Initial Environmental Examination

August 2020

Sri Lanka: Science and Technology Human Resource Development Project: Rajarata University of Sri Lanka —Proposed Faculty of Technology Building Complex

Prepared by Total Management Solutions for Rajarata University of Sri Lanka for the Asian Development Bank. This is an updated version of the draft originally posted in August 2018 available on https://www.adb.org/projects/documents/sri-50275-002-rrp.

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ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected Person
BO	Built operate
BIQ	Basic Information Questioner
BOQ	Bill of Quantities
BD	Building Department
CAP	Corrective Action Plan
CEA	Central Environmental Authority
CEB	Ceylon Electricity Board
COC	Certificate of Conformity
DBO	Design-built-operate
DMC	Developing Member Country
DOF	Forest Department
DPC	Damp-proof couse
DSD	Divisional Secretariat Division
DM	Disaster Management
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EPL	Environmental Protection Licenses
ESIA	Environmental and Social Impact Assessment
EMP	Environmental Management Plan
FT	Faculty of Technology
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GND	Grama Niladari Division
HSE	Health, Safety and Environment
IEE	Initial Environmental Examination
IP	Indigenous Peoples
IR	Involuntary Resettlement
IR DDR	Involuntary Resettlement Due Diligence Report
ILO	International Labor Organization
LFS	Labour force survey
M&E	Monitoring & Evaluation
MHECA	Ministry of Higher Education and Cultural Affairs
MOFP	Ministry of Finance and Planning

MMDE	Ministry of Mahaweli Development and Environment
MSL	Mean sea level
NEA	National Environmental Act
NIRP	National Involuntary Resettlement Project
NWRB	National Water Resources Board
NWSDB	National Water Supply and Drainage Board
PAA	Project Approving Authority/Agency
PBC	Performance Based Contracts
PIU	Project Implementation Unit
PMC	Project Management Consultant
PMU	Project Management Unit
PP	Project Proponent
REA	Rapid Environmental Assessment
RUSL	Rajarata University of Sri Lanka
SEP	Site Environment Plan
SLEC	State Level Empowerment Committee
SLLRDC	Sri Lanka Land Reclamation and Development Cooperation
SPS	Safeguard Policy Statement
STHRDP	Technology and Human Resource Development Project
TA	Technical Assistance
TDP	Technology Stream Degree Programmes
TMS	Total Management Solutions
UDA	Urban Development Authority
VEC	Valued Environment Component
WRB	Water Resource Board

EXECUTIVE SUMMARY

I. Government of Sri Lanka with loan funding from the Asian Development Bank (ADB) has proposed to implement Science and Technology and Human Resource Development Project (STHRDP). This subproject aims to increase the technology oriented workforce to transform Sri Lankans growing economy by supporting a series of universities across the country. The objectives of the IEE are to:

- Determine the category of the subproject depending on improvement proposal, environmental sensitivity and magnitude of impacts, i.e. screening as per Government of Sri Lanka's regulations and ADB's Safeguard Policy Statement 2009;
- Determine the requirement of statutory clearances;
- Baseline environmental monitoring and survey;
- Prediction of impacts on relevant environmental attributes and mitigation measures to minimize the impacts.

II. **The Subproject:** The subproject under study is the new Factually of Technology (FT) at University of Rajarata (RUSL). Phase I will involve the construction of proposed laboratory and administration building (3000 m^2), faculty library (600 m^2), industrial park area (550 m^2), auditorium (800 m^2) and waste water treatment plant, organic waste composting area and transformers.

III. The FT will provide training on bio process technology, food technology, electrical and electronic technology, materials technology, and information and communication technology. The University will enroll about 1570 students each year.

IV. **Description of the environment**: The proposed location for the Technology Faculty is in Mihinthale in Anuradhapura District, North Central Province, Sri Lanka. It is accessible through Puttalam- Anuradhapura- Trincomalee highway and is alongside it. Subproject site is located adjacent to the existing Rajarata University of Sri Lanka premises with the auditorium to be located within the main existing University Complex, however adjacent to the Technology Faculty (see Figure 05 for the siting of the buildings). The location coordinates are $8^0 21' 38.74''$ N latitude and $80^0 30' 12.18''$ E longitude. The government granted the university with 2 acre 14.9 perch land for the development of the new FT and a further 3 acre 15 perch acres for the auditorium.

V. This area faces several crucial environmental challenges including deforestation and non-demarcation of wildlife management areas, improper land use planning, presence of uncovered archeologically significant areas, human elephant conflict, water pollution due to agricultural activities, irregular practices of solid and liquid waste disposal etc. Some of these challenges are immediately relevant to the subproject and the others are relevant to the area of influence.

VI. **Policy, Legal and Administrative Framework and Sub Project Categorization:** As per the ADB's Safeguards Policy Statement of 2009 and based on the REA Checklist of ADB classification, the FT is categorized as Environment Category B. Since all due diligence was carried out in line with the SPS Environmental Policy Principals, no further assessments were carried out nor recommended.

VII. ADB IP safeguards were not triggered under this subproject. IR safeguards were triggered due to land acquisition and relocation of the District Secretary's, however, since it was voluntary relocation and carried out prior to ADB financing, the subproject will be Category C.

VIII. According to the BIQ and IEE/EIA environmental guidelines of Central Environmental Authority of Sri Lanka (CEA), the proposed subproject falls in to the "non-prescribed" category. Therefore environmental assessment (EIA or IEE) will not be required from the government of Sri Lanka to proceed. However, environmental and other clearances from the Government of Sri Lanka will have to be obtained prior to commencement of the sub project as stipulated in the IEE. The IEE was carried out as a requirement of ADB under its safeguards policy to be eligible for their financing.

IX. **Analysis of Alternatives**. The selected site is strategically located in close proximity to the existing premises of RUSL. The site is also in close proximity to the Lakshauyana Industrial Zone in Polonnarwa and the Mawathagama Export Processing Zones (EPZ) in Kandy. It is closely located to mineral resources such as Eppawella mineral deposit, Pulmudai Mineral (Zircon, Ilmanite, and Rutite), deposits, Kaikawala Feldspar and Quartz deposits, Namal Uyana Rose Quartz deposit, Yan Oya, Red Clay deposit which provides ideal research opportunities for RUSL students in material sciences.

X. The current subproject location was provided as an alternative to the initially selected site which included a rock outcrop and an undulating landscape unsuitable for development. There is no other existing land in the vicinity that can be developed as an alternative to the proposed subproject. Examination of alternatives to the subproject's design, technology will be considered in the detailed engineering designs currently being formulated.

XI. **Public Consultation:** The stakeholder consultation was held on 19th April 2018 and was attended by 26 people including government officer, residents, villagers, other stakeholders, student and staff. Department of Archeology was consulted on significance and impact on the archeology as a result of the subproject. CEA was consulted on compliance of National Environmental Standards and UDA on zoning and green building requirements for the subproject. During the site inspection on, 31st October 2017, consultation with the local officers, key informant interviews were carried out. The main issues that were raised at the meeting include monsoonal flooding of one section of the site as a result of the raising of the A12 road; the need for a proper waste management plan for RUSL; unregulated solid waste and domestic waste water disposal in the region which has caused degradation of Mihintale Tank. The public participation process that was undertaken so far ensures that residents within the subproject area of influence were engaged during the preparation of the IEE.

XII. **Grievance Redress Mechanism:** The subproject will follow the GRM process identified in the IEE. Assessment of the existing GRM shows that it has provided citizens with an effective platform for redress of their grievances. This IEE describes the existing GRM including informal and formal channels, time frame and mechanisms for resolving complaints about environmental performance.

XIII. **Anticipated Impacts and Mitigation Measures:** A summary of the potential environmental impacts expected during construction and operation phase along with recommended mitigation measures are provided in the IEE in the form of an EMP. The FT subproject is unlikely to cause significant adverse impacts because most predicted impacts are localized and likely to be associated with the construction process which is temporary. The subproject has identified the adoption of mitigation measures against the monsoonal flood risk on the northern boundary of the subproject site by infilling and engineering alternatives in the area. RUSL would also need to coordinate and manage the drainage on the northern boundary of the subproject site in association with the Department of Irrigation.

XIV. **Recommendations:** The EMP has been prepared incorporating various modern technologies and guidelines to reduce the environmental impacts of subproject constructions to make it a Green building. Therefore, it is recommended that the EMP and associated Guidelines during construction and operation phases of the subproject are strictly adhered to.

XV. RUSL need to obtain the geotechnical report and engage with CEA and the UDA to initiate the green building designs. The RUSL will have to fill and submit the BIQ and obtain an EPL for the canteen that will cater for more than 500 students.

XVI. RUSL will be required to develop a drainage plan for the sub project, to clean and maintain the systems and to develop site by filling and raise the DPC level to approximately 1.5m since it is lower than the road level. The detailed engineering design of the building should consider the geotechnical report and propose mitigation measures that ensure strong foundation and flood resilience.

XVII. FT of RUSL with consultation of the Mihintale Pradeshiya Saba should enter into an agreement on solid waste collection and management until the RUSL solid waste management plan and bio gas plant are implemented.

XVIII. Consult CEB and relocated the high tension electricity wires to increase the available spaces for design of FT and improve the health and safety of the students.

XIX. Continued consultations with the Department of Archaeology and develop code of protocol of operation during excavation and site preparation activities on site.

XX. **Conclusion**: The IEE did not find any major incompatibilities with the surrounding physical, biological, socio-economic or cultural environment. However careful planning and design of the new development is necessary to ensure that it does pose any significant long term environmental threat. Most impacts are likely to be during the construction phase and are expected to be temporary in nature and could be mitigated with proper management and good practices. The GRM and EMP provide appropriate guidance for suitable environmental and social safeguards. Accordingly, the proposed subproject can be recommended for implementation with strict adherence to EMP and GRM provided in this IEE. The EMP will be included in civil work bidding and contract documents. No further special study or detailed EIA needs to be undertaken to comply with the Safeguard Policy Statement, 2009 or Government of Sri Lanka EIA regulation.

1. INTRODUCTION

1.1 Subproject Background

1. In Sri Lanka, the service sector, financial activities, transportation and real estate activities have shown a significant year to year (YOY) growth together with activities such as IT/BPO and telecommunications. In the ICT services sector, IT programming consultancy and related activities has grown significantly by 21.1% YOY in 2015[1]. Successive governments in Sri Lanka have promoted the concept of a 'knowledge-based economy', particularly during the past two decades.[1,2]

2. The International Labor Organization publication titled 'The Skills gap in four industrial sectors in Sri Lanka' has identified major skills mismatches especially in the high-skill job categories in the ICT, tourism & hospitality, construction and light engineering industries[3].The Faculty of Technology (FT) of Rajarata University of Sri Lanka (RUSL) was established in 2016 to make a significant contribution to meet the human resource needs of Sri Lanka. The FT has introduced latest teaching and learning methodologies to its undergraduate students.

3. Government of Sri Lanka with loan funding from Asian Development Bank (ADB) has proposed to implement the Science and Technology and Human Resource Development Project (STHRDP). The Ministry of Ministry of Higher Education and Cultural Affairs (MHECA) shall be the Executing Agency and RUSL shall be the implementing agency for the subproject. This subproject aims to increase the technology oriented work force which will contribute to transform Sri Lankans growing economy. Under this subproject the RUSL will build a new Faculty of Technology. This will be referred to as the subproject in this report.

4. The safeguards screening for the FT of RUSL has been completed by the consultants mobilized under TA8235 with recommendation for a biodiversity assessment only if there are future expansion towards the Mihintale Tank beyond the currently selected site. The subproject is composed of phase I and it would be purely funded by ADB.

[1] Mahinda Chinthana, 2005, Government of Sri Lanka
[2] An Empowered Sri Lanka, 2016, Government of Sri Lanka
[3] The skills gap in four industrial sectors in Sri Lanka, 2015, International Labour Organisation

5. Five Departments under the Technology Faculty include Bio-Process, Electrical & Electronic, Food, Information & Communication (ICT) and Materials Technology has been established at the RUSL. Already two batch intakes have been taken to the Faculty though they do not have the resources. At the end of five years, the Faculty will accommodate about 1400 students in total.

Table 1: Intake of students

Year	New Intake (No. of Student/Year)
Year 1	243 (already in 2nd year)
Year 2	272 (already 1st year)
Year 3	300
Year 4	300
Year 5	300
Total	**1415**

6. FT at RUSL aims at establishing industry-specific skills and soft skills among its graduates, improving and initiating liaisons with the industry and inculcating innovation into the teaching and learning environment. This will ensure that these graduates will have a competitive edge to secure jobs both locally and internationally.

1.2 Objectives of the IEE

7. The objectives of the Environmental Study are to:

- Determine the category of the subproject depending proposal, environmental sensitivity and magnitude of impacts, i.e. screening as per Government of Sri Lanka's regulations and ADB's Safeguard Policy Statement 2009;
- Determine the appropriate extent of scoping;
- Determine the requirement of statutory clearances;
- Provide a baseline environmental monitoring and survey; on biodiversity, biophysical resources
- Predict impacts on relevant environmental attributes and mitigation measures to minimize the impacts.

8. Recommendations will be provided for mitigating any negative impacts wherever possible through the EMP. The EMP will include the recommended institutional arrangements for monitoring activities for identified environmental issues. The IEE will address current physical, ecological, economic and social background of the subproject anticipated environmental impacts that will arise due to subproject activities, necessary measures that have to be adopted to mitigate them and public views and suggestions regarding the subproject.

9. Accordingly, a single consolidated IEE report will be submitted to ADB and also be made available to the PP to facilitate their decision making.

1.3 Approach and Methodology

10. The IEE has been carried out within the existing policy, legal and administrative framework considering the applicable environmental legislation, regulations & guidelines of ADB and MOMDE.

11. **Reconnaissance Survey:** A reconnaissance survey was carried out identify the value environmental components surrounding the subproject. Location of environmentally protected areas; surface water bodies; environmentally sensitive receptors (educational institutions, religious structures, medical facilities etc.) at the subproject site was identified during the survey. The Consultant conducted preliminary analysis of the nature, scale and magnitude of the impacts that the subproject is likely to cause on the environment, especially on the identified Valued Environment Component (VECs). Site inspection of proposed subproject was carried out on 31st of October 2017 (Refer Annex 01 for details).

12. During the inspection, activities such as assessment of the existing location and the surrounding environment identification of sensitive areas, consultation with the local officers, key informant interviews were carried out. Other reliable information was collected from villagers and respective authorities during public consultation meetings. Secondary information for the report was gathered from printed materials and other sources of the relevant Government Departments, Authorities, Divisional Secretariat and relevant websites.

13. Another study will be carried out to analyze and identify the demand for technology graduates in the labor market to justify the public investment in the technology education and on proposed FT project. This will be carried out by ADB separately.

14. **Data Collection & Review:** Secondary data such as Survey of Sri Lanka Topo Sheets, District Planning Maps, Irrigation Working Plans, etc. have been collected from various secondary sources. Further, secondary data, which are relevant to understand the baseline as pertaining to physical and biological environments has been collected and reviewed. Applicable environmental legislation, regulations & guidelines of ADB and MOMDE were reviewed.

15. **Environmental Screening & Scoping:** Screening has been conducted with specific consideration such as location of the subproject with respect to archeological sites and sensitive environment such as Mihintale tank. It will help to modify the designs at locations where impacts can be avoided and incorporate mitigation measures wherever the impacts were unavoidable due to other constraints.

16. **Baseline Environmental Monitoring:** To establish the baseline environmental status, it is recommended that monitoring would have to be carried out for various environmental parameters such as meteorology, ambient air quality, ambient noise level, ground & surface water quality and soil quality at the subproject site. Secondary data was referred from numerous reports for current IEE. No rapid biodiversity assessment was carried out to assess the importance of the biodiversity surrounding the subproject site as it was an already developed land. However, secondary data such as scientific papers published for subproject associated at RUSL was reviewed. The subproject site is 1.5m lower than the road level and therefore infilling and land preparation will be important. It is recommended that a simple flood assessment on temporary flooding within the subproject area be carried out prior to construction. At the time of this IEE there was no geotechnical report made available, therefore it is recommended the geotechnical report be considered when finalizing the layout of the master plan. RUSL is in the process of developing their Master Plan (only rough diagram available).

17. **Stakeholder Consultation:** Consultations on environmental issues have been carried out with relevant stakeholders identified through stakeholder analysis. Refer Chapter 7 for further details

18. **Analysis of Alternatives:** The environmental analysis of alternatives mainly focuses on location, building design if any, sources of designs from an environmental management perspective to reduce flooding. Refer Chapter 5 for details.

19. **Prediction of Impacts & Mitigation Measures:** Based on the above study potential positive and negative impacts on land environment, air environment, noise environment, water environment and biological environment has been assessed for both construction and operation phase. For each impact predicted, feasible and cost effective mitigation measures has been suggested to reduce potentially significant adverse environmental impacts to acceptable levels. Refer Chapter 6 for details.

20. **Environment Management Plan:** The EMP (Part III) has been prepared as per the requirements of ADB Safeguard Policy Statement. The EMP includes management of construction camps; impacts of construction such as dust and noise; rain water harvesting, storm water management practices; establishment of a waste water treatment plant & solid waste management plan; flood control; essential clearances; etc. At the same time, information was collected to prepare a Basic Information Questionnaire (BIQ) for environment clearance from CEA (refer Annex 02).

