FRAMEWORK DEVELOPMENT AND INFRASTRUCTURE FINANCING TO SUPPORT PUBLIC PRIVATE PARTNERSHIPS

ENVIRONMENTAL ASSESSMENT & MANAGEMENT FRAMEWORK (EAMF)

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Government of Sri Lanka

Ministry of Finance

National Agency for Public Private Partnership

Abbreviations and Acronyms

ADB	Asian Development Bank
BCM	Billion Cubic Meter
BIQ	Basic Information Questionnaire
BOI	Board of Investment
BP	Bank Procedure
CBO	Community Based Organization
CCAC	Coast Conservation Advisory Council
CCCRMD	Coast Conservation & Coastal Resources Management Department
CEO	Chief Executive Officer
CMC	Colombo Municipal Council
CMR	Colombo Metropolitan Region
DWC	Department of Wildlife Conservation
EA	Environmental Assessment
EAMF	Environmental Assessment & Management Framework
ECD	Early Childhood Education
ED	Executive Director
EEZ	Exclusive Economic Zone
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESMP	Environnemental and Social Management Plan
EPA	Environmental Protection Area
EPL	Environmental Protection License
FD	Forest Department
FDI	Foreign Direct Investment
FFPO	Fauna & Flora Protection Ordinance
FI	Financial Intermediary
GDP	Gross Domestic Product
GIS	Global Information System
GOSL	Government of Sri Lanka
GSMB	Geological Survey and Mines Bureau
HIA	Heritage Impact Assessment
IBNET	International Benchmarking Network for Water and Sanitation
ICOMOS	International Council for Monuments and Sites
ICT	Information & Communication Technology
IDA	International Development Association
IEE	Initial Environmental Examination
IMF	International Monetary Fund
KWP	Keralwalpitiya Waste Park
LA	Local Authority
LIC	Low Income Country
LRT	Light Rail Transit
LTGEP	Long Term Generation Expansion Plan
MC	Municipal Council
MIC	Middle Income Country
MOF	Ministry of Finance
MSDVT	Ministry of Skills Development & Vocational Training
NAPPP	National Agency for Public Private Partnership
NCDM	National Council for Disaster Management
NEA	National Environmental Act
NER	Net Enrolment Rate
NVQ	National Vocational Qualification
NWPC	North Western Provincial Council
NWSDB	National Water Supply & Drainage Board
O&M	Operation & Maintenance
OP	Operational Policy
OUV	Outstanding Universal Value
PAA	Project Approving Agency
PCR	Physical Cultural Resources
PPE	Personal Protection Equipment
PPP	Public Private Partnership
PSPG	Pump Storage Power Generation
RDA	Road Development Authority
RE	Renewable Energy
RFP	Resettlement Policy Framework
SDG	Sustainable Development Goals
SLINTEC	Sri Lanka Institution of Nanotechnology
SLLRDC	Sri Lanka Land Reclamation & Development Corporation
SIMP	Social Impact Mitigation Plan
SOE	State Owned Enterprise

SWM	Solid Waste Management
TC	Technical Committee
TOR	Terms of Reference
Tpd	Tonnes per Day
TRWR	Total Renewable Water Resources
TSP	Tourism Strategic Plan
TVET	Technical & Vocational Education & Training
UC	Urban Council
UDA	Urban Development Authority
UGC	University Grant Commission
VGF	Viability Gap Financing
WH	World Heritage

Executive Summary

CHAPTER 1: INTRODUCTION

Public-Private Partnerships (PPPs), although complex and time-consuming, are seen as one of the solutions that will provide value for money for projects that are well prepared and structured, where suitable. There are several constraints faced by the Government in executing a successful PPP program including: over-reliance on unsolicited proposals, multiple agencies with overlapping functions, poorly prepared projects have adversely affected recent PPP procurement, limited long-term debt and liquidity, legal framework not conducive for private sector investment, limited institutional capacity for PPPs. Limited ability to manage contingent liabilities.

The Government's recent economic policy framework (Vision 2025) features PPPs as an integral part. Vision 2025 highlights the Government's commitment to encourage PPPs to strengthen the country's growth framework. It identifies the importance of empowering the private sector and reducing reliance on public sector borrowing in the provision of public assets and services. Furthermore, the Government envisions expanding PPPs beyond the current sectors of transport and energy into health care, leisure, tourism, and education.

The project development objective and components

The Project Development Objective is to support the preparation of Public-Private Partnerships that will enable GOSL to utilize private sector finance.

Component A: Improving the Enabling Environment (US$2.5 million)

This component aims to improve and strengthen the enabling environment for PPPs in Sri Lanka by building on the various PPP related support that has been previously provided by the World Bank and other IFIs/donors (e.g. USAID).

A.1 Establishing the Institutional environment for sustainability of PPPs. This subcomponent will strengthen the institutional framework to improve sustainability of the PPP program, by: (a) organizing and staffing NAPPP; (b) establishing institutional arrangements for the provision of long term infrastructure financing for PPPs and funding for project development with a focus on addressing the existing weaknesses in the infrastructure financing sphere; (c) establishing mechanisms to channel Viability Gap Funding (VGF) to improve financial viability of PPPs; (d) developing principles for the assessment of contingent liabilities arising from PPPs and (e) establishing and strengthening other key institutions which would contribute to the successful implementation of the PPP program, such as the establishment of PPP nodes in line agencies, and establishment of institutions critical in enhancement of the enabling environment such as procurement appeals committee and arbitration center. The establishment of these key institutions is expected to contribute towards the sustainability of the program.

A.2: PPP Capacity Building. Proposed activities will encompass capacity building for PPPs for both GoSL and private sector that is critical for successful implementation and sustainability of PPPs. This subcomponent will provide specific capacity building for NAPPP to carry out its functions, and training to acquire required skills. The programs will also focus

on Government agencies, the Attorney General's department and National Planning Department The project will provide specific training for agencies already involved in the PPP process as well as decision makers in Government, particularly Cabinet Appointed Negotiating Committees to facilitate the expeditious processing of the PPP transactions. The project will also carry out capacity building for staff at central and provincial levels with focus on female Government staff. The capacity building program will also include the local private sector and the banking Industry for the imperative for the sustainability of the PPP Program.

A.3: Communications and Stakeholder Engagement for PPP. This component will support the development of a PPP communication strategy and private sector (and other stakeholders) engagement. Engaging stakeholders and having a robust communication strategy is seen as a critical element in ensuring successful implementation of PPPs that require buy-in from all stakeholders and general acceptability from the public. This subcomponent will support NAPPP in the development and implementation of a robust communication strategy intended to ensure that all stakeholders are adequately informed and engaged in the GoSL's PPP program and the program is sustainable. Through increased awareness, this subcomponent will seek to address the historic misconception that PPPs are privatization, foster support and buy-in from the media, help mitigate some of the risks associated with the political economy of the country and contribute to broadening the program. This sub component will also support in organizing roundtables and consultations etc. with the private sector and other stakeholders to gain their input into the design and sustainability of the PPP program.

Component B: Preparation of PPP Transactions (US$20 million)

The Project will support the transactions selected and prioritized by NAPPP in consultations with various sector Ministries and line agencies, and: (i) for which an outline business case has already been prepared; or (ii) which are already being prepared and/or negotiated but need additional support to achieve financial close.

B1: Feasibility Studies. Under this subcomponent, the Project will: (i) carry out the due diligence necessary to assess all project related aspects and scope of the project. It will include due diligence work to assess the technical, legal, economic, and financial feasibility of the proposed transaction (technical scoping, concept design, economic and financial analysis including value for money analysis). It will also cover other assessments such as gender analysis, traffic surveys and willingness-to-pay surveys; address mechanisms for citizens engagement, grievance redress and management of labor influx; as well as environment and social assessments (although they will not be carried out independent of the feasibility study); and (ii) provide technical assistance to agencies where policy or strategic decisions are needed prior to initiating PPPs. The objective of these activities will be to strengthen the likelihood of economically viability of the transactions proposed by GoSL for public private partnership.

B.2 Project Structuring and Transaction Advisory Services. Under this subcomponent, the Project will support the structuring of the transactions, preparation of procurement documentation and negotiations of the contractual documents with the selected bidder up to the financial closure of one or more selected transactions. It will ensure that the GoSL, through NAPPP, receives transaction, legal and financial advisory support in the structuring and negotiation of transactions, to supplement NAPPPs in-house resources. This component will include market sounding, design of risk allocation, financial modelling, preparation of

the PPP project documents (concession and other agreements), provision of professional and experienced skills for GoSL negotiations with the selected bidder to increase value for money, up to financial close, including the assessment of GoSL's contingent liabilities for each transaction and, where necessary, the structuring of risk mitigation instruments to improve bankability.

Component C: Project Management (US$2.5 million)

Under this component, the Project will support the costs of operation of NAPPP for the management of GoSL's PPP program. It will finance the day to day activities of NAPPP, goods and services required for the preparation and operation of NAPPP, as well as the cost of consultants for certain pre- identified positions for skills that cannot be easily accessed in the market.

Environmental Assessment and Management Framework

The Environmental Assessment and Management Framework (EAMF) has been prepared in lieu of a standalone Environmental Assessment as required under the World Bank's Operational Policy 4.01 – Environmental Assessment.

The proposed PPP transactions that will be supported under the project is expected to have significant environmental impacts and high risks, as well as some social impacts such as involuntary resettlement, labour influx, etc. The potential environmental risks (and resettlement and other social risks), as anticipated at this stage, would largely result from new and large infrastructure projects that have been short-listed listed for PPPs, which have been identified by the Government. Since the exact sites of project interventions are unknown at this stage, it is necessary to prepare an Environmental Assessment and Management Framework (EAMF) that would guide the Government of Sri Lanka (GoSL) in managing the environmental impacts and related social issues (such as community environment, health and safety issues) of the short-listed PPP transactions and scaling up positive impacts. A separate Resettlement Policy Framework (RPF) has been developed which provides the guidance to manage, social issues including potential resettlement issues, gender based violence and labour influx.

This EAMF has been designed to be consistent with (a) the national requirements that governs the sector and environmental management according to specifically the National Environmental Act and other related acts that that may be of relevance; and (b) the World Bank's operational policies on environmental safeguards. The RPF covers the (a) national requirements for managing involuntary resettlement and labour; and the World Bank operational policies on social safeguards and gender.

The EAMF will serve as a template for site-specific environmental and social assessments to be undertaken for project-supported physical activities as part of the feasibility studies. The main purpose of the EAMF is to develop environmental and social profiles of the country, identify potential environmental and non-resettlement social impacts early in the project cycle and to provide broad guidelines outlining measures, processes, institutional arrangements, procedures tools and instruments that need to be adopted by the project and integrated into project implementation to mitigate environmental and non-resettlement social risks and impacts.

Applicability of the EAMF to the project activities

The project is primarily for providing technical assistance to develop a comprehensive PPP system in Sri Lanka. Based on the initial assessment of the proposed project activities, it has been identified that environmental safeguards will become applicable for two project sub-components including: A.2: PPP capacity building; and B.1: Feasibility studies.

Under capacity building, the capacity of the NAPPP to ensure overall due diligence process is in place when developing and managing PPPs for environmental management will be put in place with qualified staffing and training.

A tentative list of prioritized PPP transactions is in place (Annex 1). The project will provide assistance to carry out feasibility studies for short-listed PPP transactions under sub-component B.1. These feasibilities studies will include independent environmental assessments that will be also financed under this sub-component.

Structure of the EAMF

The EAMF has 7 chapters including the first chapter on Introduction that provides the background to the project, project objectives, project component descriptions and the reason for the preparing an EAMF. The chapters 2-7 covers the following:

- Environmental and social baseline condition in Sri Lanka
- Environmental legislation, regulatory and institutional framework in Sri Lanka (legislation on resettlement and labour are covered in RPF)
- Applicability of World Bank's environmental and social safeguard policies
- Safeguards due diligence process (social screening and assessment, resettlement action plan, labour influx plans are included in the RPF)
- Potential environmental and social impacts and mitigation measures
- Implementation arrangements under this project

It also includes supportive Annexes that provides further information and guidance including the following:

- Annex 1: List of Proposed PPP Transactions
- Annex 2: Suggested Format for Environmental Screening Form
- Annex 3: Policy Framework: Environmental Assessment and Impact Mitigation
- Annex 4: Generic Terms of Reference for Category A and B Environmental Assessment
- Annex 5: Basic Information Questionnaire of the CEA
- Annex 6: Format for Environmental Management and Monitoring Plan under the Environmental Assessment
- Annex 7: Generic Environmental Management Plan (EMP) for Construction of Ancillary Facilities as New Infrastructure and/or Rehabilitation of Existing Infrastructure.
- Annex 8: Guidance Note on Selecting Mitigation Measures to be Included in the Environmental Management Plan for Construction Projects
- Annex 9: Guidelines for the Rehabilitation of Burrow Pits
- Annex 10: Guidelines for Decommissioning and Demolition of Existing Buildings
- Annex 11: Guidelines for Health and Safety of Workers, Communities and Visitors
- Annex 12: Chance find procedure for Physical Cultural Resources

CHAPTER 2: 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 brief assessment of current status of operationalizing environmental management in these sectors where applicable.

Bio-physical environment

Location, geography and climate. Sri Lanka is a tropical island in the Indian subcontinent. It covers an area of about 65,610 km^2 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. 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. 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. 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.

Terrestrial water resources. There are 103 natural *river basins* with catchments ranging from 9 to 10,448 sq. km. Seventeen river basins have catchment areas of over than 1000 sq. km. The largest basin, is the 335km long Mahaweli river, which has a catchment area of 10 448 km^2. 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 north western and northern coastal areas. *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. 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) *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.

Coastal and marine resources. Sri Lanka has a coastline of about 1,620 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. 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),

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 two kilometers 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 two kilometers 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". Coastal ecosystems include coral reefs, sea grass beds, estuaries, lagoons, salt marshes, mangroves, barrier beaches, spits and sand dunes.

Land resources. 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% of the country's land is owned by the State while only 17.75% is privately owned, reflecting a history of centralized control over land. 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.

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. What remains of forest cover is highly fragmented, making protection and management challenging.

Biodiversity. The southwestern region of Sri Lanka, encompassing approximately 20,000 km^2, 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's biodiversity is significantly important both in a regional and global scale. Sri Lanka has the highest species density (number of species present per 10,000 sq. km) for flowering plants, amphibians, reptiles, and mammals in the Asian region. 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.

Cultural environment. 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 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).

Socio-economic environment

Sri Lanka has a population of about 21.2 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%. Sri Lanka is a lower middle-income country of 21.2 million people with per capita GDP in 2016 of $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. Sri Lanka has made significant progress in human development. Social indicators rank among the highest in South Asia and compare favorably 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.

Broad sectors considered for PPP transactions

Transport. 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; maintaining, upgrading, modernizing, and ensuring connectivity between those transport facilities and services.

Energy. 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.

Water. On a national basis, safe water coverage—defined here as the proportion of the population having access to water supplies from piped water systems, protected wells, or rainwater systems—is currently almost 85%. About 44% of the population (over 9 million people) have access to piped water, 3% (more than 0.6 million) have access to hand pump tube wells, 36% of the rural population has access to safe drinking water through protected dug wells, and 1% of the population uses rainwater harvesting systems. The other side of the coin, however, is that 15% of the population is unable to access a safe water source within 200 meters of their residence.

Sanitation. In the sanitation subsector, coverage (which principally comprises on-site facilities such as septic tanks and closed pit latrines but also some piped sewerage systems) has increased from 83% in 2008 to 90% in 2013. Piped sewerage systems are limited to those locations where other forms of sanitation service provision are not practical due to population and housing density. As a result, sewerage networks presently cover only about 2.5% of the country's population in major urban areas

Urban. Sri Lanka needs to tap the competitive advantages of the Colombo Metropolitan Region (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. In order to realize the vision of a system of cities, GoSL has initiated a national-level program – the Strategic Cities Program (SCP) – to manage the development of strategic cities and to ensure a consistent and coherent approach in developing key cities.

Housing and construction. Slum upgrading and prevention Based on the 2011 survey of Colombo carried out by the urban development authority (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 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.

Education. Although Sri Lanka has long outperformed comparable developing countries at the primary and secondary school levels, it still faces major problems in the education sector which undermine the country's inclusive growth goal and ambition to become a competitive upper middle-income country (MIC).

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 $2.98 billion[1]. in 2016, international visitor arrivals reached over 2 million and revenue generated was approximately $3.5 billion.

Industries. 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. 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.

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 behaviour 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.

CHAPTER 3: ENVIRONMENTAL LEGISLATION, REGULATORY AND INSTITUTIONAL FRAMEWORK IN SRI LANKA

Sri Lanka is one of the leading countries in the South Asian region in enacting environmental legislations. Its concern for environment dates back to over two and a half millennia. The constitution of the Democratic Socialist Republic of Sri Lanka under chapter VI Directive Principles of State policy and Fundamental duties in section 27-14 and in section 28-f proclaim, “The state shall protect, preserve and improve the environment for the benefit of the community”, “The duty and obligation of every person in Sri Lanka to protect nature and conserve its riches” thus showing the commitment by the state and obligations of the citizens.

The overall environmental concerns are addressed by the National Environmental Act No. 47 of 1980 (and subsequent amendments by act no 56 of 1988 and act no 53 of 2000). It is the umbrella legislation for environmental protection in the country. In addition, several other sectoral legislative enactments are in place. The national organization that has the mandate to protect and take measures to safeguard the environment is the Central Environmental Authority. It currently operates in the entire country except in the North Western Provincial Council (NWPC), where the NWPC has enacted a separate statute under the 13th amendment to the Constitution of Sri Lanka and had created a separate provincial institute.

There are several other key national agencies with a mandate for environmental management and protection. The Forest Department, Department of Wildlife Conservation, Department of Archaeology, Department of Coast Conservation and Coastal Resources Management,

Disaster Management Center and Geological Survey and Mines Bureau have their regional offices and staff to cater to and monitor the environmental safeguards as per the policies and regulations governing them. In addition, there are several national agencies that are impacting on the environment and adopting environmental safeguards as well. They are the Sri Lanka Land Reclamation and Development Corporation, Urban Development Authority, Water Supply and Drainage Board, Water Resources Board and Irrigation Department. The chapter lists 23 legislations, policies and treaties important for environmental management. Applicable national legislation and policies on social safeguards are covered under RFP.

CHAPTER 4: APPLICABILITY OF WORLD BANK'S ENVIRONMENTAL AND SOCIAL SAFEGUARD POLICIES

Environmental and Social Safeguard Policies and Environment, Health and Safety Guidelines

The following safeguard policies have been identified to be applicable for the proposed project:

- OP 4.01 Environmental Assessment
- OP 4.04 Natural Habitats
- OP 4.11 Physical Cultural Resources
- OP 4.12 Involuntary Resettlement (details covered in the RPF)
- OP 4.36 Forests

In addition to the above safeguard policies, the project will follow the World Bank Group's Environmental, Health, and Safety (EHS) Guidelines which are technical reference documents with general and industry specific examples of Good International Industry Practice. The EHS Guidelines are applied as required by their respective policies and standards. Industry sector EHS guidelines will be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. In addition, the World Bank guidance note on Managing the Risks of Adverse Impacts on Communities from Temporary Project-Induced Labour Influx will also be followed.

Stakeholder consultations and disclosure

At this stage of the project, the stakeholders and people who may get impacted by the project have not yet been identified. Broader consultation with stakeholder was held on February 20, 2018 to discuss this EAMF.

The EAMF was disclosed in line with the World Bank's requirements by advertising in newspapers (in all three languages) and has been made available in hard copy at the Ministry of Finance and NAPPP, as well as disclosed in the website of the Ministry of. The EAMF was also publicly disclosed through the Bank's external website. Executive Summary of the document will be submitted to WB Board of Directors before concluding project appraisal.

All subsequent environmental instruments that will be prepared through the project support will be also put into consultations with project affected persons and stakeholders, cleared by the World Bank and disclosed to public as part of the environmental assessment reports. For Environmental Category A transactions, at least two consultations will be carried out and for Category B transactions at least one consultation will be held. All environmental assessment

instruments supported under this project will be cleared by the Bank and will be made available publicly both in country and the Bank's external website.

CHAPTER 5: ENVIRONMTAL AND SOCIAL SAFEGUARDS DUE DILIGENCE PROCESS

This chapter covers primarily environmental safeguard instruments to be utilized as part of the due diligence process. It also includes social aspects that are required to be jointly screened and/or assessed as a requirement of OP 4.01 – Environmental Assessment. All other social safeguard aspects including resettlement issues, labour influx and gender-based violence and the related due diligence processes are covered under the RPF.

Environmental and Social Screening

Environmental and social screening is counted to be a useful tool in identifying safeguard issues in large investment programs consisting of many sub-projects – under this project, the PPP transactions. The main objective of the screening will be to:

a) determine the anticipated environmental/social impacts, risks and opportunities of the PPP transactions; and
b) determine if the anticipated impacts and public concern warrant further environmental/social analysis, and if so to recommend the appropriate type and extent of assessments needed as listed below.

Category A - Transactions with substantial to high environmental and/or high social risks and sensitive, diverse unprecedented impacts. Will require Environmental Impact Assessments and preparation of Environmental Management Plans and Social Impact Mitigation Plans (SIMPs).

Category B – Transactions with moderate to substantial risks and impacts that can be mitigated. Will require Environmental Impact Assessments if risks are substantial or Initial Environmental Examination if risks are moderate and preparation of Environmental Management Plans and Social Impact Mitigation Plans (SIMPs).

Category C – Transactions with low risks and negligible impacts. Will not require further assessments.

Environmental Impact Assessment (EIA)/Initial Environmental Examinations (IEE)

EIA and IEEs are effective tools for evaluating the environmental risks and opportunities of transaction proposals and improving the quality of outcomes. Ideally the EIA/IEE should be carried out at the end of the preliminary design phase so that the impacts of each planned activity can be evaluated and alternatives can be worked out for activities that have major impacts. The outcomes of the EIA/IEE should then be used to finalise the transaction design, which should ensure that the impacts of the given transaction are minimal.

For transactions that require land acquisition, potential labour influx, and gender-based violence, the accompanying Resettlement Policy Framework (RPF) includes detailed guidance on the screening, social assessments and preparation of site-specific social safeguards instruments.

Environmental Management Plans (EMPs)/Social Impact Mitigation Plans (SIMPs)/Environmental and Social Management Plans (ESMPs)

Certain activities will have explicit impacts on the natural environment and non-land related social impacts and thus require specific plans to institute and monitor mitigation measures and take desired actions as timely as possible. An Environmental Management Plan (EMP) and Social Impact Mitigation Plan (to be combined into an Environmental and Social Management Plan (EMSP), if relevant, must be kept as simple as possible, clearly describing adverse impacts and mitigation actions that are easy to implement. The scale of the transaction will determine the complexity of the EMP/SIMP/ESMP. The basic elements of these instruments are;

a. A description of all possible significant adverse impacts that are likely to arise due to the transaction that the EMP/SIMP/ESMP, is intending to deal with;
b. A description of planned mitigation measures, and how and when they will be implemented;
c. A program for monitoring with measurable indicators that will allow to determine the effectiveness of the mitigation actions;
d. A description of who will be responsible for implementing the safeguards management plan; and
e. A cost estimate and source of funds.

Environmental and social audits

An environmental and social audit in the context of this technical assistance is to assess the due diligence performed as part of associated facilities/linked activities as part of the EA process and identification of any improvements needed to be included under the safeguard documents and compliance of those associated facilities/linked activities.

The environmental and social audit if necessary will:

- collect, analyse and interpret monitoring results to detect changes related to implementation and operation of specific activities;
- verify the monitoring parameters are in compliance with national set standards;
- compare the predicted impacts with actual impacts and evaluate the accuracy of predictions;
- evaluate the effectiveness of implementation of the EMP/SIMP/ESMP;
- identify shortcomings in the safeguards management plan, if any and incorporate it into the EMP/SIMP/ESMP if deemed necessary; and
- identify and report if there is non-compliance with the EMP/SIMP/ESMP.

Consultation Plan

The NAPPP has already conducted a consultation for the EAMF with stakeholders identified at the preparation stage of the project, which was held on February 20, 2018.

The relevant PPP partners including NAPPP in consultation with the relevant line ministry or line agency must undertake several consultations during transaction preparation on the overall planned interventions to be financed by the project. Instrument wise consultations need to be taken around each transaction site. These should be duly documented in the respective outputs of the consultancies.

Safeguards Training

The Environmental Specialist of NAPPP will be trained by the Environmental Specialist of the World Bank on the EAMF implementation and procedural requirements of the World Bank. As part of the Component A4, the Environmental Specialist of NAPPP will develop and implement a training plan for the relevant implementing agencies.

CHAPTER 6: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

Environmental and Social Impacts

PPP transactions are likely to result in both positive and negative social and environmental impacts. Highlighted below are the potential adverse impacts that could occur when the PPPs are implemented.

Positive impacts

- Improved legal, institutional and technical PPP growth environment
- Increased Private Sector Investment
- Employment and Improved Service Delivery
- Government Fiscal Efficiency and Transparency
- Modernisation
- Reducing risk for the public sector
- Providing alternative funding/freeing government funds
- Provide funding to maintain infrastructure overtime
- Improved economic growth
- Expected transactions Results/Output(s)

Environmental benefits associated with the PPP transactions include:

- Enhanced environmental capacity for the PPP implementing institutions
- Availability of resources for environmental management
- Improved aesthetics nationally, due to more environmentally friendly infrastructure
- Public safety improvements from better management of resources
- More efficient use of national environmental resources

Negative impacts

- Incessant Traffic including accidents
- Diseases Spread-Public Health
- Noise and Vibration Impacts
- Health and Safety of Construction Workers
- Decreased Air Quality
- Solid and Effluent Waste Hazards and Pollution
- Chemical Wastes
- Increased crime and in-migration
- Physical and economic displacement on identified transaction sites
- Loss of Land

- Access Creation
- Borrow Pits and Quarry Sites
- Blasting and Rock Excavation
- Underground Fractures and Hydrogeology
- Soil Erosion/Run Off
- Loss of vegetation
- Loss of Flora and Fauna
- Reduction of biodiversity due to blocking of movement of organisms
- Ecological Niches Interference
- Decreased Water Quality
- Visual Intrusion
- Risks of Birds
- Changes in downstream morphology of the riverbed and banks
- Changes in the downstream water quality
- Impacts on Ecosystems
- Impacts of labor influx, including GBV, worker's code of conduct, community conflict, etc
- Gender and exclusion

Environmental & Social Management Process

Impacts identified as part of the Environmental Assessment and mitigation measures will be included as part of an Environmental Management Plan (EMP), Social Impact Mitigation Plan or the combined Environmental and Social Management Plan (ESMP). The EMP/SIMP/ESMP will include measures that will be undertaken at different stages of the transaction (planning, design, procurement, construction and post-construction) in order to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

Mitigation considerations and options

All moderate to major adverse impacts are considered for mitigation. Specific measures have been suggested in this regard where practicable. With regard to negligible and minor impacts where the transaction activity is not expected to cause any significant impact in such cases, best practice measures and mitigation have also been recommended where appropriate to improve the environmental and social performance of the transactions. The mitigation options considered may include project modification, provision of alternatives, transaction timing, pollution control, compensations and relocation assistance. In cases where the effectiveness of the mitigation is uncertain, monitoring programs are introduced.

Recommended mitigation measures

The mitigation measures or guidelines have been designed in order to avoid, minimize and reduce negative environmental and social impacts at the transaction level. The following table provides some of the key environmental issues that are likely to take place and proposed mitigation measures.

Impacts	Description of mitigation measures
Physical Environment	

Impacts	Description of mitigation measures
Waste disposal	Solid nontoxic waste Adequate waste reception facilities should be provided at project sites/camp sites Final disposal should be at dump sites approved by the municipal or urban council. Waste oil /fuel Spent or waste oil from vehicles and equipment should be collected and temporarily stored in drums or containers at site Waste oil should be disposed by oil marketing companies or agents approved or recognized and have the capacity to undertake oil disposal
Air pollution	The Projects should require that construction contractors operate only well-maintained engines, vehicles, trucks and equipment. A routine maintenance program for all equipment, vehicles, trucks and power generating engines should be in place. The project should ensure the use of good quality fuel and lubricants only If dust generation at the project/construction site becomes a problem, limited wetting of sites and or unloading and reloading points should be done to reduce dust raising Construction traffic speed control measures should be enforced on unpaved roads (speed limits through communities should be ≤50km/hr on unpaved roads and near or at project site should be ≤30 km/hr). Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.
Noise and vibration	The Projects should require contractors to use equipment and vehicles that are in good working order, well maintained, and that have some noise suppression equipment (e.g. mufflers, noise baffles) intact and in working order. This will be achieved by making it a component of contractual agreements with the construction contractors. Contractors will be required to implement best driving practices when approaching and leaving the site (speed limit of ≤30 km/hr) to minimize noise generation created through activities such as unnecessary acceleration and breaking squeal. Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.
Impacts on Landscape and Visual Receptors	Project sites should be boarded off from public view during construction Good house-keeping at construction sites should be ensured
Impact on traffic and Public safety	Only road worthy vehicles and trucks should be used to avoid frequent breakdowns on the roads Only experienced drivers should be employed
Water use	Obtain water abstraction permit from the Water Supply and Drainage Board.
Water pollution	No garbage/refuse, oily wastes, fuels/waste oils should be discharged into drains or onto site grounds Fuel storage tanks/sites should be properly secured to contain any spillage Maintenance and cleaning of vehicles, trucks and equipment should take place offsite especially where project sites are close to water bodies. Toilet facilities should be provided for construction workers to avoid indiscriminate defecation in nearby bush or local water bodies

Impacts	Description of mitigation measures
Soil and Land degradation	Minimize land clearing areas as much as possible to avoid unnecessary exposure of bare ground to the elements of the weather Re-vegetate cleared areas as early as possible using native plant species As much as possible, avoid construction work during the monsoon period.
Impact on fauna and habitat	Avoid unnecessary exposure and access to sensitive habitat areas. For identified or suspected sensitive habitats (swamps/ wetlands), regular inspection or monitoring should be carried out in the area prior to start and during work. If sensitive habitats are encountered, Project activities should cease and the Project should consult NAPPP to determine the appropriate course of action. If the project site is discovered as a sensitive habitat area, the Project should engage the NAPPP to develop a suitable plan.
Impacts on inland water bodies/marine Fauna/habitat	The Projects should require that contractors implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and clean-up of accidental spills into the aquatic environment. During pre-installation and installation of project facilities, spotting of sensitive aquatic mammals should form part of the project activities. Should these species be observed in the vicinity of the work area, the project should execute measures to avoid destruction or disturbance. Project staff must report sightings of any injured or dead aquatic life (fishes)/marine mammals immediately, regardless of whether the injury or death is caused by a Project activity. The report should include the date and location of the animal/strike, and the species identification or a description of the animal. The report should be made to the NAPPP and the relevant line ministry or line agency The Project workforce and local communities should be educated to ensure that the importance of environmental protection and nature conservation are effectively communicated and that wider appreciation of environmental issues and construction best practice are fostered
Impact on inland water/marine water quality /coastal processes	All Projects should implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and clean-up of accidental spills into the inland water/marine environment. Marine vessels will be required to adhere to International Maritime Organization (IMO) regulations on bilge and ballast water discharge. Areas close to water environment that are disturbed during construction activities (such as trench digging) should be rehabilitated as soon as possible after the pipes have been installed. All rehabilitated areas should be surveyed on weekly basis for the first month after rehabilitation, and a monthly basis for the subsequent five months, to monitor levels of erosion in the vicinity of the development. If observations indicate that significant erosion and sediment transport is taking place (i.e. that rehabilitation has been unsuccessful) additional mitigation should be employed to reduce erosion.
Social Environment	

Impacts	Description of mitigation measures
Physical displacement	All affected persons to be given relocation assistance (cash or kind) at replacement cost by the project to enable them to move their properties to new locations, i.e. in accordance with the GoSL's legal framework and Bank's policies as laid out in the Resettlement Policy Framework (RPF). Resettlement Action Plans will be required. If a site is acquired, the State may relocate persons and their families as well as community facilities to be affected. The affected families should not be made to incur any cost during the relocation period. The resettlement action plan should be prepared for this area with the RPF as a guide.
Employment and loss of livelihood	If a site is acquired, all persons living off the site should be provided with livelihood assistance based on their current income levels or the project should assist such persons obtain new jobs immediately without any loss of income such that each affected person is able to improve or at least restore his/her income to pre-project level. Income restoration schemes to be prepared should be designed in consultation with affected persons, and in consideration of their resource base and existing skills. The measures adopted should be done in accordance with the RPF.
Loss of access to land	Due process should be followed to establish the true owner of any land, be it family or stool land. Once established, the project should acquire the site by paying appropriate compensation. The land compensation should be based upon replacement value, impact issues, description of mitigation measures of land in the area and in accordance with the RPF. In case of loss of common resources, structures and facilities, the same should be restored or reinstalled or access to lost facilities provided at a new place in consultation with the community or appropriate authority
Loss of structures/properties	For a project site to be used, irrespective of the land compensation, appropriate compensation should be paid to the owner for any structures/properties which are permanent structures at the site. Depreciation should not be factored during valuation of these properties. The compensation process should satisfy the RPF developed for the project. Appropriate compensation should be paid for any damaged or destroyed propriety that belongs to affected persons. No depreciation during valuation of these properties. Guidance for these measures are provided in the RPF.
Impacts on recreation and public areas	Appropriate notices and warning signs will be erected around working areas and public areas to warn prospective trespassers of any danger or risk.
Impacts on Human Health/ Safety and sanitation	Trucks carrying construction materials such as sand, quarry dust, laterite etc. will have the buckets covered with tarpaulin or appropriate polythene material from or to project site.
Construction-related Impacts	Only road worthy vehicles/trucks should be used. Only experienced drivers/operators should be employed. Except for areas secured by fencing, all active construction areas will be marked with high-visibility tape to reduce the risk accidents involving pedestrians and vehicles. All open trenches and excavated areas will be backfilled as soon as possible after construction has been completed. Access to open trenches and excavated areas will be secured to prevent pedestrians or vehicles from falling in. Adequate sanitary facilities will be available for workers and open range defecation will not be countenanced. Construction workers will be provided with and educated to wear suitable Personal Protective Equipment (PPE) including hard hats, overalls, high-visibility vests, safety boots, earplugs, gloves etc. Construction workers should be educated to adhere to basic rules with regard to protection of public health and sexual health practices, including most importantly hygiene and

Impacts	Description of mitigation measures
	disease prevention.
Impacts on cultural heritage / archaeological interest / existing ecologically sensitive areas	The pre-construction surveys should identify cultural heritage resources and existing ecologically sensitive areas that the project should avoid and by-pass these resources. The Project should implement a chance find procedure and reporting system to be used by contractors in the event that a cultural heritage feature or ecologically sensitive item/issue is encountered.
Impacts on Human Health and Public Safety	The project will require all contractors to implement an Environmental, Health and Safety (**EHS**) plan which will outline procedures for avoiding health and safety incidents and for emergency medical treatment. This will be achieved by making it a component of contractual agreement. Contractors will be required to wear suitable Personal Protective Equipment (PPE) including hard hats, high-visibility vests, safety boots and gloves and life vests as appropriate in accordance with the EHS plan. All construction and other workers will be sufficiently trained in the safe methods pertaining to their area of work to avoid injuries.
Labour related issues	Contractors should use local labour as much as possible and where available. As much as possible, all unskilled labour should be contracted or obtained from the local community. Contractor's ESMP/SIMP should be prepared which should include among others management plans for labour influx and worker camp management plan and code of conduct for workers, including measures to address GBV, as provided for in the RPF Preparation of redundancy plans and packages should be discussed with affected workers that will include re- training and re- tooling of affected workers and aim to avoid labour strife.
Gender and exclusion related issues	Besides project related activities, women and other vulnerable groups' access to infrastructure and services that PPP projects are expected to deliver, capacity building of the PPP unit on gender, the feasibility studies should include gender analysis for every PPP project.

CHAPTER 7: IMPLEMENTATION ARRANGEMENTS

Overall implementation arrangement in the NAPPP

The NAPPP will be the key agency responsible for supervising the implementation of these environmental safeguards by the respective line ministry or line agency of the GOSL and the private partner in respect of this World Bank project. As the NAPPP was recently established with new personnel, the institution does not have previous experience in executing World Bank- financed projects and thus, will be closely guided by the World Bank team to adhere to various requirements and polices of the Bank with regards to Safeguards, procurement and financial management during the implementation of the project.

Implementation arrangements for environmental safeguard management

The NAPPP will recruit a qualified Environmental Specialist to supervise the project related environmental safeguards. Specifically, the Environmental Specialist will be responsible for ensuring project activities that have environmental safeguards implications under different project components to be supported under the World Bank project, follows the necessary environmental safeguard due diligence defined earlier.

Table of Contents

CHAPTER 1: INTRODUCTION

1.1 Project Background

Sri Lanka is a lower-middle-income country with a per capita gross domestic product (GDP) of US$3,835 in 2016. The economy grew at an average 6.2 percent during 2010–2016 following the end of the 30-year civil war in 2009, enjoying the benefits of a peace dividend and policy thrust toward reconstruction and growth. In 2016, it recorded a 4.4 percent GDP growth and is expected to reach 4.7 percent growth in 2017. It ranks relatively high (73) on the United Nations Human Development Index compared to other developing economies and 110 on the World Bank Group's Doing Business Indicator in 2017 (up from 113 in 2015).

Over the past few years, Sri Lanka has been grappling with large fiscal deficits and public debt management issues. In 2015, it recorded a fiscal deficit of 7.6 percent of GDP with public debt levels of 77.6 percent of GDP. The corrective fiscal measures adopted following the International Monetary Fund (IMF) program in June 2016 saw the fiscal deficit reduce to 5.4 percent of GDP in 2016. However, public debt levels remained elevated at 79.3 percent of GDP at the end of the year. These high public debt levels have been exacerbated by weak foreign direct investment (FDI) flows over the past few years, leading the Government to rely more and more on domestic and foreign loans to bridge the fiscal deficit. Considering this, Sri Lanka still has a long way to go, to be able to meet its commitments of lowering the fiscal deficit to 3.5 percent of GDP by 2020.

Constrained by a large fiscal deficit and high debt levels, Sri Lanka's actual spending on infrastructure (both economic and social) as a percentage of GDP was only 4.6 percent in 2016. This compares unfavourably to other countries in the region, emphasizing the need for Sri Lanka to ramp up its infrastructure investment to strengthen its competitiveness.

While infrastructure has been a key driver of economic growth in recent years, the country still has a large infrastructure deficit. With increased urbanization in the Colombo Metropolitan Region (CMR), connectivity and congestion have become severe productivity constraints. The country still has a lot to do in addressing economic and social infrastructure needs beyond the CMR.

