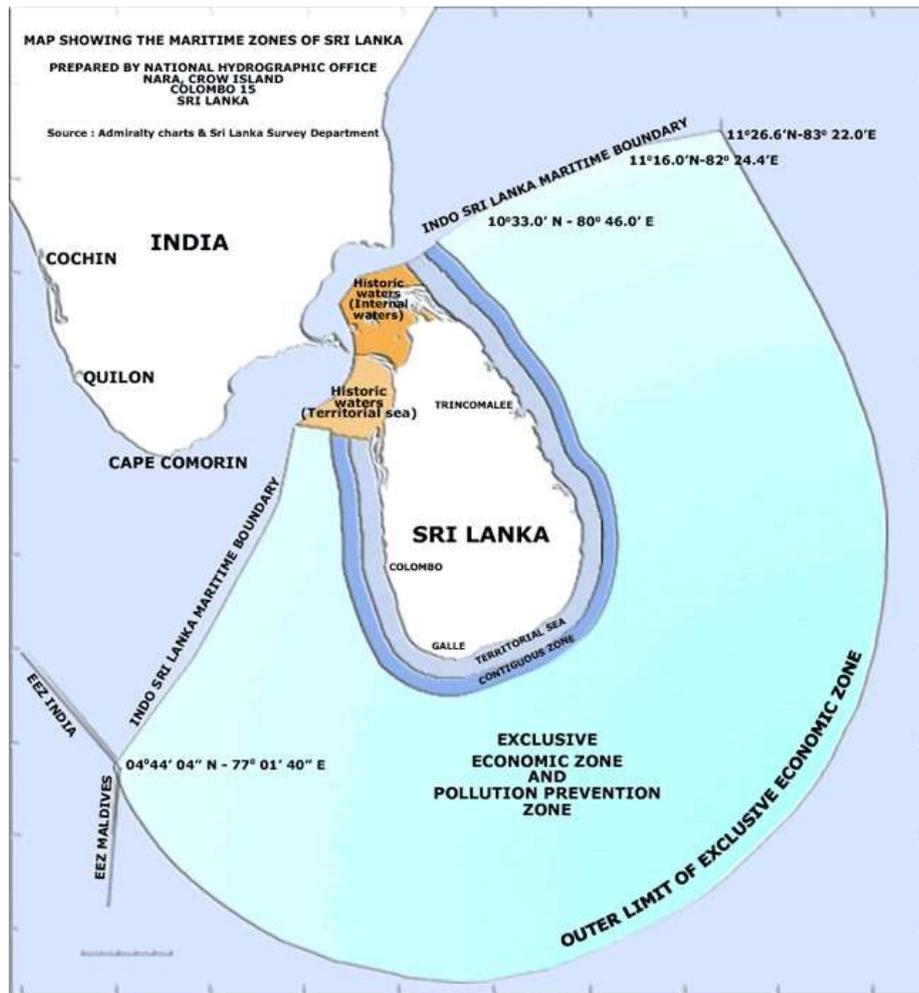


Figure 2.5 Map of Sri Lanka showing the 200 mile Exclusive Economic Zone

Sri Lanka's only international border is its maritime boundary with India. In the north western quadrant of Sri Lanka the EEZ and other areas of maritime jurisdiction adjoin those of India and as a result are restricted to narrower zones than around the rest of the island.

The establishment of EEZs by Sri Lanka and other countries of the region led to Sri Lanka losing access to the Wadge Bank after 1979, as well as to one third of the Pedro Bank, and some areas to the north of it. These areas, which are now in Indian waters, were the only grounds in Sri Lanka known to be suitable for the use of large trawlers.

The country can also claim an extensive but yet to be determined additional extent of seabed area under the United Nations Convention on Law of the Sea. The total area including the EEZ is suspected to be 23 times larger than the total land area and can be used for exploration and exploitation of minerals and hydrocarbon resources.

Sri Lanka's *coastal zone* is defined in the Coast Conservation Act No. 57 of 1981 as "that area lying within a limit of three hundred metres landwards of the Mean High Water line and a limit of 2 km seawards of the Mean Low water line and in the case of rivers, streams, lagoons, or any other body of water connected to the sea either permanently or periodically, the landward boundary shall extend to a limit of 2 km measured perpendicularly to the straight baseline drawn between the natural

entrance points thereof and shall include the waters of such rivers, streams and lagoons or any other body of water so connected to the sea” (Figure 2.6). The area defined for management purposes as the coastal region comprises all of the 74 administrative divisions (Divisional Secretary) with a coastal boundary.

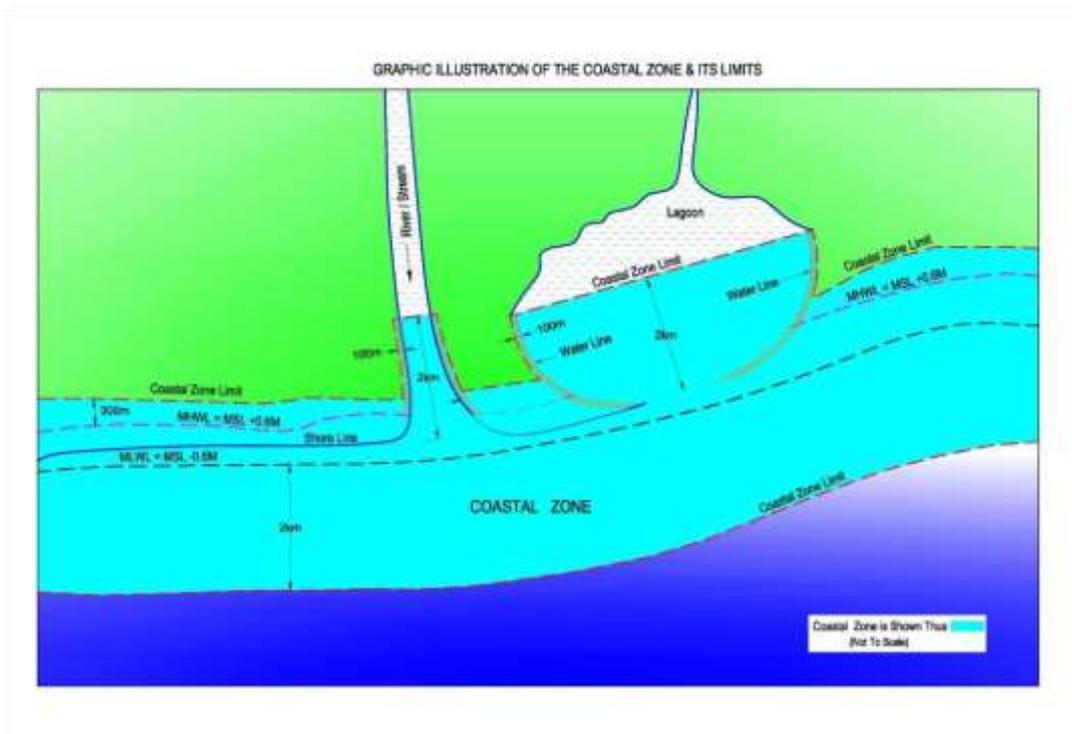


Figure 2.6. Coastal zone as per the Coast Conservation Amendment Act No. 49 of 2011

**Coral reefs** in Sri Lanka are categorized into three habitat types. They are: (a) true coral reefs consisting of live corals as well as calcareous substances, (b) sandstone reefs, and (c) rocky reefs. The latter two reef types may also be covered by corals in varying degree. All three habitats are distinctly different, but may be found mixed together.

As per the condition of the reef, mainly combined with substrate cover, diversity and abundance of reef organism; indicate that best reefs are associated with the barrier type reefs located offshore. These reefs are found mainly in Northwestern; Southeastern and Eastern waters. Most extensive coral reefs in Sri Lanka are the patchy coral reefs in the northwestern coastal and offshore waters, occurring within the Gulf of Mannar and west of the Kalpitiya peninsula. Patchy coral reefs have also been recorded in the western and eastern coastal areas of the island at a distance of about 15-20 km from the shore, at an average depth of 20 m. The southwestern, eastern and northern coasts also contain fringing coral reefs adjacent to the shore, growing from the sea floor usually on a nucleus of rock. It has been estimated that about 2% of the coastline contains fringing coral reefs. Hikkaduwa, Unawatuna and Rumassala are some of the main fringing reefs along the southwestern coast and Passikudah is one of the known fringing reefs in the eastern coast. Coral reefs also occur around the Jaffna Peninsula - mainly around the small coastal islets, but they are not extensively developed. Barrier coral reefs, consisting of ridges of coral lying some distance from the shore, parallel with it, and forming a broad 'reef lagoon', are rare in Sri Lanka but some are found at Vankalai and

Silavathurai. Sandstone reefs are widespread along the coast. Many of these are located along the bathymetric contours of the continental shelf. Rocky reefs occur from south of Colombo in the west coast to the southern areas of the Trincomalee District in the northeast.

The coral cover in the reefs located in the southern part of the island is extremely low when compared to the reefs located in the eastern and the northern part mainly due to the external impacts. Bottom set netting, stepping, dynamiting, coir industry, glass bottom boat manoeuvring, destructive fisheries activities and excess sediment and fresh water influx are the major causes responsible for the degraded situation in the southern coast. However, current information revealed that the live coral cover at Hikkaduwa National Park had increased from 12% in 2005 to 26% in 2007 mainly due to rapid settlement and growth of *Pocillopora damicornis* which had risen from 6% of the total live coral cover in 2004 to 35% in 2007. It is also reported that the present cover of *Acropora* was only 0.6% due to high level of sedimentation. The live coral cover at Kapparatota also decreased from 52% in 2004 to 22% in 2006. As per the current information it was reported that live coral cover at Polhena is confined to 21.2% while 6.45 % at Madiha due to anthropogenic activities such as coconut retting, ornamental fish collection and reef walking.

The current information revealed that the coral reefs located in the Northern and the Eastern part of the country are in better condition with compared to the southern part of the country. It was reported that live coral cover at Punkudativu and Mandativu island in the Jaffna peninsula was 45% with 29% of limestone substrate. The condition of the coral reef in Dutch Bay in Trincomalee is reported as relatively in good condition and constitute with branching *Acropora spp.*, foliose *Montipora* and *Echinopora lamellose*. According to the previous monitoring reports, the live coral cover of this reef was 52% and 20% coral rubble. As a result of 2004 tsunami, the reef sustained extensive damages and currently supports 38.8% live hard corals with 40.23% rubble cover. The shallow coral reef at Pigeon Island in Trincomalee is dominated by branching and tabulate *Acropora spp* and no damages were reported due to 2004 tsunami. Thus, the live coral cover of 54.38% in 2003 has been increased up to 74.25% by 2005. According to the monitoring studies carried out by National Aquatic Resources and Research Development Agency, the live hard coral cover has increased from 40% in 2004 to 70% in early 2007 in the Bar Reef Marine sanctuary at Kalpitiya. This increase is mainly due to rapid growth of *Acropora cytherea* that constitutes more than 75% of the live hard corals.

Sri Lanka's coastal waters have extensive *sea grass beds*, often occurring in association with coral reef ecosystems or in estuaries and lagoons. They are particularly found in the basin estuaries and lagoons of Puttalam, Mundal, Negombo, Mawella, Rekawa, Koggala, Kokilai, Jaffna and Batticaloa. A total of 16 sea grass species belonging to 10 genera have been reported from Puttalam Negombo, Mundal and Rekawa lagoons. Extensive seagrass beds have been reported from the Dutch bay (in Kalpitiya) to the western end of the Jaffna Peninsula, and from Mannar to the northwest across the Palk Bay and to Rameswaram Island on the Indian coast. However, the distribution of sea grasses along the coast from north east to south east is limited and no records are available. Thus, it is difficult to get a clear picture of total composition and distribution of sea grasses in coastal zone of Sri Lanka. However, in 2008 the extent of sea grass beds in Sri Lanka has been reported as 23,819 ha.

Sea grasses, the marine angiosperms, are among the most productive submerged eco-system. They serve as a source of energy for a complex food web, provide habitats for endangered dugong (Dugong dugong) and other aquatic organisms including epiphytes to consolidate sediment, produce detritus, and area source of dissolved and particulate organic carbon for the aquatic food webs. In addition, they also serve as nursery functions for a large number of fish, crustaceans and bivalves that use these habitats as a refuge, particularly in the larval stage of their life cycles that are vulnerable to sudden environmental changes and susceptibility to predation. In Sri Lanka Bristle worms (Polychaetes) are

harvested from sea grass beds as brood stock for feed aquaculture. In addition to temperature, light and nutrients, sheltered zone with substrate constitute with sand mud and dead, are corals ideal for dense growth of sea grasses that are rich in species diversity. Sea grass also act as filters for coastal waters and stabilizes the floor of the coastal seas, In addition sea grass absorb carbon dioxide from the ocean when they photosynthesize.

Sea grass beds are subjected to various threats due to anthropogenic activities such as destructive fishing practices, collection of invertebrates or shellfish harvesting, construction of physical structures, altering tidal influx, intrusion of agro-chemicals, emergence of macroalgal stands, regulation of water inflows, effluent discharges from shrimp farms and solid waste disposal.

Sri Lanka's coastline is characterized by a series of *estuaries and lagoons* which are transitional ecosystems of diverse tropic statuses, scenic beauties, rich rare and endemic species, aquatic biodiversity and ecosystem productivity. They are complex socio-ecological systems containing a diversity of species and a variety of coastal habitats including, mangroves, salt marshes, seagrass beds and mud flats. The heterogeneous nature and complexities of lagoons and estuaries are primarily determined by geomorphology, climate and weather, tidal fluxes and fluvial inputs and cohesive interactions with land based activities. By and large, the range of ecosystem services provided by the lagoons and estuaries are undervalued and their multiple use and benefits have not been adequately taken into consideration policy formulation and decision making process. Beside the primary features, the knowledge of the ecological significance of the lagoon and estuaries are negligible. A total of 82 lagoons with a shoreline (perimeter) of 2791 km are located in the coastal region and considered to be highly productive and contained economic value associated with biological production of aquatic and semiaquatic habitat and mangrove vegetation. Meaningful approach to management of barrier built estuaries and lagoons must combine bio-physical, socio-economic and political considerations. Therefore, estuaries and lagoons are regarded as Socio-Ecological Systems.

There are two different types of estuaries; Riverine estuaries where the rivers or streams discharge directly into the sea through relatively narrow channels (e.g. the Kelani Ganga, Maha Oya, Kalu Ganga and Nilwala Ganga estuaries), and barrier built basin estuaries where the river or stream first discharges into a relatively shallow basin before entering the sea (e.g. Puttalam, Negombo, Jaffna, Batticaloa estuaries). In some places riverine estuaries open into a bay that opens to the sea (e.g. the Kala Oya riverine estuary opens to Dutch Bay; the Mahaweli estuary opens to Koddiyar and Thambalagam Bays, and the Polatu Modara estuary to Weligam Bay). Overall, there are 45 estuaries of which 28 are of the riverine type and 17 of the basin type. The total extent of basin estuaries in the country amounts to 90,965ha (basin area only), and riverine estuaries cover about 2,110 ha. There are around 89 lagoons ranging from 3 ha to 7,589 ha in extent, of which 8 cover more than 1,000ha each. Total extent of lagoons amounts to about 36,000 ha. Lagoons are more abundant along the north, south, southeastern and eastern coasts where the littoral drift causes an accumulation of sand to form barriers and spits at river mouths through which the freshwater discharge is low.

*Salt marshes* are found close to the landward margin of the intertidal zone where the soil salinity is relatively high due to insufficient fresh water supply to flush out the accumulated salts. Salt marshes consist of herbaceous, salt resistant plants growing in sandy or mud tidal flats in arid areas and are periodically inundated by the sea. The existing information revealed that there are around 27,520 ha of salt marshes in the country. Extensive salt marshes also occur in the Mannar area (mainly on tidal flats and containing about 56 species of marsh vegetation) in the coastal belt from Mantai to Vankalai. Patchy salt marshes also occur mainly in sedimented lagoon/estuarine areas such as Hambantota, Puttalam, Kalpitiya and Mundel.

**Mangroves** are highly productive but extremely vulnerable ecosystems confined to intertidal zones of coastal environment including lagoons. Sri Lanka's mangrove areas amounted to about 15,669 ha in extent in 2013. As per the estimates prepared in 2014 using Global Information System (GIS) and remote sensing, the extent of mangrove areas is about 11,656 ha. Sri Lanka's tidal variation being low and rarely exceeding 75 cm, mangroves generally occur as a narrow belt in inter-tidal areas of lagoons, estuaries or associated islands and river mouths. However, they do not occur in all inter-tidal areas and are confined to areas with low wave action. Although mangroves rarely extend beyond 1km landwards from the mean low water tidal level they may spread up-river to the upper limit of brackish water intrusion in some riverine estuaries, even up to a distance of 20 km (e.g. Galatara in the Kalutara district). In addition to the tacit value and environmental services rendered by mangroves, it supports the depending communities by providing fish resources, fuel wood, building materials and dyes for coloration of fish nets. Mangroves serve to reduce the effects of floods while functioning as filters to sift out pollutants that reach the coastal area from inland and trap sediments. It is also important in carbon sequestration.

Sri Lanka's wide and sandy beaches along much of the 1620 km coastline are famed for their scenic beauty and support a distinct littoral fauna and flora. Beaches have been formed by accumulation of sediment deposited on the shore. Among them, barrier beaches, spits and dunes are the most delicate and vulnerable due to their changing nature.

The major mangrove areas in Sri Lanka are located around Jaffna, Vadamarachchi (Thondamanar) lagoons, Nanthikadal lagoons in North coast Kokilai, Nayar, Trincomalee, Kathiraveli, Upparu Lagoon, Valachchenai, Batticaloa Lagoon, Pothuvil in Eastern coast, Weligama, Gintota, Balapitiya, Bentota in Southern coast, and Panadura estuary, Negombo and Chilaw lagoons, Mundal lake, Puttalam lagoon, Dutch bay, Portugal bay and Mannar in Western and North western coast. According to Amarasinghe (1986), 29 mangrove species are found in Sri Lanka.

**Barrier beaches** are accumulations of unconsolidated sediments transported ashore by waves and moulded into a form that lies across a body of water, isolating it from the sea. Coastal areas around the island contain barrier beaches that isolate lagoons and swamps from the sea (e.g. the beaches at Rekawa, Kosgoda, and Panama). Barrier beaches are found mainly between Bentota and Balapitiya on the southwest coast. Along the southern coast there is a barrier beach at Weligam Bay, and several between Dondra and Ambalantota. Thambalagam Bay, a westward embayment of Koddigar Bay, is almost entirely cut off as a barrier beach which gets partially breached during the northeast monsoon. Some barrier beaches are free at both ends and form islands (e.g. at Karaitivu).

**Spits** are incipient barrier beaches that project from the shore in the direction of the dominant drift and are free at one end. Spits are frequently observed along the western and eastern coasts of the country and are associated with estuaries. Examples are the shoal that builds seasonally at the mouth of the Negombo estuary and the sand spit at the Kalu Ganga estuary. Some of the barrier beaches and spits have extensive dunes associated with them as seen at Kalpitiya. Most spits appear to be unstable, especially those which protrude into estuaries (e.g. the Kalu Ganga spit). Consequently, they shift position from time to time, causing changes in the form and precise location of the inlets of estuaries. For example, the inlet of the Batticaloa estuary has shifted northward to its present position from a previous location 5 km to the south. Some spits are formed seasonally at estuarine inlets and tend to obstruct the natural water flow patterns, often resulting in the inundation of low-lying lands (e.g. the Kalu Ganga and Maha Oya estuaries).

**Sand Dunes** are wind-blown accumulation of sand which are distinctive from adjacent land forms such as beaches and tidal flats mainly due to the fact that dunes do not get the effects of tides. Coastal dunes are unique terrestrial ecosystem located in the transition zone between the ocean and the

continent. These habitats are naturally dynamic. Therefore, highly fragile and vulnerable to the impacts of human induced activities. There are three types of dunes that have been identified in the country. They are:

- low, flat to slightly undulating, isolated platforms of sand less than 1m in height (e.g. incipient dunes found at Koggala, Matara, Akurala and Uswetakeiyawa);
- transverse primary dunes, consisting of single fore- dune ridges of undulating sand masses associated with stable beaches, exceeding 5 m in height (e.g. dunes at Mannar, Pooneryn, Kalpitiya and along the southeastern coast).
- secondary transgressive dunes; usually exceeding 3 m in height (e.g. dunes at Mannar, Pooneryn, Kalpitiya and Jaffna); most of which are longitudinal, some are parabolic, and a few are complex in form.

The most prominent sand dunes lie along the northeastern, northwestern and southeastern coasts of Sri Lanka. These extend from Mullaitivu and Point Pedro, Elephant Pass and Chavakachcheri across Mannar Island towards Kalpitiya and Ambakandawila. On the southeast, they extend from Ambalantota (Godawaya) in the Hambantota district to Sangamankande Point in the Ampara district. The latter is identified as the longest stretch of dunes in the world, close to the equator. Sand dunes in Sri Lanka are essential components of the coastal vistas and bio-diversity. The materials in sand dunes protect the land behind them from storm erosion and potential sea level rise. Dune vegetation also traps sand and prevent it from being blown further inland. When there are storm surges and waves, sand dunes prevent flooding inland. According to prevailing information, intact sand dunes were the most effective barrier against tsunami waves that affected the coastal region of Sri Lanka in 2004.

#### 3.1.4 Minerals

Minerals and rocks in Sri Lanka can be classified under several categories of economic geology. Economic minerals are classified into four major groups: energy minerals, the ferrous and ferro-alloy group, the non-ferrous group and the non-metallic group. Energy minerals, uranium, uranite, thorite (the silicate of thorium), thorianite (the oxide of thorium) and monazite have been found in Sri Lanka.

Magnetite, hematite and iron oxides are the most common minerals found in the island and the recently found magnetite-hematite deposit at Wellawaya is one of the best ferrous and ferroalloy mineral deposits in Sri Lanka. Forty per cent of the copper-magnetite deposit at Seruwawila is considered as iron while 2 per cent is estimated as copper. Sri Lankan beaches are rich with mineral sands such as ilmenite, rutile, monazite, zircon, garnet and silica. The largest deposit of mineral sands (ilmenite, rutile and zircon) is found in Pulmoddai. The silica sand deposit at Madampe and Naththandiya is used for the glass industry. Non-metallic minerals such as feldspar, gems, apatite, graphite, mica, quartz and halite are widely excavated. Three main types of clays (kaolinite, ball clay and brick clay) are used to produce domestic and export goods. Further, graphite in Sri Lanka is of high purity in carbon (99 per cent), which occurs as massive veins in rocks. Major mines are in Kahatagaha-Kolongaha and Bogala. The Eppawala apatite deposit has been estimated at 40 million tonnes of phosphate. However, this phosphate has a very low water solubility and a concern of many chemists and geologists has been finding a method to increase its water solubility. Silica rich (100%) high-quality quartzite is found in many places of Sri Lanka, such as Galaha, Wellawaya, Ambalamana and Akarella. Mining vein quartz produces a lot of weather-resistant waste material.

The recovery of gems in Sri Lanka has over 2,000 years of history. Sri Lanka has long been recognized for varieties of corundum, chrysoberyl, spinel, garnets, beryl, tourmaline and zircons. Sri Lanka is the

largest producer of gem varieties per square kilometer in the world. The gem trade accounts for nearly 60% of the five mineral-based, foreign-exchange earning industries of Sri Lanka.

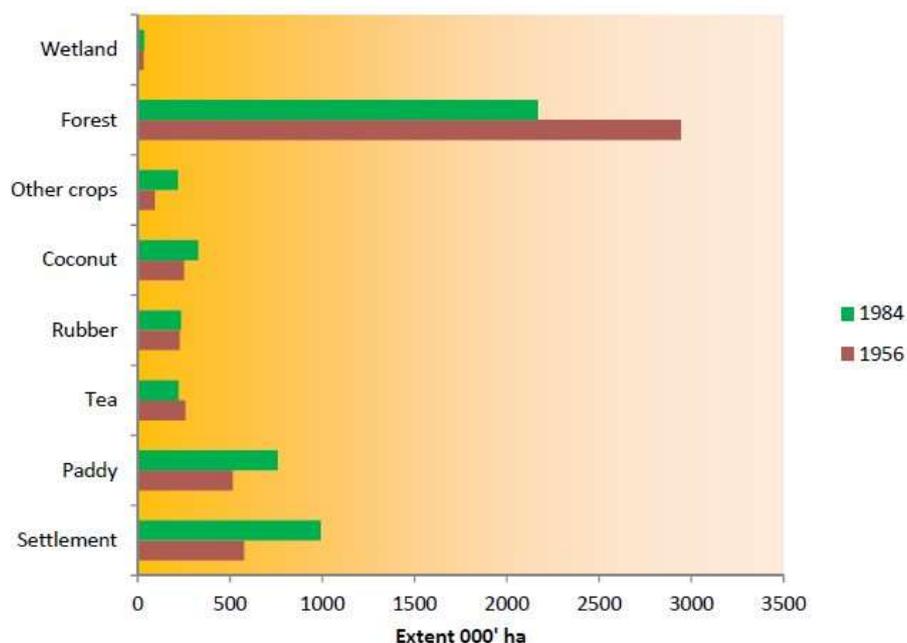
### 3.1.5 Land resources

**Land tenure.** During the last few decades, natural disasters have been on the increase because of improper land uses in Sri Lanka. For example, human settlement and cultivation of annual crops on steeply sloping lands have resulted in rapid soil erosion, landslides and the silting of rivers, waterways and reservoirs, thereby reducing their capacity and causing floods. Furthermore, the productivity of fertile lands has been reduced due to improper land use. According to the available statistics nearly 44% of agricultural lands have been subject to land degradation.

There is also a significant imbalance between the ownership and tenure patterns of land. There are a large number of fragmented agricultural lands small in size and generally unproductive. Similarly, there is a large extent of agricultural land in plantations areas, a significant proportion of which is underutilized.

In Sri Lanka, 82.25 percent of the country’s land is owned by the State while only 17.75 percent is privately owned, reflecting a history of centralized control over land. Records from as early as 500 B.C. document land allocation by the Kings while successive colonial governments (Portuguese (1505 – 1656), Dutch (1656 – 1796), and British (1796 – 1948)) asserted their control over land while instituting land ordinances and centralized administration systems.

**Land use.** Sri Lanka is one of the most densely populated countries in the world, and therefore much of the land has been put into productive use. There is limited information to assess the spatial and land use changes that have taken place due to incompatibility of available data. Figure 2.7, based on forest cover assessments, provides gross evidence that forests are the major land use type lost between 1956-1984. It also suggests that the combined increase in area under paddy, settlements and other crops, which can be considered as the major outcome of land settlement and irrigation development, is a compatible gross match with the loss of forest cover. Land use categories in Sri Lanka is provided in Table 2.1.



*Figure 2.7 Land use changes (1956-1984)*

Table 2.1 below shows how land is used throughout the country based on data from Survey Department in 2015.

*Table 2.1 Land use in Sri Lanka*

Land Type	Land Use	Hectares (Year 2000)	% Area
Urban Land	Urban Land/Settlement	27,830	0.40%
Agriculture	Homesteads (associated non-agricultural land)	943,495	14.40%
	Horticulture Plantation	1,779,245	27.10%
Crop Land	Paddy	912,927	13.90%
	Other Crop Land	176,218	2.70%
Forest Land	Dense Forest	1,070,555	16.30%
	Open Forest	439,050	6.70%
	Forest Plantation	93,910	1.40%
Range Land	Scrub land	590,180	9.00%
	Grass land	97,274	1.50%
	Wetland	55,698	0.80%
	Barren Land	93,810	1.40%
	Water	285,778	4.40%
	Unclassified	124	0%
<b>Total</b>		<b>6,566,094</b>	<b>100 %</b>

A multitude of policies and legislations concerning land resources management exists in the country. Among others, laws and regulations connected to alienation and management of state land has had a significant catalytic effect on deforestation and degradation processes in Sri Lanka. These have significant implications on major proximate drivers in operation, namely, encroachments, infrastructure development projects and private agriculture ventures. All successive governments have followed a policy of periodic regularization of encroachments. The encroached lands were usually unutilized state land, often forested. The permissive policy of regularization of encroachments is therefore a catalyst, and has provided a clear encouragement to encroachers to continue with the expectation that one day the encroached property would be theirs legally.

Poor implementation of existing land use policies has created catalytic conditions for deforestation and forest degradation. This is particularly important in the cases of large government projects for infrastructure development, private sector agriculture and tourism ventures. The country has a number of agencies with some mandate connected to the land use planning. The major institutions are Land Use Policy Planning Department, National Physical Planning Department, Urban

Development Authority and Mahaweli Development Authority. It seems their activities are not fully coordinated or connected through an overall planning framework. As a result, agencies with different sectoral mandates (e.g. forestry, agriculture, infrastructure development) do not have a common guide or framework of reference concerning decisions on land use. For instance, agriculture policy of government promotes expansion of agricultural lands. Given the growing scarcity of land, such expansions could only come at the expense of existing natural forests. Role of land use planning and policy is to harmonize such competing claims so that sustainable solutions can be found.

Liberal economic reforms introduced since 1977 have progressively connected rural economies to the global and domestic markets. The process of commercialization was accelerated recently due to: (a) growing market opportunities for local agricultural products such as offering forward contract arrangements for maize; and (b) development of marketing facilities (e.g. the

Economic Centre in Dambulla) for channeling rural agricultural products to urban markets. Such developments enhanced the market access for agricultural products that had earlier been produced for household consumption. According to farmers in dry zone villages, supply side facilitation for entry to the commercial stream brought several changes to traditional farming systems. One major change occurred the 1990s is the rapid spread of rain-fed commercial farming of maize in the *Maha* season. This accelerated deforestation in dry zone villages significantly, as surrounding forest lands were encroached for commercial cultivation of maize.

Adoption of technological innovations significantly increased the farmers' capacity to expand the area of cultivation within a short period of time. Use of hybrid seeds and adoption of land preparation machinery have played a significant role here. These factors seem to have had a cumulative impact on transforming the traditional farming system in the dry zone to a commercial system. Commercialization and adoption of technological innovations has provided a clear direction for farmers to face resource scarcities by intensifying the production of cash crops to meet the market demand. Overall, the net effect of all key factors has pushed the traditional farming system towards a commercially oriented direction. This has invariably accelerated the deforestation process.

According to Census and Statistics data of 2015, overall cultivate extent was 2,196,306ha. Highest cultivation extent was coming from paddy cultivation that covers 1,253,288ha, followed by coconut (394,836ha), tea (221,969ha), and rubber (143,137ha). Other significant crops such as maize, pepper, and cinnamon remained below 70,000ha each.

**Forest land.** In Sri Lanka forests cover approximately 29.7% (1.95m ha) of the land area, with dense forest amounting to 21.88% (1.44m ha). Eighty-six percent of the natural forest is located in the dry and intermediate zones of the country, and these areas contain about 85% of the closed canopy forests and 90% of the sparse (open) forests in Sri Lanka. The total area of dense natural forests in the country is 1.44 million ha of which 167,000 ha are identified as primary forest, while the remaining area is categorized as naturally regenerated forests. Approximately 79,941 ha are identified as plantation forests, including coconut and rubber plantations. Table 2.2 reveals the relatively low proportion of primary forest compared to regenerating forest. These primary forests, most important from a biodiversity perspective, are conserved within protected areas. Furthermore, the extent of plantations, while significant, does not indicate widespread conversion

Forest cover in Sri Lanka has declined sharply over the past century as evidenced in a number of studies. Early forest inventories suggest that Sri Lanka's closed canopy (dense) forest cover declined from about 84% of the land area in 1881, to 44% in 1956 and to 31.2% in 1992. It further declined to 29.6% in 1996. A district-level analysis suggests that closed canopy forest cover increased in recent years but the accuracy of this data is unclear. The Forest Resource Assessment indicates that the trend

in forest cover loss has considerably slowed down during the recent past but is still continuing and now increasing.

Findings of a recent study on the drivers of deforestation and degradation suggest that current (i.e., from 1992 onwards) drivers of deforestation in Sri Lanka result from four major proximate drivers including encroachment, infrastructure development projects, large scale private agriculture ventures, and localized drivers of forest degradation scattered around the country. The study also concluded that:

- Overall, the process of deforestation has slowed down all over Sri Lanka. The current rate of deforestation (7,147 ha/year) has dropped significantly compared with the earlier rate reported in the period 1956 - 1984 (42,200 ha/year).
- Even if five hotspots of deforestation have been identified, deforestation also appears to be more scattered and widespread all over the country.
- Deforestation still takes place at a higher rate in the dry zone compared to the wet zone.

As seen on the forest cover map of 2010 (Figure 2.7), what remains of forest cover is highly fragmented, making protection and management challenging. Furthermore, the level of forest degradation has not been clearly assessed. Moreover, regions in the north and east are rapidly changing since the end of the civil war.

For the most part, natural forests in Sri Lanka are owned, managed and protected by the State Forest Department (FD) or the Department of Wildlife Conservation (DWC), which account for approximately 1,767,000 hectares of the total forest estate, equivalent to over 26.5% of the total land area of Sri Lanka (Figure 2.8). Forest resources owned privately or by other parties are negligible in relation to State-controlled forests, but may nevertheless be a significant part of the national Reducing Emissions From Deforestation and Forest Degradation Plus strategy. Much of the State-owned forestland controlled by the FD and the DWC are designated protected areas<sup>4</sup> falling within a number of sub-categories as follows:

In terms of administration, State forests are tightly controlled. In the case of the FD, staff are assigned to 23 forest divisions that are divided into more than 300 ranges, which are further divided into beats. In the case of the DWC, the island is divided administratively into 12 regions.

In addition, a new category of protected area is administrated by the CEA. These are known as Environmental Protection Areas (EPAs) and are gazetted under the provisions of sections 24C and 24D of the National Environmental Act No. 47 (1980). There are currently eight EPAs detailed in table 7 below and four more are proposed.

Scattered along Sri Lanka's coastline are important mangrove forests that cover 15,669 hectares. These areas are under the authority of the FD, though the Coast Conservation Department's role in overall management in coastal regions is complementary. In the 1990s, mangrove forests were destroyed and converted to areas for shrimp aquaculture. However, the shrimp farming industry failed, and these areas have been abandoned. There could be potential to rehabilitate these areas and replant mangroves; however, one barrier is the long-term leases (99 years) which some of the aquaculture companies still possess. In May 2015, Sri Lanka announced the Sri Lanka Mangrove Conservation Project, a joint program with foreign and domestic non-governmental organizations' support to protect all of the country's remaining mangroves through demarcation, gazettement, legal protection, and enforcement.

**Other forest land and tree tenure.** Outside the forest lands owned and controlled by the FD, DWC, and CEA which are mentioned above, there are a number of other types of forest land in Sri Lanka, as described here briefly.

**Forest Plantations and Woodlots.** A number of different entities own forest plantations including State government departments (FD, DWC), State corporations, village collectives, and private plantation owners. Between 1972 and 1975, some 419,100 hectares were nationalized with tea plantations accounting for 39.7%, rubber for 17.8%, coconut for 11.5%, and other land 31%. Most of these lands were vested with two state corporations: the Janatha Estate Development Board and State Plantation Corporation (SPC). Plantations managed by Regional Plantation Companies currently account for approximately 6,000 hectares, while village collectives lease approximately 16,250 hectares of farmers' woodlots.

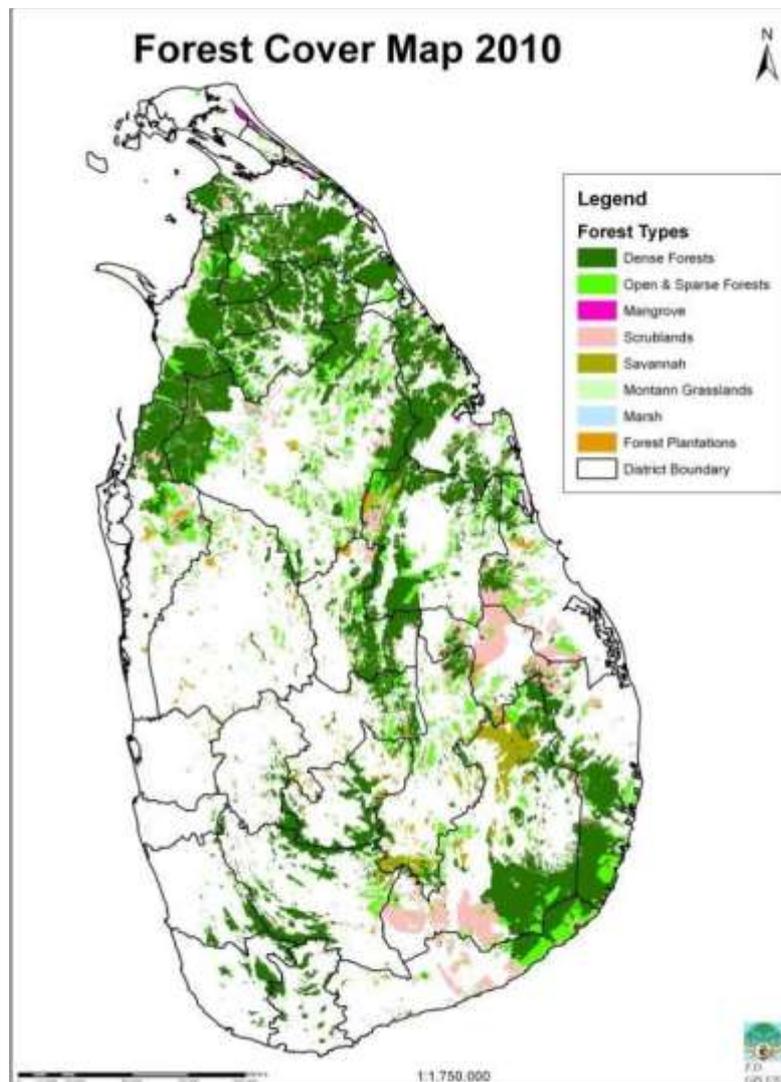


Figure 2.7. Forest cover map of 2010

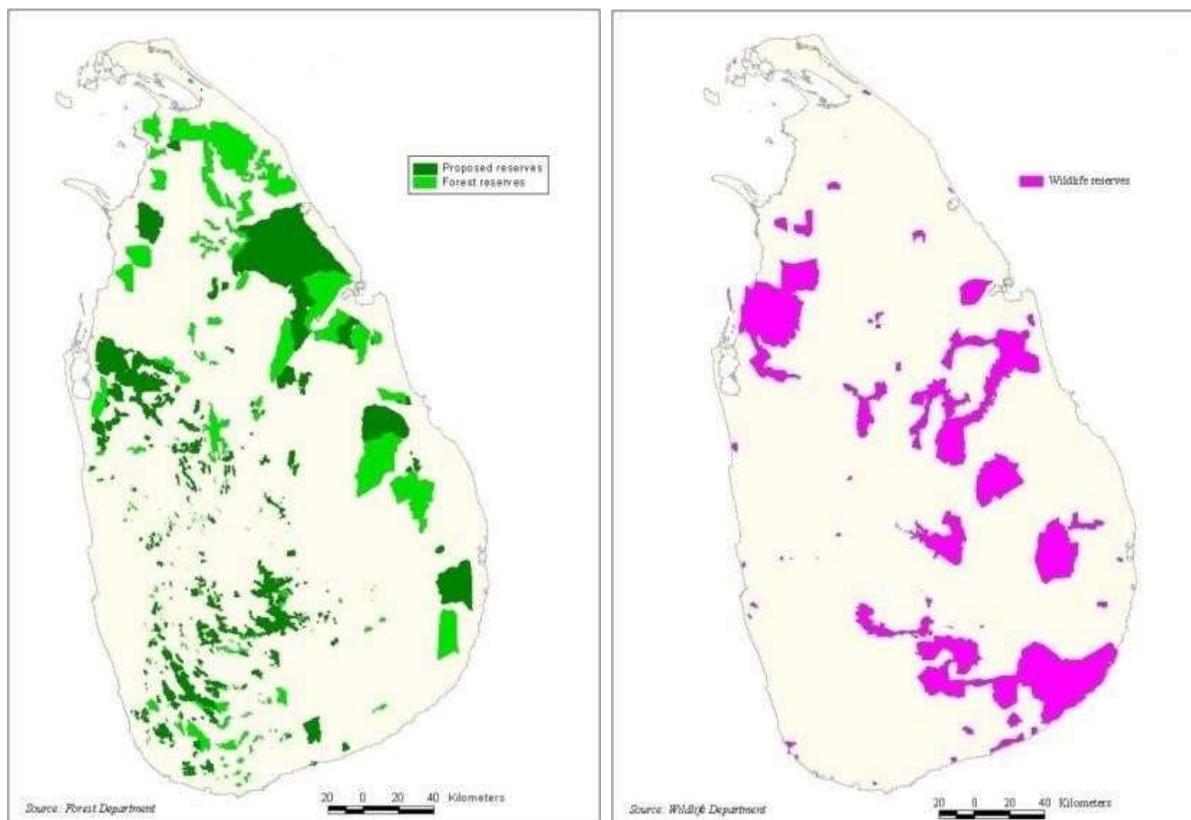


Figure 2.8 Land under the jurisdiction of FD (green) and DWC (purple)

*Home Gardens and Tree Tenure.* Home gardens are widespread throughout Sri Lanka and represent a significant non-forest carbon sink, classified as ‘settlement’ land. Home gardens are said to cover 858,490 hectares, a relatively large area comparable to about half of natural forest cover. Notably, home gardens provide approximately 40 to 60 percent of household fuelwood supply, among other food and medicinal household goods. There are regulations to protect trees within these systems, and village officers are responsible for monitoring. Since home gardens tend to be part of deeded private property, tenure is generally secure.

Throughout Sri Lanka there is a ban on felling trees in natural forests. Even within home gardens there are restrictions on cutting certain species (i.e. jack tree, wal del and female Palmyrha), requiring a permit from the Divisional Secretariat through the Grama Niladhari, and village officers are responsible for enforcing these rules. In this sense, owners of home gardens are subject to some restrictions on the rights over trees on their properties. As mentioned, home gardens are not considered to be part of Sri Lanka’s forest cover. However, they remain potentially important in addressing drivers of deforestation and forest degradation.

*Temple Forests.* Traditionally in Sri Lanka temple lands were given by the King to the community in order to facilitate their provision of goods and services to the temples. Some of the temple lands contain forest areas of significant size and richness, and one source estimated that temple forests may cover as much as 30,000 hectares (in sum) though specific figures are not available.

Over time, the authority over temple lands has shifted from the surrounding community into the hands of the high priest. This concentration of power in the hands of the high priest has left the temple

forests vulnerable to conversion. In one notable case in Soragune) the temple forest has been leased and cleared for a golf course while natural forests on the hillside were converted to rubber. Leasing of temple lands must be approved by the Ministry of Buddhist Affairs, but nevertheless with ‘proper justification’ forests may be converted to other uses. In practice, decisions may be taken by the priest or appointed layman called the Basnayaka Nilame.

### 3.1.6 Biodiversity

The southwestern region of Sri Lanka, encompassing approximately 20,000 km<sup>2</sup>, is the only aseasonal ever wet region in the whole of South Asia. This region is referred to as the wet zone of Sri Lanka and receives up to 3,000 mm of rainfall annually. Wet-zone of Sri Lanka along with the Western Ghats of India is designated as one of the world’s biodiversity hotspots, in demand of extensive conservation investment. This high biodiversity seen in Sri Lanka can be attributed to a wide variety of climatic, topographic and soil conditions that exist in the island that has resulted in a diverse array of aquatic and terrestrial habitats.

Sri Lanka was part of the ancient Gondwanaland and was located adjacent to the African continent. Around 160 million years ago, the Deccan plate which comprised of India and Sri Lanka, broke away from the Gondwanaland, drifted northwards and collided with the Asian plate around 55 million years ago. Thereafter, Sri Lanka separated from India due to submersion of the land bridge between the two countries about 20 million years ago. These zoogeographic, climatic, topographic and edaphic factors have shaped the faunal and floral assemblage seen in Sri Lanka. During the last 2 to 3 thousand years land-use changes brought about by humans have been instrumental in large scale habitat changes that have had both positive and negative influences on Sri Lanka’s flora and fauna.

Sri Lanka’s biodiversity is significantly important both in a regional and global scale. Sri Lanka has the highest species density (number of species present per 10,000sq. km) for flowering plants, amphibians, reptiles, and mammals in the Asian region. The currently recognized statistics of the major plant and animal taxa treated in this book are given in Table 2.2. However, it should be noted that there are many other taxonomic groups in Sri Lanka that are excluded from this table due to lack of clear data on their current status.

Even though the above table indicates that Sri Lanka is endowed with a rich biodiversity, at present only a small fraction of Sri Lanka’s biodiversity is known to science. For instance, higher plants and vertebrates are the only taxa that have been studied in sufficient detail to date.

Lower plants and invertebrates are largely neglected except for few selected groups such as butterflies, dragonflies, land snails, pteridophytes and algae. Even the vertebrates and, for that matter, higher plants are not completely listed, as during the last two decade alone large number of new species have been discovered (Table 2.3).

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*Table 2.3 Species richness of selected faunal and floral groups of Sri Lanka.*

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<b>Taxonomic Group</b>	<b>Number of Species</b>	<b>Number of Endemic Species</b>
Angiosperms	3,154	894
Gymnosperms	2	0
Pteridophytes	336	49

<b>Taxonomic Group</b>	<b>Number of Species</b>	<b>Number of Endemic Species</b>
Soft corals	35	
Hard corals	208	
Spiders	501	256
Centipedes	19	
Marine crustaceans	742	
Fresh water crabs	51	50
Dragonflies	118	47
Ants	194	33
Bees	130	
Butterflies	245	26
Leafhoppers	257	
Dung beetles	103	21
Bivalves	287	
Gastropods (marine)	469	
Land snails	253	205
Echinoderms	190	
Marine fish	1377	
Fresh water fish	91	50
Amphibians	111	95
Reptiles	211	125
Resident birds	240	27 + 6 Proposed
Mammals	125	21

The statistics clearly indicate that most of the information available for flora and fauna of Sri Lanka is on higher plants or vertebrates. However, one must keep in mind that higher plants and vertebrates make up only about 3% of all the species described to date while Order Insecta alone make up about 54%. There is no doubt that large number of insect species are awaiting to be discovered in Sri Lanka. It will be rather unfortunate if some of these organisms would perish even before we discover them. Furthermore, so far very little attention has been given to species that inhabit the forest canopy. Studies in Australia and South America have shown that the forest canopy is home to large number of living organisms that will not be detected by the traditional sampling techniques used.

Sri Lanka's exceptional biodiversity is possible due to the high ecosystem diversity it supports on land and in the coastal seas (Table 2.4), and the wealth of plant and animal species they harbour (Tables 2.5 and 2.6). This includes many species that are yet to be discovered. Of note is the remarkably high

percentage of endemic and geographically relict species that are found in the island's forests and wetlands.

*Table 2.4 Ecosystem diversity in Sri Lanka: status and trends*

<b>Ecosystems</b>	<b>Previous data (ha)</b>	<b>Present (ha)</b>
<b>Forest and related ecosystems</b>	<i>(1999 data, FD)</i>	<i>(2010 survey, FD)†</i>
<input type="checkbox"/> tropical wet lowland evergreen forest (includes lowland and mid elevation rain forests)	124,340.8	123,302
<input type="checkbox"/> tropical sub-montane forest	65,792.3	28,513
<input type="checkbox"/> tropical montane forest	3,099.5	44,758
<input type="checkbox"/> tropical moist monsoon forest	221,977.0	117,885
<input type="checkbox"/> tropical dry monsoon (mixed evergreen) forest <sup>†</sup>	1,027,544.1	1,121,392
<input type="checkbox"/> tropical thorn forest	NA	NA
<input type="checkbox"/> riverine dry forest	18,352.1	2,425
<input type="checkbox"/> grasslands (wet pathana, dry pathana, savannah, etc)	>75,000	68,043 (savannah only)
<b>Inland wetland ecosystems</b>	<i>(4th National Report to CBD)</i>	
<input type="checkbox"/> flood plains	NA	NA
<input type="checkbox"/> lentic waters (tanks/reservoirs and ponds)	179,790	*169,941
<input type="checkbox"/> swamps	NA	NA
<input type="checkbox"/> wet villu grasslands	NA	*12,500
<input type="checkbox"/> Overall water bodies	NA	‡ 488,181
<b>Coastal and marine ecosystems</b>	<i>(4th National Report to CBD)</i>	
<input type="checkbox"/> mangroves	6,080	+15,669
<input type="checkbox"/> salt marshes	23,800	NA
<input type="checkbox"/> sand dunes and beaches	19,394	NA
<input type="checkbox"/> mud flats	9,754	NA
<input type="checkbox"/> sea grass beds	NA	NA
<input type="checkbox"/> lagoons and estuaries	158,017	NA
<input type="checkbox"/> coral reefs	NA	68,000
<b>Agricultural ecosystems</b>	<i>(4th National Report to CBD)</i>	
<input type="checkbox"/> paddy lands	525,000	*845,444.00

Ecosystems	Previous data (ha)	Present (ha)
<input type="checkbox"/> fruit cultivations	97,000	‡135,567
<input type="checkbox"/> small crop holdings or other field crops (pulses, sesame etc)	128,000	‡146,544.69
<input type="checkbox"/> vegetable cultivations ( <i>excluding root and tuber crops for 2012</i> )	110,000	‡89,980
<input type="checkbox"/> crop plantations (major export crops)	772,000	‡703682.8
<input type="checkbox"/> minor export crops	NA	‡‡106,232
<input type="checkbox"/> home gardens (cultivated, includes fruit cultivations in home gardens)	367,800	‡1,684,165.60
<input type="checkbox"/> chena lands (slash and burn cultivation)	NA	‡227,710.28

Source: The data for this table are from the following sources except where specifically mentioned: Forest Department 2010 survey data; ‡ AgStats, 2013; \* paddy land extent is Asweddumized land area from the DOA for 2012/13; ‡‡ Data from Department of Export Agriculture, 2014; \*IUCN and CEA, 2006; \*MOE, 2010, \*\*MoENR, 2003.  
Note: The discrepancies between areas given for montane and sub-montane forests in the 1999 and 2010 forest assessments are reportedly due to differences in criteria for separation of these forest types. Accordingly, the area under both montane and sub-montane forests has changed from 68,892 ha in 1999 to 73,271 ha in 2010.