1.4 Structure of IEE Report

21. In order to fully meet all requirements, the IEE report generally follows the ADB Safeguard Policy Statement 2009 and EA Guidelines 2003. Structure of the IEE report is organized as follows:

22. **Part I. IEE Report**

Executive Summary
Chapter 1- Introduction
Chapter 2-Description of the subproject
Chapter 3- Policy, Legal, and Administrative Framework
Chapter 4-Description of the Environment (Baseline Data)
Chapter 5-Analysis of Alternatives
Chapter 6-Anticipated Environmental Impacts and Mitigation Measures
Chapter 7-Public Consultation
Chapter 8- Grievance redress mechanism
Chapter 9-Environmental Management Plan
Chapter 10-Conclusion and Recommendation

Part II. Annexes

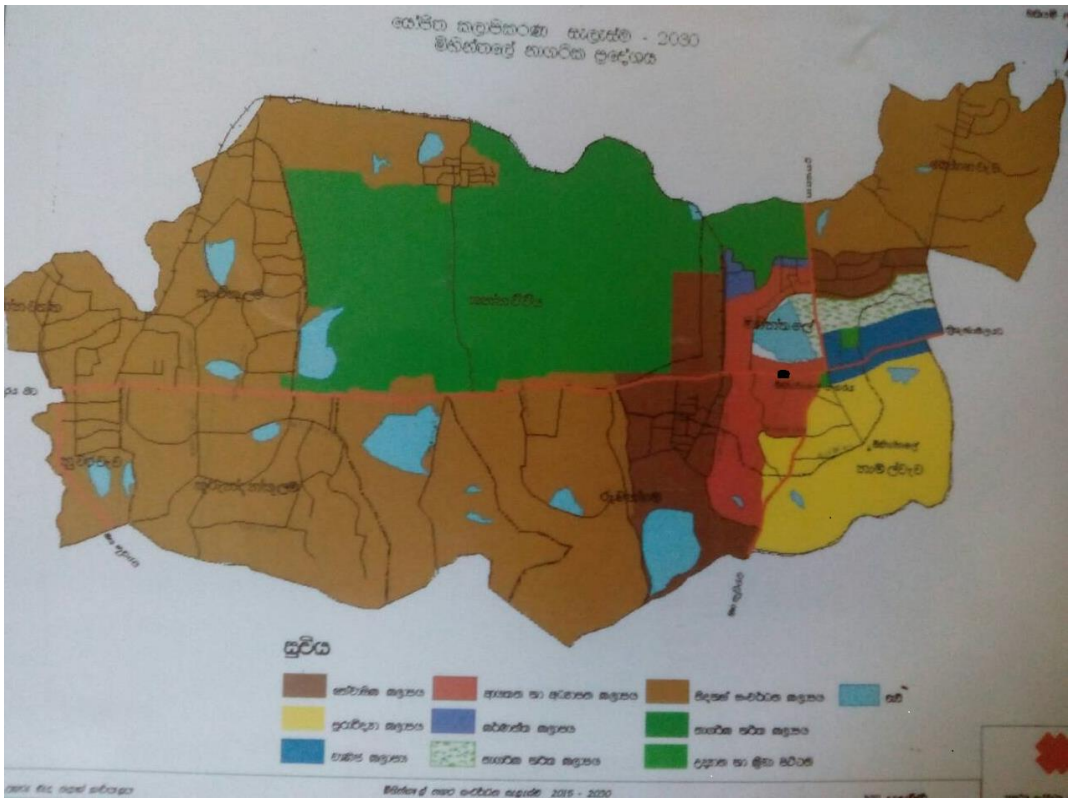
Part III. EMP

2. DESCRIPTION OF THE SUBPROJECT

2.1 Sub Project Location

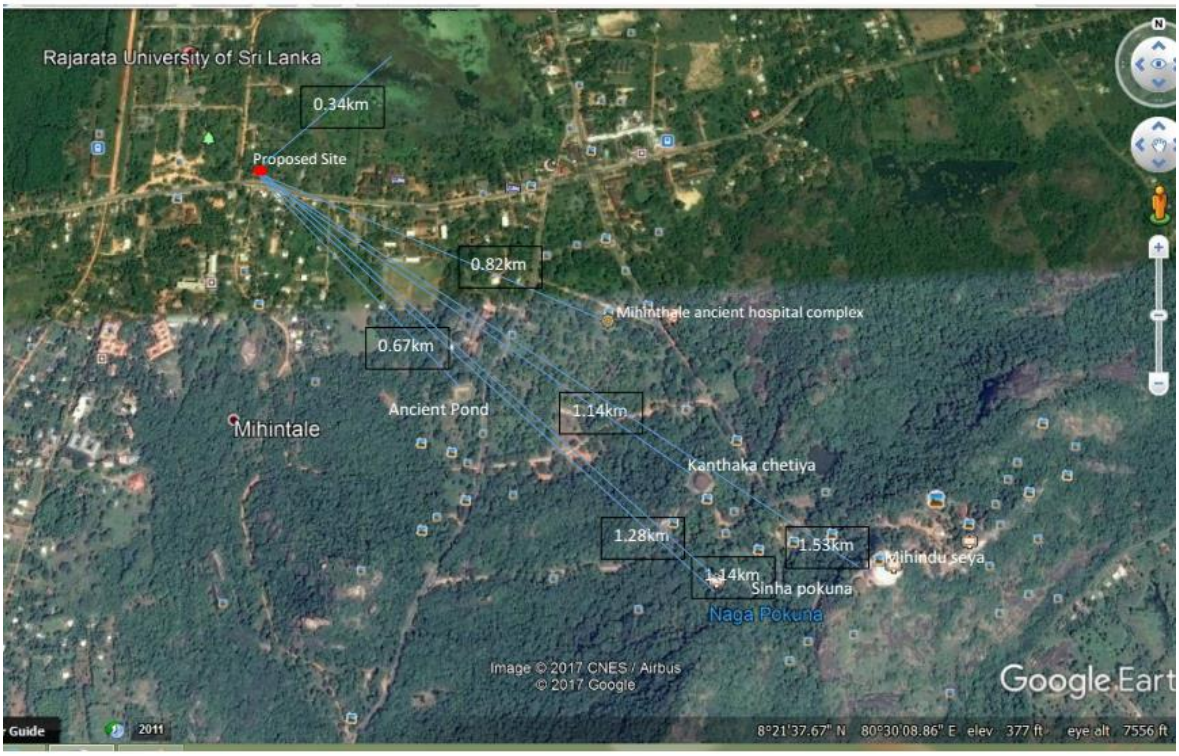
23. The proposed construction of the new FT is located in Mihinthale, Anuradhapura District, and North Central Province, Sri Lanka. The proposed subproject site is located 100m from the existing RUSL campus with its proposed auditorium being given space from within the existing campus bordering the main road and being adjacent to the FT. The land location points are 8021′38.74″ N latitude & 80030′12.18″ E. The land is rectangular in shape. The subproject site (i.e. both lands) are located alongside the A12 -Puttalama- Anuradhapura- Trincomalee highway, 794 m from the Mihintale town. The government granted the university with a 2 acre 14.9 perches land plus a further 3 acre 15 perches acres (for the auditorium) located in Rabawa, within the Mihinthale Pradeshiya Saba. Adjoining properties are privately owned for residential and commercial purposes or government owned. The subproject side is in an institutional and educational zone according to the Mihintale Provisional Zonation Plan for 2030 provided by UDA. The FT subproject location is marked in Figure 1 in UDA map.

Figure 1*: UDA Zonation Plan for Mihintale Divisional Secretariat*



24. The primary land is composed of two plots that are marked as 1 and 2 in the survey plan. On the eastern boundary lies Lots 3 and southern boundary the A12 road (Puttalum Anuradhapura road) and, while the western boundary adjoins the Lot 1 and the Pradeshiya saba road that adjoins RUSL. These details are shown in the attached site survey plan (Annex 03). Anubudu Mihindu Maha Seya which is 190m from the site is one of the closely located archeological sites. Other sites include Mihintale Temple (1.5km), Naga Pokuna (1.37km), Sinha Pokuna (1.26km), and Kaludiya Pokuna (1.37km). The Mihintale Tank is 190m from the site past the northern boundary. The site map with the respective distance is provided in Figure 2. The secondary land given for the auditorium is adjacent to the primary land divided by the small road leading to the village. The land location points are 8.35N latitude and 80.50 E. This land with an extent of 1.252 ha is owned by RUSL and does not pose any environmental of archeological issues.

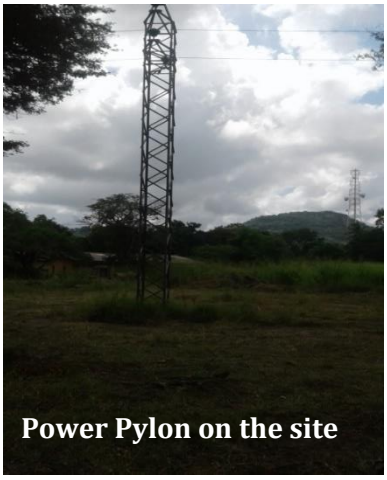
Figure 2*: Site Map Showing Area of Influence*



25. The environmentally sensitive receptors at the subproject site include the Mihintale tank, archeological monuments and the few surrounding household (see Figure 2), and the existing RUSL campus.

26. There are no permanent or temporary structures on the site following the demolition of the former Divisional Secretariats residence. Since the site has been lying vacant and unused, small shrubs have grown over time. Some photos of the site are shown in Figure 3. The land which was under state ownership was transferred by the Mihintale Divisional Secretary to the University in 2015.

Figure 3: ***Plates of subproject site***



Power Pylon on the site

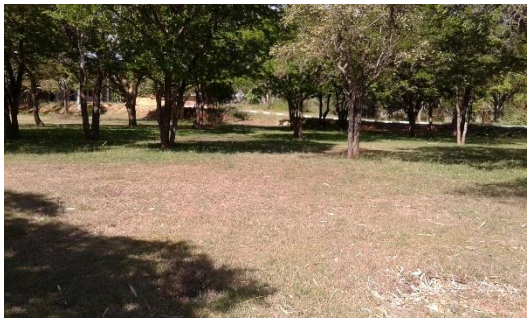
Mihintale tank adjacent to the site

Site view with the access from A12 road

Site view on the eastern boundary

DSD quarters that have been vacted and alternative site given

Site seen from the A12 road



2.2 Description of the Subproject

27. The subproject land is government owned and was previously occupied by the District Secretary's bungalow. The university took custody of the property with the condition that they would build new quarters for the DS in another property. Alternative housing was provided for the Mihintale Divisional Secretary. (see Annex 4). Details of land acquisition is provided in the ADB Involuntary Resettlement Due Diligence Report (IR DDR) prepared for STHRDP.

28. The RUSL has obtained approval from the Department of Irrigation and is in the process of obtaining CEA approval. This was necessary since the subproject area is 190m from the Mihintale tank.

29. The proposed FT subproject will involve construction of a new faculty with facilities to conduct lectures for technology students. The FT will consist of four buildings for Industrial park, library building, laboratory, administration and auditorium. The exact number of stories is yet to be determined based on the requirement provided by RUSL. The details design and the lay out plan for the FT is enclosed.

30. Reviewing the existing buildings of RUSL which forms a separate complex to the FT complex represented a few aspects to focus on as corrective measures for the new FT complex. Occupational Health and Safety is one aspect that would require being steeped up to meet the ADB safeguards guidelines as well as the local guidelines by displaying adequate safety display boards, having adequate number of fire extinguishers and other fire safety measures such as fire exits (these should be in consultation with the fire department). Also COVID 19 safety measures will have to be installed and measures followed. The existing RUSL has solid waste collected by the Local Authority 5 times a week. A composting program has been started for perishable items within campus. This program can process all organic waste produced within the campus. This is used for university gardens and willing to sell public in future. For the new FT, solid

waste will be managed in a similar fashion. Wastewater is treated before release and sewage is collected into sealed pits. The existing RUSL also was not designed with many energy saving technologies which will be include in the new subproject by adopting the green building criteria given in UDA .

31. At the moment the Faculty is operating in 3 storied building (2000 m^2) in the University. Due to limited space, faculty is not in a position to cater the total space requirement for the academic works. Hence other faculties' lecture halls and labs are used to fulfill the current requirements. However, once the new infrastructure facilities are provided under STHRD Project, the Faculty is intended to function totally on their onsite facilities and willing to enroll more students.

The subproject will be constructed as four buildings and they are as follows.

- Proposed academic and laboratory building (7 stories, 3000 m^2)
- Proposed Library building (4 stories, 600 m^2)
- Proposed industrial park (1 story, 550 m^2)
- Proposed auditorium (2 stories, 800 m^2)

The details of the requirement proposed by RUSL for the FT are given in Table 2

Table 2: Salient Features of the Proposed Project

Name		Area in sqm
Faculty board room		232.2576
Six Academic departments		1393.546
Academic staff rooms		929.0304
General Administration		278.7091
Lecture halls		1170.578
Seminar room		232.2576
Drawing room		278.7091
Physical laboratory		325.1606
Chemistry laboratory		325.1606
Biological Laboratory		325.1606
General computer lab		232.2576
Labs for bio system technology	Biosystem technology	
	Molecular biology lab	

	Micro Biology Laboratory	
	Tissue Culture Laboratory	
	Immunology Laboratory	
	Cell Culture Laboratory	
	Bio technology lab	
	Bio processing lab	
Labs for food technology	Food Microbiology	
	Accredited Laboratory	
	Research Laboratory	
Electrical and Electronic Technology	Electronics Lab	167.2255
	Electrical Power Lab	278.7091
	Robotic & Automation lab	167.2255
	Telecommunication lab	167.2255
	Computer Lab	185.8061
	Advanced Research lab	92.903
	Students common area	185.8061
	Library	92.903
	subproject lab	185.8061
	demonstrator room	46.4515
	Report room & Submission area	83.6127
Materials Technology	Network and security lab	
	Hardware Technician Laboratory	
	Robotics Laboratory	
	Virtual Reality Laboratory	
	IOTA laboratory	
Faculty library		139.3546
Student common area		929.0304
Industrial park-	Industrial Collaborative Cell	747.2
Auditorium	800 seating capacity auditorium with cafeteria and wash rooms	1053

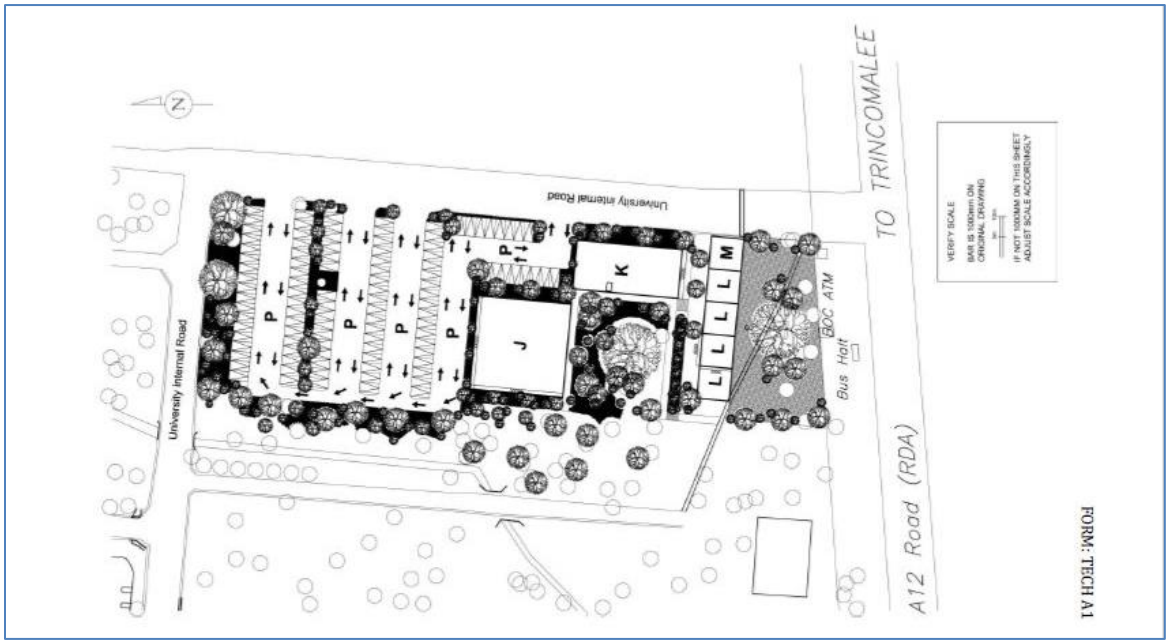
Land Use	Bare land adjacent to the University of Rajarata. Already developed land with Divisional Secretariats quarters (subsequently demolished).	
Total		10,245.543

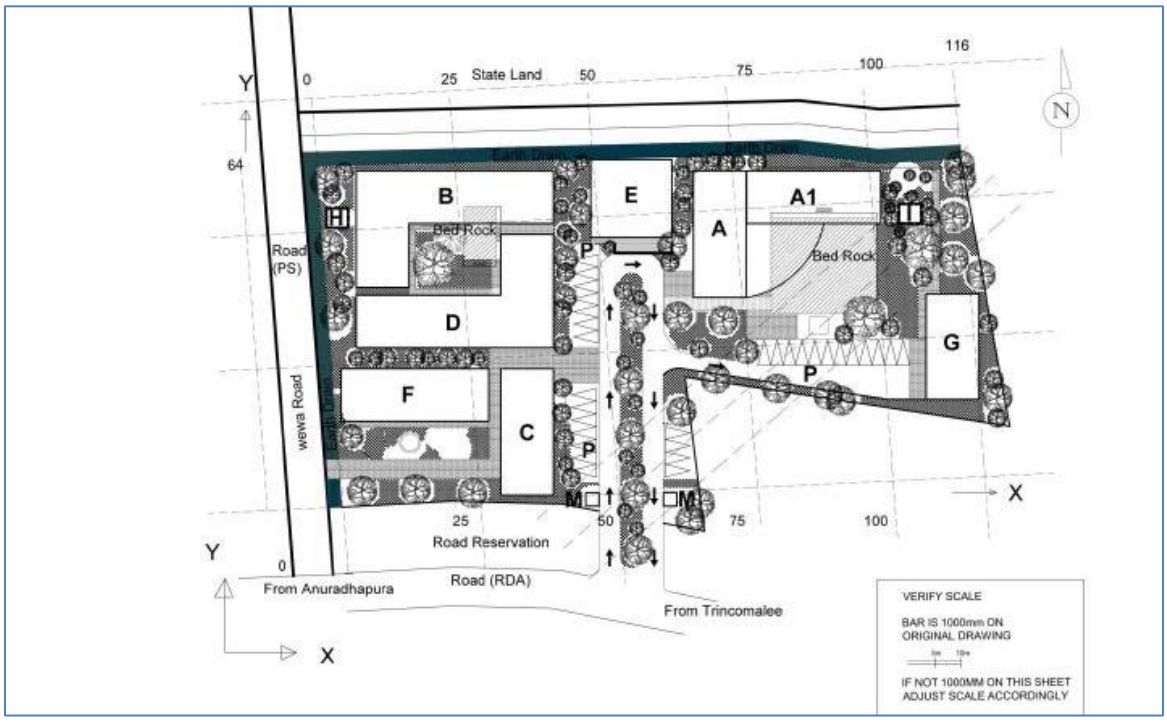
32. At the moment the RUSL has not appointed any architect for the detail engineering designs. Only available information is the estimated details prepared by the faculty staff at RUSL.

33. The rough layout plan for FT of RUSL is shown above in Figure 04. The site plans and 3D views will be developed later. At the time of this IEE preparation the detailed layout plan was not available.

34. The FT is designed based on the green building concept that includes energy saving systems such as solar panels to harvest renewal energy, inverter type air conditioning, LED lighting and rain water harvesting. Initially design for 15% of total annual energy consumption to be generated from on-site renewable energy, upgradable to 25% in future by using solar panels located in building's roofs in the faculty. Building Management system in the proposed faculty will be incorporated with the operational and management procedures of solar panels and their disposal in event of malfunction will be carried out by the provider. The wastewater that is generated from the facility will be directed to a treatment plant and then released for irrigation within the premises. The building structure will be designed on a slab and beam with Alume Zinc roofing (marine quality). All doors and windows will be powder coated aluminum.

Figure 4: Layout Plan





Legend

A- Main Administration Building

A1- Library

B- Engineering Technology Block

C- Core Lab Building

D- Bio-System Block
E- Plant House
F- Laboratory Block
G- Student Welfare Facility
H- Waste Disposal Unit
I- Sewer Treatment Plant
J- Faculty Auditorium
K- Collaborative Cell
L- Service Outlets
M- Gate House

P- Parking slots

35. Other design considerations include fire safety, air conditioning, septic tank and treatment plant for collection of waste water and sewage will be developed with detailed design.

36. **Road Side Drain**: Roadside drains shall generally be provided on both sides of the embankment to safely carry the discharge from the embankment without eroding the pavements.

37. **Utilities**: Existing high-tension power pylons will have to be relocated in order to maximize the space and reduce the magnetic radiation impacts on the development project and the community. To facilitate utilities to the FT which may include electric lines and poles, fiber optics, waterlines, etc., sufficient space should be provided on both sides of the access road. The size of pipes to carry utilities will be based on FT occupancy size and utilities needed.

38. **Archeological Significance**: Subproject site is located within an archeologically significant region of the country. Thereby archeological clearance has been obtained. RUSL will have to follow chance find procedures as instructed by Department of Archeology during development and construction of the subproject. In the event that any archeological monument /object is discovered they are expected to stop all work, take protective measures and inform the Department of Archeology.