Infrastructure financing in the country has so far been dominated by public funding, often supported by loans from international financial institutions and countries such as China and Japan that have typically lent to the Government/state-owned enterprises (SOEs). In addition, some of the infrastructure projects were also financed by SOE's by borrowing locally with the support of a sovereign guarantee. Private sector financing in infrastructure is often only sought in cases where a project is unable to secure public funding.

With public debt levels close to 80 percent of GDP, continuing to rely on public debt financing to provide infrastructure is unlikely to be a sustainable approach for the Government, moving forward. Public-Private Partnerships (PPPs), although complex and time-consuming, are seen as one of the solutions that will provide value for money for projects that are well prepared and structured, where suitable. However, it will be important for the Government to realize that PPPs will not be the appropriate solution for all their

infrastructure needs and that PPPs will also bring contingent liabilities that need to be quantified and managed.

There are several constraints faced by the Government in executing a successful PPP program. The diagnostic (September 2016) carried out by the World Bank and recent experiences indicate several constraints that need to be addressed to pave the way for a successful PPP program:

- Over-reliance on unsolicited proposals. In recent years, a substantial number of public sector projects have been procured on an unsolicited basis which is a practice that can have adverse implications with respect to transparency and value for money. Unfortunately, the absence of a guiding policy framework for PPPs together with a distinct lack of understanding based on limited institutional capacity to identify, assess, and prepare bankable PPPs has exacerbated the use of unsolicited proposals.
- Multiple agencies with overlapping functions. The absence of a cohesive framework to govern the institutional mandates, responsibilities, and interagency decision-making processes has created an environment of uncertainty and confusion for investors.
- Poorly prepared projects have adversely affected recent PPP procurement. More recently, the Government's attempts at developing key infrastructure projects on a PPP basis have brought mixed reaction from private developers with different Government agencies attempting to lead the path amidst political uncertainties. Several key infrastructure projects, mainly in the areas of ports, highways, and energy, have failed because of inadequate or non-existent feasibility studies resulting in poorly structured transactions. The market has also seen political interference because of the ambiguity created by poorly structured transactions coupled with the absence of a clear procurement process. Unfortunately, these failed attempts at PPPs pave a clear path for unsolicited proposals that attempt to meet the delivery time line of a Government under pressure to demonstrate results.
- Limited long-term debt and liquidity. There is lack of long-term debt in the domestic banking market for infrastructure loans that typically require longer repayment periods. In addition, the banking system does not have enough liquidity to support the amount of infrastructure investment required, particularly when it comes to large individual infrastructure projects. At the same time, the capital markets in Sri Lanka are significantly underdeveloped and ill-equipped to support the large amount of investment required in the infrastructure as well as other sectors. Therefore, it will be important for Sri Lanka to deepen and broaden its capital markets, encourage local banks to increase their infrastructure financing, and attract offshore banks (at least in the short term). However, to do this, Sri Lanka will need to establish an appropriate legal, regulatory, and institutional enabling environment together with a pipeline of well-structured PPP projects.
- Legal framework not conducive for private sector investment. Although Sri Lankan law relating to investments is not explicitly restrictive of foreign investment, there are obstacles to investment including the lack of clarity and scope, lack of information, and excessive discretion permitted by the legal framework. Unfortunately, Sri Lanka does not currently have one comprehensive 'Investment Law'.
- Limited institutional capacity for PPPs. There is currently very little understanding within the public sector of PPPs and little, if any, capacity to prioritize, structure, procure, and manage PPPs. In addition to this, the PPP-enabling environment is very weak and there is no clear policy on PPPs.

- Limited ability to manage contingent liabilities. Although much of the public-sector borrowing is guaranteed by the Government, the Government's capacity to manage contingent liabilities is very limited. The ability to manage liabilities is critical because it is likely that most PPPs will have some form of contingent liability associated with them.

Sri Lanka has the potential to benefit immensely from a PPP program in addressing its infrastructure requirements given its past successful track record where private participation in infrastructure over 1995–2005 totalled US$2.1 billion across the transport, telecom, and energy sectors. Several of these projects procured over a decade ago have already completed successful implementation without any renegotiation. At the forefront of this success was the central, dedicated NAPPP established under the Board of Investment (BOI) that was tasked with the identification, structuring, evaluation, and negotiation of PPP projects. However, despite the success, this PPP Unit was wound up post 2005 by a Government that increasingly favoured the development of infrastructure through the use of public finance, particularly with the assistance of bilateral development partners.

Given the combination of fiscal constraints and the need to invest in infrastructure, the Government is keen to relaunch the PPP program. The Government approached the World Bank in 2016, seeking assistance in developing a robust PPP program in Sri Lanka. The work carried out by the World Bank to provide this assistance has received great appreciation indicating genuine commitment to the PPP program. The immediate establishment of the NAPPP based on these recommendations was a demonstration of this strong support.

The Government's recent economic policy framework (Vision 2025) features PPPs as an integral part. Vision 2025 highlights the Government's commitment to encourage PPPs to strengthen the country's growth framework. It identifies the importance of empowering the private sector and reducing reliance on public sector borrowing in the provision of public assets and services. Furthermore, the Government envisions expanding PPPs beyond the current sectors of transport and energy into health care, leisure, tourism, and education.

1.2 Project Development Objective

The Project Development Objective is to support the preparation of Public-Private Partnerships that will enable GOSL to utilize private sector finance.

1.3 Project Components

Component A: Improving the Enabling Environment (US$2.5 million)

This component aims to improve and strengthen the enabling environment for PPPs in Sri Lanka by building on the various PPP related support that has been previously provided by the World Bank and other IFIs/donors (e.g. USAID).

A.1 Establishing the Institutional environment for sustainability of PPPs

This subcomponent will strengthen the institutional framework to improve sustainability of the PPP program, by: (a) organizing and staffing NAPPP; (b) establishing institutional arrangements for the provision of long term infrastructure financing for PPPs and funding for project development with a focus on addressing the existing weaknesses in the infrastructure

financing sphere; (c) establishing mechanisms to channel Viability Gap Funding (VGF) to improve financial viability of PPPs; (d) developing principles for the assessment of contingent liabilities arising from PPPs and (e) establishing and strengthening other key institutions which would contribute to the successful implementation of the PPP program, such as the establishment of PPP nodes in line agencies, and establishment of institutions critical in enhancement of the enabling environment such as procurement appeals committee and arbitration center. The establishment of these key institutions is expected to contribute towards the sustainability of the program.

A.2: PPP Capacity Building

Proposed activities will encompass capacity building for PPPs for both GoSL and private sector that is critical for successful implementation and sustainability of PPPs. This subcomponent will provide specific capacity building for NAPPP to carry out its functions, and training to acquire required skills. The programs will also focus on Government agencies, the Attorney General's department and National Planning Department The project will provide specific training for agencies already involved in the PPP process as well as decision makers in Government, particularly Cabinet Appointed Negotiating Committees to facilitate the expeditious processing of the PPP transactions. The project will also carry out capacity building for staff at central and provincial levels with focus on female Government staff. The capacity building program will also include the local private sector and the banking Industry for the imperative for the sustainability of the PPP Program.

A.3: Communications and Stakeholder Engagement for PPP

This component will support the development of a PPP communication strategy and private sector (and other stakeholders) engagement. Engaging stakeholders and having a robust communication strategy is seen as a critical element in ensuring successful implementation of PPPs that require buy-in from all stakeholders and general acceptability from the public. This subcomponent will support NAPPP in the development and implementation of a robust communication strategy intended to ensure that all stakeholders are adequately informed and engaged in the GoSL's PPP program and the program is sustainable. Through increased awareness, this subcomponent will seek to address the historic misconception that PPPs are privatization, foster support and buy-in from the media, help mitigate some of the risks associated with the political economy of the country and contribute to broadening the program. This sub component will also support in organizing roundtables and consultations etc. with the private sector and other stakeholders to gain their input into the design and sustainability of the PPP program.

Component B: Preparation of PPP Transactions (US$20 million)

The Project will support the transactions selected and prioritized by NAPPP in consultations with various sector Ministries and line agencies, and: (i) for which an outline business case has already been prepared; or (ii) which are already being prepared and/or negotiated but need additional support to achieve financial close.

B1: Feasibility Studies

Under this subcomponent, the Project will: (i) carry out the due diligence necessary to assess all project related aspects and scope of the project. It will include due diligence work to

assess the technical, legal, economic, and financial feasibility of the proposed transaction (technical scoping, concept design, economic and financial analysis including value for money analysis). It will also cover other assessments such as gender analysis, traffic surveys and willingness-to-pay surveys; address mechanisms for citizens engagement, grievance redress and management of labour influx; as well as environment and social assessments (although they will not be carried out independent of the feasibility study); and (ii) provide technical assistance to agencies where policy or strategic decisions are needed prior to initiating PPPs. The objective of these activities will be to strengthen the likelihood of economically viability of the transactions proposed by GoSL for public private partnership.

B.2 Project Structuring and Transaction Advisory Services

Under this subcomponent, the Project will support the structuring of the transactions, preparation of procurement documentation and negotiations of the contractual documents with the selected bidder up to the financial closure of one or more selected transactions. It will ensure that the GoSL, through NAPPP, receives transaction, legal and financial advisory support in the structuring and negotiation of transactions, to supplement NAPPPs in-house resources. This component will include market sounding, design of risk allocation, financial modelling, preparation of the PPP project documents (concession and other agreements), provision of professional and experienced skills for GoSL negotiations with the selected bidder to increase value for money, up to financial close, including the assessment of GoSL's contingent liabilities for each transaction and, where necessary, the structuring of risk mitigation instruments to improve bankability.

Component C: Project Management (US$2.5 million)

Under this component, the Project will support the costs of operation of NAPPP for the management of GoSL's PPP program. It will finance the day-to-day activities of NAPPP, goods and services required for the preparation and operation of NAPPP, as well as the cost of consultants for certain pre- identified positions for skills that cannot be easily accessed in the market.

1.4 Environmental Assessment and Management Framework

1.4.1 Objectives and rationale for using the Framework

The Environmental Assessment and Management Framework (EAMF) has been prepared in lieu of a standalone Environmental Assessment as required under the World Bank's Operational Policy 4.01 – Environmental Assessment.

The proposed PPP transactions that will be supported under the project is expected to have significant environmental impacts and high risks, as well as some social impacts such as involuntary resettlement, labour influx, etc. The potential environmental risks (and resettlement and other social risks), as anticipated at this stage, would largely result from new and large infrastructure projects that have been short-listed listed for PPPs, which have been identified by the Government. Since the exact sites of project interventions are unknown at this stage, it is necessary to prepare an Environmental Assessment and Management Framework (EAMF) that would guide the Government of Sri Lanka (GoSL) in managing the environmental impacts and related social issues (such as community environment, health and safety issues) of the short-listed PPP transactions and scaling up positive impacts. A

separate Resettlement Policy Framework (RPF) has been developed which provides the guidance to manage, social issues including potential resettlement issues, gender based violence and labour influx.

This EAMF has been designed to be consistent with (a) the national requirements that governs the sector and environmental management according to specifically the National Environmental Act and other related acts that that may be of relevance; and (b) the World Bank's operational policies on environmental safeguards. The RPF covers the (a) national requirements for managing involuntary resettlement and labour; and the World Bank operational policies on social safeguards and gender.

The EAMF will serve as a template for site-specific environmental and social assessments to be undertaken for project-supported physical activities as part of the feasibility studies. The main purpose of the EAMF is to develop environmental and social profiles of the country, identify potential environmental and non-resettlement social impacts early in the project cycle and to provide broad guidelines outlining measures, processes, institutional arrangements, procedures tools and instruments that need to be adopted by the project and integrated into project implementation to mitigate environmental and non-resettlement social risks and impacts. The Framework will: (i) articulate the criterion and due diligence processes based on risks; (ii) time-bound action plans to assure compliance during preparation of Environmental Assessments; and (iii) guidance for public consultation process and disclosure of safeguard documents. It also includes 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 risks and impacts;
(ii) Enhance positive environmental outcomes;
(iii) Ensure protection of environment, health and safety, as well as community health and safety;
(iv) Ensure compliance with applicable national environmental policies and legislation; and
(v) Ensure compliance with applicable World Bank environmental safeguard policies.

1.4.2 Applicability of the EAMF to the project activities

The project is primarily for providing technical assistance to develop a comprehensive PPP system in Sri Lanka. Based on the initial assessment of the proposed project activities, it has been identified that environmental safeguards will become applicable for two project sub-components including: A.2 PPP capacity building and B.1: Feasibility studies.

Under capacity building, the capacity of the NAPPP to ensure overall due diligence process is in place when developing and managing PPPs for environmental management will be put in place with qualified staffing and training.

A tentative list of prioritized PPP transactions is in place (Annex 1). The project will provide assistance to carry out feasibility studies for short-listed PPP transactions under sub-

component B.1. There is a possibility that the current list identified could change due to changing priorities during the World Bank project implementation. These feasibilities studies will include independent environmental assessments that will be also financed under this sub-component.

CHAPTER 2: 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.

5.5.1 Bio-Physical Environment

2.1.1 Geography and climate

Sri Lanka is a tropical island in the Indian subcontinent. It covers an area of about 65,610 km^2 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).

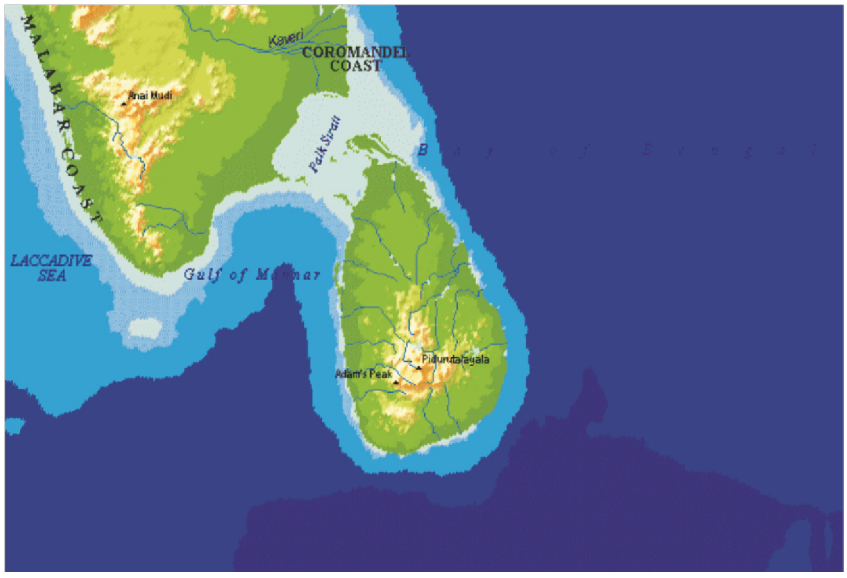

Figure 2.1 Locality of Sri Lanka

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).

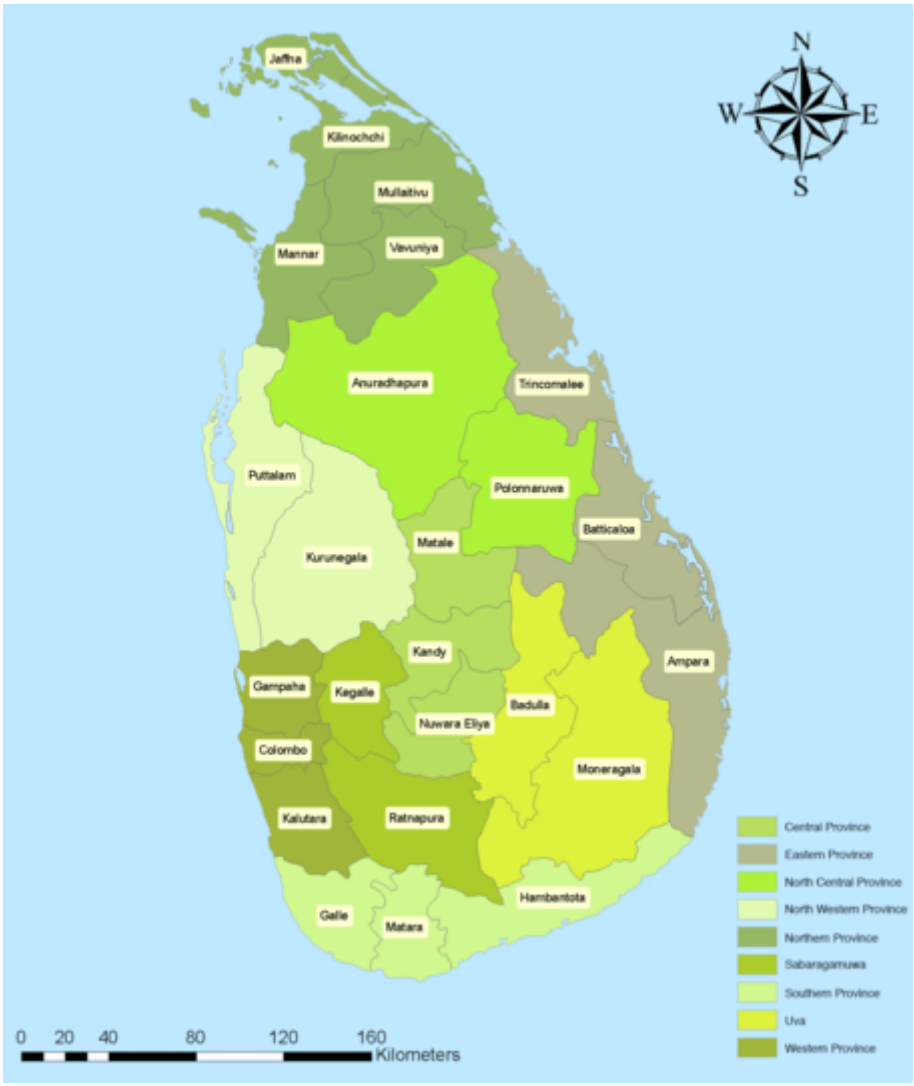

Figure 2.2. Provinces and districts of Sri Lanka

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 peneplains 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 peneplain, in a steep step of about 300 meters is the middle peneplain 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.

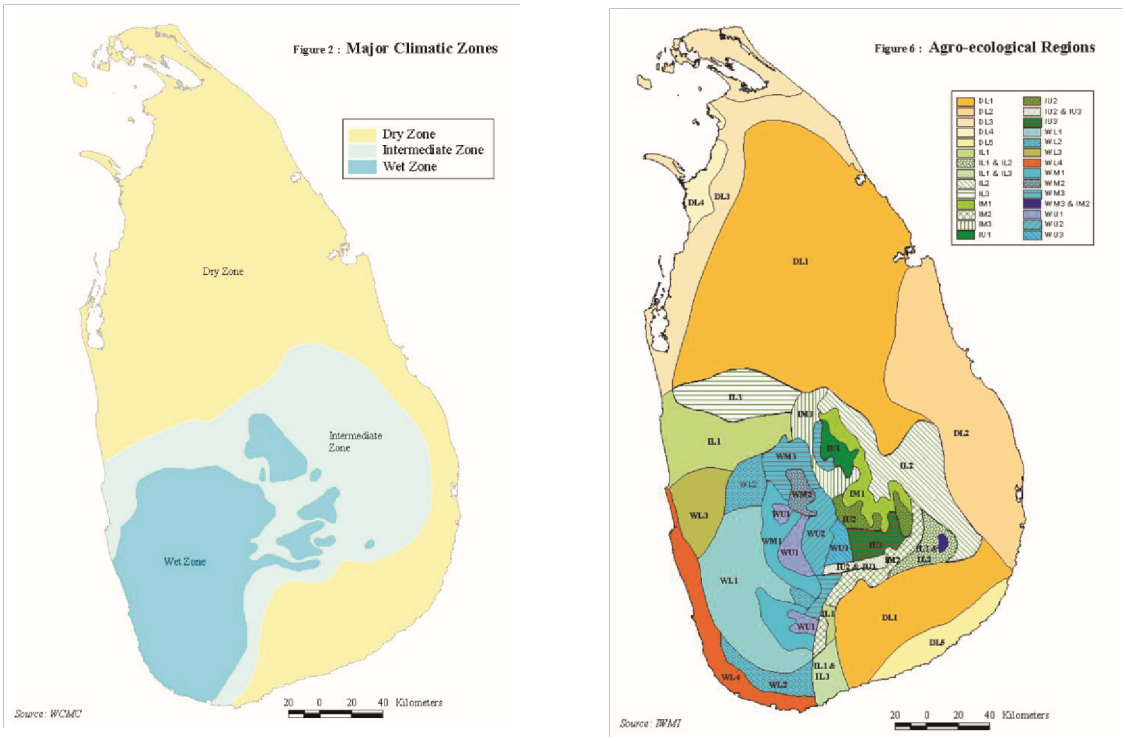

Figure 2.3. Major climatic zones and agro-ecological regions in Sri Lanka

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 Wanni 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 Sabaragamuva 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 27.5^0 C in most parts of the island's low-lying areas, while it is around 18^0 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.

2.1.2 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^2. They are, from north to south: Maha river (1 528 km^2), Attanagalu river (736 km^2), Kelani river (2 292 km^2), Kalu river (2 719 km^2), Bentota river (629 km^2), Gin river (932 km^2) and Nilwala river (971 km^2). 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^2. 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 km². Besides the Mahaweli basin, four others exceed 2 500 km^2. 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^3/year. Considering 75% and 50% dependability rainfall, annual runoff estimates are 42 and 49 km^3 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^3, most (estimated as 7 km^3/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^3/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. Dry-zone 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 tube wells relatively cheap.

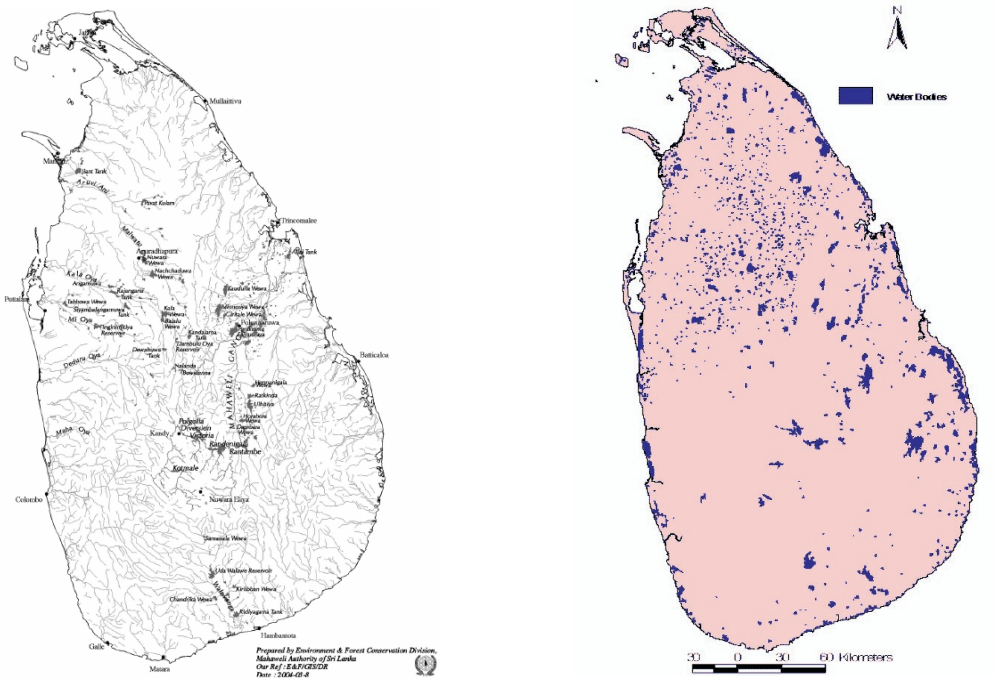

Figure 2.4 Rivers and lentic waters in Sri Lanka

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.

2.1.3 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 covers 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^2.
- 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^2, which is 7.8 times the total land area of the country.

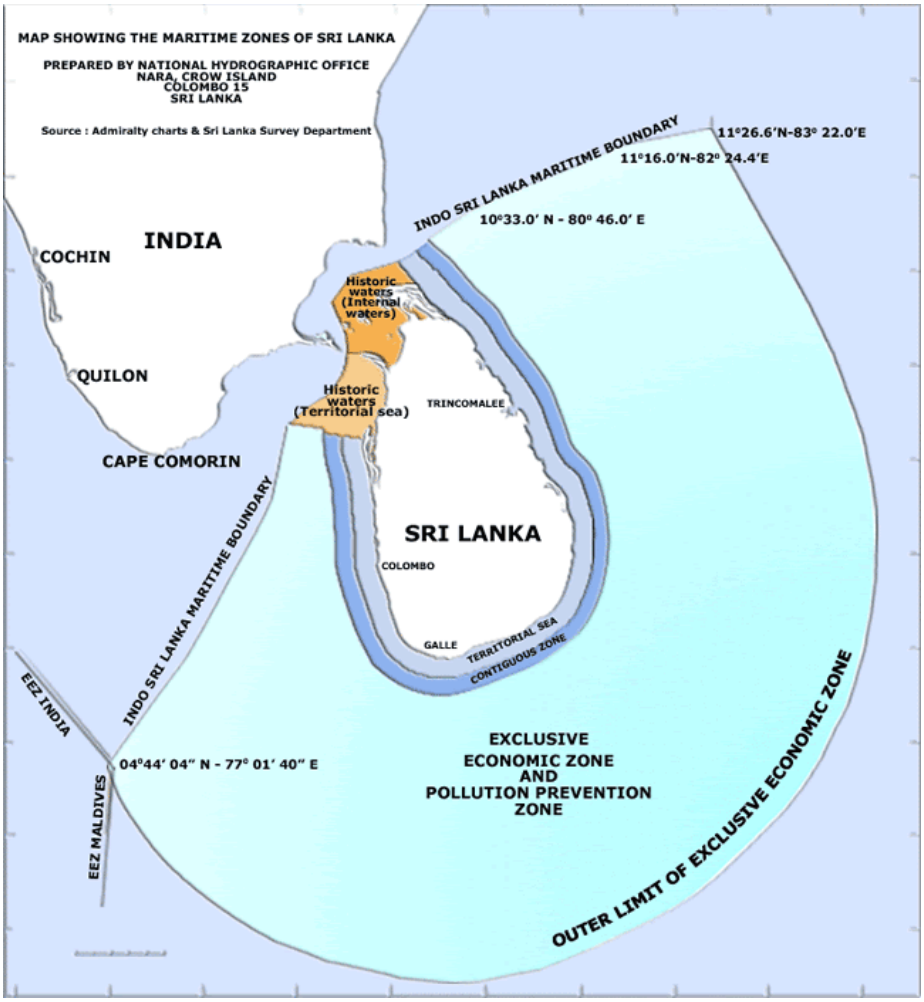

Figure 2.5 Map of Sri Lanka showing the 200-mile Exclusive Economic Zone

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.

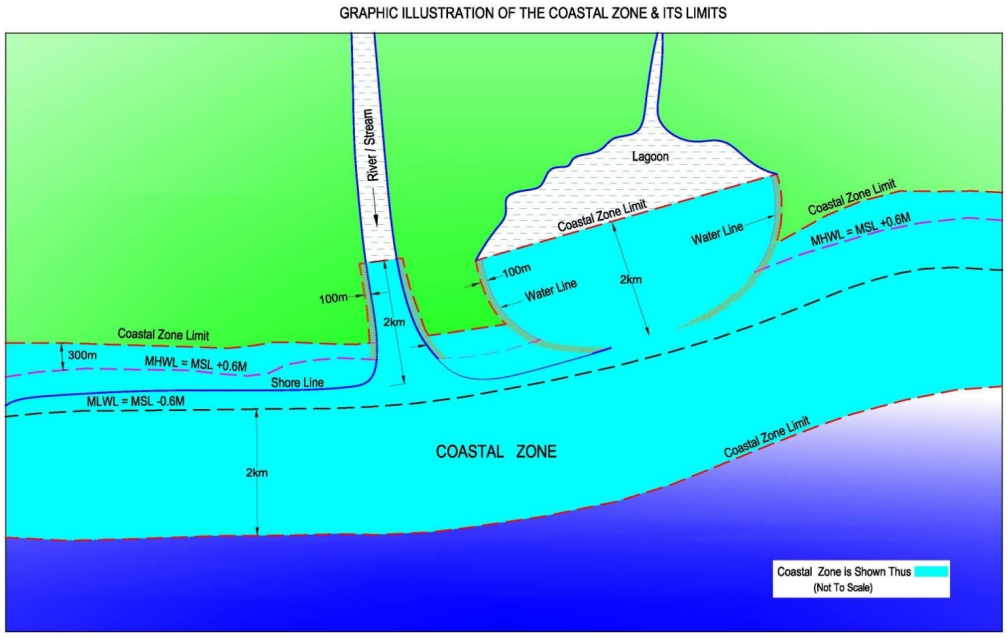

Figure 2.6. Coastal zone as per the Coast Conservation Amendment Act No. 49 of 2011

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 *Monitipora* and *Echinpora 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 absorbs 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 bio-diversity 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 provides 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 semi-aquatic 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 1,000 ha 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 inter tidal 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 fishnets. 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, Nayaru, 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 Northwestern 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 Koddiyar 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 projects 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, exceeding5 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.

2.1.4 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 ferro-alloy 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.

2.1.5 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.

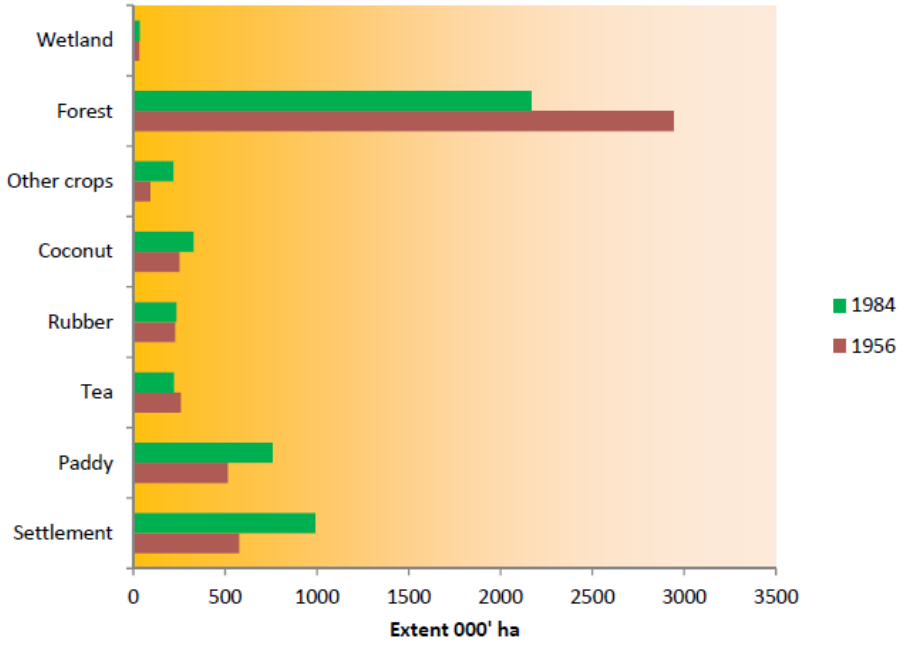

Figure 2.7 Land use changes (1956-1984)

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%
Total		**6,566,094**	**100 %**

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 areas4 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[5]. 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, gazetting, legal protection, and enforcement.

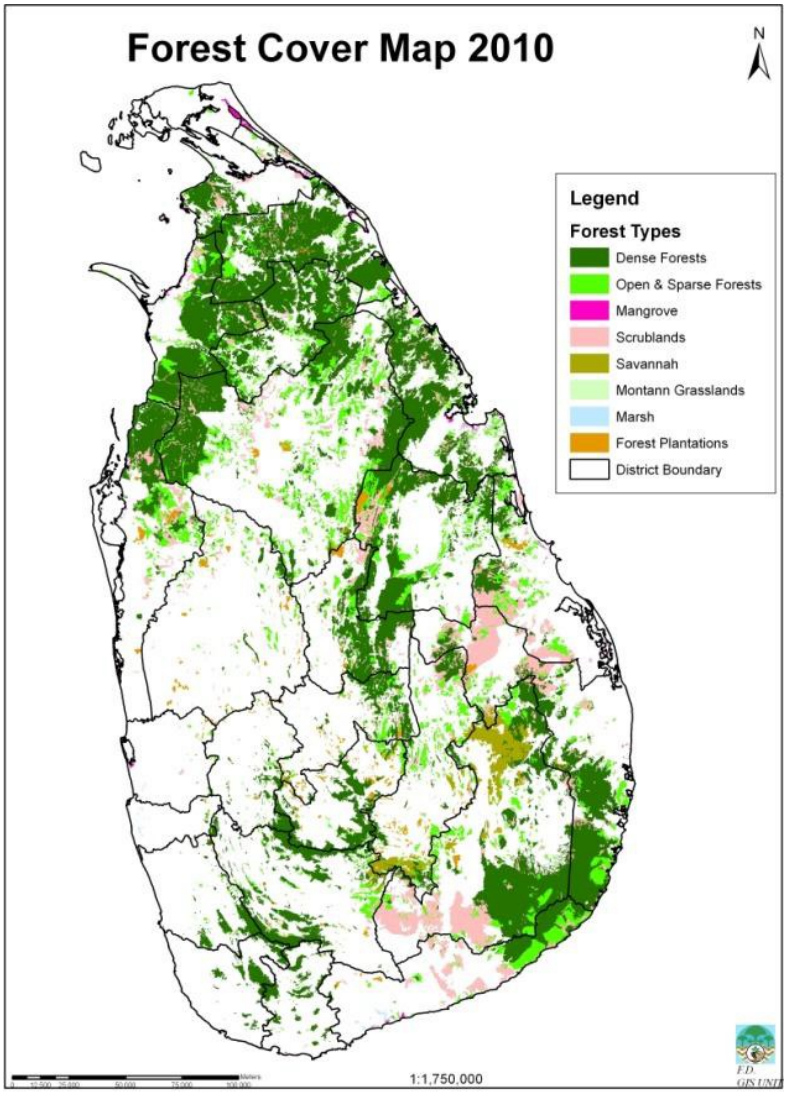

Figure 2.7. Forest cover map of 2010

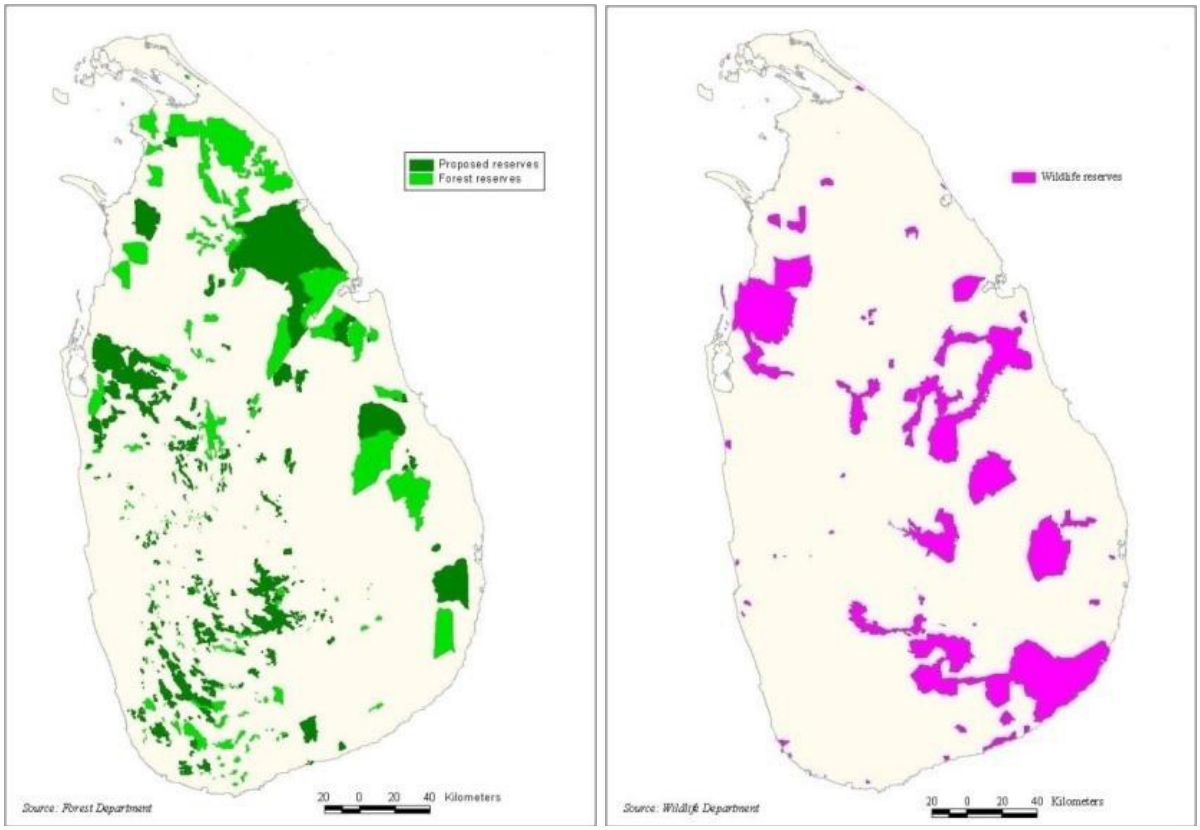

Figure 2.8 Land under the jurisdiction of FD (green) and DWC (purple)

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.

Home Gardens and Tree Tenure. Home gardens are widespread throughout Sri Lanka and represent a significant non-forest[7] 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.

2.1.6 Biodiversity

The southwestern region of Sri Lanka, encompassing approximately 20,000 km^2, 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 10,000 sq. 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).

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

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

Ecosystems	**Previous data (ha)**	**Present (ha)**
Forest and related ecosystems	***(1999 data, FD)***	***(2010 survey, FD)***[†]
☐ tropical wet lowland evergreen forest (includes lowland and mid elevation rain forests)	124,340.8	123,302
☐ tropical sub-montane forest	65,792.3	28,513
☐ tropical montane forest	3,099.5	44,758
☐ tropical moist monsoon forest	221,977.0	117,885
☐ tropical dry monsoon (mixed evergreen) forest[†]	1,027,544.1	1,121,392
☐ tropical thorn forest	NA	NA
☐ riverine dry forest	18,352.1	2,425
☐ grasslands (wet pathana, dry pathana, savannah, etc)	>75,000	68,043 (savannah only)
Inland wetland ecosystems	***(4th National Report to CBD)***	
☐ flood plains	NA	NA
☐ lentic waters (tanks/reservoirs and ponds)	179,790	*169,941
☐ swamps	NA	NA
☐ wet villu grasslands	NA	*12,500
☐ Overall water bodies	NA	‡ 488,181
Coastal and marine ecosystems	***(4th National Report to CBD)***	
☐ mangroves	6,080	†15,669
☐ salt marshes	23,800	NA
☐ sand dunes and beaches	19,394	NA
☐ mud flats	9,754	NA
☐ sea grass beds	NA	NA
☐ lagoons and estuaries	158,017	NA
☐ coral reefs	NA	68,000
Agricultural ecosystems	***(4th National Report to CBD)***	
☐ paddy lands	525,000	[x]845,444.00
☐ fruit cultivations	97,000	[‡]135,567

☐ small crop holdings or other field crops(pulses, sesame etc)	128,000	‡146,544.69
☐ vegetable cultivations *(excluding root and tuber crops for 2012)*	110,000	‡89,980
☐ crop plantations (major export crops)	772,000	‡703682.8
☐ minor export crops	NA	††106,232
☐ home gardens (cultivated, includes fruit cultivations in home gardens)	367,800	‡1,684,165.60
☐ 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; ˣ 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	482 (220	453, with	27 (11.3)
migrants)	residents)	240 residents	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
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^2, 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.[1] 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, Thalangama 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.

