

# ENVIRONMENTAL AND SOCIAL CODE OF PRACTICE

Construction of a mechanical composting building at existing IWRMC of Maamendhoo, Laamu Atoll



**Report Prepared by LAMER Group Pvt Ltd**

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January 2021

## **Table of contents**

<b>List of Tables</b> .....	iii
Consultants Declaration .....	iv
Proponent’s Declaration.....	v
1 Executive Summary.....	vi
Background .....	vi
Key impacts and mitigation measures.....	vi
.1 <i>ދިވެހިސަރުކާރުގެ ގެޒެޓް</i> .....	viii
<i>ދިވެހިސަރުކާރުގެ ގެޒެޓް</i> .....	viii
<i>ދިވެހިސަރުކާރުގެ ގެޒެޓް ގައި ބަޔާންކުރި ޖަހާލުމުގެ ސަބަބުން ޖަހާލުމުގެ ސަބަބުން ޖަހާލުމުގެ ސަބަބުން</i> .....	viii
2 Introduction .....	2-10
2.1 Purpose of the report and need for the ESCP .....	2-10
2.2 Terms of Reference (TOR) .....	2-11
3 Project Description .....	3-12
3.1 Inputs.....	3-15
3.2 Construction methodology.....	3-15
3.2.1 Design of Aerobic system (composting machine).....	3-16
3.2.2 Waste management during construction.....	3-17
4 Existing Site Condition.....	4-18
4.1 Existing IWRMC site.....	4-18
4.2 Natural and human threats and interventions.....	4-21
5 Mitigation Plan .....	5-23
5.1 Grievance Redress Mechanism (GRM).....	5-34
6 Stakeholder consultation - Island Council.....	6-39
7 Monitoring Program .....	7-41
7.1 Reporting Procedures and Implementation Schedule .....	7-43
8 Conclusion.....	8-44
Acknowledgements .....	8-46
References .....	8-47
Appendices.....	8-48
Appendix 1 List of abbreviations .....	8-49
Appendix 2 Terms of Reference .....	8-50
Appendix 3 Site plan.....	8-51
Appendix 4 Map of Maamendhoo showing shoreline and erosion areas .....	8-52
Appendix 5 Translation of the Environmental and Social Management Plan (matrix).....	8-53

## **List of Tables**

Table 1. Work schedule for the civil works related to the project .....	3-14
Table 2. Waste quantities as per segregation categories present at the site .....	4-19
Table 3. Mitigation measures proposed for the project (ESMP matrix) .....	5-24
Table 4. Grievance Redress Mechanism for the project, formulated by the PMU .....	5-34
Table 5. Details of participants of consultation meeting with Island Council .....	6-39
Table 6. Monitoring work to be carried out during the different phases of the project .....	7-42
Table 7. Reporting schedule for the monitoring programme .....	7-43

## **Table of Figures**

Figure 1. Location of existing IWRMC and project site (red highlight) and open dumping area (blue polygon) .....	3-13
Figure 2. Images of the waste management site at present .....	3-13
Figure 3. Site layout of the existing IWRMC showing the proposed mechanical composting building area (pink outline) (large scale drawing given in Appendix 3) .....	3-14
Figure 4. Flow diagram of the process of the OWC machine.....	3-17
Figure 5. Garbage collected outside the IWRMC .....	4-18
Figure 6. Segregated waste stored at different areas of the existing IWRMC .....	4-19
Figure 7. Areas of the island where construction and demolition waste have been disposed ...	4-20
Figure 8. Existing compost slab (left) and groundwater well (right).....	4-20
Figure 9. Erosion prone areas of L. Maamendhoo (red outline) .....	4-21
Figure 10. Beach adjacent to the IWRMC where erosion is being experienced.....	4-22
Figure 11. Construction cuto adjacent to IWRMC site .....	4-22

## Consultants Declaration

I certify that to best of my knowledge the statements made in this Environmental and Social Code of Practice for the construction of a mechanical composting building at the existing IWRMC at Maamendhoo, Laamu Atoll, are true, complete and correct.

Name: Hussein Zahir

Consultant Registration Number: EIA P04-07



Signature:

Company Name: Land and Marine Environmental Resource Group Pvt Ltd

Date: 28<sup>h</sup> January 2021

# **Proponent's Declaration**



PREVENT  
DOMESTIC  
VIOLENCE

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**Ministry of Environment**  
Male', Republic of Maldives.

Date: 27 January 2021

No: 438-WMPC/203/2021/22

Mr. Ibrahim Naeem,  
Director General,  
Environmental Protection Agency,  
Green Building, Handhuvaree Hingun, Maafannu,  
Male', 20392, Maldives.

Dear Sir,

**Sub: Commitment to undertake Mitigation and Environmental Monitoring**

The Environmental and Social Code of Practice (ESCP) prepared for the proposed establishment of the Island Waste and Resource Management Centre (IWRMC) in L. Maamendhoo has been prepared in accordance with the EIA Regulations 2012 and its amendments, issued by the Ministry of Environment.

We would like to confirm our commitment to the proposed mitigation measures and the monitoring programme that has been highlighted in the ESCP report prepared for the above referenced project.

Sincerely,

Amru Adam,  
Assistant Director



Page 1 of 1

Green Building, Handhuvaree Hingun,  
Maafannu, Male', 20392, Republic of Maldives.