39. **FT improvement proposal:** The primary objective of the proposed Faculty of Technology at the RUSL is to exploit the Technology Stream Degree Programs (TDPs) for training graduates who have the capacity to contribute to the country's technological advancements and initiatives.

There will be more reforms within the FT university system such as:

- Implementation of modern teaching practices; rather than the conventional practices. students will be placed in industrial training and research projects. Establishment of the

proposed technology development programs and curricula. Revision of academic regulations and administrative policies.

- Establishment of useful collaborations with the industry: this will help the students to receive continuous mentoring from the industry that will provide them the competency to enter the job market.
- Establishing industry-specific skills and soft skills among graduates through in-plant training and establishment of incubators.
- To facilitate interaction with the industrial sector and academia and industrial consultative committee is formed to identify the industrial and economic needs of the country.
- Formation of the industrial cell that will help the private sector industries to find solutions for their problems and work with the academia.
- The FT at RUSL has developed collaborations with foreign universities such as Chalmers University of Technology and Gothenburg University both in Sweden. Over the years the faculty members of these two institutes have been contributing to establish new syllabi in the technology stream. There are student faculty exchange program established with Gothenburg University. These mechanisms have assisted in capacity building and continuously supporting and improving the quality of the technology programs offered at the RUSL.
- Revitalizing the efficiency and effectiveness of library and laboratory facilities

39 **Development of infrastructure**: Development of the FT will be carried out to conform new state of the art standards including the green building concept.

40 **Building safety design and devices**: The building must have built-in alternative emergency evacuation routes for speedy evacuation of occupants during an emergency. In case of a major fire, the building components should withstand the fire for a nominated time period without a catastrophic failure occurring until all occupants safely vacate the building. Fire Precautions for Buildings: During the building design the Code of Fire Precautions for Buildings would have to be applied i.e. ICTAD Publication No. ICTAD/DEV/14 that deals with the regulations on fire prevention in a building. There are many more periodic maintenance requirements to be fulfilled to ensure structural integrity, user safety and internal hygienic environment of the building. Apart from the above the manual on 'Energy Savings in Buildings' developed by Sri Lanka Sustainable Energy Authority and the Construction Material Specifications developed by the former Institute for Construction and Development should be referred.

41 **Sources of Construction Materials**: Soil and material investigation for a FT is very essential to assess the availability of suitable construction material in the vicinity of the subproject. This includes investigation of suitable borrow area for borrowing earth and quarries for stone /aggregate material and also for the other construction materials like cement, steel, sand, soil etc. ICTAD/DEV/17R specification will provide the guidance on site investigation for building and civil engineering works.

- **Borrow Areas:** Potential sources of earth for the construction of embankment and soil infilling needs to be identified by the consultant design engineers and the contractors for the subproject at RUSL. These will be sourced from mines that have obtained approval from Geological and Mine Survey Bureau and the respective Divisional Secretariat. The suitability of borrow materials can be checked by laboratory tests such as proctor compaction test, gradation test, liquid limit plastic limit etc.
- **Cement**: Local and imported cement in bag or bulk form is available for construction. Cement shall conform to SLS 107 for building. Normal Portland cement can be used for the construction however this should be based upon the recommendations of the geotechnical report.
- **Cement block & clay bricks**: These should be tested according to SLS 847 and SLS 39 for compressive strength, dimensions and water absorption.
- **Steel**: High strength deformed bars manufactured by various steel manufacturing companies conforming to SLS standards are available. Before incorporation into the work, steel should be approved by the Engineer.

42 **Quality Control of Earth Work**: This includes excavation, filling and leveling of the earth work. The failure of quality control of earth works in building construction sites would lead to ground subsidence, cracks and structural failure in a part of or whole building .To minimize the delay during progress of earth filling work, it is necessary to select borrow materials well in advance to the earth filling work because it will take a considerable time duration for selecting, testing, obtaining approval etc. of borrow materials.

43 According to the site condition, it is necessary to select suitable machines for spreading, leveling and compaction. The capacity of the machine and size of the blade are important factors for selection. After completion of each layer of compaction, dry density has to be checked as specified in the specifications. The failures of earth compaction compliance with the specifications may cause future settlements, erosions or subsidence.

44 **Cost of the Subproject** : The total cost estimated for major items associated with the proposed subproject (including earth work, pavement, drainage structures and construction of buildings) have been established by application of appropriate unit rates to the estimated work item quantities derived from the results of surveys, test results and design analysis for the subproject. The estimated cost is Rs 1600 million for infrastructure development. Total sub project sot will be Rs 2,930 million. (Refer Table 03 subproject setup cost and Table 04 for recurrent cost).

Table 3: Subproject cost as per the submission to National Planning Department

Item & Description	Estimated Cost (Rs.) Millions	Year 1	Year 2	Year 3	Year 4
Buildings and infrastructure	1600	700	600	200	100
Lab equipment	800	200	180	240	180
Lab furniture, IT and Office equipment	360	100	200	60	-
Books, journals and e-journals	90	40	20	20	10
Vehicles	50	30	10	10	-
Other	30	10	10	5	5

Table 4: Recurrent Expenditure

Year	Salary cost (Rs.) Millions	Other recurrent cost (Rs.) Million	Total Cost (Rs.) Million	New Intake (No. of Student/Year)	Average Recurrent Cost / Student (Rs.)
Year 1	45	20	65	245	265306
Year 2	96.42	20	116.42	275	221752
Year 3	158.94	30	188.94	300	230414
Year 4	220.14	30	250.14	350	213794

3. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

3.1 Applicable Measurable Environmental legislations

45. In Sri Lanka, there are over 70 laws that directly or indirectly relate to protecting and conserving the natural environment and human health. While most of these laws address specific issues pertaining to environment in the respective sector, it was the introduction and enactment of the National Environmental Act (NEA) that provided the overarching legal basis for regulation of pollution and protection of the environment in a comprehensive manner.

46. The following section outlines the broad legal and institutional framework in Sri Lanka for environmental management, relevant to the proposed subproject. The legislations relevant to the subproject are listed below. Further details are provided in Annex 05. This subproject comes under the purview of the following sector level Acts. The EPL procedure under the CEA is explained in Annex 05 along with the rest of the laws that are listed below.

- The Constitution of Sri Lanka (Articles 18, 27(14), Articles 154 (A), 9, 19 and (III) 17)- Covers environmental governance at the provincial level. In the event of public nuisance / grievance this becomes applicable to address the court of law.
- National Environmental Act No. 47 of 1980 (and its amendments of 1988) EIA is covered under this Act- This is discussed separately below since this is the main environment regulatory enactment.
- Ceylon Electricity Board Act No. 17 of 1969- Applicable for the relocating the high tension wires and pylons within the subproject.
- Disaster Management Act No. 13 of 2005- Comes into force in case of a national or regional level disaster. This is relevant due to the flood risk in the area.
- Pradeshiya Sabha Act No. 15 of 1987- body which regulates the planning and zonation of the region. This will be relevant for obtaining planning approval for the sub project.
- Mines and Minerals Act No. 33 of 1992 – Relevant for the extraction of building material from the natural environment,
- Fauna and Flora Protection Ordinance, Act No. 49 of 1983 – Protection and management of wetland fauna and flora at site.
- Flood Protection Ordinance, Act No. 22 of 1955 – Control and protects the watershed area of a catchment.

- Irrigation Act No 23 of 1983- control and service of irrigation water and systems.
- National Water Supply and Drainage Board Law of No. 2 of 1974 – supply of water for the sub project.
- Prevention of Mosquito Breeding, Act No. 11 of 2007 – to ensure that the site is free of mosquitoes related habitats as this is an area identified for dengue epidemics.
- The Urban Development Authority, Law, No 41 of 1978- regulates the zonation of the Mihintale urban development. Provides guidelines for the FT green building certification.
- State Land Ordinance, Act No. 13 of 1949, Land Acquisition Act No. 09 in 1950 and subsequent amendments in 1983 1nd 1986, and Land Acquisition regulation of 2008- Relevant for land transfer from state to state agency.

47. **National Environmental (Amendment) Act 47 of 1980 and its amendments.** This is the law that incorporates and covers all aspects of the environment in Sri Lanka. The National Environmental Act (NEA) No. 47 of 1980 is the basic national decree for protection and management of the environment. The NEA has gone through several amendments in the past in a bid to continually improve and to respond to the challenging conditions. There are two main regulatory provisions under the NEA which is implemented by the Central Environmental Authority (CEA).

48. The Environmental Impact Assessment (EIA) procedure for major development projects has been published in 1993 and is available with the CEA. The EIA process is implemented through designated Project Approving Agencies (PAAs). The screening, scoping, formulation of initial environmental examination (IEE), environmental management plan (EMP) and procedures for IEE and EMP disclosure and public comments will be governed by NEA of 1980 and its subsequent amendments of 1988 and 2000, and by environmental regulations. Under the national regulations, the current development subproject of the FT does not require an IEE because it is not within a designated protected area.

49. The Environmental Protection License (EPL) is a procedure for the control of pollution. Regulations pertaining to this process have been published in 1990 and are available with the CEA EPL is issued on the regulations are gazette under Gazette Extraordinary No. 1533/16 dated January 25, 2008, for a variety of sectors involving in manufacturing, construction and services.

50. Under local legislation, an IEE is not required as the development is categorized in the “un - prescribed projects. However, CEAs consent for the projects under non-prescribed category has

not been obtained. The EPL process for the subproject will have to be initiated. For this purpose, the filled BIQ is in Annex 2.

51. A summary of the statuary clearances required for the FT is presented in Table- 05

Table 5: Statutory Clearances required for the Subproject

Type of Clearance	Activity	Authority	Timeframe
Environment Clearance Environmental Protection Licensing) Regulation No. 1533/16of 2008	Implementation of the subproject and waste water treatment guidelines.	CEA	Before construction
Archaeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188) Antiquities (Amendment) Act No. 24 of 1998	Consent to build the FT at the selected site.	Department of Archeology	Before construction
Permission for storm water drainage and infilling	Implementation of the subproject. On regulations pertaining reservation of Mihintale Tank.	Irrigation Department (refer Annex 06)	Before construction
Clearance for development activities Green building certificate	Implementation of the subproject and construction of the building. They will direct to relevant authorities.	UDA	Before construction
Local Government Authorities building approval	The Municipal Councils, share the powers regarding the approval of buildings plans, control of solid waste disposal, sewerage and other public utilities. Adhere to building regulation.	Local Authority (Mihintale Pradeshiya Saba)	Before construction
Approval for removal of trees on site	Site clearance to have space for the building and to provide access and material storage.	DS	Before construction
Consent from relevant government agencies	Construction of building and culverts and other drainage systems etc.	UDA, Irrigation Department, RDA, CEA	Before construction
Consent from Ceylon Electricity board	Obtaining the electricity supply for the FT complex Relocation of high tension lines to obtain maximum space for building design.	Ceylon Electricity Board	Before completion of the building
Water Supply	Supply of potable water for the facility and supply during the construction.	NWSDB	At commencement of subproject.

Source: Compiled by TMS

52. Apart from the clearances for the overall subproject work, the contractor, before starting the construction work, has to obtain required clearances listed in Table 06. for operating his equipment and carrying out construction work.

Table 6: Clearance required to be obtained by the Contractor

No	Construction Activity & Type of Clearance Required	Statutory Authority	Statute Under which Clearance is Required
1	Consent for establishment of Stone Crushers and Cement Mixing Batching Plant	CEA	National Environmental Act No. 47 of 1980
2	Permission for withdrawal of groundwater for construction	NWRB/	National Water Supply & Drainage Board Law, No. 2 of 1974
3	Permission for extraction of sand, metal from soil	Geological Survey and Mines Bureau (GSMB)	Geological Survey and Mines Bureau (GSMB) Act No. 33 of 1992
4	Location and layout of workers camp, & equipment and storage yards	Mihintale Pradeshiya Saba	Local Government Ordinances and Acts –Urban Council Ordinance 61 of 1939, Act 29of 1947, Act 18 of 1979, and Act 13 of 1979
5	Discharges from labour camp	CEA	National Environmental Act Act No. 47 of 1980 National Environmental (Protection & Quality) Regulations, No. 01 of 1990
6	Disposal of solid and liquid waste	CEA	National Environmental Act No. 47 of 1980
7	Noise and dust pollution during construction activities	CEA	Air (Prevention and Control of Pollution) Act, 1981 National Environmental (Noise Control)Regulations No. 01 of 1996
8	Disposal of spoil material garneted during building and construction and demolition of already existing building	Mihintale Pradeshiya Saba CEA	National Environmental Act Act No. 47 of 1980
9	Revenue license for the heavy machinery and other vehicles at the work site	Office of provincial Commissioner for Motor Traffic the vehicle is being registered	Motor traffic Statute of Western Province No 7 of 1991.
10	Engagement of Labour - Labour License	Labour Commissioner	Shop and office Employees Act 1934 Employees' Trust Fund Act No 15 of 1980 established the Employees' Trust Fund (ETF). Employees' Provident Fund Act of 1958 Municipal Council Ordinances and Acts – Urban Council Ordinance 61 of 1939, Act 29 of 1947, Act 18 of 1979

11	Engagement of Labour- ● Social Security- ● Labour Welfare- ● Wages	Labour Commissioner (Ministry of Labour and Employment	The Employees' Provident Fund Act, 1958 & Miscellaneous Provisions 1975 Workmen's Compensation Ordinance of 1935 and subsequent Amendments hop and Office Employees (Regulation of Employment and Remuneration) Act, 1954 Factories Ordinance, 1942 2010 on fair treatment

53. **Construction and Demolition Waste**: When obtaining permission for building construction, a plan should be made available as to how to dispose the waste that is generated on site. Every waste generator shall be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated separately; deposit at collection center so made by the local authority. LA shall be responsible for proper management of construction and demolition waste within its jurisdiction including placing appropriate containers for collection of waste, removal at regular intervals, transportation to appropriate sites for processing and disposal Table 07 Timeframe for Planning & Implementation.

Table 7: Timeframe for Planning & Implementation

Sl. No	Compliance Criteria	Duration
1	Identification of site for collection and processing facility	3 month
2	Commissioning and implementation	5 month
3	Monitoring by SPCBs	2 times a year

54. Present feasibility and cost for equipment and building of the FT at RUSL is not completed at the time of this report preparation. Bidding document will be prepared for FT in September 2018 and technical bids will be evaluated. The contracts for the civil works of this subproject are expected to be awarded by December 2020.

3.2 Administrative Framework

55. **Central Environmental Authority**: The CEA basically designs the scheme, procedures and standards to control the water, air & noise pollution, land degradation and hazardous substances and waste management.

56. CEA advise the MOMDE on matters concerning prevention, control and abatement of water and air pollution; coordinate the activities of CEA & provide technical and research assistance; prepare manual, codes, guidelines & standards etc.

57. RUSL will be required to obtain an environmental recommendation letter or EPL from CEA. The NEA regulations stipulates that canteen facilities which provide seating capacity for over 50 student will requires an EPL and falls under category B. RUSL proposes a canteen seating capacity of 500 students.

58. According to the BIQ, the proposed subproject falls in to the un-prescribed category. According to the BIQ and IEE/EIA Environmental Guidelines of CEA, the proposed subproject falls in to the non-prescribed category. Therefore environmental clearance for an IEE will not be required from government of Sri Lanka. CEA consent for the FT development under un-prescribed category has to be obtained through a letter. (Annex 02- BIQ has been filled out and ready to be submitted to CEA for environment clearance).

59. The domestic waste water that will be generated during the operation of the facility will be collected to a septic tank and disposed at regular intervals. Since the Before discharge, water quality should conform to regulations No. 1534/18 dated 01.02.2008.

60. **Department of Archeology, Anuradhapura Division:** Coordinate with the Department of Archeology, Anuradhapura Division during the land preparation activities and develop a conduct of protocol for the contactor in case any antiquities are found at the site.

61. **Irrigation Department**: Consult the Engineer Provincial Irrigation Office, Kahatagasdigiliya on the proposed detailed drain plan for the site. The provisional approval letter states that no effluent from the university premises should not be discharged to the Mihintale Tank and that under no circumstances should the RUSL block any drainage paths proposed in the survey plan.(refer Annex 03)

62. **UDA**: Liaise with UDA and obtain and approval for the subproject. The area is already demarcated as an institutional and educational zone under UDA 2030 zonation plan for the Mihintale divisional secretariat. Consult the UDA to obtain the green building certificate. (refer Annex 07)

63. **Mihintale Pradeshiya Saba:** Coordinate with the Mihintale Pradeshiya Saba on the solid waste disposal until the composting and bio gas plants are established. Obtain the assurance or agreement to remove the sewage until the waste water treatment plant is re-commissioned. Without any treatment, waste water should not be disposed to any of the peripheral drainages at the new FT.

3.3 International Agreements

64. Sri Lanka is signatory to numerous environmental conventions. The applicable international agreements are provided below.

- Conventions on Wetlands of International Importance especially as waterfowl habitats / Ramsar (entered into force in Sri Lanka in 1990)
- Convention on International Trade in Endangered Species of Wild Fauna & Flora/ CITES (entry into force in Sri Lanka in 1979).
- Convention on the conservation of Migratory Species of Wild Animals/ CMS (1990).
- United Nations Framework Convention on Climate Change/ UNFCCC (Sri Lanka ratified it in November 1993
- UN Convention on Biological Diversity / CBD (Sri Lanka ratified in 1994).
- Plant Protection Agreement for Asia and the Pacific region (Sri Lanka ratified in 1994).
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Sri Lanka ratified in 1992).

3.4 ADB Safeguard Policy Statement, 2009

65 The Asian Development Bank has defined its Safeguard requirements under its 'Safeguard Policy Statement 2009 (SPS 2009). It has three operational policies on the environment, indigenous people, and involuntary resettlement. These three policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of the subprojects throughout its cycle. The safeguard policies require that (i) impacts are identified and assessed early in the project cycle; (ii) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and (iii) affected people are informed and consulted during project preparation and implementation. The policies apply to all ADB-financed projects.

66 The Environment Safeguards Policy ensures environmental soundness and sustainability of projects and supports the integration of environmental considerations into the decision making process.

67 The subprojects under the project are screened according to type, location, scale, and sensitivity and the magnitude of their potential environmental impacts, including direct, indirect, induced, and cumulative impacts.

68 ADB's SPS 2009 classify a project depending on following four categories.

- Category A: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An Environmental Impact Assessment is required.
- Category B: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, none or very few of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An Initial Environmental Examination is required.
- Category C: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.
- Category FI. A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system, unless all of the financial intermediary's business activities have minimal or no environmental impacts or risks.

69 **Policy principles**: Ensures that the screening process is used for proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken and potential impacts and risks assessed. There are 11 guiding policy principals for environmental safeguards to ensure environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. Environmental safeguards are triggered if the subproject is likely to have potential environmental risks. Their relevance to the subproject is discussed in Table 8.