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)**	
Forests under the Forest Department(FD)*	4th NR (ha)	2010 (ha)
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
Forests under the Department of Wildlife Conservation (DWLC)*		
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

[1] 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).

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 Sits (IUCN category X PA)	**n=1, 8864 ha** The Sinharaja World Heritage site	**n=2, 118,884** New: The Central Highlands Serial World Heritage Site with 3 forests
Biosphere Reserves Recognised by UNESCO (IUCN category IX PA)	**n=4, extent 81363.7 ha** Sinharaja, KanneliyaDediyagala-Nakiyadeniya, Hurulu and Bundala BRs	**n=4, extent 143106.3** Same reserves, increased area
Ramsar sites	**n-3; 8,377 ha**	**n=6, 198,027 ha**

2.1.7 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.[2] 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 [6] 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.

Skyscrapers. 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^2) 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^2) 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.

2.2 Socio-Economic Environment

2.2.1 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
TOTAL	**20,966**	**62,705**	**334**

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

By Ethnicity	%	By Religion	%
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.

2.2.2 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).

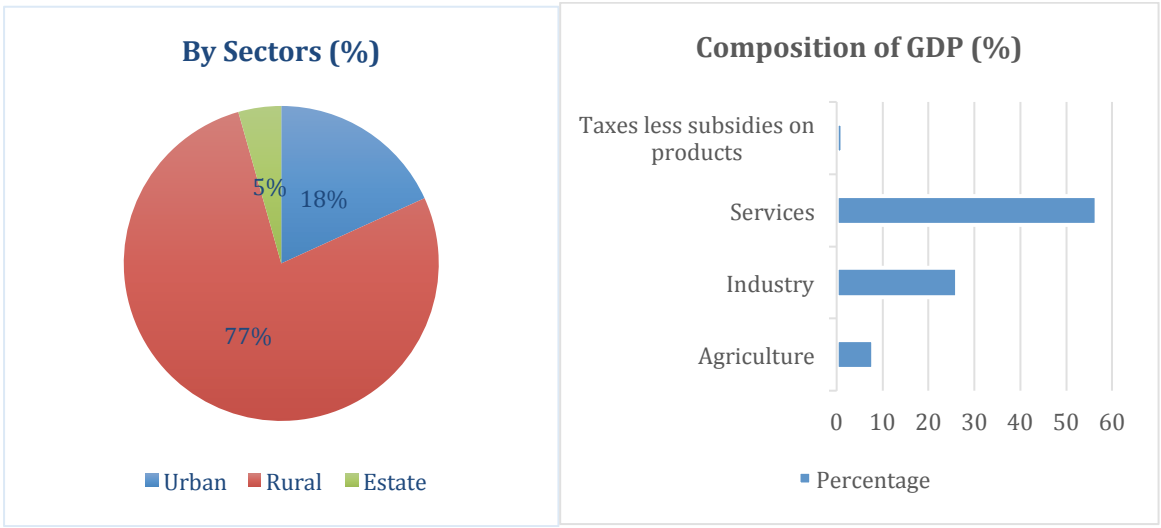

Figure 2.9 Basic Profile of the Economy

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.

2.2.3 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	
Labour Force Participation Rate (%)	
Total	53.8%
Male	74.7%
Female	35.9%
Unemployment Rate (% of labour force)	4.7%
Life Expectancy (Avg. years)	74.9
Literacy Rate (Aged 15 years and above)	
Total	93.2%
Male	94.1
Female	92.4

Human Development Index	0.757

2.3 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.

2.3.1 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 peopleized 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 other 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.

2.3.2 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, high plant load factor and base load operation. An integrated national energy policy formulation to support RE growth is the need of the hour.
4. 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
5. a commercially viable option. Also, with the evolution of storage facilities, the situation may further change and skew towards the incorporation of RE.
6. 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.
7. 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.
8. 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.

2.3.3 Water and Sanitation

Water. On a national basis, safe water coverage—defined here as the proportion of the population having access to water supplies from piped water systems, protected wells, or rainwater systems—is currently almost 85%. About 44% of the population (over 9 million people) have access to piped water, 3% (more than 0.6 million) have access to hand pump tube wells, 36% of the rural population has access to safe drinking water through protected dug wells, and 1% of the population uses rainwater harvesting systems. The other side of the coin, however, is that 15% of the population is unable to access a safe water source within 200 meters of their residence.

Nevertheless, and even though Sri Lanka has a better record than other countries in the region in terms of the provision of access to safe water supplies, challenges remain with respect to maintaining service levels to current users while, at the same time, extending services to the presently underserved population—currently estimated at over 3 million people.

Sri Lanka's principal water supply and sanitation utility, the National Water Supply and Drainage Board (NWSDB), had an estimated 840,000 total water connections in 2004 and this figure had doubled by the end of 2013. Another feature characterizing the evolution of Sri Lanka's water supply sector is the increased use of community-managed water supply systems. In 1980s, aside from a few urban pipe-borne water supply networks, the bulk of the rural population was served by small gravity systems and dug wells. At the beginning of 1990, a series of programs got under way for scaling up district-level rural water supply systems that were to be operated by the communities themselves— so-called community-based organization schemes. These schemes delivered a further 500,000 water supply connections.

The quality and reliability of water provided by the NWSDB is at an acceptable level. Currently, 98% of the bacteriological tests carried out by the NWSDB show satisfactory results. The reliability of water supply systems in Kandy and Nuwara Eliya is also satisfactory. However, the various small schemes managed by Jaffna Municipal Council are not deemed to be operating at a satisfactory level, and there is a shortage of water in Kurunegala (for which the NWSDB is the bulk water supplier). In rural areas, water quality for a considerable number of community-based water supply systems is not at an acceptable level.

Leakage in distribution systems is a component of what is referred to as nonrevenue water, which is a combination of unbilled metered or non-metered consumption, apparent losses (due either to unauthorized consumption or consumption that is under-measured due to metering inaccuracy), and real losses (due to various kinds of leakage). Nonrevenue water levels are variable from moderate to high but losses in Colombo, at 48%, are very high.

Overall, the NWSDB and other institutions handling water and wastewater services in Sri Lanka have made remarkable progress in expanding water supply services. However, their performance with respect to operational efficiency, financial sustainability, and the cost effectiveness of investment needs further improvement.

Three important features ought to be noted. First, despite the rise in community-based organizations, there remains a marked rural–urban disparity in the quality of services provided to consumers. Second, although substantial progress has been achieved in improving access to safe water supplies in post-conflict areas in the Northern Province, more work needs to be done. Finally, improvement is also needed in providing safe water supply to estate communities such as in Nuwara Eliya district.

The main strategic challenge in the water supply sector will be how to maintain and/or improve service levels to current users while, at the same time, extending services to the approximately 3 million people who are presently unserved.

Sanitation. In the sanitation subsector, coverage (which principally comprises on-site facilities such as septic tanks and closed pit latrines but also some piped sewerage systems) has increased from 83% in 2008 to 90% in 2013. Piped sewerage systems are limited to those locations where other forms of sanitation service provision are not practical due to population and housing density. As a result, sewerage networks presently cover only about 2.5% of the country's population in major urban areas such as Colombo, Kataragama, Hantana, and Hikkaduwa, as well as major housing complexes and condominiums. Industrial zones in

various parts of the country are also served by extensive industrial sewerage collection and treatment facilities.

Change in people's behaviour is another important factor behind the improvement in sanitation coverage. For example, public perception of the importance of sanitation in schools has increased. It is no longer acceptable to randomly construct a set of toilets at schools; rather, parents expect that combined water, sanitation, and hygiene interventions will be installed using resources allocated on the basis of the number of students that need to be served. As a result, the percentage of schools with adequate sanitation coverage had reached 80% by the end of 2012, and 85% of schools had improved drinking water sources.

The combined effect of these developments is that, by 2013, Sri Lanka had achieved its Millennium Development Goals for water and sanitation.

The NWSDB's revenue position is predominantly determined by the tariffs it charges for water and sanitation services. Revenues from the sale of water increased significantly due to tariff increases made in 2009 and 2012 plus the number of new connections made in the 2009-2010 period.

The NWSDB's revenues cover the cost of water sold but they do not cover the overall cost of operations, which have been increasing due to rising costs of fuel, personnel, and energy. Personnel costs constitute 53% of the NWDSB's total operational costs while electricity costs constitute a further 24% of total costs. Together, these two account for almost 80% of total operating costs. Finance costs will also increase in the future as the scale of debt on the NWSDB balance sheet is growing. This will increase pressure on the NWSDB's liquidity position.

Overall, for the 2006-2012 years, the NWSDB's financial performance could be described as relatively static, with increasing costs being generally offset by higher revenues gained from tariff adjustments.

The future profitability of the organization will depend on several key factors including the adequacy of on-going tariff adjustments, increased attention to efficiency initiatives with a focus on energy conservation, a reduction in nonrevenue water, the optimization of staffing costs, and an expansion of service territory utilizing the present staff complement.

At present, a uniform national tariff is applied on all NWSDB-operated schemes regardless of the actual cost of operating them. As a consequence, cross-subsidization takes place between those regions and schemes that are more expensive to operate and those that are less expensive. As the sector continues to evolve, a key question to be considered is whether the form and scale of this cross subsidization is either desirable or sustainable. The current model strives for financial sustainability at the national level with cross-subsidization applied between the provinces. In a more decentralized environment, it might be appropriate to aim for financial sustainability at a provincial level with cross subsidization applied between schemes within the province. Irrespective of the issue of cross-subsidy, tariffs are normally revised on a 3-year cycle.

The financial performance of sewerage facilities is difficult to assess. At present, major sewerage facilities have only been developed in Colombo, Ekala, Jaela, Moratuwa, and Ratmalana. In addition, there are a number of housing schemes having individual wastewater

systems. Colombo city sewerage is managed by the Colombo Municipal Council (CMC) while most other sewerage systems are managed by the NWSDB. Sewerage systems installed at housing schemes are either managed by individual households or, in some cases, by the NWSDB.

It is difficult to assess the financial performance of the Colombo sewerage system since its operations have been decentralized into six administrative districts operating under the CMC Drainage Division's central office, which also manages the city's surface water drainage system.

Based on various assumptions made as part of the study, it was concluded that the system's ratio of staff to service population is about 30% higher than the benchmark median of over 4,000 water and sanitation utilities around the world based on data compiled by the International Benchmarking Network for Water and Sanitation Utilities (IBNET), The staffing level per 1,000 connections, on the other hand, is about 270% to 500% higher than the IBNET benchmark figure, depending on which staffing level is used. These figures are distorted by the number of multiple customer connections that are counted as a single connection (at an apartment block, for example). Correctly accounting for the number of connections would lower CMC's staffing ratio but, even so, the staffing ratio is unlikely to compare favourably with relevant international comparators.

In spite of the achievements made, there remain five major challenges that will need to be overcome: rapid urbanization, water scarcity and degradation, investment needs, sector governance, and the need to achieve greater financial sustainability.

Urbanization is a global phenomenon and one of the world's most challenging issues—the global urban population is estimated to be increasing by over a million people a week, creating enormous challenges for the delivery of infrastructure and basic services such as housing, electricity, water, and sanitation. These problems will continue to intensify as economic development and the associated migration of people out of rural areas continues. The quality of life in the developing world's rapidly growing cities will not be sustainable without reliable access to safe drinking water and adequate sanitation facilities.

As elsewhere in the world, improving and redeveloping urban infrastructure poses a serious challenge in Sri Lanka. The number of people without access to improved water sources is rising while drainage networks and flood control systems require rapid improvement. A sewerage system is present only in Colombo city and is rather overburdened.

On the positive side, the economic growth that is attracting people to the cities and that is further fuelled by this migration also creates wealth that will help enable cities to both expand water and wastewater services and upgrade standards of service.

With an island-wide rainfall average close to 1,900 mm, total annual precipitation amounts to approximately 132 billion cubic meters (BCM) while total surface runoff is estimated to be 50 BCM. The annual internally renewable water supply capacity has been estimated at 43.2 BCM and annual withdrawals amount to 8.7 BCM. In principle, therefore, there is no shortage of water.

However, there is a wide variation in regional water availability, which causes water stress in dry zone areas. These problems are compounded by a combination of factors concerning water resource management that are harming the water sector.

Competition between water users, lack of compliance in relation to pollution control, and poor land-use policy are threatening critical watersheds. A lack of data and information concerning real time water planning also hinders equitable water allocation, while the absence of a strong legal basis for node in IBNET includes not only the data for a set of utilities of a specific country, but also a minimum set of performance indicators that presents a first analysis of the data at the country or utility level. Safeguarding water rights discourages user commitment to water resource protection and conservation.

Groundwater in Sri Lanka is widely used for domestic, agricultural, industrial, and other purposes. Groundwater conditions, in terms of yield and quality, vary considerably throughout the country depending on prevailing rainfall, topography, geology, and hydrogeological conditions. However, highly productive aquifers are only found in the sedimentary limestone zone extending from Puttalam to the Jaffna Peninsula and Mullativu. The remaining parts of the country have local and discontinuous weathered and fissured hard rock aquifers of rather low productivity. Although 35,000 wells have been drilled, systematic analysis and mapping of groundwater resources, in relation to either quantity or quality, has only just begun.

The issue of water rights is becoming more of a challenge as evidenced by an increasing number of related conflicts. Administrative water allocation is the most commonly practiced system in Sri Lanka as most developed water resources are utilized by national agencies. The national agencies act as the owners of water rights and water allocation priorities are fixed. Variations may take place within user groups according to politically and socially determined priorities, but essentially major water agencies such as the Irrigation Department and the Mahaweli Authority of Sri Lanka carry out de facto water allocation functions according to a predetermined plan based on the needs of project beneficiaries, and are mandated to appropriate water from any source. The consequence is that there are no provisions within the system to allocate water rights to new users. This administrative allocation process therefore needs to be complemented by the increased adoption of two alternative approaches: (i) user-based allocations to water user groups, which determine how water should be allocated to members of the group; or (ii) market-based systems in which water rights can be bought, sold, and traded with prices being set based on demand. In any event, a more transparent system of water rights that promotes equity is needed and will require amendment of current practice.

Degradation of river environments due to sand and clay mining and waste dumping are damaging river health and water resources systems. Controlling this problem requires strong political will and, so far, success has been limited, particularly in the western region where much of nation's industrial development is taking place.

The result is a shortage of cost-effective water resources for expanding safe drinking water supply to the growing population in spite of significant investment made in the water sector over the past 3 decades. Even though Sri Lanka's rivers are not as polluted as those of many other countries in the region, it is necessary to be proactive to avoid the inevitably high cost of restoration in the future.

Investment needs for the sector are large and will grow due to the combined effects of increasing demand, the need to deal with existing water scarcity and degradation problems, and national aspirations to improve the scope and quality of water and sanitation services.

The Government of Sri Lanka estimates total investment requirements for water and sanitation through to 2020 to be about LKR700 billion (US$5.38 billion). Of this total, about 80% (LKR564 billion) is estimated as being required to achieve the sector targets of 60% piped water supply coverage and 7% piped sewerage coverage by the year 2020.

Since the program is proposed to be implemented over a 7-year period, an average annual expenditure of LKR100 billion is implied. The government and foreign donors combined are expected to provide between LKR35 billion and LKR50 billion per annum with a further LKR 33 billion to be provided by local banks, leaving a significant financial gap if all the proposed programs are to be implemented.

Sri Lanka's water and sanitation sector, in contrast to the electricity and telecommunications sectors, is not presently subject to independent regulatory oversight. There have been several unsuccessful attempts to institute such oversight.

The introduction of some kind of autonomous regulatory direction would potentially be beneficial for the water and sanitation sector in at least two important respects:

- Presently, the NWSDB, community-based organizations, and locally governed utilities are responsible for overseeing their own performance, which may not result in the most efficient operational and investment decisions. An independent regulator that sets operational, customer service and investment performance targets for these utilities could potentially make a significantly positive impact.
- The public sector dominates the sector but there is an increasing expectation that the private sector will take an interest in financing and/or operating water and wastewater assets in the future. However, with its profit-seeking mind-set, the private sector will seek to maximize its return for any given level of risk. If that risk can be mitigated or controlled through the introduction of a credible supervisory regime, then the cost of private sector participation should be reduced.

The financial sustainability of Sri Lanka's water and sanitation utilities depends on a number of factors, many of which are beyond the scope of the utility's influence. These factors include tariff levels, the subsidy regime, the nature of environmental and service standards, financing options, and operating cost levels.

The tariffs set by the government for NWSDB-managed schemes historically have not been sufficient to cover total operating expenses and debt service requirements (principally to the Government of Sri Lanka). Although there was a significant increase in tariffs in 2009, this change was soon followed by a substantial increase in staff salaries and in other operating costs, including electricity prices. As a result, it was only in 2011 that the NWSDB managed to fully repay its debts to the government.

The absence of an automatic tariff adjustment formula means that the NWSDB will continue to face difficulties in covering its operating costs and so the utility must rely on improving operational and investment efficiency to reduce its operating and debt servicing costs.

Water supply schemes managed by community-based organizations (CBOs) are required by statute to be self-sustaining, meaning that they need to recover all their operation and maintenance costs through user charges in order to remain solvent. As a consequence, most functioning CBOs demonstrate adequate financial capacity—they maintain bank accounts and keep accounting records in a systematic manner, are vigilant with respect to their financial transactions, carry out regular internal audits, and are subject to external accounting audits carried out by divisional secretaries.

Many CBOs benefited from receiving initial funding to cover their investment requirements. As such, their on-going capital investment requirements are relatively limited, but in any event, they are restricted by the tariff levels they feel able to levy. This financial limitation also helps ensure that the CBOs act in an operationally efficient manner. Such efficiency is further enhanced when the CBOs themselves need to fund part of any future capital requirements.

While the financial capacity of operational CBOs is generally sufficient, they frequently face technical and social issues for which they need on-going training and support. Financial management guidance and support is required for those CBOs that have not proven to be self-sustaining in the past—a task that could be allocated to the NWSDB.

The financial stability of the sewerage operations of the CMC depends partly on sufficient budget support to the council's Drainage Division and partly on the operational and financial efficiency of the sewerage operation itself. The poor state of Colombo's sewerage infrastructure has meant that the limited budget allocation the division has historically received has been insufficient to even maintain the assets in a fully operating condition.

However, the CMC, with the assistance of various development partners such as ADB, is presently investing considerably in both rehabilitating and extending the sewerage system. Given this major new financial commitment and the need to achieve as full a level of cost recovery as possible, the existing council budget allocation process needs to be replaced with a sewerage tariff as soon as possible. At a minimum, this tariff should be set to cover operation and maintenance costs, but ideally it should also cover debt service on future capital costs.

Water supply schemes managed by local authorities, like CBOs, are also expected to be self-sustaining. As such, most local authorities impose their own tariff structure to recover all operation and maintenance costs except those relating to permanent staff salary costs.

2.3.4 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 Inter-monsoonal 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, world-

class 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 micro-drainage 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.

Since the 1990s, the GoSL has made efforts to address the worsening solid waste situation in the country. In 2014 the GoSL and the World Bank financed feasibility studies for potential solid waste disposal alternatives and locations. The Bank provided technical support for the EIA of another site located in Aruwakkalu in the Puttalam District. The GoSL engaged an international consulting firm to prepare the concept design for a proposal, comprising two transfer stations, railway connection and sanitary landfill at Aruwakkalu, 170 km from Colombo. However, the site selected was close to a National Park, and due to environmental concerns, the project did not materialize.

The waste slide at the Meethotamulla site has catalyzed public opinion that the GoSL must act to sustainably manage solid waste in the capital region. Starting at the highest levels of Government, urgent deliberations took place daily in April/May 2017 to find short term and long-term solutions for waste management and disposal. In parallel with addressing the emergency situation, the GoSL moved forward with location of a new landfill site at a previously quarried area at Aruwakkalu, but away from the earlier selected site.

The proposed new landfill site is adjacent to an operating limestone quarry site owned by the GoSL and currently operated by a cement company. About 500,000 cubic meters of limestone are extracted per year from the operational portion of the quarry. As the extractive front advances, the company routinely carries out reclamation of areas heavily affected by extractive operations (e.g., through backfilling and reforestation). Environmental and social studies have confirmed the suitability of some of the backfilled areas for landfilling purposes, given their geotechnical characteristics, their impacted condition, and the limited human presence at and around the site. The limestone formation extends approximately 3 km, which means that extraction will continue for at least 50 years, and the proposed landfill site has potential for future expansion.

Collapse of the Meethotamulla Dumpsite. On April 14, 2017, a waste slide occurred at the Meethotamulla dumpsite after several days of heavy rain, and led to its collapse onto the adjacent community. The collapse ultimately resulted in the death of over 30 people and directly affected 264 families. The incident generated much anger, public outcry, and revived debate over the practice of open dumping of waste, particularly in areas close to human settlements.

History and Current Status of Meethotamulla Dumpsite. The Meethotamulla dumpsite is located in the middle of a residential area of Colombo, in close proximity to houses and settlements. Since the late 2000s until April 2017, the CMC and Kolonnawa Urban Council

had used the Meethotamulla dumpsite to dispose of approximately 750 tonnes of waste daily, with little environmental protection. Prior to this, from the mid-1990s until the mid-2000s Colombo Municipal Council used Bloemendhal dumpsite which they had to stop using following fires at the site. Bloemendhal was never safely closed. Meethotamulla dumpsite is the largest in the CMR and contains about 1.2 million cubic meters of dumped waste over 20 acres, without an underlying barrier, leachate capture, landfill gas extraction, cover and compaction. After more than two decades in operation, the dumpsite had far exceeded its capacity and the waste pile was dangerously high, at 48 meters with steep slopes. The dumpsite had many risks, including: stability, fire, biological and chemical contamination, and health and safety. The resulting contamination continues to affect nearby water bodies and the surrounding soil. Health and safety risks were associated with the presence of waste (gas, odors, etc.) for the population living in the immediate proximity of the site, as well as lack of safety equipment for waste pickers. Following the April 2017 slope failure, there was an immediate need to stabilize the Meethotamulla dumpsite to prevent additional waste landslides, which present critical risks to the adjacent community. The GoSL requested the World Bank to provide emergency technical support with the stabilization and closure of the site, as well as with the overall management of solid waste in the CMR.

Emergency Diversion of Waste. Overnight, about 750 tonnes of waste that were disposed at Meethotamulla dumpsite needed to be diverted to some other places. The first alternative was to temporarily divert waste to other existing dumpsites sites while a solution was identified and implemented. However, consultation with local communities revealed strong citizen opposition, and residents living near those open dumpsites forcefully prevented the disposal of the diverted waste. As all other options were exhausted the GoSL decided to divert waste to the Dompe pilot sanitary landfill, the new Kerawalapitiya Waste Park (KWP), and the Karadiyana controlled dumpsite. The Dompe pilot sanitary landfill and the Karadiyana dumpsite were each able to take only a small quantity of the waste. Hence, most of the waste was diverted to the KWP, which is located 15 km north of Colombo on 28 acres of land close to the Muthurajawela wetlands. KWP is owned by the Sri SLLRDC. A composting facility was set up at KWP to process the separated biodegradable waste and the residual waste is dumped on-site. Bank technical experts recommended, and GoSL agreed to, the construction of a temporary engineered disposal cell at KWP, with leachate treatment, to mitigate potential environmental impacts at KWP and on the nearby wetlands.

The Meethotamulla emergency catalysed a strong, multi-agency effort to improve SWM operations from generation to disposal. Insufficient waste disposal capacity at the available sites in the MCR prompted the GoSL to promote a campaign to encourage waste segregation at source to reduce in the volume of waste to be disposed. This widespread campaign is being led by the national government in association with local authorities (LAs), focusing on messaging (and actions) that unsegregated waste would not be collected from residential or commercial premises.

Prevention of Further Disasters. The emergency waste management actions put in place by the GoSL following the Meethotamulla collapse could have unintended consequences, if collection and disposal are not managed in a safe manner. Sri Lanka is particularly vulnerable to dengue epidemics every year during the wet season. The risk of a dengue outbreak, for instance, is likely to be exacerbated by the interruption of waste collection, if waste is allowed to accumulate in neighborhoods. Illegal dumping of waste also increases the risks of further adverse human health effects and environmental degradation.

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

2.3.5 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, though56% 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 45underserved 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 financer, 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 programmes 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 re-house 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 thatplagued 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.

2.3.6 Education

The education system of every country plays a pivotal role in promoting economic growth and shared prosperity. Although Sri Lanka has long outperformed comparable developing countries at the primary and secondary school levels, it still faces major problems in the education sector which undermine the country's inclusive growth goal and ambition to become a competitive upper middle-income country (MIC).

Sustaining inclusive economic growth is at the heart of the government's development plan. Sri Lanka's goal is to become a competitive, middle-income country grounded in a knowledge-based economy. The government aims at achieving an annual growth rate of at least 8 percent in the future and intends to bridge the economic development gap that separates Sri Lanka from Southeast Asian countries such as Malaysia and Thailand; it intends to increase the share of its manufacturing, services, and agricultural, and fisheries products in global markets and promote the creation of an additional million jobs. Recognizing that Sri Lanka will succeed in these aspirations only if its labour force is highly educated and skilled, the government has made education a priority. It is aware that:

- Although Sri Lankans spend more time in the education system than neighbors in South Asia, employers are questioning the system's quality and its relevance.
- Major skills shortages and mismatches undermine productivity and thus growth.
- Disparities in learning outcomes in primary and secondary education and in access to both technical and vocational education and training (TVET) and higher education undermine the government's inclusive growth objectives.

Sri Lanka made excellent progress in expanding access to education in its early phases of economic development, but now faces several constraints while trying to respond to the needs of a rapidly changing economy. The main constraints are: (a) the limited education and training opportunities offered to youth at the end of compulsory schooling and inequities created by these limitations; and (c) the quality of education and training offerings which do not meet international standards and are not flexible enough to adapt to the needs of a changing labour market.

Sri Lanka has provided high and equitable access to primary and secondary education for several decades. Net enrollment rate (NER) is 99 percent in primary education and 84% in junior secondary and there is gender parity in both. In senior secondary education, NER is 70 percent which is relatively high for middle-income countries. On average, Sri Lankan students attend school for about 10 years, compared to six years in South Asia. This coverage success is the result of sustained government commitment: education is provided for free, and also backed by free textbooks and uniforms, scholarships, and adequate numbers of schools and teachers.

Beyond secondary education, however, opportunities are limited for nearly half of youth cohorts. Out of a General Certificate of Education Ordinary-level (GCE O-level) cohort of about 450,000 students, only about 20 percent will attend a higher education institution, and another 33 percent will attend TVET programs, leaving about 47% of them with no options

other than exiting the education and training sector, entering the labour market, or going abroad for further studies.

As a result, the comparative advance that Sri Lanka had and still maintains at the secondary school level, relative to comparator countries totally erodes (and even reverses) at the tertiary education level. At this level, Sri Lanka has clearly fallen behind over time. In 1960, the proportion of Sri Lankans aged 15 or over with secondary education was comparable to that of Malaysia and higher than that of South Korea, and the proportion of the population with tertiary education was similar to that in those countries. Fifty years later, in 2010, Sri Lanka's tertiary education completion rate was substantially lower than that of Malaysia and South Korea, both countries which have been investing heavily in TVET and higher education for at least three decades.

Similarly, there is low participation in TVET programs which primarily target students with GCE O-level and A-level qualifications. This largely contributes to the lack of workers with job specific skills.

The limited access to higher levels of education has entailed inequities. While participation in education across gender and economic groups is highly equitable at primary and junior secondary levels, it is much less so at senior secondary and higher education levels. Wealthier students are more likely than those from poorer families to pursue their education at levels where participation is constrained: senior secondary NERs range from 64 percent for the poorest to 78 percent for the richest. Similarly, in higher education, the gross enrollment rate (GER) for the poorest quintile is 10 percent and 26 percent for the richest. Furthermore, there are indications that the gap between

In the early stages of education, learning achievement in Sri Lanka seems relatively good. For example, a 2009 national assessment of grade 4 students conducted by the National Education Research and Evaluation Center found that a large proportion of grade 4 students were able to master the essential learning competencies expected by the national curriculum. The mean achievement score in mathematics was 77% in Sinhala-medium schools and 62% in Tamil-medium school. A review of learning outcomes in South Asia also found that Sri Lanka is the only country in the region where average achievement does not appear to have fallen over time. The 2013 national assessment also indicated that there are no huge differences in achievement by subject and type of school at this level of education.

At higher grades, such as grade 8, however, there are concerns about the ability of students to master the curriculum, and growing disparities. Although there is some evidence that test scores—and thus, quality—have been rising over time, the mean scores of grade 8 students in 2012 were still just 51% for mathematics, 42% for science, and 40% for English, indicating that the general education system fails to produce skills that are in high demand in a competitive economy. Disparities by school type have also widened significantly. Furthermore, national averages mask serious disparities in learning outcomes by regional and socioeconomic variations. Students in remote locations—especially in estates and less-developed provinces— and students from poor socio-economic background have far lower learning levels than the comparator groups.

The lack of data allowing a comparison with international standards adds to the difficulty to properly assess all dimensions of education quality in Sri Lanka, and its improvements over time. Sri Lanka has never participated in international assessments such as Programme for International Student Assessment, Trends in International Mathematics and Science Study,

and Progress in International Literacy Study. This prevents benchmarking against international standards and makes more difficult the identification of where issues stand and what are their causes.

The concern about insufficient quality extends to higher levels of education. In both TVET and higher education, not only access is limited, but the quality and relevance of existing programs is questionable. Relatively few students are enrolled in programs defined as national priorities and many graduates remain idle for an extended period between graduation and their first job. Moreover, more than 50 percent of employers, when interviewed, question the quality and relevance of general education, TVET, and universities with regard to conveying up-to-date knowledge or providing relevant skills. Asked about barriers to their growth, Sri Lankan firms put the quality and supply of skilled technicians third after taxes and regulation and financing.

Increasingly, it is recognized that participation in quality early child development programs leads to greater cognitive development, better readiness for primary school, lower repetition and dropout rates in the early grades, increased capacity for learning in school, and greater lifelong earning potential. Availability of these programs can thus bring substantial benefits in terms of greater quality of primary education and higher learning achievements.

Sri Lanka, however, only has an emerging early childhood education (ECD) sector. Considering pre-school interventions focused on children aged 3-5, Sri Lanka has low coverage: only 50% of children can access to pre-school. Access is also highly inequitable. ECD is mostly handled by private providers and NGOs due to lack of public investment, which means there are considerable access disparities by both socioeconomic status and location. In 2012, only 39% of children aged 3-5 years from the bottom quintile attended ECD centers, as against about 56% from the top quintile. In urban areas, attendance was around 59 percent vs. 50% in rural areas. This unequal participation implies that children from poor homes are often permanently disadvantaged in terms of life chances.

The regulatory structure is still unevenly developed; there is no formal curriculum and early learning standards; a significant percentage of centers lack adequate resources for teaching and learning and fewer than half the teachers meet the basic qualification requirements. Even though Government's education policy views ECD as a priority, the potential benefits of investment in ECD cannot be maximized unless such problems as low coverage, inequitable access, and the poor quality of services are properly addressed.

As discussed earlier, Sri Lanka has made impressive progress in getting children into primary and secondary school and having them complete up to 10 years of schooling. The main issue the country faces is now to bring learning achievements of Sri Lankan students to par with those of upper-middle and high-income countries.

Examining each of the critical factors that, based on international experience, are known to affect the quality of education, this study focuses on the following issues: (a) the types of education offerings available to students; (b) the quality of teachers; (c) the capacity to monitor student learning; and (d) the governance and accountability framework.

The organizational structure of the school system is both inequitable and detrimental for the future of the country. Education streams offered in small towns and rural areas are limited, reducing the opportunities offered to children in those areas to access science and maths streams and learn foreign languages. As a result, besides being inequitable, the distribution of

high-school graduates is highly skewed towards the arts and humanities, fields that are not in high demand in the labour market.

Qualified and motivated teachers are key to imparting good education. In Sri Lanka, the efficiency of the teacher management process is undermined by recruitment rules related to minimum qualifications and subject-specific vacancies sometimes relaxed or subject to political influence, leading to an imbalanced deployment of teachers (with surplus of subject teachers in urban areas, and shortages in rural) and an acute deficiency of teachers in maths, science and English.

This acute shortage of teachers with adequate knowledge in maths, and science affects student scores in those subjects. The National Institute of Education assessed the mathematics knowledge of teachers in schools where students scored less than 30% on the GCE O-level mathematics test. From the 170 teachers who participated in the study, 36% of teachers from the Western province and 51% of those from the other provinces scored no more than 5 marks out of 10.

Teachers also lack incentives to perform well because promotion is based on length of services rather than on effective teaching and because the pay level is low relative to other countries. In addition, the pay scale is compressed. As a consequence, teachers often seek opportunities outside school (e.g., private tutoring). Finally, absenteeism is a significant problem in terms of teacher accountability, especially in difficult areas. It results in disparities in learning outcomes and completion rates, especially in rural areas and poor provinces.

Delivery of quality education requires effective student assessment to provide the information stakeholders need to make policy decisions to improve learning outcomes. Sri Lanka has a fairly well-established assessment system (comprising classroom assessment, public examinations, and large-scale, national and international surveys), but there is a need to improve the enabling environment—the alignment between different systems and technical aspects, especially for classroom and large-scale assessments.

- *Classroom assessment:* Classroom assessment can be used to diagnose student learning problems, provide feedback to students, and inform parents about their child's learning. Sri Lanka has the foundation in place, but classroom assessment needs to be fully integrated into teaching practice.
- *Examinations.* Sri Lanka has a long history of public examinations. The objectives and content of national examinations (GCE O-level and A-level) are carefully chosen and textbooks and teaching are aligned with examinations. With the new curriculum reform in place, there is a need for the Department of Education and the National Institute of Education to maintain that alignment.
- *Large-scale assessments.* National assessments were introduced in 2003 in Sri Lanka and several rounds conducted since then. While they permit monitoring learning achievements over time, data limitations do not allow a deeper analysis of determinants of learning that could disentangle the impact of schools and teachers from that of social background. Limited dissemination of results and the non-participation of Sri Lanka into international assessments also limit the use of assessments results for policy formulation.

The basic institutional foundation to deliver public education services exists in Sri Lanka with responsibilities shared between the central government and provincial councils.

Nevertheless, the incentive system is feeble. As mentioned above, the promotion system based on seniority and the low and compressed salary structure do not provide incentives for better performance to public employees. At the school level, the Government is relying on two tools to improve accountability: an inspectorate system based on the United Kingdom and Scottish models, and a school-based management program to empower schools and local communities. An initial evaluation suggests that the latter program has had a positive impact on learning outcomes and could be strengthened and implemented more extensively in the future.

The complexity of competing in the global economy requires not only advanced skills but also a workforce that can adjust to shifts in demand. Pegged at 68 of 142 countries evaluated in the 2012/13 Global Competitiveness Index, Sri Lanka compares favourably with the rest of South Asia but trails behind East Asian countries. If the country is to transition from being factor-driven to being efficiency-driven, its workers need the ability to operate the latest equipment and technology, computer knowledge and fluency in foreign languages to communicate with international clients.

The drive for industrial growth is severely deterred by the shortage of technically skilled labour—a scarcity worsened by the migration of many skilled individuals who seek employment overseas and higher earnings. In addition to shortages, recent analysis reveals serious skills mismatches in the labour market. Both could depress the country's growth and competitiveness as a middle-income economy. Although the government has in recent years embarked on reforms in skills development, several factors still contribute to skills constraints in Sri Lanka:

- The complexity of Sri Lanka's skills development system demands more effective coordination, management and monitoring. The TVET sector is fragmented and uncoordinated which undermines sector performance and thus the potential to meet the skills needs of the economy. To realize government skills development policies, an inter-ministerial committee working in tandem with the different units within agencies like the Ministry of Skills Development and Vocational Training (MSDVT), would necessitate both a monitoring and coordinating unit within MSDVT and a revision of the structure, mandates, and functions of the many agencies. The recent setup of an Inter-Ministerial Sector Coordination Committee, has been a first step toward addressing this issue.
- A rigid and supply-driven TVET system with minimal involvement of the private sector undermines the efficiency and effectiveness of the skills supply. A heavily supply-driven TVET system does not take into account either the skills demanded by employers or the needs of the informal sector. In Sri Lanka, employers are still only minimally associated with the activities of public institutions, which compounds the problem.
- There is a shortage of qualified teaching staff, especially staff with industrial experience. There needs to be a better balance between academic credentials and professional experience for instructors in vocational training centres and teachers in technical colleges. In addition, unattractive salaries and inadequate professional development undermine teacher motivation and make retention difficult.
- Many centres could benefit from substantial upgrading of equipment. TVET graduates are often not workplace-ready when they finish their courses. Vocational centres in particular often lack equipment that would allow trainees to practice what they are being taught. Employers are reluctant to recruit graduates who have no

hands-on experience and prefer to hire trainable youth with a good general education whose technical skills can be built in-house.

- Over the past decade, Sri Lanka has become a regional leader in the design and implementation of the National Vocational Qualification (NVQ), but the framework has not been fully implemented and the design needs to be better actualized if it is to build up the quality and relevance of both public and private training programs and facilitate transfers between training and education streams. Moreover, the image of the NVQ has to be enhanced so that employers recognize the benefit of NVQ qualifications.
- There is a lack of both institutional autonomy and accountability for performance. Public training providers are financed primarily by the national budget, but allocations are not linked to their performance. Consequently, public institutions do not have incentives to revamp obsolete training courses, and curricula, and bring the private sector into their decision making.
- The planning process does not regularly ascertain national and regional skills needs based on labour market information. There is no timely and accurate information about current demand for skills and available training opportunities, nor reliable analysis of skills gaps. Moreover, no regular studies track competencies achieved, and it is not possible to evaluate the performance of TVET institutions directly.