Table 2.5 Species diversity among selected groups of Sri Lanka's fauna and flora in terrestrial and freshwater habitats

Taxonomic group	Number of species		Number of endemic species and % endemism
	4th National Report to CBD	Present	Present
Land snails	246	253	205 (81)
Dragonflies	120	118	47 (39.8)
Bees	148	130	NA
Ants	NA	194	33 (17)
Carabid beetles	525	NA	NA
Butterflies	243	245	26 (10.6)
Spiders	501	510	257 (51)
Freshwater crabs	51	51	50 (98)
Freshwater fish	82	91	50 (54.9)
Amphibians	106 +	111	95 (85.6)
Reptiles (terrestrial)	183	193	124 (58.8)
Birds (including migrants)	482 (220 residents)	453, with 240 residents	27 (11.3) definitive and 8 Proposed
Mammals	91	95	21 (22.1)
Angiosperms	3,771	3,154	894 (28.3)
Pteridophytes (Ferns only)	348	336	49 (14.6)
Mosses ‡	560	560	63+
Liverworts*	303	222	NA

Taxonomic group	Number of species		Number of endemic species and % endemism
	<i>4th National Report to CBD</i>	Present	Present
Lichens*	661	661	NA

*NA= data not available; All data are from BDS/MoE &DNBG (2012) except otherwise mentioned  
Data source for present status: BDS/MoE &DNBG, 2012 except IUCN and MoENR, 2007 for mosses and MoENR 2006 for Liverworts and Lichens*

*Table 2.6 Species diversity among selected groups of fauna in coastal and marine systems*

Taxonomic group	Number of species	
	4th report	present
Hard coral species	183	208
Soft corals	NA	35
Echinoderms	213	NA
Echinoderms (Echinoidea)	NA	55
Echinoderms (Crinoidea, Ophuroidea and Holothuroidea)	NA	135
Marine mollusks	228	NA
Marine shelled bivalves and gastropods	NA	756
Marine crustaceans	NA	742
Sharks	61	64
Skates and Rays	31	33
Marine reptiles	18*	18
Marine mammals	28	30
Marine and brackish water bony fishes	NA	916

While association with Peninsular India and its mega biodiversity for millions of years has resulted in a high species diversity in Sri Lanka, the island's separation in the Miocene about 20 million years ago, has resulted in a remarkable endemism. This is underscored by the fact that 28% of Sri Lanka's 3,154 species of indigenous angiosperm flora are endemic to the country, including 14 endemic genera distributed in 186 families. For example, all 58 species of Dipterocarps found in Sri Lanka are endemic. Similarly, the genus *Syzygium* (Myrtaceae) has 30 indigenous species, of which 25 are endemic, while 26 of the 33 species of *Memecylon* (Melastomataceae) are endemic. The lower plant groups are insufficiently identified, but a high biodiversity and endemism is revealed from past studies. Among aquatic plants, the family Araceae harbors the highest number of endemics including 10 species of the genus *Cryptocoryne* and seven species of *Lagenandra*.

Endemism is also high among the indigenous vertebrates, which without the migrant birds, is about 42%. Highest endemism in vertebrates is seen among amphibians, freshwater fishes and reptiles. Most invertebrate groups in the island have been incompletely surveyed, but a high diversity is documented among butterflies, dragonflies, bees, spiders and land snails.

Biodiversity is also high among marine species such as corals, echinoderms, molluscs and pelagic fishes. Fringing coral reefs with high biodiversity such as those in the southwest and eastern coasts of Sri Lanka and offshore reefs such as the Bar Reef are of high tourism value, while echinoderms such as sea cucumber, molluscs such as squid and cuttlefish, crustaceans such as lobster, crabs, prawns and shrimps, and a host of marine fishes are of major importance in the food fishery in terms of national nutrition and export value.

The global recognition of Sri Lanka's unique biodiversity is demonstrated by the fact that in a land area less than 65,250 km<sup>2</sup>, the country has four forests recognized as Natural World Heritage Sites because of their exceptional biodiversity value due to high endemism, and four Biosphere Reserves (with Core Zones recognized as making significant contribution to national and global biodiversity) within the UNESCO World Network of Biosphere Reserves. Sri Lanka also has six Ramsar wetlands (namely: Bundala National Park, Annaiwilundawa Tanks Sanctuary, Maduganga, Vankalai Sanctuary, Kumana Wetland Cluster and the Wilpattu

Ramsar Wetland Cluster) indicating global importance of the island's wetlands. The Bundala Ramsar site harbours a large number of migrant waterbirds, and four marine turtle species come ashore to its beaches. Thus, biodiversity loss in Sri Lanka will contribute significantly to the loss and degradation of the earth's ecosystem services that underlie human well-being in addition to the national impacts of biodiversity loss.

The areas managed and protected by the FD and the DWC have increased from 2008 to 2010 (Table 2.7). The moratorium on logging in all natural forests which came into force in 1990 is continuing. Hence, commercial timber extraction is prohibited from all natural forests in Sri Lanka. The extent of Conservation Forests set aside for strict conservation has increased over the years with more valuable wet zone forests being added to the Protected Area Network based on the biodiversity assessments made through the National Conservation Review.<sup>1</sup> Fifteen mangrove sites have also been protected by the Forest Department along the southwest and north-west coast. There has also been a perceptible increase in the Protected Area extent under the Department of Wildlife Conservation. However, management of all Protected Areas do not always meet the required standards, particularly the forest reserves that are not set aside for strict conservation and the wildlife sanctuaries, due to limitations of staff and other resources in the agencies responsible for conservation of these areas. This is compounded in recent years by poor coordination between agencies concerned directly with development and conservation. Eight (08) Environmental Protection Areas have been gazetted by the CEA under the National Environmental Act. They are Gregory's Lake, Thalagama Lake, Bolgoda, Walauwatte–Wathurana, Muthurajawela (buffer zone), private lands within the Knuckles Conservation Forest boundary, Hantane and Maragala. Although they do not have strict legal protection, only identified development activities are allowed in them by the CEA as specified in the National Environmental Act. The CEA, however, does not have adequate mandate to monitor these areas to see that developers adhere to the conditions that need to be followed during development.

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<sup>1</sup> This assessment of natural forests >200 ha (1992 – 1996) occurred in all parts of the country except in areas inaccessible due to the war prevailing at that time (IUCN/WCMC/FAO (1997).

*Table 2.6 number and extent of protected areas administered by the Forest Department and the Department of Wildlife Conservation*

Protected Area category	Area under each category (ha)	
	4th NR (ha)	2010 (ha)
Forests under the Forest Department (FD)*		
National Heritage Wilderness Area (also a World Heritage Area) [N=1]	11,187	11,427
Conservation Forests* [2008 = 33, now N=75]	76,227	118,758.7
Other Reserved Forests [now N=371]	NA	1,044,008.5
Forest Plantations	72,350 (in 2001)	75,556.7 (in 2014)
Mangroves (now N=15)	2,163	1153.1
<b>Forests under the Department of Wildlife Conservation (DWLC)*</b>		
National Parks (2008=14, now = 22)	495,984	535,182
Nature Reserves (2008=4, now = 5)	32,581	64,585
Sanctuaries (2008=63, now =65)	262,156	376,943
Strict Natural Reserves (3)	31,573	31,574
Jungle Corridors (Kaudulla- Minneriya) (1)	10,360	8,777

The extent (proposed and implemented) as Biosphere Reserves has increased (Table 2.7) with the identification of Transition Zones for the Sinharaja and Hurulu Biosphere Reserves where people live and lead normal lives and demonstrate sustainable livelihoods that do not degrade the adjacent biodiversity rich Core Zones.

Table 2.7 Changes in international protected areas and Ramsar Sites

International PA Category	Number of PAs and area covered in 2008	Number of PAs and area covered in 2014
Natural World Heritage Sites (IUCN category X PA)	<b>n=1, 8864 ha</b> The Sinharaja World Heritage site	<b>n=2, 118,884</b> New: The Central Highlands Serial World Heritage Site with 3 forests
Biosphere Reserves Recognised by UNESCO (IUCN category IX PA)	<b>n=4, extent 81363.7 ha</b> Sinharaja, Kanneliya, Dediya, GahaNakiyadeniya, Hurulu and Bundala BRs	<b>n=4, extent 143106.3</b> Same reserves, increased area

Ramsar sites	n-3; 8,377 ha	n=6, 198,027 ha
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### 3.1.7 Cultural resources

The culture of Sri Lanka mixes modern elements with traditional aspects and is known for its regional diversity. Sri Lankan culture has long been influenced by the heritage of Theravada Buddhism passed on from India, and the religion's legacy is particularly strong in Sri Lanka's southern and central regions. South Indian cultural influences are especially pronounced in the northernmost reaches of the country. The history of colonial occupation has also left a mark on Sri Lanka's identity, with Portuguese, Dutch, and British elements having intermingled with various traditional facets of Sri Lankan culture. Culturally, Sri Lanka, particularly the Sinhalese people, possesses strong links to both India and Southeast Asia.

The country has a rich artistic tradition, with distinct creative forms that encompass music, dance, and the visual arts. Sri Lankan culture is internationally associated with cricket, a distinct cuisine, an indigenous holistic medicine practice, religious iconography such as the Buddhist flag, and exports such as tea, cinnamon, and gemstones, as well as a robust tourism industry. Sri Lanka has longstanding ties with the Indian subcontinent that can be traced back to prehistory.

The architecture of ancient Sri Lanka displays a rich diversity, varying in form and architectural style from the Anuradhapura Kingdom (377 BC–1017) through the Kingdom of Kandy (1469–1815). Sri Lankan (Sinhalese architecture also displays many ancient North Indian as well as East Asian influences). Buddhism had a significant influence on Sri Lankan architecture after it was introduced to the island in the 3rd century BC, and ancient Sri Lankan architecture was mainly religious, with more than 25 styles of Buddhist monasteries.

Significant buildings include the stupas of Jetavanaramaya and Ruwanvelisaya in the Anuradhapura kingdom and further in the Polonnaruwa Kingdom (11th–13th centuries). The palace of Sigiriya is considered a masterpiece of ancient architecture and ingenuity, and the fortress in Yapahuwa and the Temple of the tooth in Kandy are also notable for their architectural qualities. Ancient Sri Lankan architecture is also significant to sustainability, notably Sigiriya which was designed as an environmentally friendly structure.

**Monasteries** were designed using the Manjusri Vasthu Vidya Sastra, a manuscript which outlines the layout of the structure. The text is in Sanskrit but written in Sinhala script. The script is believed to be from the 5th century. It is exclusively about Buddhist monasteries and is clearly from the *Mahayana* school. The text shows much originality and there is nothing similar in the existing Indian treatises, which deal only with Hindu temples.

**Cave temples.** The earliest evidence of rudimentary cave temples is found in Mihintale, a unique feature in these caves was the use of a drip ledge carved along the top edge of the rock ceiling which stopped rain water running into the cave. With time doors, windows and walls of brick or stone were added. The roof and walls were plastered white and finished with decorative paintings, these are evident in the cave temples of Dambulla.

Cave complexes of Dambulla, Situlpahuwa, Mulkirigala are significant cave temples which demonstrate rudimentary architectural developments of the island. The Kaludiya Pokuna, Mihintale cave temple was constructed with brick walls, granite window openings, and ceilings. The Gal vihara, Polonnaruwa and the cave temples of Dambulla were initially constructed as cave temples, later on the cave temples were converted to image houses.

**Dagobas or stupas.** The dagobas or stupas of Sri Lanka are significant to the architectural and engineering development in the island, stupas designed and constructed in Sri Lanka are the largest brick structures known to the pre-modern world. Demala Maha Seya, which was never completed, had a circumference of 2,011 feet (613 m), Jetavanaramaya at the time of its completion was the largest stupa constructed in any part of the world at 122 m in height. Jetavanaramaya was also the third tallest building in the ancient world, Abhayagiri Dagaba (370 ft) and Ruwanwelisaya (300 ft) were also significant constructions of the ancient world.

The construction of stupas was considered acts of great merit, the purpose of stupas was mainly to enshrine relics of Buddha. The design specifications are consistent within most of the stupas, entrances to stupas are laid out so that their centre lines point to the relic chambers. Stupa design it is admired for its structural perfection and stability, stupas such as Jetavanarama, Abhayagiri, and Mirisaveti Stupa were in the shape of a paddy heap. Other shapes such as the bubble (Ruwanweli), pot and bell developed later, it is suggested that the stupa at Nadigamvila was in the shape of an onion.

An ornamented *vahalkada* was added to stupa design around the 2nd century; the earliest is at Chaitya. The four vahalkadas face the cardinal points, ornamented with figures of animals, flowers, swans and dwarfs. The pillars on either side of the vahalkada carry figures of lions, elephants, horses or bulls, depending on the direction of the structure. The stupas were covered with a coating of lime plaster, plaster combinations changed with the requirements of the design, items used included lime, clay, sand, pebbles, crushed seashells, sugar syrup, white of egg, coconut water, plant resin, drying oil, glues and saliva of white ants.<sup>[2]</sup> The fine plaster at Kiri Vehera used small pebbles, crushed seashells mixed with lime and sand were used in the stupas from the 5th to 12th centuries.

**Vatadage.** The vatadage is considered to be one of ancient Sri Lanka's most prolific architectural creations; this design represented a changing perspective of stupa design independently within the island. Early provincial vatadages have been in the form of a square<sup>[6]</sup> later it developed into a circular form enclosing the dagoba. Polonnaruwa, Medirigiriya and Tiriyaya vatadages still have their circles of slender, graceful pillars. The vatadage roof was of a sophisticated design unique to ancient Sri Lanka, it is a three-tiered conical roof, spanning a height of 12–15 m, without a centre post, and supported by pillars of diminishing height. The weight was taken by a ring beam supported on the inner row of stone columns, the radiating rafters met in a cartwheel-like design. The ornamental qualities of the Polonnaruwa vatadage are highly valued and scholars maintain that the Polonnaruwa vatadage represents the best architectural work of the Polonnaruwa period.

**Meditation houses.** The meditation houses found in the forest monasteries in Ritigala and Arankele are unique to Sri Lanka, Each house consists of two raised platforms, linked to each other by a monolithic stone bridge. The outer platform is open to the sky, larger and higher than the inner platform. These meditation houses achieved a very high degree of perfection in their architecture, the design combined square and rectangular shapes and yet maintained symmetry, indicating the architects' sophisticated knowledge of geometry. The stone masonry is also of a very high standard. The basements of these buildings were constructed of monumental blocks of stone, cut to different sizes, carefully dressed and very finely fitted together. The bridge connecting the two platforms was formed out of a single slab of stone. Some such slabs measured 15 feet (5 m) by 13 feet (4 m). The sides have been cut with precision where the joints between the slab and the stone moulding of the platforms are hardly perceptible.

**Vaulted roof shrine.** The brick shrine with vaulted roof, as seen at Thuparama, Lankatilaka and Tivanka Pilimage, is also considered unique to Sri Lanka. The Thuparama is almost intact today and gives an

idea of the manner in which the vaulted roof was created. The principles of the true arch were known to the ancient Sri Lankans, but the horizontal arch was considered a safer method of construction.

**Sky scrapers.** The nine-storied Lovamahapaya (3rd century BCE) would have been an elegant building. It had an exposed wooden frame supported on stone pillars. It was plastered in white, with shining copper roof tiles and a pinnacle at its apex. It had lightning conductors or *chumbakam* made of amber and tourmaline. Its rafters were made of talipot palm. It rose to a height of 162 feet (49 m) and had approximately 179,316 square feet (16,659 m<sup>2</sup>) of floor space. It could seat 9000 monks. Roland Silva remarked in 1984 that such an extensive floor space would stagger the designers in Sri Lanka "even today". The dominant element in these buildings, was the tiled roof supported by timber beams and rafters. The roofs were tiled, from as early as the 3rd century BCE, with red, white, yellow, turquoise and brown tiles. There were also tiles made of bronze.

**Palaces.** Five royal residences have been identified. They are Vijayabahu's palace in the inner city at Anuradhapura, the palaces of Nissanka Malla and Parakramabahu in Polonnaruwa, the palace off Sugala in Galabadda in Uva province, and Parakramabahu's palace in Panduwasnuwara near Hettipola, when he was ruling over Malaya rata. All the palaces had the same ground plan. Each was set in a rectangular area enclosed by galleries with an entrance from the east. A spacious courtyard in front acted as a reception room, where sitting was not allowed. A flight of steps led to a central building where there was an imposing pillared hall with a dais at the end. Around the royal complex were over fifty small cells, in two or three rows. The hall in Nissanka Malla's palace was 133 feet (41 m) by 63 feet (19 m). The floors of the upper storey in Parakramabahu's palace were of concrete. [Panduwasnuwara] palace had good provision for ventilation and there were soakage pits for drainage.

**Rock Palaces.** There was a palace on top of Sigiriya rock as well. The outlines, layout and several detailed features of this Sky Palace are still visible. There was an upper palace that ran parallel to the lower one, but at a much higher elevation. It had a viewing gallery. The innermost royal abode, which was originally a storeyed structure, had a magnificent 360-degree view of the city gardens and countryside below. There was a series of successive courtyards, chambers, and terraces connected by stairs and paved pathways.

**Pools.** Kuttam Pokuna in Polonnaruwa provides one of the best examples of the construction of a royal bath. A flight of long narrow steps led to an oblong shaped pond that had graduated gangways. The water was conducted by underground pipelines from the canal nearby and led into the bath by two *makara gargoyles*. A stone water lock acted as water locking valve and an exit for used water. There is also a now-ruined changing room. Other magnificent pool designs in Anuradhapura era such as "Twin Ponds" Kuttam Pokuna, "lotus Pond" Nelum pokuna, "hot water pond" janthagara Pokona, ath Pokuna-built for use of elephants and "black water pool" Kaludiya Pokuna are significant. Also, there are significant series of ponds and pools which contains water fountains at the Sigiriya citadel, which marvels the hydro engineering in the ancient Sri Lanka.

**Audience halls.** Polonnaruwa also has the remains of two magnificent audience halls. They are the public audience halls of Parakramabahu and council chamber of Nissanka Malla. Parakramabahu's council chamber was a three-tiered oblong structure built on a broad terrace, facing north, and consisted of an entrance provided with two flights of steps, having a gangway in between at ground level. The pillars in the council halls at Polonnaruwa are square at the bottom, octagonal in the middle and square again at the top.

**Hospitals.** Some idea of hospital architecture can be inferred from the monastic hospitals at Mihintale and Polonnaruwa. This hospital plan can be seen at the National Museum, Colombo. There was an inner and outer court and the rectangular inner court had a series of cells, toilets and bath, with an

exit at one end. One cell had a medicinal bath. Alahena had long dormitories instead of cells. The outer court accommodated a refectory, a hot water bath, storerooms and dispensary. A wall cordoned off the hospitals. The provision of two open courts in addition to windows ensured maximum ventilation and free circulation of air within the building itself.

**Houses.** A house dated to 450 BCE, built of warichchi (wattle and daub) has been discovered near Kirindi oya. Another has been found at Adalla, Wirawila, and at Valagampattu evidence has been discovered of houses dating from 50 CE to 400 CE. The kitchen utensils are still there. In medieval times, the rich had large houses built of stone, mortar and lime, with tiled roofs and whitewashed walls. There were rooms and apartments with doors and windows. The windows had fanlights. The doors had keys, locks, and hinges. The houses had compounds or courtyards and balconies. There were separate rooms for pounding paddy, a storeroom or *atuva* for paddy, and sheds for keeping chariots. Latrines are also mentioned. All houses however had small kitchens.

**Cultural triangle.** Sri Lanka's Cultural triangle is situated in the centre of the island and covers an area which includes the World Heritage cultural sites of the Sacred City of Anuradhapura, the Ancient City of Polonnaruwa, the Ancient City of Sigiriya, the Ancient City of Dambulla and the Sacred City of Kandy. Due to the constructions and associated historical events, some of which are millennia old, these sites are of high universal value; they are visited by many pilgrims, both laymen and the clergy (prominently Buddhist), as well as by local and foreign tourists.

**Other religious sites.** In addition to sites around Buddhism, there are many sites scattered across the entire country that honours religions, especially Christianity and Hinduism.

Cultural heritage sites under UNESCO's World Heritage List.

- Ancient City of Polonnaruwa - Polonnaruwa was the second capital of Sri Lanka after the destruction of Anuradhapura in 993. It comprises, besides the Brahmanic monuments built by the Cholas, the monumental ruins of the fabulous garden-city created by Parakramabahu I in the 12th century.
- Ancient City of Sigiriya - The ruins of the capital built by the parricidal King Kassapa I (477–95) lie on the steep slopes and at the summit of a granite peak standing some 180m high (the 'Lion's Rock', which dominates the jungle from all sides). A series of galleries and staircases emerging from the mouth of a gigantic lion constructed of bricks and plaster provide access to the site.
- Golden Temple of Dambulla - A sacred pilgrimage site for 22 centuries, this cave monastery, with its five sanctuaries, is the largest, best-preserved cave-temple complex in Sri Lanka. The Buddhist mural paintings (covering an area of 2,100 m<sup>2</sup>) are of particular importance, as are the 157 statues.
- Old Town of Galle and its Fortifications - Founded in the 16th century by the Portuguese, Galle reached the height of its development in the 18th century, before the arrival of the British. It is the best example of a fortified city built by Europeans in South and South-East Asia, showing the interaction between European architectural styles and South Asian traditions.
- Sacred City of Anuradhapura - This sacred city was established around a cutting from the 'tree of enlightenment', the Buddha's fig tree, brought there in the 3rd century B.C. by Sanghamitta, the founder of an order of Buddhist nuns. Anuradhapura, a Ceylonese political and religious capital that flourished for 1,300 years, was abandoned after an invasion in 993.

Hidden away in dense jungle for many years, the splendid site, with its palaces, monasteries and monuments, is now accessible once again.

- Sacred City of Kandy - This sacred Buddhist site, popularly known as the city of Senkadagalapura, was the last capital of the Sinhala kings whose patronage enabled the Dinahala culture to flourish for more than 2,500 years until the occupation of Sri Lanka by the British in 1815. It is also the site of the Temple of the Tooth Relic (the sacred tooth of the Buddha), which is a famous pilgrimage site.

### 3.2 Socio-Economic Environment

#### 3.2.1 Demography

Sri Lanka has a population of about 20 million. Population density is highest in the southwest where Colombo, the country's main port and industrial centre, is located. The net population growth is about 1.3% (Table 2.8).

*Table 2.8 Population and Land Area by Provinces*

Province	Population ('000)	Land Area (sq. km)	Population Density
Western	5,979	3,593	1,664
Central	2,658	5,575	477
Southern	2,556	5,383	475
Northern	1,094	8,290	132
Eastern	1,615	9,361	173
North Western	2,448	7,506	326
North Central	1,312	9,741	135
Uva	1,316	8,335	158
Sabargamuwa	1,988	4,921	404
<b>TOTAL</b>	<b>20,966</b>	<b>62,705</b>	<b>334</b>

Sri Lanka is ethnically, linguistically, and religiously diverse. Sinhalese make up 75% of the population and are concentrated in the densely populated southwest. Sri Lanka Tamils, citizens whose ancestors have lived on the island for centuries, total about 11% and live predominantly in the north and east. Indian Tamils who constitute about 4% of the population are a distinct ethnic group who were brought to Sri Lanka in the 19th century as tea and rubber plantation workers, and they remain concentrated in the "tea country" of south-central Sri Lanka. Other minorities include Muslims (both Moors and

Malays), at about 9.3% of the population; Burghers, who are descendants of European colonists, principally from Portugal, the Netherlands and the UK; and aboriginal Veddahs (Table 2.9).

*Table 2.9 Composition of Population*

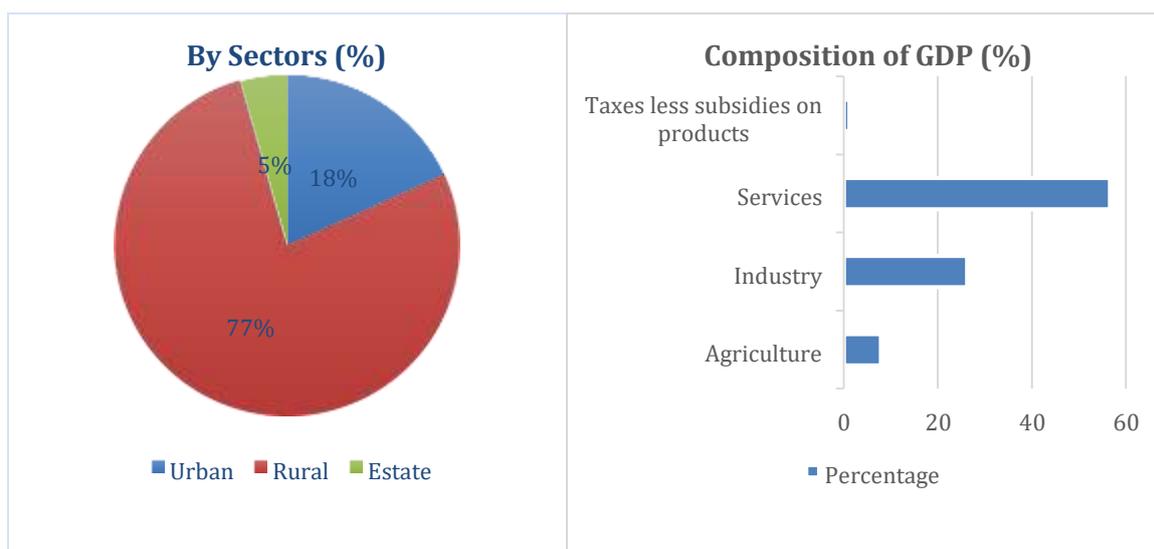
<b>By Ethnicity</b>	<b>%</b>	<b>By Religion</b>	<b>%</b>
Sinhalese	74.9	Buddhist	70.1
Sri Lankan Tamil	11.2	Hindu	12.6
Indian Tamil	4.1	Islam	9.7
Sri Lankan Moor	9.3	Christian & Roman Catholic	7.6
Other	0.5	Other	0

Most Sinhalese are Buddhist; most Tamils are Hindu; and the Malays and Moors are Muslim.

Sizable minorities of both Sinhalese and Tamils are Christians, most of whom are Roman Catholic. The Burgher population is mostly Roman Catholic or Presbyterian. The Veddahs have Animist and Buddhist practices. Sinhala, an Indo-European language, is the native tongue of the Sinhalese. Tamils speak Tamil, a Dravidian language. The moors speak an Arab-Tamil dialect, consisting of a large number of Arabic words. The Malays speak Sri Lankan Creole Malay. Many of the Burghers speak Sri Lankan Indo-Portuguese although its use has declined and all speak Sinhala. The Veddahs speak a language closely related to Sinhala.

### 3.2.2 Economy

Sri Lanka is a lower middle-income country of 21.2 million people with per capita GDP in 2016 of US\$3,835. Since the civil war ended in 2009, the economy has grown on average at 6.2 percent a year, reflecting a peace dividend and a commitment to reconstruction and growth, but there have been signs of a slowdown in the last three years. The economy is transitioning from being predominantly rural-based to urbanized economy-oriented around manufacturing and services (Figure 2.9).



*Figure 2.9 Basic Profile of the Economy*

The government is carrying out fiscal reforms, improving public financial management, increasing public and private investments, addressing infrastructure constraints and improving competitiveness. It launched its Vision 2025 on September 4, 2017 to strengthen democracy and reconciliation, inclusive and equitable growth and ensure good governance.

### 3.2.3 Human Development

Sri Lanka has made significant progress in human development. Social indicators rank among the highest in South Asia and compare favourably with those in middle-income countries. The national poverty headcount ratio declined from 15.3 percent in 2006/07 to 6.7 percent in 2012/13 although disparities remain. Unlike other South Asian countries, Sri Lanka is facing an aging population (Table 2.10).

*Table 2.10 Status of Human Development Indicators in Sri Lanka*

Indicators	
<b>Labour Force Participation Rate (%)</b>	
Total	53.8%
Male	74.7%
Female	35.9%
<b>Unemployment Rate (% of labour force)</b>	4.7%
<b>Life Expectancy (Avg. years)</b>	74.9
<b>Literacy Rate (Aged 15 years and above)</b>	
Total	93.2%
Male	94.1
Female	92.4
<b>Human Development Index</b>	0.757

### 3.3 Status of Selected Key Sectors

The Physical Infrastructure Sector consists of Roads; Public Works; Transport; Energy; Agriculture and Housing Sub-Sectors. In the new long-term development blueprint for the country “Sri Lanka Vision 2025”, infrastructure development has been recognized as an enabler for sustained development of the economy.

Sri Lanka Vision 2025 sets out a course of reforms to make the country more competitive and lift all Sri Lankans’ standards of living. These reforms range from the pressing need for labour law reform to restructuring social safety net programs and boosting technology acquisition and digitisation. It also recognizes the importance of development infrastructure as critical for socio-economic transformation.

The Government recognises that inadequate physical infrastructure services are a significant drag on growth. Physical connectivity, both internal and external, will be an important part of

Sri Lanka’s efforts to position itself as a trade and services hub in the region. Some of the key projects include investments on road infrastructure, Western Megapolis Development, Industrial zones

(Charlie Mount, Matara, Kalutara, Seethawaka, Hambantota, and Trincomalee), Kerawalapitiya Liquefied Natural Gas (LNG) Project, and the Floating Terminal.

Sri Lanka aspires to be a country with modern infrastructural facilities that meet international standards to make Sri Lanka a globally competitive and prosperous country. The strategies and measures to be pursued in the medium term include; supporting the development of infrastructure initiatives around flagship projects, strengthening the institutional framework for infrastructure development, raising the efficiency and quality of infrastructure as well as increasing the pace of infrastructure projects so that they are completed as envisaged, protecting the environment as a national asset and conserving it for the benefit of the future generations and the wider international community. Other measures include encouraging Private Sector participation in the provision of infrastructure services through the PPPs framework.

The Government aims to encourage PPPs especially in the Build-Operate-Transfer model in small to medium scale infrastructure projects across the country. The Government aims to encourage the private sector to build small and medium infrastructure projects, which could in turn be leased by the Government with the intention to transfer eventually. These projects are expected to be in education, health and other sectors where Government expenditure is high for infrastructure requirements.

### 3.3.1 Transport Sector

To increase economic productivity through export oriented growth, the country needs a transport system that functions in a seamless fashion from the perspective of the exporter. This requires more focus on transport facilities and services attending to export regions and products as well as an integrated intermodal transport sector strategy; in particular, maintaining, upgrading, modernizing, and ensuring connectivity between those transport facilities and services.

Successful policy reform in the transport sector can have significant payoffs for the country. Improving the performance of the transport sector could remove major bottlenecks to economic growth and productivity. The transport sector is also an important source of employment. The sector also absorbs, at present, a large share of public investments. Improving the effectiveness of transport expenditures could result in major savings in the projected needs for investment. Estimates indicate that projected savings from reforms in the highway sector alone could be as high as 70% of estimated expenditures without reforms. In other words, with reform the Government could invest 30% of the estimated funds otherwise needed to support economic growth.

The transport sector in Sri Lanka has not performed as well as that of its East Asian neighbors, failing to meet the demands necessary for the country to sustain higher levels of economic growth. Furthermore, rising expectations as a result of Sri Lanka's long-term per capita growth as well as changing characteristics of Sri Lanka's production and trade, have placed new challenges on the sector. Among these challenges is the need for reliable, efficient, and safe services for passenger and freight transport, while managing the negative consequences such as congestion, air pollution, and accidents.

Basic coverage has been good in terms of extending transport networks but existing systems are aged, obsolete, and congested. Misguided capital investments, inadequate balance between transport modes, and inattention to maintenance have further reduced the ability of the transport sector to perform. The transport sector is suffering from a low-level equilibrium trap. Misallocation of expenditures in transport has led to improper modal balance in capital investments as well as an underinvestment in recurrent relative to capital expenditures. This has led to insufficient maintenance, causing deterioration in assets and service quality, and the consequent decline in willingness to use public services. This has made it difficult to raise revenues through higher prices, as users have resisted having to pay more for increasingly deteriorated services. The country, and

especially the Greater Colombo Region, has seen a high rate of motorization, and the private vehicle has captured a larger share of the growing demand for transport. In combination with deterioration in urban bus and rail services, motorization has led to large modal shifts from public transit to private vehicles. The transport sector in Sri Lanka has not performed as well as that of its East Asian neighbors, failing to meet the demands necessary for the country to sustain higher levels of economic growth. Furthermore, rising expectations as a result of Sri Lanka's long-term per capita growth as well as changing characteristics of Sri Lanka's production and trade, have placed new challenges on the sector. Among these challenges is the need for reliable, efficient, and safe services for passenger and freight transport, while managing the negative consequences such as congestion, air pollution, and accidents.

The Government plays a major role in the transport sector in Sri Lanka. Public enterprises are responsible for direct provision of road, railway, and port infrastructure. There is no private provision of infrastructure. The Government plays a smaller role in the direct provision of transport services, with the exception of railways which are in the hands of Sri Lanka Railways, a Government Department, and bus transport where the Government is a 50% shareholder of the peoplized bus companies. The poor performance of the transport sector has been mainly because the public sector has overextended itself as a direct provider of facilities and operator of services and is failing to meet important functions as manager of *competition*, custodian for the *environment*, and guarantor for *social concerns*. The challenges of operating and managing transport infrastructure and services have absorbed a lot of effort from the public sector, fostering weaknesses in planning, implementation, and regulation.

The Government is committed to improving the public transport system. Vision 2025 includes the setting up of multi-modal transport centres with park and ride facilities, electrifying the existing railway system between Veyangoda and Panadura, laying of double tracks on the Kelani Valley railway, and constructing new rail tracks connecting Kurunegala and Habarana via Dambulla. The Government is also committed to innovations in the public transport system, such as bus priority lanes and an advanced traffic management system. Planning studies are to be completed soon for a Light Rail Transit to begin building six lines in the metropolitan Colombo area. These measures are expected to greatly ease current passenger congestion in the system as well as increase facilities for the transportation of goods.

The Road Development Authority (RDA) has significant capacity to manage environmental and social concerns when developing the road network as a result of continuous engagement with financing institutions like the World Bank and Asian Development Bank (ADB). The RDA has its own Environment and Social Unit which was established over a decade ago with the support of ADB. The national environmental management regulations mainly apply to new road construction activities and not for existing road rehabilitation. However, natural resources use during construction/rehabilitation activities require to obtain necessary licenses and permits including the Environmental Protection License. Local authorities which manages roads within their jurisdiction with the technical support from Provincial Roads Development Department has limited capacity and also rarely need to adopt the national regulations due to many of their current activities only involves rehabilitation and maintenance. Maintenance of roads has been relatively weak in the past due to non-allocation of maintenance funds. With the Road Maintenance Trust Fund in place and with the transition towards design, build, operate and maintain type of arrangements, the situation is slowly changing, especially for RDA managed roads.

There is little information available on the environmental management of construction/operations of others agencies that manage railways, seaports, airports, etc. as the usual multilateral financing agencies have not been involved in support such activities in the recent past. Compliance on

environmental management regulations have been questioned number of times for recent developments such as siting and construction of Mattala airport and Hambantota seaport, although both have been subjected to national environmental act and its regulations. There are no recorded significant issues on the operations of international ports due to international requirements, except the Mattala airport where issues related to siting has continue to arise. Land management of railway reservation has been extremely weak, due to proliferation of squatters on the either side of the railways.

### 3.3.2 Energy Sector

A corollary of economic growth has been the increasing demand for energy in the country. This demand is expected to continue to grow as Sri Lanka pursues economic growth and development.

In 2015, 52 percent of Sri Lanka's electricity was generated through fossil fuels. Indigenous fossil fuel resources are scare, so the fossil fuel used for electricity is imported, a significant part of Sri Lanka's import expenditure. As a developing country, Sri Lanka's demand for electricity is going to increase in the future. It is imperative therefore, for Sri Lanka to secure its energy future by focusing on the development and adoption of indigenous, renewable sources of energy to meet this growing demand and reduce the economic burden of imports.

Sri Lanka's energy demand is currently being catered to by several energy sources consisting of both indigenous non-fossil fuels and imported fossil fuels. Most of the country's energy needs are met through biomass, an indigenous fuel source, and imported fossil fuels, such as petroleum and coal. The remainder is made up of other indigenous sources which, include large hydro and renewables such as solar, small hydro and wind.

Acknowledging this need, Sri Lanka saw an increase in the share of renewable energy (RE) in the electricity mix, when in 2014, the country met its target of generating at least 10 percent of its electricity using renewable energy. Subsequently, in 2015, the contribution of fossil fuels to the electricity mix decreased, at the same time as a rise in the contribution of both renewable energy and large hydro. In an endeavour to embrace renewables more fully, Sri Lanka, while attending the 22nd United Nations Framework Convention for Climate Change Conference of Parties in Marrakech, Morocco, as part of the Climate Vulnerable Forum, pledged to use only RE for electricity generation by 2050.

This report has been developed with the purpose of designing and proposing scenarios and mechanisms through which the goal of 100% RE in electricity generation by 2050 can be achieved. It details among other things the plausible electricity generation mix as well as financial interventions required for Sri Lanka to achieve its goal while highlighting the numerous technical and economic challenges the country is likely to face on its road to a 100% RE power sector. While the result of the study is to propose a scenario where all of Sri Lanka's electricity is completely generated through renewables, given the high costs and technical challenges associated with integrating renewables into the electricity generation mix, especially in terms of ancillary and balancing needs, the report proposes a gradual phase out of fossil fuels from the country's electricity mix. The report estimates that total investments to the tune of US\$54-US\$56 billion will be necessary in the power sector to achieve the 100 percent RE scenario. Furthermore, by 2050, the report estimates that the 100% RE scenario can potentially save Sri Lanka US\$18-US\$19 billion by avoiding the use of imported fossil fuels.

While the time is right for Sri Lanka to pursue the establishment of a 100% RE electricity generation sector, the Sri Lankan power sector still faces multiple key challenges, highlighted below, which will need to be proactively tackled if the country wishes to be successful in achieving this target.

1. A large amount of investment is required for infrastructure development in the power sector (generation, transmission and distribution). Sri Lanka does not have the domestic capability to fund ambitious projects from commercial banks. Without support from multilaterals and foreign banks with low cost finance, it will be difficult to bolster growth.
2. Technical challenges in terms of inadequacy of ancillary systems to support the grid in a high RE scenario. High penetration of RE is likely to induce intra-day variability in power supply and this variability needs to be addressed with a strong ancillary system. As of now, grid balancing is only done through hydro plants. For the replacement of thermal capacity by renewables to be successful, Pump Storage Power Generation (PSPG) is going to be very important. PSPG will be essential for managing prominent peak and off-peak characteristics of the daily demand pattern. Without setting up the necessary ancillary infrastructure, achieving Sri Lanka's ambitious RE targets will be difficult.
3. Non-availability of proper incentives to develop RE based capacity. At times, developing coal based capacity becomes more lucrative because of its large unit size,
4. high plant load factor and base load operation. An integrated national energy policy formulation to support RE growth is the need of the hour.
5. Currently, the high cost of electricity from RE sources is a deterrent to development of new RE capacity. From this perspective, coal is a preferred fuel. However, with technological innovation, there is expected to be a drop in the price of RE-generated power such as solar power, which could make RE
6. a commercially viable option. Also, with the evolution of storage facilities, the situation may further change and skew towards the incorporation of RE.
7. Lack of local research and development to promote local capacity development: Sri Lanka has limited or negligible research facilities dedicated to the development of RE resources locally, thus creating an industry which is dependent on importing RE expertise and resources.
8. Slow development of roof-top solar due to lack of proper education among consumers and limited options for low cost finance from commercial banks. Despite having regulations promulgating the adoption of rooftop solar, Sri Lanka has been unable to produce any gainful traction in the deployment of rooftop solar in the country. One of the primary reasons for this is the high cost of rooftop solar systems, coupled with the lack of cheap financing or business models available for the public to install and use these systems.
9. As Sri Lanka's electricity sector is largely dependent on hydro plants, any variability in the monsoon pattern hits the sector hard. Only after the requirements of domestic water consumption and irrigation are met, is permission for power generation from hydro projects granted. Though hydro plants' plant load factor (PLF) in Sri Lanka is in the range of 50 percent, there are concerns about non-availability of capacity in the future.

For any scenario incorporating RE in the electricity generation mix to succeed in Sri Lanka, it is imperative that it address the challenges and deploy measures to mitigate them to the furthest extent possible.

According to the current long-term generation expansion plan (LTGEP), two sub-critical coal units of 300 MW capacity are probably going to be commissioned, in 2024 and 2027 respectively. As part of the 100 percent RE scenario, for the early years of the plan, this coal capacity will be used as the base load instead of RE, while storage will be used as a peaking source. Since pump storage cannot be a reliable source because of seasonal variances, and by 2025, battery storage may not have emerged as

an economical grid scale solution, widespread use of RE, especially as a viable base load, will not be possible in the early years of the proposed scenario, thus necessitating the use of fossil fuel based power for that period. Any additional RE or coal power generated throughout the day will be stored in the small amounts of battery capacity that will be economically viable at that time. This storage, coupled with the base coal capacity, will serve to meet the morning and evening daily peak deficits. Following depreciations in cost, this scenario will be reversed where, with increasing, cost effective storage solutions, coal power plants will gradually stop supplying any power to the grid while RE sources take over as the eventual base load source.

While the model currently uses coal, capacity proposed under the current LTGEP as the solution for peak deficits, Sri Lanka can consider using gas based combined cycle power plants instead as a cleaner alternative to meet the same objective.

Other energy sources consist of the LNG based climate change project as planned by Ceylon Electricity Board. The generation gap arising out of the low coal scenario will be bridged through solar and wind energy while large hydro, small hydro and biomass capacity addition are present as per the long-term generation plan.

The generation mix between wind and solar energy has been determined to be such that by 2050, solar energy is expected to contribute ~30 percent while wind energy will contribute ~50% of the total demand. The assumption is that a significant portion of domestic and commercial use will be powered by solar energy through an accelerated adoption of roof-top solar infrastructure. However, at the same time, a very high concentration of solar energy is likely to pose balancing issues for the grid and until storage facilities have evolved to become commercially viable, demand that cannot be met by solar will be primarily catered to through wind.

Apart from technologies considered in our current assessment, Sri Lanka can consider the adoption of additional, advanced RE technologies such as geothermal, wave, tidal and off-shore wind as part of 100% RE electricity generation scenario in the future. However, before any decisions on these technologies and their involvement in the 100% RE scenario are made there is a need to conduct detailed assessments to explore their feasibility and viability in Sri Lanka.

Use of environmental management regulations in energy sector development has been consistently well practiced, particularly at the stage of initial capital investments. The post Environmental Impact Assessment (EIA) monitoring is however, weak, which is the case across overall EIA process irrespective of the sector. There have also been issues related to environmental flows of hydropower generation, as well as site selection of new hydropower stations due to short-coming is in assessing the cumulative impacts along river basins, poor assessments of environmental flows and ensure the environmental flows are maintained.

### 3.3.3 Urban

Sri Lanka has become a lower middle-income country, with GDP per capita reaching US\$3,194 in 2013. It is shifting from a predominantly rural-based economy to an urban economy oriented around manufacturing and services. Currently, services account for 59% of the economy, followed by manufacturing at 30% and agriculture at 11%. Experiences from other countries indicate that urbanization can be a potentially powerful force in support of economic growth and poverty reduction, depending on how well urban growth is managed. Cities contribute significantly to national economic growth by increasing productivity at the firm and industry levels via agglomeration economies. Likewise, Sri Lankan cities account for the majority of the country's physical, financial, intellectual and technological capital. Average productivity in urban manufacturing and services is three to five times that of traditional sectors. By acting now, Sri Lanka has the opportunity to take full

advantage of the economic benefits of the urban transition, while mitigating the problems associated with fast urbanization found elsewhere in South Asia.

***Colombo Metropolitan Region (CMR).*** Sri Lanka needs to tap the competitive advantages of the CMR to accelerate growth. Colombo City is the commercial and financial center of the country. The CMR is the international gateway to Sri Lanka and houses most of the country's manufacturing facilities and services. The three cities of Colombo, Gampaha, and Kalutara (all located within the CMR) are by far the most competitive cities in Sri Lanka. Hence, the CMR will continue to drive the country's economic development for decades to come. Most of Sri Lanka's foreign trade passes through the Colombo Port, and the CMR will continue to generate much of the capital, human resources, technology, and services needed for growth in the rest of the country.

Economic density is concentrated in the CMR, which accounts for almost half of national GDP.

A contiguous urban belt encircles Colombo, on the west coast, and spreads both north and south. This is the major urban agglomeration in the country, and is growing faster than any other in Sri Lanka (National Physical Planning Department, 2006). While the CMR covers only about 6 percent of the country's total land area and is home to 28 percent of its population, it accounts for almost 50 percent of national GDP and 80 percent of industrial value added.

A number of obstacles are preventing the CMR from realizing its full economic potential.

- Infrastructure and services are inadequate, with key bottlenecks in drainage, sewerage, solid waste, and urban transport infrastructure.
- The CMR is highly vulnerable to the effects of flooding, the impacts of which are being exacerbated by climate change and sea level rise. In fact, current rainfall trends hint at larger and more frequent rainfall amounts in future, particularly in the Second Intermonsoonal period, while sea level rise will further impede gravity drainage. May and November 2010 saw the area impacted by the worst floods in four decades. After witnessing the unprecedentedly high economic losses that resulted, stakeholders reached a consensus that the CMR's vulnerability to natural disasters requires immediate attention.
- The poor design and maintenance of micro- and macro-drainage systems by the local authorities and the Sri Lanka Land Reclamation and Development Corporation (SLLRDC), illegal encroachments on flood retention areas and along canal banks, and industrial pollution—combined with rapidly changing climate patterns characterized by more frequent and intense precipitation—has further aggravated flooding in the metropolitan area.
- Service and infrastructure provision within the CMR is highly unequal, particularly between the CMC and the peripheral local authorities. Outside the CMC area, solid waste collection is often inefficient, and inadequate sewerage services result in uncontrolled discharge of sewerage into waterways and marshes.
- The limited financial and human resources available to local authorities, combined with their lack of coordination, hinder effective delivery and operation and maintenance (O&M) of local infrastructure services, while management and coordination at the metropolitan level are virtually nonexistent.

The Government of Sri Lanka (GoSL) has launched an ambitious program of economic and physical regeneration for metropolitan Colombo in a bid to transform it into a modern, worldclass capital. This program aims to improve the overall urban environment and attract private capital. It encompasses: (i) improvements to the overall quality of life of low-middle and low-income families living in underserved settlements (mostly through resettlement/relocation to subsidized housing); (ii)

investments in metropolitan services and infrastructure such as drainage and flood control systems, urban transport, and solid waste management (SWM); and (iii) area-specific investments aimed at leveraging private sector capital (for example, the improvement of historic areas with high tourist potential).

The management of metropolitan Colombo involves many institutions. What is generally identified as the CMR, which accommodates about 2.23 million inhabitants, coincides with the area covered by the Colombo Metropolitan City Corporation, the creation of which was approved by the cabinet in March 2011 and which comprises the CMC and four peripheral local authorities within the CMR. The institutional mapping of line agencies currently involved in the planning and delivery of infrastructure and services in the CMR shows that at least 17 are active, each following its own sectoral plans and priorities. The overall lack of interagency coordination results in overlaps and inefficiencies.

The Urban Development Authority (UDA) is the leading central planning agency, with responsibilities for urban physical planning, regulation, and land development. UDA structural plans that aim to protect wetland areas and canal reservations are not keeping pace with the speed of development on the ground. Meanwhile, the SLLRDC is the main agency responsible for the development of low-lying areas, flood control and drainage investments, and the management and maintenance of the primary canal system. The SLLRDC, however, shares its responsibility with the Ports Authority and Irrigation Department and becomes functionally constraint when managing its system of canals and protect critical retention areas, often having to deal with inherited situations of land filling and the development of retention and reservation areas systematically approved by the UDA and local authorities outside the control of the SLLRDC. The local authorities in the CMR are responsible for the secondary canals and microdrainage system, which are affected by a chronic lack of maintenance and ad hoc expansion without proper planning.

The CMR is the engine of growth for Sri Lanka but investing only in Colombo will be insufficient to achieve the economic goals of GoSL. As Sri Lanka moves into the more intermediate stages of urbanization, economic activities will spread towards the secondary cities, especially with increased investments in connective infrastructure. Analysis indicates that the higher growth rates are concentrated in the secondary cities, especially in the Central and Southern Provinces. Improvements in urban services and infrastructure are urgently needed to cope with the development challenges and manage growth.

A well-functioning and productive system of urban centers is essential for catalyzing and supporting the transformation of the Sri Lankan economy and efforts to translate economic growth into poverty reduction. Sri Lanka's Urban Vision is to develop as *a system of competitive, environmentally sustainable and well-linked cities*, and provide every family with affordable and adequate urban shelter by 2020. The development of this system of cities is based on fostering economic growth in major urban centers outside of Colombo, a process which is intended to produce a more spatially balanced distribution of economic opportunities, while at the same time reducing congestion in the capital and bolstering overall national economic growth.

**Other Cities.** In order to realize the vision of a system of cities, GoSL has initiated a national level program – the Strategic Cities Program – to manage the development of strategic cities and to ensure a consistent and coherent approach in developing key cities. A number of obstacles are preventing Sri Lankan cities from realizing their full economic potential:

- Basic urban services and infrastructure are inadequate to meet growing demand and existing assets are deteriorating due to a lack of adequate maintenance.

- Infrastructure provision and service delivery are institutionally and sectorally fragmented, especially at the local level. Municipalities are responsible for fairly limited mandates while many other areas are coordinated and managed by various agencies at the national level.
- Most urban development occurs without appropriate planning. This has led to many *ad hoc* development patterns, such as ribbon development along many roads, which has caused major transport bottlenecks, environmental and land use concerns.

A holistic, integrated and multi-sectorial approach is needed to address these obstacles and to improve the overall functions, attractiveness and livability of these cities and their surrounding areas (City Regions). This can be achieved through two main categories of strategic investments: (i) integrated urban services improvement with system-wide basic services improvement, thereby enhancing the functional aspects of the city; and (ii) public urban spaces enhancement with catalytic urban upgrading efforts, thereby enhancing the attractiveness and livability of the city.

Both Kandy and Galle are attracting population and economic activities faster than they are able to keep up service delivery; and both have existing or planned market access points (e.g., southern expressway to Galle and planned expressway access to Kandy) that allow the benefits of agglomeration to be realized. Despite the relatively quicker growth, the Central and Southern Provinces in Sri Lanka have a large absolute number of poor people. As such, an important policy implication is that interventions targeting rapidly growing urban areas can potentially alleviate poverty in their broader peripheries through improved linkages. The context and challenges of these cities are:

- *Kandy City Region* hinges around an internationally acclaimed UNESCO world heritage site and is located in a region which has high poverty incidence. The city is a regional transport and services hub in the Central Province, serving about 350,000 daily commuters, over 60% of whom arrive by public transport. Sited in a hilly terrain and an environmentally sensitive area, Kandy currently faces critical challenges in terms of traffic congestion, growing demand for drinking water and environmental protection.
- *Galle City Region* is anchored around a historical Dutch Fort, a UNESCO world heritage site. The future extension of the Southern Expressway to Matara and Hambontota will strengthen Galle's role as a major service center along the country's southern coastal development belt. Today, the Galle City Region faces several critical challenges. Flooding in Galle is an annual occurrence due to poor drainage, inadequate maintenance, and increased intensity and frequency of rainfall due to climate change. Unplanned development along the coastal towns, which are key tourist locations, has also resulted in coastal pollution and limited access to beaches along the coastline for recreational purposes.

***Solid Waste Management.*** The estimated solid waste generated nationwide is between 6,000 and 7,000 tonnes/day (tpd). Approximately half the total waste is generated in the MCR. The overall waste collection rate is low in Sri Lanka, at approximately 50%. However, waste collection rate in Colombo Municipal Council is the highest in the country about 70%. There are no sanitary landfills in the country, except for a small (90 tpd) pilot at Dompe. All collected waste is disposed in open dumpsites, located within or near human settlements, creating serious environmental problems, and affecting public health.

The institutional arrangement for SWM involves multiple agencies and authorities. Local Authorities are statutorily responsible for providing municipal solid waste management services. However, due to budget and capacity constraints, they are unable to provide quality service, prompting other agencies such as the Central Environmental Authority (CEA), the regulator of the sector, and the Waste

Management Authority of the Western Province (WMA), a provincial level planning agency, to develop and manage some processing and disposal facilities.