Table 8: SPS Policy Principle

	Policy principles	Met	Comments
1	Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of Potential impacts and risks.	✓	All screening for environmental, IR, IP carried out
2	Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential trans boundary and global impacts, including climate Change. Use strategic environmental assessment where appropriate	✓	
3	Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative	✓	This site was provided as a location alternative.
4	Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.	✓	EMP prepared
5	Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's	✓	Stakeholder consultations were carried out on 19th April 2018 and was attended by 26 people with female representation. EMP

	participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.		recommends continuous stakeholder consultations.
6	Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.	✓	Done
7	Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports	X	To be carried out. No in-house capacity to implement therefore external consultant will be brought in.
8	Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	✓	

9	Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phaseouts. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	X	National standards for air, noise and sewage discharge are below the IFC-WB EHS standards. Therefore IEE recommend the adoption of more stringent standards.
10	Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities	✓	IEE has in corperated these conditions.
11	Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	✓	'Chance find' protocol in place by Department of archeology. Approval obtained with conditions

70. There are 12 IR Safeguard policy principles to avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring sub project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups. IR safeguards are triggered under physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) as a result of (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas.

It covers them whether such losses and involuntary restrictions are full or partial, permanent or temporary. For this subproject IR safeguards are triggered however there is no involuntary resettlement issue associated. The land accession did not take place in anticipation of ADB financing.

71. IP Safeguards have 9 guiding policy principals to design and implement projects in a way that fosters full respect for Indigenous Peoples' identity, dignity human rights, livelihood systems, and cultural uniqueness as defined by the Indigenous Peoples. IP safeguards do not get triggered under this subproject or the overall project.

72. **Conclusion**: The proposed subproject cause environmental impacts which are less adverse in nature and few of them are reversible and mitigation measures can be designed more readily for the identified impacts. To assess the impact the REA, IP and IR Checklist of ADB was followed as per the ADB's Safeguard Policy Statement the proposed FCT subproject of RUSL has been classified as Category 'B' subproject requiring Initial Environmental Examination (IEE). In order to meet policy principles 2 and 7 additional recommended actions are proposed. All other policy principles are in line with subproject. IR classification is category C.

73. It also aims to identify any potential negative environmental or social impacts in the immediate vicinity or surrounding areas that maybe short term or long term. Accordingly a single consolidated IEE report is submitted for ADB to facilitate their decision making required for the subproject.

4. DESCRIPTION OF THE ENVIRONMENT

4.1 Methodology used for Baseline Study

74. Data collection and stakeholder consultations. Data for this study has been primarily collected through comprehensive literature survey, discussion with stakeholder agencies, and field visits to the proposed site.

75. The literature survey broadly covered the following;

- Subproject details, reports, maps, and other documents prepared by technical experts of the ADB PPTA team and discussions with technical experts of the PIU of RUSL team, local authorities, relevant government agencies like UDA, Department of Archeology, CEA, Irrigation Department etc.
- Secondary data from previous project reports and published articles, and literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and other planning documents collected from government agencies (including the resource profile for the area) and websites.
- Several visits to the subproject sites were made during IEE preparation period between Oct 2017 to May 2018 to assess the existing environment (physical, biological) and gather information with regard to the proposed site. No separate studies were done on the monsoonal floods or biodiversity at the selected site as it was not deemed necessary. However published scientific papers on avifaunal species diversity for the area were reviewed.

4.2 Location Area and Connectivity

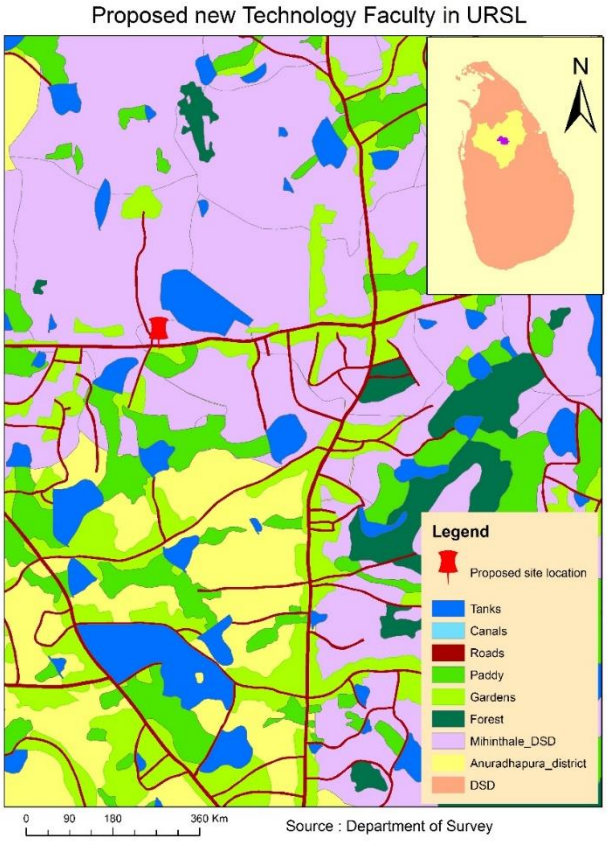
76. The subproject area connects to townships Mihintale, Anuradhapura and Rabawa. Subproject site is in the No 577 Mihintale GN division having a land extent of 880ha.

77. The proposed subproject site is adjacent to the current RUSL Campus on the western boundary. The land frontage is to the main A12 road. Mihintale bus stop is located 1km and the railway station is 350m from the site.

78. The site is located close proximity to several important mineral resources such as Eppawella mineral deposit, Pulmudai Mineral (Zircon, Ilmanite, and Rutite), deposits, Kaikawala Feldspar and Quartz deposits, NamalUyana Rose Quartz deposit, Yan Oya. As one of the main highways are connect to the university Mawathagama Export Processing Zones (EPZ) in Kandy would be

easily accessible. The site is located 16 km form the Anuradhapura town, 100km from Polonnaruwa and 134km to Kandy. Refer Index Map - Figure 5 for location.

Figure 5*: FCT project Location*



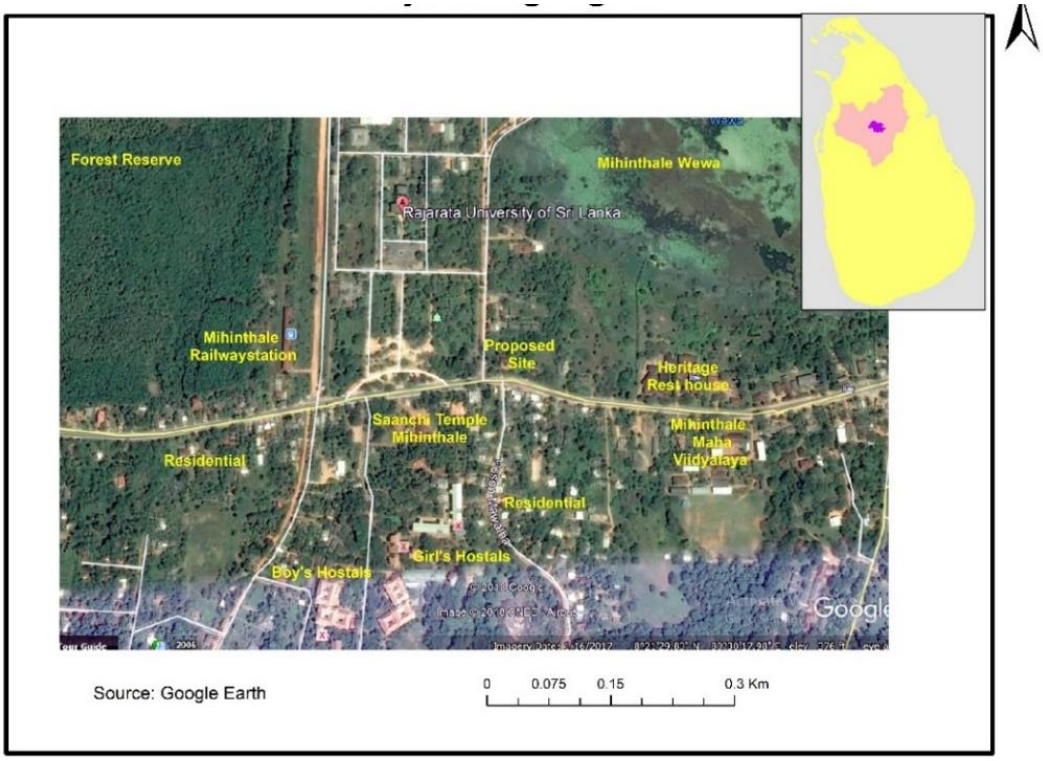
Source: Prepared by TMS

79. There are several crucial environmental challenges facing the Mihinthale DSD including human elephant conflict, deforestation and non-demarcation of wildlife management areas, improper land use planning, improper waste disposal, water pollution due to agricultural activities etc.

4.3 Area of Influence

80. Subproject area of influence as identified by the UDA includes educational zone, industrial zone, town ship and associated green zones. See Figure 1 Chapter 1. Some of the significant developments in area are RUSL campus, archeological monuments, Mihintale Tank, railway station, post office and Mihintale hospital, identified. Figure 06 showing location of the sub project and the surrounding.

Figure 6: ***location of the sub project and the surrounding***



4.4 Land Use

81 The site is composed of scrub vegetation and has few large trees such as Mee (02), Kohomba (02), coconut tree (1) and Kiriya tree (2). Some of these trees would have to be removed during the site preparation as per the requirement of building designing and construction. On the eastern section of the land water logged condition was observed. On the south west boundary lies a well that was used to supply water for the Divisional Secretary's residence (Figure 11). The auditorium building site is within the RUSL and has been maintained as part of the University garden to date. The site is leveled and there are no building structures. There are however, several trees including bamboo that have been maintained as garden that will have to be removed prior to construction depending on the building plan (unavailable at the time of inspection). There were no endangered, critically endangered, nor endemic tree species noted.

82 The land use system of the region is dominated by home gardens (848.67 ha) and forest. Total land use is dominated by agricultural lands which covers 12,000.15 ha. Agriculture is the main livelihood. People engage in extensive crops such as maize, kurahan, Undu, chili etc. About 17

ha of land is under shift cultivation and is rainfed[4]. Vegetables are cultivated in a traditional slash-and-burn practice called chena cultivation[5]. The communities surrounding the sanctuary depend on non-timber forest products such as honeybees, food sources, and medicinal plants.[6]

83. Vegetation such as green gram, black eye beans, maize, chili, soya beans, gingerly, undu, big onions, banana, passion fruit, and guava are grown in the home gardens and chenas. Table 09 highlights the land use patterns in the DSD.

Table 9: Provides details on the land use pattern in the division

Lands (Goda)		Muddy Lands	
Cultivable lands (ha)	Cultivated lands (ha)	Cultivable lands (ha)	Cultivated lands (ha)
5382.95	4697.45	6618.3	4873.2

84. Livestock practices in the Mihintale DSD include cattle farms that produce 1,574 L of dairy production per day. Poultry farming is common to the region. Table 10 provides details on the Livestock farming practices in the DSD.

Table 10: Details on the Livestock farming practices in the DS

Cattle			**Buffalo**		**Goats**		**Pigs**	**Poultry**	
Local Cattle (no)	Daily Dairy Products (liters)	Hybrid cattle (no.)	Daily Dairy Products (liters)	Farms of Buffalos (no.)	Daily Dairy Products (liters)	Goat Farms (no.)	Farms (no)	Eggs (no)	Meat (no)
478	1574	445	741	632	907	414	15	1055	88

[4] Mihintale DSD Resource profile 2017

[5] Schütt, B.; Bebermeier, W.; Meister, J.; Withanachchi, C.R. Characterisation of the Rota Wewa tank cascade system in the vicinity of Anuradhapura, Sri Lanka

[6] Evaluating temporal changes of vegetation using tm data at Mihintale divisional secretariat in Sri Lanka: Madurapperuma,B. Kuruppuarachchi,J National Symposium on Livelihoods, Biodiversity and Ecosystem Services 2013

4.5 Seismicity

85. The subproject is located in the North Central province of Sri Lanka which is not an active seismic region. The area does not have any potential risk of damage due to earthquake. However the stability of the bedrock and peat soil should be considered during building design.

4.6 Geology, Soil and Topography

86. The DSD is composed of rain fed tank cascaded system. The soil cover in the DSD is composed of reddish brown earth. The bedrock is composed of metamorphic crystalline rocks, first of all charnockitic gneiss[7]. The site specific soil report was not available at the time of IEE. Therefore, no recommendations on the building structure have been provided. The initial designs of FT academic building and the faculty library should consider that net allowable carrying capacity and the carrying capacity in skin friction within the basement rock or the ultimate skin friction coefficient. It is recommended that ICTAD guidelines be adopted when preparing the detailed engineering designs. Refer the geotechnical soil assessment recommendations upon availability.

4.7 Climate and Meteorology

87. Climate conditions in the study area: Mihintale division lies within the dry zone and according to agro ecological classification, the subproject area comes under the category of Dry zone Low Country (DL1b)[8]. It experiences a non-uniform rainfall pattern and receives rainfall mainly from the North Eastern monsoon season and during inter-monsoon periods. Due to the geographical specialty of being centrally located, Mihintale DS, except a few months, has a dry climate.

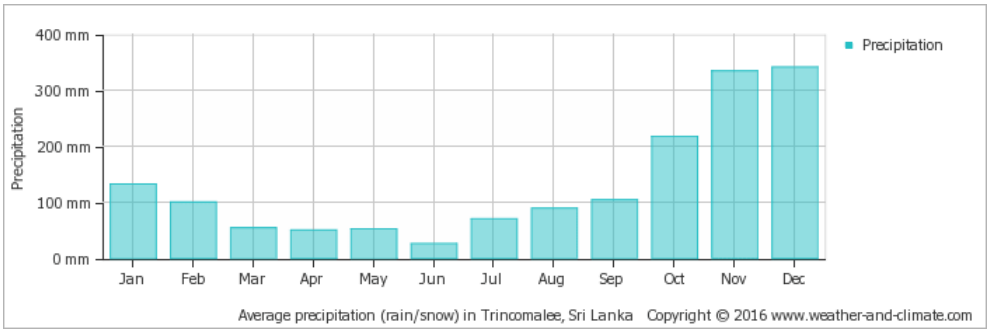
88. **Rainfall** Mihintale has a tropical climate and North East monsoon is the main rainfall period. It starts at the beginning of November and ends in January. The highest rainfall recorded in 2016 was 463.1mm per day. The region experiences roughly two main rainy seasons in January–April and September–December. Rainfall and Temperature details of the subproject area are given in Figure 07. High evapotranspiration rates foster water stress, especially during the period between May and September[9].

[7] Somasekaram, T. *The National Atlas of Sri Lanka*; Sri Lanka Survey Department: Colombo, Sri Lanka, 1988;pp. 1–141

[8] Panabokke, 1996

[9] Panabokke, C.R.; Sakthivadivel, R.; Weerasinghe, A.D. *Evolution, Present Status and Issues Concerning Small Tank Systems in Sri Lanka*; International Water Management Institute (IWMI): Colombo, Sri Lanka, 2008

Figure 7 ***: Average monthly precipitation over the year (rainfall) at the subproject site***



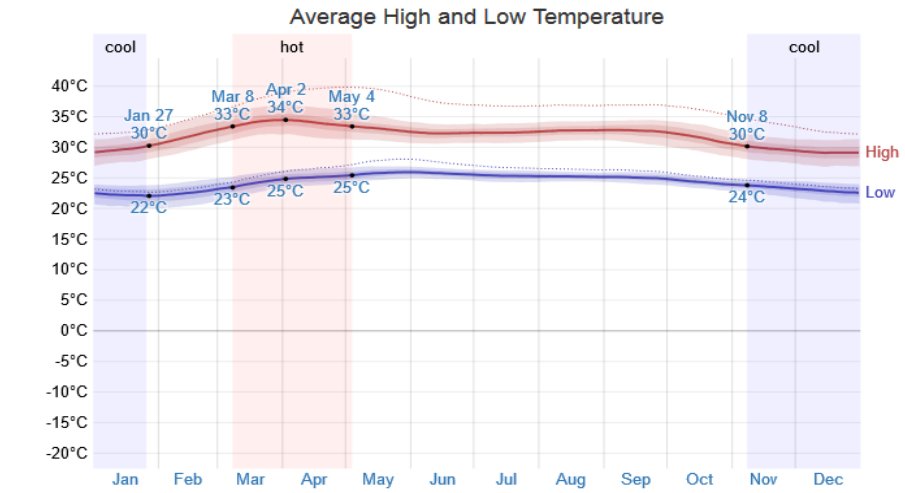
89. Past meteorological data was collected from the nearest Anuradhapura air force station for the period of January 1, 1980 to December 31, 2016 establishes the baseline climatic conditions of the area. The key parameters of collected meteorological data have been summarized in Table 11.

Table 11: Summaries of the Climatological Data

Parameters	**Amount**
Maximum Temperature(^{0}C)	29 ^{0}C
Minimum Temperature (^{0}C)	26.6 ^{0}C
Maximum Relative Humidity (%)	95%
Minimum Relative Humidity (%)	5%
Total Rainfall (mm)	1034.6 mm
Average Wind Speed [CK1]	10 mph
Predominant wind direction	From the West
Dry hours (%)	More than 90%

90. **Temperatur**e The dry season is windy, hot, and oppressive. The hot season lasts for 2 months, from March 9 to May 10, with an average daily high temperature above *34°C*. The monthly mean minimum and maximum daily temperature chart shown in centigrade is given in Figure 08.

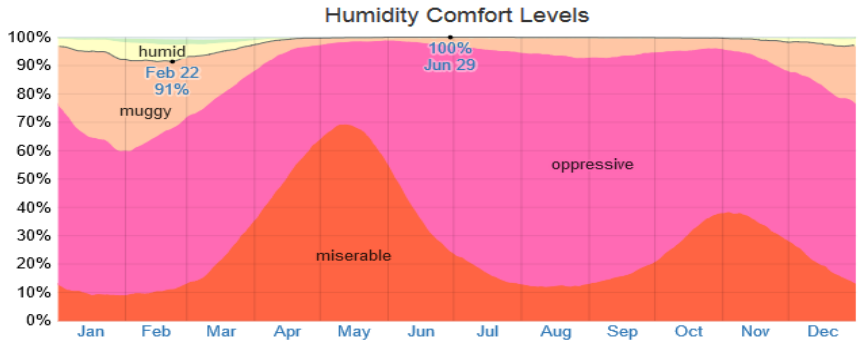
Figure 8*: Variation of Temperature Average in the Subproject Area*



The daily average high (red line) and low (blue line) temperature, with 25th to 75th and 10th to 90th percentile bands. The thin dotted lines are the corresponding average perceived temperatures.

91. **Humidity**. The perceived humidity level in Anuradhapura, as measured by the percentage of time in which the humidity comfort level is muggy and oppressive does not vary significantly over the course of the year, staying within 4% of 96% throughout (refer Figure 09).

Figure 9 ***: Humidity comfort level***



The percentage of time spent at various humidity comfort levels, categorized by dew point: dry < 13°C < comfortable < 16°C < humid < 18°C < muggy < 21°C < oppressive < 24°C < miserable.

92. **Wind speed and direction:** In recent times Kannattiya and Ruwangama in the Mihintale Divisional Secretariat recorded a tornado[10]. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages. The windier part of the year lasts for about 5 months, from May to October, with average wind speeds of more than 17.4 km per hour. The calmest month of the year is April, with an average hourly wind speed of 9.2 km per hour.

[10] "Tornado devastates Kannattiya, Ruwangama" 4.10/2017 : Daily News

4.8 Drainage and the River Systems:

93 Since ancient times and to date the region is known to collect surface runoff and store in human-made reservoirs to provide water for irrigation. The two main rainy seasons in January–April and September–December, surface runoff is collected and stored in these reservoirs, the so-called tanks or wewas, and successively distributed during the dry periods to the paddy fields located downslope[11]. The tanks are arranged in a cascade-like fashion along shallow valley courses. They are connected by canals and spillways and build a complex system of floodwater harvesting, water storage and water distribution.