Sri Lanka has a well-established system of higher education but its expansion is facing major challenges. Access to higher education has been increased but areas of economic and social importance remain underrepresented. The skills of academic staff for student-cantered learning are being upgraded but the pool of faculty staff is still insufficient; learning opportunities have been significantly increased but the availability of such courses – e.g. English and information and communications technology (ICT) is still limited. The country is also working to build research capacity at universities through Doctor of Philosophy programs and competitive research grants but research activities and outputs remain at a low scale.

Participation in higher education in Sri Lanka is exceptionally low for a middle-income country. The country's higher-education enrolment is about half the average for MICs and well below comparator countries South Korea, Thailand, Malaysia, and Indonesia. The higher education Gross Enrolment Ratio is 17%, compared with an average of 27% for MICs and 33% for upper MICs. Though, the expansion of basic and secondary education is producing unprecedented demand for university education, given the current public university capacity, only a small proportion of those qualifying can be admitted. Moreover, public university capacity to meet growing student demand is inadequate, especially in science- and technology- fields.

The quality and relevance of tertiary teaching and learning are minimal. A significant share of higher education graduates currently fails to meet the requirements of private employers, in particular related to good communication, soft, and ICT skills. Moreover, 50% of tertiary students are enrolled in external degree programs that offer little academic support and are often not leading to high employment prospects.

Private provision of higher education is limited. Until a few years ago, private sector participation in higher education was restricted; and because of ambiguous and inconsistent regulations, how this sector's participation is to be governed is unclear. Evidence from other countries shows that it is important to set clear, objective, and streamlined criteria and

processes for establishing and regulating higher education institutes, which would include incentives for private providers to invest and independent mechanisms to ensure the quality of the outcomes of both private and public higher education.

The links between industry and academia are minimal. To advance as an MIC, Sri Lanka needs to acquire and use technologies of ever-higher complexity, quality, and productivity, and also to generate a continuous stream of improvements and innovations. The government must promote collaboration between universities, research institutes, and companies to establish synergy for networking on research and development. This could be achieved through research partnerships, entrepreneurship initiatives for university students and staff, technology commercialization centres, and technology broker programs.

Compared to other countries at similar levels of development, Sri Lanka spends a smaller percentage of its income on education. Among low-income countries (LICs) and MICs, it has the lowest spending on public education as a percentage of its GDP (Sri Lanka: 2%; LIC and MIC average: 4.5%). Moreover, for several years public investment in education has actually declined in real terms. Even as a share of total government spending, public education is among the lowest (Sri Lanka: 10.2%; LIC and MIC average: 17.3%). Public investment mainly goes to general and higher education; TVET, important for the labour market, only gets about 5%; and early childhood education, which has a major impact on subsequent education levels and life chances, receives almost no public resources.

Spending on general education, which gets the highest share of education spending, is inequitably allocated. About 95% of schools in Sri Lanka are in the provinces and are attended mostly by poor rural children, but public investment in provincial education is only about 65% of the total general education spending. The 35% spent by the central government goes mainly to national schools which only account for about five percent of schools and are typically attended by affluent urban children. Insufficient accountability, and monitoring mechanisms further interfere with efficient and effective use of education resources.

The unfinished agenda of access, equity, and quality could be achieved through a more efficient use of current resources and by raising public investment by modest amounts. Over the medium term, the government plans to raise its spending on education from 1.7% to 6% of GDP. With more modest increases, public spending could be made more effective and achieve better outcomes.

Effective financing might be based on a combination of central government redistribution, local authorities allocating resources according to student needs, and monitoring spending. A transparent fund flow and giving a larger role to parents and communities can improve accountability in the use of resources. Sri Lanka has made significant progress in providing equity across provinces through needs-based formula funding: poorer provinces that have worse education outcomes receive more funds than wealthier provinces for primary and secondary education. This is due to a budget formula that promotes balanced regional development.

Expanding the resource base by leveraging public resources with increased private funds could lead to sustained financing at higher levels for education and training. In South Asia, PPPs have proved useful in providing educational opportunities improving access, and presenting choices and competition in education. Although Sri Lanka has only a few PPP

initiatives in TVET, more and better-designed PPPs could help it to achieve its objective of quality education for all, especially in TVET and higher education.

2.3.7 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[1]. 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)[7]. 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 commoditized (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[9], 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, whole-community 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 "over-tourism", for instance on food security, housing and local culture. High-level national economic objectives for the entire industry are listed below[12]. 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 eco-friendly 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).

2.3.8 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 post-conflict 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,6 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 low-skill/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 sub-market 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 Achchuveli 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 Build-Own-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 sector8. 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 soft-skills. 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 firm-level 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.

2.3.9 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.

2.4 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.
5. 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 3: ENVIRONMENTAL LEGISLATION, REGULATORY AND INSTITUTIONAL FRAMEWORK IN SRI LANKA

3.1 Overview of Environmental Legislation

Sri Lanka is one of the leading countries in the South Asian region in enacting environmental legislations. Its concern for environment dates back to over two and a half millennia. The constitution of the Democratic Socialist Republic of Sri Lanka under chapter VI Directive Principles of State policy and Fundamental duties in section 27-14 and in section 28-f proclaim, "The state shall protect, preserve and improve the environment for the benefit of the community", "The duty and obligation of every person in Sri Lanka to protect nature and conserve its riches" thus showing the commitment by the state and obligations of the citizens.

The overall environmental concerns are addressed by the National Environmental Act No. 47 of 1980 (and subsequent amendments by act no 56 of 1988 and act no 53 of 2000). It is the umbrella legislation for environmental protection in the country. In addition, several other sectoral legislative enactments are in place. The national organization that has the mandate to protect and take measures to safeguard the environment is the Central Environmental Authority. It currently operates in the entire country except in the North Western Provincial Council (NWPC), where the NWPC has enacted a separate statute under the 13th amendment to the Constitution of Sri Lanka and had created a separate provincial institute.

There are several other key national agencies with a mandate for environmental management and protection. The Forest Department, Department of Wildlife Conservation, Department of Archaeology, Department of Coast Conservation and Coastal Resources Management, Disaster Management Center and Geological Survey and Mines Bureau have their regional offices and staff to cater to and monitor the environmental safeguards as per the policies and regulations governing them. In addition, there are several national agencies that are impacting on the environment and adopting environmental safeguards as well. They are the Sri Lanka Land Reclamation and Development Corporation, Urban Development Authority, Water Supply and Drainage Board, Water Resources Board and Irrigation Department.

The Local Authorities (LA) are also have provisions under their respective acts to safeguards and provide useful facility and maintain the same for the convenience of the public in their respective areas. The Municipal Council (MC) Act No. 19 of 1987 & Urban Council (UC) Act No. 18 of 1987 provide for the establishment of MCs and UCs with a view to provide greater opportunities for the people to participate effectively in the decision-making process relating to administrative and development activities at a local level and it specify the powers, functions and duties of such LAs and provide for matters connected therewith or incidental thereto. These acts contain sixteen and eight parts respectively, several schedules and 327 & 249 sections respectively. The MC act, spell out its status, powers & functions in Section IV, Section V and Section VI in sections 34 to 154 and covers public health, drainage, latrines, unhealthy buildings, conservancy & scavenging, nuisance etc. Further the respective local authorities have mandate regionally to implement the project activities and monitor the progress of compliance work.

3.2 Detail Review of Key Environmental Related Legislation

3.2.1 The Constitution of Sri Lanka & the 13th Amendment

The Constitution of Sri Lanka contains several provisions, relating to the environment 9 Article 27 (14) and article 28 (f). The 13th amendment to the constitution introduced a new level of institution for environmental protection and management. Therefore, the provincial government also has legislative and executive power, the North Western Provincial Environmental Authority to control, prevent and monitor all environmental related activities.

Application to PPPs*:* Overall responsibility of individuals and organizations to protect and conserve the natural environment. All project proponents/implementers, financing institutions including investors and public are responsible.

3.2.2 The National Environmental Act. No. 47 of 1980 & its amendments

The National Environmental Act (NEA) provides conservation and development guidelines for natural resources including water, soil, fisheries resources, forest, flora and fauna in Sri Lanka. It also paved the way for the creation of the Central Environmental Authority (CEA). Further it spells out the creation of an Environmental Council in collaboration with the respective line agencies to advise the CEA (Section 7) and provide necessary guidelines to establish District Environmental Agency under the chairmanship of the District Secretary. The NEA is the basic national decree for environmental protection. The three main regulatory tools implemented under the NEA are Environmental Impact Assessment/Initial Environmental Examination, Environment Protection License (EPL) and Schedule Waste Management License supported by standards for discharge and waste disposal guidelines.

A comprehensive description of EIA/IEE process is given in Annex 6. It is the key regulatory tool enabling any developer to implement the development activity in line with the NEA and thereby assuring the long-term sustainability of the development undertaken while paying due respect to the environment.

The second regulatory tool under the provisions of the National Environmental Act is the EPL. The EPL procedure has been introduced to prevent or minimize the release of discharges and emissions in to the environment from industrial activities in compliance with national discharge and emission standards, to provide guidance on pollution control for polluting processes and to encourage the use of pollution abatement technology such as cleaner production, waste minimization etc. Here the industries are classified into three lists named A, B and C. List A is comprised of 80 potentially high polluting industries, List B is comprised of 33 medium polluting industries and List C is comprised of low polluting industrial activities. The operational details are given in CEA website (www.cea.lk).

The third regulatory tool deals with the disposal of scheduled waste. The gazette notification No 1534/18 of 1stFebruary 2008 made by the Minister under section 23A and 23B of the National Environmental Act No. 47 of 1980 is referred to as the National Environmental (Protection & Quality) regulations No. 1 of 2008. It deals with waste from specific and non-specific sources. The notification has three parts and eight schedules. The Part I deals with the Issue of Environmental Protection License for Emission of Disposal of waste. Part II deals on issue of license for the management of scheduled waste (Hazardous Waste) and Part

III on General matters including definitions and the effectiveness and validity of the license issued under National Environment (Protection & Quality) regulation No 1 of 1990 published in extraordinary gazette No 595/16 of February 1990. The eight schedules include the tolerance limits, applications, formats for reporting, categorization of non-specific and specific waste etc.

The 1994 amendment delegated the authorization to the local authorities to issue EPL for low polluting industries. The CEA's environmental management functions are holistic and they are very well set out in section IV of the act. Along with the EPL procedures several standards also have been gazette with regard to disposal of effluents to land and water bodies.

Application to PPPs*:* All project proponents/implementers and financing institutions including investors are responsible to ensure necessary IEE/EIA process is followed and in compliance for those projects that falls within the prescribe lists.

For further information of prescribed projects please visit: www.cea.lk

3.2.3 Environmental Protection License

The Environmental Protection License (EPL) is Sri Lanka's major regulatory program for control of industrial pollution stipulated in the National Environmental Act No. 47 of 1980, which was amended by Acts No.56 of 1988 and No. 53 of 2000. Industries and activities that have to be issued EPLs are classified under three categories: Category A, B and C. If a proposed project falls under Category A, the project proponent requires an EPL from the CEA, while Category C projects require EPLs from the respective local authorities. Like Category A, Category B projects require EPLs from the CEA, but the EPLs can be processed though the regional office of the CEA.

Application to PPPs*:* All project proponents/implementers and financing institutions including investors are responsible to ensure EPLs are obtained for those activities in projects that requires EPLs.

3.2.4 The North Western Provincial Environmental Statute No. 12 of 1990

Provincial Environmental Act of 1991 implemented by the North Western Provincial Council applies 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 27th 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 Project Approving Agency (PAA) decides so. The process is similar to that of the NEA and will be headed by one of the two listed PAAs; (a) Provincial Environmental Authority or (b) Provincial Ministry of Fisheries and Aquaculture.

Application to PPPS – Similar to IEE/EIA regulations applicable under the NEA. In areas of the North-Western Province, this Act will supersede the NEA, except areas under the DWC or Department of Coast Conservation and Coastal Resources Management.

3.2.5 State Land Ordinance Act No 13 of 1949

The State Lands Ordinance provides necessary guidelines to:

- The protection of the source, course or bed of any public stream
- The protection of springs, reservoirs, lakes ponds lagoons, creeks, canals, aqueducts etc.
- The construction or protection of roads, paths, railways and other means of internal communication.
- The prevention of the erosion of soil.
- The preservation of water supplies.

In addition, section 75 of the State Land Ordinance highlights on riparian proprietors' activities. The occupier of land or the bank of any public lake or public stream shall have the right to use the water in that lake or stream for domestic purpose and shall not be diverted through a channel, drain or pipe or by means of a pump or other mechanical contrivance but shall be removed in a bucket or other receptacle.

3.2.6 The Coast Conservation and Coastal Resources Management Act No.49 of 2011 (Amendment)

The Coast Conservation and Coastal Resources Management Act makes provisions for the regulation and control of development activities within the coastal zone as well as formulates and executes schemes of work for coast conservation. Under the section 6 of the act, there is provision to appoint a Coast Conservation Advisory Council (CCAC) which would advise the Coast Conservation and Coastal Resources Management Department (CCCRMD) on all development activities proposed to be implemented in the coastal zone and review its coastal zone management plans. The law specifies that projects located wholly or partly within the coastal zone (the area lying within a limit of three hundred meters landwards of the Mean High Water line and a limit of 2km seawards of the Mean Low Water line and in the case of rivers, streams, lagoons, or any other body of water connected to these either permanently or periodically, the landward boundary shall extend to a limit of 2km measured perpendicular to the straight base line drawn between the natural entrance point thereof and shall include waters of such rivers, stream and lagoons or any other body of water so connected to the sea) must undergo the approval process that is laid down in the Act irrespective of its size.

Only those projects located totally outside the Coastal Zone will be subject to the approval process laid down in the National Environmental Act. Therefore, any development work taking place within this zone falls under the jurisdiction of CCCRMD. According to the Act, a Director of the CCCRMD has the discretion to request for an EIA/IEE from the project proponent if the initial screening reveals significant impacts in the coastal areas by the project. The process is very much similar to the NEA excepting that the Director of the CCCRMD reserves the right to request for an EIA/IEE depending on the nature and scale of anticipated impacts of the proposed investments rather than on pre-determined prescribed limits as in the NEA and also to make a final decision. The Director is advised by the CCAC on the findings of EIA/ IEEs.

Application to PPPS: Any project with potential to cause negative impacts on the coastal zone needs to comply with the EIA/IEE regulations of the Coast Conservation and Coastal Resources Management Act in addition to NEA.

3.2.7 The Flood Protection Ordinance Act No.22 of 1955

This Act provides the respective Minister to declare any area in the country as a flood area. It has provisions to prepare schemes for protection of a flood area, creation of a flood authority, regulations for management of flood area and acquisition of land for the purpose of the ordinance. The flood authority is usually the District Secretary of the affected area. In case of a large area of a Municipality coming under flood the Minister may substitute the District Secretary by appointing the Mayor of the Municipality.

Application to PPPs: Flood mitigation measures should be built in to the essential design of the projects as well as storm water management interventions and improve drainage which need to be built in to the project designs to ensure potential impacts are mitigated. Site selection procedures will ensure that projects are located well away from flood plains and areas known as high-risk inundation areas.

3.2.8 The Fauna & Flora Protection Ordinance Act No. 49 of 1993 and its amendments

This Act provides for the protection, conservation and preservation of the fauna and flora of Sri Lanka. Under the Fauna and Flora Protection Ordinance (FFPO), five categories of protected areas are established viz. Strict Nature Reserves, National Parks, Nature Reserves, Jungle Corridors and Intermediate Zones including sanctuaries. According to the FFPO, any development activity of any description what so ever proposed to be established within a national reserve or within one mile from the boundary of any national reserve is required to be subjected to EIA/IEE, and written approval should be obtained from the Director General, DWC prior to implementation of such projects. 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 Director General of the DWC finally grants the decision of project approval or disapproval.

Application to PPPs*:* Any activity which will be implemented in close proximity of protected areas/ wildlife reserves will require clearance from the Department of Wildlife Conservation.

3.2.9 The Sri Lanka Land Reclamation & Development Corporation Act No. 15 of 1968

The Act provides for the formation of the SLLRDC**.** The latest amendment to this Act is No 35 of 2006 which incorporated section 2A- Prohibiting filling or developing and reclaiming land, section 2B-declaring areas as low lying marshy or swampy and section 20 C-stipulating that pollution of canal as an offence. In addition, Section 28 of the principal enactment has added new definition–retention areas. The gazette regulations under this act also had declared several areas as wetland.

Application to PPPs*:* Any activity that will impact low-lying areas such as wetlands will require to adhere to the above Act, as well as other legislation that provides protection to such areas such as FFPO, FO, EPAs etc.

3.2.10 The Urban Development Authority Act No. 41 of 1978

This Act provides provisions to establish the UDA and declaration of areas as urban development areas. Its Part II outlines 22-point powers and functions of the UDA. Under Part IV it has power to acquire immovable property and sale of land belonging to the authority. The Act provides room to make regulations for the purpose of carrying out or giving effect to the principles and provisions of this law. The amendment brought in Act no 2 of 1980 under special provisions provided room to declare lands urgently require for urban development projects and remedies to affected parties and to uphold the power of the Supreme court. The amendment brought under Act No 4 of 1982 in its Part II A describes the planning procedure, appointment of planning committees, preparation of draft development plans, approval of the same also provide room for subsequent amendment. It also provides room to issue permits for development work, and delegation of the powers of the authority and procedures to be followed if activity takes place in contrary to the permit issued. Further the principle enactment amended by the addition of section 29 by adding a schedule, indicating the matters for which provisions may be made in the development plan. The subsequent amendments deal with levies, joint venture development projects etc.

Application to PPPs: Many areas to be covered under PPP projects may fall under the UDA jurisdiction including the CMR. Project activities need to maintain consistency with the UDA regulations.

3.2.11 The Mines and Mineral Act No.33 of 1992

The Geological Survey and Mines Bureau established under the Mines and Minerals Act No. 33 of 1992. Under this act, mining falls within the purview of the Geological Survey and Mines Bureau (GSMB). Mining and exploitation for minerals, including sand, must be licensed under the Act by the GSMB. Mining licenses are issued only to qualified individuals and companies registered to do business in Sri Lanka. Mining is not permitted within Archaeological Reserves and within specified distance of monuments. New mining licenses are subject to the EIA process, if the type and extent of mining is listed under the EIA regulations. Additionally, the GSMB has power to stipulate conditions including the taking of deposits and insurance for the protection of environment. Regulations made by the GSMB under the Act cover a variety of environmental stipulations, criteria and conditions for licensing and operating mines.

This also covers the disposal of mine wastes. The Act also deals with the health, safety and welfare of miners. Reclamation of mines is a major problem in Sri Lanka and due to current practice requires the mining enterprise to make a deposit to cover costs of recovery. The deposit however is inadequate for the purpose. Large extents of mined areas, particularly areas mined for clay and sand remain open. Mining rights on public and private land are subject to licensing by the GSMB and all minerals wherever situated belonging to the state. The right to mine particular parcels of public lands may be subject to EIA procedures as well as to lease for permit conditions.

Application to PPPs: Earth and quarry material may be needed for the development work undertaken for the PPP projects. In such cases quantities specified need to be extracted and permission from the GSMB is required in addition to EPLs. Alternatively, the project

contractors can procure them from the open market but they will have to make sure that such sources/traders are operating with valid licenses.

3.2.12 Local Authorities Acts

The Municipal Council (MC) Act No. 19 of 1987 & Urban Council (**UC)** Act No. 18 of 1987 make provisions for the establishment of MCs and UCs for the purpose of administrative and development activities at a local level. Further the respective local authorities have a mandate regionally to implement the project activities and monitor the progress of compliance work.

Application to PPPs: Some of the PPPs maybe implemented by the local authorities, particularly MCs. In such situations, the respective Acts will need to be also adhered to.

3.2.13 Water Resources Board Act No. 29 of 1964

The Water Resources Board is a key player in the formulation of national policies relating to the control and use of water resources of the country, as well as coordination of projects undertaken by Government departments, local authorities and public corporations relating to the conservation, utilization development of the subterranean water resources of the country and the assessment of the possibilities, benefits and economic feasibilities of such projects.

Application to PPPs: For PPP projects on the water sector, this Act becomes applicable.

3.2.14 Forest Ordinance including Amendments

The Forest Ordinance is one of the oldest ordinances in the country, first enacted in 1887 under which the Forest Department was established in 1887. This act has been amended several times in the past. The Forest Reserves gazetted under the provisions of the ordinance and all proposed reserves that are not gazetted under these provisions but selected for conservation based on biological and hydrological importance should be taken into account in implementation of this project.

Application to PPPs: Any projects conducted in proximity to buffer areas of forest reserves should obtain guidance from the Forest Department prior to implementation.

3.2.15 National Wetland Policy

The National Policy and Strategies on Wetlands (2005) seeks to give effect to the National Environment Policy and other relevant national policies, while respecting national commitments towards relevant international conventions, protocols, treaties and agreements on wetland protection to which Sri Lanka is a party. Among the International Conventions, Ramsar Convention on Wetlands of International Importance (1971), the Convention on Conservation of Migratory Species of Wild Animals (1979) and the Convention on Biological Diversity (1992) are significant.

The definition given for Wetlands in the policy is “Areas of marsh, fen, peat and or water, where natural or artificial, permanent or temporary with water that is static or flowing, fresh,

brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters and may incorporate riparian and coastal zones adjacent to the wetlands and islands or bodies of marine water deeper than six meters at low tide within the wetlands".

All sectoral development plans should be based on principles of wetland ecosystem management.

Institutional arrangement to manage wetlands is well established at present. A multi-stakeholder National Wetland Steering Committee has been established in the Ministry of Environment to advise on wetland issues in the country and wetland management unit has been set up at the Central Environmental Authority to oversee and facilitate policy implementation.

Application to PPPs: Project investments that have the potential to cause impacts to wetlands should have specific mitigation measures as per the relevant regulations embedded in to the project design to ensure that they are managed within the purview of these regulations.

3.2.16 Mahaweli Authority of Sri Lanka Act (Act No.23 of 1979)

This act established the Mahaweli Authority of Sri Lanka, which is the authority responsible for the implementation of the Mahaweli Ganga Development Schemes including the construction and operation of reservoirs, irrigation distribution systems and installations for the generation and supply of electrical energy.

Further, the functions of the authority include fostering and securing the full and integrated development of any special area, conservation and maintenance of the physical environment within any special area, optimizing agricultural productivity, employment potential and generation and securing economic and agricultural development within any special area, promotion and securing the co-operation of Government Departments, State Institutions, Local Authorities, public cooperation and other persons, whether private or public, in the planning and implementation of the Mahaweli Ganga Development Schemes and in the development of any special area etc.

Application to PPPs: Development interventions in and around the Mahaweli Development area should obtain consents from the Mahaweli Authority of Sri Lanka.

3.2.17 The Antiquities Ordinance

The Antiquities Ordinance (Revised in 1956 & 1998) is the main legislation dealing with the preservation of cultural assets in Sri Lanka. Section 16 covers Ancient Monuments and their declaration as well as the declaration of specified trees as ancient monuments. According to Section 21, the restoration, repair, alteration or addition in connection with any protected monuments has to be conducted in accordance with the conditions of a permit issued by the Director General of Archaeology, or in accordance with an agreement entered in to under Section 20. Section 24 prohibits or restricts subjects to certain prescribed conditions, the erection of buildings or carrying out mining, quarrying, or blasting operations on any land within the prescribed distance of any ancient monument situated on Crown land or any protected monument. As per the ordinance the Director General of Archaeology "shall cause

an impact assessment survey to be undertaken at the expense of the sponsors of such project or scheme to assess the consequences thereof upon the antiquarian, historical or archaeological aspects or value of the land in question or on any antiquities upon it and shall, within such period of time as may be agreed on.

Application to PPPs: All projects that may have activities in the vicinity of archaeological sites will require prior clearance from the Department before investments are being done. Specific measures to ensure chance find physical cultural resources are managed accordingly as per this ordinance, should be embedded in to project environmental due diligence procedures.

3.2.18 Disaster Management Act No. 13 of 2005

Under the Disaster Management Act No.13 of 2005, there is a provision to establish a National Council for Disaster Management (NCDM). The Act defines "disaster" as an actual or imminent occurrence of a natural or man-made event, which endangers or threatens to endanger the safety or health of any person or group of persons in Sri Lanka, or which destroys or damages or threatens to destroy or damage any property, and inter alia includes:

- An industrial hazard
- A fire
- An explosion
- A chemical accident
- Oils spills including inland oil spills
- Cyclones
- Tsunamis

Disasters may happen as the result of a malfunction of the normal operating procedures or precipitated by the intervention of an outside force such as a cyclone, flood or deliberate acts of arson or sabotage. The major objective of this act is to protect human life, property and the environment of Sri Lanka from any event defined as a disaster. Therefore, this act plays key role to protect the environment and provides necessary guidelines for the protection of human life, property and the environment of the country.

Major functions of the NCDM include, to formulate a National Policy and Program on the management of disasters which shall provide for the protection of life of the community and environment and the maintenance and development of disaster affected areas; the effective use of resources for preparedness prevention, response, relief, reconstruction and rehabilitation; and the enhancement of public awareness and training to help people to protect themselves from disasters.

Section 10 of the Sri Lanka Disaster Management Act stipulates that "It shall be the duty of every ministry, Government Department and public corporation to prepare a Disaster Management Plan with respect to such ministry, Government Department or public corporation to counter any disaster or impending disaster based on the National Disaster Management Plan and in accordance with such guidelines as may be specified by the National Council for Disaster Management. As per the definition of public corporation provided under Section 25 of the said act, a Disaster Management Plan is compulsory for coal-based thermal power plant operations.

Application to PPPs: All projects should be prepared taking Disaster Management Plan of the respective sectors into consideration including specific measures to reduce impacts to the investments by potential disasters.

3.2.19 Prevention of Mosquito Breeding Act No. 11 of 2007

This Act was passed for the purpose of ensuring the prevention and eradication of all mosquito-borne diseases. Under this Act, it is the duty of every owner or occupier of any premises to cause, (a) open tins, bottles, boxes, coconut shells, split, coconuts, tyres or any other article or receptacle found in or within such premises, capable of holding water, to be removed, destroyed or otherwise effectively disposed; (b) any well found in the premises and its surroundings to be maintained and kept in good repair so as to make it mosquito-proof and thereby prevent the breeding of mosquitoes; (c) any artificial pond or pool found in a premises to be emptied at least once every week; (d) any casual collection of water within the premises which is conducive to mosquito breeding, to be regularly drained; (e) shrubs, undergrowth and all other types of vegetation, other than those grown for the purpose of food or those which are ornamental, found within or outside any building or structure within the premises used as a dwelling place which has become a breeding place for mosquitoes, to be removed; (f) the removal and destruction of water plants having the botanical name *Pistia stratiotes* and commonly known as “diyaparandal”, “kondepasei”, “telpassy”, “barawa-pasi”, “nanayaviraddi” and of any other water plant, or plants, found within the premises, which may facilitate the breeding of mosquitoes.

Application to PPPS: All projects during construction and operational stages should comply with the Prevention of Mosquito Breeding Act requirements to control or mitigate or avoid generation breeding sites.

3.2.20 Coconut Development Act 46 of 1971 amended by Coconut Development Law, No 24 of 1975 – Section 63 Regulations stipulated in the Gazette Notification No 331 of August 18, 1978 of Palmyra Development Board

Ministry of Plantation constituted by the Gazette Notification 331 of August 18, 1978 published in terms of introduction of amendments of 74 of 1975 to the Sri Lanka Coconut Development Act of 46 of 1921 to carry out all forms of cultivation and development in relation to Palmyra Plantation. Under this gazette notification, Palmyra Development Board established and its main office located in Jaffna district. According to this gazette notification, engaging in the regulation, control, supervision, direction, management and inspection of the cultivation and utilization of land in Palmira plantation and the cultivation of land with Palmyra palms.

Application to PPPS: Any PPPs requiring use of Coconut and Palmyra cultivated lands, should obtain the prior approval from the Palmyra Development Board.

3.2.21 Occupational Health and Safety

Project interventions involve multifarious activities during construction and operation and maintenance phases. These activities are also associated with problems of occupational health and safety. The problems envisaged during construction and erection stages can mainly be due to exposure to dust, accidents and noise. The problems envisaged during the

operation and maintenance phase are accidents, exposure to heat, noise, arc lights, chemicals etc.

The National Policy on Occupational Safety and Health in Sri Lanka is in the drafting stage. The Labour and Labour Relations Ministry in collaboration with 25 ministries, trade unions, employers and other authorities are involved in the drafting with the intention of reducing work place related injuries and other mishaps.

Application to PPPS: All project activities, during construction should comply with, as far as applicable, with the Factory Ordinance requirements related to occupational, health and safety and International Labour Organization guidelines on the same.

3.2.22 The World Heritage Convention

The United States initiated the idea of cultural conservation with nature conservation. A White House conference in 1965 called for a 'World Heritage Trust' to preserve "the world's superb natural and scenic areas and historic sites for the present and the future of the entire world citizenry." The International Union for Conservation of Nature developed similar proposals in
1968, and they were presented in 1972 to the United Nations conference on Human Environment in Stockholm. States Parties are countries which have adhered to the World Heritage Convention. They thereby agree to identify and nominate properties on their national territory to be considered for inscription on the World Heritage List. When a State Party nominates a property, it gives details of how a property is protected and provides a management plan for its upkeep. States Parties are also expected to protect the World Heritage values of the properties.

Under the World Heritage Committee signatory countries are required to produce and submit periodic data reporting providing the World Heritage Committee with an overview of each participating nation's implementation of the World Heritage Convention and a "snapshot" of current conditions at World Heritage properties. State parties that have ratified the World Heritage (WH) Convention, agree to assure the effective implementation of any measure to protect designated WH properties. They are bound to ensure that development or change does not impact negatively on the “Outstanding Universal Value (OUV)”, integrity and/or authenticity of the property. Despite this, management deficiencies of nations that have ratified the convention and aggressive development, especially in urban areas, are the two major threats to WH properties. These are typical scenarios under the World Heritage context within which the WH Convention has a strong mandate to ensure that proper due diligence mechanisms are undertaken.

According to the UNESCO WH Committee, over the last decade they have addressed a considerable number of Status of Conservation Reports related to threats to WH properties from various forms of large-scale development. These developments include roads, bridges, tall buildings, “box” buildings (e.g. malls), inappropriate, a contextual or insensitive developments, renewals, demolitions and new infrastructure typologies like wind farms, as well as land-use policy changes and large scale urban frameworks. The Committee has also examined threats from excessive or inappropriate tourism. WH properties need to be seen as single entities that manifest OUV. The OUV of Heritage a Assets, both designated and non-designated, is reflected in a range of attributes, and in order to sustain OUV it is those attributes that need to be protected. Heritage Impact Assessments (HIAs) have been identified

by The WH Committee as the most appropriate tool to evaluate effectively the impact of potential development on the OUV of properties and ensure proper management mechanisms are put in place to mitigate any potential negative impacts.

In order to provide a clear directive on the HIA requirements the International Council on Monument and Sites (ICOMOS) published the Guidance on Heritage Impact Assessments for Cultural WH Properties in January 2011. ICOMOS is the Advisory Body to the WH Committee for cultural World Heritage properties. The guidance document was prepared in order to contribute to an effective impact assessment of potential development on the OUV of properties. It is addressed to managers, developers, consultants, donors and decision-makers, but also to the WH Committee and States Parties. The HIA process increases objectivity related to individual assessments while providing better protection of OUV attributes. It also facilitates a clear understanding not only of the key threats and causes to OUV attributes but also on the level of integrity of OUV attributes, while considering both substantive and procedural effectiveness and continual conservation and management of the heritage asset.

3.3 Priority sectors identified for potential PPPs and list of their applicable national laws

Sector	Applicable laws
Roads	1. Road Development Authority Act No. 73 of 1981 2. National Thoroughfares Act, No. 40 of 2008 3. State Land Ordinance No 8 of 1947 4. Roads and Thoroughfares Act no.45 of 1956 and Law no.37 of 1973 5. Town and Country Planning Ordinance Of 1946 6. The Land Acquisition Act of 1950 (LAA) and Subsequent Amendments and Regulations. It has several amendments and the latest being the version of 1986 and the land acquisition regulations, 2008 gazetted as No. 1585/ 7 on Tuesday, 20th of January 2009. 7. Land Development Ordinance (1935) 8. 13th Amendment to the Constitution (governing provincial roads)
Railway	1. Railways Ordinance 1902 (as amended from time to time) 2. Sri Lanka Railways Authority Act (No. 60 of 1993) (now repealed) 3. State Lands (Recovery of Possession) Act, No. 7 of 1979 4. Town and Country Planning Ordinance Of 1946 5. The Land Acquisition Act of 1950 (LAA) and Subsequent Amendments and Regulations. It has several amendments and the latest being the version of 1986 and the land acquisition regulations, 2008 gazetted as No. 1585/ 7 on Tuesday, 20th of January 2009. 6. Land Development Ordinance (1935)
Bus	1. Sri Lanka Transport Board Act 2005 2. National Transport Commission Act 1991 (as amended from time to time) 3. 13th Amendment to the Constitution (governing bus and local transport)
Marine	1. Merchant Shipping Act 1971 2. Sri Lanka Ports Authority Act 1979 3. Admiralty Jurisdiction Act 1983 4. Marine Pollution Prevent Act 2008 5. Licensing of Shipping Agents Act 1972 and subsequent regulations (as amended from time to time) 6. Freight Forwarders, Non-Vessel Operating Common Carriers and Container Operators Regulations (No.1717/6-02nd August 2011) 7. Suppression of Unlawful Acts Against the Safety of Maritime Navigation Act 2000 8. Piracy Act 2001 9. Carriage of Goods by Sea Act No. 21 of 1982
Energy	Electricity 1. Sri Lanka Electricity Act 2009 (as amended in 2013) 2. Public Utilities Commission of Sri Lanka Act, No. 35 of 2002 3. Ceylon Electricity Board Act, No. 17 of 1969

	Petroleum and Gas 1. Ceylon Petroleum Corporation Act No. 28 of 1961 2. Petroleum Products (Special Provisions) Act No.33 of 2002 3. Energy Supply (Temporary Provisions) Act No.2 of 2002 4. Petroleum Resources Act 2003 5. National Gas Policy (draft) 6. Petroleum Resources Development Bill (draft) 7. Public Utilities Commission of Sri Lanka Act, No. 35 of 2002
Water and Sanitation	1. National Water Supply and Drainage Board Law 1974 2. Sludge Management Policy for Water Treatment Plants 2012 3. National Rain Water Harvesting Policy and Strategies 4. National Policy for Rural Water Supply and Sanitation Sector 2001 5. National Drinking Water Policy 6. National Policy on Water Supply and Sanitation 2002 7. National Policy on Private Sector Participation in Water Supply and Sanitation 8. Urban Water Supply Policy
Health	1. Health Services Act 1952 (as amended from time to time) 2. Private Medical Institutions (Registration) Act No. 21 of 2006 3. National Medicines Regulatory Authority Act 2015 4. Medical Devices Pricing Regulations, No. 05 of 2017 (No. 2030/47) 5. Registration and Licensing of Medicines (fees) Regulations, No. 02 of 2017 (No. 2023/30) 6. National Medicines Regulatory Authority (Ceiling on Prices) Regulations, No. 2 of 2016 (No. 1989/61) 7. National Policy on Health Information of Sri Lanka 2017 8. 13th Amendment to the Constitution shifted responsibility for regulation of private sector medical institutions from the Ministry of Health and assigned it via the concurrent list to the joint responsibility of the central government and the provincial councils.
Housing Construction and Land	1. Construction Industry Development Act, No. 33 of 2014 2. Condominium Management Authority Law, No. 10 of 1973 3. Condominium (Charging of Fees) Regulations No. 01 of 2017 (No. 2026/25) 4. Rent Act no. 7 of 1972 5. National Housing Act 1954 6. National Housing Development Authority Act no. 17 of 1979 7. Ceiling on Housing Property Law (as amended from time to time) 8. Ceiling on Housing Property (Special Provisions) Act No. 4 of 1988 9. Urban Development Authority Act no. 70 of 1979 10. Land Acquisition Act 1950 11. Urban Councils Ordinance No. 61 of 1939 12. Pradeshiya Sabhas Act no. 15 of 1987 13. Land Acquisition Act no. 9 of 1950 14. Prescription Ordinance no. 22 of 1871 15. Primary courts Procedure Act no. 44 of 1979, section 66 (relating to land disputes) 16. Land Grants (Special Provisions) Act 1979 17. Lands Resumption Ordinance 1887 18. State Lands (Recovery of Possession) Act no. 7 of 1979 19. State Lands Ordinance no. 8 of 1947 20. Land Development Ordinance no. 19 of 1935 21. Partition Law No. 21 of 1977
Urban	1. Municipal Councils Ordinance 2. Pradeshiya Sabhas Act, No. 15 of 1987 3. Provincial Councils Act, No. 42 of 1987 4. Provincial Councils (Payment of Salaries & Allowances) Act, No. 37 of 1988 5. Sri Lanka Institute of Local Governance Act 6. Urban Councils Ordinance Urban Development Authority Law, No. 41 of 1978 7. Urban Development Projects (Special Provisions) Act, No. 2 of 1980 8. Town & Country Planning Ordinance 9. Sri Lanka Land Reclamation and Development Corporation Act 10. Colombo District (Low Lying Areas) Reclamation and Development Board Act, No. 15 of 1968 11. National Water Supply and Drainage Board Law, No. 2 of 1974

	12. Urban Settlement Development Authority Act, No. 36 of 2008
Tourism	1. Tourism Act, No. 38 of 2005
Education	1. Assisted School and Training Colleges Act, No. 5 of 1960 2. Colleges of Education Act, No. 30 of 1986 3. National Authority on Teacher Education Act, No. 32 of 1997 4. National Institute of Education Act, No. 28 of 1985 5. Public Examinations Act, No. 25 of 1968 6. School Development Boards Act, No. 8 of 1993 7. UNESCO Scholarship Fund Act, No. 44 of 1999 8. National Education Commission Act No 19 of 1991
Industry	1. National Institute of Plantation Management Act, No. 45 of 1979 2. Sri Lanka Tea Board Act, No. 15 of 1970 3. Rubber Replanting Subsidy Act, No. 36 of 1953 4. Rubber Research Ordinance No. 10 of 1930 5. Rubber Control Act, No. 11 of 1956 6. Tea (Tax and Control of Exports) Act, No. 16 of 1959 7. Tea and Rubber Estates (Control of Fragmentation) Act, No. 2 of 1958 8. Tea Control Act, No. 51 of 1957 9. Tea Shakthi Fund Act, No. 47 of 2000 10. Tea Small Holdings Development Act, No. 35 of 1975 11. Tea Subsidy Act, No. 12 of 1958 12. Thurusaviya Fund Act, No. 23 of 2000 13. Tea Research Board Act, No. 52 of 1993 14. Coconut Cultivation Board Act, No. 46 of 1971 15. Coconut Development (Special Provisions) Act, No. 45 of 1984 16. Coconut Development Act, No. 46 of 1971 17. Coconut Fibre Act, No. 17 of 1967 18. Coconut Products Ordinance No. 13 of 1935 19. Coconut Research Board Act, No. 37 of 1950 20. Sugarcane Research Institute Act, No. 75 of 1981 21. Business Names Act, No. 7 of 1987 22. Companies Act, No. 7 of 2007 23. Intellectual Property Act, No. 36 of 2003 24. National Enterprise Development Authority Act, No. 17 of 2006 25. Sri Lanka Export Development Act, No. 40 of 1979 26. Trade Marks Act, No. 30 of 1964 27. Textile Quota Board Act, No. 33 of 1996 28. Textile Training & Services Institute Act, No. 03 of 1984 29. Chitty Ordinance 30. Public Contracts Act, No. 3 of 1987 31. Sri Lanka Accreditation Board for Conformity Assessment Act, No. 32 of 2005 32. Sri Lanka Standard Institute Act, No. 6 of 1984 33. Sri Lanka Inventors' Incentives Act, No. 53 of 1979

3.4 Adequacy of GOSL Environmental Clearances

The composite 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.