Development of urban areas without taking the existing natural environment into consideration can result in medium to long-term issues such as loss of ecosystem services, flooding, loss of important biodiversity, heat island effect, loss of recreational and spiritual values, etc. While the donor-financed projects try to mainstream these impacts into consideration when financing urban development, other projects give less importance to these impacts.

### 3.3.4 Housing

***Slum upgrading and prevention.*** Slum upgrading and prevention Based on the 2011 survey of Colombo carried out by the UDA, an estimated 68,812 households live in 1,499 underserved settlements, accounting for more than half the city's population. These settlements tend to be small and scattered, and about 74% of them have less than 50 housing units. The living conditions and the status of the housing stock are generally not comparable to those in the slums of South Asian megacities. Still, available evidence indicates that substandard living conditions in underserved settlements have become a pressing issue in Colombo. A survey of the city's flood-prone underserved settlements indicates that 81% of the housing structures in the underserved areas are made of permanent building materials such as bricks, cement, and asbestos. However, the quality of construction varies and the infirmity of the ground on which they have been built (canal reservations) is perceived as prone to damage, with observed tilting of houses and cracks on the floor and walls. Lack of security of tenure is the norm in these settlements. About 90% of the surveyed communities live on land owned either by the municipal council or the Government, though 56% of them claim to have a user permit. The facilities available in the surveyed areas have improved, when compared with the situation in 2001.

Water is one of the services that has most improved; of the surveyed households, 82% (44% in 2001) reported that they now have individual connections and 90% (55% in 2001) receive adequate water throughout the day. Inner access roads, a more serious concern in the surveyed communities are worse than they were in 2001. Many inner access roads in the settlements are narrow and have been further narrowed by encroaching communities who extend their houses onto the pathway. Latrines and sewerage constitute one of the thorny issues faced by the dwellers. The sharing of toilets results in many difficulties, and privacy for women is wanting. The poor connection to the sewerage system has resulted in overflows, especially during rain and flood periods, creating health hazards. 76% of the residents surveyed have been affected by recent floods. Households have developed coping mechanisms that help them reduce the economic losses associated with flooding by raising the floor levels etc. or by building additional floors. Evidence indicates that cities and towns outside the Western Province are not spared from the challenge of underserved settlements. For example, in Matara, 17% of the housing stock is deemed to be unsanitary, due to the use of low quality material and unsafe locations. In Kandy, 18% of the population lives in 3,602 low-income housing units in 45 underserved settlements. Nuwara Eliya has more than 7,000 temporary houses constructed with non-permanent materials, equivalent to about 20% of the total housing stock. The suburban cities of Colombo, such as Dehiwala-Mount Lavinia, Kollonnawa, Kotte, Moratuwa, and Wattala, have on average 10–15% of their urban housing stock at substandard quality.

It is necessary to ensure adequate and affordable shelter for all urban dwellers, in Sri Lanka's track record in achieving the Millennium Development Goals, providing basic services, and expanding access to the underserved population. Attendance at primary school is universal in both urban and rural areas. Sri Lanka does not have informal settlements as large as those in other Asian countries, but

substandard housing is becoming a concern in both Colombo and urban areas outside the Western Province. Only 15–20% of planned low-income settlements in urban areas are financed through formal sector initiatives, with the balance funded through informal initiatives with private resources. Given past trends, addressing the backlog of substandard housing and meeting additional housing requirements in urban areas will be demanding. The government's target is to increase the supply of adequate housing to 100,000 units a year (including the improvement of existing stock) to address the backlog and ensure adequate and affordable housing for all by 2020. A substantial share of these annual new buildings, possibly around 40–45% in the initial years and then an even larger proportion, will be in urban areas. But meeting this target will be challenging given past trends. For example, each of the two largest municipalities – Colombo and Kandy –approves 1,000 building permits a year on average, and Galle 500. If the Western Megapolis is not complemented by similar development efforts elsewhere in other regions, the influx of people in search of better incomes will escalate the slum problem beyond control.

The government performs multiple functions in the low-income housing markets as a policymaker and regulatory authority, a housing promoter and financier, and a housing and infrastructure developer. In addition to urban local governments, the National Housing Development Authority, the UDA, and the Urban Settlements Development Authority are the main government agencies involved in low-income housing, but their mandates often overlap and their functions evolve as a result of changes in government funding. In the past and until the recent launch of the new low-income housing programme in Colombo, pruning of government funding led to relative neglect of the lowest income groups, as agencies shifted their focus to commercially viable income groups. Most low-income households are not

“bankable” and cannot afford access to formal housing finance. The banks classify about 80% of the nation's earners as low income. Only 20% of all low-income earners have regular employment, potentially allowing them access to bank loans for finished housing. Achieving this long-term vision of the government - “Affordable Housing for All by 2020” rests on preventing informal settlements from forming by developing a functioning housing market that meets the need of all segments of the population. This in turn requires the removal of constraints on the supply of land and housing finance that limit the production of formal housing by the private sector and that keep formal shelter beyond the reach of most of the urban population. The needs of the poorest people must also be met, through well targeted housing assistance programmes (for example, credit enhancement for affordable housing and home improvements).

The UDA is, among its other functions, responsible for addressing low-income housing needs within declared urban areas. It does not receive budget transfers, except for special projects. It manages and develops government-owned land and infrastructure, frequently working with private developers (in which case it provides the land) or municipal governments (for which it develops municipal government land). As with the National Housing Development Agency, most low-income programme were curtailed until the recent launch of the new low-income housing programme for Colombo, as part of the urban regeneration agenda for the city. The government had renewed its attention to low-income housing by launching a new Sustainable Township Programme in Colombo, as part of the urban renewal initiative for Colombo. The programme aimed to build approximately 41,000 housing units over a five-year period to rehouse dwellers in underserved settlements and release valuable land for urban development. Funds for this programme are expected to be raised from sales of released lands. The success of earlier programmes implemented in the 1990's was marred by inadequate maintenance. Two successful earlier projects stand out, however: the Clean Settlements Project – a slum upgrading initiative piloted in the mid-1990s under the World Bank-funded Greater Colombo Environment Improvement Project – and the Lunawa Project, which put Sri Lanka's National

Involuntary Resettlement Policy into practice. To succeed, the new Sustainable Township Programme needs to find solutions to the problems that plagued the earlier programmes and address institutional and policy failures in the housing sector that prompted some settlers to abandon their new apartments. The new programme departs from the previous initiative in its stronger political commitment to regenerating the city and to provide all urban dwellers with adequate housing within the city limits. Yet its long-term sustainability requires an equal commitment to addressing the basic institutional and policy failures in the low-income housing market.

**Real estate.** The property market in the country is on an upward trend with the demand for land growing each year, and the growth cycle expected to hit a peak by 2020, urban planners say. The market has been on a steady line of growth since the end of the conflict in 2009, and with the dawn of peace and stability, which are key factors for investment in housing and apartments. According to Urban Development Authority (UDA) Chairman and National Physical Planning Department Director General, the real estate market fluctuates, undergoing peaks and depressions.

When the demand rises and the supply has yet to meet the demand, prices go up. This marks the upgrading of the cycle. The prices reach a level affordable only to a certain class/income group of society. This is expected in an open market situation. However, when the supply is in excess and the market heats up, and also when the size of the affordable group goes down due to high pricing, the curve takes the downward trend. At present, the country experiencing the upward movement in the cycle and very likely, it will hit the peak by the 2020-2025 period.

The present Urban Development Plan for Colombo was prepared in 2008. A development plan is updated every 10 years. The UDA will take into account this situation with the next update, which is due next year. The role of the State is to look into the needs of the lower middle income and lower income groups of society and assure that they are not deprived of opportunities to live in the city and its suburbs. That's why the Urban Development Authority has initiated a few housing projects for middle income groups in the suburbs of Colombo. The Government has launched a program of housing for low income groups, as stated in the Budget Speech, 2017.

With regard to the number of condominiums under construction in Colombo, around 150 projects are under implementation and are pending approval, for development within the city. There will be over 20,000 new housing units added to the market by 2020. This development could be seen in the immediate suburbs, such as, Kotte, Dehiwala, Mount Lavinia, Wattala and Kolonnawa. There is no account of the number of new units that have been completed during the past two years. However, it has been estimated that around 3,000-3,500 housing units have been put up by the private sector during this period.

The UDA has re-housed 5,000 families in under-served settlements in Colombo, from 2014-2016. When the demand for housing increases, the need for utilities such as, water and electricity would rise. However, considering the approaching demand, there are projects undertaken by the National Water Supply and Drainage Board and the Metro Colombo Urban Development Project (Under the Ministry of Megapolis and Western Development) to augment the existing water supply and drainage facilities within the city and in the suburbs, in order to meet the rising demand.

According to Condominium Developers' Association of Sri Lanka Secretary, there are currently around 8,000 apartments being built in Colombo compared to less than 1,000 in 2008. There are investments in strategic development projects in the city, such as, the Shangri-la, Tata Housing and the Astoria, to name a few. However, according to real estate experts, the growth momentum which had been high in the immediate post war years has not been seen in the subsequent years, due to policies that were

not conducive for investments in the real estate sector. Unlike Singapore and Malaysia, Sri Lanka is not a high net worth investment destination. The lack of accommodative and flexible investment policies in the real estate sector for foreign investments have stifled the growth momentum to a certain extent.

According to Lamudi Managing Director the real estate market in Sri Lanka has been growing constantly over the past few years. We notice a positive trend on several aspects, specifically, investment apartments in the country, since there has been a growth in tourism and short term foreign employees. They search for fully furnished accommodation for short term stays, which can be a hassle in an emerging tourist destination such as, Sri Lanka. Thus, this category can be satisfied through investment apartments. Nevertheless, both, residential and commercial segments are growing rapidly. The mid-range apartments sector is on high demand, based on search requests made on Lamudi.lk over the past year. Similarly, the need for commercial space is on the rise, as well. Several start-ups launching in Sri Lanka are looking for space in the commercial capital of the country, Colombo. The need for short term space which can be used to launch a product/service is on the rise because it reduces the monetary risk for start-ups. Overall, the demand is on the growth stage now, showing signs of growth for the near future. However, it is necessary to note that projects that launch in the local market based on the demand side analysis would definitely succeed.

Further, a report on the economy and the construction sector after the end of the conflict in 2009 by Lamudi states, the landscape in Colombo has been changing with the growth in tourism, infrastructural developments, domestic and international real estate projects. There is a strong correlation between urbanization and GDP per capita. Rapid urbanization continues to affect the Sri Lankan economy. Driven by economic growth and infrastructure development, Colombo has experienced urban migration. In recent years, skyscrapers have begun to dominate the city's skyline, an attestation to the pulling power that the country is developing with domestic and international investors. This is expected to continue as infrastructure, transportation, and connectivity improve. The transformation over the years has caused an increase in luxury apartments, hotels and retail outlets. Though the key focus has been within the economic hub, Colombo, several residential and commercial projects have gradually begun targeting the suburbs and other districts. It shows that investors see the potential, not just of the largest city in the country, but in what Sri Lanka has to offer as a whole, especially, in terms of real estate and the property industry, the report states.

Similar to the urban development, urban housing development while needed could also bring about negative impacts to the existing natural environment. With the increase of condominiums, the existing green areas maintained as part of home gardens are reducing rapidly. In addition, the low-lying areas are getting reclaimed, increasing the flooding potential and financing needed to provide engineering solutions to manage urban flooding. In addition, the existing sewerage systems are not planned to receive the increase levels of sewage and could have impacts on the coastal waters if discharged without been treated properly. The above changes also continuing to increase the generation of solid waste, requiring more efficient service on SWM and SWM systems.

### 3.3.5 Tourism

In Sri Lanka, tourism is the third largest export earner in the economy, after remittances and textiles and garments. In the past five years, growth in visitor numbers has been unprecedented, averaging more than 22% year on year, of which 80% to 90% was visitors coming to Sri Lanka on holiday. In 2015, 1.8 million international visitors came to Sri Lanka, stayed an average of 10.1 days, and generated an estimated US\$2.98 billion<sup>1</sup>. In 2016, international visitor arrivals reached over 2 million and revenue generated was approximately US\$3.5 billion.

Sri Lanka is an increasingly popular destination for international travellers, as well as for expatriates returning home to visit friends and relatives. In 2013, Lonely Planet nominated Sri Lanka as the number 1 destination in the world to visit. In 2015, Forbes magazine ranked the island among the “top ten coolest countries” to visit. Global influencers including Condé Nast Traveler, Rough Guides, Lonely Planet, The Guardian, and the New York Times identified Sri Lanka as a top location to visit in 2016.

Internationally, travel and tourism generated US\$7.2 trillion in 2015, accounting for 9.8% of global gross domestic product, and 1 in 11 jobs worldwide were in the travel and tourism sector. The government of Sri Lanka recognises the importance of developing tourism and the potential it has to create jobs (the tourism sector reportedly provided more than 319,000 local jobs in 2015), encourage domestic and foreign investment, and promote conservation practices.

Hitherto, the sector has not fully captured its true potential and thus has not reaped the expected benefits. In part, Sri Lanka’s untapped potential is a symptom of the decades-long civil war, during which large parts of the island were unsafe to travel to, and infrastructure was not maintained. Also during this time, tourism operators were limited in the products and services they could offer. The risks of taking visitors to places and experiences outside the large resorts were high. For instance, there were extensive restrictions on marine-based tourism activities, and there was no opportunity to develop the domestic civil aviation sector.

International travellers saw Sri Lanka as a cheap destination where the product was limited to sun, sea and sand, and holidays to Sri Lanka were traded on price; operators survived only by offering low rates. There was limited reinvestment because margins were small. Much of the talent pool in the hospitality industry emigrated to other, safer parts of the world. In the years since the cessation of the civil war in 2009, Sri Lanka’s economy, particularly its tourism industry, has been growing rapidly. Although the tourism industry is expected to continue to grow, poor planning and management of this growth and limited diversity of markets and products is contributing to a lack of value-adding opportunities and limiting per capita visitor expenditure. As visitor numbers increase, there is mounting pressure to manage environmental impacts in areas of high tourist use, for land use in high tourism potential areas, to access appropriately skilled human resources, and to maintain tourist service and product quality standards.

It can already be seen in certain areas that the rush to develop and expand tourism in Sri Lanka is harming the natural environment and excluding local communities and local content — the very foundation and uniqueness of the Sri Lankan travel experience.

Community engagement is critical for tourism to take root in local destinations, to build local pride, to mine local tangible and intangible assets, to motivate more people to be trained, and for benefits local households. The general population still does not view tourism as a sector that is good enough for their children to build careers in. These cultural and social perceptions will change only if communities are fully engaged in the process of developing tourism and feel empowered to be proud custodians, as well as beneficiaries, of the valuable endowments around them.

Based on the Tourism Area Life Cycle, a tool for framing the development of a destination, Sri Lanka is in its infancy and is at a critical juncture. To continue up the growth curve, the Sri Lankan tourism sector must reframe its value proposition to conserve assets, develop and better define new markets and products, and include and involve citizens and local communities as participants in the tourism economy.

Sri Lanka’s prospects for sustainable tourism growth are therefore at a critical juncture. Building on steadily growing visitor interest over the past five years and Sri Lanka’s exceptional island-wide natural and cultural endowments, the government of Sri Lanka has positioned tourism as a central pillar of

the economy. The government is determined to nurture world-class visitor experiences firmly rooted in the inherent natural, cultural, historic and social capital of Sri Lanka and its people, and to ensure that these experiences generate island-wide economic value. This intended expansion of Sri Lanka's tourism value proposition is at the heart of this four-year strategic plan.

current demand patterns — origin of visitors and what they consume in Sri Lanka — suggest there is potential to improve Sri Lanka's market mix by targeting high growth-potential niche (and other mainstream but underdeveloped) markets compatible with Sri Lanka's emerging value proposition.

Defining, expanding and sustaining these markets also depends on expanding products and services, which in turn requires more-specialised jobs and more-focused product definition and market interventions. At present, visitors and major investments are concentrated in clusters and corridors around Colombo as a commercial hub, the beaches of the south coast, yala national park, the tea estates and forests of the hill country, and the historic and religious heritage of the cultural Triangle. potential economic benefits are only trickling to other areas of the country, which have untapped tourism assets. it is a priority for the government to address these geographic and economic inequalities, informed by accurate, up-to-the-minute market intelligence, asset mapping, and data collection and analysis.

A brief summary and analysis of the current situation indicates its shortcomings and provides a basis for a four-year strategic plan that supports Tourism Vision 2025. in general,

- Sri Lanka's tourism product and market mix lack diversity
- Sri Lankan tourist products and services miss the potential to add value along the supply chain
- Sri Lanka's tourism product and market mix lack diversity

More than 85% of visitors to Sri Lanka are travelling for leisure and participate in mainstream activities such as going to the beach, visiting historical and cultural sites, and viewing wildlife, following a well-beaten path established in the 1970s (map 1)<sup>7</sup>. There are abundant resources and investment opportunities in addition to these basic activities that could significantly expand the economic footprint of the tourism sector. developing these further is necessary for Sri Lanka to disperse visitors more widely around the island but also to expand the value, diversity and quality of the overall experience. Visitors also tend not to return to Sri Lanka because they may feel they have "seen everything" on their first trip, or it was not up to expectations.

Accommodations are a key building block for any destination, and it is indicative that more than 95% of Sri Lanka's officially registered room stock is distributed around this popular route. The pattern is similar for unregistered rooms such as those sold through Airbnb, booking.com and Agoda.

To note, unregistered rooms are also appearing in areas outside the main circuit. for instance, a large proportion of room stock in areas such as Kalpitiya, Jaffna, Arugam Bay and Ella is not yet registered with the Sri Lanka Tourism Development Authority. However, it is important to acknowledge the role these early investors have played in providing accommodations in new areas from which visitors can access activities and attractions in emerging destinations.

The local and national governments have an important role in planning and managing destination growth. This role is especially important in the early stages of destination development, when the unique character of a place and its people is intact. The strengths and settings of Sri Lanka's natural, historic, and cultural assets — tangible and intangible — will position Sri Lanka competitively for years to come.

Diversity of source markets and the market mix within them is as important as the development of diverse accommodations, activities, products and services. Visitors from the United Kingdom, Western Europe, China, and India make up more than 62% of Sri Lanka's leisure visitors, and their own domestic economies and traditional travel patterns heavily influence these source markets. Although current travel trends to Sri Lanka are seasonal, improving the market and product mix could influence this considerably. There are clear seasonal variations in overall visitor arrivals, but it can be seen that this trend is more nuanced when looking at visitors according to country of origin. Deeper analysis of the purpose of visit from different countries of origin could form the basis of more-targeted marketing strategies.

Sri Lankan tourist products and services miss the potential to add value to the supply chain overall, the visitor experience could be improved, beginning with destination planning to consider the visitor experience from entry to exit. Improvement of the visitor experience has the added effect of being a positive promotion tool and is an opportunity for job creation, entrepreneurship and innovation.

When products and services are more homogenous and commodified (e.g., a package holiday to a beach resort), there is a tendency for operators to undercut each other in a price war to the bottom to gain market share of a relatively inelastic demand situation. This has been the case for Sri Lanka's tourism industry. Economic research shows that there is more demand and price elasticity where value is added to consumer products, which is also true of destinations. For instance, experiences such as whale watching can garner high prices because of their market appeal, but the current lack of value addition and poor management in Sri Lanka does not justify it. A spot price check for 3-hour whale watching excursions reveals that Sri Lanka is priced on average at only US\$26 per person, whereas internationally, the closest in price is \$78, and the highest price charged is in Greenland, at \$120.

Similarly, national park entrance fees for non-resident foreigners in Sri Lanka are lower than in many other countries<sup>9</sup>, and although this may be an enticement to visit, again, the quality of the experience falls far short of expectations. Also, the opportunity to add value for the consumer, in terms of quality of experience, and for the supplier of services, in terms of being able to charge more, are lost. This loss of value also compromises the sustainability of the parks. Furthermore, visitor satisfaction and a sense of value for experiences that are in high demand are not met, which is likely to result in poor consumer reviews.

Successful development of tourism requires vision, planning and strategic commitment to actions to achieve that vision. The untapped potential of tourism in Sri Lanka will require committed, sustained support from all stakeholders, especially government and the private sector. The Tourism Strategic Plan (TSP) defines a framework and a transformation agenda intended to expand tourism's economic footprint to underused natural, cultural, geographic and human resources in Sri Lanka. Economic, environmental and social sustainability, from the local level to the national, underpin every action recommended. Furthermore, sustainable tourism is founded on — sometimes-fragile — intersecting social, cultural, environmental, political and economic ecosystems that, in an island context, are especially challenging to manage.

The existing fragmentation of the planning, management and policy making related to tourism assets and the associated and overlapping legal, regulatory and institutional responsibilities are core challenges to address in transforming the way sustainable tourism development is planned and managed in Sri Lanka. The TSP identifies pragmatic approaches, based on global best practices but relevant to the local context, that contribute to a whole-government, wholecommunity approach to the tourism sector.

This four-year TSP indicates steps and actions necessary to move toward Sri Lanka's Tourism Vision 2025. To achieve the government's high-level objectives and address a range of identified systemic

failures, six transformative themes have been developed, with corresponding core strategies. The strategic plan is based on extensive consultation with stakeholders over eight months; stakeholders included large and small companies, entrepreneurs, conservation organisations, education bodies, and relevant central government agencies and provincial governments. The strategic policy being adopted for tourism in Sri Lanka is to strengthen and nurture the roots of people, places, and natural and cultural heritage and to add economic value to these inherent assets throughout the island. This is encompassed in Sri Lanka's roots philosophy.

The Vision defines a desired future reputation. It draws inspiration from the 13th century explorer Marco Polo's description of the island as "the finest island of its size in all the world" and from market research conducted into Sri Lanka's value proposition. The mission sets an agenda for transformation – improved quality of services and service delivery that will lead to greater local creation and retention of revenue, investment in human resources and skills, and improved coordination and collaboration between government institutions, the private sector and local communities.

"High value" means that every aspect of tourism must ensure quality and yield, and not be volume driven. It does not denote Sri Lanka as an expensive, luxury-only destination. The roots philosophy advocates that value not be viewed solely in a monetary sense, but in terms of the experience, authenticity, diversity, community and sustainability. Also, there must be value for money in every category of experience.

There is a desire to set ambitious targets, but these must be balanced with the effect of "overtourism", for instance on food security, housing and local culture. High-level national economic objectives for the entire industry are listed below<sup>12</sup>. Considerable research is required to gather more-reliable data and to analyse growth trends and opportunities. (more details in ensuing chapters).

Sri Lanka's Tourism Vision 2025 and Sri Lanka's roots philosophy are aligned with the SDGs, and specific core strategies and actions below have been developed to achieve them: •Developing sustainable destinations, particularly the Transformative Tourism projects

- Lifting industry standards
- Engaging the workforce and communities, particularly the local community focus

The central aim of the Paris Agreement is to strengthen the global response to the threat of climate change by preventing the global temperature from rising by more than 2 degrees Celsius this century. One hundred and ninety-five countries, including Sri Lanka, signed the agreement. Efforts need to be made to lower greenhouse gas emissions and build climate resilience. Sri Lanka's Tourism Vision 2025 and Sri Lanka's Roots Philosophy emphasise ecofriendly practices and green principles for tourism.

This TSP and the tourism institutions will work closely with the relevant authorities and existing national plans and strategies to achieve the Sustainable Development Goals (SDGs) and mitigate the effects of climate change. Based on the national economic objectives and the UN SDGs, seven guiding principles for Sri Lanka's tourism industry have been identified. To move toward the vision and objectives of expanding Sri Lanka's tourism value proposition through world-class visitor experiences, a transformation in thinking and planning for tourism is required. Sri Lanka's tourism industry, in particular the role that the public-sector plays, requires a systemic rethinking and reorganising to address the failures: (a) coordination failures; (b) resource failures; (c) market failures; and (d) institutional failure.

To overcome the above-mentioned institutional failures that impede sustainable tourism, a whole-government, whole industry approach must be taken. This will require meaningful communication, cooperation, and involvement of key partners from local, regional and national governments. A

significant systemic transformation of tourism in Sri Lanka is required. This involves changing government views and management of the industry (institutional reform), changing government and industry understanding of and provision for targeted visitors (visitor experience), and changing the implementation process (to tangible measurable actions).

### 3.3.6 Industrial sector

Emerging out of a protracted conflict, and moving in to a new era of economic progress, Sri Lanka is now ready to place a stronger focus on developing its industrial capacity in contributing to its broader development objectives. Without the stifling effects of political instability and with the dawning of a peaceful environment, Sri Lanka can seize on this opportune moment to re-energize its manufacturing potential. As a result of the unfavorable environment that prevailed for nearly thirty years, industrial development in Sri Lanka did not reach the heights that many of its regional competitors did. Although the country did grow its manufacturing base to some extent during this time, particularly in textiles and garments, rapid industrialization was not possible.

The volume of FDI that the country attracted into the industrial sector was largely of the 'footloose' type, and not the high-value type, such as electronics and automobiles industries. Multinational corporations), which often lead these types of investments, were unwilling to set up in Sri Lanka, mainly due to the instability related to the conflict. As a result of not being able to attract this 'right' type of FDI that was desired, the manufacturing sector did not have the impetus to move further and further up the value chain. However, in the current postconflict environment, Sri Lanka has a renewed opportunity to build its higher-value industrial potential, attract better foreign investments, and boost its production of higher income-earning exports. Yet, while the uncertain security and political environment did have a stymieing effect on industrial progress, various other issues also did, and continue to contribute to the lackluster performance of the manufacturing sector. These include inadequate infrastructure, regulatory impediments including rigid labour laws, lack of clarity in industrial policies, high cost of finance (in part due to crowding out by state borrowing), unavailability of skilled workers, deficiencies in technological capability, and institutional inefficiencies.

The share of industry in GDP has grown modestly in the last several decades, from 26 percent in 1990, to 29.7 per cent by 2009. In recent times, the structure of GDP has changed only marginally in favour of the manufacturing sector, but it continues to employ around 25 per cent of the labour force. The industry sector had not progressed as quickly as the services sector has, which has grown from contributing 47.7 per cent to GDP in 1990 to 57.7 per cent in 2009. As for its contribution to growth, in 2009 the industrial sector contributed towards 40 percent of the GDP growth. Its contribution to overall exports has also grown steadily, from 33.8 per cent in 1980 to 54.2 per cent in 1990 and to 75 per cent by 2009. By 2009, the sub-category of

'factory industry' contributed around 15.8 per cent to GDP.

Although more recently other industries have emerged, much of the industrial sector has been, and continues to be, led by the apparel industry which benefited from a quota regime and preferential market access, as well as comparatively low labour costs. As some of these advantages gradually diminish, it is now imperative that the industrial base is expanded and moves towards industrialization in other categories. It is widely recognized that the manufacturing industry sector can make a more significant contribution to Sri Lanka's economic development process, as it has a more pronounced employment-generation potential vis-à-vis other sectors such as services, and in meeting the changing aspirations of the youth. Faster growth in the sector can also lead to more export income for the country. Fast-tracking industrial development, therefore, becomes an important component in

propelling the country towards lowering unemployment and rapid economic progress in the post-conflict phase.

The quest for greater industrialization in the Sri Lankan economy has been an area of focus by nearly all governments since the country attained independence. Various policy prescriptions were attempted towards fulfilling this, each with differing degrees of success. Industrialization in the period between independence and 1977 was characterized by import-substitution industries producing basic industrial products, mainly by state-run manufacturing companies. This was coupled with high import tariffs and other protectionist measures. These policies, however, failed to deliver. By 1977, most import substitution industries had become largely import-dependent, not saving any foreign exchange and functioning at below capacity level. Following the 1977 liberalization of the economy, there was a sustained focus on export oriented industrialization, accompanied by various incentives. The open trade regime was allowed to dictate industrial development, and so trade policy became the main instrument of industrial promotion in the country until the late 1980s. FDI played a major role in export-led industrialization and firms with FDI contributed substantively to the export expansion.

There was a notable rise in industrial output in general, and manufactured exports in particular. Yet, in the decade following liberalization, industrialization was very much urban-biased, with nearly 80 per cent of industrial output concentrated in the Western Province. It also remained relatively undiversified with 60 per cent of industrial output originating from the textile and garment sector alone.

To address some of these issues, in 1989 Sri Lanka released its first industrialization policy statement. To implement this, an Industrial Promotion Act was enacted in 1990 which created an 'Industrialization Commission' tasked with devising suitable policies and addressing identified impediments. These efforts were bolstered by a second wave of liberalization in the early 1990s which included liberalizing FDI flows, supported by a reconstituted Board of Investment (BOI). Incentivized schemes such as the '200 Garment Factory' program was initiated to take industries to rural areas. On the whole, however, geographically-spread industrial development was slow to take off due to the unsuitable business environment that existed, mainly characterized by a lack of suitable infrastructure.

Sri Lanka's experience with export-oriented industrialization was often referred to as a 'late comer's story' compared to most East Asian countries,<sup>6</sup> as Sri Lanka transitioned to this strategy around a decade 'late'. However, unlike the Newly Industrialized Economies (NIEs) of East Asia, with their skills and technology upgrading and industrial diversification, Sri Lanka's manufactured exports consisted mainly of low value-added products that utilized lowskill/low cost labour.

Market liberalisation has certainly led to a greater 'internationalization' of Sri Lankan industries, with many manufactured exports enjoying valuable positions in foreign markets. In many manufactures like apparels, rubber products, fabricated metals and ceramics, Sri Lankan industries have improved their technological capability, skills, and product quality to match international standards. However, this is limited to a small number of firms, and the key is to propagate this more broadly.

While there has been an expansion of the import-substitution industry sector, with a focus on quality – particularly in the categories of instant food products, biscuits, confectionery, beverages, milk food, clothing, plastic items, paints and ceramics – the limited size of the domestic market remain a constraint to rapid growth of this sub-sector. Nevertheless, there are a large number of imported consumer items that still have the potential to be produced by import-substituting industries in Sri Lanka.

In the near-term, however, the growth in the industrial sector is likely to come largely from the growth of industrial exports. Despite the end of the quota regime in 2005, apparel exporters have successfully managed to exploit domestic design and product development capabilities to carve lucrative niches abroad. It will be increasingly important to replicate this success in other export-oriented industries, as the country's manufacturers attempt to move from low value-added to high-value added export products.

In the industrial sector particularly, there is an ongoing thrust to take industries to other regions, under the present development vision. A joint scheme recently launched by the Ministry of Industries and the BOI – 'Gamata Karmantha' (or 300 Enterprise Program) – is aimed to develop industrial potential in rural areas, by mapping the unique resource and skill advantages inherent in each area and then leveraging on them to develop relevant industries.

Finance has been a perennial stumbling block for domestic industrialists in their growth efforts, either due to its cost, or in the case of regional businesses a lack of access to large loans. The state-run Lankaputhra Development Bank has been mandated to provide this finance on submarket rates to domestic industrialists. Moreover, state banks, private development banks and also donor re-financed concessionary loan schemes have been mobilized to provide finance for industries in lagging regions. There also exist some special loan schemes for the revival of, and establishment of new industries in the Northern and Eastern Provinces.

The small and medium enterprise (SME) sector has often been touted as the backbone of the private sector in the country, and is being given priority under the current policy framework. The National Enterprise Development Authority (NEDA) was set up to assist this sector, and ease the constraints that are holding it back. Together with the Industrial Development Board (IDB), NEDA is involved in encouraging small scale industrialists to adopt a product-based cluster approach to build scale economies and improve technical capacities, and then help these industries 'internationalize' – i.e., link up with regional and global supply chains. Moreover, recently a committee for Small and Medium Industry (SMI) development was appointed and was tasked with looking into the problems of, and prospects for expanding this sector and increasing its contribution to overall industrial sector growth. Having rightly identified 'access to finance' as a key impediment to SMI growth, this committee includes representatives from the banking sector as well.

Infrastructure remains a constraint to industrial development country-wide, and as a result, much of the large industrial production facilities are concentrated in the Western Province. As a second-best solution to expanding industries to other regions, several Export Processing Zones and Industrial Estates have been established, which offer improved infrastructure within the zone and good road connectivity to the country's international port and airport. The Achchueli Industrial Zone in the Jaffna district, which is being developed under a partnership between United Nations Office for Project Services (UNOPS) and the Ministry of Industries, and the Kappalthurai Industrial Zone in the Trincomalee district, offer much encouragement in the prospects for industrial development in these previously conflict-torn regions. Already some industries have begun setting up in both these zones. As physical infrastructure in these areas requires much improvement, the rapid development of infrastructure-ready zones like these will undoubtedly be an important first step in reviving the industrial potential and in creating employment opportunities. However, relevant skills development must go hand in hand, so that the labour force is able to take advantage of the opportunities arising from these developments.

Additionally, there is vast untapped capacity in the agriculture and fisheries sectors in the

Northern and Eastern regions. Following the dawning of peace, restrictions both in fishing (fishing areas, durations, permitting radio tracking, multi-day fishing, high-speed out-board motors, etc.) and

agriculture (lands becoming unlocked after de-mining) in these areas have been dismantled. With production capacities increasing, there are opportunities for related industries in agro-processing (spice products, fruit and vegetable canning, jams, cordials, food products, etc.,) and fish-processing and related activities (fish canning, ice production, etc.) to take off.

While recent investments in commercial water supply and wide-scale electrification program have relieved many operational constraints, energy costs still remain high compared to Sri Lanka's regional competitors. Countries like China benefit from nuclear power, which is inexpensive to the end-user, and Thailand, Bangladesh and others in the region benefit from vast natural gas deposits.

Connective infrastructure in many parts, particularly in the North and East remain a constraint, with road transport from Batticaloa in the East taking as much as 8-9 hours. Highways and high-speed rail connectivity will certainly ease this constraint. The latter is particularly useful, and it is encouraging that Sri Lanka Railways has expressed willingness to grow its rail cargo services. Although currently any export-oriented industries setting up in the North and East would have to make this long and expensive journey to transfer its goods to the only container port in Colombo, the proposed redevelopment of the Trincomalee and KKS ports as industrial ports will certainly improve the prospects for industrial development in these areas. It will also enhance the cost-competitiveness for industries in the border regions like the North Central Province. Owing to both the connectivity constraint and also a skills constraint, industrial sector undertakings in the North and East, in the short to medium term, are likely to cater mainly to the domestic market, i.e., as import-substitution industries. As mentioned earlier, with agriculture and fisheries sectors demonstrating a fast recovery, there is strong potential for agro and fisheries-based industries to thrive. Capacity for export oriented industries may take more time to develop and mature. Constraints in the enabling environment in areas besides infrastructure also require attention. As highlighted previously, a conducive business environment effected by appropriate policy fixes are vital to spur industrial development. Key business climate constraints like labour laws, tax regulations and time and costs associated with licensing and permits, etc., prevail. Sri Lanka is at a disadvantageous position in many of these indicators relative to its competitors.

A key priority for the government is providing the requisite infrastructure base to spur industrial development in all regions. This process has already begun, with several roads, highways, port and airport projects ongoing island-wide. Connective infrastructure, alongside improvements in commercial water and electricity, are vital. However, while building and improving the quality of existing, regular roads is useful, it is important to fast-track investments in high-speed rail and motor highways to better connect industries across regions, as well as with external markets via the new and existing ports and airports.

Port access is an important prerequisite to creating strong industrial capacity in a region, and currently only the Western Province enjoys that advantage. However, with the construction of the Hambantota port, and the proposed industrial zone linking with it, Sri Lanka will be able to create its second industrial hub. Moreover, with a natural deep water harbour and airport, Trincomalee appears ideally poised to become another new industrial trading hub of the country, providing the linkage to international markets for industries in the Northern, Eastern and North Central Provinces. The Trincomalee harbour has a natural depth sufficient to cater to the newest range of deep-hull industrial goods vessels. While many prominent ports around the world are having to gradually undertake dredging and other upgrades for this purpose, the Trincomalee port enjoys a natural advantage in this aspect.

Existing rigid labour market regulations place Sri Lankan industries, especially those employing large numbers, at a disadvantage relative to competitor countries. Thus, there is a need to reform these

labour laws in line with global changes in this area, while maintaining adequate protection for workers. Currently in Sri Lanka, the average cost of severance payments for a worker, as mandated by law, is 178 weeks of wages. This is the 4th highest level in the world. Within a liberalized and dynamic global environment, it is important to allow for industries to adjust its factor positions to cope with market changes; this is particularly applicable to the factor labour. Sri Lankan industries need to compete with larger economies like China, Indonesia, Thailand and Malaysia who enjoy scale economies and countries like Vietnam and Bangladesh which enjoy lower costs of labour.

Export oriented industries often report of difficulties in attracting potential foreign investors to expand their production due to preconditions of having to streamline the workforce, and this bearing a restrictively high cost of severance.

Investment incentives via various income tax breaks and import duty concessions have been a feature of Sri Lanka's industrial promotion strategy implemented through the BOI. Although generous incentives have been continuously offered under the BOI regime, rapid industrial development has been slow to materialize. This can be largely attributed to the security climate which was a disincentive for private investment in industries, particularly those that require significant capital commitments. Foreign collaborations in the industry sector were also slow to materialize during this time. During the period of uncertainty, some industrial development did take place despite this, but was confined mainly to labor-intensive industries.

Now it is important to re-visit the current incentive structure, and revise and rationalize it in line with a broader industrial development policy. Industries face high capital costs, and the initial expenditure on facilities, machinery and equipment poses significant cash flow challenges. To tackle this, there is a need to reform the existing investment incentive structure which focuses only on tax breaks that come into effect years after set-up, and instead introduce alternative incentive tools like accelerated depreciation, up-front capital write-offs, and investment credits that reduce initial capital costs. These tools are also more attractive to those industries with FDI that have to still pay taxes in their home country despite enjoying tax breaks in the host country. Instead of tax breaks which erode future tax revenue, the government could also consider granting government land at concessionary prices. The BOI should also actively promote foreign 'anchor investments' for large, ready-to-use industrial zones. Under a BuildOwn-Operate model, the concessionaire is granted tax holidays to develop the zone, and is then responsible for drawing in industries to operate in it. Similar models have been successfully followed in other industrialized countries in the region, and there are indications that such an arrangement is proposed for the Muttur region in Trincomalee.

Building a skilled talent pool to feed into industries remains a constraint. Although the country boasts near universal primary education, achievements at higher levels of learning like O/Ls and A/Ls, particularly in science and mathematics streams remains weak. Additionally, the graduates passing out from local universities remain unattractive to industrial enterprise, as they lack the management and technical capabilities as well as soft skills which private enterprises place heavy emphasis on. Overall, there needs to be greater investment in vocational training, skills-for-work for school leavers, and measures to grow the science and engineering talent pool. Enrolments for science and engineering subjects in Sri Lankan universities are low, compared to other subjects in the Arts and Commerce streams. While this is indicative of the general lack of science, engineering and technology teaching in the universities, it is also a consequence of the fact that the number of schools across the country that offer science and math streams at A/Ls is very limited.

Sri Lanka has been unable to preserve its science and engineering talent, due to the conflict-related instability, and also due to the unappealing potential for advancement in the innovation industry in the country. Sri Lanka is second only to the Philippines on the extent of brain drain in this sector<sup>8</sup>. The

Indian diaspora has been touted as being a key reason for India's IT and R&D boom. The Indian diaspora actively sought contracts for science, engineering and IT firms back home. They were also linked with the academia and research organizations in India. Sri Lanka too enjoys a similar position. There are many Sri Lankan scientists and engineers, graduating from local institutes and now well qualified, but are domiciled abroad. Sri Lankan experts in the diaspora range from NASA scientists to globally-recognized ISO certificate providers. This potential must be tapped by introducing innovative mechanisms to create diaspora-local linkages, with knowledge exchanges between them and local research and training institutes, as well as leading local firms.

Developing industry-oriented skills improve worker's employability, productivity and labour mobility. Thus, there is a need to expand industry-specific vocational training programs, once future growth industries are identified under an industrial development policy. Moreover, there needs to be better re-training and re-skilling programs to enable re-deployment of labour, to help mitigate the impact of large-scale layoffs, and dampen the impact of changes in sectoral structure over time. This would also make the country's workforce more dynamic and able to move with global changes.

It is encouraging that a high proportion of production-sector workers (compared to managers and professionals) in Sri Lanka receive training, and is far ahead of countries like Bangladesh, India and Pakistan. This augurs well for the availability of workers for the industrial sector. However, a problem experienced by the majority of SMIs looking to grow is that they are constrained by the availability of technical as well as managerial talent, with the right softskills. Considering the previous conflict-affected regions particularly, the potential for industrial development will be fairly contingent on the labour force there acquiring the requisite skills suited for manufacturing sector jobs.

There needs to be a stronger productivity-improvement program to support industrial sector growth. Governments have had several initiatives to improve awareness on productivity improvement in the last decade. The most wide-ranging was the National Productivity Decade 1996-2006, which provided Sri Lankan industries practical information and supported firmlevel productivity improvements. Such a scheme needs to be re-introduced, especially as the government's priorities now focus on economic growth following the end of the conflict. However, associating productivity improvement with the labour sphere alone is insufficient. Productivity is a much more holistic concept that requires a focus in every sphere of activity, from the firm-level to mezzo and macro level state institutions.

Sri Lanka has made little advances in the area of research and development (R&D) recently, and a focused effort is required to arrest this trend. According to various indicators that measure this, such as the number of researchers in R&D per million people, scientific and technical journal articles per million people, patents granted to Sri Lanka by the United States Patent and Trademark Office, etc., Sri Lanka has made little progress in the last decade. Sri Lanka lags behind regional competitors in many of these indicators. At the 1979 Vienna Conference on Science and Technology for Development it was advocated that countries looking to achieve faster growth rates should spend at least 1 percent of GDP on R&D activities. Possibly owing to the heavy burden of the war, Sri Lanka has spent only a small percentage of its GDP on R&D work, amounting to around 0.14 per cent of GDP annually.

This has remained largely stagnant; the corresponding figure for 2001 was 0.19%, with a similar figure for 1996. In contrast, India spends around 0.85 per cent annually, and China, a clear outlier, allocates 1.44 per cent. It is commendable that the current policy framework has set a target of raising spending on R&D up to 1.5 per cent of GDP by 2016. Sri Lanka is home to several impressive research institutes, like the Industrial Technology Institute, and the National Engineering Research and Development Centre. They continue to play an important role in developing national and firm-level technology capabilities. Their potential needs to be further harnessed, and their scope needs to be expanded to be more relevant to the needs of the industrial community. Forging industry-research linkages and

public-private partnerships for R&D are important in advancing this field, and a model initiative that has engendered this idea is the Sri Lanka Institute of Nanotechnology (SLINTEC). Nanotechnology is increasingly gaining prominence, not only in the R&D field per se, but more importantly in the industrial sector where nanotechnology can benefit in new product developments and efficiency improvements. The SLINTEC has brought together key innovators from the private sector and scientific community to find new ways of feeding nanotechnology into broader industrial development.

### 3.3.7 Health

The key themes affecting demand for healthcare are expected to be ageing population, lifestyle factors and increase in purchasing power. The growth in the proportion of the aged population of Sri Lanka is expected to alter the overall disease profile of the country and consequently affect the volume and type of services required. In addition to the ageing population, prosperity related changes in lifestyle including comparatively regionally high levels of exposure to alcohol, tobacco and sedentary behavior have exacerbated the incidence of non-communicable diseases (NCD) to 65% of mortality and 80% morbidity.

In addition to demographic and epidemiological shifts, increasing prosperity, education and awareness levels have contributed to elevated healthcare seeking behaviour. The improvement in purchasing power of the population in Sri Lanka coupled with actual and perceived gaps in quality and availability of public health services has contributed to increased demand for health services delivered by the private sector.

Healthcare expenditure in Sri Lanka was equivalent to 3.3% of GDP in 2012. Historically, expenditure on healthcare has tracked GDP per capita with an approx. even split between private and public sectors with private expenditure reaching LKR141 billion (US\$1,084 million) and public sector reaching LKR116 billion (US\$891 million) in year 2012. Government expenditure on healthcare is funded through taxation and other Government receipts and channeled through the Ministry of Health.

Private expenditure on healthcare is dominated by out of pocket expenditure (c.86%) with the remainder relatively evenly split between private insurance, employer provision of private insurance and benevolent funds. It is noteworthy that private expenditure on healthcare is disproportionately weighted to the comparatively prosperous western province.

The state sector under the Ministry of Health operates the largest number of hospitals (593) in Sri Lanka. Consequently, the public sector dominates the inpatient segment. Although the public sector operates the largest network of hospitals, there are considerable disparities in perceived quality and availability of public healthcare provision. Consequently, patients tend to bypass their nearest primary and secondary public facilities in preference for tertiary public institutions and in some cases private hospitals. The resulting imbalance of utilization has led to long waiting lists and overcrowding in tertiary institutions.

While the public sector operates almost 3 times as many hospitals in the private sector, healthcare expenditure directed towards the private sector accounted for almost 55% of total healthcare expenditure in 2012. Total estimated private expenditure recorded a compound annual growth rate of 10.8% over the last 12 years reaching LKR 141 billion (USD 1,084 million) for year 2012. The private sector caters to the majority of outpatients (c.60%) and currently only addresses one tenth of inpatient numbers in the country.

There are approximately 197 private hospitals distributed island wide of which the “big 4” including Asiri Hospital Holdings, Durdans PLC, Nawaloka Hospitals PLC and Lanka Hospitals PLC dominate the marketplace. It is noteworthy that all 4 have a significant concentration of facilities in Colombo with a

regional presence. The private healthcare sector is characterised by the propensity of healthcare seekers to purchase services commensurate with increasing disposable income.

Provision of diagnostics is a key component of healthcare delivery in Sri Lanka. The market for diagnostic services has grown in the last 5 years at a compound annual growth rate of 19.2% to an estimated LKR 6 billion (USD 49.6 million). Two private sector players, Asiri Hospital Holdings and Durdans PLC, dominate the industry with a market share of 45% of total revenue. Asiri PLC holds 60% of market share in terms of test volumes. Despite high operating margins (c.25%-30%), pricing of diagnostics services is such that it is affordable by the vast majority of the population. Most tests are in relation to microbiology, biochemistry, haematology, histopathology, immunology, molecular biology (DNA testing) and clinical pathology. Delivery of diagnostics typically occurs via hospital-lab combinations which use a series of reference labs, satellite labs and collection centres to expand their coverage of services.

Indigenous medicine has a rich history of over 3,000 years with 4 specialisations including Ayurveda, Unani, Siddha and Paramparika. Ayurveda is the most commonly used alternative medicine medium in Sri Lanka with 6 categories of specialists totaling 17,503 in number. Over 3 mn patients are treated annually at 438 Ayurvedic hospitals and dispensaries island wide. It is noted that 60%- 70% of rural population prefer Ayurvedic medicine treatment. Sri Lanka has been designated as a World Bank Global Environment Facility zone as a biological hotspot, with 1,500 species of plants of the 8,000 known medicinal plants in the world.

Lack of funding and domestic technical expertise has limited research and development in the fields of herbal drugs, nutraceuticals and beauty products. The pharmaceutical sector is a key component of the healthcare services industry in Sri Lanka. The market is estimated to be worth LKR 61 billion (USD 469 million) having grown by a compound annual growth rate of 14% over the last five years. Pharmaceutical sales within Sri Lanka have grown exponentially over the last decade with bulk of pharmaceutical needs being met by India (c.52% by sales) followed by Switzerland, Pakistan and United Kingdom.

Pharmaceutical manufacturing in Sri Lanka is currently at its nascent stages with only 25-28 active pharmaceutical manufacturers producing close to 200 types of generic drugs. Whilst generic drugs dominate the market by quantity, branded drugs hold a larger market share by value. Uptake of branded drugs is significantly influenced by medical practitioners and the presence of substandard drugs in the market. However, the industry expects the Government to implement strict regulations to ensure quality of drugs sold in the market.

Furthermore, the Government of Sri Lanka has introduced a new price control formula for pharmaceuticals in March 2014 to prevent wide variations in drug prices. The mechanism was put in place by the Health Ministry and the Internal Trade Ministry. In year 2011 the Government established a 48-acre pharmaceutical industrial zone to stimulate local manufacturing of drugs by local and foreign players. Opportunities in the preventive healthcare market remains untapped, whilst demand for safe, affordable, quality medication for NCDs are on the rise.

Medical equipment and devices accounts for a quarter of Sri Lanka's total healthcare expenditure. The GoSL accounts for a major share of inpatient care and consequently accounts for the bulk of the expenditure on medical equipment. The market in Sri Lanka has increased steadily (compound annual growth rate 17%) over the past five years. This has been largely driven by the increase in number of private hospitals (115 to 197). Furthermore, GoSL has stated a policy of increasing timely accessibility of health equipment in public hospitals. In particular, the Government has identified the need to procure X-ray and related equipment, gastro viewing and high energy radiotherapy treatment machines for selected hospitals. A major share of medical device requirements of the country is met

by imports. Local manufacturing typically occupies low value healthcare consumables such as cotton wool, beds etc. High technology equipment requirements are met by imports from China, Singapore and Japan.

The GoSL via the University Grants Commission (UGC) undertakes the responsibility to fund and deliver medical education in Sri Lanka. Currently there are 8 UGC approved universities conducting medical and related programs. In addition to this, there is also a UGC approved private medical college conferring degrees from Nizhny Novgorod State Medical Academy in the Russian Federation. Despite the 9 institutions offering medical education, the programs are currently oversubscribed with only 35% of applicants winning places for most medical programs. However, there are private institutions affiliated with international universities offering foundation modules with the opportunities to complete medical training abroad. In terms of research, Sri Lanka spends 5.7% of the expenditure on research and development for medical related disciplines. The GoSL allocates funds via the National Health Development Master to improve research capability in Sri Lanka. Although research is done locally, foreign collaborations play a pivotal role in research. The UGC also undertakes responsibility to arrange collaborations between domestic and foreign research led universities.

The burden of diseases and changing demographic patterns have added pressure to the healthcare system resulting in disparities in numbers, types, functions, distribution, and quality of health workers. Although the pool of human resources for healthcare in Sri Lanka has increased over the last decade, the skill mix remains imbalanced with a lack of specialists. The increase in demand for healthcare is expected to result in a significant shortfall in qualified medical practitioners. This shortage is likely to become increasingly acute as both public and private sectors largely depend on resource constrained public sector funded and delivered programs. The shortage is likely to be exacerbated by a “brain drain” where qualified staff seek more lucrative opportunities abroad.

### **3.4 Economic Corridors**

The Government is committed to establishing economic corridors that are geographically widespread to encourage growth and prosperity for all sections of the population. These are:

1. The South Western economic corridor will provide connectivity to Galle, Hambantota and Moneragala, Kandy and Colombo utilising the network of highways. The second phase will connect to Dambulla via Pothuhera. This economic corridor already includes Katunayake and Mattala International Airports and regional ports in Colombo and Hambantota.
2. The North Eastern economic corridor will bring large-scale development to the Eastern and the Northern Provinces, along with the completion of the Moragahakanda and the Malwatu Oya reservoirs.
3. The secondary economic corridor is expected to develop agro-based industries and tourism by connecting Nuwara Eliya and Badulla Districts via the Kandy-Colombo Expressway and the Southern Expressway through Mattala.
4. An economic corridor between Colombo and Trincomalee will facilitate industrial development.