94. In Mihintale DSD, there are 100 tanks and all these are rainfed. There are several tanks located near the RUSL site and these are Mihintale, Mahakandarawa, Pudukkulama and Ukkulan Kulama tanks. Table 12 provides information on the closest tanks to the subproject site.

Table 12: Tanks in a 10 km perimeter to the subproject site

No	Name of Tank	Distance from RUSL
01	Mihinthale Wawa	0.26Km
02	Mahakanadarawa Wawa	3.71Km
04	Mankadawala Wawa	6.73Km
07	Pudukkulama Wawa	4.15Km
08	Ukkulan Kulama Wawa	4.68Km
09	Sangilikulama Wawa	5.99Km
14	Mankadawala Tank	6.71Km
17	Kawarakkulama Wawa	6.45Km
21	Saliyapura Wawa	7.41Km
22	Nika Wawa	8.53Km
23	Mekicha Wawa	8.50Km

95. There are 1,040 agricultural wells out of which only 853 are being used. A list of agricultural wells in the GN divisions close to the subproject site is provides in Table 13.

Table 13: agricultural wells in the subproject associated GNs

Description GN	Total number of agricultural wells	Unused agricultural wells	Used agricultural wells

[11] Tank Cascade Systems as a Sustainable Measure of Watershed Management in South Asia. Bebermeie, W.,Meister, J., Withanachchi, C.R., Middelhaufe,I and Schütt,B.Water 2017 (9) 231

576 Kahapathwilagama	16	22	100.5
577 Mihintale	3	1	4.5
578 Ruwangama	38	0	22
579 Namalwewa	16	6	15
Total no of well in the DSD	**1040**	**238**	**853**

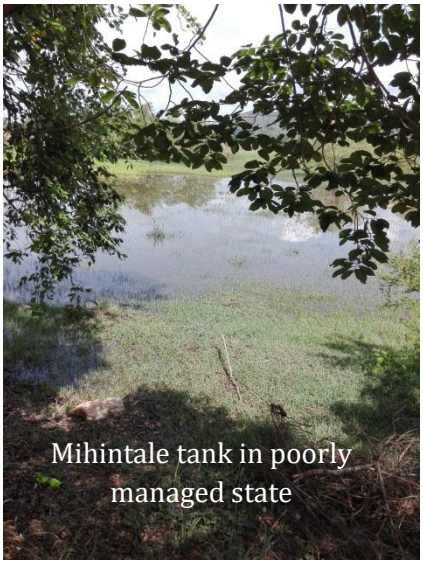
Source: Mihintale Division Resource Profile 2017

96. There is no proper assessment done for the possible risk of flooding due to monsoonal weather in October. The site should be developed in accordance to the drainage plan to avoid possible risk of water logging at the site. Mihintale tank is currently highly polluted due to release of waste and non-maintenance and neglect. Poorly manage Mihintale tank is visible in Figure 10.

97. **Conclusion**: On site observations show that currently subproject site is supported by a poor drainage system which is not regularly cleared nor maintained properly.

Figure 10*: Plates of drainage system in surrounding the site*

A 12 road is in high grown and water is logged at the site during the monsoon



Mihintale tank in poorly managed state

98. The university is served by a special potable water connection from NWRDB. Water for the FT can be supplied through this connection. However NWRDB had not been contacted yet.

4.8 Ambient Air Quality and Noise

99. To draw up a baseline status of the ambient air quality the RUSL will take the measurements prior to the commencement of the development subproject. Particulate matter, SO_2, NO_2 and

Ozone will be monitored at regular intervals as stipulated in the monitoring plan in Chapter 7. Since the IFC- WB EHS guidelines are more stringent than the NEA limits provided, IFC- WB EHS will be adopted in this subproject. See Chapter 6 for values.

100. To assess the baseline value for the background noise level, ambient noise monitoring will be conducted by the RUSL prior to the construction activities at the site. Since the IFC- WB EHS guidelines are more stringent than the NEA limits provided, IFC- WB EHS will be adopted in this subproject. See Chapter 6 for values.

4.9 Surface and Ground Water Quality

101. The water supply for the project will be from the National Water Supply and Drainage Board including construction, workers and students. The baseline data on water quality will be collected for two locations (dug well and nearby lake) within the subproject area by the RUSL and will be monitored, analyzed and assessed during the construction and operational period. The water quality results will indicate quality of the adjoining surface water. An assessment of water quality will be done to check coliform count, BOD, COD to obtain the baseline value. Before the construction, it is recommended that the above test be carried out.

102. Anuradhapura district is known to have the highest concentration of fluoride of approximately 7.0 mg/L. The upper limit value of fluoride considered suitable for consumption in Sri Lanka is 0.6 mg/L which is in line with the recommended guideline value by World Health Organization (WHO)[12].

103. The pH values of selected agro-wells in Malwathu Oya cascade-I varied between 7.2 and 8.4 in pre monsoon period, which indicates the alkaline nature of groundwater in the study area[13]. However, the groundwater potential in this region is limited due to low ground water storage capacity and transmissivity of the underlying crystalline basement hard rock[14]. Kidney disease is prevalent in the region due to high levels of fluoride found in the ground water it is not suitable for drinking.

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12 Weragoda S.K., Kawakami T. (2017) Evaluation of Groundwater Quality in 14 Districts in Sri Lanka: A Collaboration Research Between Sri Lanka and Japan. In: Kurisu F., Ramanathan A., Kazmi A., Kumar M. (eds) Trends in Asian Water Environmental Science and Technology. Springer, Cham

13 Evaluation of Groundwater Quality for Irrigation in Malwathu Oya Cascade-I in Anuradhapura District of Sri Lanka Kumari et al Tropical Agricultural Research Vol. 27 (4): 310– 324 (2016)

14 C.R. Panabokke 2002.Nature of occurrence of the regolith aquifer in the hard rock region of the North Central dry zone, and its rational exploitation for agro-well development Proc. Sym. on the Use of Groundwater for Agriculture in Sri Lanka, 30 September 2002, Peradeniya, Sri Lanka

104. The shallow regolith aquifer is mainly confined to the narrow belt along the inland valley systems of the undulating mantled plane landscape located within the agro-ecological region. This landscape makes up the cascades of small tanks as well. The average thickness of the regolith is not more than 10 m in this region, and both agro-wells as well as domestic wells exploit this shallow phreatic water table, which is present within this regolith zone up to depths of between 6 to 8 m[15]. The water quality of the dug well present at the subproject site will have to be monitored for quality. This water should not be used as potable water. The location of the dug well is shown in Figure 11.

Figure 11 ***: Dug well located at the site***

105. The subproject site runs a possible risk of flooding during the monsoonal rains. The main cause for flooding can be attributed to:

- Discharge from the A12 road and cascade tank systems and the adjoining Mihintale water tank.
- Lack of drainage on site

However during the construction phase the groundwater can be extracted from the dug well located at the site after water quality test.

4.10 Ecology and Biodiversity

106. Mihinthale Sanctuary is located 3.15 km away from the RUSL FT site. The forest consists of dry mixed evergreen vegetation with good leaf litter. The Mihintale Sanctuary (as gazette on 27/05/1938 in the Sri Lanka Government Gazette No.8370 (Department of Government Printing 1938), is situated in Kanadara Korale of Nuwaragam Palatha and encompasses an area of 2,470 acres (999.6ha)[16]. and is managed by Department of Wildlife Conservation in Sri Lanka.

[15] Ibid

[16] Species diversity and conservation of avifauna in three different habitat types within the Mihintale Sanctuary, Sri Lanka; Wimalasekara C., Wickramasinghe,S. Journel of threatened taxa.(2014)

Mihintale Sanctuary has some of the widely used medicinal plants in traditional ayuruwedha systems[17]. The Sanctuary has lately been used as a disposal ground for solid waste (Figure 12).

Figure 12: ***Garbage accumulation in Mihinthale Sanctuary***

107. Mihinthale Sanctuary and Mihintale Forest Reserve (1.77 km) are both habitats rich in faunal and floral diversity. Herpetofauna, avifauna, terrestrial mollusk species of endemicity are common to the region. Endemic avifaunal species such as brown-capped babbler (*Pellorneum fuscocapillum*) grey horn bill (Ocyceros gingalensis). *Loriculuc beryllinus,* and the orange headed thrush *(Loothera citrina).* Herpitfauna such as the Polonnaruwa shrub frog (*Pseudophilautus regius)*[18] (Figure 13) and other endemic frogs (*Euphlyctis cyanophlyctis*, *Fejervaraya syhadrensis*, *Microhylarubra)* are found in tank associated grass lands. There are lizards such as *Hemidactylus depressus*, *Hemidactylus leschenaultia*, *Calotes versicolor,* and *Geckoella yakhuna*. The area is well known for endemic species of reptiles, butterflies and other endemic insects and terrestrial snails found in the area.

108. Herpetofauna Avifauna study carried out at the existing RUSL campus from 2010 to 2014 showed that a total of 68 species belonging to 34 families were recorded in the disturbed habitat within the university premises. Among them 64 (94.2%) were breeding residents and 4 (5.8%) were winter visitors recorded in disturbed habitat. The grass patch within the premises recorded 87 (87.8%) breeding residents and 12 (12.2%) winter visitors. The Shannon Weiner Diversity Index (H') for disturbed and grass patch habitat was 2.48[19] thereby making the area a moderately diverse habitat. A comparative study on Herpetofauna in the Mihintale Sanctuary and the disturbed grass land exhibit that Shannon Weiner Diversity Index is higher in the Sanctuary[20]. Some endemic species spotted in the RUSL premises are provided in Figure 14. The presence

[17] The Status Of Vesicular Arbuscular Mycorrhizal Associations with Medicinal Plants In Mihintale Sanctuary *K.S.N. Silva, P.N. Yapa,* Interstation forestry and environmental symposium 2010

[18] IUCN red list 2012

[19] Diversity, Abundance and Habitat Utilisation of Birds in Periphery of the Mihintale Sanctuary; De Zoysa H.K.S., Sandunika I.A.I., Rathnayake D.G.R.M.M. and Wickramasinghe S. *Forestry and Environment Symposium 2013*

[20] Dissanayake, D.M.D.B.S., Wellappuliachchi and S.M. Wichramasingha.2011.Diversity and Abundance Distribution of Amphibians in Mihintale Sanctuary. : Proceedings from the international forest symposium 2011.

of these species is due to the close proximity to the Mihinthale Forest Reserve (discussed below). Project activity is not expected to have a significant effect on these species as the site is an already developed area and it does not serve as a permanent habitat for them.

Figure 13*: Plates of endemic species*

Grey hornbill Ocyceros gingalensis

Inside forest: Dry mixed evergreen vegetation with good

Brown-capped Babbler (*Pellorneum fuscocapillum*)

Sri Lanka hanging parrot *Loriculuc beryllinus*

View of Grassland Habitat (GLH)

Orange headed thrush *(Loothera citrina)*

Endemic shrub frog Pseudophilautus

109. **Mihinthale Forest Reserve:** Located 1.77 km away from the subproject site, it is 2,462ha in extent. There are 21 woody plant families in this forest belonging to 36 Genera. Out of 41 plant species recorded 6 were endemic plants and one is a nationally and globally threatened species. Faunal diversity in Mihinthale Forest Reserve is provided in Table 14.

Table 14 : Mihintale forest faunal diversity

	Families	Genera	Species	Endemic	Threatened Species	
					National	Global
Birds	12	14	17	1	1	0
Amphibians	0	0	0	0	0	0
Butterflies	4	6	7	0	0	0
Mollusks	2	2	2	1	0	0
Mammals	6	8	8	0	0	0
Reptiles	2	3	3	2	2	0

Source: Biodiversity baseline survey: Minneriya NP, Department of Wild life Conservation, 2008

110. There are key environmental issues governing the DSD and these include non-demarcation of the wildlife reserves and the forest reserves, human elephant conflict and unregulated solid waste and waste water disposal. The sub project site does not have any impact of human elephant conflict.

111. Over the years the unregulated disposal of waste to the Mihintale tank has seriously impacted the biodiversity in this unique wetland.

112. **Relevance to sub project:** The Mihintale tank associated habitat needs to be conserved. A biodiversity assessment was not recommended for the current land as it was an already developed land that had been cleared. As land was left undisturbed for 12 months a grassland habitat associated with the tank can be observed[21]. There are many drivers of change operating in the wetland associated ecosystems such as spreading of invasive species, unregulated waste disposal. With these environmental pressures, it would be difficult to maintain the ecological balance in and around the subproject site unless there is a well thought out holistic management plan for the broader area.

[21] Site observation on 19th April 2018 at the stakeholder meeting university of Rajarata

113. If the sub project were to be extended beyond the current site, it is recommended that a rapid biodiversity assessment be carried out on the adjoining land which is a successional grassland that is associated with the Mihintale tank.

4.11 Educational, Medical and Health Facilities

114. There are 18 provincial schools in Mihintale DSD. Health facilities in this area include Mihintale and Thammannawa Divisional Hospitals, 1 Ayuruvedic hospital, peripheral central dispensaries, and dispensaries. Additionally, the health sector cadre for the region includes 15 registered Ayurvedic doctors, 03 health inspectors and 08 midwifes.

4.12 Cultural Archaeological and Historical Significance

115. Dating back to B.C. 236 Mihinthalaya is connected with the Sinhala Buddhist culture. It is believed that Mahinda Thera and four other theras started out from India to visit Lanka to "Missaka Pavva". (Mihintale rock which is190m from the site) Figure 14. It is believed by Sri Lankans to be the site of the meeting between the Buddhist monk Mahinda and King Devanampiyatissa which inaugurated the presence of Buddhism in Sri Lanka. It is now a pilgrimage site, and the site of several religious monuments and abandoned structures. At the foot of the mountain are the ruins of a hospital, medical bath (or stone canoe in which patients were immersed in medicinal oil) a stone inscription and urns belonging to the ancient period have been unearthed. This region is part of the ancient Kingdom of Rajarata. Therefore, has may ruins and monument that have not yet been uncovered. The site is archeologically sensitive hence the required provision approval was obtained from Department of Archeology Sri Lanka (see Annex 08).

Figure 14*: Plates of archeological sites*

Mihintle temple

Anubudu Mihindu Maha Seya Mihintale

Kalu Diya Pokuna

Mihintale rock

4.13 Communication Facilities and CBO

116. Central post office is located in the Mihinthale DSD. There is a sub post office at RUSL. There are several registered community organizations such as sport clubs, elder's society, three wheeler society, village development society inland fisheries society within the DSD. For the purpose of the subproject, the RUSL will require good telecommunication system.

4. 14 Demographic Details of Affected Population

117. **Population and Community:** Total population of Mihintale DSD is 35,898 of which 48.67 % is male and 51.35% is female. Mihintale population is predominantly Sinhala (94.51%). Tamil, 5.06 %, Muslim, 0.01%, Burgher, and 0.28% others. When considering the religion within the

DSD 93.99% of the population is Buddhist, 0.12% Hindu, 5.06 % Islam, 0.10% Catholic, and 0.37% is Christian.

118. **Industry and Economy:** Local industry is manly on bottling water apart from other industries such as clothing, textile and leather, wood, wooden based. A detail list of industries available locally is provided in Table 15.

Table 15 : Detail list of industries available locally

Mining and digging	Food, beverages and tobacco	Clothing, textile and leather	Wood, Wooden Goods and furniture	Paper production, printing	Chemicals, Petroleum, Rubber and Plastic	Basic Metal Industrial Machinery and Tools	Water related activities and water supply	Other manufacturing industries
7	6	15	13	2	1	1	18	4

5. ANALYSIS OF ALTERNATIVES

119. The proposed FT subproject location alternatives were considered and the proposed site was identified as the best in terms of accessibly and connectivity and terrain. The previous location was deemed unsuitable for the development and thereby rejected. Impacts associated with construction stage are temporary and short term. Any long term impacts can be managed by adhering to the EMP.

120. By looking at the Table 16 below it can be concluded that "With" subproject scenario, with positive/beneficial impacts will greatly enhance social & economic development of the region and improve the environment, when compared to the "Without" subproject scenario. Hence the "With" subproject scenario with some reversible impacts is an acceptable option rather than the "Without" subproject scenario.

121. The implementation of the subproject therefore will contribute positively to improve the environmental quality in the area and the associated surroundings. It will result in holistic development of the economy and improve the region.

122. There will not be considerable increase in the pollution levels during construction. Dust and particulate matter during construction will affect the air quality on immediate environmental sensitive receptors on a short-term basis

123. The FT subproject of RUSL forms an important training center for the technology students and since accessible to major EPZ such as, Lakshauyana Industrial Zone in Polonnarwa, 103.59 km Mawathagama Export Processing Zones (EPZ) in Kandy Sri Lanka. It is closely located mineral resources such as Eppawella mineral deposit, Pulmudai Mineral (Zircon, Ilmanite, and Rutite), deposits, Kaikawala Feldspar and Quartz deposits, NamalUyana Rose Quartz deposit, Yan Oya Red Clay deposit which provides ideal research opportunities for RUSL students in material sciences. It is easily accessible to the student community to carry out research and their educational activities. Thus, the development of the land into a training facility will be the better option under the existing condition. Keeping this in view, the site conditions and the scope of development of the area, the 'with' and 'without' subproject scenarios have been compared as shown in Table 16.

Table 16: Subproject scenario

With Subproject	Without Subproject	With Subproject	With Subproject
Impacts	**Impacts**	**Impacts**	**Impacts**
Positive	**Negative**	**Positive**	**Negative**
Provision of facility to train graduates that are geared to job market and economic and best use of the available space	Water retention surrounding area reduced	Nil	Unemployed graduates who cannot secure jobs are trained which become a social problem of unrest.
Use of the land that could not be used for other purpose except as residential purpose is being used to improve the regional economy and education.	Nil	Land widely available for flood water retention.	Not being used as per the zonation plan for the region.
Land preparation and improvement activities will increase the chance off unearthing ancient monuments	Impact on archeologically sensitive site	Possible unearthing and conservation of ancient artifacts without damage	No discovery of archeological monument
Improvement in ecology through maintenance of Mihintale tanks and the watershed	Nil	Succession vegetation and ecosystem change	Further degradation of Mihinatale tank and the watershed
Improved drainage in subproject site and the surrounding area	Nil	Nil	Flooding conditions during rainy season will be increased and vector borne health issues prevalent
Enhanced trade and commerce replacing ecosystem degrading livelihoods such as slash and burn	Uncontrolled infrastructure development	Undisturbed environment	Microlevel trade in the area will be limited. Continuation of environmentally degrading practices
Increased access to job markets	Nil	Nil	Reduced employment/ economic opportunities
Employment to local workers during the execution of the subproject	Outsourcing people from other parts of the country will increase traffic congestion and demand for logistics and social unrest	Nil	Nil

6. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

124. The proposed work under FT subproject will impact on the environment to some degree. During the construction phase which may be regarded as temporary or short-term and operation stage which will have long term effects. The negative impacts can be reduced or minimized only if proper safeguards are put in place during the design and construction stage itself. These can include reducing pollutant discharge from waste at FT, by enhancing the landscape to support the nearby wetlands, etc. Efforts will be worked out to minimize any adverse impacts on the various environmental and social components through practicably implementable strategy. Where the impacts on various environmental components are unavoidable, mitigation measures will be worked out to minimize the impacts. The mitigation measures recommended during the construction phase should be included in the contract agreement with the contractor and discussed with them to ensure smooth implementation from the beginning.