For potential PPP projects where feasibility studies including the pilot PPP that will be supported through this project will require to adhere to both national environmental regulations as well as the World Bank's environmental safeguard policies (discussed in the next Chapter). The CEA's and other Project Approving Agencies (PAAs) regulated EA procedures have been in place for more than three decades and substantial experience has been made by the CEA and other PAAs in evaluation of EIAs/IEEs. Hence, there will be no

need for the project to provide technical assistance to the CEA and other PAAs to provide support to the project on environmental matters. However, capacity of the NAPPP to guide and monitor the investors on the national requirements and other financial institutions requirements must be built as part of the project.

CHAPTER 4: APPLICABILITY OF WORLD BANK'S ENVIRONMENTAL AND SOCIAL SAFEGUARD POLICIES

The World Bank has several Operational Policies (OPs) and Bank Procedures (BPs) concerning environmental and social issues, which together are referred to as the Bank's Safeguard Policies. If, during the development of a transaction, it is considered that it is possible that a proposed transaction activity could be the subject of one of the safeguard policies, that policy is considered to have been triggered or applicable. The sections below provide some details of those environmental safeguard policies that may be applicable for the transaction and the actions need to be been taken to ensure that the requirements of those policies will be met adequately.

4.1 Environmental Assessment (OP/BP 4.01)

This policy is triggered if a transaction is likely to have potential (adverse) environmental risks and impacts in its area of influence. The policy requires environmental assessment (EA) of transactions proposed for World Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. Safeguard Instruments should consider the natural environment, human health and safety and social aspects in an integrated way. It should also take into account the variations in transaction and country conditions, the findings of country environmental studies, national environmental action plans, the country's overall policy framework and national legislation, the transaction sponsor's capabilities related to the environment and social aspects, and obligations of the country, pertaining to transaction activities, under relevant international environmental treaties and agreements.

When OP 4.01 is triggered, the World Bank classifies proposed transactions into one of four categories, depending on the type, location, sensitivity, and scale of the transaction and the nature and magnitude of its potential environmental impacts.

(a) A proposed transaction is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.

(b) A proposed transaction is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas including wetlands, forests, grasslands and other natural habitats are less adverse than those of Category A transactions. These impacts are site specific; few if any are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A transactions. The scope of an EA for Category B transactions may vary from transaction to transaction, but it is narrower in scope when compared with Category A transactions.

(c) A proposed transaction is classified as Category C if it is likely to have minimal or no adverse environmental impacts. For example, technical assistance transaction on institutional development, computerization, and training fall in Category C.

(d) A proposed transaction is classified as FI when the Bank provides funds to participating national banks, credit institutions and other financial intermediaries (FIs) for on lending at the FIs' risk to final borrowers. In the case of such transaction, the FI

screens each subproject proposed for financing, and classifies it into any one of three categories: A, B or C. FIs must prepare an Environmental and Social Management Framework, following the Bank's consultation and disclosure requirements as in the case of other safeguards documents. The screening process for categorization of subprojects, must be spelled out in the operational manual.

World Bank OP 4.01 is very clear that for all Category A transactions and as appropriate for Category B transactions during the EA process, the transaction sponsor should consult transaction -affected groups and local NGOs about the transaction's environmental aspects and take their views into account. The transaction sponsor should initiate such consultations as early as possible. For Category A transaction, the transaction sponsor should consult these groups at least twice (a) shortly after environmental screening and before the terms of reference for the EA are finalized, and (b) once a draft EA report is prepared. The EA should particularly incorporate such comments to improve the transaction's social acceptability and environmental sustainability. In addition, the transaction sponsor should consult with such groups throughout transaction implementation, as necessary to address EA related issues that affect them.

The overall project is classified as an Environmental Category A. This is based on the current proposed list of sectors and PPP transactions which include new large infrastructure in potential sensitive localities and potential high risk associated facilities. Some of the new and large infrastructure likely to have significant and irreversible negative impacts to the environment and people. This project will only support preparation of Environmental Assessments as part of technical assistance for short-listed transactions.

It has been agreed with the Bank in order to be in compliance with the OP4.01 – Environmental Assessment during the project preparation stage, an EAMF will be prepared that would guide the processes to be followed including site-specific environmental instruments to be prepared for the short-listed PPP transaction. Due diligence measures will include classification of the short-listed PPP transaction according to the environmental categories defined above based on the initial screening/scoping, standalone EAs and Environmental Management Plans (EMPs), Social Impact Mitigation Plans (SIMPs) and/or Environmental and Social Management Plans (ESMPs) for the proposed sites and technologies of the selected PPPs. This EAMF emphasizes the importance of both national environmental guidelines as well as the World Bank Group General and Sectoral Environmental, Health and Safety Guidelines to design transactions.

Compliance with OP 4.01 Annex B Content of an Environmental Assessment Report for a Category A Project. Please refer to Annex 4 for details.

Compliance with OP 4.01 Annex C Environmental Action Plans (or Environmental Management Plans). According to Annex C of the World Bank OP 4.01, an EMP/SIMP/ESMP is an essential element of EA reports for Category A transactions. The EMP/SIMP/ESMP should consists of a set of mitigation, management, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, reduce them to acceptable levels or offset them. The plan should also include the actions needed to implement these measures. In preparation of an EMP/SIMP/ESMP, the EA consultant should:

(a) Identify the set of responses to potentially adverse impacts;

(b) Determine requirements for ensuring that those responses are made effectively and in a timely manner
(c) Describe the means for meeting those requirements.

More specifically, the EMP/SIMP/ESMP should include the following components:

- The EMP/SIMP/ESMP should identify feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient.
- The EMP/SIMP/ESMP should define monitoring objectives and specify the type of monitoring needed, with linkages to the impacts assessed in the EA report and the mitigation measures described in the EMP/SIMP/ESMP.
- To strengthen the transaction sponsor's environmental management capability, EMP/SIMP/ESMPs should mention any technical assistance that may be needed by the borrower.
- For all three aspects (mitigation, monitoring, and capacity development), the EMP/SIMP/ESMPs should provide (a) an implementation schedule for measures that must be carried out as part of the transaction, showing phasing and coordination with overall transaction implementation plans; and (b) the capital and recurrent cost estimates and sources of funds for implementing the EMP/SIMP/ESMP.
- The EMP/SIMP/ESMP must be integrated into the transaction's overall planning, design, and budget.

4.2 Natural Habitats (OP/BP 4.04)

This policy is triggered to ensure due diligence actions are in place as part of the EAs if transactions 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 transactions that, in the its opinion, involve the significant conversion or degradation of critical natural habitats. Therefore, the project will not provide technical assistance to PPP transactions that would convert or degrade critical natural habitats and PP transactions should not conduct any activities within designated or on the buffer zones of protected areas. The PPP transaction interventions will design in mitigating pollution and degradation of such ecosystems as part of the EAs.

Wherever feasible, the transactions should be sited on lands already converted or degraded (excluding any lands that in the Bank's opinion were converted in anticipation of the transaction or proposed to be restored). The Bank does not support transactions involving the significant conversion of natural habitats unless there are no feasible alternatives for the transaction and its siting, and comprehensive analysis demonstrates that overall benefits from the transaction substantially outweigh the environmental costs. If the environmental assessment indicates that a transaction would significantly convert or degrade natural habitats, the transaction 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 transaction 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 transaction includes components that develop the capacity of national and local institutions for effective environmental planning and management. The mitigation measures specified for the transaction may be used to enhance the practical field capacity of national and local institutions.

4.3 Physical Cultural Resource (OP/BP 4.11)

While at this point of time the scope and actual locality/foot print of proposed PPP transactions to be supported under this project is unknown, except general details, given Sri Lanka has vast array of physical cultural resources spread across the country, it is prudent to trigger this policy. 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, paleontological, 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 policy requires the transactions to avoid or mitigate adverse impacts on physical cultural resources. The impacts on physical cultural resources resulting from transaction activities, including mitigating measures, may not contravene either the country's national legislation, or its obligations under relevant international environmental treaties and agreements.

Physical Cultural Resources within Environmental Assessment. The transaction proponent addresses impacts on physical cultural resources in transactions proposed for Bank financing, as an integral part of the EA process. The steps elaborated below follow the EA sequence of: screening; developing TORs; collecting baseline data; impact assessment; and formulating mitigating measures and a management plan.

The following transactions are classified during the environmental screening process as Category A or B, and are subject to the provisions of this policy:

(a) any transaction involving significant excavations, demolition, movement of earth, flooding, or other environmental changes; and
(b) any transaction located in, or in the vicinity of, a physical cultural resources site recognized by the borrower.

Transactions specifically designed to support the management or conservation of physical cultural resources are individually reviewed.

To develop the TORs for the EA, the transaction proponent, in consultation with the Bank, relevant experts, and relevant transaction -affected groups, identifies the likely physical cultural resources issues, if any, to be considered by the EA. The TORs normally specify that physical cultural resources be included in the baseline data collection phase of the EA. The transaction proponent identifies physical cultural resources likely to be affected by the transaction and assesses the transaction's potential impacts on these resources as an integral part of the EA process, in accordance with the Bank's EA requirements. When the transaction is likely to have adverse impacts on physical cultural resources, the transaction proponent identifies appropriate measures for avoiding or mitigating these impacts as part of the EA

process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.

As an integral part of the EA process, the transaction proponent develops a physical cultural resources management plan that includes measures for avoiding or mitigating any adverse impacts on physical cultural resources, provisions for managing chance finds, any necessary measures for strengthening institutional capacity, and a monitoring system to track the progress of these activities. The physical cultural resources management plan is consistent with the country's overall policy framework and national legislation and takes into account institutional capabilities with regard to physical cultural resources. The Bank reviews, and discusses with the transaction proponent, the findings and recommendations related to the physical cultural resources aspects of the EA, and determines whether they provide an adequate basis for processing the transaction for Bank financing.

As part of the public consultations required in the EA process, the consultative process for the physical cultural resources component normally includes relevant transaction -affected groups, concerned government authorities, and relevant nongovernmental organizations in documenting the presence and significance of physical cultural resources, assessing potential impacts, and exploring avoidance and mitigation options.

The findings of the physical cultural resources component of the EA are disclosed as part of, and in the same manner as, the EA report. Exceptions to such disclosure would be considered when the borrower, in consultation with the Bank and persons with relevant expertise, determines that disclosure would compromise or jeopardize the safety or integrity of the physical cultural resources involved or would endanger the source of information about the physical cultural resources. In such cases, sensitive information relating to these particular aspects may be omitted from the EA report.

4.4 Forests (OP/BP 4.36)

Similar to OP 4.11, while the actual foot prints of the PPP transactions are unknown, it is anticipated based on current practices in the country, these transactions may bring about impacts on the health and quality of forests, specifically due to construction material extraction. While, the World Bank-financed transactions explicitly prohibits such activities particularly in protected areas, the public-sector transactions still carry out such activities. Therefore, this policy is triggered. Therefore, as part of the EA process, it will be necessary to identify material extraction sites outside the protected area network of the country.

The Bank does not finance transactions that, in its opinion, would involve significant conversion or degradation of critical forest areas or related critical natural habitats. If a transaction 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 transaction and its siting, and comprehensive analysis demonstrates that overall benefits from the transaction substantially outweigh the environmental costs, the Bank may finance the transaction if it incorporates appropriate mitigation measures. The Bank also does not finance transactions that contravene applicable international environmental agreements. In accordance with OP/BP 4.01, *Environmental Assessment*, the EA for the PPP transactions should address the potential impact of the transaction on forests and/or the rights and welfare of local communities where applicable.

4.5 Involuntary Resettlement (OP/BP 4.12)

Involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. For these reasons, the overall objectives of the Bank's policy on involuntary resettlement are the following:

(a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative transaction designs;

(b) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the transaction to share in transaction benefits. Displaced persons3 should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs; and

(c) Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of transaction implementation, whichever is higher.

This policy covers direct economic and social impacts that both result from Bank-assisted investment transactions, and are caused by

(a) the involuntary taking of land resulting in
  (i) relocation or loss of shelter;
  (ii) lost of assets or access to assets; or
  (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or

(b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

This policy applies to all components of the transaction that result in involuntary resettlement, regardless of the source of financing. It also applies to other activities resulting in involuntary resettlement, that in the judgment of the Bank, are

(a) directly and significantly related to the transaction,

(b) necessary to achieve its objectives as set forth in the transaction documents; and

(c) carried out, or planned to be carried out, contemporaneously with the transaction.

Please refer to Project's Resettlement Policy Framework for further details.

4.6 The World Bank Group's Environmental, Health and Safety Guidelines

The World Bank Groups Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice. The EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.

Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each transaction on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the implementing entities defined as the exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a transaction may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility. Environment, and other transaction factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When national regulations differ from the levels and measures presented in the EHS Guidelines, transactions are expected to include whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific transaction circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

Following links provides the applicable guidelines:

Table 4.1 Web links to applicable EHS guidelines

EHS Guideline	**Web link**
World Bank Groups Environmental, Health, and Safety (EHS) Guidelines	http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES
EHS Guidelines for LNG facilities	http://www.ifc.org/wps/wcm/connect/edb102c5-ca61-4561-8b8e-8124fa2060af/20170406-FINAL+LNG+EHS+Guideline_April+2017.pdf?MOD=AJPERES
EHS Guidelines for construction material extraction	http://www.ifc.org/wps/wcm/connect/d6bb0e80488551afa93cfb6a6515bb18/Final%2B-%2BConstruction%2BMaterials%2BExtraction.pdf?MOD=AJPERES&id=1323162191491
EHS Guidelines for airports	http://www.ifc.org/wps/wcm/connect/9f9d398048855251ab3cfb6a6515bb18/Final%2B-%2BAirports.pdf?MOD=AJPERES&id=1323162248606
EHS Guidelines for healthcare facilities	http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e6f66a6515bb18/Final%2B-%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&id=1323161961169
EHS Guidelines for ports, harbours and terminals	http://www.ifc.org/wps/wcm/connect/d2f2cf88-ce22-4a48-86fc-45ee3b8e9e45/20170201-FINAL_EHS+Guidelines+for+Ports+Harbors+and+Terminals.pdf?MOD=AJPERES
EHS	http://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B-

Guidelines for water and sanitation	%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES
EHS Guidelines for waste management facilities	http://www.ifc.org/wps/wcm/connect/1cd72a00488557cfbdf4ff6a6515bb18/Final%2B-%2BWaste%2BManagement%2BFacilities.pdf?MOD=AJPERES&id=1323162538174
EHS Guidelines for tourism and hospitality development	http://www.ifc.org/wps/wcm/connect/e9f48800488559c0840cd66a6515bb18/Final%2B-%2BTourism%2Band%2BHospitality%2BDevelopment.pdf?MOD=AJPERES&id=1323162543953
EHS Guidelines for toll roads	http://www.ifc.org/wps/wcm/connect/7e4c7f80488554d5b45cf66a6515bb18/Final%2B-%2BToll%2BRoads.pdf?MOD=AJPERES&id=1323162564158
EHS Guidelines for railways	http://www.ifc.org/wps/wcm/connect/9180c18048855a78862cd66a6515bb18/Final%2B-%2BRailways.pdf?MOD=AJPERES&id=1323152551661
EHS Guidelines for geothermal power generation	http://www.ifc.org/wps/wcm/connect/329e1c80488557dabe1cfe6a6515bb18/Final%2B-%2BGeothermal%2BPower%2BGeneration.pdf?MOD=AJPERES&id=1323161975166

The project will require to follow the World Bank guidance note on Managing the Risks of Adverse Impacts on Communities from Temporary Project-Induced Labour Influx. The following link provides the relevant guidelines:

http://pubdocs.worldbank.org/en/497851495202591233/Managing-Risk-of-Adverse-impact-from-project-labor-influx.pdf

4.7 Consultation and Public Disclosure

The EAMF has been consulted with the initial stakeholders identified by the NAPPP on February 20, 2018 and comments and suggestions received have been incorporated in finalizing the EAMF. The NAPPP and the Bank has disclosed the EAMF report dated April 24, 2018 in the MOF website and in the Bank's external website. The NAPPP has also placed newspaper advertisement on the disclosure of the EAMF in all three local languages. All subsequent environmental instruments that will be prepared through the project support will be also put into consultations with transaction affected persons and stakeholders, cleared by the World Bank and disclosed to public.

For all Category A and B transactions proposed under Sub-component B2, during the EA process, the borrower consults transaction -affected groups and local NGOs about the transaction's environmental aspects and takes their views into account. The borrower initiates such consultations as early as possible. For Category A transactions, the borrower consults these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared.

At this stage of the project, the stakeholders and people who may get impacted by the proposed PPP transactions have not yet been fully identified. However, once the final identification of specific-PPP transactions to be supported under the project are finalized, the

scope, impact areas and related stakeholders are known, the implementing agencies will lead and NAPPP will facilitate consultations as part of environmental and social assessments and report to the Bank with the details of the attendees and minutes of such meetings, as well as including in the assessments.

For meaningful consultations between the borrower and transaction-affected groups and local NGOs on all Category A and B transactions proposed for World Bank financing, the borrower provides relevant material in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted.

For a Category A PPP transaction, the borrower provides for the initial consultation, a summary of the proposed transaction's objectives, description, and potential impacts; for consultation after the draft EA report is prepared, the borrower provides a summary of the EA's conclusions. In addition, for a Category A transaction, the borrower makes the draft EA report available at a public place accessible to transaction-affected groups and local NGOs in a form and language that are understandable and accessible to the groups being consulted. At least two consultations need to be conducted during scoping stage and the draft report stage of the EA process.

For a Category B PPP transaction, at least one consultation during the draft report stage has to be conducted. The disclosure process is the same as for Category A defined above.

The EAs of all Category A and B transactions will be also made available in World Bank's external website. If the borrower objects to the Bank's releasing an EA report through the World Bank external website, Bank staff (a) do not continue processing the IDA financed project, or (b) for an IBRD project, submit the issue of further processing to the Executive Directors.

CHAPTER 5: SAFEGUARDS DUE DILIGENCE PROCESS

5.1 Environmental and Social Screening of PPP transactions to be supported

Environmental and social screening is counted to be a useful tool in identifying safeguard issues in large investment programs consisting of many transactions. The main objective of environmental and social screening of transactions will be to:

c) determine the anticipated environmental/social impacts, risks and opportunities of the transaction; and
d) determine if the anticipated impacts and public concern warrant further environmental/social analysis, and if so to recommend the appropriate type and extent of assessments needed as given below:
    - Category A - Transactions with substantial to high environmental risks and sensitive, diverse unprecedented impacts. Will require Environmental Impact Assessments and preparation of Environmental Management Plans and Social Impact Mitigation Plans (SIMPs).
    - Category B – Transactions with moderate to substantial risks and impacts that can be mitigated. Will require Environmental Impact Assessments if risks are substantial or Initial Environmental Examination if risks are moderate and preparation of Environmental Management Plans and Social Impact Mitigation Plans (SIMPs).
    - Category C – Transactions with low risks and negligible impacts. Will not require further assessments.

At the national level, screening is the process by which proposed developments are reviewed to determine the level of environmental and social assessment to which they should be subjected, which could range from none at all up to a full Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA). At the transaction level, screening is the process of reviewing a proposed activity against a checklist of factors to determine whether it is likely to have adverse environmental and social effects, and if so, what mitigation measures should be applied.

Screening should go hand in hand with transaction concept development. This way environmental opportunities and risks can be appropriately and easily integrated into subsequent design stages, rather than being brought in at the last minute. The environmental screening report and social screening report should be prepared by an environmental expert/s and social expert/s respectively with field visits and available data and information (implementation arrangements are given in the subsequent chapter). Once the report is ready it will be made available to the transaction-implementing agency to take necessary actions particularly in relation to the recommendation given in the report.

5.1.1 Screening Method

Preparation of the screening reports will be conducted in four distinct stages, namely:

(i). field visits, data collection and stakeholder consultation;
(ii). data analysis and interpretation;
(iii). impact identification; and

(iv). filling the screening including recommendations for next steps. The methodologies for each of these steps are explained briefly below.

The proposed environmental screening report format is given in Annex 2 and the social screening report format is given in the RPF.

Data collection and stakeholder consultations. Data will be primarily collected through field visits, discussion with stakeholder agencies and known sources of literature. In addition, supportive tools such as GIS based mapping using Global Positioning System coordinates covering the transaction sites, wherever possible is encouraged.
Literature survey will broadly cover the following aspects and attributes necessary for environmental screening**:**

- Transaction details/ reports/ maps/ documents including design details available with the implementing agencies;
- Literature on flora/ fauna/ biodiversity/land use/soil/geology/ hydrology/ climate /socio economic profiles and environmental planning collected from Government agencies;
- Literature review on ambient environmental quality such as air, water, noise and soil; and
- Hydrological/ rainfall/ drainage datasets.

Field Visits. Each transaction site will be visited by the expert/s filling the screening form together with representatives from the design team to assess the existing environment (physical, biological and socio-economic environment) and gather information with regard to the proposed sites and scale of the proposed transactions and any prevalent issues. During these visits rapid reconnaissance surveys will be conducted in order to record the faunal, floral diversity, where necessary, to verify and support information gathered through the literature survey.

Focus Group Discussions/ Meetings. Focus group discussions will be carried out with other stakeholder agencies, local authorities and community to discuss pertinent issues. In addition, the community/visitors will be consulted to record their views and opinions about the proposed site-specific investment.

Data Analysis and Interpretation. Data collected from field visits and stakeholder discussions will be analysed by the expert and discussed with the technical team of the transaction proponent for feedback.

Impact identification. The safeguards expert, through discussion with the technical team, will carry this out.

Filling screening reports. The screening report will be filled with details on the proposed transaction intervention, physical/ecological baseline conditions of the site, assessment of potential impacts, feedback from community/public/visitor consultations and recommendations for the type of environmental assessment required. If the findings confirm that anticipated impacts are not significant enough for a stand-alone EA and that an EMP would suffice to mitigate the likely impacts, the screening exercise would be completed with the preparation of a site-specific EMP and SIMP or a combined ESMP.

If the likely impacts are significant and would require greater environmental analysis, the screening report would recommend the appropriate assessment type for the implementation agency to carry out before designs are finalised. A description of the commonly used environmental management tools are given below with guidance on preparation based on the nature of solid waste management transaction that the project will finance.

5.2 Environmental and Social Safeguard Assessments, Management and Monitoring Instruments

5.2.1 Environmental Impact Assessment (EIA)/Initial Environmental Examinations (IEE)

EIA and IEEs are effective tools for evaluating the environmental risks and opportunities of project proposals and improving the quality of outcomes. Ideally the EIA/IEE should be carried out at the end of the preliminary design phase so that the impacts of each planned activity can be evaluated and alternatives can be worked out for activities that have major impacts. The outcomes of the EIA/IEE should then be used to finalise the transaction design, which should ensure that the impacts of the given transaction are minimal. The importance of this management tool as a means of foreseeing potential environmental impacts caused by proposed transactions and its use in making transactions more suitable to the environment has been highly effective. Since its introduction in 1969 in the US, many countries and international organisations have accepted the EIA as an important planning and environmental management tool. Sample Terms of References for the sectors identified as potential PPP transactions are included in Annex 4.

If a specific transaction requires environmental assessment the first step will be to provide CEA the preliminary information on the proposed transaction, in order for the process to be initiated (See Annex 3 for the description of major steps of the environmental assessment process with responsibilities and time frames). The best time for a transaction proponent to submit the preliminary information on the proposed transaction is as soon as the transaction concept is finalized and the location of the transaction is decided. If the transaction warrants an Environmental Impact Assessment a CEA clearance will be required (Annex 5).

Once the environmental screening is conducted for the PPP transactions that this project provides feasibility studies, the following steps need to be taken.

- For transactions that require EIA\ IEE as the Terms of Reference issued by the CEA will be reviewed by the World Bank Task Team and World Bank safeguards requirements as per the EAMF will be included in the same Terms of Reference (TOR) to align the processes and ensure there is no replication of instruments.

- For transactions that do not require EIA\IEE, but warrant Environmental Assessment as per World Bank Policy OP 4.01, the NAPPP safeguards team will produce a TOR which will be reviewed and cleared by the World Bank prior to commencement of the study.

For transactions that require land acquisition, the accompanying RPF includes detailed guidance on the screening, social assessments and preparation of site-specific social safeguards instruments.

Detailed processes related to social assessment are covered under RFP.

5.2.2 Environmental Management Plans (EMPs)/Social Impact Mitigation Plans (SIMPs)/Environmental and Social Management Plans (ESMPs)

Certain activities will have explicit impacts on the natural environment and/or have non-land related social impact, and thus require a specific plan to institute and monitor mitigation measures and take desired actions as timely as possible. The Environmental Management Plan (EMP), Social Impact Mitigation Plan (SIMP), and if relevant, a combined Environmental and Social Management Plan (ESMP) must be kept as simple as possible, clearly describing adverse impacts and mitigation actions that are easy to implement. The scale of the transaction will determine the complexity of the EMP/SIMP/ESMP. A small-scale transaction's EMP/SIMP/ESMP can be elaborated in a few paragraphs or in tabular format, keeping it as simple as possible with concrete mitigation actions, timelines and responsible persons.

The basic elements of an EMP/SIMP/ESMP are;

a. A description of all possible significant adverse impacts that are likely to arise due to the transaction that the EMP/SIMP/ESMP is intending to deal with;
b. A description of planned mitigation measures, and how and when they will be implemented;
c. A program for monitoring with measurable indicators that will allow to determine the effectiveness of the mitigation actions;
d. A description of who will be responsible for implementing the EMP/SIMP/ESMP; and
e. A cost estimate and source of funds.

(Refer Annex 6 for guidelines for developing EMPs and Annex 15 for a sample SIMP)

It is essential to involve local communities during the development of the EMP/SIMP/ESMP since they are likely to be the most affected parties due to the proposed development. Further, most of the local knowledge is important in identifying, designing and planning the implementation. In addition, the success of the implementation of the EMP/SIMP/ESMP will depend on community support and action.

The PAA will request the transaction proponent to prepare an EMP/SIMP/ESMP, to address any potential environmental and social issues as well as incorporate the PAA/CEA's approval conditions. Ideally, all EIAs and IEEs that identifies adverse environmental and social impacts should prepare an EMP/SIMP/ESMP as part of the report.

In World Bank funded transactions; a standalone EMP/SIMP/ESMP is only considered appropriate in situations where a detailed environmental analysis is not required.

As per the nature of the physical interventions identified, it will be mandatory that all proposals/ physical interventions implemented will require an EMP/SIMP/ESMP to mitigate transaction specific impacts identified during the screening exercise. EMP/SIMP/ESMP are to be prepared at the stage of transaction design and included in bidding documents, to be costed for accordingly, and will be part and parcel of contract documents.

In addition, EMP/SIMP/ESMP require having specific impacts identified with regard to operational impacts that may occur during the operation stage of the investment.

A set of generic EMP/SIMP/ESMP and guidelines to facilitate sound EMP/SIMP/ESMP preparation during the transaction implementation stage are presented in Annex 7 through Annex 15.

- Annex 7: Generic Environmental Management Plan (EMP) for Construction of Ancillary Facilities as New Infrastructure and/or Rehabilitation of Existing Infrastructure.
- Annex 8: Guidance Note on Selecting Mitigation Measures to be Included in the Environmental Management Plan for Construction Projects in Sri Lanka
- Annex 9: Guidelines for the Rehabilitation of Burrow Pits
- Annex 10: Environmental Guidelines for Decommissioning and Demolition of Existing Buildings
- Annex 11: Guidelines for Health and Safety of Workers, Communities and Visitors
- Annex 12: Chance find procedure for Physical Cultural Resources
- Annex 13: Special Monitoring Checklist for Ensuring Safe Conditions for Workers and Public
- Annex 14: Terms of Reference for Projects involving major dredging
- Annex 15: Generic Social Impact Mitigation Plan (SIMP)

5.2.3 Precautionary Procedure for Management of Chance Found Physical Cultural Resources

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the Contractor shall:

1. stop the construction activities in the area of the chance find;
2. delineate the discovered site or area;
3. secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible authorities take over; and
4. notify the Supervising Officer who in turn will notify the responsible authorities immediately (within 24 hours or less).

Responsible authorities are in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by archaeologists. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values used by the Government.

Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage.

Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and construction works could resume only after permission is granted from the responsible local authorities concerning safeguard of the physical cultural resource.

The Supervising Officer must have capacity to manage the processes in the plan. At a minimum, expert opinion should be sought from government agencies or specialist consultants for the following:

Further elaboration of required steps for the management of any chance for physical cultural resources or property or artefacts of cultural/archaeological significance are presented in Annex 11.

5.2.4 Environment and Social Audits

Most of the development projects in Sri Lanka follow EAMFs and develop EMP/SIMP/ESMP's that need to be implemented ardently at the end based on screening and EAs which will render the entire process either a success or futile. Therefore, monitoring of the transaction during the construction and implementation phase is a must to ensure environmental compliance of a transaction. This could be achieved through regular environmental audits that will look at the experience of incorporating environmental safeguards and the level of impact it has had on ensuring the sound environmental management, specifically.

The purpose of the environmental audit is to

- collect, analyse and interpret monitoring results to detect changes related to implementation and operation of specific activities;
- verify the monitoring parameters are in compliance with national set standards;
- compare the predicted impacts with actual impacts and evaluate the accuracy of predictions;
- evaluate the effectiveness of implementation of the EMP/SIMP/ESMP;
- identify shortcomings in the safeguards management plan, if any, and incorporate it into the EMP/SIMP/ESMP if deemed necessary; and
- identify and report if there is non-compliance with the EMP/SIMP/ESMP.

The auditors must first develop a structured questionnaire based on the details available on associated facilities/linked activities through existing EIAs and EMP/SIMP/ESMPs for the purpose of conducting the audit. They will also need to identify the monitoring parameters to be tested that have relevance for environmental compliance of the associated facilities/linked activities and the proposed project interventions. Then during the site visit data can be collected using this questionnaire through interview surveys of officers responsible for implementation of the EMP/SIMP/ESMPs and site records, logs etc. and undertaking primary data collection of the monitoring parameters.

Expected outcomes of the Environment and Social Audits are:

- ensure that EMP/SIMP/ESMPs are implemented properly;
- ensure that the mitigation measures are effectively minimizing the identified impacts as well as identify new impacts that may have been excluded in the EMP/SIMP/ESMPs that require mitigation. Then make necessary adaptive changes to the EMP/SIMP/ESMPs to ensure that the all significant impacts are effectively mitigated; and
- identify noncompliance with EMP/SIMP/ESMPs if any and provide recommendations as part of the EA process of the proposed PPP transaction as to how to deal with such non-compliance of the associated facilities/linked activities to further strengthen the success of transaction activities.

The audit will capture the compliance status of a detailed TOR for the Environmental and Social Audit as presented in Annex 14.

5.3 Information Disclosure

The World Bank policies require that environmental reports for transactions are made available to transaction affected groups, local NGOs, and the public at large. Public disclosure of EA documents is also a requirement of the Sri Lanka's EA procedures. However, there is no limitation as to the extent and scope of disclosure. MoF in collaboration with the line agencies and NAPPP will make available copies of the EAMF in selected public places as required by the national law and the World Bank for information and comments. Public notice in the media in all three languages should be served for that purpose (Annex 19).

The notification should be done through a newspaper or radio announcement or both. The notification should provide:

- A brief description of the transaction;
- A list of venues where the EAMF report is on display and available for viewing;
- Duration of the display period; and
- Contact information for comments.

The summary of the documents will be further translated into local languages to afford easy dissemination. The NAPPP will assist to select display venues upon consultation with MoF.

All safeguards documentation will also be made available in the World Bank external website.

5.4 Grievance Redress Mechanism

Grievance mechanisms provide a formal avenue for affected groups or stakeholders to engage with the project implementers or owners on issues of concern or unaddressed impacts. As this project focuses on preparation of environmental assessments, the grievances in this context are any complaints or suggestions about the way a transaction is being designed. They may take the form of specific complaints or concerns about proposed transaction activities, or perceived incidents or impacts. Identifying and responding to grievances supports the development of positive relationships between transactions and affected groups/communities, and other stakeholders.

The World Bank/IFC standards outline requirements for grievance mechanisms for some transactions. Grievance mechanisms should receive and facilitate resolution of the affected institutional or communities' concerns and grievances. The World Bank/IFC states the concerns should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities, at no cost and without retribution. Mechanisms should be appropriate to the scale of impacts and risks presented by a transaction.

Grievances can be an indication of growing stakeholder concerns (real and perceived) and can escalate if not identified and resolved. The management of grievances is therefore a vital

component of stakeholder management and an important aspect of risk management for a transaction. Transactions may have a range of potential adverse impacts to people and the environment in general, identifying grievances and ensuring timely resolution is therefore very necessary.

Grievance Redress Mechanisms are institutions, instruments, methods and processes by which a resolution to a grievance is sought and provided. Establishment of grievance mechanism will be one of the key requirements in every PPP transaction. Grievance mechanisms provide a formal avenue for affected groups or stakeholders to engage with the transaction implementers or owners on issues of concern or unaddressed impacts. In order to be effective, it is important that these mechanisms are able to address the concerns promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities, at no cost and without retribution. Under this project, grievance redress committees will be established at the project level for addressing concerns/complaints that are escalated during the preparation of environmental and social impacts assessments. Members of the Project-level Grievance Redress Mechanism will comprise among others, representative from the concerned line Ministry/agency at the level of Additional Secretary; Safeguards Specialist of the concerned line Ministry/Agency; representative from the investing partner if identified, representative of civil society; and a representative of affected person. A representative from the NAPPP may also be engaged as a committee member and should also provide Secretariat support for documentation.

Following is the proposed grievance redressal process proposed.

Table 5.1 Grievance Redress Process

Process	Description	Time frame	Other information
Identification of grievance	Face to face; phone; letter, e-mail; recorded during public/community interaction; others	1 Day	Email address; hotline number
Grievance assessed and logged	Significance assessed and grievance recorded or logged (i.e. in a log book)	4-7 Days	Significance criteria: Level 1 –one off event; Level 2 – complaint is widespread or repeated; Level 3- any complaint (one off or repeated) that indicates breach of law or policy or this EAMF/RPF provisions
Grievance is acknowledged	Acknowledgement of grievance through appropriate medium	7-14 Days	
Development of response	Grievance assigned to appropriate party for resolution Response development with input from management/ relevant stakeholders	4-7 Days 7-14 Days	
Response signed off	Redress action approved at appropriate levels	4-7 Days	Project staff at MoF to sign off
Implementation and communication of response	Redress action implemented and update of progress on resolution communicated to complainant	10-14 Days	
Complaints Response	Redress action recorded in grievance log book	4-7 Days	

	Confirm with complainant that grievance can be closed or determine what follow up is necessary		
Close grievance	Record final sign off of grievance If grievance cannot be closed, return to step 2 or refer to sector minister or recommend third-party arbitration or resort to court of law.	4-7 Days	Final sign off on by Director, NAPPP, MoF

5.5 Consultation Plan

Through a detailed stakeholder analysis, key institutions that are likely to be affected or through its activities cause potential environmental and social impacts should be identified and preliminary consultations conducted. A stakeholder workshop can be held where key stakeholders can be purposively invited to detail their concerns, perceptions, reactions and experiences in relation to large-scale infrastructure transactions and how these experiences may be of relevance to the overall project. An issues and response report should be produced as part of the product of the stakeholder consultation process.

The relevant PPP partners including NAPPP must undertake several consultations during transaction preparation, specifically a part of the environmental assessment process on the overall planned interventions to be financed by the project. Instrument wise consultations need to be taken around each transaction site. These should be duly documented as part of the environmental assessment. Consultations programs should first provide information in the form of briefs and relevant documents to the group being consulted at minimum at least 2 weeks prior to the date of consultation. The feedback and concerns raised on environmental safeguards issues, during consultations are to be thoroughly evaluated and any issues and concerns, once verified and where practically possible in the context of the transaction, should be included as part of the environmental assessment including the proposed mitigation measures.

5.5.1 Project level consultation strategy

An effective communication strategy will reach out to various stakeholders to help address some of the concerns or misconceptions that prevail over PPPs. The community or stakeholder engagement strategy will be developed by stakeholder mapping and needs assessment and would focus on full transparency through periodic release of information on the status of projects (Table 5.2). This would allow the NAPPP to deal with issues proactively and broad base the PPP programme for increased sustainability.

Stakeholder mapping will be undertaken taking the relative power dimension of various actors and players into account. Some stakeholders may oppose the project interventions while still others would support the project. Some others will be interested in the project while others may be less enthusiastic. Approach to stakeholder identification and analysis is summarised below.

Table 5.2 Identification of stakeholders

Broad Category	Sub Category	Types of Individuals

Those who affect the project	Those involved in project delivery	NAPPP, line Ministry/Agency for the PPP projects, Developer/designer, Client, Owner, Investor, Professional consultants, National political authorities, Government Ministries, Departments at Central, District and Divisional levels, National Statutory Bodies
	Those who determine the context	Provincial Political Authorities, Provincial councils, departments and administrative authorities, Provincial level statutory bodies, Local government authorities
Those who are affected by the project	Directly affected, potentially affected directly or indirectly depending on the context	Users of Infrastructure / Facilities/ Spaces, Communities in the project area and surroundings, Community groups and associations, including Service Groups, General public, specific socio-demographic groups (e.g., ethnic minorities, women, youth, elderly, children, etc)
Those Who may be Interested	Environmental and Social Campaigning organizations; National non-government organisations, international non-government organisations, business community organisations/federations, academics and researchers, media, potential clients and users of future projects	

A carefully planned consultation and participation process needs to be formed with the stakeholders thereafter, agreeing on an information dissemination strategy. Furthermore, a platform will be created in order to engage the public and various interest groups to inform the approach to be adopted for the PPPs and address sensitive issues.