Western Region Megapolis. The Government is committed to fast track the long-term structural transport master plan in line with the Megapolis Development Plan for the Western Region. Major development initiatives under the Western Region Megapolis Development Plan include the:

- establishment of a multi-modal transport hub;
- railway electrification and modernization;
- waste to energy projects on PPP basis;

- development of East and West terminals of the Colombo Port;
- establishment of science parks;
- modernisation of the Bandaranaike International Airport; and
- flood mitigation projects within metropolitan areas, such as the flood control at Kelani river basin.

## CHAPTER 4: ENVIRONMENTAL AND SOCIAL SAFEGUARDS POLICIES AND THEIR IMPLEMENTATION

### 4.1 National Policies, legislative and regulatory considerations.

#### National Environmental Act (NEA) No 47 of 1980, and its' amendment Act No. 56 of 1988 and Act No. 53 of 2000

Under provisions of Part IV C of the NEA No. 47 of 1980 as stipulated in Gazette (Extra Ordinary) No. 772/22 dated June 24, 1993 GOSL made Environmental Assessment (EA) a legal requirement for a range of development projects. The list of projects requiring an EIA/ IEE is prescribed in the above Gazette notification. In addition, the Gazette notification includes a list of line ministries and agencies that are designated as Project Approving Agencies (PAA). The PAA's are responsible for the administration of the EIA process under NEA. Further amendments to the NEA stipulated environmental approvals for material extraction, emissions, noise and vibration levels. These regulations will also have a bearing on this development project.

According to provisions of the NEA regulations, the only prescribed project type under the Transport and Highways Sector relevant to the proposed project requiring an EA is the construction of national and provincial highways involving a length exceeding 10 Km.

In addition, other prescribed projects requiring environmental assessments, listed in the same regulations relevant to the proposed project include;

1. Reclamation of land, wetland area exceeding 4 hectares;
2. Conversion of forests covering an area exceeding 1 hectare into non-forest uses;
3. Involuntary resettlement exceeding 100 families, other than resettlement effected under emergency situations;
4. Extraction of timber covering land areas exceeding 5 hectares;
5. Clearing of land areas exceeding 50 hectares;
6. Inland deep mining and mineral extraction involving a depth exceeding 25 meters;
7. Inland surface mining of cumulative areas exceeding 10 hectares;
8. Mechanized mining and quarrying operations of aggregate, marble, limestone, silica, quartz, and decorative stone within 1 kilometer of any residential or commercial areas;

All projects and undertakings irrespective of their magnitude, if located partly or wholly within 100 meters from the boundaries of or within any area declared under the National Heritage Wilderness Act; the Forest Ordinance; 60 meters from a river or stream bank and having a width of 25 meters or more at any point of its course; any archeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188); any areas declared under the Botanical Gardens Ordinance; and within 100 meters from the boundaries of or within any areas declared as a Sanctuary under the Fauna and Flora Protection Ordinance.

Considering the scope of activities supported under this project, the most likely PAA's would be the CEA, Ministry of Highways or Ministry of Provincial Councils and Local Government. The CEA will formally decide on the PAA depending on the scope and location of the project on a case by case basis.

According to GOSL procedure, all development activities require environmental clearance. In order to obtain such clearance, the project proponent has to fill in a Basic Environmental Information Questionnaire. The questionnaire requires information from the project proponent to enable the CEA to determine the level of environmental analysis required prior to providing approval for the project. Upon reviewing the questionnaire, the CEA determines whether the project requires an Initial Environmental Examination (IEE), or an Environmental Impact Assessment (EIA), or whether no further environmental analysis is required, depending on the nature of the potential impacts.

#### Coast Conservation Act No. 57 of 1981

A project or any development activity that falls within the "Coastal zone" as stipulated in the Coast Conservation Act (CCA) will have to obtain approval/ permit from the Coast Conservation Department (CCD).

#### Fauna and Flora Protection Ordinance (FFPO) No.2 of 1937 (amended in 1993)

Implemented by the Department of Wildlife Conservation, this act specifies that any development activity that takes place within one mile of the boundary of a National Reserve declared under the Ordinance require an EIA/IEE. The FFPO follows a similar process as the NEA in conducting scoping, setting the ToR, preparation of EA, review of EA and public consultation and disclosure. The decision of project approval or disapproval is finally granted by the Director of the Department of Wildlife Conservation.

#### Provincial Environmental Act (PEA) of 1991

Implemented by the North Western Provincial Council for areas coming under the North Western Province. Environmental Assessments are required for prescribed projects that have been gazetted in Gazette Extraordinary 1020/21 of 27<sup>th</sup> March, 1998. It specifies two lists of project types (a) where EIA/IEE is mandatory and (b) where the EA can be requested if the PAA decides so. The scoping process is similar to that of the NEA and will be headed by one of the two listed PAAs; (a) Provincial Environmental Authority and (b) Provincial Ministry of Fisheries and Aquaculture. Representation of the CEA and the Ministry of Environment in the scoping committee is a mandatory requirement. Setting up of the Terms of Reference (ToR), preparation of the EA, review and public disclosure and consultation, granting of the project decision are the same as specified in the NEA.

#### Land Acquisition Act (LAA) No.09 of 1950as Amended

Land Acquisition Act No.09 of 1950 is the principal Act that is used for public purposes. The Act is based on the doctrine of Eminent Domain, though it was amended several times, last amendment being in 1986, there was no attempt to change the principles outlined in the Act on compensation until regulations pertaining to payment of compensation passed in Parliament in 2008 and made public by the Government Gazette No. 1596/12 dated 07th April 2009, which is applicable for the acquisition where intention of acquisition has been published under Land Acquisition Act, (Sec.02 of LAA) on or after 17th March 2009. The NGOs and other pressure groups played a significant role to influence the legislators to pass these regulations though it fell sort of amending the relevant clauses of the Act. Nevertheless the regulations are a part of the Act and recognized by law

The main feature of the regulations is that the provisions have been made for the payment of Market Value for the portion of the land that is acquired if the acquired land as an entity realize a value lower than the Market value of the land if it is sold as whole parcel. Replacement cost for structures is another salient feature of the approved regulations. Payment of disturbances and other expenses are

categorized under 12 sub headings,(Annexure 03.(The operational procedures of the LAA are laid down in detail and under it claimants are paid only the depreciated value for structures which often led to difficulties in resettling affected people. Under LAA, any aggrieved party on the valuation determined by the Department of Valuation can appeal to the Land Acquisition Review Board, and if not satisfied with the decision of the LARB, an appeal can be made to the Supreme Court. But past experience is that the Review Board, and legal procedures are time consuming and the increase of compensation have been very much to the dissatisfaction of the affected due to procedural and other constraints. Since introduction of new compensation package contained in the government gazette NO.1596/12 dated 07th April 2009, the appeals to LARB has decreased appreciably in the case of road development projects. The orders made by the Minister of Land and land development under LAA and made operative by Government Gazette No.1837/47 22<sup>nd</sup> November 2013 for selected 18 road projects appear to be an improvement on the regulations made in 2009 where Land Acquisition and Resettlement Committee (LARC) and Super LARC had been empowered to decide on certain categories of entitlements and ex-gratia payments but payments for disturbances and expenses for attending inquiries, shifting, re fixing cost of fixtures and fittings etc. have been dropped.

The law discourages unnecessary acquisition and land acquired for one purpose cannot be used for another purpose and should be returned to the original owner subject to certain requirements under the Act.

#### Land Development Ordinance (1935)

This ordinance deal with the alienation of Crown (state) land for development purposes. Land alienated to the peasants settled in colonization schemes were done under the Land Development Ordinance. Permit holders are expected to adhere to prescribed requirements in the permit. Subsequently most of these land lots were converted to almost free holds under, Swarna Bhoomi and other programmes that followed. By virtue of this ordinance and its subsequent amendments, households that occupy crown land illegally may request permission from the Divisional Secretary to be regularized their occupation on the land. Encroachers who have occupied and developed land are reconsidered for regularization unless the land does not fall within the category of reserved land

#### State Land Ordinance No 8 of 1947 –

Section (b) of the ordinance explains the state land grants which can be made on request and the rents to be obtained for the grants.

#### Road Development Authority Act No. 73 of 1981-

The Road Development Authority Act (1981) provides for the establishment of the RDA and specifies the powers; Section 22 deals with land acquisition for road development as a "public purpose" and provides for the acquisition by, and transfers to, the RDA of immovable or moveable property within any declared road development area.

#### Thoroughfare Ordinance (40 of 2008)

Salient features of the above Act are:

- It empowers the Highways Authority to establish Road Network Development Advisory Council and District Road Development Coordinating Committees and:
- Prevent unauthorized constructions within the road reservations.
- Construct new roads divert roads.

- Acquire lands vested in a local authority for widening and construction of roads.
- Make special grants under the Crown land Ordinance. Power of authority to alienate lands.
- Purchase lands for resettlement sites.
- The power to purchase land by the Highways Authority would accelerate the process of resettlement, Officers are authorized to pay compensation for the damages caused to properties.

In totality this act promotes the construction of new roads and improvement to existing roads in a more accelerated phase due to build in mechanisms to acquisition of land, payment of compensation and resettlement speedily.

### Mahaweli Authority Act of 1977 –

Under the Mahaweli Authority Act of 1977, with in the area declared under the Act, all matters pertaining to the administration of land, falls within the Mahaweli Authority.

### Forest Ordinances Amended –

Land declared as forest land is administered by the Department of Forest Conservation. They have no authority to release land on long term lease. They can release land only on renewable annual permits, still land within conservation and strict reserves would not be released for other activities by the Department of Forest Conservation. Land required for public purposes should be released by the DFC when requested by the relevant PMUs, after satisfying the conditions laid down in the NEA for prescribed projects.

### Vihara (temple) and Devalagam Ordinance –

Any construction within a land belonging to a temple or devalaya, in the event of an acquisition should be paid to the Commissioner General of Buddhist Affairs on behalf of the temple and trustees on behalf of the devalayas even if the construction had been done by a third party. The Prescriptive Ordinance does not apply to Temple and Devalagam lands

### Mines and Minerals Act No. 32 of 1992

The Geological Survey and Mines Bureau was established under the Mines and Minerals act to regulate the exploration of mines and minerals, transportation, processing, trading in or export of minerals.

### National Involuntary Resettlement Policy (NIRP)

The LAA and subsequent regulations enacted by parliament in 2008, only provides for compensation for land and structures and loss of income for some categories. It does not require project executing agencies to address key resettlement issues such as exploring alternative project options that avoid or minimize impacts on people, compensating those who do not have title to, but are currently using and dependent on land, or implementation of income restoration measures aimed at the social and economic rehabilitation of displaced/affected persons. It does not deal adequately with the impacts on those occupiers of lands who are not legal owners but lands they have occupied being taken for development purposes.

To ensure that displaced /affected persons are treated in a fair and equitable manner, and to particularly ensure that people are not impoverished or suffer unduly as a result of public or private project implementation, Sri Lanka has adopted a national policy to protect the rights of all people

affected by development projects. To remedy the current gaps in the LAA in addressing key resettlement issues, the Cabinet of Ministers approved on 16 May 2001, the National Policy on Involuntary Resettlement (NIRP) and enunciated its adoption to all development induced resettlement. The Ministry of Lands has the institutional responsibility for implementing the NIRP. The newly adopted policy, principled on human and ethical considerations entails the payment of resettlement value (replacement cost) and arranges for their resettlement and where necessary even their rehabilitation. Even though NIRP is not in the statute book, the policy is adopted by the GOSL for projects funded by ADB, WB and Japanese Bank for International Cooperation after its adoption in 2001. The NIRP was first implemented to address the issues of APs in STDP. Now the policy applies to all projects where private land is acquired for public purposes. The rules enacted in parliament under LAA in 2008 to pay compensation for structures and land at replacement cost and payment of other entitlements to the APs was to give legitimacy to the provisions of the NIRP. Any public official who contravene the NIRP is subject to disciplinary action by the heads of respective organizations. It is an issue that can be raised at parliamentary select committee by a member of parliament on behalf of APs or inquired by the Ombudsman of Parliament, Human Rights Commission or by courts of Law. In fact the highest courts in Sri Lanka have recognized that NIRP could be treated as an obligation of the state towards the affected. **Case of RDA vs. Mundy** is a good example. LARB which is the legal body under the LAA to review the appeals against compensation issues often referred the applicants back to LARC in the past, subsequently there were hardly any appeals directed to LARB by the APs. The practice had been in the past to follow the policies of ADB, WB and, JBIC and other relevant donors when there exists an ambiguity between donor policy and NIRP/LAA. At close examination it appears that the NIRP and donors policies particularly that of WB and ADB are at congruent in most of the issues. Contravention of provisions of the RAP which is prepared based on NIRP and donor policies could invite sanctions from the donors too.

NIRP emphasizes that Involuntary resettlement should be avoided or reduced as much as possible by reviewing alternatives to the project as well as alternatives within the project.

- Where involuntary resettlement is unavoidable, affected people should be assisted to re-establish themselves and improve their quality of life.
- Gender equality and equity should be ensured and adhered to throughout the policy.
- Affected persons should be fully involved in the selection of relocation sites, livelihood compensation and development options at the earliest opportunity.
- Replacement land should be an option for compensation in the case of loss of land; in the absence of replacement land cash compensation should be an option for all affected persons
- Compensation for loss of land, structures, other assets and income should be based on full replacement cost and should be paid promptly. This should include transaction costs.
- Resettlement should be planned and implemented with full participation of the provincial and local authorities.
- To assist those affected to be economically and socially integrated into the host communities; participatory measures should be designed and implemented.
- Common property resources and community and public services should be provided to affected people.
- Resettlement should be planned as a development activity for the affected people.
- Affected persons who do not have documented title to land should receive fair and just treatment.

- Vulnerable groups should be identified and given appropriate assistance to substantially improve their living standards.
- Project Executing Agencies should bear the full costs of compensation and resettlement.
- The adoption of NIRP in its entirety will make it possible to conform fully to the Bank policies. The RDA has a special unit called the Environment and Social Unit to assist it in dealing with APs and it is experienced in such work.

#### **Mines and Minerals Act, No. 33 of 1992**

The Geological survey and Minus Burao is the authorized Statutory body of Sri Lanka established to regulate Mining and mineral related activities. This bureau has been empowered by the Minerals Act, No. 33 of 1992 as amended by Mines and Minerals (Amendment) Act, No.66 of 2009, to combine the functions of the GSD with additional responsibilities to regulate the country's mining and mining related activities by the issue of licences.

## **4.2 World Bank polices on environment and social safeguards**

### **OP/BP 4.01 Environmental Assessment (EA)**

Projects financed with IDA resources normally need to comply with World Bank Operational Policies. World Bank OP 4.01 requires Environmental Assessment (EA) of projects proposed for Bank financing to help ensure that these projects are environmentally sound and sustainable. EA is a process whose breadth, depth and type of analysis depend on the nature, scale and potential for environmental impacts of the proposed project.

Considering the work involved and resultant environmental repercussions in road resurfacing and upgrading and/or provision of drainage in non-sensitive environments, this project is be treated as Category B.

World Bank OP 4.01 is very clear that for a project in Category B proposed for financing under an IDA Credit, the developer must consult project affected groups and local non-governmental organizations (NGOs) about the project's environmental aspects and take their views into account in the design and implementation. The EA should particularly incorporate such comments to improve social acceptability and environmental sustainability. Such consultations should be initiated as early as possible, in the Project cycle and it is mandatory that consultations are undertaken after the draft EA is prepared. In addition, the RDA and contractor are expected to consult with stakeholders throughout project implementation as necessary to address EMP related issues that affect them. The OP 4.01 also highlights the importance of analyzing alternative designs, technologies and operational strategies systematically in terms of their potential environmental impacts in order to select the most environmentally friendly and economically viable option.

### **OP/BP 4.04 Natural Habitats**

This policy is triggered to ensure due diligence actions are in place as part of the EAs if projects are carried out closer to sensitive natural habitats require specific measures to mitigate potential impacts to these natural habitats and associated fauna and flora. The World Bank does not support projects that, in the its opinion, involve the significant conversion or degradation of critical natural habitats. Therefore, the short-listed PPP projects should not conduct any activities within designated or on the

buffer zones of protected areas and project interventions will facilitate in mitigating pollution and degradation of such ecosystems due to project investments.

Wherever feasible, the projects should be sited on lands already converted (excluding any lands that in the Bank's opinion were converted in anticipation of the project). The Bank does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting, and comprehensive analysis demonstrates that overall benefits from the project substantially outweigh the environmental costs. If the environmental assessment indicates that a project would significantly convert or degrade natural habitats, the project includes mitigation measures acceptable to the Bank. Such mitigation measures include, as appropriate, minimizing habitat loss (e.g., strategic habitat retention and post-development restoration) and establishing and maintaining an ecologically similar protected area. The Bank accepts other forms of mitigation measures only when they are technically justified.

In deciding whether to support a project with potential adverse impacts on a natural habitat, the Bank considers the borrower's ability to implement the appropriate conservation and mitigation measures. If there are potential institutional capacity problems, the project includes components that develop the capacity of national and local institutions for effective environmental planning and management. The mitigation measures specified for the project may be used to enhance the practical field capacity of national and local institutions.

#### OP/BP 4.36 Forests

Similar to OP 4.11, while the foot prints of the PPPs that will be selected are unknown, it is anticipated based on current practices in the country, these projects may bring about impacts on the health and quality of forests due to construction material extraction. While, the World Bank-financed projects explicitly prohibits such activities particularly in protected areas, the public-sector projects still carry out such activities. Therefore, this policy is triggered.

The Bank does not finance projects that, in its opinion, would involve significant conversion or degradation of critical forest areas or related critical natural habitats. If a project involves the significant conversion or degradation of natural forests or related natural habitats that the Bank determines are not critical, and the Bank determines that there are no feasible alternatives to the project and its siting, and comprehensive analysis demonstrates that overall benefits from the project substantially outweigh the environmental costs, the Bank may finance the project if it incorporates appropriate mitigation measures. The Bank also does not finance projects that contravene applicable international environmental agreements. In accordance with OP/BP 4.01, *Environmental Assessment*, the EA for the PPP projects should address the potential impact of the project on forests and/or the rights and welfare of local communities where applicable.

#### OP/BP 4.11 Physical Cultural Resources

This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, pale-ontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community.

The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrowers' national

legislation, or its obligations under relevant international environmental treaties and agreements. The Bank adheres to the following project financing policies:

- The Bank finances only those projects that are sited and designed so as to prevent significant damages to non-replicable cultural property. This policy pertains to any project where the Bank is involved, irrespective of whether the Bank is itself financing the part of the project that may affect cultural property.
- Deviation from this policy may be justified only where expected project benefits are great, and the loss of or damage to cultural property is judged by competent authorities to be unavoidable, minor, or otherwise acceptable. The Bank also requires a discussion with specific details for their justification in the documents.

Furthermore, should any other site get identified the Project will do the following: Whenever chance finds are made during the construction of the roads, the contractor will immediately inform the project execution agency which will, in turn, inform the government department concerned with cultural property.

- The project execution agency will be responsible for securing the artefacts from theft, pilferage and damage until the responsibility is taken over by the relevant authorities.
- Failure to report a chance find immediately by the contractor will result in cancellation of the contract and punishment according to the relevant laws.
- These conditions and procedures regarding chance finds will be included as standard provisions in the construction document in details and made available for IDA review and other interested persons and entities.

#### OP/BP 4.12 Involuntary Resettlement Policy

Involuntary resettlement policy applies where a project may cause physical and economic displacement require to compensate people for loss of land, other assets, livelihood, or standard of living. The WB operational policies seek to avoid where feasible or minimize involuntary resettlement, exploring all viable alternative project designs. Resettlement planning has the objectives of providing displaced persons with a standard of living equal to, if not better than, their pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. The required measures to address the impacts resulting from involuntary taking of land. If project has significant impacts or physical displacement over 200 persons, a full Resettlement Action plan (RAP) is required to ensure that the displaced persons are informed about their options and rights pertaining to resettlement; consulted on and provided with technically and economically feasible resettlement alternatives and provided compensation at full replacement cost. Where the impacts include physical relocation the RAP includes measures to ensure that the displaced persons are provided moving allowances and provided with residential housing. Where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, an abbreviated resettlement plan may be agreed with the borrower. Impacts are considered "minor" if the affected people are not physically displaced and less than 10 per cent of their productive assets are lost.

## CHAPTER 5: GENDER AND INCLUSION

Issues relating to gender, vulnerability, and inclusion will be considered from various perspectives within the context of the Project and this ESMF, including: (i) gender-sensitive analysis and identification of risks and benefits associated with activities under the Project; (ii) Project-specific gender considerations to enhance Project benefits to women, vulnerable groups, and local community members; (iii) measures for ensuring that any risks and impacts arising from Project interventions, that have differential impacts on women and other vulnerable groups, are identified and mitigated; (iv) enhancing the voice and representation of women, especially through continuous engagement and consultations with women, and (v) gender-disaggregated monitoring indicators.

### Gender and Vulnerability Analysis

As part of the sub-project preparation, a detailed baseline analysis will be carried out to understand how communities obtain project related information, and how these different communities, including women, people with disabilities, the elderly, or any other such vulnerable groups, can be effectively informed about such information availed through the Project. Based on the findings of the assessment, an action plan for addressing inclusion issues, including gender, in this operation, will be prepared.

### Enhancing Gender Outcomes under the Project

Gender considerations will be made an integral part of the sub-project preparation and implementation. To address the gap in leadership, voice, and agency that women experience, the Project will:

- Organize focused information dissemination and awareness raising for female citizens on the likely adverse impacts faced as a result of road rehabilitation works, including likely issues faced with labor influx;
- Explore the use of citizens' monitoring committees that review and follow up on quality, safety, and progress aspects of the road rehabilitation. Measures will be put in place to ensure women's involvement and increasing leadership in citizens' monitoring committees. Women will be supported and trained to play leadership roles in these community groups;
- Enhance gender sensitivity of decision-makers, including at the PMU and PIAs, through orientation trainings on gender, and ensure women's voice and participation in decision-making bodies established under the Project, including the PMU;
- Ensure the inclusion of women in the different consultation activities, including through organizing targeted meetings for women. Such consultations will seek to address the needs and explore opportunities to support women and other vulnerable groups;
- Develop a robust Grievance Redressal Mechanism (GRM) that is sensitive to the needs of women and other vulnerable groups.

### Mitigating Adverse Impact on Women and Other Vulnerable Groups

Gender is a key issue in the social safeguard management in view of the differential vulnerabilities of affected men and women, where the latter often tend to experience the impact much more. In view of their higher vulnerability levels, specific measures will be undertaken to enable the affected

women – especially the poor and vulnerable – to cope with the Project related impacts. These actions/activities will be detailed in each of the subproject-specific ESMPs.

A GBV risk assessment was carried out using the tool provided by the World Bank, and this Project was considered as low risk, with score at 8.75 out of 25. This means that the potential for incidents of GBV to arise due to the proposed investment is low. To take appropriate mitigation action, this operation will follow the guidance put forth in the World Bank’s Good Practice Note on GBV for low risk projects, as recommended by the WB’s GBV task force, including having Codes of Conducts among other measures. Due to the nature of the major civil works involved, the following mitigation measures will be put in place to address the risks:

- All the procurement documents for civil works will put in place codes of conduct, and will be signed by contractors and their employees for appropriate mitigation and prevention actions;
- The GRM will be gender sensitive through: (i) representation of women as GRM committee members; and (ii) training and capacity building activities for GRM members on gender issues;
- A special procedure will be set up as part of the GRM that can allow GBV-related complaints to be captured and referred to existing credible care service providers as necessary.

#### Measuring the impacts

The Project will monitor the changes in women’s voice and agency using the following indicators:

- (i) Number of women who have direct access to Project-related information;
- (ii) Percentage of grievances resolved in timely manner.

## **CHAPTER 6: MANAGING THE RISKS OF ADVERSE IMPACTS FROM LABOR INFLUX**

Road rehabilitation activities supported under the Project will involve the construction of civil works for which the required labour force and associated goods and services cannot be fully supplied locally for a number of reasons, among them worker unavailability and a lack of technical skills and capacity. In such instances, the labour force (total or partial) will have to be brought in from outside the project area. In many cases, this influx is compounded by an influx of other people (“followers”) who follow the incoming workforce with the aim of selling them goods and services, or in pursuit of job or business opportunities.

#### Potential adverse impacts due to labour influx

On the one hand, an appropriately managed labor influx can provide potential benefits for the community, including economic opportunities through employment and/or training by the project, contributions to the local economy by selling goods and services, the provision of local infrastructure (such as access roads, power, or water connection) which is developed for the project and which

serves the community beyond the project duration. However, the rapid migration to and settlement of workers and 'followers' in the project area can affect project areas negatively in terms of:

- Risks of social conflict, especially between the local community and the construction workers, and also between different groups within the labour force;
- An increased risk of illicit behaviour and crime through the influx of workers and service providers into communities and the resultant perception of insecurity by the local community;
- Discontent amongst the local community on the engagement of outsiders in the project, especially in terms of job opportunities and crowding out of locals;
- An increased burden on and competition for public service provision, such as water, electricity, medical services, transport, education, and social services;
- Local inflation of prices, with the increase in demand for goods and services due to labor influx, and increased pressure on accommodations and rents, which may lead to price hikes and crowding out of local residents;
- An increased risk of communicable diseases and burden on local health services, including sexually transmitted diseases;
- GBV, particularly in the form of inappropriate behaviour, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community;
- Child labour and school dropout, especially following the increased opportunities for the host community to sell goods and services to the incoming workers;
- Risks of exploitation of labourers, especially in the form of hiring underage labourers, low and unequal wage payments, forced labour, and discrimination on basis of the basis of gender, caste, religion, or ethnicity.

The potential for these risks is more likely in project sites that are in isolated areas and/or in areas where the scope of construction work is large and the possibilities for hiring local laborers is limited, thus requiring laborers and workers to be brought in from outside.

To address the above-mentioned impacts from labor influx on local communities, the Project will:

- Reduce labour influx by tapping into the local workforce, to the extent possible;
- Assess and manage labor influx risks based on appropriate instruments; and
- Incorporate social and environmental mitigation measures, including those relating to GBV, into the civil works contract.

#### Assessment and management of risks and impacts

To address the risks and adverse impacts on communities from the Project induced labor influx, the following steps will be adopted:

- Administer the Social Screening Checklist prepared for this ESMF to identify and assess the type and significance of potential social impacts on local communities that may be generated by labor influx;
- As part of the SIA, carry out an assessment of the location of the Project, contextual factors of the location, and the legal and policy framework of the GoSL, if the screening suggests potential impacts;
- Incorporate the recommendations of the SIA and define mitigation measures, including those recommended by the World Bank's Good Practice Note on GBV, which has been prepared based on the recommendation of World Bank's Global GBV Task Force;
- Develop specific measures to mitigate the risks associated with the social and environmental impacts from labor influx into the ESMP in consultation with affected communities, in the civil works bidding documents, and subsequent contracts (contractor responsibilities are outlined in Box 1 below);
- Implement the appropriate mitigation and monitoring programmes, which includes the development and implementation of a stakeholder engagement programme;
- Establish a GRM for workers and host community which among others will integrate protocols established by the World Bank's Good Practice Note on GBV;
- Monitor and supervise regularly, including on GBV-related issues, in co-ordination with other government agencies and civil society organisations; and
- Prepare periodic reports for submission to the PMU, the World Bank, and other relevant Ministry/government agencies on implementation and the results of the ESMP and other relevant plans, as well as the GRM resolutions relating to labour and GBV-related issues.

Further, mitigation measures will be driven by consultations with stakeholders and in alignment with the World Bank's Guidelines on 'Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx'. It will be the contractor's obligation to prepare and submit a plan that outlines code of conduct for workers, worker camp management plan and measures to address GBV.

### **Box 1. Contractors' Responsibilities**

The Environment and Social Management Plan (ESMP) and/or the Social Impact Mitigation Plan (SIMP) is developed during project preparation. Based on the findings of the screening report of the sub-project activities, the management plans contain general mitigation measures. These mitigation measures will be part of the tender package and construction contract.

Prior to starting construction, the Contractor will be required to prepare and submit its own ESMP/SIMP to the supervision engineer (who is the GoSL's representative) for acceptance. The Contractor's ESMP/SIMP will provide a detailed explanation of how the Contractor will comply with the Project's safeguards documents, including the RAP, ESMP, and SIMP, and demonstrate that sufficient funds are budgeted for that purpose. The Contractor's ESMP/SIMP will include management plans for: (i) work activities; (ii) traffic management; (iii) occupational health and safety; (iv) environmental management; (v) social management; (vi) labour influx and worker camp management plan; (vii) code of conduct for workers, including measures to address GBV; and (viii) chance-finds, where relevant.

The PMU will verify and ensure the adequacy of the Contractor's ESMP/SIMP and the plan prepared under each sub-project. If issues emerge during implementation for which the Contractor's ESMP/SIMP does not contain appropriate mitigation measures, the Contractor will be required to update their ESMP/SIMP to include such mitigation measures and, if necessary, the civil works contract will be amended.

Civil works for the sub-projects will not commence until the Contractor prepares an appropriate ESMP/SIMP, which properly identifies and proposes risk mitigation measures, and it is approved by the PMU.

During implementation, the Contractor will implement civil works in accordance with its ESMP/SIMP, including all works conducted by sub-contractors under the Contractor's control. The Contractor will also be required to train workers on the roles and responsibilities under these plans, policies, and standards.

The Contractor will submit regular reports to the PMU and/or other relevant Ministry/Agency, and proactively address any issues that arise.

## **CHAPTER 7: ENVIRONMENTAL ASSESSMENTS AND MITIGATION MEASURES**

Road specific environmental assessments (EA), social impact assessments (SIA), and respective Environmental and Social Management Plans (ESMP) should be conducted before commencement of each sub-project (during detail design). Such approach will provide more specific information on the

environment and socio-economic profile along a given road section. It will also generate project specific impacts on environment and society and help to formulate mitigation measures. However, this ESIMF will outline all possible impacts to the environment and society on a generic basis.

Different types of baseline data on environmental characteristics, socio-economic baseline information and project affected persons information may be necessary for formulating detailed EAs/ SIAs. Therefore, it is necessary undertake collection of baseline data on environmental characteristics and a socioeconomic study of the project area and project affected persons.

TOR for road specific EA, SIA and ESMP is attached as annex 5.

## 7.1 Potential environmental issues and impacts

The purpose of this section of the report is to identify the possible environmental and social impacts and issues that could arise as a result of the proposed project activities. The nature and scale of impacts (500 m belt to the both side of the road considered as the impact zone) will be determined by the type of interventions undertaken by the project to assist the road sector, which focuses on rehabilitation, improvement and upgrading the existing road section through resurfacing and provision of drainage. The section also discusses environmental and social issues that may arise during periodic maintenance of the rehabilitated and improved roads.

Impacts and issues of any road development project could be distinguished between physical, biological/ ecological and social environments. These impacts could be significant or non-significant, positive or negative, direct or indirect and could be immediate or long-term impacts.

As stated previously this project is categorized as a category B project in which the impacts are mostly non-significant and manageable. Some of the impacts to physical and ecological environment during construction phase are as follows:

1. Adverse impacts on soil at construction and material extraction sites and yard could occur due to; Loss of productive top soil due to site preparation work, Soil erosion caused by clearing & grubbing operations which removes the vegetative cover on the roadway and in the immediate surroundings Soil erosion caused by mining and quarrying operations, Soil erosion caused by temporary diversions of water ways, Contamination of soil by heavy metals & chemicals discharged by construction vehicles and from material storage sites, Erosion of uncovered temporary stock piles and soil dumps.
2. Impacts on surface and ground water sources occur due to following activities;

Adverse impacts	Siltation of waterways due to modifications to surface water flow and drainage patterns,	Short term (during construction)
	Flooding of local areas due to re-channelization of waterways intersected by the road,	Short term (during construction)
	Impacts of impoundment, channel deepening and filling,	Long term
	Degradation of surface water quality due to equipment and material piling on the site,	Short term (during construction)
	Degradation of water quality due to waste water from worker camps,	Short term (during construction)
		Short term (during construction)

	Degradation of water quality in water bodies in the vicinity of quarry and borrow sites Reduction in groundwater recharge due to road drainage and excavation, especially in dry areas.	Long term
Beneficial impacts	Improvement of surface water quality due to better run off management	Long term

3. .... Ambient air quality within construction sites, material extraction sites and yards will be affected due to following operations;

- Operation of construction vehicles and plants (AC plant and concrete batching plants) that emit obnoxious gases
- Exposure of soil surface due to excavation, clearing of surface vegetation which generates dust
- Mining operations of metal and gravel for construction material will emit dust and other particulate matter
- Improper storage of chemicals that could emit fumes of stored chemicals

4. .... Impacts on Eco-systems, Fauna and Flora could occur due to following operations and activities;

- Clearing of roadside vegetation for construction activities may lead to disturbance to natural habitats (wetlands, forestry areas, lagoons, etc)
- Clearing of surface vegetation in quarry sites and burrow sites may lead to the loss of land/ natural habitats
- Loss of fauna and flora in the road site due to construction works
- Disturbance to animal migration routes and patterns
- Pouching and hunting of animals by workers
- Disturbance to animal migration routes and patterns
- Changes to aquatic eco-systems due to siltation of waterways, changes to speed and volume of water flow
- Contamination of biota by emissions to air, water and soil during construction and material extraction works
- Loss of standing crops, fruit trees and commercially valuable trees due to construction works close to home gardens, chena lands and paddy fields

5. Increased noise nuisance and vibration issues to public living close to construction areas and quarries. Following adverse impacts could occur after construction has been completed and during operational stage where periodic maintenance of the rehabilitated road and road furniture;

1. Flooding of road and surrounding areas due to blocking of culverts and other drainage structures
2. Threats of modification of previously pristine areas by humans as a direct result of improved accessibility
3. Road safety issues of road users
4. Encroachment in to new ROW

As indicated, rehabilitation of roads will have minimal amount of on-site environmental impacts. Disturbances to land, interference to soil stability and the hydrology in the area will be minimal. Impacts on air quality and noise levels during project operational stage will depend on the projected traffic flow increases and the anticipated reduction in traffic congestion both due to improved road conditions.

Issues and impacts identified will be mitigated through actions stipulated in table 4.1. Provincial offices of PRDA will execute these mitigation measures through respective Chief Engineers and Executive Engineers. ESD of RDA will monitor the effectiveness of implementation of the selected mitigation measures.

## 7.2 Mitigation measures for potential environmental issues and impacts

Impacts and issues relating to the development works discussed in the previous section could be avoided/ minimized by adopting various mitigation measures that could be applied during the preconstruction, construction and operation phases of the project. Below table outlines the impacts/ issues and possible mitigation measures that could be adopted to avoid/ minimize the impacts on physical, biological and social environments.

Table 7.1: Possible impacts and issues and mitigation measures

Environmental Issues		Protection and preventive measures
<b>1.0 Advance Works</b>		
<b>1.1</b>	<b>Land Acquisition</b>	
	<b>1.1.1</b>	<b>Removal of structures built within the existing road reservation</b>
	(a)	Providing labour to shift and restore the structures outside the new road corridor.
	(b)	Possible livelihood restoration measures for affected persons should be considered in line with Environmental and Social Safeguard Policies of World Bank, National Involuntary Resettlement Policy (NIRP) and concession arrangements made by Ministry of Highways and Road Development for compensating project affected persons
	<b>1.1.2</b>	<b>Acquisition of private/ state land for adjustments to road alignment</b>
	(a)	Compensation based on the Land Acquisition Act (LAA), National Involuntary Resettlement Policy (NIRP) and concession arrangements made by Ministry of Highways and Road Development for compensating project affected private lands that may need to be acquired for road construction.
	(b)	Consent of Department of Forest (DoF), Department of Wildlife Conservation (DWLC), for releasing forest land that may need to be acquired due to minor adjustment to alignment within such areas.
	(c)	Identification of wildlife transition locations should be carried out in order to avoid any impacts such as potential of collision and run over of animals and disturbance to their natural movement.
	(b)	RDA should obtain prior consent from DoF and DWLC for the construction works near lands belonging to these institutes.
<b>1.2</b>	<b>Road sections near archaeological sites</b>	
	(a)	Prior consultation and consent should be taken from Department of Archaeology for proposed construction works close to archaeological sites.
<b>1.3</b>	<b>Identification of utility supply lines that may need to be shifted</b>	
	(a)	Prior consultation and consent should be taken from relevant service provider if sections of utility lines need to be shifted due to design requirements or shift in alignment.
<b>1.4</b>	<b>Design for culverts and bridges</b>	

<b>Environmental Issues</b>	<b>Protection and preventive measures</b>	
	(a)	RDA should obtain prior consent from relevant authorities such as Department of Irrigation, Department of Agrarian services, etc., for any proposed construction works on reservoir embankments, irrigation canals etc.
	(b)	Designs for bridges should conform to the requirements of the "Bridge Design Manual" of RDA considering a flood return period of 100 years. For culverts appropriate designs should be considered to allow sheath flow or cross drainage without any blocking.
<b>2.0 Construction Phase</b>		
<b>2.1</b>	<b>Earthwork and Soil Conservation</b>	
	<b>2.1.1</b>	<b>Disposal of Debris and Spoil</b>
	(a)	All debris and residual spoil material including any left earth shall be disposed only at locations approved by the engineer for such purpose and subjected to the clauses 2.1.1.b and 2.1.1.c.
	(b)	If directed by the engineer the contractor shall obtain the approval from the relevant Local Authority (LA) such as Pradeshiya sabha, Municipal Council and other government agencies (as required) for disposal and spoil at the specified location.
	(c)	The debris and spoil shall be disposed in such a manner that; (i) waterways and drainage paths are not blocked (ii) the disposed material should not be washed away by runoff and (iii) should not be a nuisance to the public
	(d)	If directed by the Engineer the debris and residual spoil material including any left earth shall be used, to refill the borrow areas as directed by the engineer, subjected to laying of topsoil as per EMAP clause 2.1.2.
	(e)	If consented by the engineer, contractor can dispose the debris and spoil as a filling material provided that the contractor can ensure that such material is used for legally acceptable purposes with disposed in an environmentally acceptable manner.
	<b>2.1.2</b>	<b>Conservation and reuse of top soil</b>
	(a)	Top soil of the agricultural areas and any other productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth of 150mm and stored in stockpiles of height not exceeding 2m, if directed by the engineer. If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he shall obtain the direction from the engineer in writing
	(b)	Removed top soil could be used as a productive soil when replanting/establishing road side vegetation
	(c)	Such stockpiled topsoil must be returned to cover the areas including cut slopes where the topsoil has been removed due to project activities. Residual topsoil must be distributed on adjoining/proximate barren areas as identified by the engineer in a layer of thickness of 75mm – 150mm.
	(d)	Topsoil thus stockpiled for reuse shall not be surcharged or over burdened. As far as possible multiple handling of topsoil stockpiles should be kept to a minimum.
	<b>2.1.3</b>	<b>Protection of Ground Cover and Vegetation</b>
	(a)	Construction vehicle, machinery and equipment shall be used and stationed only in the areas of work and in any other area designated/ approved by the engineer. Entry and exit of construction vehicles and machinery should be restricted to particular points as directed by the engineer
	(b)	Contractor should provide necessary instructions to drivers, operators and other construction workers not to destroy ground vegetation cover unnecessarily
	<b>2.1.4</b>	<b>Borrowing of Earth</b>
	(a)	Earth available from excavation for roadside drains as per design, may be used as embankment materials, subject to approval of the engineer
	(b)	Contractor shall comply with the environmental requirements/guidelines issued by the Central Environmental Authority (CEA) and the respective local authority

Environmental Issues	Protection and preventive measures
	with respect of locating borrow areas and with regard to all operations related to excavation and transportation of earth from such sites.
(c)	All borrow pits/areas should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the CEA and the respective local authority.
(d)	Borrow areas shall not be opened without the permission of the engineer. The location, depth of excavation and the extent of the pit or open cut area shall be as approved by the engineer.
(e)	Establishment of borrow pits/areas and its operational activities shall not cause any adverse impact to the properties. Also shall not be a danger of health hazard to the people.
(f)	Contractor shall take all steps necessary to ensure the stability of slopes including those related to temporary works and borrow pits.
<b>2.1.5</b>	<b>Prevention of soil erosion</b>
(a)	Embankment slopes, slopes of cuts, etc shall not be unduly exposed to erosive forces. These exposed slopes shall be graded and covered by grass as per the specifications. All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch.
(b)	Work that lead to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the Engineer by submitting a proposal on actions that will be undertaken by the contractor to prevent erosion.
(c)	The work, permanent or temporary shall consist of measures as per design or as directed by the engineer to control soil erosion, sedimentation and water pollution to the satisfaction of the engineer. Typical measures include the use of berms, dikes sediment basins, fiber mats, mulches, grasses, slope drains and other devices. All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork or other items of work and no separate payment will be made for their implementation.
<b>2.1.6</b>	<b>Contamination of soil by fuel and lubrications</b>
(a)	Vehicle/machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the engineer
(b)	Approval from CEA in the form of an Environmental Protection Licenses (EPL) should be secured by the contractor if he intends to prepare his own vehicle servicing yard
(b)	Waste oil, other petroleum products and untreated wastewater shall not be discharged on ground so that to avoid soil pollution. Adequate measures shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers. All waste petroleum products shall be disposed of in accordance with the guidelines issued by the CEA or the engineer.
(c)	Sites used for vehicle and plant service and maintenance shall be restored back to its initial status. Site restoration will be considered as incidental to work.
<b>2.1.7</b>	<b>Disposal of harmful construction wastes</b>
(a)	Contractor prior to the commencement of work shall provide list of harmful, hazardous and risky chemicals/ material that will be used in the project work to the Engineer. Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful materials have been dumped as waste at the end of the project.
(a)	All disposal sites should be approved by the engineer and approved by CEA and relevant local authority.
(b)	The contractor shall clean up any area including water-bodies affected/contaminated (if any) as directed by the engineer at his own cost.
<b>2.1.8.</b>	<b>Quarry operations</b>

<b>Environmental Issues</b>		<b>Protection and preventive measures</b>
	(a)	Utilizing the existing quarry sites available in the project influential area as much as possible which are approved by GSMB or local authorities, operating with EPL and Industrial Mining Licences (IML); If new quarries are to be opened, prior approval should be obtained from GSMB, CEA and local authorities such as Pradeshiya Sabha; Selected quarry sites should have proper safety measures such as warnings, safety nets etc., and third party insurance cover to protect external parties that may be affected due to blasting.
	(b)	It is recommended not to seek material from quarries that have ongoing disputes with community.
	(c)	The maintenance and rehabilitation of the access roads in the event of damage by the contractors operations shall be a responsibility of the contractor.
<b>2.2</b>	<b>Storage and handling of construction material</b>	
	2.2.1	<b>Emission of dust</b>
	(a)	Storage locations of sand, metal, soil should be located away from settlements and other sensitive receptors and covered (with artificial barriers or natural vegetation). Measures given under clauses 2.4.1 (c), (d), (e) should be considered within material storage site to minimize dust during handling of material. All access roads within the storage site should be sprinkled with water for dust suspension.
	2.2.2	<b>Storage of fuel, oil and chemicals (avoid fumes and offensive odour)</b>
	(a)	All cement, bitumen (barrels), oil and other chemicals should be stored and handled on an impervious surface (concrete slab) above ground level. Storage facility of cement, bitumen (barrels), oil and other chemicals should be an enclosed structure ensuring that no storm water flows in to the structure. A ridge should be placed around the storage facility to avoid runoff getting in to the structure. Adequate ventilation should be kept to avoid accumulation of fumes and offensive odour that could be harmful to material handlers. Measures given under clause 2.9 should be considered to avoid any accidents and risks to worker population and public.
	2.2.3	<b>Transportation of material</b>
	(a)	The contractor should avoid over loaded trucks to transport material to construction sites.
<b>2.3.</b>	<b>Water – Protection of Water Sources and Quality</b>	
	2.3.1.	<b>Loss of minor water sources and disruption to water users</b>
	(a)	Contractor should make employees aware on water conservation and waste minimization in the construction process.
	(b)	Contractor shall protect sources of water (potable or otherwise) such as water sources used by the community so that continued use these water sources will not be disrupted by the work. In case the closure of such sources is required on temporary basis contractor shall provide alternative arrangement for supply. Alternative sources such as wells thus provided should be within acceptable distance to the original sources and accessible to the affected community.
	(c)	Contractor shall not divert, close or block existing canals and streams in a manner that adversely affect down – stream intakes. If diversion or closure or blocking of canals and streams is required for the execution of work, contractor must obtain the engineers approval in writing. Contractor shall also obtain the approval from the National Water Supply and Drainage Board (NWS&DB) or local authority of Divisional Secretary depending on the operating agency of the intake/water supply. Contractor shall restore the drainage path back to its original status once

Environmental Issues	Protection and preventive measures
	the need for such diversion or closure or blockage ceased to exist. During the affected period contractor shall supply water to the affected community.
(d)	In case the contractors activities going to adversely affect the quantity or quality of water, the contractor shall serve notice to the relevant authorities and downstream users of water sufficiently in advance.
	<b>2.3.2 Siltation into water bodies</b>
(a)	Contractor shall take measures to prevent siltation of water bodies as a result of his work including construction of temporary/ permanent devices to prevent water pollution due to siltation and increase of turbidity. These shall include the measures against erosion as per EMAP 2.1.6.
(b)	Construction materials containing small/ fine particles shall be stored in places not subjected to flooding and in such a manner that these materials will not be washed away by runoff.
(c)	Temporary soil dumps should be placed at least 200m away from all water bodies
(d)	If temporary soil piles are left at the site for a long time those piles should be covered with thick polythene sheets
(f)	All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch
	<b>2.3.3 Alteration of drainage paths</b>
(a)	Contractor shall not close or block existing canals and streams permanently. If diversion or closure or blocking of canals and streams is required for the execution of work (e.g. for construction of bypass), contractor must first obtain the Engineers approval in writing. Contractor shall carry out an investigation and report to the Engineer, if an investigation is requested by the Engineer. Contractor shall also obtain the approval from the relevant agency such as Department of Irrigation (DI)/Agrarian Services Department (ASD)/Divisional Secretary (DS) prior to such action is taken. Contractors shall restore the drainage path back to its original status once the need for such diversion or closure or blockage is no longer required.
(b)	The debris and spoil shall be disposed in such a manner that waterways and drainage paths are not blocked.
(c)	Avoid/ minimize construction works near/ at such drainage locations during heavy rain seasons such as Mara rains from November to December.
	<b>2.3.4. Contamination of water from construction wastes</b>
(a)	The work shall be carried out in such a manner that pollution of natural watercourses, inland tanks and irrigation canals is avoided. Measures as given in 2.1.6., 2.1.7, 2.1.8, 2.3.2 and 2.3.6. clauses shall be taken to prevent the wastewater produced in construction from entering directly into streams, water bodies or the irrigation systems.
(b)	Avoid/ minimize construction works near/ at such drainage locations during heavy rain seasons such as Mara rains from November to December.
(b)	The discharge standards promulgated under the National Environmental Act shall be strictly adhered to. All waste arising from the project is to be disposed in a manner that is acceptable to the engineer and as per the guidelines/instructions issued by the CEA.
	<b>2.3.5. Contamination from fuel and lubricants</b>
(a)	All vehicle and plant maintenance and servicing stations shall be located and operated as per the conditions and /or guidelines stipulated under the EPL issued by CEA. In general these should be located at least 200m away from water bodies and wastewater shall not be disposed without meeting the disposal standards of the CEA. Wastewater from vehicle and plant maintenance and servicing stations shall be cleared of oil and grease and other contaminants to meet the relevant standards before discharging to the environment.

Environmental Issues	Protection and preventive measures
(b)	Vehicle, machinery and equipment maintenance and re-filling shall be done as required in EMAP clause 2.1.6. to prevent water pollution as well
<b>2.3.6.</b>	<b>Locating, sanitation and waste disposal in construction camps</b>
(a)	Locations selected for labour camps should be approved by engineer and comply with guidelines/ recommendations issued by the CEA/Local Authority (LA). Construction labourer's camps shall not be located within 200m from waterways, within an area coming under DWLC or DoF, near to a site or premises of religious, cultural or archaeological importance and school.
(b)	Labour camps shall be provided with adequate and appropriate facilities for disposal of sewerage and solid waste. The sewage systems shall be properly designed, built and operated so that no pollution to ground or adjacent water bodies/watercourses takes place. Garbage bins shall be provided the camps and regularly emptied. Garbage should be disposed off in a hygienic manner, to the satisfaction of the relevant norms. Compliance with the relevant regulations and guidelines issued by the CEA/LA shall be strictly adhered to.
(c)	Contractor shall ensure that all camps are kept clean and hygienic. Necessary measures shall be taken to prevent breeding of vectors
(d)	Contractor shall report any outbreak of infectious disease of importance in a labour camp to the engineer and the Medical Officer of Health (MOH) or to the Public Health Inspector (PHI) of the area immediately. Contractor shall carry out all instructions issued by the authorities, if any.
(e)	Contractor shall adhere to the CEA recommendations on disposal of wastewater. Wastewater shall not be discharged to ground or waterways in a manner that will cause unacceptable surface or ground water pollution.
(f)	All relevant provisions of the Factories Act and any other relevant regulations aimed at safety and health of workers shall be adhered to.
(g)	Contractor should remove all labour camps fully after its need is over, empty septic tanks, remove all garbage, debris and clean and restore the area back to its former condition.
<b>2.3.7.</b>	<b>Wastage of water and waste minimization</b>
(a)	The contractor will minimize wastage of water in the construction process/operations by reusing water as much as possible, utilizing only the required amount of water for the construction works etc...
(b)	The contractor shall educate and made employees aware on water conservation, waste minimization and safe disposal of waste following guidelines given by CEA and LA.
<b>2.3.8.</b>	<b>Extraction of water</b>
(a)	The contractor is responsible for arranging adequate supply of water for the project purpose throughout the construction period. Contractor shall not obtain water for his purposes including for labour camps from public or community water supplies without approval from the relevant authority. Such extraction (if approved) should be under direct supervision of the engineer
(b)	Extraction of water by the contractor for the project purposes shall comply with the guidelines and instructions issued by relevant authority. The Contractor shall not extract water from groundwater or from surface water-bodies without permission from the Engineer.
(c)	Construction over and close to the non-perennial streams shall be undertaken in the dry season. Construction over the irrigation canals, if disruption to the flow, quality of water and impact on the irrigation structure is expected (or probable in the view of the Engineer), will be undertaken under necessary permission from the Department of Irrigation.