6.1 Land and Environment

125. The impacts on existing topographical setting originate primarily from opening up borrow pits to fulfill the requirement of huge quantity of earth material to raise the DPC level as required since the A12 road is higher that the subproject site during construction.

126. **Construction Impacts**:

- Changes of topography due to indiscriminate digging of borrow pits. Un-managed digging of borrow pits resulting in water accumulation & breeding of vectors. Soil required to be filled for the sub project site by about 2 feet (quantity of soil required will have to be calculated once the detail designs are available). Alteration of current land use & change in existing profile of the land due to proposed subproject location.

127. **Mitigation Measures:**

Contractor needs to prepare / follow several mitigation / management plan / guidelines for various construction activities. These guidelines are listed below and detailed out in "Part-III EMP".

- **ICTAD Guidelines for Siting and Layout of Construction Camp Guidelines for Siting**, Storage of construction materials should be located sufficiently away from the road frontage. Sand, rubble, metal bitumen and cement should be covered. All cement, bitumen (barrels), oil and other chemicals should be stored and handled on an impervious surface above ground level (e.g. concrete slab) and should be enclosed ensuring that no storm water flows in to the structures.

There should be adequate ventilation to avoid accumulation of fumes and offensive odour that could be harmful

- **ICTAD Operation and Re-Development of Borrow Areas Guidelines for Siting**,

Extraction of construction materials should be undertaken only from mines and quarries approved by Geological Survey and Mines Bureau (GSMB). Gravel for the compaction and filling is supplied from government authorized pits. If new material extraction sites need to be located, those should exclude areas which are public and environmentally sensitive. Burrow areas shall not be opened without permission of the site engineer. Environmental requirements and guidelines issued by the CEA, GSMB and LAs should be followed with respect of locating material extraction sites, other operations and rehabilitation of extraction sites at the end of use.

Transport, loading and unloading of construction materials should not cause a nuisance to surroundings by way of noise, vibration and dust. All drivers should have valid license for the category of vehicles they drive and follow the speed limits of roads. Construction materials should not exceed the carrying capacity of trucks and the local road.

- **ICTAD Operation and Re-development of Quarrying and Stone Crushing Operations**
- **ICTAD Guidelines for Siting and Management of Debris Disposal Site**
- **ICTAD Guidelines for Preparing Comprehensive Waste Management Plan**

128. In the operation phase, the temporarily modified land use pattern such as temporary construction camps / tents would be dismantled. The FT subproject, after completion of its construction, would consist of neat landscape pleasing environment.

129. **Operation Impact**:

- Likely change of land use due to squatter / encroachment within subproject land area and the surroundings.
- Likely change of land use due to site preparation including earth filling of the site and building in the subproject area.
- Likely change due to construction of the earth drains on the northern and the western part of the boundary of the subproject site.

130. **Mitigation:**

- After the construction phase, it is necessary to ensure that no further deterioration or major land use changes such as ribbon development takes place in a manner that will jeopardize the interests of RUSL.
- Squatter development along the subproject shall be strictly avoided by proper regulation and vigilance. LA will have to be informed.
- All debris, piles of unwanted earth, spoil materials and temporary structures should be cleared away from the subproject site and disposed at locations designated or acceptable to the Department of Irrigation, LA and CEA. Subproject landscape activities have to be done as per either detailed design or typical design guidelines given as part of the bid documents.

6.2 Social and Cultural Resource

131. There are heritage sites notified by Department of Archaeology of Sri Lanka near the subproject area. Similarly, common property resources such as Mihintale tank will be affected by the proposed subproject unless managed accordingly during construction.

132. **Construction Impact:**

- Vibration and site preparation activities with the machinery may impact the archeological site that is located close by (Anubudu Mihidu Maha Saya).
- In cases where heavy loads are imposed, sediment deformation may be accompanied by damage to fragile artifacts[22]. Biological and geochemical effects impact most dramatically upon the preservation of archaeological materials.
- Excavation during construction may lead to unearthing of archeologically significant objects and may cause damage.

133. **Mitigation:**

- Consult Department of Archaeological of Sri Lanka or Anuradhapura Divisional Archaeology Department to obtain an expert assessment of the archaeological potential of the site Obtain a provisional clearance letter from Department of Archaeological of Sri Lanka. Letter was obtained prior to construction and designing of the subproject (already

[22] SHILSTON D.T. and FLETCHER S.L., 'Geotechnical engineering for the in-situ preservation of archaeological re- mains', in Preserving archaeological remains in situ. Pro- ceedings of the conference of 1st–3rd April 1996, ed. M. CORFIELD, P. HINTON, T. NIXON and M. POLLARD, Mu- seum of London Archaeological Service, London, 8–15, 1998

obtained – Annex 08) Department of Archaeological stipulates that in the event any archeological monument is discovered stop any development at the site immediately and take measure to protect the "find" . Department should be contacted for further instructions.

- Develop a protocol for use by the construction contractor in conducting any excavation work, to ensure that any chance finds are recognized and conserved. All worked involved in the excavation activities should be made aware of the importance possibly of chance finds. They should be educated on step to be followed.

6.3 Water and Environment

6.3.1 Drainage and Hydrological Flow

134 The FT subproject site is 190m from the nearby tank. Mihintale tank is a wetland that is protected by Irrigation Department and the services. There has not been an assessment of the seasonal flooding experienced at the site. It is recommended that a simple on site assessment be done prior to construction.

135. **Construction Impact**

- Construction activities will also create temporary floods during the monsoonal season.
- Increase of mosquitoes and other vectors increasing health risk.
- Based on observation carried out during the field visit during the monsoonal period it is evident that Irrigation Department does not satisfactorily carry out its responsibilities on maintenance the Mihintale tank. There are no drainage channels surrounding the subproject site at the moment.
- The Mihintale tank is polluted and neglected due to the unregulated disposal of gully bowsers. Adjacent settlements dispose the untreated water to the tank. If this is not properly mitigated it would be a continuous health risk which will result in unpleasant odor and sight. This is already leading to sedimentation of tank reducing its ecosystem functions.

136. **Mitigation Measures:**

- Construct additional drainage structures in consultation with the Irrigation Department so as to not obstruct the natural water flow towards the Mihintale tank. Construction activities will not aggravate flooding condition in the area if mitigation measures are followed by the contractor.
- When filling the FT site to reach A12 road level, sloping of terrain should be carried out towards Mihintale tank to ensure natural drainage.

- Adequate building and roadside drains will be provided along property to facilitate its better maintenance.
- Detailed drainage plan to be developed upon carrying out a simple seasonal flood risk study on site to avoid flooding & formation of water pool that leads to soil erosion & breeding of mosquitoes.at the site. Propose a storm water drainage system around the FT complex to capture flood waters during heavy rain and reduce runoff.
- Construction works of culverts will be taken up during the lean flow periods to minimize the impacts on drainage.
- Reduce the inflow locations adjacent to the site, i.e. the side drains of the road need to be constructed by the relevant authorities (Mihintale Pradeshiya Saba RDA).
- Drains, of the subproject site and Mihintale tank should be cleaned regularly to ensure smooth flow of water. This includes the regular maintenance of the downstream main peripheral drain. RUSL will have to keep close connections with the relevant authorities in ensuring the water drains are cleaned especially prior to the commencement of the rainy season.
- Temporary earth drains should be provided until required line or earth drains are provided after excavation or during other construction activities.
- Design and maintenance of the suitable sewerage system taking into account the impermeable bed rock level.
- **Ground Water Recharge Pit/ Rainwater Harvesting Structures:** Unlined drain in the subproject may also be connected with the ground water recharge pit to facilitate the recharge of runoff water in to the ground, augmenting the water table of the subproject area. Paved surface of the FCT will reduce the percolation of runoff water and decreases the ground water recharge. Location of proposed ground water recharge pits will be reviewed by the Environmental Consultant, and an Independent Engineer to finalize in consultation with PIU. These locations should be permanent which shall be handed over to the university maintenance engineering body at the end of the construction. The rainwater that will be harvested will be used only for irrigation and gardening purposes and therefore no rainwater treatment system.

6.3.2 Water Use

137. **<u>Construction Impact</u>**

- During the construction period water is required for compaction of earth fill, dust suppression, concrete mixing and domestic use in the construction camp. The estimated

tentative water requirement during construction stage will be calculated by the site engineers before the commencement of the subproject. Refer Annex 09 table format to be followed.

- Non availability of adequate potable water will lead to worker dehydration and associated health issues. Also use of ground or untreated surface waters in this region has been reported to cause health issues with excessive content of fluoride and calcium.

138. **Operation Impact**

- During the operational phase water will be a limiting resource unless a proper water supply system is established. Ground water should not be used for construction since it may be unsuitable at the subproject site. Estimated water consumption for the FCT will be approximately 10,000 l per day (considering occupancy of 1400 and gardening).

139. **Mitigation:**

- Obtain the water supply connection to the site from the NWSDB and calculate the requirements of water when the FT is in operation and during construction activities in order to avoid likely impacts on other users. Before use conduct a water quality test. Water would have to be supplied from outside for the construction purposes in bowsers. The contractor will arrange water required for construction in such a way that the water supply to nearby communities remains unaffected.
- Potable water to be sourced from a reputable source during construction. Storage tanks should be provided to ensure adequate potable water on site.
- If tube-wells are to be bored to supply the water required for construction or use a prior approval from the NWRB has to be obtained by the Contractor. Without permission from NWRB, contractor will not be allowed to extract ground water.
- Wastage of water during the construction should be minimized. Regular maintenance of taps to ensure no leakages and adopt water saving technologies.
- During the construction it is important that the workers are adequate potable water brought from the market and stored in water tanks ensure that they are not dehydrated and not exposed to unsuitable drinking water. The NWSDB water connection to the subproject site should be obtain without delay at the onset of the subproject.
- **Water Quality Monitoring**: The ground water at the site may be unsuitable for consumption due to high fluoride and $CaCO_3$ content unless treated. In the event water from the already existing dug well is used for construction or operation water quality

should be tested prior to use. Apart from provision of the mitigation measures, water quality (refer table 17) shall be monitored to understand the effectiveness and further improvement in designs in reducing the concentration of pollutants. The monitoring plan shall be functional in construction as well as in operation stages. Once the detail plans are available monitoring points will be established by the Environmental Consultant of the PMU. Water quality parameters will be monitored bi-annually during construction and annually during operation. Any release of waste water has to conform to SLSI standards. The proposed SLSI standards guideline is comparable to European Guidelines and are adopted nationally.

Table 17: Waste water quality standards

Parameter	Unit	Bathing Water	Raw water for Drinking	Agriculture Water
Colour	Pt units.	-	100	-
pH	-	6.0-9.0	6.0-9.0	6.0-8.5
Conductivity	dS/m	-	-	0.7
Nitrates	mg/l	5	5	5
Total phosphate	mg/l	0.7	0.7	0.7
BOD5	mg/l	4	5	5
Total coliform	MPN/100 ml, (*P=95%)	1000	5000	1000
Fecal coli form	MPN/100 ml, (*P=95%)	50	-	-
Aluminum	mg/l		0.2	0.5

- Any release of sanitary sewage discharge should conform to IFC-WB EHS standards. This is in line with the SPS 2009 requirements. Refer Table 18 for standards.

Table 18: Sanitary sewage discharge water quality standards comparison

NEA standards Tolerance limits for discharge of effluents into public sewers with central treatment plants			IFC-WB EHS Guidelines 2007 Indicative Values for Treated Sanitary Sewage Discharges	
	Unit type of limit	Tolerance limit values	Units	Guideline Value
pH			pH	6-9
BOD	mg/1, max.	350	mg/l	30
COD	mg/1, max.	850	mg/l	125
Total nitrogen	mg/1, max.	500	mg/l	10
Total phosphorus			mg/l	2
Oil and grease	mg/1, max.	30	mg/l	10
Total suspended solids	mg/1, max.	500	mg/l	50
Total coliform bacteria			MPNb / 100 ml	400a

- **Functional Sanitary Facilities:** It is important that functional sanitary facilities are maintained in the university to avoid health risks and spread of disease. Regular sanitary facility checks and maintenance to be carried out by university. Already the design lay out of the building proposes a maintenance space. Maintenance staff should be employed for running of these sanitary facilities. Water storage facilities such as provision of a water storage tanks should be in place so that there will not be any shortage experienced during subproject implementation Therefore it is highly recommended that water connection be secured through NWSDB for use. It is important that functional sanitary facilities are maintained in the university to avoid health risks and spread of disease. Water storage facilities such as provision of a water storage tanks should be in place so that there will not be any shortage experienced during subproject implementation.

6.4 Air Environment

140. **Impact**

- Particulate matter would be the predominant pollutant affecting the air quality during the construction phase as it is likely to generate considerable quantities of dust, especially during dry condition. Dust will be generated mainly during excavation, backfilling, hauling & transportation activities to the site, loading/ unloading, spilling of material during transportation, and open storage of fine construction materials.
- Undesirable gaseous pollutants will be generated mostly by the construction machineries. However, suspended dust particles may be coarse and will be settled within a short distance of construction area. Therefore, impact will be temporary and restricted within the closed vicinity of the FT and the access road only.

141. **Mitigation:**

- Wet down and spray water at construction site, quarries if required.
- Dust emissions during transportation of construction materials should be controlled by enforcing speed limits on the vehicles and ensure transported material is covered with tarpaulin.
- All filling works are to be protected or covered in a manner to minimize dust generation
- All vehicles, equipment, and machinery used for construction shall conform to the Sri Lankan government vehicle emission test. For equipment emission norms as specified in air emission gazette under NEA.
- The Contractor shall maintain a record of pollution under control for all vehicles and machinery used during the contract period, which shall be produced for verification whenever required.
- The air quality monitoring will be conducted as per the plan in chapter 7 and will follow IFC-WB EHS standards. This is in line with the SPS 2009 requirements. Refer Table 19 for air quality standards.

Table 19: Air quality standards comparison

NEA standards			IFC Guidelines	
	Averaging Period	Guideline value in **m**g/m3	Averaging Period	Guideline value in **m**g/m3
Sulfur dioxide (SO2)	24 hrs	80	24hrs	125 (Interim target-1)* 50 (Interim target-2) 20 (guideline
Nitrogen dioxide (NO2)	24hrs	100	1-year 1-hour	40 (guideline) 200 (guideline)
Ozone	8-hour daily Maximum	-	8-hour daily maximum	160 (Interim target-1) 100 (guideline

*Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

6.5 Noise Environment

142. **Construction Impact:**

- During the construction phase, noise will be generated due to movement of operation of light & heavy construction machineries (i.e., dozer, tipper, loader, excavator, grader, scraper, roller, concrete mixer, generator, pump, vibrator, Drilling machines, crane, compressor etc.) that are known to emit sounds with moderate to high decibel value. Noise generated from sources mentioned above will be intermittent and mostly during daytime.

- Increase in noise level due to construction activities like operation of construction equipment and excavations will cause disturbance to environmentally sensitive receptors such as RUSL current campus and its hostels, residents (on either side of A12 road), Mahindoayaramaya temple, Mihnitale CEB office, RDA circuit bungalows and government office, which are in the immediate vicinity of the sub project.
- Workers are likely to be exposed to high noise levels that may affect them.

143. Typical noise level of various activities associated with the subproject is presented below in Table 20 and Table 21 provides typical noise level associated with the operation of construction machinery.

Table 20: Noise Level of Road Construction Activities

Sl. No.	Construction Activity	Noise Level dB(A)
1.	Grading & Clearing	84
2.	Excavation	89
3.	Foundations	88
4.	Erection	79
5.	Finishing	84

Note: Measured at Leq assuming 70 dB(A) ambient noise level

Table 21: Typical Noise Level of Construction Equipment

Clearing		**Structure Construction**	
Equipment	**Noise Level dB(A)**	**Equipment**	**Noise Level dB(A)**
Bulldozer	80	Crane	75-77
Front end loader	72-84	Welding generator	71-82
Jack hammer	81-98	Concrete mixer	74-88
Crane with ball	75-87	Concrete pump	81-84
Concrete vibrator	76		
Excavation & Earth Moving	Air compressor	74-87	
Bulldozer	80	Pneumatic tools	81-98
Backhoe	72-93	Bulldozer	80
Front end loader	72-84	Cement & dump trucks	83-94
Dump truck	83-94	Front end loader	72-84

Jack hammer	81-98	Dump truck	83-94
Scraper	80-93	Paver	86-88
Grading & Compaction	**Landscaping and Cleanup**		
Grader	80-93	Bulldozer	80
Roller	73-75	Backhoe	72-93
Paving	Truck	83-94	
Paver	86-88	Front end loader	72-84
Truck	83-94	Dump truck	83-94
Tamper	74-77	Paver	86-88

U.S. Environmental Protection Agency, Noise from Construction Equipment and Operations. Building Equipment and Home Appliance. NJID.300.1. December 31, 1971

144. **Mitigation:**

- All machinery, equipment and vehicles should be maintained in a good condition by engaging skilled mechanics and regularly maintained in compliance with National Emission Standards (1994). Noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinance, No 924/12) should strictly be implemented for crushers, construction vehicles and equipment.
- Activities involving high amounts of vibration should be limited since it may impact archeological monuments in the area of influence.
- Occupational safety measures should be adopted (e.g. usage of ear mufflers for workers engaged in high noise activities).
- The maximum permissible noise levels at boundaries of the land in which the sources of noise is located for construction activities will conform to IFC-WB EHS mix development standards. This is in line with the SPS 2009 requirements. These standards override the NEA standards. Refer Table 22 below.

Table 22: Noise level standards

NEA standards			IFC Guidelines	
	Day time 6am-7pm	Night time7pm-6am	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Commercial Areas	65	55	70	70
Industrial Area	70	60	70	70
Mixed Residential/ Residential; institutional; educational55	63	55	55	45

Source: Compiled by TMS

6.6 Impact on the Fauna and Flora

145. **Construction Impact:** The species richness presently in the subproject area and the surroundings are moderate. Activities during construction phase such as site clearing, construction of drains, mining of boulders, removal of trees and green cover vegetation and etc., will potentially impact on the ecological resources of the area by means of disturbing habitat, increasing soil erosion , creating noise and vibration at the subproject site, etc.

- Overall impacts will be insignificant on the fauna and flora at the subproject site as it was already developed location.
- Egrets that were observed feeding at the grass land associated wetland may be disturbed with the construction work associated noise.
- Haphazard removal of existing trees may reduce the moderately diverse status of the area.
- Unregulated disposal of construction and labour camp solid waste in surrounding areas will degrade the ecosystem. .

146. **Mitigation:** Adoption of certain practices of mitigation will ensure that the subproject land and its surrounding habitat will not be further degraded, but enrichment of the habitat is encouraged.

- All the construction workers and staff of the subproject should be made aware and educated about the presence of the flora and fauna in the area. Environmental awareness program should be provided to the contractor, labours and all staff deployed at the site.
- All staff / workers should be instructed not to harm or disturb any fauna seen near the subproject area.
- Noise has to be kept under control by regular maintenance of equipment and vehicles. “No honking” board shall be placed near the boundaries. Noisy activity shall be prohibited during night time.