5.5.2 Consultation related to the individual PPPs

Under the World Bank Safeguard Policies: Consultation is mandatory for transactions screened as Environmental Category A, during the preparation of the Environmental Assessment (EIA) including when drawing up plans for mitigation of impacts. At least two consultations need to be carried out with transaction stakeholders during this stage in addition to or included within the consultation process to be used according to the Resettlement Policy Framework of the project. Any stakeholder consultation will adopt the principles of transparency, participation, equity, consultation, social learning, local knowledge incorporation, integration and collaboration. For Environmental Category B transactions with substantial risks and require Environmental Assessments (EIA) will also undertake a minimum of two consultations. Lower risk Category B transactions that require (a) Environmental Assessments (IEE) should undertake at least one stakeholder consultation during the preparation stage; and (b) only EMP/SIMP/ESMPs while recommended to hold at least one consultation, it is not mandatory. Environmental Category C transactions do not require consultations, although stakeholder engagement is recommended.

In order to achieve the goals of ensuring free, prior and informed consultation, information relating to the project will be made accessible and understandable and where necessary, information will be translated into the preferred languages of the affected population. Separate and targeted consultations will be held with women and vulnerable groups.

A sound information, education and communication (IEC) campaign will be adopted to disseminate information to the public through such communication tools as public and social media, public notice boards, newspapers, leaflets, flyers and door to door visits. The IEC campaign and the materials developed will focus on disseminating the following:

- Brief account of the transaction;
- Potential impacts which can be expected during the implementation of the PPP transaction;
- Implementation schedule with name and designation of key officers in charge; and

- Persons to be contacted for further information with contact details.

These activities relating to consultation and participation aim at obtaining stakeholder cooperation and community engagement where both primary and secondary stakeholders have opportunities to meaningfully contribute to the development process.

Under the Government environmental regulations only those transactions under the Prescribed List according to the National Environmental Act/North Western Provincial Environmental Statute/Flora and Fauna Protection Ordinance and all transactions in the coastal zone that requires EIAs need to undertake consultations. However, if World Bank is involved in financing feasibility studies PPP transactions, the World Bank requirements will need to be adhered to during consultations.

5.6 Safeguards Training

The Environmental Specialist of NAPPP will be trained by the Environmental Specialist of the World Bank on the EAMF implementation, safeguards and procedural requirements of the World Bank. The Environmental Specialist of NAPPP will train the environmental focal points of the implementing agencies as part of overall project's capacity building component.

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CHAPTER 6: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

PPP transactions are likely to result in both social and environmental impacts. These impacts are defined as:

Positive Impact*:* A change which improves the quality of the environment (for example by increasing species diversity; or improving the reproductive capacity of an ecosystem; or removing nuisances; or improving amenities).

Neutral Impact: A change which does not affect the quality of the environment.

Negative Impact: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance). The potential adverse impacts of the project fall under two broad categories of bio-physical (natural) and socio-economic environments.

6.1 Positive Impacts

PPP transactions are aimed at targeting PPP infrastructure across several sectors of the Sri Lankan economy and include among other transactions in power, energy, transport (highways, ports, airports, railways, transport systems), telecommunications, water and waste management, housing and agriculture. The expected positive impacts include among others;

- ***Improved legal, institutional and technical PPP growth environment.*** The primary objective of PPPs is to improve the legislative, institutional, financial, fiduciary and technical framework to generate a pipeline of bankable PPP transactions. This is a definite positive impact that will result in improved legal, institutional, financial, fiduciary and technical framework supportive of pipeline bankable PPP transactions.
- ***Increased Private Sector Investment.*** By strengthening this PPP framework, PPP transactions will put in place the necessary foundation for Sri Lanka to realize the benefits of PPPs, including increased private investments in infrastructure. This framework will allow increasing the availability and quality of infrastructure in different sectors to boost enterprise growth and productivity and improve the wellbeing of Sri Lankans.
- ***Employment and Improved Service Delivery.*** Increased employment opportunities, improved service delivery to enterprises and the population across the stated sectors in general remains one of the positive benefits that will arise from the PPP transactions.
- ***Government Fiscal Efficiency and Transparency.*** Improved fiscal impact on Government from better transaction preparation, better risk allocation, increased transparency, wider quality control, and greater efficiency are other positive impacts expected as a result of implementing PPP transactions.
- ***Modernisation.*** The private sector is often ahead in deploying modern day technology and business tools for improved efficiency. Through PPP therefore, the public can benefit from more modern technology in infrastructure and associated services.

- ***Reducing risk for the public sector.*** PPP can help the public sector reduce financial risk by passing the burden of economic performance of infrastructure transactions to the private sector
- ***Providing alternative funding/freeing government funds***. PPP arrangements attract investors and financial institutions and this helps to mobilize alternative funding for transactions that may have been financed by scarce government resources
- ***Provide funding to maintain infrastructure overtime.*** PPPs run as revenue generating enterprises, often with loan repayment obligations, there is an underlying driver to maintain the income generating facilities. Indeed, lack of maintenance has been one major reason for Sri Lanka's poor state of infrastructure.
- ***Improved economic growth.*** Poor infrastructure has been identified as one of the primary causes of poor economic and employment growth in Sri Lanka. If the PPPs succeed, the program will translate to overall measurable economic growth for the country.
- ***Expected Transaction Results/Output(s).*** PPPs will result in: (a) priority "first moving" pipeline of well-designed and bankable transactions ready for market; (b) an improved regime for management of fiscal risks from PPPs and other sources; and (e) an improved legal and regulatory environment for PPPs, including the publication of a PPP policy and the promulgation of laws and regulations consistent with global good practice. An intermediate output will be: a fully functional and strengthened NAPPP with the capacity to advise on the feasibility, bankability and risks proposed.

Environmental benefits associated with the PPP transactions include:

- Enhanced environmental capacity for the PPP implementing institutions
- Availability of resources for environmental management
- Improved aesthetics nationally, due to more environmentally friendly infrastructure
- Public safety improvements from better management of resources
- More efficient use of national environmental resources

6.2 Potential Adverse Impacts

The actual impact significance rating depends on a lot of factors, including:

- The magnitude of the impact;
- The sensitivity and value of the resource or receptor affected;
- Compliance with relevant laws, regulations and standards;
- Views and concerns of stakeholders;
- Overall worker/public comfort; and
- Likelihood of occurrence.

Scale and significance of the risks associated with the potential transactions depends on specific transaction design.

6.3 Environmental and social negative impacts

Highlighted below are the potential adverse impacts that could occur when the PPPs are implemented focusing mainly on the generic impacts related to infrastructure transactions. Initial assessment of high risks associated with the types of transactions proposed is provided in Table 6.1

6.3.1 Incessant Traffic including accidents

Traffic congestion from construction and operation phases of PPPs and which could potentially cause disruption, health and safety impacts, as well as economic impacts. The use of heavy moving construction vehicles and machineries in transaction sites is generally known to cause traffic reducing movement and flow of vehicles. It is also further envisaged that with the improvement of the transport sector (i.e. construction, expansion or of new roads, highways and bridges) the traffic volumes and speeds will increase, and composition will change. This is likely to cause increased frequency and severity of accidents.

6.3.2 Diseases Spread-Public Health

There is a potential risk that the construction process for most of the PPPs could increase the risk of communicable diseases in the transaction area, especially sexually transmitted diseases due to influx of migrant workers; solid waste and effluent discharge from construction camps; risk of increase in dengue due to stagnant water associated with construction works/borrow pits etc.

Further the specific increase in water borne diseases including spread of dengue among others will specifically be a potential adverse impact in transactions under PPPs especially in water sector (targeting bulk water supply schemes, dams or irrigation schemes).

Spread of waterborne diseases and spread of dengue may proliferate from stagnation of the watercourse. This may be quite rampant in irrigation systems. Changes in the ecosystem will be responsible for the increase in diseases.

6.3.3 Noise and Vibration Impacts

Construction activities could result in significant noise impacts so as to impact on general wellbeing, health and functioning. Large scale infrastructure developments involve the use of heavy equipment (graders, drilling equipment, trucks, blasting equipment, tractors, and excavators) for among others rock blasting, excavation, asphalt mixing plant operations and vehicular movement that emit incessant noise usually harmful to the environment. Introduction of new sources of noise is an issue in areas where ambient noise levels have been low.

During the operation phase of certain transactions within specific sectors (e.g. power plants) noise and vibration impacts may be experienced and can impair the hearing of the local communities and workers.

6.3.4 Health and Safety of Construction Workers

Occupation health and safety of the workers during the construction phase (and in certain cases operation phase) is likely to be a concern due to the accidents that normally occur in construction sites that could cause loss of life, limbs among others.

6.3.5 Decreased Air Quality

Airborne dust will be caused by excavation, vehicle movement hence engine combustion and materials handling, particularly downwind from the construction sites during the construction phase of the identified transaction activities. Uncovered stockpiles and asphalt mixing plant operations are another source of dust. Air pollution will be further caused by emissions from vehicles and construction machinery. There will be decreased air quality due to dust, suspended particles, hydrocarbon vapours, oxides of nitrogen and sulphur (NOx and SOx) and Volatile Organic Compounds among other emissions.

At the operation phases of certain transactions (e.g. thermal power plants, coal fired plants) air quality degradation is a real problem and issue that portends health problems for affected persons especially the workers and even the community who face the risk of chronic respiratory infections.

Increase in emissions resulting from an increase in road and railway use due to the improved quality of the route during operations also compromises air quality.

6.3.6 Solid and Effluent Waste Hazards and Pollution

Solid waste issue is a potential adverse impact that will be as a result of abandonment of litter/construction materials on site, use of plastic container/bags by road users and the construction crew and use of polythene sheet for curing by the contractor. Construction camps may be a further source of both solid and liquid wastes.

Waste generation is also expected to be a problematic phenomenon within the health sector where medical wastes will remain a challenge when healthcare facilities constructed is in operation. Other sectors include power (oil and lubricants), housing (domestic), ICT (electronic waste). Effluent waste issue will arise from wastewater during storm water runoff, sanitary systems, process water in power generation, oil and gas facilities, and vessels arriving at ports. Bearing in mind that Sri Lanka lacks a sanitary landfill, possesses inadequate capacity to manage healthcare waste and other hazardous wastes and even to an extent general domestic waste this remains a critical concern for the implementation of the PPP transactions.

6.3.7 Chemical Wastes

Some infrastructure transactions require the use of chemicals and or hazardous fluids, sometimes routinely. Examples include herbicides to maintain railway right of ways, biocides and other ingredients for hydro testing and treating of pipeline and flow lines, poly chlorinated biphenyls in cooling fluids used in power transformers. Others are chemical additives used drilling during geotechnical investigations. Many of these chemicals are persistent pollutants, which pose long-term health hazards for exposed persons and if ingested either directly inadvertently or through food chain bioaccumulation.

6.3.8 Impacts of labor-influx

Infrastructure projects often involve construction of civil works for which the required labour force and associated goods and services cannot be fully supplied locally for several reasons, among them worker unavailability and lack of technical skills and capacity. The labour force (total or partial) needs 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.

On the one hand, such movements of labour 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 increased risks of social conflict, illicit behaviour, burden on and competition for public service provision, such as water, electricity, medical services, transport, education, and social services, risk of communicable diseases and burden on local health services, including sexually transmitted diseases, gender-based violence, particularly in the form of inappropriate behaviour, etc.

6.3.9 Physical displacement on identified transaction sites

Depending on the PPP nature of the PPP selected for feasibility studies, the requirements for land acquisition will vary. The construction of the transactions in almost all the sectors will involve a relatively high degree of land take bearing in mind that most of the transactions are linear in nature thus requiring adequate land and space. For instance, the construction of irrigation schemes, dams, oil and gas pipelines, houses, sanitary landfills, electricity transmission lines among others is only possible through acquisition of land. The existing land use of the transaction area will also be affected by the construction of access roads, construction camps and opening up of material sites and quarry sites among others. These will scar the land, cause vegetation loss leading to soil erosion. The need for additional land taking, if any, and the magnitude of the risks, can be established only after the engineering designs for the various PPP feasibility studies become available. To the extent possible, land acquisition requirements and involuntary resettlement will be avoided in the siting of new facilities but when that is not possible, the accompanying Resettlement Policy Framework (RPF) includes guidance on measures to be adopted to address these impacts.

6.3.10 Loss of assets and/or access to assets, income sources or means of livelihood

The scope and extent of land acquisition under the PPP projects selected for feasibility studies, whether permanent or temporary, will largely determine the impacts on assets or access to assets (e.g., compound walls, gates, office, garage, stores, etc). Further, there may also implicate temporary or permanent impacts on people's income sources or means of livelihood, especially through different forms of land-taking. Measures for addressing these impacts are included in the accompanying RPF prepared under the Project.

6.3.11 Access Creation

Access creation is one of the major causes of adverse environmental impacts of infrastructure transactions. In areas poorly served by roads, access creation is usually required to

rehabilitate, extend or install new infrastructure facilities. Access creation may involve, land clearing, trenching, dredging and canalization. Depending on the ecological zone and type of activity, access creation may cause soil loosening and exacerbation of wind or soil erosion, deforestation, wildlife displacement, alteration of hydrologic processes, salt water intrusion, shoreline erosion, contamination of water bodies, physical and economic displacement.

6.3.12 Borrow Pits and Quarry Sites

Borrow pits and quarry sites where stone, sand, gravel, till, clay, or other granular soils are extracted for construction of the various PPP transactions. The term 'pit' is used when granular material is extracted. The term 'quarry' is used where consolidated rock is removed.

Environmental impacts of pit and quarry development can include the loss, reduction or disturbance to wildlife and habitat, erosion, dust, soil/ground water contamination, damage to historic resources, waste disposal, noise, and aesthetics.

6.3.13 Blasting and Rock Excavation

Blasting is used to loosen or break up rocks for removal. It is used during excavation of bedrock. Potential environmental impacts include dust (air quality), contaminant spills, sedimentation, safety (workers, storage), fly rock and debris, noise and explosive detonation effects on people and structures.

6.3.14 Underground Fractures and Hydrogeology

Possible impacts resulting from the construction of transaction activities like tunnels, excavations include the creation of underground fractures with impacts on hydrogeology leading to alteration of underground drainage. In addition, the steep terrain increases the likelihood of local earth movements and landslides. Any construction activities, including tunnelling may increase the chance of landslides.

6.3.15 Soil Erosion/Run Off

This will be as a result of the intensive activities that will be going on in the construction areas especially land clearing. The heavy equipment and machines that shall be used in the construction process will interfere with the soil structure making it lose hence liable to erosion.

6.3.16 Loss of vegetation

There will be a significant vegetation loss both during the construction phase either to pave way for access roads, actual transaction construction among others. The vegetation will be cleared so that the area where the construction work is to take place is clear for the construction work to be performed. The construction works will involve direct land take of productive pasture land and agricultural lands, bush clearing, removal of top soil, excavation and mass haulage. These activities will expose the land to elements of erosion such as wind and water and thus will trigger the process of land degradation.

6.3.17 Loss of Flora and Fauna

Destruction of flora and fauna and disturbance of livestock due to construction (on site and along road rehabilitation profile/borrow pit sites). The increase in noise during construction may scare away wild animals. In addition, the presence of wind turbines and associated facilities may affect local fauna populations by decreasing the area of habitat available.

Potential environmental impacts associated with clearing include: removal of trees, shrubs and wildlife habitat, changes to soil water, temperature and fertility in adjacent areas, erosion and fire hazards due to slash stockpiling. Where farmland or natural vegetation exists, and which provide adequate habitats for fauna clearing activities will affect animals such as rabbits, moles and birds. Generally, animals are less affected by construction activities than plants. While transporting materials to the site invasive vegetation may be introduced in the area.

6.3.18 Reduction of biodiversity due to blocking of movement of organisms

Dams generally tend to fragment river ecosystems, isolating species population living up and downstream of the dam and cutting off migrations and other movement. The peak flows that carry suspended sediments to the shore will be reduced by the presence of this dam. This dam will block the upstream and downstream passage of migrating aquatic animals. This will isolate them from vital spawning and feeding areas. Many fish and invertebrates inhabit the gravely river bottom, but these habitats will decline due to depletion of riverbed gravels.

6.3.19 Ecological Niches Interference

Clearing and levelling of sites using heavy machinery may interfere with ecological niches for the few resident species in the transaction areas leading to habitat loss. Disturbance of the plant community may induce changes in species composition.

6.3.20 Decreased Water Quality

Increase in suspended particles due to construction works; risk of human contamination from construction camps; and competition for water. This will mainly occur during the construction of the dam and the filling of the main dam. Suspended particles including soil from the neighbouring catchment area will contribute to this.

Drilling fluids (as in the case of geothermal power works) may result in the contamination of water and soil. Drilling and well testing also result in the generation of H_2S and other non-condensable gases and this will be in addition to exhaust gases (CO_2, CO, NO_x, SO_x, particulate matter) and dust from machineries during mobilization and by traffic movement during drilling.

6.3.21 Visual Intrusion

Unsightly earthworks and borrow pits during construction. During operations, visual intrusion of equipment on site, including the wind turbines and overhead cables, may be seen as a negative impact at the local level.

6.3.22 Risks of Birds

The construction and specifically operation of solid waste facilities-landfills will involve the introduction of solid wastes materials in the area and has the attendant risk of attracting scavenging birds that could pose a danger to airplanes.

6.3.23 Changes in downstream morphology of the riverbed and banks

The impact of the proposed water transactions like irrigation schemes, bulk water supply dams on downstream habitats will be through changes in the sediments load of the rivers. All rivers carry some sediment as they erode their watershed. When the river is held behind a dam in the reservoir for a period of time, most of the sediment is trapped in the reservoir and settle to the bottom. Clear water below the dam will recapture its sediments load by eroding the downstream bed and banks. Eventually all the erodible material on the riverbed below the dam will be eroded away, leaving a rocky streambed, and a poorer habitat for aquatic fauna.

6.3.24 Changes in the downstream water quality

This applies in the case of water transactions proposed under the PPPs and will manifest itself in change in river temperature, nutrient load, and turbidity; dissolve gases, concentration of heavy metals and minerals. When river water is held in a reservoir for a period of time, the quality of the water is affected. When a reservoir is first firmed, submerged vegetation and soil decomposes. As it does so it will deplete oxygen in the reservoir water. Deoxygenated water can be lethal to both plant and animal lives. Another water quality problem is mercury contamination while mercury is often present in a harmless inorganic form in soil, once the soil is flooded bacteria may transform this inorganic mercury into methyl-mercury, which is toxic and can be absorbed, concentrated and passed up the food chain.

6.3.25 Impacts on Ecosystems

Potential environmental impacts will result from the creation of the diversion sites and structures themselves, and from operational management of diversion sites and the impacts on downstream riverine ecosystems, including maintenance of in stream and riparian habitats. Downstream impacts on riverine ecosystems are considered above under downstream environmental flows and these are considered to be the primary environmental impacts associated with the development of these water supply abstraction sites. The most important mitigation measures are the release of good quality Reserve Flows capable of maintaining important environmental services, and satisfying downstream water requirements. Additional impacts are related to a) construction and b) operation of the diversion sites and associated transmission pipelines, as well as to reservoirs that have additional site level or local level impacts.

6.3.26 Impacts on Women and Vulnerable Groups

A recent ADB Country Gender Assessment report points out that while infrastructure development is a major area of priority in national policy in Sri Lanka, gender issues have been largely invisible in infrastructure-related policies and have not received adequate recognition. This is critical since the employment structure of Sri Lanka is characterised by male dominance, the conflict-areas have significant number of female headed households and population of working women, and gender-based violence is highly prevalent across the country. Further, adverse impacts on women and vulnerable groups, especially in the form of

resettlement impacts, are known to be hard on females, female-headed households, poor and other vulnerable groups.

6.4 Initial sectoral and PPP-specific impact identification

6.4.1 Sectoral initial impact identification

The following table provides an initial assessment of potential impacts identified under different sectors.

Table 6.1 Potential negative impacts on types of PPPs proposed

Sector	Examples of Transactions / Associated Activities	Potential Environmental and Social Impact Risks
Transport	Airport facilities: expansion and rehabilitation (within existing land	Noise and vibrations Storm water and wastewater Hazardous materials management Solid waste Air emissions Energy and water consumption Wildlife strikes Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc) Extraction of material from sensitive ecosystems Gender and exclusion concerns
	Roads: construction of new roads, expansion and rehabilitation of existing roads	Habitat alteration and fragmentation Stormwater Waste Noise Air emissions Soil erosion Water pollution Water stagnation Traffic disruption Involuntary resettlement Hazardous materials disposal Chance finds of cultural resources Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Occupational health and safety Community health and safety Extraction of material from sensitive ecosystems Gender and exclusion concerns
	Rail lines: construction and rehabilitation	Habitat alteration and fragmentation Emissions to air Fuel management Wastewater Waste Noise Hazardous material Involuntary resettlement Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Soil erosion Occupational health and safety

Sector	Examples of Transactions / Associated Activities	Potential Environmental and Social Impact Risks
		Community health and safety Gender and exclusion concerns
	Bridges: construction and rehabilitation	Water pollution Water unavailability Solid waste disposal Contaminated sediments Negative effects on coastal marine habitats Soil erosion Fire/explosion Occupational health and safety Community health and safety Hazardous materials disposal Negative effects on fisheries and other aquatic resources Public safety Gender and exclusion concerns
	Ports: Expansion of ports including breakwaters	Terrestrial and aquatic habitat alteration and biodiversity Climate change resilience Water quality (dredged material, waste water, sedimentation) Air emissions (combustion sources, volatile organic compounds, dust) Waste management (waste reception, ship waste, construction waste) Hazardous materials and oil management (spill prevention, dangerous goods handling) Noise and vibration (including underwater) Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Gender and exclusion concerns
Energy	Geothermal	Effluents (Drilling fuels and cuttings, spent geothermal fluids) Air emissions Solid waste Well blowouts and pipeline failures Water consumption and extraction Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Gender and exclusion concerns
	Liquefied Natural Gas	Hazardous material management (Spills) Wastewater discharges (cooling water and cold-water streams, other waste water) Air emissions (Exhaust gases, boil off gas, fugitive emissions) Waste management Noise generation LNG transport related issues LNG fueling related issues (fire and explosions, pipeline failures) Impacts from labour influx (GBV, worker's code of conduct, camp

Sector	Examples of Transactions / Associated Activities	Potential Environmental and Social Impact Risks
		management, etc)Occupational health and safety Gender and exclusion concerns Community health and safety
Water and Sanitation	Water supply schemes	Impacts on water resources (water withdrawal) Water treatment (solid waste, waste water, hazardous chemicals, air emissions) Impacts on the environmental flows Loss of vegetation due to land clearing Threats to aquatic habitats and biodiversity Water system leaks Occupational health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Gender and exclusion concerns
	Reservoir improvement including expansions	Impacts to the water catchment including sensitive ecosystems and biodiversity of inundation areas Threats to aquatic habitats and biodiversity Impacts on the environmental flows Air pollution Water Noise Soil erosion Involuntary resettlement Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Chance finds of cultural resources Gender and exclusion concerns
	Septage treatment plants and disposal	Threats to aquatic and shoreline habitats and biodiversity Loss of vegetation due to land clearing Pipeline failures including the sea outfalls Water pollution (leaks and over flows) Liquid effluents Soil erosion Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Chance finds of cultural resources Gender and exclusion concerns
Urban	Municipal Solid Waste	Loss of vegetation due to land clearing Ground and surface water pollution (contaminated run off, litter) Aesthetic nuisance Destruction of flora/fauna Soil erosion Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Noise Air emissions (dust, bio-aerosols and odours, vehicle emissions, fire)

Sector	Examples of Transactions / Associated Activities	Potential Environmental and Social Impact Risks
		Gender and exclusion concerns
Housing	Housing	Loss of vegetation due to land clearing Filling of low-lying areas and destruction of flora/fauna Solid waste Release of untreated septage to waterways Noise Air pollution Water pollution Soil erosion Involuntary resettlement Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Loss of privacy due to high rising buildings Gender and exclusion concerns
Education	Establishment of educational facilities	Loss of vegetation due to land clearing Filling of low-lying areas and destruction of flora/fauna Solid waste Septage Noise Air pollution Water pollution Soil erosion Occupational health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc)Gender and exclusion concerns
Tourism	Establishment of tourism facilities	Resource consumption Emissions to air Wastewater Hazardous Materials Management Waste Biodiversity conservation Noise Loss of habitats due to land clearing Soil erosion Chance finds of cultural resources Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc.) Misbehaviour in Protected Areas Gender and exclusion concerns
Health	New Health Care Facilities / Upgrade of the Existing Facilities	Health care waste management Construction waste disposal Vegetation loss/land clearing Solid waste management Noise

Sector	Examples of Transactions / Associated Activities	Potential Environmental and Social Impact Risks
		Air pollution Wastewater management Occupational health and safety Community health and safety Impacts from labour influx (GBV, worker's code of conduct, camp management, etc.) Public safety Gender and exclusion concerns

6.4.2 Initial impacts identified for short-listed PPPs

The following is the initial impact/risk assessment based on available information of the current 16 short-listed PPPs identified to be supported by the project. It is noted that this list is continuing to evolve/change and the project will need to undertake full due diligence for PPP transactions that will be supported under the project as per the Chapter 5.

Proposed PPP transaction	Transaction Description	Likely Environmental Category and site details
Affordable housing	Following a comprehensive study, government has identified the need for middle-income housing which can be executed on a PPP basis. Specific locations have not yet been identified. PWC is expected to come up with a model that can be replicated, also exploring the option of accessing gap finance.	A/B - If the locations to be identified will be on wetlands or closer to significant natural habitat and/or Protected Area, the transaction will be categorized as A. There is also a potential of land acquisition.
	Initial site/region-specific impact/risk assessment	
	Site or region unknown.	

Proposed PPP transaction	Transaction Description	Likely Environmental Category and site details
Health Sector – Establishing Diagnostic Center	A business case for a model PPP arrangement for a diagnostic center to be done in order to explore PPPs to provide solutions to health sector issues.	B - If the locations to be identified will be on an existing heath facility, the risk will be low. However, if the facility is to be established in a new location, the risks could be high based on the site identified.
	Initial site/region-specific impact/risk assessment	
	Site unknown.	

Proposed PPP transaction	Transaction Description	Likely Environmental Category and site details
Implementation of New Inland Water Transport System	A business case is to be developed in order to obtain better value in providing a transport solution through the use of the canal system to be development as a PPP. The IW1 procurement has not been successful with only one bidder participating in the process that is currently a stalled negotiation. The transaction has been proposed in three phases, however for the purposes of this transaction, only the following two phases will be considered. IW1 - Battaramulla to Wellawatte through the canal (Total distance of 10.6Km, with 9 stops/jetties) Passengers from Wellawatte Railway station	B – The canal from Battaramulla to Welawatte and Beire Lake are both currently polluted due to industrial and domestic waste water entering into the waterways across the entire catchments. Water movements during dry seasons tend to be stagnated with eutrophication. The canal often gets infested with invasive plants such as water hyacinth. Both water bodies also tend to be highly sedimented that

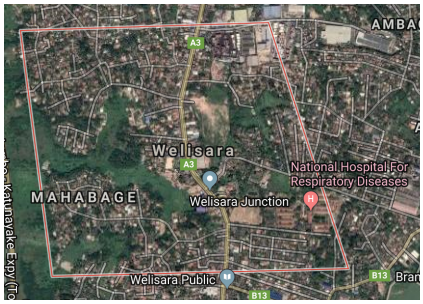
	travelling into Sethsiripaya, Battaramulla (Government Administrative areas) are the main potential users of this service during peak hours. Additionally, there are several key locations along the route (e.g. hospitals, universities and schools) that will attract additional passenger journeys. The canal passes through several major road traffic corridors (Galle Road, High-Level Road, Havelock Road, Narahenpita Road etc.) therefore, this transport system has great potential to act as a transverse connector link for Colombo's radial road network. IW2 - Fort to Union Place across Beire Lake (Total distance of 2Km, with 4 stops/jetties) Passengers from Colombo Railway Station, Fort Bus Stand to the areas around Union Place (such as National Hospital, Mahaweli Ministry and several other public and private offices) are the potential users of the service. The Boat Service will be converted for recreation purposes during the night time and off-peak hours. Total distance of IW2 is 2Km, will have 4 stops/jetties. The pilot phase is underway for IWT 2 (expected mid 2018) with 2 stops (start and end) – to be initially operational by Sri Lanka Land Reclamation and Development Corporation with the assistance of Sri Lanka Navy. Vessels with 30 passenger capacity (three lagoon craft boats) and 50 passenger capacity (one catamaran boat) will be used for the pilot transaction. For each route network, it is expected that the line agency will be responsible for land acquisitions and construction of jetties/stations (and access to these locations). Additionally, the line agency will be responsible for the maintenance of a navigable water way.	require dredging. Studies undertaken under the Metro Colombo Urban Development Project provides initial assessments of the Beire Lake confirms possible heavy metal contamination. 
	Initial site/region-specific impact/risk assessment	
	In Battramulla-Wellawatte canal dredging can result in change in the water table in the upper catchment where critical natural habits – wetlands are located. Hydrological studies/modelling need to be done to ensure these habitats are not negatively impacted. Impacts to the aquatic life in both sites as a result of boat operation will be minimal due to existing pollution. However, quality of the boats and fuel to be utilized will require adequate standards, as well as management of possible oil spills in addition to occupational health and safety requirements of their operations. In both cases, disposal of dredge material will be a challenge as the country does not have many sites to receive contaminated dredge material. In many places along the canal and the Beire Lake, it is built up closer to the canal/lake edge and therefore land acquisition will be likely to be needed to set up the jetties/stations including access to these locations.	

Proposed PPP transaction	**Transaction Description**	**Likely Environmental Category and site details**
Elevated Expressway from Rajagiriya to Athurugiriya – Phase 2	An Urban Expressway being proposed to address some of the congestion issues that is in two phases. The ADB is acting as the transaction advisor for phase 1 with assistance being provided for the Feasibility of Phase2. The option of the proposed transaction assisting the structuring of the transaction for phase 2 is being explored.	A/B - If the locations to be identified will be on wetlands or closer to significant natural habitat, the transaction will be categorized as A. According to ADB's initial screening, there may not be any resettlement.
	Initial site/region-specific impact/risk assessment	

	Trace to be confirmed. If resettlements are avoided, there is a high possibility that the trace may go across wetlands. Wetlands in this area are critical for endangered fishing cat and migratory and resident wetland birds – particularly to ensure connectivity and habitats.

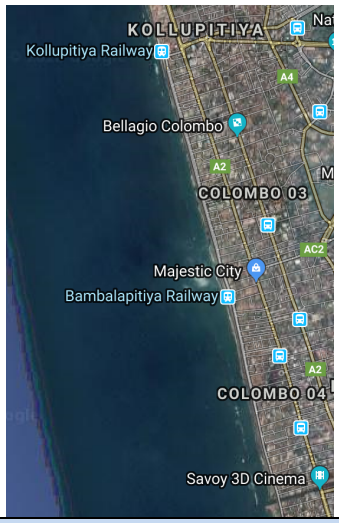
Proposed PPP transaction	Transaction Description	Likely Environmental Category and site details
Tunnel to Port City	Construction of a tunnel road, directly linking the Port city to the road network of Colombo. The tunnel going under the Galle Face Green walkway, will link the coastal Marine Drive from the Kollupitiya railway station, with the Port City at the Chaitya Road junction with an expected distance of 2.5 - 3Km.	A/B Tunnel will be running under already built in area
	Initial site/region-specific impact/risk assessment	
	Actual trace to be confirmed. While tunnel will go under the Galle Face Green walkway part of the way, it is not clear where it will be built under the existing privately-owned buildings/premises from Galle Face Green to Kollupitya. There could be impacts on historical buildings such as the Galle Face and other buildings due to vibrations as a result of drilling if it runs on the landside and it may bring changes to current patterns, if it runs from the seaside. If the route is through the sea (even for a short distance) and assessment will be needed on the risks/impacts due to changes to water currents as a result of the new foot print. Sedimentation and construction debris moving to the coastal waters is possible.	

Proposed PPP transaction	Transaction Description	Likely Environmental Category and site details
Transport Smart Card	As a part of the modernization of the public transport system, the GOSL is expected to establish an integrated payment system for all modes of transport, publicly and privately owned. This is expected to establish the necessary infrastructure and services related to operation of the system.	C - There will not be any physical activities.
	Initial site/region-specific impact/risk assessment	
	Not applicable	

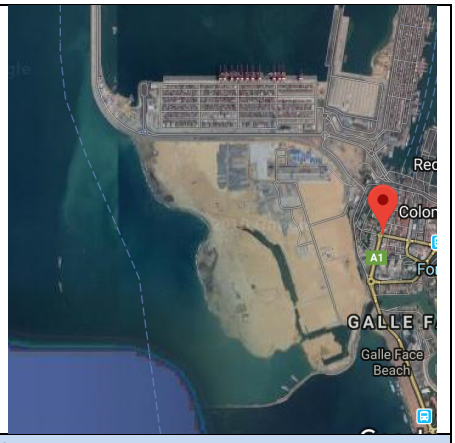
Proposed PPP transaction	Transcation Description	Likely Environmental Category and site details
Proposed Logistic Centre at Welisara	Development of a Logistic Park to consolidate and link the existing and potential logistics activities in the Western Region and the country as a whole. It is also a move to reduce the congestion in the Colombo city around the port. The proposed transaction in Welisara spreads across a land stretch of approximately 250 Acres and is proposed to be developed in four phases. It is aimed to grow logistics industries and manage the sporadic existing logistic activities. This Logistic Park envisioned to be the premier transport and logistics strip of the silk route. It will consolidate and link the existing and potential logistics activities in the Western Region and the country as a whole. It will cater the expected logistic demand in the coming years.. Further, it is proposed to be developed in four phases (Phase I- Development of a Cargo Village by Acquisition, Relocation, Development/improvements to the	A/B – Welisara is located North of Colombo along A3 highway. There are number of logistic centers and industries already located in this area. Significant sites include the National Hospital for Respiratory Diseases, Nawaloka playground and number of Catholic churches. 

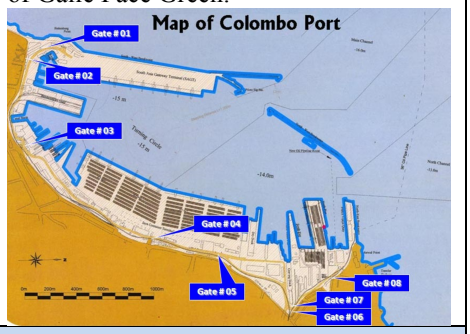
	existing explosive storage currently utilized by tri services, police and government explosive unit and the race track utilized by Sri Lanka Navy, Phase II-Marshy area to be developed as a world class wetland park model, including road and railway developments/ improvements to facilitate external linking, Phase III-Acquisition, Relocation, Development/improvements to the existing logistic hangers utilized by Sri Lanka Navy for logistics/explosive storage and open space, Phase IV- Acquisition, Relocation, Development of the existing space utilized by Sri Lanka Navy (for Volunteer Naval Headquarters and Volunteer base). Logistic Park expected to enhance entire logistic operation in Sri Lanka, to a very competitive level while improving the quality and efficiency of the services to the consignees with the international level services and standards. The early implementation of this Logistic Park will surely pave the way, to integrate Sri Lanka into the global value and supply chain, and transform Sri Lankan economy with more imports and exports as never before. This will create adequate spaces for manufacturing, value additions, warehousing, exports/imports, Multi Country Consolidation, and logistic service providers. Multi model connectivity such as dedicated roads, expressways and railway links are some of the important components to be included within the Logistic Park for smooth freight handling and transportation.	
	Initial site/region-specific impact/risk assessment	
	Exact site of the logistic centre and the traces of its linked infrastructure are not yet identified. There are wetlands in this area which connects to the Muthurajawela Sancutuary and important social infrastructure including a hospital, a playground and physical cultural resources, which can be impacted based on the location of the logistic centre. The area is also highly congested with businesses (including existing private logistic centres), as well as residences. There is possibility of resettlement. Impacts due to closing of existing logistic centres Developing the centre will involve land reclamation, building contraction and access for muti-modal transport system and will result in impacts due to land reclamation and construction (including off-site impacts during sourcing of construction material), drainage issues (due to potential flooding), air, water and land pollution, occupational and community health and safety issues, labour influx, land preparation and construction waste generation. Logistic centre operating impacts include air pollution due to poor performing vehicles, water and soil pollution due to oil spills and exposure to other hazardous material, noise pollution, occupational and community health and safety issues, labour inflx and impacts to wetland areas.	

Proposed PPP transaction	**Transction Description**	**Likely Environmental Category and site details**
Formation of Recreational Beach Area Along the Shoreline South	Development of a Recreational Beach/Sea Waterfront in the West coast of Sri Lanka from Colpetty to Dehiwala Canal outlet for about 85ha. It is expected to	A/B - from Colpetty to Dehiwala Canal outlet for about 85ha of reclaimed land along 6.2 km length of coastal strip, is to be implemented to address the requirement of another green and smart leisure area in the country with the engagement of best

of Colombo (in the form of perched beaches)	reclaim land along 6.2 km length of coastal strip.	design, engineering and town planning skills, state-of-art technology and world's best practices mainly for public entertainment. 
	Initial site/region-specific impact/risk assessment	
	Currently, the railway line from Colombo to south of the country is running parallel to the shoreline, with a small reservation. There are few private business (restaurants) between the railway reservation and the beach, which may get impacted. The Marine Drive runs parallel to the land side, with mostly business premises located along the right side of the road. There are also one school which borders the road. There is an existing coral reef closer to the Wellawatte beach. There has been some level of degradation due to pollution entering the waters. There have not been any studies in recent time to provide status of the reef. The reclamation and related sedimentation will likely to result in loss of the coral reef and any other natural habitats. The changes to the coastline is expected due to reclamation will have impacts on the coastal current patterns (which may result in erosion and excessive accretion in various sites). The Dehiwela canal also currently bring in pollution including solid waste. There has been number of train accidents during crossing of the railway line as there are not overhead crossing(s) to the beach.	

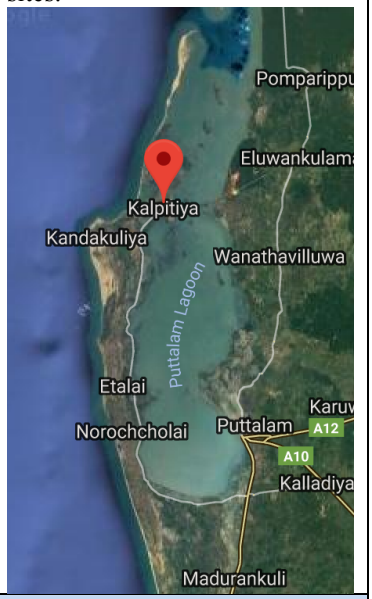
Proposed PPP transaction	**Transaction Description**	**Likely Environmental Category and site details**
Convention centre in the Port City	The GOSL, in using its part of the land in the Port City is expected to establish a convention Centre that will attract MICE tourism to Colombo.	B – Port city is located on the on-going reclaiming area in the sea closer to Galle Face Green. 