<b>Environmental Issues</b>	<b>Protection and preventive measures</b>	
	(d)	The Contractor may use the natural sources of water subject to the provision that any claim arising out of conflicts with other users of the said natural sources of water shall be made good entirely by the contractor
<b>2.4.</b>	<b>Flood Prevention</b>	
	<b>2.4.1.</b>	<b>Blockage of drainage paths and drains</b>
	(a)	Contractor's activities shall not lead to flooding conditions as a result of blocked drainage paths and drains. The contractor shall take all measures necessary or as directed by the Engineer to keep all drainage paths and drains clear of blockage at all times.
	(b)	If flooding or stagnation of water is caused by contractor's activities, contractors shall provide suitable means to (a) prevent loss of access to any land or property and (b) prevent damage to land and property. Contractor shall compensate for any loss of income or damage as a result.
	<b>2.4.2</b>	<b>Work in Flood Prone Areas</b>
	(a)	Contractor's activities shall not lead to aggravate floods in flood prone areas when working in flood prone areas.
	(b)	When working in flood prone areas during rainy season the contractor shall avoid storing materials, chemicals and other items of work in areas where those can be washed away by the floods.
<b>2.5</b>	<b>Air Pollution</b>	
	<b>2.5.1.</b>	<b>Generation of Dust</b>
	(a)	The contractor shall effectively manage the dust generating activities such as topsoil removal, handling and transporting sand, rubble, bitumen, and cement during periods of high winds or during more stable conditions with winds directed towards adjacent residences and other facilities.
	(b)	All stockpiles shall be located sufficiently away from sensitive receptors.
	(c)	All vehicles delivering materials shall be covered to avoid spillage and dust emission.
	(d)	The Contractor should avoid, where possible and take suitable action to prevent dirt and mud being carried to the roads (particularly following wet weather).
	(e)	The contractor should enforce vehicle speed limits to minimize dust generation.
	(f)	The Contractor shall employ a water truck to sprinkle water for dust suppression on all exposed areas as required (note: the use of waste water / waste oil for dust suppression is prohibited)
	(g)	All cleared areas shall be rehabilitated progressively.
	(h)	All earthwork shall be protected in a manner acceptable to the minimize generation of dust.
	(i)	All existing highways and roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similarly roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres.
	(j)	Clearance shall be affected immediately by manual sweeping and removal of debris, or, if so directed by the Engineer, by mechanical sweeping and clearing equipment. Additionally, if so directed by the Engineer, the road surface will be hosed or sprinkled water using appropriate equipments.
	(k)	Plants, machinery and equipment shall be handled (including dismantling) so as to minimize generation of dust.
	(l)	The contractor shall take every precaution to reduce the level of dust emission from the hot mix plants and the batching plants up to the satisfaction of the Engineer in accordance with the relevant emission norms.
	(m)	The hot mix plant be sited in accordance with CEA guidelines and operated with an EPL. The hot mix plants shall be fitted with the requirements of the relevant current emission control legislation.
	<b>2.5.2</b>	<b>Emission from Hot-Mix Plants and Batching Plants</b>

<b>Environmental Issues</b>		<b>Protection and preventive measures</b>
	(a)	The hot mix plants and batching plants shall be sited in accordance with CEA guidelines. It is recommended that hot mix plants and batching plants to be located sufficiently away from sensitive receptors such as vulnerable habitats, religious, cultural and archaeological sites, residential areas, schools and industrial areas (locations given in item 2.4.1).
	(b)	The exhaust gases shall comply with the requirements of the relevant current emission control legislation. All operations at plants shall be undertaken in accordance with all current rules and regulations protecting the environment as well as the conditions given in the EPL.
	<b>2.5.3.</b>	<b>Odour and offensive smells</b>
	(a)	Contractor shall take all precautions such as storing all chemicals used for construction works in properly closed containers with good ventilations to prevent odour and offensive smell emanating from chemicals and processes applied in construction works or from labour camps. In a situation when/where odour or offensive smell does occur contractor shall take immediate action to rectify the situation. Contractor is responsible for any compensation involved with any health issue arisen out of bad odour and offensive smells.
	(b)	The waste disposal and sewerage treatment system for the labour camps shall be properly designed, built and operated so that no odour is generated. Compliance with the regulations on health and safety as well as CEA and LA guidelines shall be strictly adhered to.
	<b>2.5.4.</b>	<b>Emission from construction Vehicles, Equipment and Machinery</b>
	(a)	The emission standards promulgated under the National Environment Act shall be strictly adhered to.
	(b)	All vehicles, equipment and machinery used for construction shall be regularly serviced and well maintained to ensure that emission levels comply with the relevant standards.
	(c)	Contractor should obtain the certificate issued by the Vehicular Emission Test (VET) for all construction vehicles, plants and other machineries and it should be renewed annually
	<b>2.5.5.</b>	<b>Air Pollution from Crusher</b>
	(a)	Crusher plants should operate under an EPL and shall confirm to relevant dust emission levels as stated in the EPL. Only the quarries approved by GSMB and holding current EPL shall be used for material extraction.
	(b)	Crushing plants shall be sited sufficiently away from sensitive receptors such as houses, schools, hospitals, temples, shrines and outdoor recreation areas (locations given under item 2.4.1) or as required by the Engineer.
	(c)	Sprinkling of water (through a sprinkler system) for dust suppression.
<b>2.6.Noise Pollution and Vibration</b>		
	<b>2.6.1</b>	<b>Noise from Vehicles, Plants and Equipment</b>
	(a)	All machinery and equipment should be well maintained and fitted with noise reduction devices in accordance with manufacturer's instructions.
	(b)	In construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing and batching, mechanical compaction, etc., will be stopped between 20.00 hours to 06.00 hours .In silence zone (areas up to 100 m around such premises as hospitals, educational institutional and courts) no hot-mix, batching or aggregate crushing plant will be allowed. No construction shall take place within 100m around hospitals between 20.00 hours to 06.00 hours. Near noise sensitive sites, such as hospitals, educational institutional and courts noisy equipment shall not be used during noise sensitive times of the day.
	(c)	All vehicles and equipment used in construction shall be fitted with exhaust silences. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced.

<b>Environmental Issues</b>	<b>Protection and preventive measures</b>
	Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed from site.
(d)	Noise limits for construction equipment used in this project (measured at one meter from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB(A)c Day time and shall not exceed 60 in the night time.
(e)	Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the Engineer, to keep noise from these at a minimum.
(f)	Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall be provided with protective gear.
<b>2.6.2</b>	<b>Vibration</b>
(a)	Contractor shall take appropriate action to ensure that construction works do not result in damage to adjacent properties due to vibration.
(b)	Prior to commencement of excavation, blasting activity, the Contractor shall undertake a condition survey of existing structures within the zone of influence, as agreed with the relevant government agencies and the engineer.
(c)	Contractor shall carry out monitoring at the nearest vibration sensitive receptor during blasting or when other equipments causing vibration are used.
(d)	The contractor shall modify the method of construction until compliance with the criteria, if vibration levels exceed the relevant vibration criteria.
(e)	Contractor shall pay due consideration on vibration impacts of blasting on adjoining structures. Explosive loads shall be determined so that excessive vibration can be avoided and blasts shall be controlled blasting in nature. Notwithstanding to these provisions contractor is liable for any damage caused by blasting work.
<b>2.6.3</b>	<b>Noise from Blasting or Pre splitting Operations</b>
(a)	Blasting shall be carried out only with permission of the Engineer and approval from GSMB for road side blasting all the statutory laws, regulators, rules, etc., pertaining to acquisition, transport, storage, handling and use of explosives shall be strictly followed.
(b)	Blasting shall be carried out during fixed hours (preferably during mid-day), as permitted by the Engineer. The timing should be made known to all the people within 500 m (200 m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200 m (50 m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting.
<b>2.7.</b>	<b>Impacts to Flora</b>
<b>2.7.1</b>	<b>Loss or Damage to Trees and Vegetation</b>
(a)	All works shall be carried out in a manner that the destruction to the flora and their habitats is minimised. Trees and vegetation shall be felled / removed only if that impinges directly on the permanent works or necessary temporary works. In all such cases contractor shall take prior approval from the Engineer.
(b)	Contractor shall make every effort to avoid removal and/or destruction of trees of religious, cultural and aesthetic significance. If such action is unavoidable the Engineer shall be informed in advance and carry out public consultation and report on the same should be submitted to the Engineer.
(c)	Contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority, if any with regard to felling of trees and removal of vegetation.

Environmental Issues	Protection and preventive measures
(d)	If the trees and vegetation that require removal is in a forest plantation or natural forest under the jurisdiction of the DoF the contractor shall take prior approval from the DoF for such removal and adhere to conditions /guidelines imposed by the DoF if any.
(e)	If the trees and vegetation that require removal is in a protected area under jurisdiction of the Department of Wildlife Conservation, the contractor shall take prior approval from the DWLC for such removal and adhere to conditions /guidelines imposed by the DWLC if any.
(f)	Removed trees must be handed over to the Timber Corporation.
(g)	A compensatory tree planting program should be developed in consultation with DoF, local authorities and communities in order to replenish the loss of trees. At least 3 good specimens of same tree species (having > 4 cm DBH) should be planted for each tree removed. Compensatory tree planting should be attended for about two years to promote survival of the replanted specimens Replanting should be as near as possible to the removal location Planting of selected fast growing trees which are of native species Replanting in the private lands could be encouraged to compensate impact due to loss of vegetation in private lands
<b>2.7.2</b>	<b>Chance found important Flora</b>
(a)	During construction, if a rare/threatened/endangered flora species is found, it shall be immediately informed to the PMU by the contractor. All activities that could destroy such flora and/or its habitat shall be stopped with immediate effect. Such activities shall be started only after obtaining the Engineer's approval. Contractor shall carry out all activities and plans that the Engineer instructed him to undertake to conserve such flora and/or its habitat.
<b>2.8.</b>	<b>Impact on Fauna</b>
<b>2.8.1.</b>	<b>Loss, Damage or Disruption to Fauna</b>
(a)	All works shall be carried out in such a manner that the destruction or disruption to the fauna and their habitats is minimum.
(b)	Construction workers shall be instructed to protect fauna including wild animals and aquatic life as well as their habitats. Hunting, pouching and unauthorized fishing by project workers is not allowed.
(c)	Strict worker force supervision should be carried out by the contractor when conducting construction work close to forest lands of DoF and DWLC Construction workers shall not be allowed to trespass into such forest land
(d)	Siting of all hot mix plants, crushing plants, workshops, depots and temporary worker camps and storing of toxic and hazardous materials at approved locations, and recycling and dumping of solid waste matter at locations approved by local authorities, maintenance of vehicles and equipment in good operable condition, ensuring no leakage of oil or fuel and the fitting of proper exhaust baffles. Any solid waste should not be dumped into water bodies.
(e)	Regular and adequate fuel supplies of Liquid Petroleum Gas (LPG) or kerosene to worker camps in order to avoid workers scavenging for fuel wood from the proposed forest reserves and sanctuary areas.
<b>2.8.2</b>	<b>Chance found important Fauna</b>
(a)	During construction, if a rare/threatened/endangered <b>fauna</b> species is found, it shall be immediately informed to the PMU by the contractor. All activities that could destroy such fauna and/or its habitat shall be stopped with immediate effect. Such activities shall be started only after obtaining the Engineer's approval. Contractor shall carry out all activities and plans that the Engineer instructed him to undertake to conserve such fauna and/or its habitat.

<b>Environmental Issues</b>	<b>Protection and preventive measures</b>	
<b>2.9.</b>	<b>Disruption to Users</b>	
	<b>2.9.1</b>	<b>Loss of Access</b>
	(a)	At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock to and from side roads and property accesses connecting the project road. Work that affects the use of side roads and existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer.
	(b)	The works shall not interfere unnecessarily or improperly with the convenience of public or the access to, use and occupation of public or private roads, railways and any other access footpaths to or of properties whether public or private.
	(c)	On completion of the works, all temporary obstructions to access shall be cleared away, all rubbish and piles of debris that obstruct access be cleared to the satisfaction of the Engineer.
	(d)	Providing advance information to the public about the planned construction works and activities causing disruption to access roads, and the temporary arrangements made to give relief to public in order to avoid any inconveniences due to the construction activities.
	(e)	Use of flagmen and/or temporary traffic lights to control traffic flows at constricted sites, including safe crossing for pedestrians especially at town areas and near schools.
	<b>2.9.2</b>	<b>Traffic Jams and Congestion</b>
	(a)	Detailed Traffic Control Plans shall be prepared and submitted to the Engineer for approval 5 days prior to commencement of works on any section of road. The traffic control plans shall contain details of temporary diversions, details of arrangements for construction under traffic and details of traffic arrangements after cession of work each day. If directed by the Engineer the contractor shall obtain the consent for the traffic arrangement from the Local Police.
	(b)	Temporary diversion of traffic to facilitate construction work shall have the approval of the Engineer. If directed by the Engineer the contractor shall obtain the consent for the traffic arrangement from the Local Police.
	(c)	Special consideration shall be given in the preparation of the traffic control plan to the safety of pedestrians and workers at night.
	(d)	The contractor shall ensure that the road surface is always properly maintained, particularly during the monsoon so that no disruption to the traffic flow occurs.
	(e)	The temporary traffic detours shall be kept free of dust by frequent application of water.
	(f)	Personnel used for traffic control by the contractor shall be properly trained, provided with proper gear including communication equipment, luminous jackets for night use. All signs, barricades, pavement markings used for traffic management should be to the standards and approved by the Engineer/ Police.
	(g)	The manual of traffic control devices of RDA Should be followed during construction period in order to ensure the safety and traffic control.
	<b>2.9.3</b>	<b>Traffic Control and Safety</b>
	(a)	The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the highways under improvement. The provision of traffic safety measures shall be considered incidental to work and follow The Institute for Construction Training and Development (ICTAD) guidelines and instructions given by the Police, if any.
	(b)	Informing the public through newspapers/ announcements/ radio/ TV etc. about the construction activities in order to avoid any inconveniences due to the construction activities.

<b>Environmental Issues</b>	<b>Protection and preventive measures</b>	
<b>2.10.</b>	<b>Accidents and Risks</b>	
	<b>2.10.1</b>	<b>Public and Worker safety</b>
	(a)	All reasonable precautions will be taken to prevent danger of the workers and the public from accidents such as fire, explosions, blasts, falling rocks, falling to excavated pits, chemical sprays, unsafe power supply lines etc.
	(b)	The Contractor shall comply with requirements for the safety of the workmen as per the international labour organisation (ILO) convention No. 62 and Safety and Health regulations of the Factory Ordinance of Sri Lanka to the extent that those are applicable to this contract. The contractor shall supply all necessary safety appliances such as safety goggles, helmets, masks, boots, etc., to the workers and staff. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, excavations, trenches and safe means of entry and egress.
	<b>2.10.2</b>	<b>Prevention of Risks of Electrocutation</b>
	(a)	All electrical wiring and supply related work should conform to British Standards (BS) or relevant Sri Lankan Standards. Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. Measures such as danger signboards, danger/red lights, fencing and lights will be provided to protect the public and workers. All electric power driven machines to be used in the construction shall be free from defect, be properly maintained and kept in good working order, be regularly inspected and as per BS provisions and to the satisfaction of the Engineer.
	<b>2.10.3</b>	<b>Risk at Hazardous Activity</b>
	(a)	All workers employed in hazardous activities shall be provided with necessary protective gear. These activities include mixing asphalt material, cement, lime mortars, concrete etc., welding work, work at crushing plants, blasting work, operators of machinery and equipment such as power saws, etc.
	(b)	The use of any toxic chemical shall be strictly in accordance with the manufacturer's instructions. The Engineer shall be notified of toxic chemicals that are planned to be used in all contract related activities. A register of all toxic chemicals delivered to the site shall be kept and maintained up to date by the Contractor. The register shall include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product.
	<b>2.10.4</b>	<b>Lead Pollution</b>
	(a)	No paint containing lead or lead products will be used except in the form of paste or readymade paint. Face masks shall be supplied to workers who are working in spray painting or scraping lead paints.
	<b>2.10.5</b>	<b>Handling of Explosives</b>
	(a)	Except as provided in the contract or ordered or authorized by the Engineer, the Contractor shall not use explosives. Where the use of explosives is so provided or ordered or authorized, the Contractor shall comply with the requirements of the following Sub-Clauses of this Clause besides the law of the land as applicable.
	(b)	The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain Ministry of Defence (MoD) approval for importing and handling explosives and keep the Local Police informed of the same.

<b>Environmental Issues</b>		<b>Protection and preventive measures</b>
	(c)	Contractor shall take precaution to prevent injury to people and damage the structures/houses and vehicles in the vicinity at the locations of blasting work. Blasting should be controlled to prevent vibration damage to structures and injury to people. The vehicles and road users should be stopped at a reasonable distance from the site and people in the vicinity should be informed when the blasting is carried out. Any debris on the road should be removed promptly before clearing the road for users. Blasting work should be carried out in off peak hours but not during the hours of darkness or at other times, which may cause unacceptable disturbance to religious or other ceremonies.
	(d)	Sufficient and adequate warning shall be given prior to blasting. Use of flagmen, siren, etc. should be arranged to the full satisfaction of the Engineer. The public in the area should be informed well in advance about the blasting operation and timing.
<b>2.11.</b>	<b>Health and Safety</b>	
	<b>2.11.1</b>	<b>Prevention of Vector based Diseases</b>
	(a)	Contractor shall take necessary actions to prevent breeding of mosquitoes at places of work, labour camps, plus office and store buildings. Stagnation of water in all areas including gutters, used and empty cans, containers, tyres, etc shall be prevented. Approved chemicals to destroy mosquitoes and larvae should be regularly applied. All burrow sites should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the Central Environmental authority and relevant local authorities
	(b)	Contractor shall keep all places of work, labour camps, plus office and store buildings clean devoid of garbage to prevent breeding of rats and other vectors such as flies.
	<b>2.11.2</b>	<b>Workers Health and Safety</b>
	(a)	Contractor shall comply with the provisions in Health and Safety regulations under the Factory Ordinance with regard to provision of health and safety measures and amenities at work place(s).
	<b>2.11.3</b>	<b>First Aid</b>
	(a)	At every workplace, first aid kit shall be provided as per the regulations. At every workplace an ambulance room containing the prescribed equipment and nursing staff shall be provided.
	<b>2.11.4</b>	<b>Potable Water</b>
	(a)	In every workplace and labour camps portable water shall be available throughout the day in sufficient quantities.
	<b>2.11.5</b>	<b>Hygiene</b>
	(a)	The contractor shall provide and maintain necessary (temporary) living accommodation and ancillary facilities for labour to standards and scale approved by the resident engineer.
	(b)	At every workplace and labour camps sufficient number of bathing facilities, latrines and urinals shall be provided in accordance with the Health and Safety regulations and/or as directed by the Engineer. These bathroom and toilet facilities shall be suitably located within the workplace/buildings. Latrines shall be cleaned at least three times daily in the morning, midday and evening and kept in a strict sanitary condition. If women are employed, separate latrines and urinals, screened from those for men and marked in the vernacular shall be provided. There shall be adequate supply of water, within and close to latrines and urinals.

<b>Environmental Issues</b>	<b>Protection and preventive measures</b>	
	(c)	The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place.
	(d)	Garbage bins must be provided in the camp, work sites and regularly emptied and the garbage disposed off in a hygienic manner. Construction camps shall have a clean hygienic environment and adequate health care shall be provided for the work force.
	(e)	Unless otherwise arranged for by the Local Authority, the contractor shall arrange proper disposal of sludge from septic tanks. The contractor shall obtain approval for such disposal from the Public Health Inspector of the area.
<b>2.12</b>	<b>Protection of Archaeological, Cultural and Religious Places and Properties</b>	
	<b>2.12.1</b>	<b>Prevention of damage to Archaeological, Cultural and Religious Places and Properties</b>
	(a)	During construction activities the contractor should take all necessary and adequate care to minimize impacts on archaeological and cultural properties which includes cultural sites and remains, places of worship including temples, mosques, churches and shrines. Workers should not be allowed to trespass in to such areas.
	(b)	Conservation and protection measures shall be taken up as per design and as per the instructions issued by the Department of Archaeology (DoA) or Department of Cultural Affairs when working close to such sites. Contractor shall seek advice from the Engineer if such instructions are not available. Access to such properties from the road shall be maintained clear and clean.
	(c)	Blasting work shall not be allowed near or within archaeological and historical sites without prior approval of the Department of Archaeology and the Engineer.
	<b>2.12.2</b>	<b>Chance found Archaeological property</b>
	(a)	All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest etc. discovered on the site and/or during construction work shall be the property of the Government of Sri Lanka, and shall be dealt with as per provisions of Antiquities Ordinance of 1940 (Revised in 1956 & 1998)
	(b)	The contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any such article or thing and shall, immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out the Engineer's instructions for dealing with the same, awaiting which all work shall be stopped within 100m in all directions from the site of discovery.
	(c)	If directed by the Engineers the Contractor shall obtain advice and assistance from the Department of Archaeological of Sri Lanka on conservation measures to be taken with regard to the artefacts prior to recommencement of work in the area.
<b>2.13</b>	<b>Environmental Enhancement</b>	
	<b>2.13.1</b>	<b>Roadside Landscape</b>
	(a)	Road landscape plantation, re-vegetation of road embankments and other slopes, edge treatment of water bodies shall be taken up as per either detailed design or typical design guidelines given as part of the Bid Documents. The contractor also shall remove all debris, piles of unwanted earth, spoil material, away from the roadsides and from other work places and disposed at locations designated or acceptable to the Engineer or as per Clause 2.1.1.
	(b)	On completion of the works, the temporary structures shall be cleared away in full, all rubbish burnt, waste dumps and septic tank shall be filled and closed and roadsides, workplaces and labour camps, cleared and cleaned.
	<b>2.13.2</b>	<b>Utilities and Roadside Amenities</b>

<b>Environmental Issues</b>	<b>Protection and preventive measures</b>	
	(a)	Contractor shall replace all amenities such as bus shelters that were removed/ relocated during the construction unless the Engineer directed the contractor not to do so.
	(b)	Contractor shall take care not to damage/destroy or affect the functional purposes of utilities such as water, electricity, telephone posts. The arrangements the contractor made with those service providers shall be informed to the Engineer in writing (advance work). Contractor shall assist the service providers in whatever possible manner to minimize disruption to such services.
	(c)	In case of an inadvertent damage cause to a utility, the contractor shall immediately inform the service provider and help to restore the service without delay.
	<b>2.13.3</b>	<b>Road Furniture</b>
	(a)	Road furniture including footpaths, railings, storm water drains, crash barrier, traffic signs, speed zone signs, pavement markers and any other such items will be provided as per design given in the Bid Documents.
	(b)	Intersections, rotaries, traffic islands, roadside protection and other structures or furniture shall be constructed, complete with the landscape elements as per design in the above manner.
<b>2.14</b>	<b>Handling Environmental Issues during Construction</b>	
	(a)	The Contractor will appoint a suitably qualified Environmental Officer following the award of the contract. The Environmental Officer will be the primary point of contact for assistance with all environmental issues during the pre-construction and construction phases. He/ She shall be responsible for ensuring the implementation of EMAP.
	(b)	The Contractor shall appoint a person responsible for community liaison and to handle public complaints regarding environmental/ social related matters. All public complaints will be entered into the Complaints Register. The Environmental Officer will promptly investigate and review environmental complaints and implement the appropriate corrective actions to arrest or mitigate the cause of the complaints. A register of all complaints is to be passed to the Engineer within 24 hrs they are received, with the action taken by the Environmental Officer on complains thereof.
	(c)	Contractor shall develop suitable method to receive complaints. The complain register shall be placed at a convenient place, easily accessible by the public.
	(d)	Contractor shall prepare detailed Environmental Method Statement (EMS) clearly stating the approach, actions and manner in which the EMAP is implemented. It is required from the contractor to prepare the EMS for each work site, if work will be carried out at more than one site at once and time plan for implementation. The EMS shall be updated regularly and submit for Engineers review.
<b>3.0 Operational stage (periodic maintenance)</b>		
	<b>3.1</b>	<b>Stagnation of water at culverts during heavy rains due to siltation and blocking of openings with debris</b>
		Regular clearing/ cleaning and maintenance of all culverts to reduce the chances of failures and blocking due to debris. Maintenance manual of RDA should be followed to maintain the road drainage system. Debris and materials that are removed from blocked drains and culverts should be disposed at only suitable sites.
	<b>3.2</b>	<b>Loss, damage or disruption to fauna</b>
		Placing warning signs at locations where wild animal movement corridors cross the road. Such sign posts should be placed at least 1 km before approaching the area in order for the drivers to be more vigilant and reduce speed.

Environmental Issues	Protection and preventive measures
	<b>3.3. Road safety</b>
(a)	All road furniture described under item 2.12.3 should be maintained by RDA
(b)	A management plan should be formulated with the local police to avoid any vehicle to carry loads that exceed the carrying capacity (load) of the rehabilitated road. Weigh stations could be introduced at selected locations to measure the load of vehicle.
	<b>3.4. Encochement of new ROW</b>
	Continuous monitoring and strict regulations should be followed to avoid the encroachment. Executive Engineers under direct supervision of Chief Engineer and Provincial Director should conduct regular checking along the road and remove any unauthorized activities within the ROW.

### 7.3 Environmental indicators to ensure implementation of mitigation measures

Effectiveness of suggested mitigation measures should be assessed in order to determine the implementation of the EMAP and compensation given to project affected persons (APs). Following is a list of such indicators and how best they could be assessed;

#### Impacts on soil

Soil should not be exposed to water or air erosion. The works, permanent or temporary, shall consist of measures as per design or as directed by the engineer to control soil erosion, sedimentation and water pollution. Typical measures include the use of berms, dikes sediment basins, fiber mats, mulches, grasses, slope drains and other devices. Measures to prevent soil contamination (petroleum products, wastewater, etc.) shall be taken in accordance with the ESMP or the engineer. Relevant past project experience in similar physical settings could be used for mitigating impacts to soil in the current project.

#### Impacts on surface and ground water

The reconnaissance survey to the study area should be targeted to identify the hydrological character of the area and an understanding of the likely modifications to the baseline conditions that could occur due to road improvements works will be required to assess the impacts on surface and ground water. It should be noted that a hydrological study should be conducted under detailed design; therefore this information should be reflected in the EA.

In terms of impacts to water quality baseline conditions for sensitive and important water bodies should be established using physical, chemical and biological parameters. When establishing the baseline conditions, it is very necessary that the selection of appropriate parameters to be monitored is carried out instead of testing the whole range which would result in the collection of large sets of data that would not be useful.

#### Impacts on ambient air quality

Generation of dust will be the main concern during construction phase of the project. However, this impact will be localized as the construction works will be mainly limited to the existing ROW. Measuring selected air quality parameters at the nearest receiver will be the ideal approach in determining the effectiveness of mitigation measures that are used to suppress dust.

### Impacts on eco-systems

Evaluation of ecological impacts should be done with three objectives, that is; to take stock of the existing conditions, determine the sensitivity of these conditions to the proposed project and to predict the short term and long term environmental response. As the rehabilitation works are to be limited to the ROW, it is anticipated that impacts on flora and fauna will be not significant. However, trees close to the existing road edges will need to be removed for road widening. Hence a tree survey should be undertaken at very initial stage of the project.

### Impacts of noise

Noise generated through construction operations and vehicle movement will have an impact on settlements through which the road passes fauna living in forest areas close to road sections under the project. Establishing baseline noise levels at sensitive receivers will assist to minimize noise impacts during construction stage.

## CHAPTER 8: POTENTIAL SOCIAL IMPACTS AND MITIGATION MEASURES-

Social screenings carried out indicate that the proposed rehabilitation and maintenance activities involve improvement of the surface, construction of side drains, widening or replacement of culverts and bridges, removal of the roadside structures and trees. Such activities may not require the acquisition of land (and as a result, may not involve physical displacement) but may involve economic displacement of people in certain locations. The ESMF establishes a process by which members of potentially affected communities participate in design of project components, determination of measures necessary to achieve the said objectives, and implementation and monitoring of project activities.

### **Potential Positive Social Impacts**

The positive social impacts include the following:

1. Savings in travel time with improved roads;
2. Savings in fuel cost;
3. Savings in repair and maintenance of vehicles;
4. Better prices of agricultural products and inputs for farmers who would get better market accessibility with better roads network;
5. Regular and on-time attendance of children in schools;
6. Regular public and private bus services;
7. All categories of people, particularly the vulnerable (patients, elderly people, pregnant women, etc) would benefit from improved roads with better access to hospitals, dispensaries, markets, offices, etc;

### **Potential Negative Social Impacts**

The anticipated negative impacts include the following:

1. Increase in road accidents due to high speed driving of vehicles once the roads are improved;
2. Long term negative impacts such as rural-urban migration;
3. Change of attitudes and values as a consequence of the impact of the urban culture;
4. Problems with laying of water pipes on roads once the asphalt layer is placed on the roads as digging again would damage the road;
5. Negative impact during construction phase particularly regarding loss of access, storing of building material on the roadside, dust and noise generated by construction work, unusual delay in public and private transportation;
6. Fears of meddling in village affairs and loss of privacy due to labor influx;
7. anticipated negative impacts due to potential loss or damage to private or community owned land, assets/infrastructure/livelihood;
8. Loss of access to houses and shops during construction;

9. Loss of livelihood for vulnerable groups including mobile vendors, encroachers/squatters and others without land title;
10. Issues concerning mobility of women and children during construction.

### **8.1 Impact Mitigation Principles**

This Framework will assist in mitigating the social safeguards impacts resulting from project interventions. This has been prepared in keeping with World Bank Social Safeguards Operational Policies.

The principles and guidelines proposed, aim at avoiding or minimizing as far as possible, the impoverishment that may result from project interventions, and also mitigate any adverse impact thereof on households and community levels.

#### **Scope and Mitigation Principles**

The proposed framework will apply to all Project Affected Persons who may be impacted through impacts on private/community land or other assets due to minor realignments;

Absence of a title will not be considered a bar to compensation for non –land assets created by the public land user. Vulnerability of PAPs, in terms of economic, social, and gender characteristics will be identified and mitigated with appropriate policies;

Where community owned facilities or restricting access to common property resources etc., result from project related interventions, the project will rebuild such facilities and provide alternative access;

There will be no land acquisition in the project. Any land that is required will be voluntarily donated or the project will use land owned by the government. For any voluntarily donated land, a participatory and transparent process will be followed and an agreement/MOU will be signed between the donor and the recipient that will, among other things, ensure the ownership of the land and voluntary nature of the donation, ii) that the land is appropriate for the intended purpose iii) that the land does not belong to any donor who is below the poverty line or whose holding would be reduced below the minimum size as stipulated to be economically viable ( 2.5 acres) iv) that there are no encumbrances on the land, v) that it does not negatively impact on the livelihood of any vulnerable group, and if so, that community developed mitigation measures are acceptable to the affectees, vi) that no compensation will be paid for the land, and vii) that the owner gives up all claims on the land and the title will be transferred to the recipient through the notary public or a registered deed or any other procedure prescribed by law. The agreement will be signed in presence of the DS and his/her signature will be placed as a third party.

### **8.2 Impact Mitigation Modalities**

The following types of losses are expected to result from Project intervention and will be mitigated:

1. Temporary displacement of mobile vendors and other vulnerable encroachers. The project will ensure that their livelihood is not affected by helping to relocate them during the construction phase and they may return to their original place subsequently;
2. Cut-off dates will be established to determine compensation eligibility of persons and their assets. These are the dates on which census of the affected persons and their assets will be taken. Any claim for compensation by affected people after the cut-off date will be ineligible for compensation;

3. Encroacher owners of the affected businesses will be compensated for temporary loss of income based on net income, or a one-time lump sum grant;
4. Where physical assets of the affected (walls, gardens, gates, etc.) located in the ROW come in the project's area of construction, the facility will be re-built, or the owners will be compensated at replacement cost;
5. The project will identify and implement policies to mitigate any adverse impacts that are unique to any project locations and have so far remained unknown.

### **8.3 Impacts and Losses Eligible for Compensation/ Assistance**

The mitigation principles and impact mitigation modalities stated in the preceding section are operationalized by defining and categorizing the potential impacts/ losses which will qualify for mitigation. The losses/ impacts listed below are only the likely ones and remain open to revision as the specific Provincial roads are selected and social screenings / assessments are carried out. Any unforeseen impacts, as and when encountered, will be taken into account along with appropriate measures to mitigate them.

#### **Impacts and PAPs Eligible for Assistance**

The following will qualify for compensation:

**Unauthorized or informal users of public lands**, such as squatters and encroachers, are not eligible for compensation for land, but for other losses covered by the mitigation policies;

**Business and Wage Income/ informal Users of public land:** Vulnerable squatters and encroachers residing on public lands and undertaking income earning activities in the ROW will be assisted to cope with the change;

**Provision of alternative permanent place:** Temporary encroachers who have been provided with a permanent place for business earlier will not be eligible for assistances;

**Structures on Public Lands:** All built up structures would be rebuilt or compensated at replacement cost;

**Unforeseen losses/impact:** All other losses/impacts that are not known but may get identified in PAP census will be mitigated with appropriate measures (where they qualify);

**For adverse impacts on community facilities**, such as educational institutions, places of worship, graveyards, and cremation grounds etc., no financial compensation will be paid directly to the affected however, the Project will rebuild the affected facilities, or provide alternatives in consultation with the user communities. Similarly, for loss of income earning opportunities or access to crucial common property resources, the project will provide alternatives to restore and improve their livelihood. Cut off dates will be established to determine compensation eligibility of persons and their assets. These are the dates on which census of the affected persons and their assets will be taken. Any claim submitted for compensation by the affected after the cut-off date will be ineligible for compensation.

Good practices to be followed:

- Place all sign boards where it is necessary indicating maximum speed limits;
- Place pedestrian crossing lines (zebra crossing) where it is necessary, particularly near the schools, religious places, government establishments, hospitals, town sections, etc.;

- Make aware all contractors and supervisors on the importance of villagers' privacy and their freedom to engage in their customary duties and tasks;
- Create awareness of preventing HIV/AIDS among the migrated workers in all project sites;
- Set up an internal monitoring mechanism on worker's behavior;
- Ensuring there is no loss of reticulated water supply (where it exists) through the placement of temporary pipe networks.

#### **8.4 Eligible Affected Persons (APs) for compensation and assistance**

As follows from the proposed mitigation principles and modalities, the following persons/households/entities will be entitled to financial and other forms of compensation and assistance. It is to be noted that depending upon the types of losses, an AP may be entitled to more than one form of compensation.

**Regularized Encroachers:** Those who have been regularized on the public lands acquired or taken back for the project, as determined by the Divisional Secretaries.

**Persons with Prescriptive Rights on Public Lands:** Those who have been using the public lands for at least 10 years, as identified by the Divisional Secretaries.

**Informal Users of Public Lands (Squatters and Encroachers):** Residing on public lands and/or using such lands for income earning purposes.

**Persons with Usufruct Rights:** Owners of business and other activities on formally leased-in public lands.

**Community or Groups:** Where local communities and groups are likely to lose income earning opportunities or access to crucial common property resources, special development programs will be undertaken to provide alternatives to restore and improve their livelihood.

#### **8.5 Procedures for Land Acquisition**

All land requirements under the Project is expected to be met within the existing ROW of the respective Provincial Council. However, for the enhancement of safety, there may be instances where small additional parcels of land would become necessary to implement safety measures such as drop-off and pick up zones near schools, pedestrian facilities, etc. As the Project does not encourage land acquisition, the required land parcels will be obtained either through voluntary land donation or confined to government/state lands [Annex 16: Template for Legal Contract for Voluntary Land Donations]. However, the extent of land requirements will be known only during implementation once the Provincial roads to be supported are selected. As such, the Project will have the following options for taking the possession of land for proposed sub-project interventions:

**Use of Government/State Land** - Land vested with the Divisional Secretary or any other State agency can be transferred to the Project Implementing Agency through a memorandum of understanding/legal land transfer agreement.

**Voluntary land donation** - Past Provincial roads project experience shows that this is a viable strategy to obtain small plots of land in rural areas to widen the existing ROW.

##### **Procedure for utilizing Government/State-owned land**

Utilization of state- owned land will be in accordance with the State Lands Act No 13 of 1949. This Act deals with the provision for the grant and disposition of state lands in Sri Lanka; for the management

and control of such lands and the foreshore; for the regulation of the use of the water of lakes and public streams; and for other matters incidental to or connected with the matters aforesaid. Section 53 exempts state from liability to pay compensation for improvements effected on reservations. However, the social screening checklist will be administered to ensure that the land to be utilized is free of encumbrances (i.e., there are no squatters and encroachers). If some encumbrances are found, a Social Impact Assessment will be carried out and the concerned individuals will be provided with assistance and compensation as presented in the Entitlement Matrix of this ESMF.

#### **Procedure for voluntary land donation**

The experience from the previous Provincial road project suggest that small plots of lands can also be made available through voluntary donations. Although project does not encourage voluntary donations in principle, the Provincial Councils participating in project activities have the right to accept or decline voluntary land donations from beneficiaries [Annex 16: Template for Legal Contract for Voluntary Land Donations]. In case of voluntary land donations, the Project will ensure the following:

- The land to be obtained through voluntary donation is free of any structures or assets;
- The land size will be a small area (less than 10% of total land owned by individual owner) that its donation does not negatively impact on the livelihood of the owner;
- The voluntary nature of donation will be fully and independently verified;
- Impact on donor household will be marginal, i.e., it will not involve more than 10 percent of the land holding and there will be no physical relocation;
- The land is unencumbered of squatters, tenants, sharecroppers or any other dependents and conflicting claims;
- The remaining assets of the household donating land will be economically viable to ensure livelihood and shelter;
- That a local/community level grievance redressal system is available; and
- The land will be transferred in the name of the recipient institution through a legal process.

The community-based mitigation measures will be acceptable and a consent letter from the land owner will be obtained granting permission for the use of the land for project activities, and a legal contract will be instituted which would include details of the land being donated; formal consent of the land owner/interested parties, and the witnesses. Template for legal agreement on land donation is provided in Annex X.

The Provincial-level Project Implementation Unit (PIU) will be responsible for ensuring that the above conditions regarding land donation are fulfilled. The ESO of the PMU will visit sub-project site, consult land donor, and other local stakeholders to verify that the donation is marginal and that it was not coerced.

#### **8.6 Entitlement Matrix**

The entitlement matrix (EM) has been developed to address impacts/losses, entitlement and entitled persons. These are for known impacts while any unknown impact that might be unique to a sub-project location will be addressed under “unanticipated adverse impact due to project intervention” of the entitlement matrix. Since the Project does not envision land acquisition, relocation or resettlement the potential impacts are limited. Hence the entitlement matrix is reflective of this issue.

However, should any land acquisition or resettlement or relocation be considered, the Project will prepare a Resettlement Plan prior to any such activity.

Table 8.1: Entitlement Matrix

TYPE OF IMPACT	COMPENSATION RECOMMENDED
Loss of land (of any kind)	World Bank and Sri Lankan Government policy is that compensation for loss of land should be compensated at replacement cost. No compensation for holders of encroached land but limited to loss of assets, structures and crops. However, for safety reasons, if small parcels of land become required this will be donated voluntarily by their present owners/occupiers. If certain occupiers of land unlikely to grant land, design alternatives for such few special locations should be adopted.
Lost assets (houses, parts of houses, other structures, walls, fences, etc.	To be built by the project or pay compensation at replacement cost.
Loss income / livelihoods due to lost assets	The project will pay compensation to rebuild the assets used for livelihood or pay a lump sum to cover the period required to build the asset.
Loss of agricultural income	Compensation for value of lost yields. If perennial crops are involved, cost for reestablishment of crops elsewhere and compensation for lost yields up to one year at market price.
Loss of agricultural income	Compensation for value of lost yields. If perennial crops are involved, cost for establishment of crops elsewhere and compensation for lost yields up to one year at market price.
Owners of boundary walls, fences and temporary extended portions of shops and houses	Money for rebuilding of the demolished structures at the market price/replacement cost, or rebuild by the project.
Value of fruit and timber trees	Timber and fruit trees lost will be valued at present age, overall life expected and lost income/output from the tree and compensated without deducting the salvage value.
Compensation for tenants	This is not envisaged. However, in the event that this is unavoidable, moving cost and rent for six months, assistance for finding alternative place if house on rent is involved. If agricultural or any other livelihood involved, compensation for lost income and lost assets by the tenant on tenanted property.
Any unanticipated negative impact	To be mitigated as required to ensure the affectee is able to restore his original life style or improve it.

## CHAPTER 9: CONSULTATION AND INFORMATION DISSEMINATION

The selected project roads are currently in-use public roads under the respective provincial councils. Further, when rehabilitating these roads, road widening is not in scope. Therefore, there is no impact to dwellers on either sides of these roads with regards to their land titles or ownership. In rare cases in the past, we have come across few possibilities of a dweller, blocking a road drain or culvert through the construct of a building or foot path to cross over to their land. In such cases in the past, we have used road officials (e.g. Divisional Engineers, Technical Officers) to cordially discuss and come to agreements with the dweller.

Therefore, when selecting roads for this project, these aspects can be considered. From a project selection point of view, there are no major actions to be taken.

### **During planning and Design stage**

During the current project planning and designing stage, two major activities will take place, which include the preparation of the Engineering estimate and the Environmental and Social Management Plan (ESMP). During this stage the Divisional Engineers and Technical staff are advised to review all areas that can impact the environmental and social areas pertaining to the project. They can review and proactively engage with Dwellers in locations where they think there will be issues. In the past a frequent complaint received is in dust management, and disposal management, in addition to minor dweller related issues highlighted above.

All these issues will be included in the Engineering estimate, under ESMP items. All these identified ESMP activities should be published as a Poster in the Divisional Secretaries office and the relevant road engineer's office for purpose of Public awareness. In addition, it is recommended to publish this in the Provincial council websites as well. This ESM Framework (ESMF) should also be published in the same manner.

We also suggest running a Public Awareness campaign, selecting a few community members from the relevant roads through Community based Organisations (CBOs) and Community centers, in order to ensure full public awareness, participation and support for these projects.

For this purpose we require representatives from Divisional secretaries and the Environmental officer from the DA's office, and two representatives from the Road Engineers office.

During these meetings called public awareness, all concerns and issues discussed during the meeting, should be minuted and shared through the village/ community representative for the general public awareness. Also, any issues identified over and above the published ESMP should be included and in case there are many such additions, this needs to be given as an addendum to the contract under ESMP.

### **During Implementation stage**

The contractor will give a plan based on the ESMP issued. The Divisional Engineer's Technical team will need to monitor the contractors plan and ensure the actions are implemented well, and the desired results and output is obtained.

The public should be given access to raise complaints if any, by placing a complaint box as a part of the Grievance Redress Mechanism (GRM). When paying the contractor on a monthly basis, the GRM should be monitored, and if any significant shortcomings are noted on the contractor's part, the monthly payment can be withheld, until the contractor rectifies the complaint related issues.

In order to ensure good governance and public good will, it is suggested to invite a community representative who participated in the original meeting, to attend a progress meeting once in 3 months, to share and contribute their views.

The PMU will keep records of public consultations, noting dates, locations, participants, salient issues raised, and responses to such issues. The procedures for consultation and communication, as well as the dissemination of information, will be formalized by the PMU.

During Project implementation, sub-project specific instruments and plans will be disclosed after review and clearance by the World Bank. These documents and plans, including sub-project specific ESMPs or other environmental and social impact mitigation plans to be implemented, will be publicly disclosed in-country as well as on the World Bank's external website.

As part of the overall results monitoring framework, the Project will also track the number of communication and citizen engagement programs implemented, the number of participants involved in consultation activities during Project implementation, and the resolution of grievances/complaints filed. Those will also include gender disaggregated data.

## CHAPTER 10: GRIEVANCE REDRESS MECHANISM

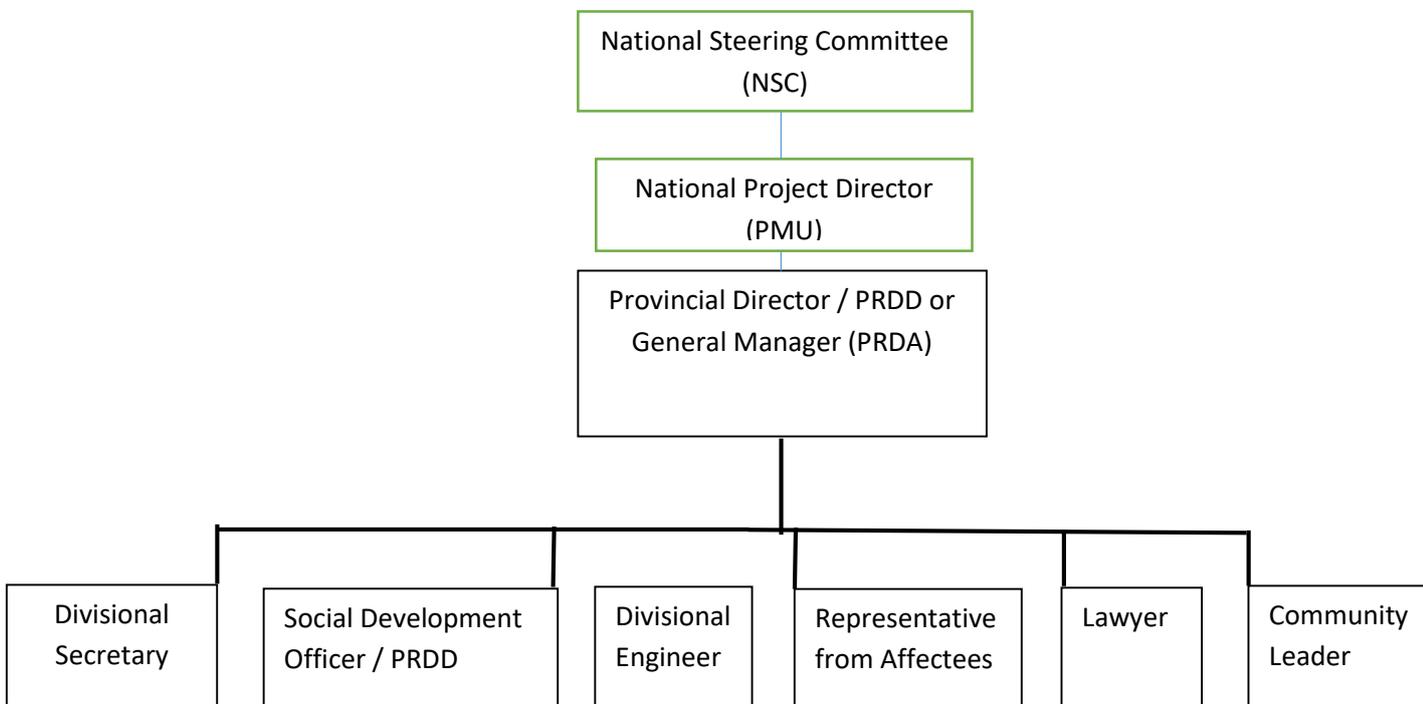
The aim is to prevent grievances rather than react to problems. Grievances can be minimized through careful subproject design and implementation by ensuring full and true participation and consultation with affectees/affected persons establishing rapport between the community and PC through frequent interactions, transparency, and monitoring.

A Grievance Redress Mechanism (GRM) will be established by the respective PCs that will be transparent, accessible to all, inclusive, participative and unbiased. Affectees/Affected persons will be made fully aware of their rights and the procedures for making a grievance – whether verbally or in writing – during consultation. Further, a special procedure will be set up as part of the GRM that can allow GBV-related complaints to be captured and referred to existing credible care service providers as necessary.

The structure of GRM is shown below. It will be a multi- tiered approach. At the sub project level minor issues may be informally settled at the field level through consultation and involvement of the project Social Safeguard Officer/Specialists, supervision consultant and local implementing officer.

For complaints related to project related impacts of any kind a complaint register will be maintained at the sub project office. This will state the type of complaint, the name of the complainant, date of the complaint and person responsible to resolve it. At the next level the GRM will be headed by the Provincial Project Director with the members as shown in the chart below. If the complaint cannot be resolved by the PD it will seek assistance from the Samatha Mandala.

Proposed structure of GRM



All GRMs should be established before awarding contract of each subproject. The functional role of GRM should be notified to all GNs in project influenced area. The period of summoning a GRM is based

on the requirement. Normally the GRM will be conducted once every two months of it's established. DE is responsible to set up GRM with support of Social Safeguard Officer of the project.

The *Samatha Mandala* (Peace Council) is the conflict resolution committee appointed by the Ministry of Justice in all Judicial Districts, as part of the grievance redress process. The members of this committee are well respected as they are educated, and citizens drawn from towns and villages. The *Samatha Mandala* attempts to resolve conflicts prior to complaints being referred to the courts. If a conflict cannot be resolved by the committee, it can still be pursued through the court system. Furthermore, since the *Samatha Mandala* is not involved in the decision-making process associated with project related land issues and properties, it can therefore provide adjudication unencumbered by any specific interest in the project.

Under the subproject, there is a potential for three types of grievances: 1) grievances related to land donations, 2) grievances related to affected structures, and other properties or entitlements, and 3) grievances related to construction activities.

The following are some issues that could be taken up at different levels of the GRM:

- Entitlement or eligibility for compensation and other benefits;
- Dust, noise, and vibration nuisance at the construction site;
- Loss of access;
- Damages to public and private property (especially damage caused by vibration);
- Removal of religious shrines, statues, or trees;
- Problems caused to the public due to road closures;
- Storage of construction material obstructing community activities.
- Damages caused to improper management of storm water

### **Principles of the GRM**

The GRM will be implemented based on the following principles:

- **Simplicity:** procedures in filing complaints is easy to understand and recall;
- **Accessibility:** filing complaints is easy through means that are commonly used by stakeholders, especially by the APs;
- **Transparency:** information about the system is made widely available to all stakeholders and the public;
- **Timeliness:** grievances are attended to and resolved in a timely manner;
- **Fairness:** feedback or complaints are validated thoroughly, and subjects of complaints are given due process and opportunities for appeal;
- **Confidentiality:** the identity of complainants remains confidential.

### **Creation of Awareness of the Grievance Redress Mechanism**

MLGPC should inform the relevant APs/Communities, Grama Niladharis, Local Samurdhi Officers and Social Development officers of the Divisional Secretariats and Pradeshiya Sabhas of the areas about the existence of grievance redress mechanism.

MLGPC should prepare flyers indicating:

- Project brief including the benefits of the rehabilitated road for the public
- Procedures for registering a complaint
- Categories of persons, institutions and property/assets affected that can claim compensation
- Explanation of those who would not be considered as an affected person, property etc.
- The address of the authority to receive and register the application with the name of the officer in-charge, address, and telephone/fax numbers to contact.

The GRM will be included as part of the Project's monitoring system. All complaints will be registered and tracked through the MIS system. The system will provide, monthly, quarterly and annual summaries of the GRM covering the following issues:

- How many complaints have been raised?
- What types of complaints have been raised?
- What is the status of the complaints (rejected or not eligible, under assessment, action agreed upon, and action being implemented or resolved)?
- How long did it take to resolve the problems?
- How many people have used the grievance redress procedure?
- What were the outcomes?

The monitoring system will also assess the overall effectiveness and the impact of the GRM. Such evaluations will be carried out annually, and the results will be used to improve the performance of the GRM and provide valuable feedback to Project management. The following questions can be addressed in such evaluations:

- Is the GRM effective in realizing the stated goals, objectives, and principles?
- Is the GRM capable of responding to the range of grievances specified in their scope?
- Is the GRM equipped with an adequate and diverse set of resolution approaches?
- Has the GRM adopted measures to improve the resolution approaches, e.g., capacity building, consultation, with technical experts.
- Was the GRM effectively integrated into overall Project management?

## CHAPTER 11: INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTATION OF ESMF

### 11.1 Institutional Mechanism

The roles and responsibilities of the major actors in the implementation of the ESMF are the following:

**Provincial Director:** He has the overall responsibility for implementing the project and the ESMP . He will allocate the following tasks to the District Chief Engineer, the Divisional Engineer and Social and Environmental staff:

Carry out stakeholder consultation on project objectives, scope, and potential adverse/positive impacts of project intervention; and process the stakeholder feedback for consideration to the project.

☒☒ Explain the mitigation policies and measures of the project. Identify PAPs (who are informal users of public land in the ROW) and process the entitlements stipulated in the SIMF.

☒☒ Explain to the PAPs the grievance redressal mechanism and its scope, functions and the procedure to bring grievances to the Grievance Redressal Committees (GRCs). Designated staff from the PD's office will record the GRC proceedings and include summary reports in the periodic progress reports.