- Construction debris should not be dispose in the Mihintale tank watershed area.
- Encourage habitat enrichment with minimal removal of tree and the site. Contractor shall adhere to the guidelines and recommendation made by CEA and DS regarding removal of trees.
- Replacement of removed trees with native or endemic species which is suitable to the existing climatic condition of the subproject areas. Carry out a resonance survey of floral species native to the area or contact Agriculture Department to identify the recommended species and plant native plant species listed in the Table 23. These have been suggested for tree planting programs to enrich the habitat.
- Develop the northern boundary of the sub project site as recreational area (green zone) with native species land scape that blends in with the native habitat that would attract local native faunal species such as birds, butterflies and dragon flies.

Table 23: List of species suggest for habitat enrichment

(species having medicinal, food and wood value)

Agroforestry tree Species		
Common Name	**Scientific Name**	**Conservation status (IUCN)[23]**
Kos	*Artocarpus heterophyllus*	*LC*
Kohomba	*Azadhirachta indica*	*LC*
Siyambala	*Tamarindus indica*	*LC*
Bulu	*Terminalia bellerica*	*NE*
Nelli	*Phyllanthus emlica*	*NE*
Beli	*Aegle marmelos*	*NE*
Ma dan	*Syzygium cumini*	*NE*
Pini mara	*Samanea saman*	*NE*
Mai Mara	*Delonix regia*	*NE*
Murutha	*Lagerstroemia speciose*	*NE*
Ritigala Mee	*Madhuca flava*	*NE*

[23] MOE 2012. The National Red List 2012 of Sri Lanka; Conservation Status of the Fauna and Flora. Ministry of Environment, Colombo, Sri Lanka.

Other woody tree spices proposed		
Burutha	*Chloroxylon swietenia*	*VU*
Kolong	*Adina Cordifolia*	*LC*
Helamba	*Nauclea orientalis*	*NE*
Helamba	*Mitragyna tubulosa*	*EN*
Pihimbiya	*Felicium decipiens*	*LC*
*EN- Endemic **VU- vulnerable ***NE- Not evaluated****LC- Least concerned*		

6.7 Waste Disposal and Sanitation

147. Under the RUSL sub project special attention will have to be given for management of waste, since it is seriously aggravating environmental problem in the region that is degrading the surrounding ecosystems such as Mihintala tank, Mihinitale sanctuary as discussed in Chapter 4.

148. **Construction Impact:**

- Construction debris, spoil, and waste generated from labour camps, officer's accommodations may impose several negative environmental and social impacts to the subproject affected area including impact on ecology, public health and scenic beauty.

- Labour camps, garbage disposal sites and material storage yards provide favorable habitats for vectors of diseases like mosquitoes and rats. Decaying wastes attract pests such as rats and flies which become unhealthy, dirty, and unsightly. Contamination of water bodies with wastewater, construction debris and spoil will create significant impact on aquatic lives and people inhabiting the area.

149. **Mitigation**

- Contactor and the engineers should consult the Mihintale Pradeshiya Sabha at the onset of the subproject on waste collection and disposal. Seek approval from the DS for storage and disposal of spoil material and other gravel.
- Selected disposal site by the contractor should exclude areas which are close to public and environmentally sensitive areas. Prior approval for the disposal site should be obtained from LAs via Grama Niladhari.
- All debris and residual spoil materials (soil, sand, rock, and deadwoods) generated from construction activities shall be re-used wherever possible for site leveling, back - filling under instruction of Building Department Engineers & Construction Supervision

Engineers from PIU. Dump materials should be placed without interference to the irrigation canals, water bodies, agricultural lands or any other environmentally sensitive sites.

- Contractor should handle and manage waste generated from construction/labour camps without contaminating the environment or without risk to public/communities living near the sites. Proper solid waste disposal, sanitation and sewerage facilities (drinking water, urinals, toilets and wash rooms) should be provided to the site of construction/labour camps. Location of labour camps should be approved by the Building Department Engineer and comply with guidelines/recommendations issued by CEA and LAs.
- Practice cleanliness and good housekeeping practices on site. Provision of proper drainage facilities to minimize stagnation of water around worker based camps and keeping the drainage facilities clean at all times to prevent breeding of rats and other vectors such as flies. Garbage bins should be provided to all workers based camps, construction sites and should be dumped regularly in a hygienic manner under the inspection of Public Health Inspector (PHI) in the area.
- Clearing of construction camp and restoration. Contractor to prepare site restoration plans for approval by the engineer (PIU). The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, at the contractor's expense, to the entire satisfaction of PIU.

150. **Operation Impact:** Waste disposal becomes an important consideration with the occupancy level of the FT buildings. A study carried out at RUSL in 2016 showed that in the existing campus an individual student will generate 476.4g of waste per day[24]. Therefore, it is estimated that the FT will generate around 650 kg per day of solid waste. Currently at the existing university premises solid waste is being collected by the Local Authority and there is a composting program ongoing. During the initial IEE site visits however, it was observed that dDisposal practices include open dumping and burning of collected waste[25]. So there is already a change in the waste management system within the already existing complex, but further enhancement for an efficient system should be looked at for the FT.

- Unregulated solid waste disposal wass one of the major environmental problems that exists in the university and in the area in general. Domestic solid waste will be generated as a result of cooking activities and consumption of packed food brought in by the

[24] Solid Waste Management Plan for the Rajarata University of Sri Lanka 2018
[25] ibid

students. As solid waste would not be disposed daily and since Mihintale is already having a waste management problem, piling up of waste will obscure the environment and lead to hygienic and health risks.

- Disposal of untreated waste water will further impact the ground and surface water.
- Disposal of waste water from some laboratories will require specialized waste and waste water management. For example chemicals for bio labs.

151. **Mitigation:**

- Enter into an agreement with the Mihintale Pradeshiya Saba for waste collection and disposal on a daily basis until the composting and biogas plants are installed.
- Implement the developed solid waste management plan that targets the reduction of waste generation for the FT. RUSL has received 10 million for composting subproject through the CEA PiliSaru Program. They are also negotiating with a German University on developing a biogas plant. These programs should be expedited to ensure functionality b operation of FT.
- Train the students on importance of social responsibility and garbage disposal. Provide colour coded bins at several locations to encourage source separation.
- Ensure demarcated solid waste storage area with source separation for organic waste and other domestic non-organic waste. This storage facility should be able to accommodate solid waste up to 7 days until disposal.
- Prevent solid waste disposal to these canals, culverts and drains that will increase drainage congestion.
- Illegal garbage dumping and open burning will be strictly prohibited.
- Waste water treatment facility has to be designed and set up to meet SLSI standards. Waste water treatment plant should consider wash water recovery technologies for the WTP to reduce effluent to be discharged. Wastewater treatment plant should be able to accommodate the waste generated for about 1500 persons. Design should be shared with ADB for approval.
- Sewage system should be designed and approval sought from ADB to ensure compliance with IFC-WB EHS standards. Regular monitoring and emptying of tanks should be carried out and a protocol should be developed and approved by ADB for this process.

6.8 Design of FCT Buildings Under the Green Building

152. FT building design and layout will follow the guidelines of the Green Building SL certification systems so that it is designed for higher performance, lower environmental impact. Under this system a building would be evaluated under eight categories and these include Management (MN), Sustainable Sites (SS), Water Efficiency (WE) , Energy & Atmosphere (EA) , Material & Resources (MR) , Indoor Environment Quality (EQ) , Innovation & Design Process (ID) and Social & Cultural Awareness (SC) This includes incorporating engineering design which would consider the following:

a. Usage of recyclable materials like wood substitutes
b. Installation of sustainable energy efficiency certified equipment
c. Usage of energy efficient lighting fixtures (LED)
d. Provision of photovoltaic cells on roofs for solar power
e. Rain water harvesting structures planned for ground water recharge and rain water collection

153. **Impact:**

- Flaws in the FT design may lead several negative impacts that may influence the students' wellbeing and function of the university complex.
- In the absence of water conservation and energy efficiency of the building structure, it may lead to resource constrains and increase the running cost.
- Lack of thermal circulation and lighting condition within the school complex will increase the electricity requirement and cause occupational safety issues for the students and staff.
- In the absence of a properly designed waste water and solid waste disposal system in the university complex, it may lead to health and environmental degradation of the immediate surroundings. Lack of provision of adequate sanitary facilities for the maximum capacity of students and staff can lead to sanitation issues. This may lead to outbreaks of illnesses among the student population.
- In the absence of a disability access such as elevators or stair ways in the building design will prevent disable students from enrolling for the training program.
- Unavailability of geotechnical report did not allow recommended mitigations regarding design of building in relation to sub project site.

154. **Mitigation:** Overall building design should incorporate design features that improve the energy efficiency and water saving devices. In whole the green building designs principles should be applied wherever possible. Ensure maximization of natural lighting and thermal circulation in the

building. Employ passive design strategies, including building shape and orientation, passive solar design, and the use of natural lighting, to dramatically impact building energy performance.

- Including safety and health measures with due regard to future maintenance and repairs. The labs and cafeteria kitchen should be equipped with fire alarms and fire extinguishers. Fire and emergency evacuation routes should be incorporated sufficiently. Gas storage areas should be built in to the designed and should be placed in a place that is ventilated. Demarcate an area within the building design for storage of cleaning equipment and garbage storage until disposal. Though a general room has been identified in the lay out plan, there is no garbage collection area demarcated.
- Design a waste water sewage tank that has a low operation cost and requires minimal maintenance. It should be properly designed to separate the sewage and the bathing water so that it does not exceed the limits of the occupancy level of the building. The choice of technology will depend on volume of wastewater and sewage generated; economy of scale; regulatory requirements, etc. The subproject management unit of RUSL has initiated the process reevaluating the building designs.
- **Stability of the foundation**: All building in the proposed FT should be solid building on column structures that will withstand high wind conditions. The basement rock structure should be investigated with bore hole casting testing. RUSL need to obtain the geotechnical report and engage with CEA and the UDA to incited the green building process immediately. It is recommended that in the geo technical investigations the ultimate skin friction coefficient (fμ) should be found and it should be less than that recommended in the ICTAD guidelines (ICTAD/DEV/15). Geotechnical report is recommended for detail designing of the subproject.

6.9 Risk of Fire and Emergency Preparedness

155. **Operation Impact:** Once the FT building is in operation, there could be incidents of student unrest or technical errors in the laboratories that may trigger off fire**.** This may cause damage to property and risk lives.

156. **Mitigation**: Several mitigation measures can be adopted and these include adoption of disaster risk reduction strategy and preparedness. This would include: Identification of an emergency evacuation point in the building and placing emergency alarm system in the building to warn the student population of any such situations. Emergency evacuation points and plan should be designed and practiced. All buildings should be adorned with adequate fire extinguishers.

6.10 Occupational Health and Safety and General Public

157. **Construction Impact**:

- Both within and outside of subproject affected areas could create accidental harm to general public and work force. Construction of culvert on the access road, excavation on site, removal of trees, working on building at heights processing and transportation of construction materials are the main causes associated with accidental risk.
- Majority of skilled and unskilled workers should be selected from the subproject influence area to avoid generation of waste and sanitation problems from labour camps. About 250 number of workers under the categories of super skilled, semi-skilled and unskilled will be engaged by the contractor. This may result in conflict situations among the workers and settlers near worker camps. Spreading of communal diseases is also possible due to migrant laborers.
- Workers may be exposed to COVID-19 disease and without proper management, construction activities may result to the spread of the disease in the worksite.

158. **Mitigation:** ADB guidelines for contracted should be included in the contract issued to the contractor with any necessary modifications.

- Contractor should prepare a detailed health and safety plan including those specific to COVID-19 pandemic and organize awareness programs about personal health and safety for workers. This should provide briefing and training on safety precautions, their responsibilities towards safety, etc. COVID Guidelines are provided in Annex 14.
- Contractor shall comply with requirements for the safety of the workmen as per the International Labour Organization (ILO) convention No. 62, Safety and Health regulations of the Factory Ordinance of Sri Lanka to the extent that is applicable to his contract. Other than that, the contractor has to comply with regulations regarding safe scaffoldings, ladders, working platforms, gangways, stairwells, excavations, trenches, safe means or entry.Use of licensed and trained vehicle operators, provision of protective footwear, helmets, goggles, eye-shields and clothes to workers depending on their duty (mixing asphalt, blasting, handling equipment) should be adopted.
- The construction labour camp should be equipped with first aid facilities and a trained personnel onsite in case of an injury.
- Ample lighting around the construction site should be provided during the night.

- Excavated areas for construction should be barricaded using barricading tapes, sign board should be placed. quarry operations, land excavations and blasting should be carried out and supervised by trained personnel.
- Regular safety checks for vehicles and equipment's, allocation of responsibility to relevant personnel, prohibition of alcoholic drinks and other substances which may impair judgment of workers engaged in construction activities, arrangement of proper first aid and transport facilities for injured people, installation of warning signs should be adopted.
- Onsite emergency plan for minor accidents and mishaps will be prepared by the contactor with the consultation of the PMU.
- *In the light of COVID-19, all applicable health and safety measures as imposed by national requirements and advised by the latest WHO guidelines and ADB guidance notes should be followed (provided in Annex 14); as much as possible, local labour should be recruited and incoming workers should be tested prior to accessing remote islands; Visit* *http://www.cida.gov.lk/newsevents/COVID%20Guidelines.Version.2_26thMay.2020.pdf* for Health and Safety Guidelines for Sri Lankan Construction Sites to be Adopted During COVID 19 Outbreak).
- Hand hygiene measures should be implemented; hand hygiene stations, such as handwashing and hand rub dispensers, should be put in prominent places around the workplace and be made accessible to all staff, contractors, and visitors along with communication materials to promote hand hygiene.
- Ensure proper and mandatory wearing of face masks; ensure that medical face masks and paper tissues are available;
- Introduce measures to keep a distance of at least 1 meter between people and avoid direct physical contact;
- Avoid crowding by staggering working hours and meal breaks to reduce congregation of employees at common spaces such as entrances or exits and mess halls
- Ensure that a detailed health and safety plan is prepared and implemented by the contractor, and ensure that the H&S plan is adequately budgeted.

6.11 Health and Safety of Trainees

159. **Impact:** There are no anticipated significant impacts during the operation and maintenance of the subproject. However, the students of the faculty may not be aware of occupational safety related issues and the impact associated with it. This may lead to injury and accidents during

practical and training. When practical sessions are conducted in the labs, it may lead to emergencies and accidents.

160. **Mitigation:**

- First aid should be available on site in each of the labs.
- Fire extinguishers and alarm system to be provided. Fire escapes should also be provided for each building.
- Emergency switches should be properly covered and placed in each laboratory.
- A pedestrian crossing traffic light at the A12 highway should be provided so that it would be easier for the student and staff to cross the road and this will ensure their safety.
- COVID-19 health and safety protocols must be implemented (i.e. social distancing, wearing of face masks, etc.)

6.12 Food safety guidelines

161. **Impact:** Unless food and safety guideline are carefully adopted, there will be increased risk of health and hygiene of the food that is prepared within the kitchens. If students don't maintain personal hygiene, it could affect their studies as well as the university.

162. **Mitigation:**

- Adopt food safety regulation imposed by the Ministry of Health.
- Train the canteen operators and improve awareness on food and safety and the national guidelines. These include adoption of food safety handling measures.
- Ensure that the waiters and food service personnel practice regular hand washing during working hours especially when entering food handling area.
- Ensure that food service personnel maintain personal hygiene and inform the canteen operator in case there are sick or has an injury.

6.13 Induced and Cumulative impacts

163. According to the ADB Environment Safeguards Sourcebook cumulative impact is described as: "The combination of multiple impacts from existing subprojects, the proposed subproject and anticipated future subprojects that may result in significant adverse and / or beneficial impacts that cannot be expected in the case of a stand-alone subproject." The sourcebook also describes induced impacts as: "Adverse and / or beneficial impacts on areas and communities from unintended but predictable developments caused by a subproject, which may occur later or at a different location.

- Economic activities supporting FT like lodging and restaurants are expected to increase with new student population and induce development in the subproject area. The subproject area has good infrastructure for training of highly skilled graduates in the IT field. Hence the subproject will trained these students in the technology field to be involved in the industrial activities.
- Location of the subproject in Mihintale supports non-academic staff requirement from the North Central province. Preference will be given to local community over other during recruitment for these positions. This will be especially true for janitorial services and security services.
- The construction of the FT will provide better technologically trained graduates to meet the future demands of the industry. This will lead to (i) Reduction in travel time to access well-resourced laboratories that are located in different places in the district (ii) state-of-the-art material science, micro biology, food science, electric and electronic labs and research labs to carry out education and research (iii) access to new teaching and learning methods (iv) competitive edge to secure quality job that ensures personnel security (v) being connected to proposed industrial areas, increased opportunities to collaborate with local and overseas companies engaged in logistics and supply chain management activities.
- In terms of environment safeguard issues, the subproject is expected to enhance the disturbed surroundings with habitat enriched green building on site. However, during the operation phase, the solid waste and waste water treatment will generate issues if not properly managed. Improvement in local economic conditions can also result in unorganized and illegal establishment of settlements and businesses adjacent to the subproject that may pose new problems of social issues. To address these potential problems, relevant local authorities will have to monitor developments and strictly enforce rules.

6.14 Climate Change Impact and Risk

164. Changes in the atmosphere have been detected that could drastically alter the climate system and the balance of ecosystems. Rising CO_2 concentrations increase the energy retention of Earth's atmosphere, leading to a gradual rise of average temperatures and global warming. This leads to unprecedented changes in the weather patterns including precipitation levels, intensities and frequencies.

- **High Precipitation Impacting Channel /Embankment**: Heavy rains can cause disruption of the water ways surrounding the subproject site and embankments, surface water drainage

problems, among others. Increased channel flow will result from precipitation and storminess may result in damages pavements, and other building structures (such as down pipes etc). If culvert capacities are reduced or exceeded it can cause flooding to occur.

- **Flood:** The study area has a seasonal flood problem. A Flood Risk Assessment has not been done due to its seasonality in occurrence but flooding patterns should be considered in the development of the drainage plan.
- **Tornados and Lightening**: Due climatic condition of high wind tornados and precipitation lighting strike could be experienced. There is a risk of fire or property damage as the high tension electrical wires are located in close proximity to proposed industrial center at the FT.

165. **Mitigation**: Several mitigation measures can be adopted and these include adoption of temporary flood risk reduction strategy. This would include:

- A drainage management plan should be developed for the site to ensure protection from seasonal flooding.
- Adopt measures suggested by CEA, Irrigation Department on construction near a wetland. Obtain their approval and clearances prior to construction.
- The waterways of the Mihintale tank should be cleaned regularly - obtain the assistance of the Mihintale Pradeshiya Saba and Irrigation Department for this purpose.
- Faculty has to carry out regular maintenance of culverts and drains adjoining the site to make sure that there are no local flooding conditions. Allocate fund by the PIU for this purpose.
- Ensure that the building and the equipment is properly insured for claims of natural disaster and lightning resistors installed. The building design be designed and material used should withstand tornadoes and high wind speeds.

7. PUBLIC CONSULTATION

7.1 Approach to Public Consultation

166. Public Consultation Meeting (PCM) provides an opportunity for the general public, private and community bodies to be aware of the environmental and social impacts as a result of subproject implementation. Thus, the meeting was held for residents around the subproject areas (see Figure 06 for residents in the vicinity), public sector and private sector agencies who are concerned with

the subproject during the initial stage. Major purpose of the public consultation is to identify the environmental issues in the IEE study and to appraise the stakeholders on potential environmental impacts. The public consultation was conducted at Rajarata University including women, and will continue public consultation, including atleast 20% female participation, to collect their feedback so that adequate safeguards can be considered during the planning phases.