		
	Initial site/region-specific impact/risk assessment	
	Integrity of the reclaimed land Sewage and waste water Drainage Solid waste (construction and during convention center operations) Construction material sourcing Air pollution Water pollution Soil erosion Occupational health and safety (construction sage and operations) Labour related issues Integrity of the building	

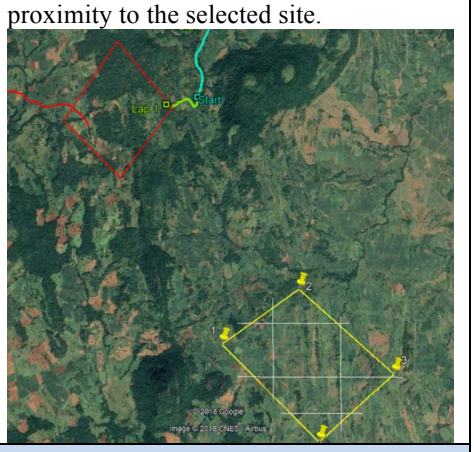
Proposed PPP transaction	**Transaction Description**	**Likely Environmental Category and site details**
Cruise terminal – Bandaranaiake Quay	Development and operation of a cruise terminal at the Bandaranaike quay of Colombo Port.	B – Colombo Port is existing port north of Galle Face Green. 
	Initial site/region-specific impact/risk assessment	
	Sewage and waste water (construction stage and during operations) Solid waste (construction stage and during operations) Air pollution Water pollution (construction stage and during operations) Occupational health and safety (construction stage and operations)	

Proposed PPP transaction	**Transaction Description**	**Likely Environmental Category and site details**
Wastewater collection, treatment and disposal system for Gampaha Municipal Council Area	Construction of facilities for waste water collection and disposal for the Gampaha Municipal council area.	B – Exact location of the treatment plant and disposal mechanism and location unknown within Gampaha Municipal Council area. Significant sites include Henaathgoda Botanical Garden, Pitikuttuwa Viharakanda Temple, many low-lying areas (marshes and

		paddy fields) 
	Initial site/region-specific impact/risk assessment	
	There is a likelihood that the site may get located in a marshy land due to limitation in land. There are no known protected areas or sites known to consist of significant natural habitats, except the Botanical Garden. Impacts due to land reclamation and construction, drainage issues (due to potential flooding), air, water and land pollution, occupational and community health and safety issues, can be expected. In appropriate selection of treatment and disposal technologies and subsequent poor operations could bring impacts to water and land as well as community health and safety issues.	

Proposed PPP transaction	**Transaction Description**	**Likely Environmental Category and site details**
Kalpitiya desalination	Establishment of a water supply transaction by using a sea water desalination (RO) plant in Puttlam district with an approximate intake of 12,000m3/day capacity.	A/B – Intake and RO plant location unknown. Kalpitiya is the northern-most town on the Kappitya Penninsula. Significant sites include Puttlam Lagoon, sand spits, mangrove areas, sea grass beds, off-shore coral reef – Bar Reef, large marine mammal habitats, number of Catholic religious sites. 
	Initial site/region-specific impact/risk assessment	
	Kalpitiya area has many significant natural habitats. The intake point could impact these habitats negatively if not located in the least significant site.	

Proposed PPP transaction	**Transaction Description**	**Likely Environmental Category and site details**

100MW Solar park in Siyambalanduwa	Construction of a 100 MW Solar Park in Siyambalanduwa, Moneragala. The pre-feasibility is being addressed through the InfraSAP for Energy. The proposed transaction could assist the transaction advisory and procurement process.	A/B – Two sites have been proposed. The phase 1 site (250ha) is proposed in a forested area. Some 50% of the selected site is covered with Tropical Dry Mixed Evergreen Forests and Damana Grasslands. The rest of the site is covered with cultivated lands or land abandoned after cultivation that has grown in to scrublands. The site lies in close proximity to southern protected area complex comprising of three National parks, Lunugamvehera, Ruhuna and Kumana of which Ruhuna National Park (Block IV) is lying in close proximity to the selected site. 
	Initial site/region-specific impact/risk assessment	
	Impacts include removal of close to 100ha of forest land, impacts to the movement of wildlife (possible increase in human-elephant conflict) and impacts from wildlife to the infrastructure. Land acquisition may be needed. Construction phase impacts – including during improvements made to access roads	

Proposed PPP transaction	Transaction Description	Likely Environmental Category and site details
170MW Wind 100MW Solar park in Pooneryn park in Pooneryn	Phase 1(100 MW) of the development of the Pooneryn site dedicated to the solar component as well as the construction of the needed transmission line to the main grid. The pre-feasibility is being addressed through the InfraSAP for Energy. The proposed transaction could assist the transaction advisory and procurement process. Phase 2 (170 MW) of the development of the Pooneryn site dedicated to the wind power component as well as increasing the capacity of the transmission lines. The pre-feasibility is being addressed through the InfraSAP for Energy. The proposed transaction could assist the transaction advisory and procurement process.	A/B – The site is an approx. 18 km long 1.2 km wide north-west oriented peninsula stretching from Pooneryn into the Indian Ocean. Interconnection could be possible means of a new east-west Gen-Tie line, to either existing 132kV infrastructure of future new 220 kV infrastructure. Distance to the nearest existing 132kV HV line is about 30km. The site includes Dunes with entrenched-vegetation, some up to 5 to 10 m high, shallow water bodies and bird fauna. Alternative localities ae explored to avoid dunes, shores and highly grown vegetation.

		
	Initial site/region-specific impact/risk assessment	
	Possible conflict with bird migration routes. Impact to sensitive significant habitats due to increased movements of vehicles and people, as well due to the foot print.	

6.5 Environmental & Social Management Process

Impacts expected as a result of the implementation of a PPP will be managed through an Environmental Management Plan (EMP), Social Impact Mitigation Plan (SIMP) or a combined Environment and Social Management Plan (ESMP) see Table 6.2 below that specifically outlines the measures that will be undertaken at different stages of the transaction (planning, design, procurement, construction and post-construction) in order to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The EMP/SIMP/ESMP includes the actions needed to implement these measures.

6.5.1 Mitigation considerations and options

All moderate to major adverse impacts are considered for mitigation. Specific measures have been suggested in this regard where practicable. With regard to negligible and minor impacts where the transaction project activity is not expected to cause any significant impact in such cases, best practice measures and mitigation have also been recommended where appropriate to improve the environmental and social performance of the transactions. The mitigation options considered may include transaction modification, provision of alternatives, transaction timing, pollution control, compensations and relocation assistance. In cases where the effectiveness of the mitigation is uncertain, monitoring programs are introduced.

6.5.2 Recommended mitigation measures

The mitigation measures or guidelines have been designed in order to avoid, minimize and reduce negative environmental and social impacts at the transaction level. The mitigation measures are presented in the following table in a descriptive format.

Table 6.2 Proposed mitigation measures

Impacts	Description of mitigation measures
Physical Environment	
Waste disposal	Solid non toxic waste Adequate waste reception facilities should be provided at project sites/camp sites Final disposal should be at dump sites approved by the municipal or urban council. Waste oil /fuel Spent or waste oil from vehicles and equipment should be collected and temporarily stored in drums or containers at site Waste oil should be disposed by oil marketing companies or agents approved or recognized and have the capacity to undertake oil disposal
Air pollution	The Projects should require that construction contractors operate only well maintained engines, vehicles, trucks and equipment. A routine maintenance program for all equipment, vehicles, trucks and power generating engines should be in place. The project should ensure the use of good quality fuel and lubricants only If dust generation at the project/construction site becomes a problem, limited wetting of sites and or unloading and reloading points should be done to reduce dust raising Construction traffic speed control measures should be enforced on unpaved roads (speed limits through communities should be ≤50km/hr on unpaved roads and near or at project site should be ≤30 km/hr). Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.
Noise and vibration	The Projects should require contractors to use equipment and vehicles that are in good working order, well maintained, and that have some noise suppression equipment (e.g. mufflers, noise baffles) intact and in working order. This will be achieved by making it a component of contractual agreements with the construction contractors. Contractors will be required to implement best driving practices when approaching and leaving the site (speed limit of ≤30 km/hr) to minimize noise generation created through activities such as unnecessary acceleration and breaking squeal. Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.

Impacts	Description of mitigation measures
Impacts on Landscape and Visual Receptors	Project sites should be boarded off from public view during construction Good house-keeping at construction sites should be ensured
Impact on traffic and Public safety	Only road worthy vehicles and trucks should be used to avoid frequent breakdowns on the roads Only experienced drivers should be employed
Water use	Obtain water abstraction permit from the Water Supply and Drainage Board.
Water pollution	No garbage/refuse, oily wastes, fuels/waste oils should be discharged into drains or onto site grounds Fuel storage tanks/sites should be properly secured to contain any spillage Maintenance and cleaning of vehicles, trucks and equipment should take place offsite especially where project sites are close to water bodies. Toilet facilities should be provided for construction workers to avoid indiscriminate defecation in nearby bush or local water bodies
Soil and Land degradation	Minimize land clearing areas as much as possible to avoid unnecessary exposure of bare ground to the elements of the weather Re-vegetate cleared areas as early as possible using native plant species As much as possible, avoid construction work during the monsoon period.
Impact on fauna and habitat	Avoid unnecessary exposure and access to sensitive habitat areas. For identified or suspected sensitive habitats (swamps/ wetlands), regular inspection or monitoring should be carried out in the area prior to start and during work. If sensitive habitats are encountered, Project activities should cease and the Project should consult NAPPP to determine the appropriate course of action. If the project site is discovered as a sensitive habitat area, the Project should engage the NAPPP to develop a suitable plan.

Impacts	Description of mitigation measures
Impacts on inland water bodies/marine Fauna/habitat	The Projects should require that contractors implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and clean-up of accidental spills into the aquatic environment. During pre-installation and installation of project facilities, spotting of sensitive aquatic mammals should form part of the project activities. Should these species be observed in the vicinity of the work area, the project should execute measures to avoid destruction or disturbance. Project staff must report sightings of any injured or dead aquatic life (fishes)/marine mammals immediately, regardless of whether the injury or death is caused by a Project activity. The report should include the date and location of the animal/strike, and the species identification or a description of the animal. The report should be made to the NAPPP and the relevant line ministry or line agency The Project workforce and local communities should be educated to ensure that the importance of environmental protection and nature conservation are effectively communicated and that wider appreciation of environmental issues and construction best practice are fostered
Impact on inland water/marine water quality /coastal processes	All Projects should implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and clean-up of accidental spills into the inland water/marine environment. Marine vessels will be required to adhere to International Maritime Organization (IMO) regulations on bilge and ballast water discharge. Areas close to water environment that are disturbed during construction activities (such as trench digging) should be rehabilitated as soon as possible after the pipes have been installed. All rehabilitated areas should be surveyed on weekly basis for the first month after rehabilitation, and a monthly basis for the subsequent five months, to monitor levels of erosion in the vicinity of the development. If observations indicate that significant erosion and sediment transport is taking place (i.e. that rehabilitation has been unsuccessful) additional mitigation should be employed to reduce erosion.
Social Environment	

Impacts	Description of mitigation measures
Physical displacement	All affected persons to be given relocation assistance (cash or kind) at replacement cost by the project to enable them to move their properties to new locations, i.e. in accordance with the GoSL's legal framework and Bank's policies as laid out in the Resettlement Policy Framework (RPF). Resettlement Action Plans will be required. If a site is acquired, the State may relocate persons and their families as well as community facilities to be affected. The affected families should not be made to incur any cost during the relocation period. The resettlement action plan should be prepared for this area with the RPF as a guide.
Employment and loss of livelihood	If a site is acquired, all persons living off the site should be provided with livelihood assistance based on their current income levels or the project should assist such persons obtain new jobs immediately without any loss of income such that each affected person is able to improve or at least restore his/her income to pre-project level. Income restoration schemes to be prepared should be designed in consultation with affected persons, and in consideration of their resource base and existing skills. The measures adopted should be done in accordance with the RPF.
Loss of access to land	Due process should be followed to establish the true owner of any land, be it family or stool land. Once established, the project should acquire the site by paying appropriate compensation. The land compensation should be based upon replacement value, impact issues, description of mitigation measures of land in the area and in accordance with the RPF. In case of loss of common resources, structures and facilities, the same should be restored or reinstalled or access to lost facilities provided at a new place in consultation with the community or appropriate authority
Loss of structures/properties	For a project site to be used, irrespective of the land compensation, appropriate compensation should be paid to the owner for any structures/properties which are permanent structures at the site. Depreciation should not be factored during valuation of these properties. The compensation process should satisfy the RPF developed for the project. Appropriate compensation should be paid for any damaged or destroyed propriety that belongs to affected persons. No depreciation during valuation of these properties. Guidance for these measures are provided in the RPF.
Impacts on recreation and public areas	Appropriate notices and warning signs will be erected around working areas and public areas to warn prospective trespassers of any danger or risk.
Impacts on Human Health/ Safety and sanitation	Trucks carrying construction materials such as sand, quarry dust, laterite etc. will have the buckets covered with tarpaulin or appropriate polythene material from or to project site.
Construction-related Impacts	Only road worthy vehicles/trucks should be used. Only experienced drivers/operators should be employed. Except for areas secured by fencing, all active construction areas will be marked with high-visibility tape to reduce the risk accidents involving pedestrians and vehicles.

Impacts	Description of mitigation measures
	All open trenches and excavated areas will be backfilled as soon as possible after construction has been completed. Access to open trenches and excavated areas will be secured to prevent pedestrians or vehicles from falling in. Adequate sanitary facilities will be available for workers and open range defecation will not be countenanced. Construction workers will be provided with and educated to wear suitable Personal Protective Equipment (PPE) including hard hats, overalls, high-visibility vests, safety boots, earplugs, gloves etc. Construction workers should be educated to adhere to basic rules with regard to protection of public health and sexual health practices, including most importantly hygiene and disease prevention.
Impacts on cultural heritage / archaeological interest / existing ecologically sensitive areas	The pre-construction surveys should identify cultural heritage resources and existing ecologically sensitive areas that the project should avoid and by-pass these resources. The Project should implement a chance find procedure and reporting system to be used by contractors in the event that a cultural heritage feature or ecologically sensitive item/issue is encountered.
Impacts on Human Health and Public Safety	The project will require all contractors to implement an Environmental, Health and Safety (**EHS**) plan which will outline procedures for avoiding health and safety incidents and for emergency medical treatment. This will be achieved by making it a component of contractual agreement. Contractors will be required to wear suitable Personal Protective Equipment (PPE) including hard hats, high-visibility vests, safety boots and gloves and life vests as appropriate in accordance with the EHS plan. All construction and other workers will be sufficiently trained in the safe methods pertaining to their area of work to avoid injuries.
Labour related issues	Contractors should use local labour as much as possible and where available. As much as possible, all unskilled labour should be contracted or obtained from the local community. Contractor's ESMP/SIMP should be prepared which should include among others management plans labour influx and worker camp management plan and code of conduct for workers, including measures to address GBV, as provided for in the RPF Preparation of redundancy plans and packages should be discussed with affected workers that will include re- training and re- tooling of affected workers and aim to avoid labour strife.
Gender and exclusion related issues	Besides project related activities, , women and other vulnerable groups' access to infrastructure and services that PPP projects are expected to deliver, capacity building of the PPP unit on gender, the feasibility studies should include gender analysis for every PPP project.

CHAPTER 7: IMPLEMENTATION ARRANGEMENTS

7.1 Overall implementation arrangement in the NAPPP

The NAPPP will be responsible for supervising the implementation of the environmental safeguards by the respective line ministry or line agency of GOSL and the private partner in respect of this World Bank project. As the NAPPP was recently established with new personnel, the institution does not have previous experience in executing World Bank-financed projects and thus, will be closely guided by the World Bank team to adhere to various requirements and polices of the Bank with regards to Safeguards, procurement and FM during the implementation of the project.

Institutional Structure of the NAPPP: The proposed organizational structure for NAPPP is based on three broad sectors, namely, infrastructure (transport, highways power, water, ports), service industries (tourism, ICT, healthcare, education), and natural resources & social infrastructure (affordable housing, special economic zones, minerals and renewable energy). The three sectors will be supported by the cross-cutting functions of legal, financial, transaction coordination and risk. The NAPPP is currently being managed by the Board of Governors/Directors and the Chairman who is also the acting Chief Executive Officer (CEO) of the NAPPP until the appointment of the CEO is made. It is currently in the process of recruiting personnel and thus far has recruited 12 staff members. The required specialists for environment and social safeguards, financial management and procurement will be recruited and/or seconded within the Government.

Functions of the NAPPP: It is envisaged that the NAPPP will support the various Ministries and line agencies in transaction identification, preparation, evaluation, negotiation, award and monitoring. It will provide support as the key contributor on commercial and financial aspects of a transaction to be developed on a PPP basis whilst facilitating the procurement process and will act as the interface between the Government and the private sector.

Board of Governors/Directors: The Minister of Finance has appointed the Board of Governors who will have oversight over the NAPPP and its processes. The appointed Board of Governors consists of members from both coalition parties to ensure buy-in from both sides. It is expected that the involvement of the Board of Governors will be limited to areas involving policy and strategy formulation and will not expand to project specific work. Its specific functions include formulating new guidelines for implementing PPP investments, creating an appropriate governance structure for PPP transactions, equitable risk allocation, assisting the Chairman on various policy and strategy issues, providing oversight on procurement of technical assistance from World Bank funding lines and creating an organization structure that builds the core skills of NAPPP. It is likely that when the new guidelines for PPPs are approved by the Cabinet of Ministers, the Board of Directors will play an expanded role and will be in a position to co-opt any Secretary of a line Ministry to the Board as and when necessary when a particular PPP transaction is being considered.

Financing for the NAPPP: Thus far, financing for the NAPPP is limited to budgetary provisions made by the Government. The Budget 2018 indicates an allocation of LKR. 50 million for the activities of the NAPPP. The NAPPP will also have access to the Programmatic Project Preparation Facility managed by the National Planning Department for

an amount of US$600,000 until Bank financing for the project is approved and the project is made effective. This facility is an advance on the loan and is structured to accommodate project preparation and implementation activities in order to provide cashflow during the interim period. Furthermore, the PPP transaction being prepared is also likely to include retroactive financing that will allow the NAPPP to obtain reimbursement of funds used for preparation activities following Bank's policies and guidelines.

Assistance provided to the NAPPP through the PPIAF Grant: The grant will be utilized to provide the following assistance to the NAPPP;

- Firm of consultants to assist in improving the enabling environment for PPPs and developing a PPP transaction pipeline: The World Bank through a competitive selection process has contracted PWC in Singapore (PWC Sri Lanka as sub consultants) as the lead firm of consultants together with Nithya Partners and Mr. Mohamed Rafeek that will provide assistance in the establishment of Component A. The firm commenced its assignment – which has an expected duration of 8 months - in December 2017.
- Resident advisor who will sit in the NAPPP office and assist the agency through its day-to-day activities and provide various capacity building: The Bank, on behalf of the GOSL, has engaged Teodoro S. Regino, Jr in a competitive selection process to support the work of NAPPP as a resident advisor. The expected tasks of the resident advisor include providing advice to continuously improve the PPP policy, legal, institutional, and procedural framework in Sri-Lanka, helping with NAPPP's coordination of PPP information dissemination, creation of a database of transactions, training and capacity building, and development of the PPP institutional procedures, including PPP Guidance Manual, liaising with the relevant Public sector institutions and PWC to help identify potential PPP projects and fast track on-going PPP transactions, assisting in conducting pre-feasibility studies for potential PPP transactions identified and assisting public sector institutions in preparing terms of reference and tender documents for the recruitment of PPP transaction advisors. The consultant is expected to start work in January 2018.

7.2 Implementation arrangements for environmental safeguard management

The NAPPP will recruit a qualified Environmental Specialist to manage the project related environmental safeguards. Specifically, the Environmental Specialist will be responsible for ensuring the shortlisted PPP transactions to be supported under the overall World Bank project, in the form of feasibility studies follows the necessary environmental safeguard due diligence defined earlier.

Responsibilities of the Environment Specialist of NAPPP

- Provide overall policy and technical direction for safeguards management under the Project, as defined by the project environmental and social safeguards instruments.
- Ensure environmental due diligence is carried out for each PPP transaction by the line ministry and line agency as soon as conceptual technical design and scope have been defined, as outlined in the safeguards processes.
- Closely co-ordinate with the NAPPP and PPP partners (including the line ministry and line agency) and technical colleagues for timely preparation of Environmental/Social Assessments/Management Plans for PPP transactions, as necessary (depending on screening outcome); co-ordinate with the PPP partners 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 EAMF; work with the NAPPP to obtain necessary clearances from local environmental/archaeological regulatory authorities for PPP transcations, 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, audits of associated facilities/linked activities 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 EMP/SIMP/ESMPs are included in the design, and conditions on compliance with EMP/SIMP/ESMPs are included in the bidding documents.
- Liaise closely with the procurement team of the NAPPP and PPP partners (including the line ministry and line agency) 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 adequate public consultation during the preparation of safeguards instruments
- Report to the NAPPP and the World Bank on the overall environmental and social performance of the project as part of NAPPP's periodic progress reporting.
- Liaise closely, where technical guidance is required, with the Environmental Specialists of the World Bank task team.
- Promote community participation in the process of planning mitigation measures for environmental/social impacts of PPP transactions.
-

The Environmental Specialist will need to have the following academic qualifications and experience.

- At minimum, a Master's Degree in a field related to Environmental Management, Environmental Engineering or a related field.
- A Minimum of 10 years' professional national experience in environmental management including extensive field experience, working with various government and private sector agencies and community organizations, especially in the field level.

Environmental Safeguards Focal Points with PPP partners. These focal points will be staff seconded by the relevant PPP partners (including the line ministry and line agency) to the transaction implementation cells to be established. They will be responsible for ensuring activities implemented by their respective PPP partners (including the line ministry and line agency) as per the EAMF are well managed and report to the NAPPP. They will assist in

providing data and the timely completion of environmental screening reports and instruments and will collaborate with the NAPPP Environmental Specialist to ensure these assessments are completed in a timely manner. As these officers, will be based in the line agencies they will be required to facilitate good communication between contractors and NAPPP on safeguards issues.

Consultants: The NAPPP will hire environmental consultants to provide technical support where specialized services are required such as preparation of EAs, EMP/SIMP/ESMPs, and audits for short listed PPP transactions to be support under the project

The Roles and Responsibilities of the World Bank

The World Bank project task team, specifically the environmental specialists, will provide close supervision and necessary implementation support including;

- Undertaking of prior review and provide feedback on all safeguards instruments
- Clearing of safeguard instruments including screening forms
- Sharing of knowledge on technologies and best practices
- Providing training support on Bank's safeguard policies and requirements of the project.

7.2.1 Training and capacity building plan

The Environmental Specialist of NAPPP will be trained by the Environmental Specialist of the World Bank on the EAMF implementation, safeguards and procedural requirements of the World Bank. The Environmental Specialist of NAPPP will develop and implement and training plan for the implementing agencies under the capacity building component.

Annex 1: List of proposed PPP transactions

The following table provides the current list of PPP transactions that are considered to be supported under the World Bank financed project.

#	Transaction Name	Brief description
1	Affordable housing	Following a comprehensive study, government has identified the need for middle-income housing which can be executed on a PPP basis. Specific locations have not yet been identified. PWC is expected to come up with a model that can be replicated, also exploring the option of accessing gap finance.
2	Health Sector – Establishing Diagnostic Centers	A business case for a model PPP arrangement for a diagnostic center to be done in order to explore PPPs to provide solutions to health sector issues.
3	Implementation of New Inland Water Transport System (IW1 & IW2)	A business case is to be developed in order to obtain better value in providing a transport solution through the use of the canal system to be development as a PPP. The IW1 procurement has not been successful with only one bidder participating in the process that is currently a stalled negotiation. The project has been proposed in three phases, however for the purposes of this project, only the following two phases will be considered. IW1 - Battaramulla to Wellawatte (Total distance of 10.6Km, with 9 stops/jetties) IW2 - Fort to Union Place (Total distance of 2Km, with 4 stops/jetties)
4	Elevated Expressway from Rajagiriya to Athurugiriya – Phase 2	An Urban Expressway being proposed to address some of the congestion issues that is in two phases. The ADB is acting as the transaction advisor for phase 1 with assistance being provided for the Feasibility of Phase2. The option of the proposed project assisting the structuring of the transaction for phase 2 is being explored.
5	East Container Terminal of the Colombo Port	East container terminal is the third consecutive PPP in the Port of Colombo where the ADB has been the transaction advisor. The PPP transaction has faced a setback due to possible public financing alternatives being pursued by the relevant Ministry.
6	Tunnel to Port City	Construction of a tunnel road, directly linking the Port city to the road network of Colombo. The tunnel going under the Galle Face Green walkway, will link the coastal Marive Drive from the Kollupitiya railway station, with the Port City at the Chaitya Road junction with an expected distance of 2.5 - 3Km.
7	Transport Smart Card	As a part of the modernization of the public transport system, the GOSL is expected to establish an integrated payment system for all modes of transport, publicly and privately owned. This is expected to establish the necessary infrastructure and services related to operation of the system.
8	Proposed Logistic Centre at Welisara	Development of a Logistic Park to consolidate and link the existing and potential logistics activities in the Western Region and the country as a whole. It is also a move to reduce the congestion in the Colombo city around the port. The proposed project in Welisara spreads across a land stretch of approximately 250 Acres and is proposed to be developed in four phases.
9	Formation of Recreational Beach Area Along the Shoreline South of Colombo (in the form of perched beaches)	Development of a Recreational Beach/Sea Waterfront in the West coast of Sri Lanka from Colpetty to Dehiwala Canal outlet for about 85ha It is expected to reclaim land along 6.2 km length of coastal strip.
10	Convention center in the Port	The GOSL, in using its part of the land in the Port City is expected

	City	to establish a convention Centre that will attract MICE tourism to Colombo.
11	Cruise terminal – Bandaranaiake Quay	Development and operation of a cruise terminal at the Bandaranaiake quay of Colombo Port.
12	Wastewater collection, treatment and disposal system for Gampaha Municipal Council Area	Construction of facilities for waste water collection and disposal for the Gampaha Municipal council area.
13	Kalpitiya desalination	Establishment of a water supply project by using a sea water desalination (RO) plant in Puttlam district with an approximate intake of 12,000m3/day capacity.
14	100MW Solar park in Siyambalanduwa	Construction of a 100 MW Solar Park in Siyambalanduwa, Moneragala. The pre-feasibility is being addressed through the InfraSAP for Energy. The proposed project could assist the transaction advisory and procurement process.
15	170MW Wind park in Pooneryn	Phase 1(100 MW) of the development of the Pooneryn site dedicated to the solar component as well as the construction of the needed transmission line to the main grid. The pre-feasibility is being addressed through the InfraSAP for Energy The proposed project could assist the transaction advisory and procurement process
16	100MW Solar park in Pooneryn	Phase 2 (170 MW) of the development of the Pooneryn site dedicated to the wind power component as well as increasing the capacity of the transmission lines. The pre-feasibility is being addressed through the InfraSAP for Energy. The proposed project could assist the transaction advisory and procurement process

Annex 2: Suggested Format for Environmental Screening Form

Environmental Screening Report

1. Project Identification

Project title	
Project Proponent	

2. Project Location

Location (*relative to the nearest town, highway*)	
Definition of Project Area *(The geographical extent of the project & areas affected during construction)*	
Adjacent land and features	

3. Project Justification

Need for the project (*What problem is the project going to solve*)	
Purpose of the project (*what is going to be achieved by carrying out the project*)	
Alternatives considered (*different ways to meet the project need and achieve the project purpose*)	

4. Project Description

Proposed start date	
Proposed completion date	
Estimated total cost	
Present land ownership	
Description of the project (*with supporting material such as maps, drawings etc. attached as required*)	
Project Management Team	Agency – Contact person -

	Nature of consultation and input received

5. Description of the existing environment

5.1 Physical features – Ecosystem components	
Topography and terrain	
Soil (*type and quality*)	
Surface water (*sources, distance from the site, local uses and quality*)	
Ground water (*sources, distance from the site, local uses and quality*)	
Flooding	
Air quality (*any pollution issues*)	
Noise level and vibration *(Any anticipated issues)*	
5.2 Ecological features – Eco-system components	
Vegetation (*trees, ground cover, aquatic vegetation*)	
Presence of wetlands	
Fish and fish habitats	
Birds (*waterfowl, migratory birds, others*)	
Presence of special habitat areas (*special designations and identified sensitive zones*)	
The site is a known area of Elephant Habituation (verify site location with DWC if elephants are recorded from the project site historically)	
Does the site require particular mitigation, including elephant fences, warning signs etc.	
5.3 Physical Cultural Resources (PCR)	
PCR resources in the area (*recorded or potential to exist)*	

Type of PCR	
Distance from the project site	
Ownership	
Protection status	
National/regional/local significance	
5.4 Other features	
Residential/Sensitive Areas (*Eg, Hospitals, Schools*)	
Traditional economic and cultural activities	

6. Public Consultation

Public consulted	Consultation method	Date	Details/Issues raised

7. Screening for Potential Environmental Impacts

	Screening question	**Yes**	**No**	**Significance of the effect (Low, moderate, high)**	**Remarks**
1	Will construction and operation of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)				
2	Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?				
3	Will the Project produce solid wastes during construction or operation?				

4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?				
5	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				
6	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater or coastal wasters?				
7	Will the project cause localized flooding and poor drainage during construction? Is the project area located in a flooding location?				
8	Will there be any risks and vulnerabilities to public safety due to physical hazards during construction or operation of the Project?				
9	Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected by the project?				
10	Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the project?				
11	Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the project?				
12	Are there any other areas on or around the location which are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other water bodies, mountains, forests which could be affected by the project?				
13	Is the location within or adjacent to the coastal zone? If so, what is the distance to the coast?				
14	Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, migration, which could be affected by the project?				
15	Are there mangrove, coral reef, sea grass bed, turtle beach habitats etc. within close proximity?				
16	Is the project located in a previously undeveloped area where there will be loss of green-field land?				
17	Will the project cause the removal of trees in the locality?				

18	Can any of the identified historic or culturally importance sites on or around the location be affected by the project?				
19	Are there existing land uses on or around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project?				
20	Are there any areas on or around the location which are densely populated or built-up, which could be affected by the project?				
21	Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project?				
22	Are there any areas on or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?				
23	Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?				
24	Will the project involve treatment of Solid Waste, if so indicate the amounts, nature of waste and briefly describe proposed waste management technologies to be implemented on site?				

8. Project operating requirements

	Screening question	**Yes**	**No**
1	Does the project belong to a prescribed category of the National Environmental Act		
2	Does the project need to obtain clearances from the following agencies?		
	a. Department of Archaeology		
	b. National Building Research Organization		
	c. Coast Conservation Department		
	d. Forest Department		
	e. Department of Wildlife Conservation		
	f. Any other:		

Screening report completed by	Date

	If so, describe		

9. Conclusion and Screening Decision

Summary of environmental effects:
Assuming that all mitigation measures are implemented as proposed, the following effects cane be predicted

	N/S - Effect not significant, or can be rendered insignificant with mitigation
	SP - Significant positive effect
	SN - Significant negative effect
	U - Outcome unknown or cannot be predicted, even with mitigation

10. Screening Decision Recommendation (check one):

	No physical investments and therefore no significant impacts. Category C
	All potentially adverse effects can be classified as general construction related impacts and are mitigatable with known technology. Public concern does not warrant further assessment. Therefore, standalone Environmental Assessment not required, an Environmental Management Plan would be sufficient. Category B
	Potential adverse impacts are significant, hence, standalone Environmental Assessment and Management Plan needed before the project can proceed Category A or B with substantial risks
	Potential adverse impacts are irreversible and cannot be mitigated cost effectively; hence project cannot be justified Project will not be financed.

11. Details of Persons Responsible for the Environmental Screening

Name/Designation/Contact information	*Signature*
Screening report reviewed by *Name/Designation/Contact information*	**Date** *Signature*
Approved by *Name/Designation/Contact information*	**Date** *Signature*

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 23rd February 1995 and Gazette Extra Ordinary No. 1373/6 of 29th 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 its 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 from 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.

(1) Grant approval for the implementation of the proposed project subject to specified conditions, or
(2) 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 an in operative within the North-western Province with effect from 10th January 1991.

Operational Framework for Implementation of EIA under national regulations

Activity	Agency	Duration
Submitting Preliminary information - 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
Environmental Scoping - Then the PAA will carry out scoping and Terms of	PAA	2 months

Reference (ToR) for the EIA/IEE will be issued to the project proponent		
EIA/ IEE report preparation	Proponent	3 months
Public participation and evaluation - 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 (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.	PAA	3 months
Decision making - 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	PAA	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: Sample Terms of Reference for Category A and B Environmental Assessment

An environmental assessment (EA) report for a Category A project1 focuses on the significant
environmental issues of a project. The report's scope and level of detail should be commensurate with the project's potential impacts. The report submitted to the Bank is prepared in English, and
the executive summary in English.

The EA report should include the following items (not necessarily in the order shown):

(a) *Executive summary*. Concisely discusses significant findings and recommended actions.

(b) *Policy, legal, and administrative framework*. Discusses the policy, legal, and administrative framework within which the EA is carried out. Explains the environmental requirements of any co-financiers (if any), the World Bank policy requirements and national safeguard regulations. Identifies relevant international environmental agreements to which the country is a party that is relevant to the project.

(c) *Project description*. Concisely describes the proposed project and its geographic, ecological, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power plants, water supply, housing, material extraction sites, and raw material and product storage facilities). Indicates the need for any resettlement plan or indigenous peoples' development plan (see also subpara. (h)(v) below). Includes a map showing the project site and the project's area of influence.

(d) *Baseline data*. Assesses the dimensions of the study area and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Also takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigatory measures. The section indicates the accuracy, reliability, and sources of the data.

(e) *Environmental impacts*. Predicts and assesses the project's likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any residual negative impacts that cannot be mitigated. Explores opportunities for environmental enhancement. Assess cumulative impacts. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specifies topics that do not require further attention. If there are any associated facilities/linked activities, an audit need to be undertaken to ensure these facilities/activities are being managed that is acceptable manner using the Annex 14.

(f) *Analysis of alternatives*.3 Systematically compares feasible alternatives to the proposed project site, technology, design, and operation--including the "without

project" situation--in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where feasible. States the basis for selecting the particular project design proposed and justifies recommended emission levels and approaches to pollution prevention and abatement.

(g) Environmental management plan (EMP). Covers mitigation measures, monitoring, and institutional strengthening.

(h) Appendixes

i. List of EA report preparers--individuals and organizations.
ii. References--written materials both published and unpublished, used in study preparation.
iii. Record of consultation meetings, including consultations for obtaining the informed views of the affected people and other stakeholders. The record specifies any means other than consultations (e.g., surveys) that were used to obtain the views of affected groups and stakeholders.
iv. Tables presenting the relevant data referred to or summarized in the main text.
v. List of associated reports (e.g., resettlement plan or indigenous peoples' development plan).

Annex 5: Basic Information Questionnaire of the CEA

APPLICATION NO	

CENTRAL ENVIRONMENTAL AUTHORITY

BASIC INFORMATION QUESTIONNAIRE

(Essential information to determine the environmental approval requirement of projects)

1 Name of the Project:

2 Name of the Developer:
(Company/firm/individual)

Postal Address:

Phone No: *Fax No*:

Contact person
Name
Designation:
Phone No: *Fax No:*

3 Brief description of the project (Use a separate sheet)
Attach copy (ies) of pre-feasibility / feasibility study report (s) if available

4 Scale / magnitude of the project:
(e.g. For a road project: Length of the trace; Tourist hotel: No. of rooms; Agriculture project: Extent of land, solid waste management projects: capacity per/day etc.)

5 Main objective(s) of the project:

6 Investment and Funding sources:

7 Location of the Project
- i Pradeshiya Sabha:
- ii Divisional Secretariat:
- iii District
- iv Provincial Council

Provide a location map indicating the project site, access to the site, surrounding development and infrastructure within 500 m of the site (1:50000 scale).

8 Extent of the project area (in ha):
A copy of the survey plan of the site

9 Does the project wholly or partly fall within any of the following areas?

Area	Yes	No	Unaware
100m from the boundaries of or within any area declared under the National Heritage Wilderness Act No 4 of 1988			
100m from the boundaries of or within any area declared under the Forest Ordinance (Chapter 451)			
Coastal zone as defined in the Coast Conservation Act No 57 of 1981			
Any erodable area declared under the Soil Conservation Act (Chapter 450)			
Any Flood Area declared under the Flood Protection Ordinance (Chapter 449)			
Any flood protection area declared under the Sri Lanka Land Reclamation and Development Corporation Act 15 of 1968 as amended by Act No 52 of 1982			
60 meters from the bank of a public stream as defined in the Crown Lands Ordinance (Chapter 454) and having width of more than 25 meters at any point of its course			
Any reservations beyond the full supply level of a reservoir .			
Any archaeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188).			
Any area declared under the Botanic Gardens Ordinance (Chapter 446).			
Within 100 meters from the boundaries of, or within, any area declared as a Sanctuary under the Fauna and Flora Protection Ordinance (Chapter 469)			
100 meters from the high flood level contour of or within, a public lake as defined in the Crown Lands Ordinance (Chapter 454) including those declared under section 71 of the said Ordinance			
Within a distance of one mile of the boundary of a National Reserve declared under the Fauna and Flora Protection Ordinance			

10 Present ownership of the project site:

State	Private	Other-specify

If state owned, please submit a letter of consent of the release of land from the relevant state agency

11 Present land use:

12 Present land use : (Please tick the relevant cage/s)

Land use Type		**Land use Type**	
Paddy		Marsh / Mangrove	
Tea		Scrub / Forest	
Rubber		Grassland / Chena	
Coconut		Built-up area	
Other Plantations / Garden		Other (pl. specify)	

13 Does the site /project require any

	Yes	No	If yes give the extent (in ha)
Reclamation of land, wetlands			
Clearing of forest			
Felling of trees			

14 Does the project envisage any resettlement

Yes	No	If yes, give the number of families to be resettled

15 Does the project envisage laying of pipelines

Yes	No	If yes, give the length of the pipeline (km)

16 Does the project involve any tunnelling activities

Yes	**No**

17 Proposed timing and schedule including phased development:

18 Applicable laws, regulations, standards and requirements covering the proposed project:

19 Clearances / permits obtained or should be obtained from relevant state agencies and / or local authorities. *(Attach required copies of the same)*

The above information is accurate and true to the best of my knowledge. I am aware that this information will be utilized in decision-making by the relevant state authorities.