☒☒ Plan, design and conduct census of the project affected persons and households listed by the surveyors; and collect all information required to identify the losses; and determine the entitlements, application guidelines and implementation issues as suggested in the 'compensation/entitlement matrix'.

**The Divisional Secretary:** He will facilitate the signing of the MOU for voluntary land donations.

#### **Environment & Social Officer:**

- Provide overall policy and technical direction for safeguards management under the Project, as defined by the project environmental and social safeguards instruments.
- Co-ordinate closely with the PMU staff in planning and managing project implementation as per the safeguards instruments; and provide necessary technical assistance to facilitate the implementation, management and monitoring of environmental and social safeguards
- Ensure environmental and social due diligence is carried out for each sub-project by the line ministry and line agency as soon as conceptual technical design and scope have been defined, as outlined in the safeguards instruments.
- Closely co-ordinate with the MPCLG and PRDD technical colleagues for timely preparation of Environmental/Social Assessments/Management Plans for sub-projects, as necessary (depending on screening outcome); co-ordinate for hiring technical assistance, where necessary, and for review and endorsement of these safeguard documents
- Ensure consistency of safeguard documents with national environmental regulations and World Bank policy requirements as defined in this ESMF; work with MPCLG to obtain necessary clearances from local environmental/archaeological regulatory authorities for sub-projects, where applicable.

- Prepare terms of references together with the line ministry or line agency to undertake requisite safeguards assessments for complex activities that will warrant EA as per the environmental screening conducted and obtain necessary clearances from the World Bank and/or designated project approving agencies.
- Manage the consultants hired to undertake the preparation of environmental safeguards instruments, including environmental assessments, site contamination audits and other safeguards assessments, where applicable, and provide coordination support with implementation agencies and individuals
- Review draft and final environmental safeguard instruments for quality and ensure that the relevant line ministry or agency obtain necessary clearances as per the safeguards instruments.
- Ensure that applicable measures in the ESMPs are included in the design, and conditions on compliance with ESMPs are included in the bidding documents.
- Liaise closely with the procurement team of the RDA on the above.
- Develop, organize and deliver environmental training programs and workshops for the Implementing Agencies at the field level, contractors, field supervision staff and other implementing agency officials as needed, on safeguard requirements and their management
- Ensure compliance with ESMPs during the construction period and maintain close coordination with the technical teams who will conduct monitoring.
- Prepare additional technical guidelines, if necessary, to support the safeguards instruments in order to strengthen the implementation of environmental and social safeguards
- Ensure adequate public consultation during the preparation of safeguards instruments
- Ensure public complaints relating to nuisance and inconvenience caused by sub-project implementation are addressed with corrective action and adequately documented
- Report to MPCLG and the World Bank on the overall environmental and social performance of the project as part of PMU's periodic progress reporting.
- Hold regular review meetings with the technical colleagues and visit selected project sites to monitor implementation of the safeguards instruments.
- Prepare routine monitoring reports, in collaboration with the MPCLG / PMU as set forth in the safeguards instruments.
- Liaise closely, where technical guidance is required, with the Environmental and Social Specialists of the World Bank task team.
- Promote community participation in the process of planning, management and monitoring of environmental/social impacts of sub-projects; provide guidelines on community participation in environmental/social monitoring.
- Prepare terms of references for the systemic environmental and social audits for all project components and obtain clearances.
- Review and comment on audit reports, take necessary actions to address audit issues raised and obtain comments from World Bank.

## **11.2 Monitoring and Evaluation Mechanism**

Monitoring and evaluation are vital activities of the project. The objectives of monitoring of the SIMF are: 1). to ensure that the standard of living of affectees is restored or improved, 2). to monitor

whether the time lines are being met, 3). to assess whether mitigation efforts are sufficient, 4). to identify construction related problems or potential problems, and 5) to identify methods of responding immediately to mitigate hardships. Internal monitoring will be conducted by project staff of each PC, and b). External monitoring which will be conducted by an independent body.

The monitoring indicators include the following:

- Number of households affected
- Size and quantity of properties and assets (lands and structures) affected
- Method of compensating or restoration of all affected properties and assets
- Number of households who donates lands and the extent
- Nature of Livelihood affected/lost
- Method of livelihood restoration followed
- Number of construction related incidents
- Number of conflicts between villagers and workers of the projects
- Number of vulnerable people/households faced impoverishment
- Number of reported cases to the GRM
- Number of reported cases resolved
- Number of women participated in project related activities
- Number of CBOs/NGOs involved in project related activities

Reporting:

This will include quarterly updates of progress in preparation and implementation of social and safeguards concerns (disaggregated by sub project). Reports for formal supervision mission with details of progress and identification of any issues that may impede progress.

### **11.3 Capacity Building Program**

For all successful project implementation, a capacity building program will be conducted for all staff of the project. It should cover the following areas:

- National Involuntary Resettlement Policy
- World Bank Policies on Involuntary Resettlement, Indigenous People, Women Participation in
- Development, Information Disclosure
- Social Impact Monitoring Framework of the Project
- Grievances Redress Mechanism
- HIV/AIDS: The Project will need to ensure that awareness raising is provided by all contractors
- to their staff.

The training/awareness workshops should be organised at the level of the PC. Such workshops should be attended by all Chief Engineers, DEs, TOs and Project staff who deal with social and environmental issues. It may be worthwhile to have two workshops for each PC to address a). Conceptual framework and b). Its applications in this project.

### **11.4 Training and capacity building plan**

The Environmental Officer will be trained by the Environmental Specialist of the World Bank on the EAMF implementation, safeguards and procedural requirements of the World Bank

- All contractors are expected to disseminate and create awareness within the workforce ESMP compliance, and any staff training necessary for their effective implementation – may become relevant to the selected pilot. Where contractors do not have existing environmental staff, Environmental & Social Officer will plan for adequate capacity building within the workforce to be involved.
- Training on safeguards regarding operation of the project systems and facilities and associated safeguards will be provided to the designated authority officials who will in due course manage the operation and are inbuilt in to the project modality.

## CHAPTER 12: MONITORING AND REPORTING

A robust monitoring and reporting system will be established by the Environmental and Social Safeguards Division of the RDA. The monitoring and reporting system will be integral to social safeguards and the Project will establish a monitoring and reporting system for ensuring efficient and effective implementation performance of the delivery of the project social safeguard program.

The monitoring and reporting system of ESD will be responsible for the systematic collection of information on the progress of the application of the social safeguards program and reporting the findings to the stakeholders through the RDA. Overall the objective of monitoring and reporting will be to ensure that the proposed mitigation measures are producing the intended results. The monitoring system will involve: guidelines and terms and reference, monitoring indicators, mechanisms and methodologies, frequency, documentation and reporting arrangements.

Monitoring will be both internal and external (Third Party) with details as described below:

### 12.1 Internal monitoring

Internal monitoring will be done by the RDA and ESD will play an active role in implementing the M&E system. Internal monitoring will be focused on timely execution of safeguard activities in line with the ESMF including screening, survey, mitigation planning, RAP implementation (if needed), scheduling with civil works, monitoring the role of contractors, managing safeguards consultants and their outputs, documentation of progress with regard to eligibility list preparation, disclosure and consultation, grievance registration and resolution, disbursement of entitlements, day-to-day relocation support, etc. Internal Monitoring will pay special attention to the following:

- Efficiency and effectiveness of the day to day planning and implementation of the RAP;
- Efficient and transparency in disbursement of compensation and R&R benefits;
- Data collection, feedback information, identification of bottlenecks and troubleshooting;
- Documentation for informed decision making, and efficient response to implementation issues;
- Maintenance of each APs entitlement updated file;
- Management of baseline information on socio economic conditions of the APs, to assess whether the socio-economic conditions improve and income and living standard are improved restored;
- Preparation of progress reports; and
- Coordination within the implementing organization as well as with outside agencies.

### 12.2 External monitoring

The RDA will engage an external monitoring and review agency/consultant for independent review of the safeguard implementation program to determine whether intended goals are being achieved, and if not, what corrective actions are needed. External monitoring will have two objectives.

- Verify if the safeguard program is being implemented in accordance with the approved framework; and

- Verify whether APs, households and communities are able to address negative impacts and either improved or at least restore their livelihoods and living standards.

External Monitoring is intended to:

- Verify that the RAP/ESMP has been implemented according to approved plans and procedures;
- Assess that the objectives of the RP has been achieved;
- Determine that APs livelihood and living standards have been restored or improved and if not suggesting ways and means of improving performance;
- Obtain views of the APs on their relocation, entitlements and Grievance Redress committee's performance;
- Evaluate the performance of all implementing Agencies including PMU, PPAs, registered civil societies, CBOs and other Government Agencies associated with the implementation of the project;
- All social development objectives have been met accordance to the ESMF

The External Monitoring (Third party) will be carried out by an experience research-based institution and which is expected to involve road users and other stakeholders as well. This also will perform the task of Citizen Engagement mechanism for the project.

### **12.3 Monitoring arrangements**

The project may undertake a Social Impact Assessment at mid-term and project closure, where the overall impact of the project will be assessed, in particular its impact on local communities and their livelihood.

## ANNEX I. SCREENING CHECKLIST TO DETERMINE THE LEVEL OF ENVIRONMENTAL IMPACTS

Screening checklist to determine the level of environmental impacts.  SCREENING QUESTIONS	Ye s	No	REMARKS
<b>A. Project Siting</b> Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Protected Area	<input type="checkbox"/>	<input type="checkbox"/>	
17 Wetland	<input type="checkbox"/>	<input type="checkbox"/>	
18 Mangrove	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Estuarine	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Buffer zone of protected area	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Special area for protecting biodiversity	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Potential Environmental Impacts</b> Will the Project cause...			
encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?	<input type="checkbox"/>	<input type="checkbox"/>	
encroachment on precious ecology (e.g. sensitive or protected areas)?	<input type="checkbox"/>	<input type="checkbox"/>	
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	<input type="checkbox"/>	<input type="checkbox"/>	
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	<input type="checkbox"/>	<input type="checkbox"/>	
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	<input type="checkbox"/>	<input type="checkbox"/>	

Screening checklist to determine the level of environmental impacts.  SCREENING QUESTIONS	Ye s	No	REMARKS
<ul style="list-style-type: none"> <li>▪ noise and vibration due to blasting and other civil works?</li> <li>▪ dislocation or involuntary resettlement of people</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ hazardous driving conditions where construction interferes with pre-existing roads?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ creation of temporary breeding habitats for mosquito vectors of disease?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ dislocation and compulsory resettlement of people living in right-of-way?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials and loss of life?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ increased noise and air pollution resulting from traffic volume?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	
<ul style="list-style-type: none"> <li>▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	

## ANNEX 2. SCREENING CHECKLIST TO DETERMINE THE LEVEL OF SOCIAL IMPACTS

Project :

Province:

Subproject :

District:

Level of Project

Design:

Potential for Involuntary Resettlement Effects*	NotKnown	Yes	No	If yes, consider potential scope of resettlement effects
Will the project include any new physical construction work?				
Does the project include upgrading or rehabilitation of existing facilities?				
Is the proposed sub-project likely to lead to loss of housing, other assets, resource use or incomes?				
Is land acquisition likely to be necessary?				
Is the site for land acquisition known?				
Is the ownership status and current usage of the land known?				
Will easements be utilized within an existing site or Right of Way?				
Are non-titled people present on the site/within the Right of Way?				
Will there be loss of housing?				
Will there be loss of crops, trees, and other fixed assets through land use related changes?				
Will there be loss of incomes and livelihoods?				
Will people lose access to facilities, services, or natural resources through land use-related changes?				
Will any social or economic activities be affected through land use-related changes?				
<b>Affected Persons and Severity of Impacts</b>				
Any estimate of the likely number of those affected by the project? No ( ) Yes ( )				
If yes, approximately how many?				
Any estimate of the severity of impact at the household level?				
If yes, what?				
Any of these people poor, indigenous, or vulnerable to poverty risks? No ( ) Yes ( )				
If yes, how?				

## **ANNEX 3. POLICY FRAMEWORK: ENVIRONMENTAL ASSESSMENT AND IMPACT MITIGATION**

The importance of the Environmental Impact Assessment as an effective tool for the purpose of integrating environmental considerations with development planning is highly recognized in Sri Lanka. The application of this technique is considered as a means of ensuring that the likely effects of new development projects on the environment are fully understood and taken into account before development is allowed to proceed. The importance of this management tool to foresee potential environmental impacts and problems caused by proposed projects and its use as a mean to make project more suitable to the environment are highly appreciated. The Environmental Impact Assessment (EIA) unit of the Central Environmental Authority (CEA) is involved in the implementation of the EIA procedure under the National Environmental Act.

### **Environmental Impact Assessment (EIA)**

Realizing the need for integrating environment, economic and social considerations with the planning and decision making process in a more formal manner, the Government of Sri Lanka decided to introduce Environmental Impact Assessment for development projects. The importance of the Environmental Impact Assessment as an effective tool for the purpose of integrating environmental considerations with development planning is highly recognized in Sri Lanka.

The Environmental Impact Assessment (EIA) unit of the Central Environmental Authority (CEA) is involved in the implementation of the EIA procedure under the National Environmental Act. Administration of the EIA process, co-ordination between Project Approving Agencies (PAA's) that have been appointed for this purpose, preparation of manuals and guidelines on EIA and maintenance of a data base on EIA is done by the CEA.

### **EIA under the National Environmental Act (NEA)**

EIA was mandated island wide by the 1988 amendments to the National Environmental Act. Part IV C of the Amendment Act No. 56 of 1988 mandated that CEA require “prescribed” development project proposals to be subjected to Environmental Impact Assessment, where adverse and beneficial impacts of the proposed projects on the environment would be identified together with measures to minimize such adverse impacts.

The procedure stipulated in the Act for the approval of projects provides for the submission of two types of reports Initial Environmental Examination (IEE) report and Environmental Impact Assessment (EIA) report. If the environmental impacts of the project are not very significant then the project proponent may be asked to do an Initial Environmental Examination (IEE), which is a relatively short and simple study. However, if the potential impacts appear to be more significant, the project proponent may be asked to do an Environmental Impact Assessment (EIA) which is a more detailed and comprehensive study of environmental impacts. Such reports are required in respect of “prescribed projects” included in a Schedule in an Order published by the Minister of Environment in terms of section 23 Z of the act in the Gazette Extra Ordinary No. 772/22 dated 24th June 1993 (ANNEX II). Once an EIA report is submitted NEA provides for a public inspection and comment on the report during a mandatory period of 30 days. A public hearing may be held to provide an opportunity to any member of the public (who has submitted his comments) to be heard in support of his comments if the PAA considers it to be in the public interest to do so. A decision whether to approve the project has to be arrived at thereafter. IEE reports have been exempted from this requirement. However, an

Initial Environmental Examination report shall be deemed to be a public document for the purposes of sections 74 and 76 of the Evidence Ordinance (Chapter 21) and shall be open for inspection by the public.

The EIA process is implemented through designated Project Approving Agencies (PAAs) specified under Section 23 Y of the NEA. At present 23 state agencies, including Ceylon Tourist Board have been specified by the Minister as contained in Gazette Extra Ordinary No. 859/14 dated 23<sup>rd</sup> February 1995 and Gazette Extra Ordinary No. 1373/6 of 29<sup>th</sup> December 2004. The National Environmental Act stipulates that all “prescribed projects” must receive approval from the appropriate project approving agencies (PAAs), which must be those that are “concerned with or connected with such prescribed projects”. A PAA, which is also the project proponent, is disqualified from acting as the PAA for the project by NEA-EIA Regulation 2(1) of June 1993. When the PAA is also the project proponent, the CEA is required to designate an appropriate PAA. Again in cases where there are more than one PAA is involved, the CEA must determine the appropriate PAA. In the event of doubt or difficulty in identifying the appropriate PAA, it has been practice for the CEA to take on the role of PAA.

### **Prescribed projects**

Prescribed projects are listed in two groups in Schedule included in the first ministerial order of June 24, 1993. Part I of the Schedule includes 31 projects and undertakings if located wholly or partly outside the Coastal Zone. The projects in this group irrespective of size if located wholly or partly within the coastal zone must undergo the approval process that is laid down in the Coast Conservation Act. In other words only those projects located totally outside the Coastal Zone will be subject to the approval process laid down in the NEA.

Item 19 in this list of 31 projects and undertakings is described as the “Development of Industrial Estates and Parks exceeding an area of 10 hectares”. Once an industrial estate or industrial park is approved under Part IV VC of the NEA, any individual project or undertaking located in it, even though prescribed, will be exempted from the approval process. Projects and undertakings, which are listed as Items 20 to 30, belong to the category of high polluting industries. They will be required to go through the EIA process only if they are located outside an approved industrial estate or industrial park.

Implementation of projects in environmentally sensitive areas that are listed in Part III of the Schedule is not prohibited, but regardless of their magnitude such projects and undertakings must go through the approval process. This itself acts as a disincentive to project proponents. Similarly, even though Part I of the Order exempts projects and undertakings proposed to be established within the Coastal Zone from the approval process set out in Part IV C of the NEA, the law requires that such projects must be subject to the NEA approval process if they are located in environmentally sensitive areas of the Coastal Zone. In short, the EIA process set out in the Coast Conservation Act applies to projects prescribed under the NEA only when they are located wholly within the Coastal Zone but not in any environmentally sensitive area therein.

Part II of the Schedule of prescribed projects includes Item 32 industries (Items 33 to 52). Item 32 is described as “All projects and undertakings listed in Part I irrespective of their magnitudes and irrespective of whether they are located in the coastal zone or not, if located wholly or partly within the areas specified in Part III of the Schedule”. The industries included as Items 33 to 52 are not described by magnitude and are subject to the approval process only if located within the environmental sensitive areas mentioned in Part III of the Schedule.

## **Operational Procedure for EIA/IEE**

The Basic Information Questionnaire (BIQ) form prepared by the CEA has to be filled by the project proponent and submitted to the CEA. On examination of the BIQ, the CEA decides on the need for an EIA/IEE. If it is determined that an EIA/IEE is required, the CEA will decide a suitable Project Approving Agency (PAA).

The PAA in turn will appoint a technical committee (TC) to scope the project based on the preliminary information. If the PAA determines that the project would have no long-term adverse environmental impacts, an initial environmental examination (IEE) would be considered adequate. The project proponent must submit a detailed IEE for review and approval by the PAA. The IEE should identify potential environmental and social issues and the possible remedial actions. Upon reviewing the IEE, if the TC identifies any substantial environmental issues that may arise as a result of the proposed project, the proponent will be advised to undertake a detailed EIA and issue the TOR for the EIA. In developing the TOR, the PAA will also consider the views of other state agencies and the public. If the PAA decided that no further environmental analysis is needed, the process ends with approval/rejection of the IEE.

If an EIA is a necessity, then the project proponent must conduct the EIA according to the TOR issued, prepare the report in all three languages and submit it to the PAA. The PAA will then declare open the EIA report for a period of 30 days for public comments and the comments received will be conveyed to the proponent. The project proponent can then prepare a response to the public comments and submit it to the PAA. The TC will then evaluate the report with respect to adherence to the TOR, quality of the report contents and adequacy of the responses to public comments.

Based on the recommendations of the TC, the PAA in concurrence with CEA would either grant approval for the implementation of the proposed project subject to specific conditions or refuse approval for implementation of the project, giving reasons for doing so. The PAA will also specify a period within which the approved project should be completed. If the project proponent is unable to complete the project within the specified period, written permission for an extension must be obtained from the PAA, 30 days prior to the expiration of the approved completion date.

## **EIA in the Coast Conservation Act**

The Coast Conservation Act No. 57 of 1981 together with the Coast Conservation (Amendment) Act, No. 64 of 1988 governs the Coastal Zone. This Zone comprises mainly “the area lying within a limit of three hundred meters landwards of the Mean High Water line and a limit of two kilometers seawards of the Mean Low Water line”. The EIA process is part of the permit procedure mandated in Part II of the Coast Conservation Act for the approval of prescribed development projects and undertakings within the Coastal Zone. The Act states that the Minister in charge of the subject of Coast Conservation “may, having regard to the effect of those development activities on the long term stability, productivity and environmental quality of the Coastal Zone, prescribe the categories of development activity, which may be engaged in within the Coastal Zone without a permit”. Such activity should not however include any development activity already prescribed under the NEA.

Section 16 of the Coast Conservation Act confers on the Director of Coast Conservation the discretion to request a developer applying for a permit (to engage in a development activity within the Coastal Zone) to furnish an Environmental Impact Assessment relating to the proposed development activity. The Coast Conservation Act does not however specify how and when this discretion should be exercised. The Coast Conservation Department interprets this provision as requiring an EIA when the impacts of the project are likely to be significant. The application form for a permit includes several

questions, the answers to which would help determine whether the development activity is likely to have significant impacts on the environment.

The Act requires the Director of Coast Conservation, on receiving an EIA Report, to make it available for public inspection and to entertain comments on it. The Act also requires the Director of Coast Conservation to refer the EIA report to the Coast Conservation Advisory Council for comment. The Council is an inter-department, inter-disciplinary advisory body. The Director of Coast Conservation may decide to Grant approval for the implementation of the proposed project subject to specified conditions, or Refuse approval for the implementation of the project, giving reasons for doing so.

Part I of the Schedule (annex II) containing the list of projects prescribed under the NEA states that the Coast Conservation Act applies in the case of those projects, which lie wholly within the Coastal Zone. This indicates that the NEA expects the Coast Conservation Department to consider these projects as prescribed and that an Environmental Impact Assessment is required albeit under the provisions of the Coast Conservation Act.

In practice however the Coast Conservation Department is guided by their own rules and regulations in determining whether any of the prescribed projects under the NEA require an EIA.

Certain parts of the Coastal Zone, which are considered environmentally sensitive and declared as “no-build” areas automatically, rule out the need to consider development projects in such areas. Similarly, development projects proposed for location in environmentally sensitive areas within the Coastal Zone are required to be submitted to the approval process specified in the NEA. Many of these environmentally sensitive areas have already been identified and listed by the Coast Conservation Department as “set-back” areas comprising reservation areas and restricted areas in which development activities are prohibited or significantly restricted.

Coast Conservation Department Planning Division officers submit their recommendations regarding proposed development projects to the Planning Committee of the Coast Conservation Department. The three technical divisions of the Coast Conservation Department recommend the issue of a permit with or without an EIA. Where an EIA is recommended, scoping sessions are convened with representatives of concerned state agencies to determine the Terms of Reference for the EIA.

The long title of the Coast Conservation Act states that the Act is established to regulate and control development activities within the Coastal Zone. Therefore, the Coast Conservation Department is the final authority in determining whether to permit a development activity in terms of the CCA, even though such activity may be required go through the approval process laid down in the NEA.

### **EIA in the Fauna and Flora (Protection) Ordinance**

The Fauna and Flora (Protection) Ordinance No. 2 of 1937, as amended by the Fauna and Flora (Amendment) Act No. 49 of 1993, requires that any development activity of any description whatsoever proposed to be established within one mile of the boundary of any National Reserve, should receive the prior written approval of the Director of DWC. The Ordinance as amended mandates that the project proponent should furnish an IEE or EIA report in terms of the National Environmental Act. The information that a project proponent applying for permission to establish a development project within one mile of any National Reserve has to submit is much more comprehensive than the information required for the approval process stipulated under the NEA. This is because every development project or activity to be established within one mile of any National Reserve is subject to the approval process of the DEC regardless of its magnitude or category. Success in the implementation of this requirement will be tested to the extent that the term “development activity” is not defined in the Act. This procedure could also discourage any development activity

however environmentally compatible it is, proposed to be established within any environmentally sensitive area.

### EIA in the Provincial Administration

The Provincial Level environmental protection and management is introduced in Sri Lanka through the 13th amendments to the constitution certified in November 1987, which specifies three lists, the Reserved list, the Provincial Council list, and the Concurrent list. Provincial Councils have the exclusive right to legislate through statues on matters specified in the provincial Council list. The subject of environmental protection is placed in the Concurrent list as well as on the Provincial Council list. Provincial councils and Parliament can both legislate on matters on the Concurrent list provides it is done in consultation with each other. Only the North Western Provincial Council enacted legislation on environmental protection by Statute No. 12 of 1990. The National Environmental Act remains suspended and inoperative within the North Western Province with effect from 10th January 1991.

### Operational Framework for Implementation of EIA under national regulations

Activity	Agency	Duration
<b>Submitting Preliminary information</b> - A project proponent is required to provide the CEA with preliminary information on the proposed project, in order for the EIA process to be initiated. The best time for a project proponent to submit the preliminary information on the proposed project is as soon as the project concept is finalized and the location of the project is decided. The Basic Information Questionnaire (BIQ) form prepared by the CEA can be used for this purpose (Annex 2). When a prescribed project is referred to CEA, the CEA will decide a suitable Project Approving Agency (PAA).	CEA	2 months
<b>Environmental Scoping</b> - Then the PAA will carry out scoping and Terms of Reference (ToR) for the EIA/IEE will be issued to the project proponent	PRDA	2 months
<b>EIA/ IEE report preparation</b>	Proponent	3 months
<b>Public participation and evaluation</b> - On receipt of an EIA report, it will be subjected to an adequacy check in order to ensure that the ToR issued by the PAA has been met. It will then be open for public inspection / comments for a period of 30 working days. If there are any public comments on the EIA report, they will be sent to the project proponent for response. Subsequent to the public commenting period the PAA will appoint a Technical Evaluation Committee	PRDA	3 months
(TEC) to evaluate the EIA report and make its recommendations. IEE reports are not required to be opened for public comments and are thus subjected to technical evaluation only.		
<b>Decision making</b> - Based on the recommendation of the TEC, the PAA makes its decision on whether to grant approval for a project. If the PAA is not the CEA, it should obtain the concurrence of the CEA prior to granting approval	PRDA	2 months

Generally, the approval is valid for 3 years. If the Project Proponent does not commence work within 3 years of the decision, renewal of the approval from the Project Approving Agencies is necessary. The validity period is usually stated in the letter of approval.

## ANNEX 4. AN ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

### Transport Connectivity and Asset Management Project (TCAMP) (Provincial Road Development Project)

#### Introduction

The Roads Development Authority of Sri Lanka (RDA), in order to ensure compliance with the World Bank's environmental and social safeguard policies and the relevant provisions under the National Environmental Act (NEA) and associated regulations, as well as other relevant legislation and policies linked to road works, prepares an Environmental & Social Management Plan (ESMP) for the Transport Connectivity and Asset Management Project (Provincial Road Development Project). The purpose of this TOR is to outline the scope of work for preparing the ESMP in accordance with the project's Environmental and Social Management Framework (disclosed in January 2016).

#### Background

The Environmental and Social Screening Assessment is a decision-support mechanism to ensure that the TCAMP project design and implementation are environmentally and socially sound and sustainable. In order to achieve this, the RDA is initially undertaking screening activities of the proposed road sections for identifying and managing environmental and social impacts, designing mitigation measures and standards to be adhered to, as well as for the RDA to monitor the performance of the TCAMP Contractors in accordance with the ESMP.

It is expected that Environmental and Social Screening Assessment will be prepared in close collaboration with the team preparing conceptual designs. The road-specific screening should be ready prior to finalization of the ESMP and TCAMP's bidding documents. Sufficient conditions should be specified in the bidding documents, as well as the contractual agreements clearly defining requirements of compliance based on standards and specific requirements necessary to reduce impacts on sensitive sites. The ESMP will be cost estimated.

It is important to put additional emphasis in collecting environmental and social baseline data such as river/stream flows/hydrology, ambient air quality, noise levels and water quality in random locations along the road, as well as strategic locations where increased levels of disturbances are expected (e.g. strengthening/widening bridges, town development, etc.) or sensitive sites are located. While it is recognized that collection of some of the environmental and social baseline data related to various sites such as crusher and asphalt plant sites and labor camps may not be possible prior to bidding process, standards to be maintained should be clearly defined including the needs to collect additional data prior and post operations.

The following objectives are expected from the Environmental and Social Screening Assessment:

- Establish the environmental and social baseline in the project areas and to identify any significant environmental and social issues based on detailed surveys, analysis of data, assessment of impacts;
- Assess impacts of the project and provide for measures to address the adverse impacts by the provision of the requisite avoidance, mitigation and compensation measures, as well as standards;

- Integrate the environmental and social issues in the project activities planning, design, and supervision; and
- Conform the Environmental and Social Screening Assessment, the ESMP, and reporting requirements to the Government of Sri Lanka guidelines and regulations and the World Bank Operational Policies.

## **Environmental Assessment Legislative and Policy Requirements**

**National laws and regulations:** The National Environmental Act (NEA) has made Environmental Assessments (EA) a legal requirement for a range of development projects. A list of projects requiring an EA is prescribed in Gazette (Extra Ordinary) No. 772/22 dated June 24, 1993. Road rehabilitation, improvement and maintenance are not listed as prescribed projects requiring EAs under the above gazette notification. Agreement has been reached with the Central Environmental Authority (CEA) and the World Bank that projects financed through World Bank resources will be required to undertake an environmental analysis commensurate with the potential for environmental impacts of roads selected for rehabilitation, improvement and maintenance and prepare detailed EMPs that will be included for implementation as part of the Contractors contracts.

The GOSL environmental clearance process, in principle, is consistent with World Bank environmental and public disclosure requirements. The exception being the screening criteria adopted in the GOSL process under the NEA, where project thresholds are used to determine the type of clearance required and the content of public consultation. However, all activities under the proposed project will be subjected to the EA process regardless of the project threshold, prior to disbursement of funds. The implementing agency will share the final versions of EAs and EMPs with the CEA for information. However, under the project activities including setting up and operating crusher plants, asphalt plants and quarry sites require obtaining an Environmental Protection Licenses (EPLs) and be valid at all times during operations.

In addition to the National Environmental Act, which is the most important legislation governing the process of EA, there are three other legislations under which EA can be required. These are (1) Coast Conservation Act (CCA) No.57 of 1981 implemented by the Coast Conservation Department (CCD) and applicable to the coastal zone as defined in the Act and its amendments; (2) Fauna and Flora Protection Ordinance (FFPO) No.2 of 1937 and its amendments implemented by the Department of Wildlife Conservation. This act specifies that any development activity that takes place within one mile of the boundary of a National Reserve declared under the Ordinance require an EIA/IEE; (3) The Forest Ordinance of Sri Lanka No. 17 of 1907 and its amendments.

**World Bank Policies:** Projects financed with IDA/IBRD resources normally need to comply with World Bank Operational Policies. TCAMP has the following WB Policies triggered: OP/BP/GP 4.01 – Environmental Assessment, OP/BP/GP 4.04 – Natural Habitats, OP / BP 4.36 – Forests, OP/BP/GP 4.11 – Physical Cultural Resources, and OP / BP 4.12 Involuntary Resettlement.

## **Scope of Work**

The consultant is required to supervise the road-specific Environmental and Social Screening Assessments and prepare the ESMP for the TCAMP project activities that will be managed through the TCAMP contracts to ensure the objectives and requirements of the ESMF are fully addressed during the project implementation.

## Task 1. Description of the Proposed Project

Major components of the project to be described include, description of the project; covering geographical location, road route(s), road length specifying start and end chainages, type of development envisaged including a description of upgrading/widening and/or maintenance treatments. In addition, to understand the proposed project activities information on ROWs, adjustments to alignments, including earthworks, repair/replacement of bridges, widening and stabilization of embankments, improvements to drainage and service ducts, sources of materials used during proposed road works, generation of wastes and their disposal, expected volume of use and traffic impacts, necessary rehabilitation activities resettlement, land acquisition and temporary re-routing of traffic, safety features, staffing and accommodation of employees, site clearance requirements, scheduling of project activities, road paving and road signs and markings, operation and maintenance activities (e.g. clearing of ditches, prevention of erosion, especially at culverts) will need to be provided as much as possible. Any information currently not available that may have a bearing on the environment or people should be also identified.

Define the road-specific influence area in consultation with the RDA and the World Bank. The basis of the next tasks should be on analyzes conducted within the influence area.

## Task 2. Description of the Environment

Assemble and evaluate and baseline data on the environmental characteristics of the study area. Include information on any changes anticipated before the project commences. (a) *Physical environment*: geology (general description for overall study area); topography; soils; monthly average temperatures, rainfall and runoff characteristics; ambient air quality; noise levels; surface and ground water hydrology; identity of streams, lakes, or marine waters and their flows; receiving water quality. In addition, identify potential natural disaster and climate change risks. (b) *Biological environment*: flora and fauna; rare or endangered species within or in areas adjacent to project-related development sites and any adjustments to the present alignment; sensitive habitats, including wetlands, protected areas or reserves in areas affected by construction, facility siting, land application or disposal; aquatic, estuarine or marine communities in affected waters; significant natural habitats; species of commercial importance in land application sites and receiving waters. (c) *Sociocultural environment*: present and projected population; present land use/ownership; planned development activities; community structure; present and projected employment by industrial category; distribution of income, goods and services; recreation; public health; cultural properties; indigenous peoples, customs and aspirations; significant natural, cultural or historic sites, etc. Identify land or water-based activities such as agriculture (eg. paddy cultivation), fisheries etc. within the project influence area.

The consultant shall:

- collect information from primary and secondary sources that are relevant to understanding the baseline, as well as the design of mitigation and enhancement measures, as pertaining to physical, biological and socio-cultural environments defined, but not limited to the above;
- carry out site visits and investigations of all the protected areas, forests reserves and other environmentally sensitive locations and document them on base maps to identify conflict points with the likely design of the project; and
- prepare detailed specific maps showing details of candidate sites for environmental enhancements.

The consultant shall extensively use the video or other records of the project road (carried out as part of the engineering surveys), as well as photo document significant sites in terms of environmental and social sensitivity and safety. All recognized environmental resources and features within the TCAMP road's influence area shall be clearly identified and studied in relation to activities proposed under the TCAMP activities. Typically, these will include stretches with significant roadside trees; environmental and common property resources such as forests, wetlands, significant water bodies; and major physical cultural properties. All these may be depicted using a line diagram or a strip map.

All surveys shall be carried out including techniques, tools and samples employed for the surveys to conform to the international practices. Environmental quality (air, water and noise) monitoring shall include an adequate number of samples so as to provide a representative sample of the entire TCAMP corridors. Additional sample data for sensitive environmental/ecological receptors, if any, shall be collected such as to analyze and predict the possible impacts to a degree and precision of acceptable professional standards. Further, additional specialized surveys, such as biodiversity assessment survey, and/or hydrological surveys shall be conducted to be agreed during the inception phase.

### Task 3. Legislative and Policy Considerations

Describe the pertinent laws, regulations and standards governing water quality and use, noise levels to be maintained, air quality to be maintained, pollutant discharges to surface waters and land, health and safety, protection of sensitive areas and endangered species, siting, land use control, etc., at national, regional and local levels. The report should describe the national laws and that need to be adhered to and to be implemented during the project including,

1. The Flora and Fauna Protection Ordinance;
2. Forest Ordinance;
3. Coast Conservation Act;
4. Geological Survey and Mines Bureau (GSMB) established under Mines and Minerals Act. Mining and exploitation for minerals, including sand, must be licensed under the Act of the GSMB;
5. Water Resources Board Act where promotion of afforestation, control of soil erosion, prevention of the pollution of rivers, streams and other water sources are required;
6. State Land Ordinance Act provides guidelines to the protection of the source, course or bed of any public stream, springs, reservoirs, lakes ponds lagoons, creeks, canals, aqueducts, etc., prevention of the erosion of soil and preservation of water supplies;
7. Soil Conservation Act makes provision for the conservation of soil resources for prevention or mitigation of soil erosion and for protection of land against damage by floods and droughts. It is possible to declare any area defined in the order to be an erodable area for the purpose of this act;
8. Prevention of Mosquito Breeding Act;
9. relevant legislation/regulation that governs the use of land, and
10. other relevant laws and regulations that should be taken into consideration.

The consultant should also specify various licenses, permits and approvals and relevant authorities that are required to be maintained by the contractors for sourcing of material for road construction and site utilization. It should also specify in all cases, according to the World Bank Policy, no activity including setting up of burrowing sites, dumping sites, quarry and sites for stock piling, storage or any

other facility siting related to the project within protected areas or forest reserves will be allowed even with the permits and approvals by the relevant agency.

#### **Task 4. Determination of the Potential Impacts of the Proposed Project**

Identify all significant changes that the project is likely to generate. Distinguish between significant positive and negative impacts, direct, indirect and cumulative impacts, and immediate and long-term impacts. Include indirect impacts (e.g., increased access to forests and other sensitive areas and increased urbanization). Identify impacts that may occur due to accidental events (e.g., spillage of toxic materials). Identify impacts that are unavoidable or irreversible. Wherever necessary, describe impacts quantitatively, in terms of environmental costs and benefits. Assign economic values when feasible. Characterize the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with predictions of impact.

Identify any significant developments proposed in the project influence area such as township development, industrial zones, etc. that may have impact on the level of road use as well as to the environmental and people and level of impacts. The EA should focus on the potential for negative environmental and social impacts caused by planned and unplanned (spontaneous) in-migration of people if applicable to the given road section; clearing of forest lands for agriculture; increased pressure on fuel wood, fodder and water resources; social disruptions and conflicts; threat to natural habitats and important wildlife species, etc.

Determine the impacts due to likely changes to hydrology due to design or construction time. Specifically describe impacts on agriculture and fisheries where applicable due to temporary and/or long-term changes to hydrology in the area.

Special attention should be given to:

- Air quality: air pollution from asphalt plants; dust; noise from construction, equipment and blasting.
- Land resources: landslides; erosion; roadside litter; material for road construction.
- Hydrology: crossing of rivers, streams, canals and ravines; temporary closure of water flow (such as due to bridge construction); foreclosure of other land uses (if new alignment proposed); landslides; erosion; roadside litter; modifications to natural drainage patterns and groundwater elevation; flash-flooding; setting up of or clearing of lead aways; upstream activities that will have impacts to the project, as well as downstream impacts.
- Water quality: river/stream and lake sedimentation; use of pesticides; fuel and oil spills; water pollution from spills or accumulated contaminants on road surfaces.
- Biological: impacts on biodiversity caused by facilitation of access to and spontaneous settlements in natural areas; impacts on coastal/wetland management; control of hunting and poaching/wood-cutting; removal of existing trees along the roadsides
- Socio-economic: loss of agricultural and residual lands; loss of water sources for drinking and agriculture purposes; unplanned settlements; noise; threat to cultural and historical sites or artifacts.

#### **Task 5. Analysis of Alternatives to the Proposed Project**

Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives that would achieve the same objectives. The concept of alternatives

extends to siting and design of new alignments, rehabilitation techniques and phasing of activities, and operating and maintenance procedures. The alternatives should be also proposed based on the experience of road rehabilitation in the recent past. Compare alternatives in terms of potential environmental and social impacts, capital and operating costs (including mitigation measures and their monitoring), and institutional, training, and monitoring requirements and recommend the best possible options. To the extent possible, quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures.

The alternatives shall reflect "best practices" in road alignment and construction to ensure that potential negative environmental impacts are minimized (e.g., through measures to prevent soil erosion, to ensure proper drainage, and provide for waste disposal such as of cut and fill material and used oil, spoil and borrow area restoration; avoidance of cutting trees; avoidance/control resettlement, etc.), avoidance of significant socio-economic changes; and safety.

#### **Task 6. Development of an Environmental Management and Monitoring Plan (ESMP)**

For each impact predicted, feasible and cost-effective mitigation measures shall be identified to reduce potentially significant adverse environmental impacts to acceptable levels. The capital and recurrent costs of the measures, and institutional, training and monitoring requirements to effectively implement these measures shall be determined. The consultant shall explore and recommend environmental enhancements including roadside landscaping, separation of non-motorized lanes in an aesthetically appealing manner, provision of walking pathways, and development of cultural properties or improving access along the corridor. At this stage, it would be important to identify the need for further environmental studies for issues that cannot be dealt with during this stage, but should be undertaken by the TCAMP Contractors.

Estimate the site-specific impacts and costs of the mitigation measures and of the institutional and training requirements to implement them. If appropriate, assess compensation to affected parties for environmental impacts that cannot be mitigated – example closure of water flow of a river that will impact the planting of paddy downstream where compensation may have to be provided to the affected communities. Prepare an ESMP, including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures, monitoring, etc. Include measures for emergency response to accidental events (e.g. entry of raw sewage or toxic wastes into rivers, streams, etc.).

Prepare a detailed plan to monitor the implementation of mitigating measures and the impacts of the project during rehabilitation and operation including monitoring indicators (e.g. emission and ambient levels of pollutants where these may be detrimental to human health, soil erosion, changes in the floodplain). Include in the plan an estimate of capital and operating costs and a description of other inputs (such as training and institutional strengthening) needed to implement the plan. Include a regular schedule of monitoring the quality of surface and ground waters, air quality and noise to ensure that mitigation measures are effective. Provide guidance for reporting, enforcement and conducting environmental audits.

Review the responsibilities and capability of institutions at local, provincial/regional, and national levels and recommend steps to strengthen or expand them so that the ESMP may be effectively adopted and implemented by the TCAMP contractor. The recommendations may extend to agency functions, intersectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting and financial support.

Identify environmental and social standards to be maintained which can be translated to environmental and social specifications for the TCAMP contractors. Each specification should also have a measurable indicator(s) for monitoring purposes.

ESMP should be also presented in summary as part of an appendix (es) in a format agreed with the PMU. The ESMP should have the following:

- Site-specific impacts identified, and mitigation measures proposed (e.g. removal of trees, need for drainage, etc.)
- Standards to be maintained which are applicable throughout the road (e.g. safety measure, traffic management, noise and dust management, water and air quality maintenance, etc.) and/or the site is unknown (e.g. site of the labor camp, asphalt plant, etc.).
- Potential list of sites for material sourcing and siting of burrowing sites, dumping sites, quarry and sites for stock piling, storage, crusher plants, asphalt plants, etc. in the vicinity of the road sections. Potential sites identified for stock piling, storage, crusher plants, asphalt plants, etc. should be also checked for existing necessary clearances/permits and reported. This should include information such as existing site clearance details (including the quality of the source as per the GSMB, amount available for extraction, expiry dates of the clearances/permits if a commercial site, etc.), as well as details of requirements of permits for such activities. Such site identification should adhere to the condition specified under the Task 3, paragraph 2.
- Staffing requirement for the Contractor and supervising entity

#### **Task 7. Assist in Inter-Agency Coordination and Stakeholder Participation**

The Consultant shall assist the PMU/RDA in coordinating the Environmental and Social Screening Assessment with relevant agencies and the government will consult with groups likely to be affected by the proposed project and with local NGOs on the environmental and social aspects of the proposed project – the detailed consultation requirements are presented separately in the next section of the ToR. These groups should be consulted during the initial stages of the assessment as well as when Environmental and Social Screening Assessment is ready. The draft assessment should also be available in a public place accessible to affected groups and stakeholders. Relevant information will be provided to affected groups in a timely manner prior to consultation and in a form and language that is understandable and accessible to the groups being consulted. The Consultant should maintain a record of the public consultation and the records should indicate: means other than consultations (eg, surveys) used to seek the views of affected stakeholders; the date and location of the consultation meetings, a list of the attendees and their affiliation and contact addresses; and, summary minutes. It should be also reported on how the suggestions and requirements of stakeholders have been influenced in proposing mitigation measures proposed under ESMP, as well as the conceptual design. The summary of the above should be presented as part of the main text of the Environmental and Social Screening Assessment and detailed information including photographs should be annexed.

#### **Environmental and Social Screening Assessment Report**

Provide Environmental and Social Screening Assessment reports for the TCAMP project activities in a concise form limited to significant environmental and social issues. The summary text should focus on findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references. Organize the Environmental and Social Screening Assessment report according to the following outline: a two page summary of the assessment followed by a detailed data table generated through the online form: <https://goo.gl/forms/aJl2AD6HrOS8RwD02>

## Qualifications

The consultant should possess verifiable experience and skills in conducting environmental and social assessments in the roads sector development and excellent communications and writing skills. The consultant will be reaching out to the PMU and PRDA staff to solicit environmental, social, hydrological, and technical / engineering inputs relevant to the TCAMP project activities and the scope of this TOR.

## Reporting and feedback schedule

All submissions related to the assignment should be submitted to Project Director of Project Management Unit (PMU), as hard copies and electronically. Electronic version of the final report should be in Word form and not PDF. During the final submission of the reports, if changes requested during the draft report stage are not satisfactory to the RDA, the consultant will be required to work further on the document until it is considered satisfactory. All reports will be also reviewed by the World Bank.

## Timeline

- Completion of the Environmental and Social Screening Assessment
- Draft Environmental and Social Screening Assessment Report shared with the World Bank
- Draft Environmental & Social Management Plan shared with the World Bank
- Feedback provided by the World Bank
- Two Reports finalized and completed

The format to present the EMP in a matrix is provided below:

Activity	Environmental Impact	Proposed mitigation Action	Location	Frequency	Implementation Responsibility	Monitoring Responsibility	Monitoring Frequency	Implementation progress
<b>Pre-Construction Phase</b>								
<b>Construction Phase</b>								
<b>Demobilization Phase</b>								

<b>Operational Phase</b>								

Important to note the following when using this template:

The EMP that will be prepared should have all sections in place, except the last column on Implementation Progress. What go in as the ESMP to the bid and contract documents of construction contractor is the sections highlighted in blue, as Implementation Progress is not relevant at the time of bidding and Operational responsibilities would lie with the council. Any activity that may be identified as the responsibility of design engineers should not be part of the ESMP that goes into the bid and contract documents of construction contractors.

**Important to note:** The consultant is responsible to ensure the ESMF requirements are taken into consideration in the designing of infrastructure. The EMP should follow the same sequence as the tasks described above including the ESMP matrix provided above.

## Generic Environmental & Social Management Plan (ESMP)

The following Generic ESMP identifies environmental and social impacts and mitigatory measures that need to be in place during the construction of ancillary facilities, such as office buildings, staff accommodation facilities, storage facilities and other facilities that are also part of the solid waste management facilities. This generic example should be used in line with site screening and assessment in the preparation of site specific ESMPs.