7.2 Methodology

167. **Arrangement:** The meeting was held at the board room of the Faculty of Applied Sciences building at the RUSL on 19th April 2018.[26] Affected communities and potential stakeholders such as a residents from the adjoining land, Grama Niladaries from Mihintale village, Administrative Secretary to the Mihintale Divisional Secretariat, academic staff members of the RUSL FT, RUSL students, etc. were invited to attend the meeting. Effort was made to make the gathering representative of the local population directly or indirectly affected by the potential impacts. About 25 participants were invited for the meeting however only 20 stakeholders came for the meeting. (Annex 10 provides the participant list). Local resident representation was only 2. This was probably because the other residences are more than 500m away from the subproject location and did not feel a direct impact at this stage. The overall female participation was 10.

168. **Discussions, Questions and Answers**: In the meeting, the participants were informed of the proposed subproject and potential environmental impacts due to the subproject. Thereafter, time was allowed for questions and answers to facilitate interaction with the stakeholders, exchange of information, collect their opinion on the environmental issues and any other issues that needed addressing. See Figure 15. General information of the participants such as name, gender, and name of the organization the participant belongs to along with their signature was recorded during the public consultation meetings and is attached in the report as Annex 10. Registration was kept voluntary. Almost all of the participants registered themselves.

169. **Collection of Feedback**: A feedback questionnaire in local language (Sinhala) was presented at the common forum and then asked each of the stakeholder to express their views regarding the question. These questions were presented by the consultants conducting the meeting and answers sourced (Annex 10 provides the list of questions presented). Participants were encouraged to provide their opinion through the feedback questionnaire, however it was kept voluntary. Some

[26] This public consultation included the scope of constructing new auditorium.

of the participants could not fill the forms as they could not read or write. The issues broadly covered in questionnaire included the following topics.

- Perception on noise vibration and dust
- Perception on water quality in the Mihintale tank adjacent to the site
- Perception on the water drainage and seasonal flood
- Perception on ecology and biodiversity issue
- Perception of building stability and the lay out plan
- Perception of the connectivity to the subproject site through the road network
- Perception of the education offered at the faculty
- Perception of the solid waste management by the Mihintale Pradeshiysa Saba
- Perception of the solid waste management at the university premises (refer Annex 11)
- Perception of the waste water management at the university

170. **Outcome of the Public Consultative Meeting:** the following are the major points of concern of the participants of PCM. Detailed account of meeting is provided in Annex 10.

- Design and implement a drainage plan for the subproject.
- Manage the ecology in the surrounding habitat.
- Reservation limits to be maintained and minimize the impact of the subproject on the Mihintale tank.
- Re-location of the CEB high tension line identified as necessary.
- Managing noise, dust and vibration at the site.
- Importance of obtaining clearance from the Irrigation Department and Department of archeology and UDA for the subproject.
- Establish a funding mechanism as well as a schedule for maintenance and cleaning work of the drains and the Mihintale tank associated with the subproject.
- Contact Mihintale Pradeshiya Saba on the future plan concerning the solid waste management of the university. Enter into a temporary agreement on removal of solid waste until the composting site is established.
- Establishment of a waste water treatment plant to reduce water pollution and discharge. Need to allocate sufficient fund to clean the sand filters of the waste water treatment plant already in place at the existing campus.
- Proper road signage and speed control measures with a traffic light for pedestrian road crossing on the A12.

- Importance of students maintaining communal harmony with the local villagers.

Figure 15*: Plates of Stakeholder meeting*

8. GRIEVANCE REDRESS MECHANISM

8.2 GRM Process

171. The affected person(s)/aggrieved party can give their grievance verbally or in written form to the local site office of FT site at Mihintale. Grievances of affected person will first be brought to the attention of the site in charge, who can resolve the issue at the site level with immediate effect. If the matter cannot be resolved at the site level it will be referred to project coordinator of RUSL PIU. In event that it is not solved within 7 days by the PIU (Project Coordinator), it will be brought to the Grievance Redress Committee (GRC) which will be appointed by the PMU of the MHECA. The GRC will comprise of State Secretary of MHECA, Project Director, religious leader from village, Grama Niladari, and community leader from village Complaints shall be submitted to the Project Director to be presented at GRC.

172. The GRC will take up any issues during its monthly meeting and provide a solution within two weeks. If the matter is not resolved by GRC at PMU level within stipulated time, it shall be referred to Land Use Committee of the region. It will meet at least once a month. The agenda of the meeting will be circulated to all the members and the affected persons/aggrieved party along with venue, date and time at least a week prior to the meeting.

8.2 Registering complaints

173. The PIU and site office shall keep records of all grievances received including contact details of complainant, date of receiving the complaint, nature of grievance, agreed corrective actions and the date these were affected and final outcome. For this a complaint register will be maintained at each sub-subproject site. The complaint will be registered by the aggrieved party by duly filling the form provided, (refer Annex 12) PIU established a public response center (PRC) helpline specifically addresses the issues arising out of subproject implementation. Compliant can be registered via any of the following means: Through Public Response Center Help Line.

Land Line Number: 025-2266228
E-mail: sthrd@gmail.com

174. In the event that the complainant is illiterate, the complaint will be recorded with the assistance of site in charge. The cost for functioning of GRC will be accounted for by PMU of MHECA.. The GRC mechanism may need further review once the implementation sets in. Figure 16 show

the GRM implementation structure. Initially when a public complaint is received, it will be registered in a public complain registry where the personnel information of the complainant will not be disclosed. Tier I will consist of the contactor and the site engineer who will try to initially resolve the complaints. This will be carried out within a 2 week period. The GRC (Tier II) will include representation from the PIU, representative from the community, representation from the local authority (Grama Niladari), female representative from the community. The minutes of the GRC meeting will be made available for review. If additional information is required, a field visit will be conducted as a means of fact finding and a resolution will be proposed. This process should be completed within 4 weeks. This decision will be communicated to the stakeholders or complainant. If a police complaint is made, it will be directed to the land use committee at the Pradeshiya Saba or Divisional Secretariat. Tine taken for this process will vary depending on the local government mechanism. The complainant may resort to legal redress at any stage and GRM may run parallel with legal redress.

Figure 16: ***Grievance Redress Mechanism of RUSL***

9. ENVIRONMENTAL MANAGEMENT PLAN

9.1 Environmental Management Plan

175. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels (refer Part III). The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between MHECA, project management unit (PMU), project implementing unit (PIU), consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

176. The contractor will be required to submit to PIU, for review and approval, a site environmental plan (SEP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No work will commence prior to approval of SEP. A copy of the EMP/approved SEP will be kept at the site during the construction period at all times. The EMP will be included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

177. For civil works, the contractor will be required to (i) carry out all of the mitigation and monitoring measures set forth in the approved SEP; and (ii) implement any corrective or preventative actions set out in safeguards monitoring reports. The Environmental consultant will carry out quarterly reviews against the EMP. The contractor shall allocate budget for compliance with these SEP measures, requirements and actions.

9.1 Implementing Arrangement

178. MHECA of Government of Sri Lanka will be the Executing Agency for the Program, responsible for management, coordination and execution of all activities funded under the loan. A central Project Management Unit (PMU) attached to MHECA will be responsible for implementing the Technology and Human Resource Development Project. The PMU will be supported by Program Implementation Units (PIUs) such as RUSL with flexibility to re-deploy depending upon the implementation requirements. The PMU and PIUs will be supported by several teams of Design Consultants in preparation of preliminary engineering designs.

179. Project Management Consultant (PMC) centrally located at PMU and with field teams located in PIUs shall be responsible for implementation of the Program. All infrastructure contract will be procured through performance-based contracts (PBCs) and include build operate (BO) framework. Based on the preliminary designs prepared by Design Consultants, the DBO (design-build-operate). The preparation, review, and approval of subproject design and due diligence studies including bidding process is centralized at the PMU. PIU of RUSL will provide necessary support to PMU in preparation, and will play main role in supervising the construction process.

180. The PMU of, MHECA has no capacity to manage the associated environmental impacts. Therefore they will need to recruit an environmental safeguards consultant to carry out the reporting and monitoring process. The terms of reference (TOR) of the environmental safeguard consultant is drafted and enclosed as Annex 13. This will ensures that MHECA will comply with the requirements of the Government and ADB. PMU of MHECA will prepare a draft TOR for environmental safeguard consultant and send it to ADB for comments before loan negotiations.

181. The PMU will continue to monitor and measure the progress of EMP implementation. The monitoring activities will be corresponding with the subproject's risks and impacts identified in the IEEs for the subprojects. The PMU and PIU will continue to undertake site inspections, document review to verify compliance with the EMP and progress toward the final outcome and recording information of the work, deviation of work components from original scope. PMU will submit environmental safeguard reports to ADB. PMU and PIU will review the environmental safeguard reports and take necessary action to mitigate issues.

182. Safeguards consultant will submit quarterly monitoring and implementation reports to the project director at PMU during the construction phase which will be sent to ADB on a bi-annual basis. For operational phase the reporting requirement to ADB will be annual. Regular monitoring will

have to be carried out by the PIU to ensure the compliance with the EMP. The PMU will submit semi-annual monitoring reports to ADB according to a suggested monitoring report format agreed by ADB for subprojects.

183. EMP budgets will reflect the costs of monitoring and reporting requirements. Monitoring reports will be posted in a location accessible to the public. The executing agency will document monitoring results, identify the necessary corrective actions, and reflect them in a corrective action plan. The MHECA, will study the compliance with the action plan developed in the previous review. Compliance with loan covenants will be screened by the executing agency.

184. ADB will review project performance against the MHECA's commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

- Conduct periodic site visits for projects with adverse environmental or social impact;
- Conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impact;
- Review the periodic monitoring reports submitted by executing agency to ensure that adverse impacts and risks are mitigated as planned and as agreed with ADB;
- Work with executing agency to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate;
- Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring**.**

185. The costs for environmental safeguard activities which are responsibilities of the PMU and PIU are included in respective consultant packages. The cost of mitigation measures during construction stage will be incorporated into the contractor's costs. Thus, remaining costs related to environmental safeguards cover the following activities

- Preparing and submitting reports and public consultation and disclosure
- EPL applications

- Conduct of environmental monitoring for baseline data and long-term evaluation of the infrastructure
- Replacement and maintenance of trees, as necessary
- Conduct of environmental capacity-building lectures and workshop for improving awareness.

186. The budgetary provision for the implementation of the EMP of the subproject can be categorized in to two types and is presented below.

- Environmental Management Plan Works to be implemented by the contractor under civil works contracts
- Environmental Management Plan Works to be implemented by the FT.

187. A capital cost provision of about US$12500 has been kept towards implementation of the environmental management plan. Summary of environmental budget is presented in Table 24.

Table 24: Summary of environmental budget

Item	Quantity	Unit Cost (US$)	Subtotal Cost (US$)	Source of Funds
Administrative Cost				
Public Consultations	Bi annually	1000	4000	Project Cost - PMU Costs (to be paid under incremental administration cost)
Environmental Monitoring			4500	
Design Stage to establish baseline environmental data	Air, water and noise monitoring	1500		Project Cost - PMU Costs (to be done under the guidance of PMC / by PIU staff and accounted under incremental administration cost
Construction Phase	Air, water and noise monitoring	1500		Civil Works Contractor Costs
O & M	Air, water and noise monitoring	1500		PIU/PMU cost
Landscaping and tree-planting		2500	2500	
Capacity Building Expenses		1500	1500	On job training is done by PIU Any other workshops and/or sessions on these will

				be under Project Cost -PMU Costs and accounted under Capacity Building expenditure
Health precautions		4000	4000	
Total Cost			**16500**	

Table 25: Monitoring Plan for FCT for Preconstruction, Construction, and Operation Phases

SI No	Field environment attribute	Phase	Parameters to be monitored	Location	Frequency a	Responsibility
1	Air quality	During preconstruction	IFC-WB EHS standards in chapter 6	FT construction at RUSL	Once in the preconstruction phase to establish baseline	Contractor through approved monitoring agency
		During construction phase			Once in every 3 months (except monsoon season) during construction phase (24 months construction phase)	
		During operation phase			Once bi-annually except during monsoon season during first 2 years	
2	Water quality	Preconstruction	IFC-WB EHS and SLSI standards in chapter 6	FT or RUSL groundwater	Once to establish the groundwater quality before construction	Contractor through approved monitoring agency
3		During construction Phase			Once in every three month during construction phase	

4		During operation phase			Once every year except during monsoon during two years	
5	Noise levels	During preconstructi on phase	IFC-WB EHS standards in chapter 6	FT or RUSL construction site	Once in the preconstruction phase to establish baseline	Contractor through approved monitoring agency
6		During construction phase			Once in every 3 months (except monsoon season) during construction phase	
7		During operation phase			Once every season except monsoon season for first 2 year	

9.3 Environmental Monitoring and Reporting

188. The FT at RUSL will monitor and measure the progress of EMP implementation while supervising civil construction activities. PIU will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. PIU will submit quarterly EMP monitoring and implementation reports to PMU of the MHECA, who will take follow-up actions, if necessary. The MHECA will review and consolidate the quarterly reports to prepare bi-annual monitoring reports to ADB during construction and thereafter, on an annual basis. A Monitoring Report Format is provided in Annex 15.

189. ADB will review subproject performance against the executing agency's commitments as agreed in the loan documents. The extent of ADB's monitoring and supervision activities will be commensurate with the subproject's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the subproject performance management system. ADB will monitor subprojects on an ongoing basis until a project completion report is submitted.

9.2 Consultation and Information Disclosure

190. Consultation. To ensure continued public and stakeholder participation in the FT subproject life cycle, periodic consultations shall be taken up at regular intervals at site during implementation. This participatory process will ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process.

191. Once the IEE is approved by the ADB, an electronic version of the IEE will be placed in the official websites of ADB. Upon written request, any person seeking information can obtain a hard copy of the complete IEE document by paying for its photocopying cost. The PMU will issue notification on the disclosure mechanism in local newspapers, ahead of initiation of implementation of the subproject, providing information on the subproject, start dates, etc. The notice will be issued by the PMU in local newspapers 1 month ahead of the implementation works. This will create awareness of the subproject implementation among the public.

10 CONCLUSION AND RECOMMENDATIONS

10.1 Conclusion:

192. The IEE study did not find an adverse incompatibility with the surrounding physical, biological, socio-economic or cultural environment and does not pose any significant long term environmental threat if all identified mitigation measures are carefully attended to. The most likely impacts during the construction phase are expected to be temporary in nature and could be mitigated with proper management and good practices. The GRM and EMP provide appropriate guidance for suitable environmental and social safeguards. Accordingly, the proposed subproject can be recommended for implementation with strict adherence to the EMP and GRM provided in this IEE.

193. The proposed FT subproject components do not involve any interventions in the natural and cultural heritage destinations and have less significant (direct or indirect) environmental impacts. However since the subproject is located in a cultural heritage site there may be possibility of cultural monuments being discovered during land preparation activities. During such an event adopt measures stipulated in the EMP. It is expected that the proposed FT at RUSL will enhance economic growth and employ ability of youth through development and operations of the FT at RUSL in Anuradhapura District.

194. Based on this IEE, it is expected that the proposed FT subproject components have only minor, localized, temporary, and low significance environmental impacts. Negative impacts on water, air quality, and noise levels during civil works and operation phase, which will be appropriately monitored and adequately mitigated. Based on the findings of the IEE, the classification of the subproject as Category 'B' is confirmed. No further special study or detailed EIA needs to be undertaken to comply with neither the Safeguard Policy Statement, 2009 nor the national regulations of Sri Lanka.

10.2 Recommendations:

195. **Local clearances:** EPL Clearances from CEA, Department of Archeology, Irrigation Department, and Mihintale Pradeshiya Saba should be followed through. UDA green building certificate will be required before commencement of construction. RUSL will be required to fill in the BIQ and obtain an EPL for the canteens that will cater for more than 500 students prior to operation.

196. **Solid waste disposal**: RUSL should immediately implement the solid waste management plan which has been recently developed. RUSL should also expedite the Pilisaru program which is in process since last year, for which they have received Rs.10 million grants from

CEA for composting. In the meantime, it is recommended that RUSL seek an agreement with the Mihintale Pradeshiya Saba to receive solid waste and dispose till waste management plan is implemented.

197. **Waste water disposal and sanitation**: Waste water should be treated in a treatment facility that can handle the occupancy capacity of the designed buildings. There should be adequate funding allocated for the operation of the facility and its maintenance throughout the FT operation. Wastewater treatment plant and sewage system designs should be shared with ADB to ensure IFC-WB EHS and SLSI standards are met. Without the prior permission of the of Irrigation Department, even treated waste water cannot be discharged to the Mihintale tank.

198. **Seasonal flood risk for subproject**: It is recommended that storm water drainage plan is developed for the site. This plan should include measures to improve the flood risk by taking in to account:

- Protection level of the proposed infrastructures
- Maintenance of the sewerage system during floods.
- Improving the surface drainage system within the subproject area

199. Provisional letter obtain from Irrigation Department recommends that Mihintale tank reservations and the proposed drains at subproject site be maintained. Subproject associated network of waterways need to be regularly cleaned and maintained for this purpose RUSL will be required to consult the Irrigation Department, RDA and the Mihintale Pradeshiya Saba. The site should be filled by about 2 feet to reach A12 road level with a sloping nature towards the Mihintale Tank to encourage natural drainage.

200. **Stability of the foundation**: All building in the proposed FT should be solid building on column structures that will withstand high wind conditions. The basement rock structure should be investigated with bore hole casting testing. RUSL need to obtain the geotechnical report and engage with CEA and the UDA to incited the green building process immediately. It is recommended that in the geo technical investigations the ultimate skin friction coefficient (fμ) should be found and it should be less than that recommended in the ICTAD guidelines (ICTAD/DEV/15)[27]. Geotechnical report is recommended for detail designing of the subproject.

201. **Provision of water supply**: The ground water quality of the subproject site needs to be investigated. Previous studies on the ground water in the area exhibit high fluoride and

[27] Geotechnical investigation for proposed building for faculty of computing and technology, university of Rajarata . April 2018

calcite deposits in the water making it unsuitable for drinking. Make sure the construction workers are provided with drinking water from the onset of the construction phase. It is also recommended that prior to construction, water quality of the dug well at the site is checked.

202. **Relocation of the CEB high-tension line:** Consult CEB and begin the process to relocated the high-tension electricity wires with immediate effect.

203. **Archeological conservation**: Have continued consultations with the Department of Archeology and develop code of protocol of operation during excavation and site preparation activities on site. Follow instructions provided in the provisional letter of approval obtained from the North Central Province Department of Archeology on "Chance Find"**.**

204. **Disaster management plan:** During all stages of the subproject cycle monsoonal flood, tornado associated disaster action plan should be developed to minimize the economic cost of the subproject and risks on life and property.

205 **Habitat enrichment**: A rapid biodiversity assessment should be carried out in event of any future expansion towards the Mihintale Tank as it is an area of moderate biodiversity. Several measures should be adopted to improve the habitat around the subproject site. Planting of recommended species along the reservation of the Mihintale tank with adequate provision to clean the drainage canals. Consider the detailed architectural designs and develop a green belt with trees and shrubs on the southern and northern borders of the land to minimize the impact of the road and to attract native fauna.