.....……. …….....

Date **Signature of Applicant**

Annex 6: Format for Environmental Management and Monitoring Plan

Objective and Scope of Preparation of Environmental Management and Monitoring Plan

In order to ensure short and long term environmental impacts that would arise due to improvement and rehabilitation work (to be described in the first section based on the sub-project/activity), an EMP/SIMP/ESMP will need to be developed as per the scope presented below and in accordance with the EAMF and the RPF of the Project. The project should be reviewed and used as the basis for baseline information. Field level verification should be conducted prior to the preparation of the EMP/SIMP/ESMPs:

1. *Identification of impacts and description of mitigation measures:* Firstly, Impacts arising out of the project activities need to be clearly identified. Secondly, feasible and cost-effective measures to minimize impacts to acceptable levels should be specified with reference to each impact identified. Further, it should provide details on the conditions under which the mitigatory measure should be implemented (ex; routine or in the event of contingencies) The EMP/SIMP/ESMP also should distinguish between type of solution proposed (structural & non-structural) and the phase in which it should become operable (design, construction and/or operational).
2. *Enhancement plans:* Positive impacts or opportunities arising out of the project need to be identified during the preparation of the check list and Environmental Assessment process where applicable. Some of these opportunities can be further developed to draw environmental and social benefits to the local area. The EMP/SIMP/ESMP should identify such opportunities and develop a plan to systematically harness any such benefit.
3. *Monitoring programme:* In order to ensure that the proposed mitigatory measures have the intended results and complies with national standards and donor requirements, an environmental performance monitoring programme should be included in the EMP/SIMP/ESMP. The monitoring programme should give details of the following;
   - Monitoring indicators to be measured for evaluating the performance of each mitigatory measure (for example national standards, engineering structures, extent of area replanted, etc.).
   - Monitoring mechanisms and methodologies
   - Monitoring frequency
   - Monitoring locations
4. *Institutional arrangements:* Institutions/parties responsible for implementing mitigatory measures and for monitoring their performance should be clearly identified. Where necessary, mechanisms for institutional co-ordination should be identified as often monitoring tends to involve more than one institution.
5. *Implementing schedules:* Timing, frequency and duration of mitigation measures with links to overall implementation schedule of the project should be specified.
6. *Reporting procedures:* Feedback mechanisms to inform the relevant parties on the progress and effectiveness of the mitigatory measures and monitoring itself should be specified. Guidelines on the type of information wanted and the presentation of feedback information should also be highlighted.
7. *Cost estimates and sources of funds:* Implementation of mitigatory measures mentioned in the EMP/SIMP/ESMP will involve an initial investment cost as well as recurrent costs. The EMP/SIMP/ESMP should include costs estimates for each measure and also identify sources of funding.

8. *Contract clauses:* This is an important section of the EMP/SIMP/ESMP that would ensure recommendations carried in the EMP/SIMP/ESMP will be translated into action on the ground. Contract documents will need to be incorporated with clauses directly linked to the implementation of mitigatory measures. Mechanisms such as linking the payment schedules to implementation of the said clauses could be explored and implemented, as appropriate.

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

Activity	Environmental Impact	Social Impact	Proposed Mitigatory Action	Location	Frequency of Implementation/ Application	Implementation Responsibility	Monitoring Responsibility	Monitoring Frequency	Implementation Progress
	Pre-Construction Phase								
	Construction Phase								
	Demobilization Phase								
	Operational Phase								

Important to note the following when using this template:

The EMP/SIMP/ESMP that will be prepared should have all sections in place, except the last column on Implementation Progress

What go in as the EMP/SIMP/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 EMP/SIMP/ESMP that goes into the bid and contract documents of construction contractors

Important to note: The consultant is responsible to ensure the EAMF requirements are taken into consideration in the designing of infrastructure.

The EMP/SIMP/ESMP Presentation

The EMP/SIMP/ESMP should follow the same sequence as the tasks described above including the EMP matrix provided above.

Consultant Qualifications

The design consultant team should include an expert with at least 10 years of experience preparing environmental management and monitoring plans for infrastructure construction, improvement and rehabilitation, costing of mitigation measures and preparing contractor clauses necessary to capture EMP/SIMP/ESMP implementation needs.

Reporting and feedback schedule

All submissions related to the assignment should be submitted to the Project Management Unit, as hard copies and electronically. The duration of the consultancy will be determined by the NAPPP in respect of each PPP project. During the final submission of the EMP/SIMP/ESMP report, if changes requested during the draft report stage have not been incorporated in a satisfactory manner to the client and the World Bank, the consultant will be required to work further on the document until it is considered satisfactory.

Annex 7: Generic Environmental Management Plan (EMP) for Construction of Ancillary Facilities as New Infrastructure and/or Rehabilitation of Existing Infrastructure.

The following Generic EMP identifies environmental 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. The EMP should be used in line with site screening and assessment in the preparation of site specific EMPs.

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
1.0	**Advance Works**					
	1.1	**Identifying Location for new infrastructure**				
		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	PPP partners	
	1.2	**Incorporation of Green Building Design**				
		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	PPP partners	
	1.3	**Design of slope protection / land-slide management structures**				
		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,	Design stage	Design cost	PPP partners	

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		etc.) Application of locally regulated building codes to ensure structural integrity Certification of designing and constructing infrastructure, the applicability and appropriateness of structural criteria				
	1.3	**Environmental Management Plan (EMP)**				
		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	
2.0	**Construction Phase**					
	2.1	**Earthwork and Soil Conservation**				
	2.1.1	**Site Clearance and Land Development**				
		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 During removing, attention should be paid to maintain minimum disturbances to soil cover and also care should be taken not to damage adjoining trees. 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	Applicable throughout the construction areas	Engineering cost	Contractor, IA	PPP partners
	2.1.2	**Disposal of Debris and Spoil**				
	(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. All material that is reusable or recyclable shall be used for such purposes either by the contractor or through dealers.	Disposal sites to be identified by the contractor and approved by Engineer.	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(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)	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)	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			
	2.1.2	**Conservation and reuse of top soil**				
	(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	Within the project sites where topsoil from productive land to be	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		the direction from the engineer in writing	removed			
	(b)	Removed top soil could be used as a productive soil when replanting/establishing vegetation	Site(s) identified for replantation program			
	(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	-		
	2.1.3	**Protection of Ground Cover and Vegetation**				
	(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	PPP partners
	(b)	Contractor should provide necessary instructions to drivers, operators and other construction workers not to destroy ground vegetation cover unnecessarily	Within the project areas			
	2.1.4	**Burrowing of Earth**				
	(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	PPP partners
	(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	All burrow sites identified and used by the			

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		excavation and transportation of earth from such sites. 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	contractor			
	(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		
	2.1.5	**Prevention of soil erosion**				
	(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	PPP partners

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		
	2.1.6	**Contamination of soil by fuel and lubrications**				
	(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	PPP partners
	(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				PPP partners
	(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			

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		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			PPP partners
	2.1.7	**Disposal of harmful construction wastes**				
	(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	PPP partners
	(b)	All disposal sites should be approved by the engineer and approved by CEA and relevant local authority.				PPP partners
	(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			
	2.1.8.	**Quarry operations**				
	(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	All, quarry sites which will be used during construction	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		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. Quarry sites should not be established within protected sites identified under the FFPO and FO	phase.			
	(b)	It is recommended not to seek material from quarries that have on-going disputes with community.		-		
	(c)	The maintenance and rehabilitation of the access roads in the event of damage by the contractor's operations shall be a responsibility of the contractor.		Engineering cost		
	2.2	**Storage and handling of construction material**				
	2.2.1	**Emission of dust**				
	(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	PPP partners
	2.2.2	**Storage of fuel, oil and chemicals (avoid fumes and offensive odor)**				
	(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	At all material storage locations (cement, bitumen, fuel, oil and other chemicals used for construction activities)	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		accidents and risks to worker population and public.				
	2.2.3	**Transportation of material**				
	(a)	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. If there are damages to local roads and other utilities due to hauling in roads which were not identified during design stage, Contractor shall attend to repair all damaged infrastructure/ roads, if needed through relevant authorities	Within the project locations and the vicinity	-	Contractor	PPP partners
	2.3	**Water – Protection of Water Sources and Quality**				
	2.3.1.	**Loss of minor water sources and disruption to water users**				
	(a)	Contractor should make employees aware on water conservation and waste minimization in the construction process.	Project sites and worker camps	-	Contractor	PPP partners
	(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		

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(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 contractor's 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			
	(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	-		
	2.3.2	**Siltation into water bodies**				
	(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	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		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				
	2.3.3	**Alteration of drainage paths**				
	(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	PPP partners
	(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.				
	2.3.4.	**Contamination of water from construction wastes**				
	(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.,	At all water courses located adjacent	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		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.	construction sites and downstream			
	(b)	Avoid / minimize construction works near / at such drainage locations during heavy rainy seasons	At all water courses located adjacent construction sites	-		
	(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		
	2.3.5.	**Contamination from fuel and lubricants**				
	(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	PPP partners
	(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			
	2.3.6.	**Locating, sanitation and waste disposal in construction camps**				
	(a)	Locations selected for labour camps should be approved by engineer and	At all labour	Engineering	Contractor	PPP

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		comply with guidelines/ recommendations issued by the CEA/Local 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.	camps	cost		partners
	(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		
	2.3.7.	**Wastage of water and waste minimization**				

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	PPP partners
	(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.				
	2.3.8.	**Extraction of water**				
	(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	PPP partners
	(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			
2.4.	**Flood Prevention**					
	2.4.1.	**Blockage of drainage paths and drains**				
	(a)	Contractor's activities shall not lead to flooding conditions as a result of	All construction	Engineering	Contractor	PPP

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		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.	work sites	cost		partners
	(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.				
	2.4.2	**Work in Flood Prone Areas**				
	(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	PPP partners
	(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.				
	2.5	**Air Pollution**				
	2.5.1.	**Generation of Dust**				
	(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 sand, rubble, bitumen, cement and all sub roads used for material transportation, paying special attention to sensitive	Engineering cost	Contractor	PPP partners
	(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 roadway (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)				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(g)	All cleared areas shall be rehabilitated progressively.	locations.			
	(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 sub-contractor 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.				
	2.5.2	**Emission from Hot-Mix Plants and Batching Plants**				
	(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	PPP partners
	(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				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	2.5.3.	**Odor and offensive smells**				
	(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	PPP partners
	(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			
	2.5.4.	**Emission from construction Vehicles, Equipment and Machinery**				
	(a)	The emission standards promulgated under the National Environment Act shall be strictly adhered to.	All plants, machinery and vehicles used for construction	-	Contractor	PPP partners
	(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				
	2.5.5.	**Air Pollution from Crusher**				
	(a)	Crusher plants should operate under an EPL and shall confirm to relevant	Location of	-	Contractor	PPP

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		dust emission levels as stated in the EPL. Only the quarries approved by GSMB and holding current EPL shall be used for material extraction.	crusher plants			partners
	(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		
	2.6	**Noise Pollution and Vibration**				
	2.6.1	**Noise from Vehicles, Plants and Equipment.**				
	(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	PPP partners
	(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).	All equipment, machinery and vehicles used for construction	-		

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(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.	works	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			
	2.6.2	**Vibration**				
	(a)	Contractor shall take appropriate action to ensure that construction works do not result in damage to adjacent properties due to vibration.	Within the construction sites and their vicinity	-	Contractor	PPP partners
	(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 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.				
	2.6.3	**Noise from Blasting or Pre-splitting Operations**				
	(a)	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.	At quarry sites and landslide mitigation sites	-	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		Only chemical blasting where rocks have to be removed for landslide mitigation measures				
	2.7	**Impacts to Flora**				
	2.7.1	**Loss or Damage to Trees and Vegetation**				
	(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	PPP partners
	(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 the contractor.	Engineering cost		

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
			Planting should take place as soon as the plant removal takes place			
	2.7.3	**Spread of Invasive Plant Species**				
		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. Close monitoring of transportation, storage of borrowing material for the spread of any invasive species must be done. Vehicles should be covered during transportation of cleared vegetation to and from the construction site. 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 burrow material. Washing the vehicles should be conducted periodically to prevent carrying any invasive species The construction site should be inspected periodically to ensure that no invasive species are establishing themselves at the site.			Contractor	PPP partners
	2.7.2	**Chance finds of important Flora**				
	(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	PPP partners
	2.8.	**Impact on Fauna**				
	2.8.1	**Loss, Damage or Disruption to Fauna**				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	.					
	(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	PPP partners
	(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		
	2.8.2	**Chance found important Fauna**				
	(a)	During construction, if a rare/threatened/endangered fauna species is found, it shall be immediately informed to the relevant agency 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.	All project sites	-	Contractor	PPP partners
	2.9	**Disruption to people**				
	2.9.1	**Loss of Access**				
	(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	PPP partners
	(b)	The works shall not interfere unnecessarily or improperly and ensure convenience of public at all times		-		

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(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.				
	2.9.3	**Traffic Control and Safety**				
	(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	PPP partners
	(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			
	2.10	**Accidents and Risks**				
	2.10.1	**Public and Worker safety**				
	(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 storage and worker camps	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(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.				
	(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.				
	2.10.2	**Prevention of Risks of Electrocution**				
	(a)	All electrical wiring and supply related work should confirm 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.	Construction areas, material storage and worker camps	Engineering cost	Contractor	PPP partners
	2.10.3	**Risk at Hazardous Activity**				
	(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	PPP partners
	(b)	The use of any toxic chemical shall be strictly in accordance with the				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		manufacturer's instructions. The Engineer shall be notified of toxic chemicals that are planned tobeused 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.				
	2.10.4	**Lead Pollution**				
	(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	PPP partners
	2.10.5	**Handling of Explosives**				
	(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	PPP partners
	(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		PPP partners
	2.11	**Health and Safety**				
	2.11.1	**Prevention of Vector based Diseases**				
	(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,	At worker camps, stores, yards	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		containers, 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.				
	2.11.2	**Workers Health and Safety**				
	(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	PPP partners
	2.11.3	**First Aid**				
	(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	PPP partners
	2.11.4	**Potable Water**				
	(a)	In every workplace and labour camps portable water shall be available throughout the day in sufficient quantities.	Within construction sites, quarry, crusher,	Engineering cost	Contractor	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
			concrete batching plants, workshops and worker camps			
	2.11.5	**Hygiene**				
	(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	PPP partners
	(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.				
	(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.				
	2.116	Gender				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	(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.				
	2.12	**Protection of Archaeological, Cultural and Religious Places and Properties**				
	2.12.1	**Prevention of damage to Cultural and Religious Places and Properties**				
	(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	PPP partners
	2.12.2	**Chance finds of Archaeological property**				
	(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	PPP partners
	(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.				
	2.13	**Environmental Enhancement**				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
	2.13.1	**Landscaping**				
	(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 contactor 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	PPP partners
	(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			
	2.14	**Handling Environmental Issues during Construction**				
	(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	PPP partners
	(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				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		received, with the action taken by the Environmental Officer on complains thereof.				
	(c)	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. • Grievances submitted in writing shall be referred to the IA/PMU by the safeguard officer of the Contractor through the Engineer. • 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. • 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				
	(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.				
3.0	**Operational stage**					
	3.1	**Hygienic Conditions**				
	(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	PPP partners
	3.2	**Solid Waste Management**				
	(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.	In all project sites	Maintenance cost	IA	PPP partners

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implementation	Supervision
		Daily collection should be conducted in facilities located within the PA boundaries.				
	3.3	**Mosquitoes and Vector Breading**				
	(a)	Regular checks should be conducted to ensure that there is no storm water collection and stagnation at the site which will facilitate the breading of mosquitoes. Clearing should be conducted accordingly to prevent collection and stagnation of water.	In all project sites	Maintenance cost	IA	PPP partners

Annex 8: 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

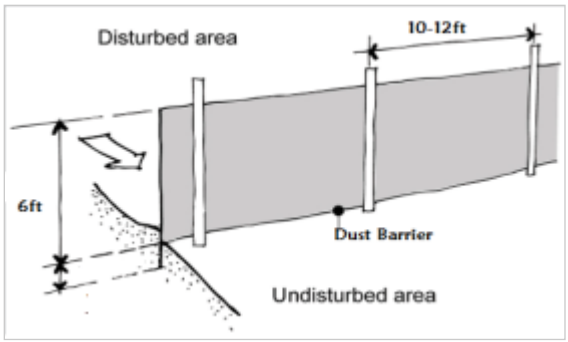
- Sites for storage of construction materials should be identified, without affecting the traffic and other common utilities that will lead to access issues as the compound is operational.
- All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled 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 sight. 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 time's 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
  - 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 of 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.

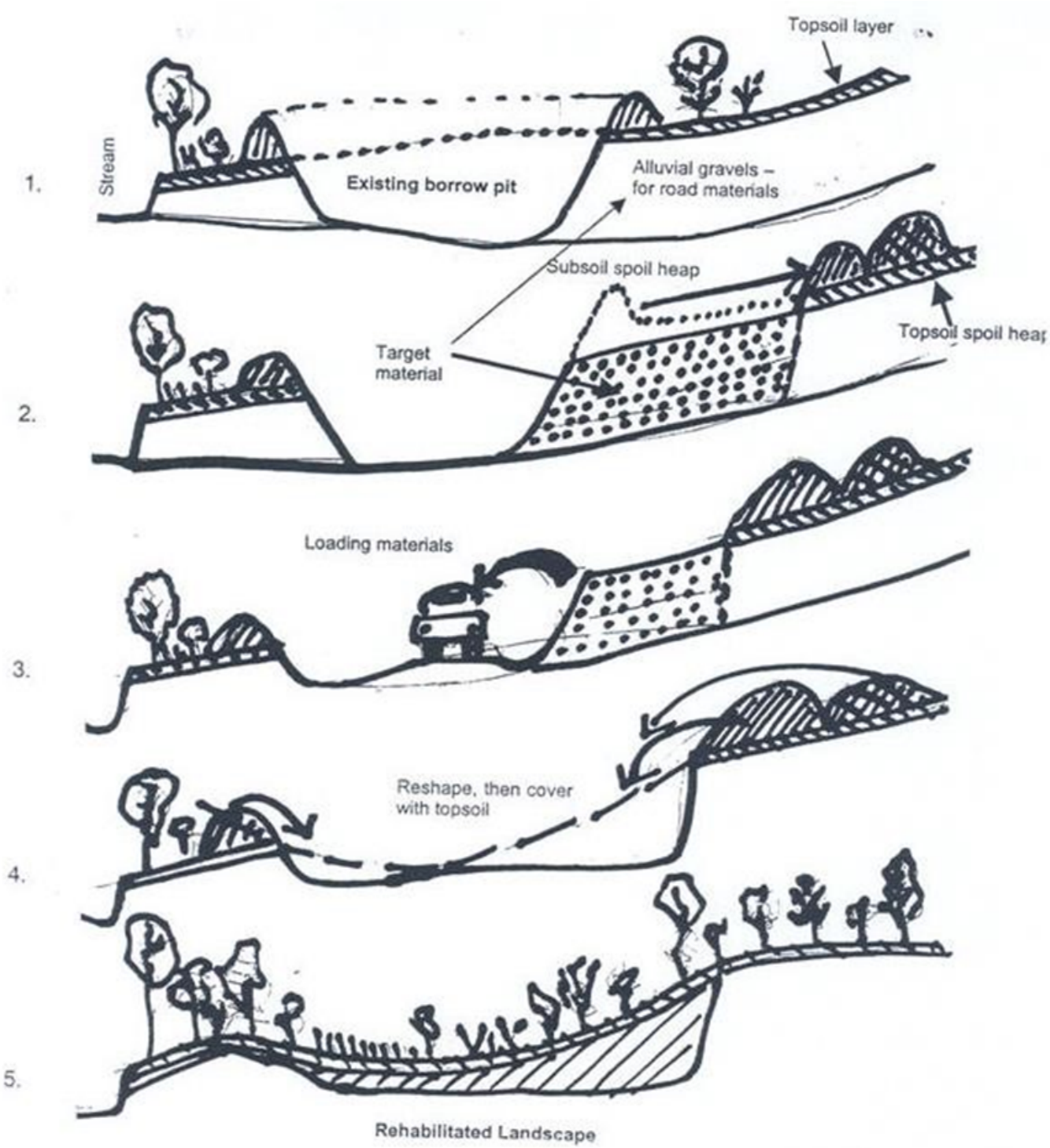
Chance Found Archaeological Property

- 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 9: 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 re-vegetation.

- 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 10: 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 or 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** o 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 11: 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 outsides 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 12: Guidelines for Chance find procedure for Physical Cultural Resources

Projects with 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 13: Terms of Reference for Environmental Assessment for sub-projects involving major dredging

Task 1 – Explain the objective of the project and what the propose interventions are going to achieve.

Task 2 – Description of the Proposed Project's Sub-Component.

The Consultant shall discuss with the implementing agency the detail design and project investment report to familiarize themselves with the contents of the proposed canal/lake rehabilitation and capacity enhancement work and shall, if deemed necessary, make comments on the contents of the designs at an early stage where it is considered that significant changes to the designs may be required to minimize environmental impacts. For each sub-component proposed under the investment, the Consultant shall provide a brief description of the work involved and the following using maps (at an appropriate scale) where necessary.

i. Site location and generally layout
ii. Detail designs
iii. Preconstruction activities
iv. Construction methodology including type of drdging equipment to be used
v. Method of dredge material loading and transporting
vi. Implementation schedule

Task 3 - Description of the Environment

Present baseline data on the relevant environmental characteristics of the proposed project area. (a) *Physical environment*: topography, land-use, soils, water sources, quality and distance from the project site, air quality, noise, vibration levels (if available)
(c) *Biological environment*: eco-system types and structure in the project area, bio-diversity in terms of fauna and flora, rare or endangered species, sensitive or significant natural habitats in both terrestrial and aquatic environments
(c) *Sociocultural environment*: key socio-economic features, uses and benefits from the project area

Task 4 - Determination of the Potential Impacts of the Proposed Project's subcomponents.

In this analysis, the Consultant will point out significant positive and negative impacts of the activities of, direct and indirect impacts, and immediate and long-term impacts. The Consultant will identify impacts that are unavoidable or irreversible. Special attention should be given to impacts during construction such as impacts on water quality, drainage, aquatic fauna, air quality, odour, noise, recreation etc. and most importantly dredge material handling, transport and disposal.

Task 5 - Analysis of Alternatives to the Proposed Project.

- The Consultant will 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 project concept and design, selection of dredging technology and machinery, dredge material management etc.

- The Consultant will compare alternatives in terms of potential environmental impacts, operating costs, reliability, suitability under local conditions, and institutional, training, and monitoring requirements.
- To the extent possible, the Consultant will quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the alternative of not constructing the project to demonstrate environmental conditions without it.

Task 6 - Development of an Environmental Management Plan (EMP).
The Consultant will develop an EMP in order to provide for control and execution of the excavation and construction work in compliance with GOSL and World Bank environmental regulations and requirements.

The EMPs should include measures to mitigate negative environmental impacts, identified in Task 4 above; The Consultant will estimate the impacts and costs of the mitigation measures and of the institutional and training requirements to implement them; Specifically, the EMP should dedicate a section as a dredge material disposal plan which will address the issue of dredge material handling and disposal and provide detail on the recommended method of disposal, controls to be implemented when loading, transporting and unloading the material, especially if contamination within the site has been established.

The EMPs should include a plan to monitor the environmental changes and the effectiveness of the mitigation measures; a regular schedule of monitoring the quality of surface and ground waters; including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures, monitoring, etc., measures for emergency response to accidental events (e.g. spillage of contaminated dredged maetrial), as appropriate, timely decision making process to resolve any significant impacts that are identified during the monitoring program, and a clear and transparent reporting procedure for environmental monitoring.

The EMP should also include measures to promote capacity building for environmental management in the implementing agency staff and contractors. In the EMP, the Consultant should provide a review of the authority and capability of institutions implementing the project and recommend steps to strengthen or expand them so that the EMP may be effectively implemented. The recommendations may extend to new laws and regulations, new agencies or agency functions, intersectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

Task 7 - Assist in Inter-Agency Coordination and Public Participation.
The Consultants shall assist the PMU and the implementing agencies in carrying out two public consultations (the first to present the projected impacts, collect public supplemental opinions and views, the second upon the completion of the draft EA Report) with project affected people and assist Inter-Agency Coordination as required by the OP 4.01. Assistance should be provided to PMU and the implementing agency in coordinating the EA with other government agencies, in obtaining their comments and views. In addition, the draft EA should be placed in the website of the project and the implementing agency for feedback from the general public. Feedback and comments from the public consultation process should be recorded and reflected in the EIAs and later on be incorporated in the final project design, if necessary.

Annex 14: Terms of Reference for the Environmental Audit for Associated Facilities/Linked Activities

1. Introduction to the project

To be filled

2. The Need for Environmental Assessment

All associated facilities and linked activities related to PPP projects are required to comply with World Bank Operational and Safeguard Policies triggered.

Accordingly, each associated facility/linked activity will require to undertake an audit to confirm to the standards required by the World Bank Safeguard Policies.

3. Objectives

The primary objective of this assignment is for the Consultant to carry out an environmental audit for associated facilities/linked activities. The consultant will review the application of the EAMF to the associated facilities/linked activities. In particular, the consultant will review (i) the environmental assessment that may have been carried out; (ii) environmental management and monitoring plans; (iii) application clearance procedures followed by the associated facilities/linked activities; (iv) , assess the conformity with conditions, environmental management and monitoring plans and other related documents; and (v) adequacy of the environmental assessment, environmental management and monitoring plans and compliance based on the World Bank safeguard policies. 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 associated facilities/linked activities proponent and contractors facilitated by the NAPPP. This may include, but not be limited to, relevant plans, drawings, screening reports, social analysis, standalone EA/EMP (if it has been necessary), etc..
- Review the above documents, discuss with the sub-project proponent as well as the surrounding community and visit the location and environs of the associated facility/linked activity.
- Check for conformity of the associated facility/linked activity 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 EAMF.
- 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 associated facility/linked activity 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 (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 15: Generic Social Impact Mitigation Plan (SIMP)

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
01	Access disturbances - Temporary Impact					
	Households/Businesses/institutions will have difficulties in access during construction works	Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for reporting any complaints.		Contractor's cost	Construction Contractor/ Relevant Line Ministry/line Agency/LA	During Construction
		Provide walkways and metal sheets where required to maintain access for people		-Do-	-Do-	-Do-
		Special care to be taken wherever the community sensitive areas are located (specified in the EMP) and accelerate the civil works in front of critical areas such as institutions, places of worship, business establishment, hospitals, and schools		-Do-	-Do-	-Do-
		Consult business and institutions regarding operating hours and factoring this into work schedules		-Do-	-Do-	-Do-
		Propose alternative access roads during construction period.		-Do-	-Do-	-Do-
		Do not damage or block the existing access road for residential areas during construction		-Do-	-Do-	-Do-
		Contractor will be instructed to use small excavating equipment as much as possible to avoid unanticipated damages.		-Do-	-Do-	-Do-
		In case of complete loss of motorable access leading to loss of business over a day, financial assistance @ SLR 1000/ per day per business owner from 1st until ease of access has been restored by the contractor.		Contractor cost	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
02	Pedestrians Safety Issues - Temporary Impact					
	Safety issues to pedestrians, vehicles and workers during construction using heavy equipment & machinery	Contactor must comply with the provisions in Health and Safety regulations under the Factory Ordinance with regards to provisions of health and safety measures, amenities at work places.		N/A	Construction Contractor/ Relevant Line Ministry/line Agency/LA	During Construction
		Alarm warning to the pedestrian, vehicle and workers using sign boards, fence, band tape, etc.		Contractor's Cost	-Do-	-Do-
		Ensure appropriate safety equipment, tools and protective clothing are provided to workers and that safe working methods are applied.		-Do-	-Do-	-Do-
		A safety inspection checklist should be prepared taking into consideration what the workers are expected to be wearing and monitored during specific construction activities.		N/A	-Do-	During construction/ Periodic monitoring
		Ensure prevention of risks from electrocution by regular inspection and maintenance of all electric power-driven machines used on the construction site. They must be kept away from permanent/ temporary pedestrian walkways.		N/A	-Do-	During Construction
		A temporary fence will be erected on near water bodies and or steep site slopes to avoid contact of public and workers with deep water bodies and steep slopes.		Contractor's Cost	-Do-	-Do-
		Ensure basic emergency aid service is in place in the work site as well in labour camps	Sites, contractor's Vehicle yard & Labour camps	-Do-	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
		Ensure training of basic health and safety be provided to the work force prior to commencement of construction with emphasis on all the above critical factors		-Do-	-Do-	Before starting construction
		Clear work camp sites after use and reinstate with vegetation	Labour camps	-Do-	-Do-	After construction
03	Traffic Congestion - Temporary Impacts					
	Traffic congestion would be aggravated due to construction works	Special traffic management plan and deploying additional traffic police should be put in place.		Contractor's Cost	Construction Contractor/ RDA/ Concerned government agency/ Developer/ LA	During Construction
04	Shifting of Common and Private Utilities - Permanent Impact					
	Shifting of Common and Private Utility Services	If the relocation of common utility services anticipated, prepare an inventory of utilities at proposed sites with assistance of service providers	Site	N/A	-Do-	Project Planning Stage
		Prepare relocation plans with service providers for utilities to be shifted.	-Do-	N/A	-Do-	Designing stage
		Liaise with NWS&DB, CEB, and SLT to obtain utility plans & shifting arrangement, machine operator awareness about utilities and plan rehabilitation routes and facility sites to avoid existing utilities wherever possible.	-Do-	N/A	-Do-	-Do-
		Arrange for service providers to attend to the site immediately to deal with any accidental damage to utilities.	When needed	Contractor cost	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
		Ensure the compensation for unexpected structural damages due to construction activities by Third Party Insurance Coverage		Project Cost	-Do-	Before start the construction
		If any public or private structures are damaged (including by vibration), replace the structures or compensate owners.	-Do-	Insurance Coverage	-Do-	During construction
05	Siting of construction camps, labour camps, stock yards and managing the risk of adverse impacts on communities from temporary project induced labour influx - Temporary Impact					
	If construction camps, labour camps, stock yards, vehicle refuelling areas etc. are located near sensitive areas such as wetlands, conservation zones and places of scenic beauty or recreational value, or any water body, those areas may be adversely affected. The risks of adverse impacts on communities from temporary project induced labour influx.	Care will be taken not to disturb sensitive areas and avoid highly residential areas when selecting sites to locate construction camps, labour camps, stock yards, vehicle refuelling areas etc. and the layout of such place should be approved by the supervision consultant	Camps/Yards	N/A	Construction Contractor/ Concerned government agency/ Developer/ LA	During construction
		Accumulation of water due to blocking of drains due to construction activities should be mitigated by removal of soil and debris from the dumping yards to avoid flooding event.	Entire drains section	Contractor Cost	-Do-	-Do-
		Maintain a sound waste management system within the camps and the site and do not allow to dispose the garbage, waste water as well as sewerage water to open places/land	Camps/ Yards/ Site	-Do-	-Do-	-Do-
		Make the contractors aware of advantages in giving priority to selecting labour from project influenced areas/local communities so as to minimise need for erecting labour camps and minimise labour influx.	N/A	N/A	Developer/ Concerned government agency/ Developer/ LA	-Do-
		Introduce Worker Code of Conduct as part of	N/A	Contractor Cost	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
		employment and sanctions/penalties for non-compliance				
		Strengthen law enforcement activities around worker camps and work sites	-Do-	-Do-	-Do-	-Do-
		Establish a grievance redress mechanism for workers and host communities	-Do-	-Do-	-Do-	-Do-
		Frequent supervision of labours' activities, labour welfare activities, basic needs provided for labours, hygienic condition of the camps/ sites	Camps/ Yards/ Sites	N/A	Concerned government agency/ Developer/ LA	-Do-
		Avoid illegal lodging arrangements by workers of contractors	Camps/ Yards/ Sites and project impact area	N/A	-Do-	-Do-
		Avoid social conflicts or tension and prevalence of gender-based violence.	-Do-	N/A	-Do-	-Do-
		Conduct awareness programmes to labourers on hygienic status including sexually transmitted diseases	Camps/Yards	Contractor's Cost	-Do-	-Do-
		Conduct cultural sensitization programmes for workers regarding engagement with local communities	-Do-	-Do-	-Do-	-Do-
		Receive timely feedback from local/host communities	-Do-	-Do-	-Do-	-Do-
		Contractor should adopt formal recruitment procedures to avoid ad-hoc recruitment of labourers	-Do-	-Do-	-Do-	-Do-
		Mandatory and continuous awareness raising for workers to refrain from unacceptable conduct of behaviour	-Do-	-Do-	-Do-	-Do-
		Keep a complaints/ grievances box and establish	-Do-	-Do-	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
		a labour GRM to report their grievances				
		Prepare an inventory (including names/ National ID numbers/ addresses etc.) of entire labour force employed by contractor, and share with the concerned line Agency/Ministry. This inventory shall be regularly updated.	-Do-	-Do-	-Do-	-Do-
06	Dust, Noise and Vibration - Temporary Impact					
	Dust, Noise and Vibration during construction and night work will cause inconveniences/ disturbances to the residents	Follow guidelines stipulated in the Environmental Management Plan (EMP)	Sites	Contractor's Cost	Concerned government agency/ Developer/ LA	During construction
		Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively	-Do-	-Do-	-Do-	-Do-
		Use the temporary and permanent dumping site as directed in contract document with Engineer supervision and guided by EMP	-Do-	-Do-	-Do-	-Do-
07	Parking of Contractor's vehicles along the Road - Temporary Impact					
	Parking of vehicles along the road especially in residential areas.	Contractor shall rent out suitable places for parking of vehicles used for rehabilitation works which may lead to inconvenience to communities	-Do-	-Do-	-Do-	-Do-
08	Social Mobility Issues - Temporary Impact					
	Social mobility issues (community integration sensitivities)	Safeguard Officer (Environment & Social) appointed by the contractor need to liaise with stakeholders and build up the community integration.	N/A	-Do-	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
09	Occupational Health and Safety - Temporary Impact					
	Occupational hazards which can arise from working in subproject	Develop and implement site-specific Health and Safety (H&S) plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment (PPE); (c) H&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work- related accidents;	-Do-	-Do-	-Do-	-Do-
		Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site	-Do-	-Do-	-Do-	-Do-
		Provide medical insurance coverage for workers	-Do-	-Do-	-Do-	-Do-
		Secure all installations from unauthorized intrusion and accident risks	-Do-	-Do-	-Do-	-Do-
		Provide suppliers of potable water and clean eating place where workers are not exposed to hazardous or noxious substances	-Do-	-Do-	-Do-	-Do-
		Provide H&S training to all new workers to ensure that they are appraised of the basic site rules of work at the site, personal protection, and preventing injuring to fellow workers	-Do-	-Do-	-Do-	-Do-
		Provide visitors if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted	-Do-	-Do-	-Do-	-Do-
		Ensure moving equipment is outfitted with audible back-up alarms	-Do-	-Do-	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
		Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate	-Do-	-Do-	-Do-	-Do-
10	Lack awareness & gender base violence issues of workers - Temporary Impact					
	Absence of enough sanitary facility for female workers, child labour, wage disparity, entitlements for leave, lack of awareness for workers, encouraging local community for works.	Provide water and sanitation facilities for employees/labourers as per IFC 2009 standards (1 toilet/15 persons) and separate facilities for men and women.	-Do-	-Do-	-Do-	-Do-
		Equal participation of women for the work shall be encouraged and ensure wage parity during the implementation of sub projects according to GoSL's labour policy, women are given equal pay for work of equal value. (This will be included in the contractual agreements)	-Do-	-Do-	-Do-	-Do-
		Prevent employing children under 16 years of age and young persons in the age group of 16 and 18 years; Equal opportunities should be given to both males and females in work assignments and depending on the type of work, underground works can be carried out regardless of gender.	-Do-	-Do-	-Do-	-Do-
		Train employees in the storage and handling of materials which can potentially cause soil contamination and precaution should be followed during construction	-Do-	-Do-	-Do-	-Do-

No	Adverse Social Impacts	Mitigation Measures	Location/ Place	Implementing Cost	Responsibility	Time Frame
		Contractor is expected to select the labour force from the local community as much as possible if the skilled people are available. Prior to recruiting the labour, the Contractor should inform the people in the surrounding area at least 5 days before the selection takes place by announcing through a public announcement system and by displaying posters in public places of the relevant villages (Any person within 3 km of the work site).	-Do-	-Do-	-Do-	-Do-
		Entitlement of Leave for workers according the Shop and Office Employees (Regulation of Employment and Remuneration) Act	-Do-	N/A	-Do-	-Do-
11	Handling complains from community - Temporary Impact					
	Pedestrians, vehicles, residential & commercial community and workers of construction site make complaints regarding inconveniences due to construction works.	Conduct GRC meetings once a month or when needed with community representatives from site impact area	N/A	Contractor Cost	-Do-	-Do-
		Keep complaint registry at site office as well as at the Project office	N/A	-Do-	-Do-	-Do-

Annex 16: Generic Session Plan for Staff Training on EAMF

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, EAMF, 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	
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	1hr	Lecture, Discussion	A Sheet describing the roles and responsibilities of each individual of	Laptop, Multimedia projector, Flip charts & Pens	

No	Subject	Purpose	Time	Session Structure	Materials	Aids	Potential Resource Person
		they can do the work assigned in the best manner.			project administrative structure.		
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 17: 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 [NAME OF THE PROJECT] PROJECT

The above-mentioned **Name of Instrument** has been prepared by the **Name of Ministry/Implementing Agency** for the World Bank Funded Emergency Solid Waste Management 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
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 18: References

Following publications, documents and websites have been referenced in drafting the country environment background and the status of long-list of sectors proposed for PPP transactions.

1. ADB and UNDP, 2017. 100% Electricity Generation Through Renewable Eneregy by 2050: Assessment of Sri Lanka's Power Sector. 106pp.
2. and Forest Degradation in Sri Lanka*:* Assessment of Key Policies and Measures. 120pp.
3. Biodiversity Secretariat, 2014. Sri Lanka's Fifth National Report to the Convention of Biological Diversity 2014. 127pp.
4. CCRMD, 2016 Coastal Zone and Coastal Resource Management Plan.
5. Department of Census and Statistics, 2012. Population and Household Survey 2012. 256pp.
6. Department of Census and Statistics, 2017. Household Income and Expenditure Survey – 2016.
7. Department of Census and Statistics, 2017. Sri Lanka Labour Force Survey Annual Report 2016.
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