Generic Environmental & Social Management Plan (ESMP) for Construction of New Infrastructure and/or Rehabilitation of Existing Infrastructure

Activities	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implementation	Supervision
<b>1.0</b>	<b>Advance Works</b>				
<b>1.1</b>	<b>Identifying Location for new infrastructure</b>				
	New infrastructure to be set up should be located in areas that are least sensitive to wildlife and land. At all times attempts, should be made to identify areas where minimal land clearance impacts are envisioned	Design stage	Design cost	RDA	
<b>1.2</b>	<b>Incorporation of Green Building Design</b>				
	Green infrastructure guidelines should be followed in designing and construction. The use of natural material sourced from sustainable sources (not from within the protected areas) should be used where suitable. Structures built should incorporate earthy and natural colors that will mingle in with the natural scape and not hinder the aesthetic value of the area	Design stage	Design cost	RDA	
<b>1.3</b>	<b>Design of slope protection / land-slide management structures</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		Design must ensure structural integrity and safety of structures to address issues such as physical trauma associated with failure of structures and address potential reduction of stabilization of the nearby land due to slope protection activities. Incorporate as appropriate the following during planning, siting and design phases, especially in hilly terrain: Inclusion of buffer strips or physical separations around project sites Incorporation of siting and safety engineering criteria to prevent failures due natural and/or man-made risks (such as wind, flooding, landslides, etc.)	Design stage	Design cost	RDA	
		Application of locally regulated building codes to ensure structural integrity Certification of designing and constructing infrastructure, the applicability and appropriateness of structural criteria				
	<b>1.3</b>	<b>Environmental Management Plan (EMP)</b>				
		A site specific. EMP and relevant guidelines should be included as a Special Condition in the Bid Document; and EMP should be attached to contract to form part of the contract requirement	Prior to bidding	To be provided as a provisional sum and/or as part of the engineering cost	PPP partners	
<b>2.0 Construction Phase</b>						
	<b>2.1</b>	<b>Earthwork and Soil Conservation</b>				
	<b>2.1.1</b>	<b>Site Clearance and Land Development</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		<p>Prevention of the removal of trees should be carried out as far as possible. No trees that are of rare endemic value are to be removed for the purpose of the project</p> <p>During removing, attention should be paid to maintain minimum disturbances to soil cover and also care should be taken not to damage adjoining trees.</p> <p>Compensation for the trees removed should be conducted at 1:2 at least Water spraying should be done at a regular interval to avoid dust generation due to site clearance</p>	Applicable throughout the construction areas	Engineering cost	Contractor, IA	PRDA /PRDD
	<b>2.1.2</b>	<b>Disposal of Debris and Spoil</b>				
	(a)	<p>All debris and residual spoil material including any left earth shall be disposed only at locations approved by the engineer for such purpose and subjected to the clauses 2.1.1.b and 2.1.1.c.</p> <p>All material that is reusable or recyclable shall be used for such purposes either by the contractor or through dealers.</p>	Disposal sites to be identified by the contractor and approved by Engineer.	Engineering cost	Contractor	PRDA /PRDD
	(b)	The contractor shall obtain the approval from the relevant Local Authority such as Prdeshiya Sabha, Municipal Council and other government agencies (as required) for disposal and spoil at the specified location, as directed by the Engineer				
		Private land that will be selected for disposal should also require written consent from the land owner				
	(c)	<p>The debris and spoil shall be disposed in such a manner that;</p> <p>(i) waterways and drainage paths are not blocked</p> <p>(ii) the disposed material should not be washed away by runoff and (iii) should not be a nuisance to the public</p>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(d)	The debris and residual spoil material including any left earth shall be used, to refill the burrow areas as directed by the engineer, subjected to laying of topsoil as per EMP clause 2.1.2.	All burrow sites (licensed sites) identified by contractor and approved by engineer.			
	(e)	Excavated earth materials and all debris materials shall be disposed immediately without allowing to stockpile at identified locations for debris disposal, recommended by the engineer. During transportation, dispose materials should be covered with tarpaulin.	Applicable throughout the project sites			
	(f)	If approved by the engineer, contractor can dispose the debris and spoil as a filling material provided that the contractor can ensure that such material is used for legally acceptable purposes with disposed in an environmentally acceptable manner.	In identified filling sites subjected to the approval of engineer			
	<b>2.1.2</b>	<b>Conservation and reuse of top soil</b>				
	(a)	Top soil of the agricultural areas and any other productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth of 150mm and stored in stockpiles of height not exceeding 2m, if directed by the engineer. If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he shall obtain the direction from the engineer in writing	Within the project sites where topsoil from productive land to be removed	Engineering cost	Contractor	PRDA /PRDD
	(b)	Removed top soil could be used as a productive soil when replanting/establishing vegetation	Site(s) identified for replantation program			

Activities	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implementation	Supervision
(c)	Stockpiled topsoil must be returned to cover the areas including cut slopes where the topsoil has been removed due to project activities. Residual topsoil must be distributed on adjoining/proximate barren areas as identified by the engineer in a layer of thickness of 75mm – 150mm.	Within the project sites where slope stabilization is carried out and/or on barren land			
(d)	Topsoil thus stockpiled for reuse shall not be surcharged or overburdened. As far as possible multiple handling of topsoil stockpiles should be kept to a minimum.	Locations where topsoil is stockpiled for reuse	-		
<b>2.1.3</b>	<b>Protection of Ground Cover and Vegetation</b>				
(a)	Construction vehicle, machinery and equipment shall be used and stationed only in the areas of work and in any other area designated/ approved by the engineer. Entry and exit of construction vehicles and machinery should be restricted to particular points as directed by the engineer	Within the project areas	-	Contractor	PRDA /PRDD
(b)	Contractor should provide necessary instructions to drivers, operators and other construction workers not to destroy ground vegetation cover unnecessarily	Within the project areas			
<b>2.1.4</b>	<b>Burrowing of Earth</b>				
(a)	Earth available from construction site excavation works as per design, may be used as embankment materials, subject to approval of the engineer	All excavation areas and embankments	-	Contractor	PRDA /PRDD
(b)	Contractor shall comply with the environmental requirements/guidelines issued by the CEA and the respective local authorities with respect of locating burrow areas and with regard to all operations related to excavation and transportation of earth from such sites.	All burrow sites identified and used by the contractor			

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		Contractor can also find suitable soil materials from currently operated licensed burrow pits in the surrounding area, subject to approval of the engineer No burrow-sites be used (current approved) or newly established within areas protected under FFPO and FO				
	(c)	Burrow areas shall not be opened without having a valid mining license from the GSMB. The location, depth of excavation and the extent of the pit or open cut area shall be as approved by the engineer.				
	(d)	All burrow pits/areas should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the CEA and the respective local authority.		Engineering cost		
	(e)	Establishment of burrow pits/areas and its operational activities shall not cause any adverse impact to the near-by properties. Also shall not be a danger of health hazard to the people.	All excavation areas, slopes and burrow sites	-		
	(f)	Contractor shall take all steps necessary to ensure the stability of slopes including those related to temporary works and burrow pits.		Engineering cost		
	<b>2.1.5</b>	<b>Prevention of soil erosion</b>				
	(a)	Debris material shall be disposed in such a manner that waterways, drainage paths would not get blocked. Drainage paths associated with the infrastructure should be improved / erected to drain rain water properly. Silt traps will be constructed to avoid siltation into water ways where necessary. To avoid siltation, drainage paths should not be directed to streams, other water bodies and sea directly and they should be separated from streams / other water bodies / sea	Applicable throughout project sites	Engineering cost	Contractor	PRDA /PRDD

Activities	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implementation	Supervision
(b)	Barricades such as humps will be erected at excavated areas for culverts, silt traps, toe walls, filling and lifting with roper sign boards, as some work in these sections will have to be stopped during heavy rains due to heavy erosion. To prevent soil erosion in these excavated areas, proper earth drain system should be introduced.	Applicable throughout project sites			
(c)	Embankment slopes, slopes of cuts, etc. shall not be unduly exposed to erosive forces. These exposed slopes shall be graded and covered by grass or other suitable materials per the specifications. All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch.				
(d)	Work that lead to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the Engineer by submitting a proposal on actions that will be undertaken by the contractor to prevent erosion.		-		
(e)	The work, permanent or temporary shall consist of measures as per design or as directed by the engineer to control soil erosion, sedimentation and water pollution to the satisfaction of the engineer. Typical measures include the use of berms, dikes sediment basins, fiber mats, mulches, grasses, slope drains and other devices. All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork or other items of work and no separate payment will be made for their implementation.		Engineering cost		
<b>2.1.6</b>	<b>Contamination of soil by fuel and lubrications</b>				
(a)	Vehicle/machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the engineer	Servicing yards to be used for vehicle servicing	Engineering cost	Contractor	PRDA /PRDD
(b)	Approval from CEA in the form of an Environmental Protection Licenses (EPL) should be secured by the contractor if he intends to prepare his own vehicle servicing yard				PRDA /PRDD

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(c)	Waste oil, other petroleum products and untreated wastewater shall not be discharged on ground so that to avoid soil pollution. Adequate measures	Servicing yards to be used for			
		shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers. All waste petroleum products shall be disposed of in accordance with the guidelines issued by the CEA or the engineer.	vehicle servicing and locations where vehicles will be temporarily stationed			
	(d)	Sites used for vehicle and plant service and maintenance shall be restored back to its initial status. Site restoration will be considered as incidental to work.	New servicing yards developed by the contractor for the project			PRDA /PRDD
	<b>2.1.7</b>	<b>Disposal of harmful construction wastes</b>				
	(a)	Contractor prior to the commencement of work shall provide list of harmful, hazardous and risky chemicals/ material that will be used in the project work to the Engineer. Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful materials have been dumped as waste at the end of the project.	Locations identified to store chemicals and waste disposal	-	Contractor	PRDA /PRDD
	(b)	All disposal sites should be approved by the engineer and approved by CEA and relevant local authority.				PRDA /PRDD
	(c)	The contractor shall clean up any area including water-bodies affected/contaminated (if any) as directed by the engineer at his own cost.	All affected water bodies close to material storage and waste disposal sites			

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	<b>2.1.8</b>	<b>Quarry operations</b>				
	(a)	Utilizing the existing quarry sites available in the project influential area as much as possible which are approved by GSMB with valid EPL and Industrial Mining Licences; If new quarries are to be opened, prior approval should be obtained from GSMB, CEA and local authorities such as Pradeshiya Sabha.	All, quarry sites which will be used during construction phase.	Engineering cost	Contractor	PRDA /PRDD
		Selected quarry sites should have proper safety measures such as warnings, safety nets etc., and third party insurance cover to protect external parties that may be affected due to blasting. Quarry sites should not be established within protected sites identified under the FFPO and FO				
	(b)	It is recommended not to seek material from quarries that have ongoing disputes with community.		-		
	(c)	The maintenance and rehabilitation of the access roads in the event of damage by the contractors operations shall be a responsibility of the contractor.		Engineering cost		
<b>2.2</b>		<b>Storage and handling of construction material</b>				
<b>2.2.1</b>		<b>Emission of dust</b>				
	(a)	Storage locations of sand, metal, soil should be located away from settlements and other sensitive receptors and covered (with artificial barriers or natural vegetation). Measures given under clauses 2.5.1 (c), (d), (e) should be considered within material storage site to minimize dust during handling of material. All access roads within the storage site should be sprinkled with water for dust suspension.	At all material storage locations (stock piles of sand, gravel and metal)	Engineering cost	Contractor	PRDA /PRDD
<b>2.2.2</b>		<b>Storage of fuel, oil and chemicals (avoid fumes and offensive odor)</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	<p>All cement, bitumen (barrels), oil and other chemicals should be stored and handled on an impervious surface (concrete slab) above ground level. Storage facility of cement, bitumen (barrels), oil and other chemicals should be an enclosed structure ensuring that no storm water flows in to the structure.</p> <p>A ridge should be placed around the storage facility to avoid runoff getting in to the structure.</p> <p>Adequate ventilation should be kept to avoid accumulation of fumes and offensive odor that could be harmful to material handlers.</p> <p>Measures given under clause 2.9 should be considered to avoid any accidents and risks to worker population and public.</p>	At all material storage locations (cement, bitumen, fuel, oil and other chemicals used for construction activities)	Engineering cost	Contractor	PRDA /PRDD
	<b>2.2.3</b>	<b>Transportation of material</b>				
	(a)	<p>The contractor should avoid over loaded trucks to transport material to construction sites. During transportation, materials should be covered with tarpaulin. Avoid peak hours in roads with moderate to high traffic'; the contractor shall minimize possible public nuisance due to dust, traffic congestion, air pollution, etc., due to such haulage; If local roads are used, select routes based on the truck load; divide the load to prevent damages to local roads and bridges; observe speed limits and maintain vehicles in the good condition; transport material under cover; avoid peak hours in roads with moderate to high traffic.</p> <p>If there are damages to local roads and other utilities due to hauling in roads which were not identified during design stage, Contractor shall attends to repair all damaged infrastructure/ roads, if needed through relevant authorities</p>	Within the project locations and the vicinity	-	Contractor	PRDA /PRDD
	<b>2.3</b>	<b>Water – Protection of Water Sources and Quality</b>				
	<b>2.3.1</b>	<b>Loss of minor water sources and disruption to water users</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	Contractor should make employees aware on water conservation and waste minimization in the construction process.	Project sites and worker camps	-	Contractor	PRDA /PRDD
	(b)	Arrange adequate supply of water for the project purpose throughout the construction period. Not obtain water for project purposes, including for labour camps, from public or community water supply schemes without a prior approval from the relevant authority. Not extract water from ground water or surface water bodies without the permission from engineer & relevant authority. Obtain the permission for extracting water prior to the commencing of the project, from the relevant authority.		Engineering cost		
	(c)	Contractor shall protect sources of water (potable or otherwise) such as water sources used by the community so that continued use these water sources will not be disrupted by the work. In case the closer of such sources is required on temporary basis contractor shall provide alternative arrangement for supply. Alternative sources such as wells thus provided should be within acceptable distance to the original sources and accessible to the affected community.	Wells and other public water sources locations within the project sites			
	(d)	Contractor shall not divert, close or block existing canals and streams in a manner that adversely affect downstream intakes. If diversion or closure or blocking of canals and streams is required for the execution of work, contractor must obtain the engineers approval in writing. Contractor shall also obtain the approval from the National Water Supply and Drainage Board (NWS&DB) or local authority or Divisional Secretary depending on the operating agency of the intake/water supply. Contractor shall restore the drainage path back to its original status once the need for such diversion or closure or blockage ceased to exist. During the affected period contractor shall supply water to the affected community.	Waterways located in the surrounding areas of road sections or the contractor's work sites.			
	(e)	In case the contractors activities going to adversely affect the quantity or quality of water, the contractor shall serve notice to the relevant authorities and downstream users of water sufficiently in advance.	Project sites			

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(f)	Apply best management practices to control contamination of run-off water during maintenance & operation of equipment. Maintain adequate distance between stockpiles & water bodies to control effects to natural drainage paths.	construction sites, material and soil storage areas, and equipment and machinery service areas	-		
	<b>2.3.2</b>	<b>Siltation into water bodies</b>				PRDA /PRDD
	(a)	Contractor shall take measures to prevent siltation of water bodies as a result of construction work including, construction of temporary / permanent devices to prevent water pollution due to siltation and increase	All water bodies located around the project areas	Engineering cost	Contractor	PRDA /PRDD
		of turbidity. These shall include the measures against erosion as per EMP 2.1.6.				
	(b)	Construction materials containing small / fine particles shall be stored in places not subjected to flooding and in such a manner that these materials will not be washed away by runoff.				
	(c)	Temporary soil dumps should be placed at least 200m away from all water bodies				
	(d)	If temporary soil piles are left at the site for a long time those piles should be covered with thick polythene sheets				
	(e)	All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch				
	<b>2.3.3</b>	<b>Alteration of drainage paths</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	Contractor shall not close or block existing canals and streams permanently. If diversion or closure or blocking of canals and streams is required for the execution of work (e.g. for construction of bypass), contractor must first obtain the Engineers approval in writing. Contractor shall carry out an investigation and report to the Engineer, if an investigation is requested by the Engineer. Contractor shall also obtain the approval from the relevant agencies such as ID/ /Divisional Secretary prior to such action is taken. Contractors shall restore the drainage path back to its original status once the need for such diversion or closure or blockage is no longer required.	All drainage paths impacted by the project activities	Engineering cost	Contractor	PRDA /PRDD
	(b)	The debris and spoil shall be disposed in such a manner that waterways and drainage paths are not blocked.				
	(c)	Avoid/ minimize construction works near/ at such drainage locations during heavy rain seasons such as monsoon rain periods.				
	<b>2.3.4</b>	<b>Contamination of water from construction wastes</b>				
	(a)	The work shall be carried out in such a manner that pollution of natural water courses rivers, lagoons, sea and other minor stream paths located within construction areas or downstream. Measures as given in 2.1.6., 2.1.7, 2.1.8, 2.3.2 and 2.3.6 clauses shall be taken to prevent the wastewater	At all water courses located adjacent construction sites and downstream	Engineering cost	Contractor	PRDA /PRDD
		produced in construction from entering directly into streams, water bodies or the irrigation systems.				
	(b)	Avoid / minimize construction works near / at such drainage locations during heavy rainy seasons	At all water courses located adjacent construction sites	-		

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(c)	The discharge standards promulgated under the National Environmental Act shall be strictly adhered to. All waste arising from the project is to be disposed in a manner that is acceptable to the engineer and as per the guidelines/instructions issued by the CEA.	At all water courses located adjacent construction sites and downstream	Engineering cost		
	<b>2.3.5</b> .	<b>Contamination from fuel and lubricants</b>				
	(a)	All vehicle and plant maintenance and servicing stations shall be located and operated as per the conditions and /or guidelines stipulated under the EPL issued by CEA. In general these should be located at least 200m away from water bodies and wastewater shall not be disposed without meeting the disposal standards of the CEA. Wastewater from vehicle and plant maintenance and servicing stations shall be cleared of oil and grease and other contaminants to meet the relevant standards before discharging to the environment.	Vehicle and plant maintenance and servicing centers	Engineering cost	Contractor	PRDA /PRDD
	(b)	Vehicle, machinery and equipment maintenance and re-filling shall be done as required in EMP clause 2.1.6. to prevent water pollution as well	Yards, servicing centers			
	<b>2.3.6</b> .	<b>Locating, sanitation and waste disposal in construction camps</b>				
	(a)	Locations selected for labour camps should be approved by engineer and comply with guidelines/ recommendations issued by the CEA/Local	At all labour camps	Engineering cost	Contractor	PRDA /PRDD
		Authority. Construction of labourer camps shall not be located within 200m from waterways or near to a site or premises of religious, cultural or archeological importance and school.				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(b)	Labour camps shall be provided with adequate and appropriate facilities for disposal of sewerage and solid waste. The sewage systems shall be properly designed, built and operated so that no pollution to ground or adjacent water bodies/watercourses takes place. Garbage bins shall be provided the camps and regularly emptied. Garbage should be disposed of in a hygienic manner, to the satisfaction of the relevant norms. Compliance with the relevant regulations and guidelines issued by the CEA/LA shall be strictly adhered to.				
	(c)	Contractor shall ensure that all camps are kept clean and hygienic. Necessary measures shall be taken to prevent breeding of vectors				
	(d)	Contractor shall report any outbreak of infectious disease of importance in a labour camp to the engineer and the Medical Officer of Health (MOH) or to the Public Health Inspector (PHI) of the area immediately. Contractor shall carry out all instructions issued by the authorities, if any.		-		
	(e)	Contractor shall adhere to the CEA recommendations on disposal of wastewater. Wastewater shall not be discharged to ground or waterways in a manner that will cause unacceptable surface or ground water pollution.		-		
	(f)	All relevant provisions of the Factories Act and any other relevant regulations aimed at safety and health of workers shall be adhered to.		-		
	(g)	Contractor should remove all labour camps fully after its need is over, empty septic tanks, remove all garbage, debris and clean and restore the area back to its former condition. A consent letter from the land owner should be obtained that certifies the decommissioning has taken place to the level acceptable to the land owner		Engineering cost		
	<b>2.3.7</b>	<b>Wastage of water and waste minimization</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	The contractor will minimize wastage of water in the construction process/operations by reusing water as much as possible, utilizing only the required amount of water for the construction works etc...	Within project sites and labour camps	-	Contractor	PRDA /PRDD
	(b)	The contractor shall educate and made employees aware on water conservation, waste minimization and safe disposal of waste following guidelines given by CEA and LA.				
	<b>2.3.8</b> .	<b>Extraction of water</b>				
	(a)	The contractor is responsible for arranging adequate supply of water for the project purpose throughout the construction period. Contractor shall not obtain water for his purposes including for labour camps from public or community water supplies without approval from the relevant authority. Such extraction (if approved) should be under direct supervision of the engineer	Within project sites and labour camps	Engineering cost	Contractor	PRDA /PRDD
	(b)	Extraction of water by the contractor for the project purposes shall comply with the guidelines and instructions issued by relevant authority. The Contractor shall not extract water from groundwater or from surface water-bodies without permission from the Engineer.		-		
	(c)	Construction over and close to rivers, minor streams and lagoon shall be undertaken in dry season.	All drainage and irrigation activities			
	(d)	The Contractor may use the natural sources of water subject to the provision that any claim arising out of conflicts with other users of the said natural sources of water shall be made good entirely by the contractor	At all natural water sources used for construction works			
<b>2.4.</b>		<b>Flood Prevention</b>				
	<b>2.4.1</b> .	<b>Blockage of drainage paths and drains</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	Contractor's activities shall not lead to flooding conditions as a result of blocked drainage paths and drains. The contractor shall take all measures	All construction work sites	Engineering cost	Contractor	PRDA /PRDD
		necessary or as directed by the Engineer to keep all drainage paths and drains clear of blockage at all times.				
	(b)	If flooding or stagnation of water is caused by contractor's activities, contractors shall provide suitable means to (a) prevent loss of access to any land or property and (b) prevent damage to land and property. Contractor shall compensate for any loss of income or damage as a result.				
	<b>2.4.2</b>	<b>Work in Flood Prone Areas</b>				
	(a)	Contractor's activities shall not lead to aggravate floods in flood prone areas when working in flood prone areas.	All construction work sites and their impacts areas	-	Contractor	PRDA /PRDD
	(b)	When working in flood prone areas during rainy season the contractor shall avoid storing materials, chemicals and other items of work in areas where those can be washed away by the floods.				
	<b>2.5</b>	<b>Air Pollution</b>				
	<b>2.5.1</b>	<b>Generation of Dust</b>				
	(a)	The contractor shall effectively manage the dust generating activities such as topsoil removal, handling and transporting sand, rubble, bitumen, and cement during periods of high winds or during more stable conditions with winds directed towards adjacent residences and other facilities.	Within the construction area where earth work will take place, storage locations of	Engineering cost	Contractor	PRDA /PRDD
	(b)	All stockpiles shall be located sufficiently away from sensitive receptors.				
	(c)	All vehicles delivering materials shall be covered to avoid spillage and dust emission.				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(d)	The Contractor should avoid, where possible and take suitable action to prevent dirt and mud being carried to the roadway (particularly following wet weather).	sand, rubble, bitumen, cement and all sub roads used for material transportation, paying special attention to sensitive locations.			
	(e)	The contractor should enforce vehicle speed limits to minimize dust generation.				
	(f)	The Contractor shall employ a water truck to sprinkle water for dust suppression on all exposed areas as required (note: the use of waste water / waste oil for dust suppression is prohibited)				
	(g)	All cleared areas shall be rehabilitated progressively.				
	(h)	All earthwork shall be protected in a manner acceptable to the minimize generation of dust.				
	(i)	All existing roads used by vehicles of the contractor, or any of his subcontractor or supplies of materials or plant and similar roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tires.				
	(j)	Clearance shall be affected immediately by manual sweeping and removal of debris, or, if so directed by the Engineer, by mechanical sweeping and clearing equipment. Additionally, if so directed by the Engineer, the road surface will be hosed or sprinkled water using appropriate equipment.				
	(k)	Plants, machinery and equipment shall be handled (including dismantling) so as to minimize generation of dust.				
	(l)	The contractor shall take every precaution to reduce the level of dust emission from the hot mix plants and the batching plants up to the satisfaction of the Engineer in accordance with the relevant emission norms.				
	<b>2.5.2</b>	<b>Emission from Hot-Mix Plants and Batching Plants</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	The hot mix plants and batching plants shall be sited in accordance with CEA guidelines. It is recommended that hot mix plants and batching plants to be located sufficiently away from sensitive receptors such as vulnerable habitats, religious and cultural sites, residential areas, schools and industrial areas	Locations at which hot mix plant/s and concrete batching plant/s to be located	-	Contractor	PRDA /PRDD
	(b)	The exhaust gases shall comply with the requirements of the relevant current emission control legislation. All operations at plants shall be undertaken in accordance with all current rules and regulations protecting the environment as well as the conditions given in the EPL.				
	(c)	The hot mix plant be sited in accordance with CEA guidelines and operated with an EPL. The hot mix plants shall be fitted with the requirements of the relevant current emission control legislation. Road side mixing should be avoided				
	<b>2.5.3</b>	<b>Odor and offensive smells</b>				
	(a)	Contractor shall take all precautions such as storing all chemicals used for construction works in properly closed containers with good ventilations to prevent odor and offensive smell emanating from chemicals and processes applied in construction works or from labour camps. In a situation when/where odor or offensive smell does occur contractor shall take immediate action to rectify the situation. Contractor is responsible for any compensation involved with any health issue arisen out of bad odor and offensive smells.	Within construction and work sites including all sites used for store all chemicals and places where chemical reactions take place.	Engineering cost	Contractor	PRDA /PRDD
	(b)	The waste disposal and sewerage treatment system for the labour camps shall be properly designed, built and operated so that no odor is generated. Compliance with the regulations on health and safety as well as CEA and LA guidelines shall be strictly adhered to.	At all labour camps			

Activities	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implementation	Supervision
<b>2.5.4</b> .	<b>Emission from construction Vehicles, Equipment and Machinery</b>				
(a)	The emission standards promulgated under the National Environment Act shall be strictly adhered to.	All plants, machinery and vehicles used for construction	-	Contractor	PRDA /PRDD
(b)	All vehicles, equipment and machinery used for construction shall be regularly serviced and well maintained to ensure that emission levels comply with the relevant standards.		Engineering cost		
(c)	Contractor should obtain the certificate issued by the Vehicular Emission Test (VET) for all construction vehicles, plants and other machineries and it should be renewed annually				
<b>2.5.5</b> .	<b>Air Pollution from Crusher</b>				
(a)	Crusher plants should operate under an EPL and shall confirm to relevant dust emission levels as stated in the EPL. Only the quarries approved by GSMB and holding current EPL shall be used for material extraction.	Location of crusher plants	-	Contractor	PRDA /PRDD
(b)	Crushing plants shall be sited sufficiently away from sensitive receptors such as houses, place of worships and outdoor recreation areas (locations given under item 2.4.1) or as required by the Engineer.				
(c)	Sprinkling of water (through a sprinkler system) for dust suppression.		Engineering cost		
<b>2.6</b>	<b>Noise Pollution and Vibration</b>				
<b>2.6.1</b>	<b>Noise from Vehicles, Plants and Equipment.</b>				
(a)	All machinery and equipment should be well maintained and fitted with noise reduction devices in accordance with manufacturer's instructions.	All machinery and vehicles used for construction works	Engineering cost	Contractor	PRDA /PRDD

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(b)	In construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing and batching, mechanical compaction, etc., will be stopped between 20.00 hours to 06.00 hours. No construction shall take place within 100m around hospitals between 20.00 hours to 06.00 hours. Near noise sensitive sites, such as schools noisy equipment shall not be used during noise sensitive times of the day.	Within the construction sites and their vicinity	-		
	(c)	All vehicles and equipment used in construction shall be fitted with exhaust silences. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed from site.		Engineering cost		
	(d)	Noise limits for construction equipment used in this project (measured at one meter from the edge of the equipment in free field) such as compactors,		-		
		rollers, front loaders, concrete mixers, cranes (moveable), vibrators, and saws shall not exceed 75 dB(A).	vehicles used for construction works			
	(e)	Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the Engineer, to keep noise from these at a minimum.		Engineering cost		
	(f)	Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall be provided with protective gear.	Within the construction sites and their vicinity			
	<b>2.6.2</b>	<b>Vibration</b>				
	(a)	Contractor shall take appropriate action to ensure that construction works do not result in damage to adjacent properties due to vibration.	Within the	-	Contractor	PRDA /PRDD

Activities	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implementation	Supervision
(b)	Prior to commencement of excavation, blasting activity, the Contractor shall undertake a condition survey of existing structures within the zone of influence, as agreed with the relevant government agencies and the engineer.	construction sites and their vicinity			
(c)	Contractor shall carry out monitoring at the nearest vibration sensitive receptor during blasting or when other equipment causing vibrations are used.				
(d)	The contractor shall modify the method of construction until compliance with the criteria, if vibration levels exceed the relevant vibration criteria.				
(e)	Contractor shall pay due consideration on vibration impacts of blasting on adjoining structures. Explosive loads shall be determined so that excessive vibration can be avoided and blasts shall be controlled blasting in nature. Notwithstanding to these provisions contractor is liable for any damage caused by blasting work.				
<b>2.6.3</b>	<b>Noise from Blasting or Pre splitting Operations</b>				
(a)	Blasting shall be carried out during fixed hours (preferably during midday), as permitted by the Engineer. The timing should be made known to all the people within 500 m (200 m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be	At quarry sites and landslide mitigation sites	-	Contractor	PRDA /PRDD
	excluded from the area of 200 m (50 m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting. Only chemical blasting where rocks have to be removed for landslide mitigation measures				
<b>2.7</b>	<b>Impacts to Flora</b>				
<b>2.7.1</b>	<b>Loss or Damage to Trees and Vegetation</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	All works shall be carried out in a manner that the destruction to the flora and their habitats is minimised. Trees and vegetation shall be felled / removed only if that impinges directly on the permanent works or necessary temporary works. In all such cases contractor shall take prior approval from the Engineer.	All project sites	-	Contractor	PRDA /PRDD
	(b)	Contractor shall make every effort to avoid removal and/or destruction of trees of religious, cultural and aesthetic significance. If such action is unavoidable the Engineer shall be informed in advance and carry out public consultation and report on the same should be submitted to the Engineer.				
	(c)	Contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority, if any with regard to felling of trees and removal of vegetation.				
	(d)	Removed trees must be handed over to the Timber Corporation.				
	(e)	The contractor shall plant over 5 year old root-balled native trees suitable for the location as identified by the Engineer. The planting should take place in public land suitable for the purpose The contractor shall build hardy structures around the trees for protection. The contractor shall be responsible for ensuring the well-being of the trees/plants until the end of the contract	Indicative number of trees / plants and indicative number of planting structures necessary are to be identified by	Engineering cost		

Activities	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implementation	Supervision
		the contractor. Planting should take place as soon as the plant removal takes place			
<b>2.7.3</b>	<b>Spread of Invasive Plant Species</b>				
	<p>There is a possibility of introducing / spreading of invasive species during material transportation and disposing cleared vegetation from one site to another, thus the following measures are to be undertaken.</p> <p>Close monitoring of transportation, storage of borrowing material for the spread of any invasive species must be done.</p> <p>Vehicles should be covered during transportation of cleared vegetation to and from the construction site.</p> <p>Borrow material to be brought from properly identified borrow pits and quarry sites, the sites should be inspected in order to ensure that no invasive plant species are being carried with the borrow material.</p> <p>Washing the vehicles should be conducted periodically to prevent carrying any invasive species</p> <p>The construction site should be inspected periodically to ensure that no invasive species are establishing themselves at the site.</p>			Contractor	PRDA /PRDD
<b>2.7.2</b>	<b>Chance finds of important Flora</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	During construction, if a rare/threatened/endangered flora species is found, it shall be immediately informed to the relevant agency by the contractor through the engineer. All activities that could destroy such flora and/or its habitat shall be stopped with immediate effect. Such activities shall be started only after obtaining the Engineer's approval. Contractor shall carry out all activities and plans that the Engineer instructed him to undertake to conserve such flora and/or its habitat.	All project sites	-	Contractor	PRDA /PRDD
	<b>2.8.</b>	<b>Impact on Fauna</b>				
	<b>2.8.1</b>	<b>Loss, Damage or Disruption to Fauna</b>				
	(a)	All works shall be carried out in such a manner that the destruction or disruption to the fauna and their habitats is minimum.	All project sites	-	Contractor	PRDA /PRDD
	(b)	Construction workers shall be instructed to protect fauna including wild animals and aquatic life as well as their habitats. Hunting, poaching and unauthorized fishing by project workers is not allowed.				
	(d)	Siting of all hot mix plants, crushing plants, workshops, depots and temporary worker camps and storing of toxic and hazardous materials at approved locations, and recycling and dumping of solid waste matter at locations approved by local authorities, maintenance of vehicles and equipment in good operable condition, ensuring no leakage of oil or fuel and the fitting of proper exhaust baffles. Any solid waste should not be dumped into natural habitats.	Locations selected for erecting the asphalt, crusher and concrete batching plants and workshops	Engineering cost		
	<b>2.8.2</b>	<b>Chance found important Fauna</b>				
	(a)	During construction, if a rare/threatened/endangered fauna species is project sites it shall be immediately informed to the relevant agency by contractor. All activities that could destroy such fauna and/or its habitat stopped with immediate effect. Such activities shall be started only after the Engineer's approval. Contractor shall carry out all activities and plans Engineer instructed him to undertake to conserve such fauna and/or its	found, All the shall be obtaining that the habitat.	- Contractor	PPP partners	

Activities	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implementation	Supervision
<b>2.9</b>	<b>Disruption to people</b>				
<b>2.9.1</b>	<b>Loss of Access</b>				
(a)	At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock. Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer.	All project sites	Engineering cost	Contractor	PRDA /PRDD
(b)	The works shall not interfere unnecessarily or improperly and ensure convenience of public at all times		-		
(c)	On completion of the works, all temporary obstructions to access shall be cleared away, all rubbish and piles of debris that obstruct access be cleared to the satisfaction of the Engineer.		Engineering cost		
(d)	Providing advance information to the public about the planned construction works and activities causing disruption to access and the temporary arrangements made to give relief to public in order to avoid any inconveniences due to the construction activities.				
<b>2.9.3</b>	<b>Traffic Control and Safety</b>				
(a)	The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the highway under improvement. The provision of traffic safety measures shall be considered incidental to work and follow The Institute for Construction Training and Development (ICTAD) guidelines and instructions given by the Police, if any.	Road-side construction sites	Engineering cost	Contractor	PRDA /PRDD
(b)	Vehicles travelling in and out of the PA should maintain low speeds when transporting material inside the boundaries of the PA in order to avoid disturbing the wildlife and avoid the risk of accidents. In the event the road within the PA is blocked by wildlife the contractor will not disturb the wildlife until they move away from the path, with noise or other means.	Construction areas			

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	<b>2.10</b>	<b>Accidents and Risks</b>				
	<b>2.10.1</b>	<b>Public and Worker safety</b>				
	(a)	All reasonable precautions will be taken to prevent danger of the workers and the public from accidents such as fire, explosions, blasts, falling rocks, falling to excavated pits, chemical sprays, unsafe power supply lines etc.	Construction areas, material	Engineering cost	Contractor	PRDA /PRDD
	(b)	The Contractor shall comply with requirements for the safety of the workmen as per the international labour organization (ILO) convention No. 62 and Safety and Health regulations of the Factory Ordinance of Sri Lanka to the extent that those are applicable to this contract. The contractor shall supply all necessary safety appliances such as safety goggles, helmets, masks, boots, etc., to the workers and staff. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, excavations, trenches and safe means of entry and egress.	storage and worker camps			
	(c)	Construction activities on existing facilities where operation is underway should be conducted post times of operation, post operational hours of the center if on the same site.				
	<b>2.10.2</b>	<b>Prevention of Risks of Electrocutation</b>				
	(a)	All electrical wiring and supply related work should confirm to British Standards (BS) or relevant Sri Lankan Standards. Adequate precautions material will be taken to prevent danger of electrocuting from electrical storage and and power supply lines including distribution boards, etc. worker camps Measures such as danger signboards, danger/red and lights will be provided to protect the public and workers. All electric machines to be used in the construction shall be free from defect, be maintained and kept in good working order, be regularly inspected and as provisions and to the satisfaction of the Engineer.	Construction areas, equipment transformers, lights, fencing power driven properly per BS	Engineering cost partners	Contractor	PPP

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	<b>2.10.3</b>	<b>Risk at Hazardous Activity</b>				
	(a)	All workers employed in hazardous activities shall be provided with necessary protective gear. These activities include mixing asphalt material, cement, lime mortars, concrete etc., welding work, work at crushing plants, blasting work, operators of machinery and equipment such as power saws, etc.	Construction areas, material storage and worker camps	Engineering cost	Contractor	PRDA /PRDD
	(b)	The use of any toxic chemical shall be strictly in accordance with the manufacturer's instructions. The Engineer shall be notified of toxic				
		chemicals that are planned to be used in all contract related activities. A register of all toxic chemicals delivered to the site shall be kept and maintained up to date by the Contractor. The register shall include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product.				
	<b>2.10.4</b>	<b>Lead Pollution</b>				
	(a)	No paint containing lead or lead products will be used except in the form of paste or readymade paint. Facemasks shall be supplied to workers who are working in spray painting or scraping lead paints.	Workshops, yards where spray painting is done	-	Contractor	PRDA /PRDD
	<b>2.10.5</b>	<b>Handling of Explosives</b>				
	(a)	Except as provided in the contract or ordered or authorized by the Engineer, the Contractor shall not use explosives. Where the use of explosives is so provided or ordered or authorized, the Contractor shall comply with the requirements of the following Sub-Clauses of this Clause besides the law of the land as applicable.	All locations where blasting activities will commence	-	Contractor	PRDA /PRDD

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(b)	The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain Ministry of Defense (MoD) approval for importing and handling explosives and keep the Local Police informed of the same.		Engineering cost		PRDA /PRDD
	<b>2.11</b>	<b>Health and Safety</b>				
	<b>2.11.1</b>	<b>Prevention of Vector based Diseases</b>				
	(a)	Contractor shall take necessary actions to prevent breeding of mosquitoes at places of work, labour camps, plus office and store buildings. Stagnation of water in all areas including gutters, used and empty cans, containers,	At worker camps, stores, yards	Engineering cost	Contractor	PRDA /PRDD
		tires, etc. shall be prevented. Approved chemicals to destroy mosquitoes and larvae should be regularly applied. All burrow sites should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the Central Environmental authority and relevant local authorities				
	(b)	Contractor shall keep all places of work, labour camps, plus office and store buildings clean devoid of garbage to prevent breeding of rats and other vectors such as flies.				
	<b>2.11.2</b>	<b>Workers Health and Safety</b>				
	(a)	Contractor shall comply with the provisions in Health and Safety regulations under the Factory Ordinance with regard to provision of health and safety measures and amenities at work place(s).	Within construction sites, workshops and worker camps	-	Contractor	PRDA /PRDD
	<b>2.11.3</b>	<b>First Aid</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	At every workplace, first aid kit shall be provided as per the regulations. At every workplace an ambulance room containing the prescribed equipment and nursing staff shall be provided.	Within construction sites, quarry, crusher, concrete batching plants, workshops and worker camps	Engineering cost	Contractor	PRDA /PRDD
	<b>2.11.4</b>	<b>Potable Water</b>				
	(a)	In every workplace and labour camps portable water shall be available throughout the day in sufficient quantities.	Within construction sites, quarry, crusher, concrete batching plants, workshops and worker camps	Engineering cost	Contractor	PRDA /PRDD
	<b>2.11.5</b>	<b>Hygiene</b>				
	(a)	The contractor shall provide and maintain necessary (temporary) living accommodation and ancillary facilities for labour to standards and scale approved by the engineer.	Worker camps and temporary sheds at work sites	Engineering cost	Contractor	PRDA /PRDD
	(b)	At every workplace and labour camps sufficient number of bathing facilities, latrines and urinals shall be provided in accordance with the Health and Safety regulations and/or as directed by the Engineer. These bathroom and toilet facilities shall be suitably located within the workplace/buildings. Latrines shall be cleaned at least three times daily in the morning, midday and evening and kept in a strict sanitary condition. If women are employed, separate latrines and urinals, screened from those for men and marked in the vernacular shall be				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		provided. There shall be adequate supply of water, within and close to latrines and urinals.				
	(c)	The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place.				
	(d)	Garbage bins must be provided in the camp, work sites and regularly emptied and the garbage disposed of in a hygienic manner. Construction camps shall have a clean hygienic environment and adequate health care shall be provided for the work force.				
	(e)	Unless otherwise arranged for by the Local Authority, the contractor shall arrange proper disposal of sludge from septic tanks. The contractor shall obtain approval for such disposal from the Public Health Inspector of the area.				
	2.11 6	Gender				
	(a)	The structure and plan of the labour camp and all living, hygiene, health and ancillary facilities for labour must take into consideration gender sensitivities.				
	(b)	All labour camps and work places shall be safe spaces for women workers. Contractors must show that adequate steps have been taken to provide a safe working environment for women.				
	<b>2.12</b>	<b>Protection of Archaeological, Cultural and Religious Places and Properties</b>				
	<b>2.12. 1</b>	<b>Prevention of damage to Cultural and Religious Places and Properties</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	During construction activities the contractor should take all necessary and adequate care to minimize impacts on cultural properties which includes cultural sites and remains, places of worship. Workers should not be allowed to trespass in to such areas.	Near physical cultural resources	-	Contractor	PRDA /PRDD
	<b>2.12. 2</b>	<b>Chance finds of Archaeological property</b>				
	(a)	All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest etc. discovered on the site and/or during construction work shall be the property of the Government of Sri Lanka, and shall be dealt with as per provisions of Antiquities Ordinance of 1940 (Revised in 1956 & 1998)	In all project sites	-	Contractor	PRDA /PRDD
	(b)	The contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any such article or thing and shall, immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out the Engineer's instructions for dealing with the same, awaiting which all work shall be stopped within 100m in all directions from the site of discovery.		Engineering cost		
	(c)	If directed by the Engineers the Contractor shall obtain advice and assistance from the Department of Archaeological of Sri Lanka on conservation measures to be taken with regard to the artefacts prior to recommencement of work in the area.				
	<b>2.13</b>	<b>Environmental Enhancement</b>				
	<b>2.13. 1</b>	<b>Landscaping</b>				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(a)	Landscape plantation, re-vegetation etc, shall be taken up as per either detailed design or typical design guidelines given as part of the Bid Documents. The contractor also shall remove all debris, piles of unwanted earth, spoil material, away from the roadsides and from other work places and disposed at locations designated or acceptable to the Engineer or as per Clause 2.1.1. Special care should be taken to ensure that the species selected for replanting are not invasive to the said site.	All project sites and associated sites	Engineering cost	Contractor	PRDA /PRDD
	(b)	On completion of the works, the temporary structures shall be cleared away in full, all rubbish burnt, waste dumps and septic tank shall be filled and closed and roadsides, workplaces and labour camps, cleared and cleaned.				
	(b)	In case of an inadvertent damage cause to a utility, the contractor shall immediately inform the service provider and help to restore the service without delay.	All project sites			
<b>2.14</b>		<b>Handling Environmental Issues during Construction</b>				
	(a)	The Contractor will appoint a suitably qualified Environmental Officer following the award of the contract. The Environmental Officer will be the primary point of contact for assistance with all environmental issues during the pre-construction and construction phases. He/ She shall be responsible for ensuring the implementation of EMP.	Relevant construction sites during the construction period	Engineering cost	Contractor	PRDA /PRDD
	(b)	The Contractor shall appoint a person responsible for community liaison and to handle public complaints regarding environmental/ social related matters. All public complaints will be entered into the Complaints Register. The Environmental Officer will promptly investigate and review environmental complaints and implement the appropriate corrective actions to arrest or mitigate the cause of the complaints. A register of all complaints is to be passed to the Engineer within 24 hrs. They are received, with the action taken by the Environmental Officer on complains thereof.				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(c)	<p>Contractor shall develop suitable method to receive complaints and establish a Grievance Redressal Mechanism (GRM). The complaint register shall be placed at a convenient place, easily accessible by the public.</p> <ul style="list-style-type: none"> <li>Grievances submitted in writing shall be referred to the IA/PMU by the safeguard officer of the Contractor through the Engineer.</li> <li>Verbal communications shall be directed to IA/PMU through Engineer. Contact information of Engineer/IA/IA/PMU/in print form shall be available at the site.</li> <li>The grievances shall be submitted to the Engineer on the same day of receiving. It has to be recorded and the safeguard officer of the Engineer shall ensure the timely redress through the IA/PMU</li> </ul>				
	(d)	Contractor shall prepare detailed Environmental Method Statement (EMS) clearly stating the approach, actions and manner in which the EMP is implemented. It is required from the contractor to prepare the EMS for each work site, if work will be carried out at more than one site at once and time plan for implementation. The EMS shall be updated regularly and submit for Engineers review.				
<b>3.0 Operational stage</b>						
	<b>3.1</b>	<b>Hygienic Conditions</b>				
	(a)	Regular clearing/ cleaning and maintenance of the facility should be conducted, especially of Kitchens and Sanitary facilities in in order to maintain hygienic conditions.	All buildings supported by the project	Maintenance cost	IA	PRDA /PRDD
	<b>3.2</b>	<b>Solid Waste Management</b>				
	(a)	Solid Waste should be segregated and collected in covered bins and arrangements should be made with the LA for removal of solid waste from the site as per the set solid waste management scheme in the area. Daily collection should be conducted in facilities located within the PA boundaries.	In all project sites	Maintenance cost	IA	PRDA /PRDD

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	<b>3.3</b>	<b>Mosquitoes and Vector Breeding</b>				
	(a)	Regular checks should be conducted to ensure that there is no storm water collection and stagnation at the site which will facilitate the breeding of mosquitoes. Clearing should be conducted accordingly to prevent collection and stagnation of water.	In all project sites	Maintenance cost	IA	PRDA /PRDD

## **ANNEX 5. TERMS OF REFERENCE FOR PREPARATION OF SOCIAL IMPACT ASSESSMENT (SIA) AND RESETTLEMENT ACTION PLAN (RAP)**

### **General**

The purpose of this TOR is to outline the scope of work for preparing the RAP in accordance with the project's Environmental and Social Management Framework (disclosed in January 2016).

### **Introduction and Objectives**

Where the project will entail acquisition of land, structures and other assets, and/or cause displacement or loss of assets within the public Right of Way (ROW), the Land Acquisition Act No. 9 of 1950 and subsequent LA regulations in 2008 applies. The project is under consideration for World Bank financing, and must therefore also be in compliance with the World Bank's policy on "Involuntary Resettlement" as described in OP 4.12.

It is the responsibility of the Borrower to prepare a plan that complies with the Government of Sri Lanka's and the World Bank's policy guidelines and directives on land acquisition and involuntary resettlement. This Plan is referred to as a Resettlement Action Plan (RAP). The RAP will be prepared in two phases and will include a gender action plan and details of community consultations. The GoSL and the World Bank will first agree on an appropriate Entitlement Framework, on the basis of which a detailed RAP will be developed.

The RAP has three main objectives:

- to present the project area and the impacts of land acquisition for project civil works on the people who own properties to be acquired, live on the land to be acquired, and/or derive their income from the land or enterprises operating on the land to be acquired;
- to present the entitlement policy for compensation and assistance to people affected by the project;
- to present an action plan for delivery of the compensation and assistance outlined in the policy, to the persons identified as entitled to such assistance.

GoSL and World Bank policy is based on the principle that the population affected by the project should receive benefits from it, or at the very least not be worse off than before. Acquisition of land and other assets, both of private holdings and within the ROW, are integral part of project design and implementation. Undertaking a social impact assessment and preparing a RAP should be incorporated as part of the project design from the start, and undertaken in close coordination with environmental analysis, the Environmental action plan, and the engineering design and implementation.

The World Bank policy emphasizes that involuntary resettlement should be avoided or minimized where possible by exploring other alternative project designs. Therefore, the initial screening for social and environmental impacts should be part of the feasibility studies to determine the final selection of roads to be included in the project.

In cases where displacement, loss of assets, or other negative impacts of people are unavoidable, the project should assist the project Affected Persons (PAPs) with the means to improve their former living standards, income earning capacities, production levels or at least maintain the previous standards of living of those suffering losses.

Since a key principle is that no civil works should be undertaken on any stretch of road before land acquisition has been completed and compensation or assistance carried out according to the RAP, it is essential that the planning and implementation of civil works be coordinated with the RAP.

Preparation of a RAP requires thorough understanding of social, economic and cultural factors influencing the lives of the adversely affected people. Detailed baseline studies need to be conducted, and a participatory approach through consultation with potentially affected persons and other stakeholders such as local NGOs, municipal authorities, etc is essential. Appropriate skills and experience to coordinate and implement this must be available within the responsible agencies.

The Terms of Reference for the work undertaken may be modified according to local contexts, subject to approval by GoSL and the World Bank.

## **Scope of Work**

### **Task 1. Social Impact Assessment (SIA)**

The objectives of the Social Impact Assessments are:

- to provide the minimum information on social impacts as part of the preliminary screening of road sections;
- to verify the legal boundaries of the Right of Way, document existing structures, land plots, and other physical assets within the ROW to establish a cut-off date for entitlements in accordance with the policy to be developed, identify project affected persons including those who are vulnerable; and
- to provide the socio-economic baseline information required for preparation of the entitlement framework.

**Preliminary Screening:** The consultant shall make initial visits to all the different stretches of road under consideration for project. Coordinated with the other screening exercises being undertaken (environmental, techno-economic), an assessment shall be made of the potential magnitude of social impacts. Any major social impact issues such as large scale resettlement, relocation or impact on dense urban clusters, loss of livelihood, acquisition of private land and other vulnerable groups shall be identified. Stretches with no or minor social impacts shall be identified, and given priority in the selection of roads to be improved.

Following the selection of road stretches to be included in the project, a verification exercise shall be undertaken. The verification shall establish the legal boundaries of the Right of Way, and identified current usage of the land in terms of squatters, land encroachments, fixed and movable structures, trees and wells, etc. This shall be jointly verified by the (RDA) and the respective Provincial Council, in the field, the information gathered should be reflected in maps and records, jointly verified by signature of the responsible senior (RDA) and PC officials. The following guidelines shall be followed:

1. Where it is likely that dislocation of people will be required, suitable resettlement sites of government owned land in close proximity to the current locations of the affected persons should be recorded. The resettlement sites should be identified and finalized in consultation with the displaced persons;

2. All encroachments within the public ROW, as well as private holding of land and other assets in areas where it is probable that the corridor of impact will go shall be documented;
3. Assets both within and outside of the ROW such as structure, land holdings, trees and wells, etc shall be recorded on strip maps, and be numbered in each named settlement and administrative unit;
4. The information gathered shall be recorded on strip maps, and if possible computerized Photography and/or video recordings should be used to document existing structures and land holdings, and circumstances for identification and planning.

Following this a public notification of the intent to undertake a project shall be issued, in accordance with the legal requirements of GoSL. This represents the cut-off date for entitlements under the project. Only those people with land or other assets identified as existing prior to this date will be entitled to support under the project. This is to prevent land invasions, erection of new structures for speculation purposes, and other attempts at false claims. The consultants shall assist the appropriate authorities in undertaking this work.

**Socio-economic baseline information:** This will be collected by means of a sample socio-economic survey of the pre-selected roads. The survey shall gather information on the various categories of losses and other adverse impacts likely under the project. The losses shall be categorized according to type. These losses will vary based on the local context. They may include, but not be limited to, types of impact and number of PAPs against each impact type such as:

- loss of land and other productive resources such as trees
- Loss of livelihood or sources of livelihood
- Temporary loss of assets, livelihood or sources of livelihood
- How project will impact women differently – on livelihood, displacement, access to resources, etc;
- loss of structures, temporary or fixed, within or outside of ROW;
- loss of access to public services (roads, water supply, schools, medical facilities, shops);
- loss of customers and supplies;
- loss of access to forest or protected areas
- Loss of fishing, grazing, or forest areas;
- loss of access to common property resources; and
- Disruption of social, cultural, religious, or economic ties and networks.
- Furthermore, the sample socio-economic survey shall identify potentially affected populations, with special attention to vulnerable groups such as landless households and women-headed households. It shall include but not be limited to:
  - demographic characteristics (age, sex, marital status, literacy level, peer relations, numbers, and categories of affected people);
  - ethnic composition of the population and settlement pattern;
  - main and secondary forms of livelihood including specification of the resource base, seasonal and permanent use of resources including land based and salaried employment for

different household members, labor mobility and migration, the importance of informal networks and labor exchange patterns and the potential impact of disrupting these patterns, skill base, training need assessment for livelihood enhancement income through various sources, expenditure pattern, economic vulnerability, asset base;

- status of access to market, health facilities, banking, communication, etc;
- if any persons have already been displaced, information on them should be collected for two time periods at the time of displacement and at present.

As part of the sample socio-economic survey, an assessment shall also be made of what the likely replacement value of the various assets lost is based on the following considerations:

1. entitlements to affected persons shall be based on replacement value rather than registered land prices etc. which tend to be undervalued;
2. this assessment is also important as a means of preventing inflated claims to compensation;
3. as part of this assessment, consultations and discussions shall be held with a representative number to the different categories of affected persons, to assess their views on what constitutes fair compensation or assistance, their preferences for resettlement actions, and reactions towards the project; and
4. a suitable methodology shall be developed to classify different types of assets, and the measurements taken to determine quantities of losses, i.e different types of land, tree, crops, structures, businesses etc, and the unit of measurement such as area of land, number of trees, floor area or other measurements for houses etc.

The sample survey shall form the basis for the full base line socio-economic survey to be undertaken subsequently of all PAPs. By conducting it first for a sample population, it may be modified and improved prior to undertaking the full survey.

**Reporting.** The findings from the Social Impact Assessment shall be presented in a report. The information collected shall be gender segregated. This shall include:

- a) Baseline information on socio-cultural and economic parameters of the project area;
- b) assessment of current land acquisition practices, their appropriateness and potential impacts for this project;
- c) estimates of the type of losses expected as a result of the project, broken up in categories of cultivated, homestead, enumeration of structures, trees and other assets;
- d) identification of the categories of affected persons, bases on the identified losses, and estimates of their numbers;
- e) it is important to analyze the data in such a way that the report captures the likelihood that some persons may lose different kinds of assets. Therefore, the number under each category is not mutually exclusive and in identifying different person's losses and entitlements, provision must be made for recording and compensation for more than one kind off loss; and
- f) the status of squatters and encroachers within the public Right of Way.

Based on this information the consultants shall prepare a draft Entitlement Framework, which will form part of the agreement between GoSL and the Bank. The following considerations are essential:

- a) the framework will be adopted as policy for this project;

- b) the entitlement framework shall be prepared by the consultants. However, it is essential that this be done in close consultation with the agencies responsible for the subsequent implementation of the Resettlement Action Plan, to ensure full understanding and agreement on the issues;
- c) the framework should be placed within the legal context of Sri Lanka and the Bank's applicable Operational Policies must be adhered to. If there is a divergence between domestic law, the practice, and the World Bank's Policies, this should be clearly identified and analyzed before the framework is finalized. If necessary, consultation between the Bank and GoSL authorities should be held to arrive at a framework acceptable to both;
- d) a key consideration should be to develop a methodology to document to what extent the objectives are achieved. Indicators should be developed which can be used for systematic monitoring and comparison with the baseline data over time;
- e) as a general principle, there ought to be more than one option offered to PAPs within each category of impact. The entitlement framework should analyze these options, the risks and benefits of each, and how to implement the various programs in a transparent manner;
- f) Wherever possible, land for land ought to be a priority. Cash compensation should only be undertaken when it can be clearly documented that land for land or other types of assistance are not available. If cash payments are made, special arrangements should be made to assist the most vulnerable in making productive use of the money. The entitlement framework should also describe how payments can be made in a transparent manner, for example, by doing it publicly with independent verification;
- g) the entitlement framework shall specify the period of notification about acquisition of assets, and establish that no civil works may start on a stretch of road before the Resettlement Action Plan has been implemented there. This is a key principle, and must be taken account of when awarding contracts for civil works. Improper or delayed implementation of the RAP may lead to costly delays in civil works;
- h) As the project will work in different areas at different times, the framework and RAP should be prepared in such a way that the period between the acquisition of people's assets and the actual start of work is the shortest possible. The framework should, therefore, also contain provisions as to how the compensation and assistance levels may be re-evaluated and adjusted in case of price increases. Such reassessment should be done at least on an annual basis (ideally every six months).

The framework shall be presented in a tabular form as below:

<b>Type of Loss</b>	<b>Entitled person</b>	<b>Entitlement</b>	<b>Implementation Issues/Guidelines</b>	<b>Organizations Responsible</b>

### **Task 2. Preparation of Resettlement Action Plan (RAP)**

The information collected during the Social Impact Assessment shall form the basis for preparing a Resettlement Action Plan (RAP). The RAP should contain, at a minimum, the following sections:

- Summary findings from the Social Impact Assessment;

- Summarized description of applicable legal framework of the Country and the World Bank's policies and Entitlement framework. The RAP should clearly bring out why and how laws and policies are applicable and what measures have been taken in the project to address them;
- Data on expected impacts, numbers and categories of affected persons;
- Consultation and participation arrangements of RAP and other stakeholders, and framework for continued consultation during implementation stage;
- Mitigation measures;
- Gender action plan;
- Institutional arrangements, including grievance procedures;
- Implementation procedures;
- Timetable of activities, with Gantt charts showing the various elements of the plan, coordination of land with road design, contracting, and construction;
- Monitoring and evaluation of land acquisition and resettlement process; and
- Budget and costs.

In preparing the RAP, the likely alignment and corridor of impact for the roads to be improved shall be determined. This shall be done as a joint exercise, coordinating the various design aspects of the project (engineering, environmental, socio-economic). The corridor of impact is defined as the width required for the improved road and the civil works necessary to construct it, including the new pavements, shoulders, support slopes, and necessary safety zones. People who live or have assets outside of this corridor of impact and who will not be affected by the project will not be considered as PAPs and will not be entitled to compensation or other forms of assistance. The following considerations are important:

- a) The identification of the corridor of impact shall be undertaken as a joint exercise between the planners responsible for engineering design, environmental assessment, social impact and R& R planning;
- b) Public consultation shall be undertaken to determine what local people consider to be the best alignment for the improved road;
- c) The corridor of impact will normally fall within the existing Right of Way but the study shall assess where private land acquisition may be required;
- d) It is likely that the exact road alignment, and therefore the corridor of impact, may shift following detailed engineering designs. The purpose of this early estimate is to get as complete a picture as possible of the expected scope of land acquisition required, number of PAPs categories and entitlements, and budgets and time frame required for the implementation of the Resettlement Action Plan. However, this shall be updated and corrected as required following the final engineering designs;
- e) the consultant, along with the engineering team, shall carry out analysis of alternatives to ensure that requirement of private land is minimum to improve and upgrade the existing road alignment to the defined technical standard;

- f) the analysis of alternatives should take into account the usage of land, vulnerability of land owner, productivity of land and land cost while determining land acquisition. The lower value land should be acquired where possible;
- g) wherever possible, the alignment should be designed so as to avoid acquiring residential buildings and buildings in which permanent businesses operate;
- h) re-alignments should only be done where it is necessary for safety reasons or when it is preferable for environmental reasons or because it has less asset acquisition impact.

Based on the agreed entitlement framework, the full baseline socio-economic survey and a joint on-site verification shall take place for the total length of highway to be improved. The baseline socio-economic survey shall be conducted within the corridor of impact.

The survey shall be a full census of all entitled persons and a baseline socio-economic survey. It shall uniquely identify all entitled persons under the policy. The survey shall use the methodology developed for the sample survey undertaken earlier and provide the data for an overall estimate of total numbers of people affected, assets to be acquired by the project, and scope of resettlement and rehabilitation measures to be taken. The joint on-site verification will determine the precise nature and quantity of assets to be acquired and the losses to be compensated.

The consultants shall advise the project authorities about the best way to coordinate this activity. The following considerations are important:

- the survey and verification should be done jointly by representatives of the project authorities and the PAPs and other authorities (as appropriate);
- during this survey, the PAPs shall be explained of the likely impact by the project authorities and presented with a copy of the entitlement framework in his/her local language;
- the assets to be acquired shall be tabulated, bearing in mind that each PAP may have losses in more than one category. The compensation or assistance he/she is entitled to shall be clearly explained, as well as the likely timetable for when the acquisition is to take place;
- where different options have been developed, these shall be explained along with the likely risks involved. Wherever possible as part of the analysis of alternatives, the principal of high vulnerability/ low risk should be followed, i.e. those among the PAPs identified as particularly vulnerable should be encouraged to choose the assistance or compensation that offers the least risk. This choice shall not be made on the spot but provision should be made in the RAP for further consultation and sufficient time should be given to the PAPs to make their choices;
- the table of likely losses and types of entitlements shall be verified by the three parties present and signed by each of them. The PAP shall be given a copy, which will serve as proof of his/her status as PAP, and each PAP should be given a unique identification code. Other measures such as identity cards may be considered if necessary;
- this information should be coded and computerized, and updated as required following finalization of the data. Developing a database to track PAPs entitlement and compensation of assistance given should be considered to ensure accurate and efficient implementation of the RAP;
- it should be made clear to the PAP that if the final road design and the choice of alignment mean that he/she is no longer within the corridor of impact, no compensation will be given;

- the PAP shall also be informed about the mechanism set up for grievance procedures;
- provision should be made for how missing data can be collected later, and other mechanisms for information sharing and local participation should also be developed;
- undertaking the baseline socio-economic survey and joint verification is a time consuming exercise. People are not always available, and it may be difficult to coordinate the movements of local government officials with the project authorities. It is therefore essential to allow sufficient time for the survey and verification before any civil work start, and to coordinate the planning of the different project components.
- Summary information shall be tabulated based on districts, with length of road, land to be acquired (cultivated and homestead listed separately), temporary and permanent buildings, and number of households and total persons affected (broken down by gender and other relevant categories such as major/minors, etc.)

**Institutional Arrangements.** Responsibilities for implementation of various parts of the RAP should be clearly delineated:

- a) while elements of the plan may be undertaken by other institutions (for example by NGOs), the consultant shall prepare terms of reference for hiring the NGO; (b) for coordination among different agencies of government of community organization, appropriate mechanisms should be identified and established. The organizational structure and type of skills required should lead to the creation of a joint task force or steering committee with representation from different agencies, involving participation from local government and representatives of the PAPs;
- b) Appropriate monitoring and evaluation arrangements should be developed. It should be the responsibility of the implementing agency to systematically monitor the progress of the RAP, and analyze and report on its impacts compared with the baseline data. Suitable indicators should be developed. Independent evaluation or supervision should be provided for, and guidelines prepared for how this is to be undertaken;
- c) A grievances and appeals mechanism should be evolved;
- d) It is essential to document the institutional capacity of the agency or agencies responsible for implementing the RAP. Where institutional capacity is yet to be developed or identified, a realistic plan shall be presented for how this is to be achieved, bearing in mind likely constraints and delays.

Assessment of institutional capacity will be a key factor in the appraisal of the RAP.

Following agreement on an entitlement framework, a summary publication with project description, estimates of land acquisition losses and entitlements should be prepared, both in English and in the local language. This is to be distributed among the local communities and other stakeholders.

### 2.3 REQUIREMENTS OF THE ASSIGNMENT

**Consulting team:** The consultant team shall, as a minimum, be staffed as follows:

- Senior Social/Resettlement Specialist with overall responsibility for the assignment - MA or above in social sciences, with relevant previous experience in land acquisition and resettlement planning with a minimum of 10 years' experience. Knowledge of the World Bank's related guidelines and operational directives will be required;

- Senior Social Specialist(s), with background in social sciences, proven ability in qualitative and quantitative methodology, and at least 5 years' experience from development related research. Practical experience in working on community development / livelihood restoration projects will be essential;
- National research assistants

**Reporting and feedback schedule:** All submissions related to the assignment should be submitted to Project Director of Project Management Unit (PMU) of Road Sector Assistance Project, as hard copies and electronically. Electronic version of the final report should be in Word form and not PDF. During the final submission of the report(s), if changes requested during the draft report stage are not satisfactory to the employer, the consultant will be required to work further on the document until it is considered satisfactory. All reports will be also reviewed by the World Bank. Any feedback/discussions in addition to below can be requested by the employer as well as the consultancy firm.

Description	Deadline	Feedback
Submission of the inception report	01 week after signing the contract agreement.	Within 1 week, comments and suggestions will be provided in writing  A meeting will be organized by the employer to discuss clarifications and provide additional feedback
Submission of the draft SIA report & RAPs	07 weeks after receiving comments.	Within 1 week, comments, corrections and further information necessary will be provided in writing
Submission of the final SIA and RAPs	02 weeks after receiving comments	Submission of Final Reports (one soft copy and two hard copies for each road)

**Information to be provided by Employer:** In order to expedite the process, the PMU will provide copies of the most recent SIA reports and RAPs (also available in the Info shop of the World Bank) of RSAP phase 2, as well as the Environmental and Social Management Framework of RSAP on the day of contract signing. The PMU will also provide any documents related to OPRC. In addition, relevant sections of the bid document of RSAP phase 2 will be provided. A meeting to discuss any clarifications with PMU and the World Bank in reference to this ToR can be arranged on request.

## **ANNEX 6: GUIDANCE NOTE ON SELECTING MITIGATION MEASURES TO BE INCLUDED IN THE ENVIRONMENTAL MANAGEMENT PLAN FOR CONSTRUCTION PROJECTS IN SRI LANKA**

### **Pre-Construction Impact Mitigation**

#### **Utility Relocation**

- Identify the common utilities to be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc.
- Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts.
- Ensure community consensus and minimum impact to common utilities like telephone cable, electric cables, electric poles, water taps and etc., Proper clearance to be obtained from the concerned authorities and sent to the PMU before commencement of works.

#### **Tree Removal**

- Attempt to save the trees by changing the alignment of the designs
- Provide adequate protection to the trees to be retained with tree guards (e.g. Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars) as required.
- Identify the number of trees that will be affected with girth size & species type
- Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department.
- Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area. (Please Refer Tree Protection/ Tree Re-Planting Procedures outlined in Section X)

#### **Construction of labour camps**

- The location, layout and basic facility provision of labour camp must be submitted to Engineer prior to their construction.
- The construction will commence only upon the written approval of the Engineer.
- The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner taking in to account gender sensitivities and as approved by the Engineer.
- All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned and implemented with concurrence from the Local Public Health Officer (PHI)
- Adequate health care is to be provided for the work force taking in to account gender sensitivities. The layout of the construction camp and details of the facilities provided should be gender sensitive, provide a safe environment for women workers and shall be prepared and approved by the engineer.

- Labour camp sites after use should be cleared and the site should be reinstated to previous condition at the close of the construction work.

### **Planning of temporary Traffic arrangements**

Temporary diversion will be provided with the approval of the engineer. Detailed traffic control plans will be prepared and submitted to the engineers for approval, one week prior to commencement of works. \

The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, Signage, safety measures for transport of hazardous materials and arrangement of flagmen.

### **Site Management and Mitigation of Impacts during Construction Phase**

#### Information Disclosure among Stakeholders

Discussions should be conducted with the residents who reside around the immediate vicinity of the construction site; provide them with information on the project activities muster their views for possible impact mitigation as this will also ensure a good rapport and less complains. This should be done immediately once the contractor is mobilized.

A copy of the EMP should be available at all times at the project supervision office on site.

#### Material Sourcing

Significant impact on geological resources is anticipated at quarry sites and borrow areas the PIA shall ask contractors to ensure that sand, aggregates and other quarry material is sourced from licensed sources.

It is recommended that all burrow and/or quarry material should be sourced from licensed sources.

The contractor is required to maintain the necessary licenses and environmental clearances for all burrow and quarry material they are sourcing to obtain soil , fine aggregate and coarse aggregate.

Sourcing of any material from any protected areas and/or designated natural areas are strictly prohibited.

The Project Supervision Engineer will require maintaining the numbers and relevant details of all necessary licenses etc. and report of their status accordingly.

#### Transport and Storage of construction materials

Sites for storage of construction materials should be identified, without affecting the traffic and other common utilities that will lead to access issues as the compound is operational.

All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled and done in a manner to suit the trucks capacity.

Construction material such as cement, sand and metal should be stored in closed structures or in a contained manner.

## Dust

All construction materials such as sand, metal, lime, bricks etc. should be transported under cover to the site and stored under cover at the site. Plastic sheeting (of about 6 mm minimum thickness) can be used and held in place with weights, such as old tires or cinder blocks, with the edges of the sheeting buried, or by the use of other anchoring systems. This will minimize the levels of airborne dust.

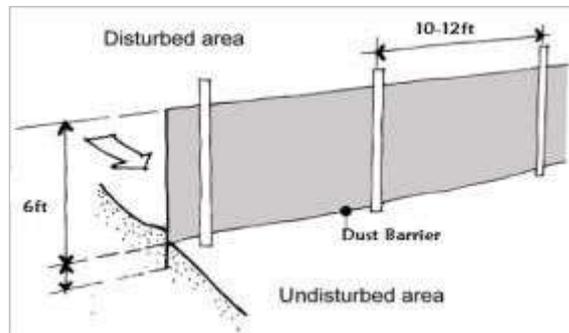
Mud patches caused by material transporting vehicles in the access road should be immediately cleaned

Continual water sprinkling should be carried out in the work and fill areas and the access road if dust stir is observed. Water sprinkling should be done more frequently on days that are dry and windy (at least four times a day) as the levels of dust can be elevated during dry periods.

Dust barriers should be used during all construction activities, especially in areas along roads with heavy traffic, commercial and residential areas.



- The maximum height of barriers should be 6ft at minimum. Material such as Amano roofing sheets, fine mesh geo textiles are recommended materials to be used for setting up dust barriers.



Dust masks should be provided to the labourers for the use at required times.

## Noise

Noise generating work should be limited to day time (6:00AM to 6:00PM). Other type of construction work which will not disturb the environment by noise or vibration could be

carried out during the night time. No work that generates excessive noise should be carried out during night hours (from 6:00PM to 6:00AM on the following day).

Even during day time use of the access road should be minimized during departure times (7:00AM to 8:30AM), school time (1:00PM-2:00PM) and arrival times (After 4:30PM - 6:00PM). This will not only reduce noise levels but also help mitigate congestion issues in the area due to the construction activities.

All equipment and machinery should be operated at noise levels that do not exceed the permissible level of 75 dB (during construction) for the day time. For all construction activities undertaken during the night time, it is necessary to maintain the noise level at below 50 dB as per the Central Environmental Authority (CEA) noise control regulations. All equipment should be in good serviced condition. Regular maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No 924/12) must be conducted for vehicles/machinery that will be used in construction on site and for transport.

Ideally noise generating work should not be carried out during public holidays and religious days. Special care should be taken as there is a temple nearby.

Labour gangs should be warned to work with minimum noise. Strict labour supervision should be undertaken in this respect. Number of night time resident labourers should be minimized.

Temporary sound barriers also should be erected around buildings or premises as appropriate to shield residents if there are complaints from them.

#### Vehicular noise pollution at residential / sensitive receptors

Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured especially near residential / commercial / sensitive areas.

Stationary construction equipment will be kept at least 500m away from sensitive receptors, where possible. These include hospitals, schools, places of worship and households.

All possible and practical measures to control noise emissions during drilling shall be employed.

#### Noise from vehicles, machinery and equipment

Contractor shall submit the list of high noise/vibration generating machinery & equipment to the PIA for approval.

Servicing of all construction vehicles and machinery must be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.

Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum.

#### Removal and Disposal of construction debris and excavated materials

During site clearance activities, demolition and debris removal must be carried out swiftly and in well-planned manner. Possibly debris removal can be carried out during non-peak hours to avoid traffic at the site.

The contractor shall identify the sites for debris disposal and should be finalized prior to start of the earthworks; Spoil and other disposal materials should only be dumped at sites for which prior approval from relevant authorities such as the LA have been obtained. Taking into account the following:

The dumping does not impact natural drainage courses

No endangered / rare flora is impacted by such dumping

Should be located in non-residential areas located in the downwind side o Located at least 100m from the designated forest land.

Avoid disposal on productive land.

should be located with the consensus of the local community, in consultation with the engineer and shall be approved by the highways department

Minimize the construction debris by balancing the cut and fill requirements.

The contractor should avoid any spillage of spoil when transporting such materials to the approved material dumping sites.

### Protection of top soil

The top soil to be protected and compacted after completion of pipe laying activities.

The contractor should attempt to reuse the cut material from earthworks for project activities where possible

### Pollution from Fuel and Lubricants

- The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located away from rivers and irrigation canal/ponds.
- Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground.
- Contractor shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to Engineer) and approved by the Engineer. All spills and collected petroleum products will be disposed off in accordance with standards set by the CEA/MoE.
- Engineer will certify that all arrangements comply with the guidelines of CEA/MoE or any other relevant laws.

### Public and Worker Safety

- The construction site should be barricaded at all time in a day with adequate marking, safety tape, flags, reflectors etc. for safety of individuals using the compound on a daily basis. ( Items such as parking cones, lights, tubular markers, orange and white strips and barricades of a luminous nature for night visibility)
- The construction site should be clearly demarcated by the above means and restriction of access to public to the site will help the safety of public.
- Safety signboards should be displayed at all necessary locations.



- The contractor should obtain a third party insurance to compensate any damages, injuries caused to the public or labourers during the construction period.
- All construction vehicles should be operated by experienced and trained operators under supervision.
- Basic onsite safety training should be conducted for all labourers during the EMP training prior to the start of the construction activities.
- All digging and installation work should be completed in one go, if this task is not accomplished the area should be isolated using luminous safety tape and barricading structures surrounding the whole area.
- Trenches should be progressively rehabilitated once work is completed.
- Material loading and unloading should be done in an area, well away from traffic and barricaded

- Construction wastes should be removed within 24 hours from the site to ensure public safety.

### Safety Gear for Labourers

- Protective footwear and protective goggles should be provided to all workers employed on mixing of materials like cement, concrete etc.
- Welder's protective eye-shields shall be provided to workers who are engaged in welding works.
- Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation.
- The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staffs.
- In addition, the contractor shall maintain in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary.
- A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored on a monthly basis and recorded.



### Prevention of accidents

- Prevention of accidents involving human beings, animals or vehicles falling or accidents due to open trenches/manholes during construction period. This needs to be ensured with proper barricading, signage boards and lighting etc.
- A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances should be available at the site office at all times
- Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital should also be insured.
- Names and contact information for emergency services such as Ambulance services, hospitals, police and the fire brigade should be prepared as a sign board and displayed at the work site.



### Presence of Outside Labour in a Residential Area

- Strict labour supervision should be undertaken. There should be labour awareness programs to educate the labourers about their general behavior while at work as well as their own safety including education on sexual harassment, reporting mechanisms and disciplinary procedures where there has been any violation of these policies.

### Operation of labour camps

- The Contractor shall construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.
- Supply of sufficient quantity of potable water (as per IS) in every workplace/labour camp site at suitable and easily accessible places and regular maintenance of such facilities.
- The sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is to be provided in all toilets and urinals.
- The contractor shall provide garbage bins in the camps and ensure that these are regularly emptied and disposed of in a hygienic manner

### Surface Drainage and Possible Water Stagnation

- Provide storm water drain system in the premises which will discharge water to the improved roadside storm water drain.
- Carry out overall storm water management in the premises during construction using temporary ditches, sand bag barriers etc.
- Temporary flooding due to excavation.
- Proper drainage arrangements to be made, to avoid the overflowing of existing drains due to excavation during the laying of pipes, cutting activities.

### Tree Protection during Construction Phase

- Giving due protection to the trees that fall in the shoulders /corridor of impact shall be the prime focus during Construction/post construction
- Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars, use of plate compactors near trees may also be considered where necessary

### Tree Re-Planting

- Re-plantation of at least twice (1:2) the number of trees cut should be carried out along the project road. Since the major portion of the project road may pass through open lands, planting of trees along the entire stretch of the road is recommended as an enhancement measure.
- Growth and survival of trees planted shall be ensured and monitoring done at least for a period of 3 years. Survival status shall be reported on monthly basis to Engineer in charge.

### Clearing/Closure of Construction Site/Labour Camps

- Contractor to prepare site restoration plans for approval by the engineer. The plan is to be implemented by the contractor prior to demobilization.
- On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the engineer.

## **Procedures for Dealing with Chance Finds**

### **Flora and Chance found Fauna**

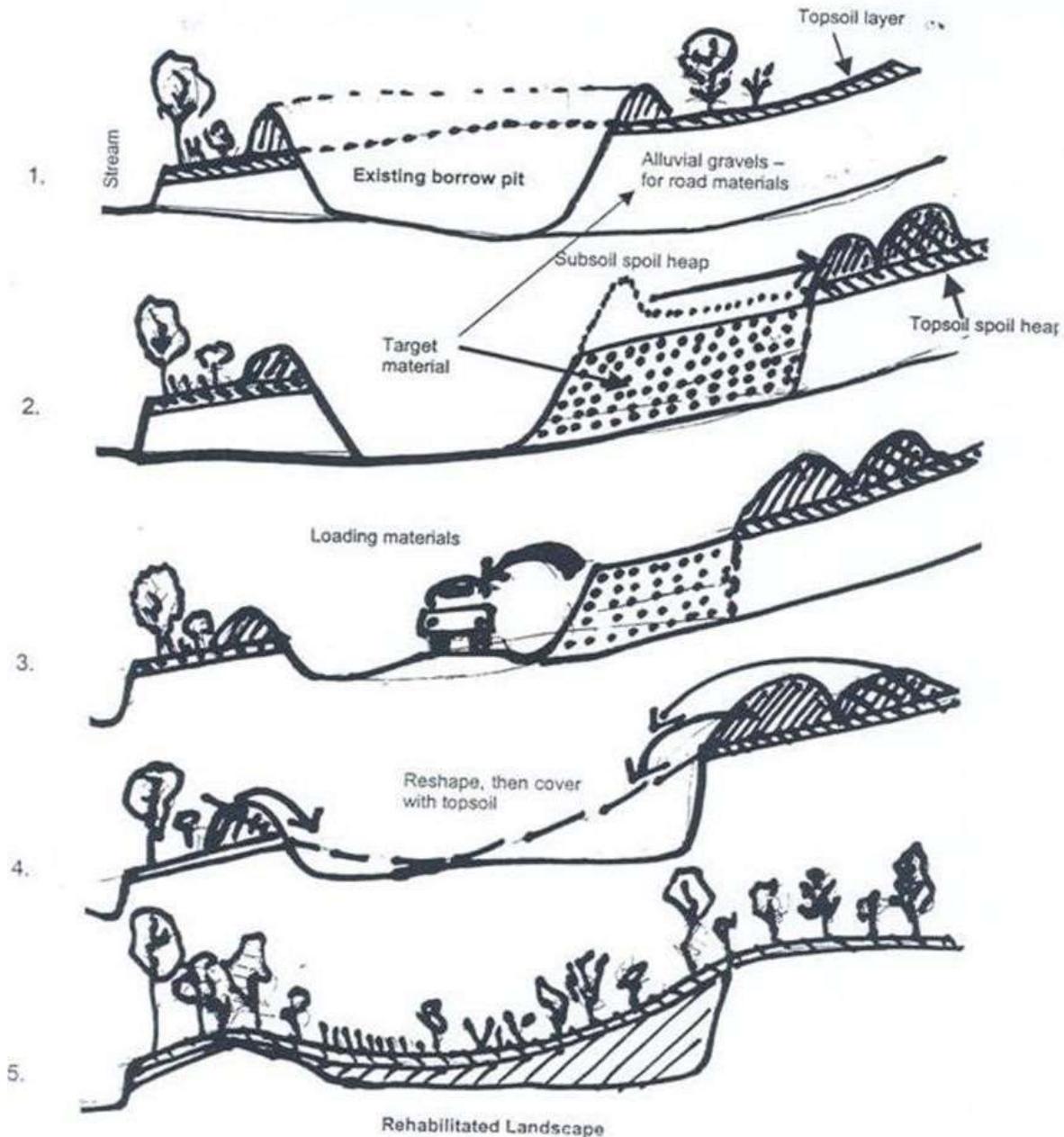
- The contractor will take reasonable precaution to prevent workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal.
- If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Engineer and carry out the Engineer's instructions for dealing with the same.
- The Engineer will report to the nearby Forest Department /Department of Wild Life Conservation (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.

### **Chance Found Archaeological Property**

- All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.
- The contractor will take reasonable precautions to prevent their labourers or any other persons from removing and damaging any such article or thing. The contractor will, immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out the instructions for dealing with the same, waiting which all work shall be stopped.
- The Engineer will seek direction from the Archaeological Department of Sri Lanka and inform the project EO to follow the Chance Find Procedures set forth.

## ANNEX 7: GUIDELINES FOR THE REHABILITATION OF BURROW PITS

Illustration on the Burrow Pit Rehabilitation



### Mitigatory Measures to be Implemented

The following conditions must follow by the contractor during the construction period in burrowing earth:

- The sides of the pits should be sloped with a minimum angle of 1:3, to enable the escape of animals that may accidentally fall into the pits.
- The burrow pits should be restored by filling them or when it is not practical to rehabilitate them as small tanks/water holes enabling wild animals to use as a water source
- The earth burrowing activity at the identified site should be carried out only during the given time period of from 6.00 am to 6.00 pm
- Burrowing earth, transportation and unloading should be carried out under the inspection of Assistant Director (Mahaweli/Irrigation) or an officer appointed by him
- A 15-cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
- Suitable drainage ditches or conduits shall be constructed or installed to avoid conditions where small pools of water that are, or are likely to become noxious, or foul, collect or remain on the burrow area. Surface drainage must be designed to minimize erosion during runoff and major rainfall events.
- Burrow Pit shall be backfilled with clean or inert fill. There shall be no material of deleterious nature (i.e. any material that would be classed as hazardous or waste). Please refer to the diagram above for the Illustration on burrow pit rehabilitation.
- Non-usable material including overburden, screenings and rocks, should be placed in the pit bottom and covered with Topsoil stripped from the surface so as to facilitate water seepage, planting grass and tree planting to be carried out using the Native trees.
- Once the site is reclaimed, any fences where they exist shall be removed to permit revegetation.
- Access and haul roads to the pit must be restored in a mutually agreeable manner where these are considered unnecessary after extraction has been completed.
- Above conditions should be included in the contract document and must monitor whether they are followed.
- Precautions must be taken to minimize spreading of the listed invasive species.
  - Destroy the listed invasive plants as much as possible prior to burrowing material.
  - Surface soil of the burrow site should be separated and stored to prevent transporting seeds of the invasive plants to the tank. This surface soil can use when restoring the burrow pit.
  - When restoring the invasive plants if any germinated in soil should be removed and burn.
  - Wash down of all vehicles that use to transport burrow materials before leaving the site

## ANNEX 8: ENVIRONMENTAL GUIDELINES FOR DECOMMISSIONING AND DEMOLITION OF EXISTING BUILDINGS

### Potential Environmental Impacts

The hazards and environmental impacts associated with demolition works are mainly a function of:

- The location of the demolition work, i.e. whether demolition is near to main road or whether demolition is far away from development and movement
- The type of building being demolished i.e. concrete, iron sheets, etc
- The method of demolition i.e. manually using hand tools; mechanically using heavy machinery including electric grinders, pneumatic compressors, excavator on trucks and lorries; or by induced collapse demolition using explosives
- The scale of the project i.e. the area of building being demolished and amount of solid wastes, dust and traffic being generated
- The duration of the demolition work

Potential environmental impacts in connection with demolition works are: -

Noise and vibration

- Dust
- Traffic implications
- Generation of demolition wastes including doors, windows, wood and metal frames; concrete rubbles and blocks, corrugated iron sheets, asbestos cement sheets, etc.
- Visual and aesthetic impacts

### Procedures for Management of Potential Environmental Impacts

- The following guidelines will be followed for any decommissioning of the existing buildings and demolition. While the EMP covers measure to manage construction waste, dust and noise in general. It is essential to ensure that the process and demolition waste is handled specifically as outlined below.
- As a requisite, a demolition plan will be prepared and approved by the project engineer of the proponent. The demolition work will be conducted post conducting the following activities.

### Crack Survey of Neighbouring Buildings

- A crack survey of neighbouring buildings should be conducted for all buildings directly adjacent to the construction site.
- The current condition of these buildings need to be photo documented and filed prior to the decommissioning commencing to ensure that no damages are caused to the structures due to vehicle movements and demolition works.
- A crack survey report will be prepared and submitted to the Engineer prior to commencement of decommissioning on the ground.

### Management of Utilities

**Termination of Utilities** Prior to actual demolition, the Authorized Person shall liaise with all available utility companies so as: (A) to keep records of available utilities leading into the premises; and (B) to cause all utilities to be terminated.

- Effects of Demolition on Utilities
  - The demolition plan shall ensure that during the course of demolition, no existing utilities in the vicinity of the demolition sites are affected by the demolition operation.
  - Common Utilities
    - ✦ The common utilities encountered in building demolition generally include the following: (A) Electricity; (B) Water; (C) Gas; (D) Telecommunication; (E) Drainage; (F) Overhead and Underground Cables; (G) Railway Tunnel and its accessories, such as vent shafts; (H) Sewage Tunnel and its accessories; and (I) Disused Tunnel.
    - ✦ All utility companies and relevant agencies should be consulted prior to demolition of the structure.
- **Management of Asbestos Cement (ACM) Based Material-Avoiding Exposure Risk** ○
  - An inspection of building materials for the presence of asbestos and lead hazards must be conducted prior to initiating demolition projects.
  - Removal of ACM roof sheeting requires trained and qualified personnel as damage to/or broken ACM during removal will have an exposure risk to demolition workers.
  - Thus it is essential that workers have the necessary personal protective equipment, most importantly masks, safety boots, full suiting to cover body and hard hats. It is also recommended that High efficiency particulate air (HEPA) filters vacuum cleaners would be requiring to vacuum up any debris. These activities must be supervised by the engineer.
  - ACM Material should be removed prior to demolition of the structure, and transported immediately in a contained manner to an approved disposal site by the engineer. As there are no sites to accept hazardous waste material this will pose a challenge, it should be explored how best the material can be managed via CEA guidance on best practice.
  - No ACM material can be stockpiled off site. This should be fully prohibited.
- **Management of Environmental Impacts During Demolition Process.**
  - The demolition works shall not cause any nuisance by way of noise, dust and vibration to the surrounding environment, by following the requirements as per the project Environmental Management Plan (EMP).
  - Particular attention should be paid to ensure the following
    - ✦ The site of works shall be fenced and screened to protect site from strong winds and to contain dust.
    - ✦ The noise level during demolition works shall be within the permissible limits as per the Central Environmental Authority (CEA) guidelines on noise.
    - ✦ All hazardous wastes, including asbestos shall be disposed of as per the provisions laid out by the CEA
    - ✦ The following measures shall be taken so as to abate the visual impacts during demolition works:
      - Visual screening / fencing of works
      - Proper location of equipment and machinery on site
      - No encroachment of demolition wastes on pavements and roads
        - ✦ Demolition works within residential areas shall be carried out during normal working hours (8:00 – 17:00) only.

- ✦ The demolition wastes may be used as filler material as appropriate and approved by the engineer. Any excess wastes shall be disposed of to an authorized site as recommended by the local authority ✦ No debris shall be burned on the site.

## **ANNEX 9: GUIDELINES FOR HEALTH AND SAFETY OF WORKERS, COMMUNITIES AND VISITORS**

Health and safety of workers and the public should be designed into constructions, before and during and after the building phase. It is cheaper and easier to control risks in construction to workers as well as the public before work starts on site by proper planning, training, site induction, worker consultation and incorporating strict safety procedures in construction plans. The proposed project interventions will mostly involve small to medium scale construction sites. As such, extreme dangers posed by working in environments such as great heights, deep water and involving dangerous chemicals and radioactive material will not be present. Potential dangers associated with ESCAMP sites will include falling from moderate heights, vehicle accidents, falling into trenches, drowning, breathing dust and other air pollutants, back aches caused by handling heavy material, wildlife attacks, etc. and can be mitigated with following safety guidelines.

EA/EMP for each site should mandatorily include a risk assessment as to what are the hazards involved in the work site, who might be harmed and how seriously, how likely this harm might happen and what actions are required to eliminate or reduce the risk and incorporate such measures in the EMP and clearly set out in the tender documents. All sub-projects must observe health and safety regulations, hence during implementation it is important to check if these control measures are put in place and are meeting the legal requirement.

Further guidance can be found in the World Bank Group General EHS Guidelines. The following measures have been developed to fit the country context based on the General EHS Guidelines.

### **Training**

- Ensure constructors carry out suitable training programs on occupational health and safety for workers prior to commencement of construction, especially with regard to working in wild territory.
- Ensure contractors carry out suitable training programme on gender sensitisation and sexual harassment in the work place.
- Ensure only experienced and well trained workers are used for the handling of machinery, equipment and material processing plants
- Ensure all persons, including managers, are trained and able to carry out their work without risk to the safety or health of themselves, other workers or the public
- Ensure contractors carry out suitable training programs on non-discrimination of workers based on ethnic or place of origin, religion, gender, caste, sexual orientation, nationality, political opinion or any of such grounds.
- Ensure that adequate reporting mechanism and disciplinary procedures are in place and are communicated and easily accessed by all workers and managers in respect of all policies applicable to workers and employers.

### **Personal Protective Equipment**

- Ensure appropriate safety equipment, tools and protective clothing are provided to workers and that safe working methods are applied. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored.
- Any person who works or operates in an area where there is a risk of flying objects, such as splinters, should wear safety goggles at all time. These should be securely fitted to the face.

Welders should protect the entire face from hot sparks and bright rays by using a welding mask.

- Any person exposed to high levels of dust or hazardous gases (when working in tunnels) should wear respiratory protection in the form of disposal masks or respiratory masks which fit more snugly around the nose and mouth.
- Any person working in an area where there is the risk of being struck on the head by a falling or flying object should wear a hard hat at all times. These should be well maintained in order to be fully effective, and any helmets or hard hats that are damaged or cracked should immediately be replaced.
- All workers will be required to wear shoes or strong boots to prevent sharp objects from penetrating or crushing the foot. Those working in muddy conditions and in canals with polluted water should avoid hand/foot contact with water and should never wear slippers.
- Road workers should wear reflective vests to avoid being hit by moving vehicular traffic.

### **Site Delineation and Warning Signs**

- Ensure delineation devices such as cones, lights, tubular markers, orange and white strips and barricades are erected to inform about work zones.
- Ensure all digging and installing work items that are not accomplished are isolated and warned of by signposts and flash lamps in night time (for those sites outside PAs).
- Ensure dangerous warning signs are raised to inform public of particular dangers and to keep the public away from such hazards, such as warning for bathing when working on river sites and irrigation works.
- Ensure rehabilitation of trenches progressively once work is completed.
- The safety inspection checklist must look to see that the delineation devices are used, whether they are appropriately positioned, if they are easily identifiable and whether they are reflective.

### **Equipment safety**

- Work zone workers use tools, equipment and machinery that could be dangerous if used incorrectly or if the equipment malfunctions. Inspections must be carried out to test the equipment before it is used, so that worker safety can be secured. Inspections should look for evidence of wear and tear, frays, missing parts and mechanical or electrical problems.

### **Material management**

- Ensure easily flammable materials are not be stored in construction site and that they are transported out of project site

### **Emergency Procedures**

- Ensure an emergency aid service is in place in the work zone.
- Ensure all site staff is properly briefed as to what to do in the event of an emergency, such as who to notify and where to assemble for a head count. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site.

### **Construction camps**

- Ensure installation of adequate construction camps and sanitation facilities for construction workers to control of transmission of infectious diseases.

- Ensure that adequate warning is provided on issues of poaching and wildlife attacks

### **Information management**

- Develop and establish contractor's own procedure for receiving, documenting and addressing complaints that is easily accessible, culturally appropriate and understandable to affected communities.
- Provide advance notice to local communities by way of information boards about the schedule of construction activities.

### **Worker consultation**

- Consulting the workforce on health and safety measures (including protection from sexual harassment and gender sensitisation policies) is not only a legal requirement, it is an effective way to ensure that workers are committed to such procedures and improvements. Employees should be consulted on these measures and before the introduction of new policies technology or products.
- Any consultation with the workforce shall only be for the purpose of advancing the health and safety of all workers and protection of workers from discriminatory practices.

## ANNEX 10: CHANCE FIND PROCEDURE FOR PHYSICAL CULTURAL RESOURCES

Contracts for civil works involving earth moving and excavation activities, especially in areas known to be sites of old civilizations and now returned to forest, should normally incorporate procedures for dealing with situations in which buried PCRs are unexpectedly exposed.

**Recognition of unknown PCRs** – This is the most difficult aspect to cover, especially if the contractor is not full-time accompanied by a specialist. **Upon discovery of such material** during project implementation work, the following should be carried out;

- Immediately stop construction activities.
- With the approval of the resident engineer delineate the discovered site area.
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over.
- Through the Resident Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours.
- Submit a brief chance find report, within a specified time period, with date and time of discovery, location of discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented.
- Responsible authorities would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out.
- An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve on-site, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days.
- Construction work could resume only when permission is given from the Department of Archaeology after the decision concerning the safeguard of the heritage is fully executed.

## ANNEX 11: SPECIAL MONITORING CHECKLIST FOR ENSURING SAFE CONDITIONS FOR WORKERS AND PUBLIC

Date inspection conducted:	Location:
Name(s) of those participating in this inspection:	
<b>INDICATE EITHER:</b>	
A = Acceptable/Yes; U = Unacceptable/No; N/A = Not Applicable	

No.	Safety Title	A	U	N/A	Action Taken
1	<b>PERSONAL PROTECTIVE EQUIPMENT:</b>				
	Foot protection worn as required?				
	Hand protection used/worn as required?				
	Safety glasses and/or goggles available + being used?				
	Hearing protection worn where required?				
	Hard hats worn when falling object hazard is present?				
	Dust masks used when needed?				
	Traffic vests being worn where needed?				
2	<b>EMERGENCY ITEMS:</b>				
	Emergency phone numbers posted and known by all?				
	Emergency eyewash and/or shower units accessible?				
	First aid kit available at work site?				
3	<b>ELECTRICAL SAFETY ISSUES: if required</b>				
4	<b>CONSTRUCTION SAFETY &amp; HEALTH ISSUES:</b>				
	100% fall protection in place above 6-5... feet in height?				
	Excavation? Protection from cave-ins for >5 feet deep				
	Hand tools are kept in safe				
	Employees instructed in proper use of all power tools? If available				
	Employees below protected from falling objects?				

	Proper access provided for workers and surrounding community?				
	<b><i>Trenches Excavation and Shoring:</i></b>				
	Materials are stored at least two feet from trench?				
	Proper number of workers for each operation?				
<b>5</b>	<b>Job Information/Administrative:</b>				
	First aid kit stocked?				
	First aid kit available?				
	Work areas properly demarcated				
	Work areas properly barricaded?				
<b>6</b>	<b>Housekeeping:</b>				
	Work area neat?				
	Protected from projecting nail points (removed/bent over)?				
	Waste containers provided?				
	Waste containers used?				
<b>7</b>	<b>General:</b>				
	Toilet facilities available?				
	Toilet facilities maintained?				
	Drinking water available?				
	Visitor hard hats available?				
	Visitor hard hats used?				
	Record Maintained at Site level:				
	Unsafe Acts or Practices Observed:				
	Comments:				
	Signature: _____			Date: _____	

**Contractor's Name : Monitoring Date :**

**Monitor's Name & :**

**Designation :**

	<b>Responsibility measures (from theEMP)</b>	<b>Compliance Yes / No</b>	<b>Reason for noncompliance</b>	<b>Follow up actions</b>	
<b>Pre-Construction Phase</b>					
<b>Construction Phase</b>					
<b>Operational Phase</b>					

**Photo-documentation of Issue Identified Above**

<b>Issue # (from description above)</b>	<b>Date of photograph</b>	<b>Photograph depicting issue</b>

## **ANNEX 12: TERMS OF REFERENCE FOR RECRUITMENT OF CONTRACTOR ENVIRONMENTAL OFFICER**

To be Included in bidding documents with respective ESMP.

The contractor through an appointment of dedicated / qualified environmental safeguard officer shall be responsible in implementation of EMP requirement by

- a) Maintaining up-to-date records on actions taken by the contractor with regards to implementation of EMP recommendations.
- b) Timely (weekly) submission of reports, information and data to the NAPPP /PPP partners Environmental Specialists, through Supervision consultant.
- c) Participating in the meetings conveyed by the Engineer and
- d) Any other assistance requested by the Engineer.

The Environmental Officer will be the primary focal point of contact for the assistance with all environmental and social issues during the pre-construction and construction phases. He/ She shall be responsible for ensuring the implementation of Environment and Social Management Plan. The appointed officer should be available on the site fulltime basis during the project period. In addition, Environmental Officer should prepare an Environmental Action Plan in line with Environment Management Plan and submit to the Engineer along with construction method statements.

The Environmental Safeguard Officer will promptly investigate and review environmental related complaints and implement the appropriate corrective actions to arrest or mitigate the cause of the complaints as specified in the EAMF. A register of all complaints is to be passed to the Engineer within 24 hrs they are received, with the action taken by the Safeguard Officer on complains thereof. In addition, Safeguard Officer required to perform following tasks as well;

1. Participation for the periodic Grievance Redress Committee Meetings at all levels
2. Coordinate and liaise with NAPPP and PPP partners
3. Support and coordinate with PMU Environmental and Social Safeguard team in carrying out the monitoring assessments such as baseline surveys, progress review, mid-term review, etc
4. Take actions to mainstream project activities during the period
5. Identify the potential environment and social safeguards issues in accordance provided EA/ EMP/ EAMF/

### **Qualifications required**

Environmental Safeguard Officer preferably possessing a Master's Degree with minimum of 5 years experiences in the relevant field or minimum of eight (8) years of experiences in the similar capacity. Preferably, experience in specific project related works is required. It is essential to have both Sinhala & English language ability (speaking) and Computer Knowledge of MS Office.

## ANNEX 13: TERMS OF REFERENCE FOR THE PROJECT LEVEL ENVIRONMENTAL AUDIT

### 1. Introduction to the project

To be filled

### 2. The Need for Environmental Assessment

All sub-projects financed under the Emergency Solid Waste Management Project (ESMP) are required to comply with World Bank Operational and Safeguard Policies triggered, in addition to conformity with the environmental legislation of GOSL. Thus all sub-projects are required to conform to:

- a) the Environmental Management Framework (EMF) adopted by GOSL and accepted by the World Bank, and
- b) the terms of the Central Environmental Authority (CEA) as mandated by the National Environmental Act (NEA) of Sri Lanka, **where it is applicable**.

According to the EAMF, each sub-projects needs to be subjected to an environmental screening using the recommended template. Based on the screening information and concerns of the public the need to pursue further stand-alone assessments and if so the type of assessment is determined. All screening forms are filled by environmental officers supporting the Project implementation agencies and reviewed and cleared by the respective Project Management Units (PMU). For a sample proposals/ sub-projects with impacts are deemed as significant a prior review of the screening is carried out by the World Bank. When standalone assessments and management plans are considered necessary, the project proponent is responsible for carrying them out while the PMU reviews and clears them.

According to CEA procedures, all sub-project requiring NEA approval need to fill in a Basic Information Questionnaire (BIQ). Upon reviewing the BIQ, the CEA will determine whether no further environmental analysis is required or whether the proponent is required to prepare an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA).

### 3. Objectives

The primary objective of this assignment is for the Consultant to carry out an environmental audit for project. The consultant will review the application of the EAMF to the project. In particular, the consultant will review a sample of (i) the screening forms prepared by each NAPPP (ii) standalone environmental assessments/management plans (iii) application of the NEA and its clearance procedures followed by the project, as the case be, and based on site visits ensure conformity with conditions, guidelines and comments stipulated in these and other related documents. The Consultant is expected to be familiar with the EAMF, the applicable safeguard policies of the World Bank, NEA and the approval procedure of the CEA.

#### **4. Tasks of the Consultant**

- Obtain the required information from the sub-project proponent, NAPPP, on the subproject under implementation. This may include, but not be limited to, relevant plans, drawings, screening reports, social analysis, standalone EA/EMP (if it has been necessary), comments of the World Bank.
- Review the above documents, discuss with the sub-project proponent as well as the surrounding community and visit the location and environs of the sub-project.
- Check for conformity of the sub-project in relation to the guidelines, conditions and comments stipulated in the item above.
- Examine monitoring reports and whether standards, procedures and controls are in place to respond to safeguards requirements stipulated in EMF.
- Examine significant new risks and propose remedial actions
- Highlight any deviations from the guidelines, conditions and comments stipulated in the aforesaid documents and assist the sub-project proponent to improve the safeguard documents incorporating the necessary mitigatory measures.
- Document any adverse environmental impacts that were not anticipated in the screening and follow up assessments that may have occurred during project construction and implementation.
- Examine procedures of corrective action if monitoring parameters are out of monitoring limits and if such incidents are actually reported, investigated and followed up

Document and submit the environmental audit report which should include (i) an Executive Summary, (ii) Overall audit opinion on the level of compliance, (iii) for each sub-project reviewed (a) a description of the sub-project, (b) the list of documents reviewed and persons interviewed, (c) observations made at the site, (d) conformity and/or deviations to guidelines (CEA and EAMF), clearance conditions (World Bank and GOSL) and plans, (e) status of progress reporting and actions taken to address issues (f) actions need to be taken to respond to negative deviations, (g) new risks and recommendations to address the risks (mitigation actions), (h) any other relevant information to support the findings.

#### **5. Application Procedure**

Qualified consultants may apply for the assignment listed above. Applications should be submitted using the format below:

Title of assignment

- Name and address of the consultant/firm
- Name, designation and telephone number of contact person
- Brief consultant/company profile
- Key staff members of the firm (giving priority to assignment-specific staff; for each staff member provide name, position in the team, number of years in the firm, relevant qualifications and assignment-specific experience and proficiency in languages – read, write and speak)
- Relevant experience of the consultant/firm (Details of assignment-specific tasks undertaken during the past 10 years with client references)

Expressions of interest should focus on aspects relevant to the particular assignment, and reach the NAPPP by [Date].

## ANNEX 14: GENERIC SESSION PLAN FOR STAFF TRAINING ON EAMF AND ENVIRONMENTAL SAFEGUARD INSTRUMENT IMPLEMENTATION, MONITORING AND REPORTING.

**Topic:** Environmental Stewardship via Safeguards

**Objective:** To introduce the project staff to the Environmental Management procedures set forth in the EAMF of the project, assist them in implementing environmental safeguards within the project and understand their function, roles and responsibilities in implementation, monitoring and reporting, while gaining an overall **Duration:** 1 Day

**Target Group:** Project Mangers, Technical Specialists, Environmental Specialists, Environmental Officers, Procurement Specialists based in PMU, Project IAs

**Training Material:** A CD with the Soft Copies of all Relevant Training Material (Session Presentations, EMF, Guiding Documents (Screening Formats, Copies of example EMPs, project safeguards instruments, etc.), and other resource material.

No	Subject	Purpose	Time	Session Structure	Materials	Aids	Potential Resource Person
1.1	Introduction to Safeguard Requirements and procedure within the project	to introduce the WB safeguard policies, the activities set forth in the ESMF and procedures of implementation, monitoring and reporting within the project	1.5hr	Brain storming, Lecture	EAMF Guideline, copies of Screening Formats,	Laptop Multimedia Projector File with Training Material for whole day	

No	Subject	Purpose	Time	Session Structure	Materials	Aids	Potential Resource Person
1.2	Identification of Environmental impacts and deducing Mitigatory Methods	To facilitate understanding on what environmental impacts can arise from project interventions and understand the nature of technical mitigation measures that can assist in curtailing these	1 hr	Brain storming, Lecture, Group work	A Copy of a well completed Screening Form and EMP as an example. Copies of Specifications for subprojects	Laptop, Multimedia projector, Flip charts & Pens	
1.3	Specific roles and Responsibilities in implementation and monitoring	To assist the members present to understand the roles and responsibilities of their designation. What is expected from them and how they can do the work assigned in the best manner.	1hr	Lecture, Discussion	A Sheet describing the roles and responsibilities of each individual of project administrative structure.	Laptop, Multimedia projector, Flip charts & Pens	
1.4	Group Activity (Details Below)	to assess the understanding post the session	2hr	Group Activity followed by a discussion	Copy of the Case study, A Blank screening form and EMP	Flip charts & Pens	

Group Activity for the End of Session- 1hr (30 minutes for Group Activity and 30 Minutes for Presentation and Discussion

Present the groups with copies of an example of a project specific subproject or project related scenario. Once the team has reviewing the case study and the copies of the Screening Form and EMPs, they should discuss and note down and present on the following areas. The Design of the intervention should be presented well with details of the surrounding area and the rational etc.

- Conduct a Screening of the Subproject with the Screening Form as an aid and deduce what sort of clearances is required and what sort of environmental assessments will be required. Based on this indicate where the project should proceed as is environmentally cleared.
- Identify the Environmental Impacts of the project and their severity based on its scope and design, and propose mitigatory mechanisms for these if they can be mitigated
- Identify who will be responsible for the safeguard activities from within the project administrative structure
- The points formulated during the discussion should then be presented group wise and discussed with the team. The Trainer should provide technical assistance to the teams where required to direct the discussion accordingly and share experiences from within the program.

## ANNEX 15: EXAMPLE OF DISCLOSURE ADVERTISEMENT FOR SAFEGUARDS INSTRUMENT

Date

### NAME OF MINISTRY/IMPLEMENTING AGENCY

NOTICE OF DISCLOSURE FOR PUBLIC COMMENTS OF THE  
NAME OF INSTRUMENT  
FOR THE EMERGENCY, SOLID WASTE MANAGEMENT  
PROJECT

The above-mentioned **Name of Instrument** has been prepared by the **Name of Ministry/Implementing Agency** for the World Bank Funded \_\_\_\_\_ Project. The document will be available for inspection by the public at the following locations between **XX am** and **XX pm** for a period of 30 days from the date of the advertisement (except Weekends & Public Holidays).

Locations: **(PLEASE LIST RELEVANT LOCATIONS BELOW)**

1. Example: Pradeshiya Sabha, Kegalle
2. Website: [www.disclosureadvert.com](http://www.disclosureadvert.com)
3. -
4. -
5. -

**Any member of the public may within 30 days from the date of this advertisement submit their comments in writing on the above document to the Secretary, the Ministry/Implementing Agency**

**ANNEX 16: DRAFT TEMPLATE FOR LEGAL CONTRACT FOR VOLUNTARY LAND DONATIONS**

The following agreement has been made on.....day of .....between Mr/Ms .....  
.....aged ..... Resident of  
.....GN.....District.....the  
grandson/daughter of ..... and son/daughter of .....

1. That the land with certificate no.....is a part of .....is surrounded from  
eastern side by .....western side by ..... on northern side, by  
..... and southern side by .....

2. That the owner holds the transferable right of ..... (unit of land) of  
land/structure/asset .....

3. That the owner testifies that the land/structure is free of squatters of encroachers and not subject to  
any other claims.

4. That the owner hereby voluntarily grants to the.....this asset for the  
construction and development of .....in.....GN/Location,  
..... supported by the Provincial Roads Development  
Project for the benefit of the community.

5. That the owner will not claim any compensation against the grant of this asset nor obstruct the  
construction process on the land in case of which he/she would be subject to sanctions according to law  
and regulations.

6. That the PMU/MPCLG agrees to accept this grant of asset for the purposes mentioned and the  
voluntary nature of the transfer of the asset.

That the agency (name of subproject executing agency)/.....shall  
construct and develop infrastructures under the project and take all possible precautions to avoid  
damage to adjacent land/structure/other assets.

7. That the provisions of this agreement will come into force from the date of signing of this deed.

Signature of the Owner

Signature of Grama Niladhari

Signature of the Chairperson, Local Authority

Witness:1 .....

Witness: 2.....