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ދިވެހިރާއްޖޭގެ ޖުމްހޫރިއްޔާ، 20392، ދިވެހިރާއްޖެ

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# 1 Executive Summary

## Background

Maamendhoo is one of the 11 inhabited islands in Laamu Atoll and is located on the southern side of the atoll. The existing IWRMC of the island was constructed in 2018 and handed over to the Island Council for operations. The main services of the facility developed then are: Waste transfer area, Sorting platform, Equipment room, Stockpile area for metals, plastics, paper/cardboards, glass, and hazardous waste, Compost bed for organic waste, Staff room and Toilet. The method of composting was not decided at the time of EMP formulation, although based on consultations with the Island Council, it was identified that windrow-based composting was being undertaken. However, based on the recommendations provided in feasibility study for the establishment of a regional solid waste management system in Zone 4 & 5, it was decided that mechanical composting is the most feasible technology for treating organic waste generated in L. Maamendhoo. Hence, the Ministry of Environment, through the World Bank funded Maldives Clean Environment Project (MCEP) intends to pilot in-vessel composting in Maamendhoo, whereby the existing compost slab used for windrow-based composting will be modified slightly to cater for the installation of a composting machine.

The proposed project involves enclosure of the existing compost slab area and undertaking the required utility connections to the structure. Once this is completed, an organic waste converter machine will be installed at the area to undertake mechanical composting of organic waste through an aerobic system.

## Key impacts and mitigation measures

All development projects will inevitably have an impact on the environment, both negative and positive. There are a number of actions that can be taken to minimize or avoid impacts altogether. Mitigation measures are selected to reduce or minimise the severity of any predicted adverse environmental effect and improve the overall environmental performance and acceptability (lower environmental damage) of the project from the perspective of construction and operation. Impacts due to the project based on the assessment principles followed are foreseen as low to moderately negative and moderately positive.

Mitigation measures have been proposed for significant environmental impacts that are associated with the project, both during construction and operational phase.

- Measures to ensure proper training in all aspects of the project during both construction and operational phase
- Measures to ensure worker health and safety both during construction and operation

- Measures to minimize impacts on the environment due to air pollution and improper handling of materials and waste
- Measures to ensure safety from fire hazards
- Measures to ensure public health and safety
- Implementation of the Grievance Redress Mechanism which has been formulated by the proponent, both during construction and operations.

Monitoring programme identified in the report will enable the proponent to assess whether the mitigation measures which have been identified in the report are effective. Early identification of negative impacts will enable the proponent to rectify the issue.

To conclude, with due consideration to the environmental components identified and the extent of the project activities and their likely and predicted impacts identified, with proposed mitigation measures and monitoring followed, it is concluded that the project is feasible and justified. Furthermore, the positive benefits due to the project, both to the environment and island community outweigh the negative effects on the environment during the project. The Consultant further recommends the following:

1. Adherence to all relevant legislations, regulations, guidelines and standards during construction and operation of the IWRMC;
2. Establish environmental and occupational health and safety procedures for all relevant components;
3. Installation of renewable energy sources at IWRMC, such as solar panels to source power for operations;
4. Carryout regular consultations with the island council during construction and operation stage of the project.
5. Carryout awareness raising campaigns to increase awareness of the public regarding proposed work;
6. Ensure adequate training is given to IWRMC staff in operations and maintenance of the new compost machine so as to ensure proper implementation of the project at all phases.
7. Encourage greater participation of women, especially during operational stage;
8. Ensure proper supervision and inspection of the IWRMC at regular intervals.
9. Carry out some form of coastal protection work at shoreline near project site to prevent further erosion







## **2 Introduction**

Maamendhoo is one of the 11 inhabited islands in Laamu Atoll and is located on the southern side of the atoll. The existing IWRMC of the island was constructed in 2018 and handed over to the Island Council for operations. The project was funded by the UNDP LECReD project. An EMP for the development of the facility then was formulated and provides details on the planned operations at that stage (CDE Consulting, 2017). The main services of the facility developed then are: Waste transfer area, Sorting platform, Equipment room, Stockpile area for metals, plastics, paper/cardboards, glass, and hazardous waste, Compost bed for organic waste, Staff room and Toilet. The method of composting was not decided at the time of EMP formulation, although based on consultations with the Island Council, it was identified that windrow-based composting was being undertaken.

However, based on the recommendations provided in feasibility study for the establishment of a regional solid waste management system in Zone 4 & 5, it was decided that mechanical composting is the most feasible technology for treating organic waste generated in L. Maamendhoo. Hence, the Ministry of Environment, through the World Bank funded Maldives Clean Environment Project (MCEP) intends to pilot in-vessel composting in Maamendhoo, whereby the existing compost slab used for windrow-based composting will be modified slightly to cater for the installation of a composting machine.

The proposed project involves enclosure of the existing compost slab area and undertaking the required utility connections to the structure. Once this is completed, an organic waste converter machine will be installed at the area to undertake mechanical composting of organic waste through an aerobic system.

### **2.1 Purpose of the report and need for the ESCP**

The Environmental Impact Assessment (EIA) Regulation of Maldives (2012/R-27) and amendments gives a list of development projects for which an EIA is required (Schedule Raa of the Regulation). With respect to waste management, EIA is required for three types of projects; installation of incinerators with a capacity of 10 or more tonnes/day, development of landfill using waste and development of large-scale waste management centres (capacity of treating 10 tonnes/day).

As per due process for projects not listed in this Schedule, a screening form for the project was submitted to the Environmental Protection Agency, to assess the level of impact due to the project. Based on this project description and areas of impact, EPA has stated that no further assessment is necessary for the proposed project. At the same time, World Bank (WB), as the funding agency has also carried out screening of the project and stated that an Environmental and Social Code of

Practice should be prepared, based on the TOR issued by WB. As EPA does not require any further document, this ESCP is prepared as required by the WB based on the TOR issued by WB.

## **2.2 Terms of Reference (TOR)**

As stated above, the Terms of Reference issued by World Bank for the project titled “Environmental and Social Code of Practice for projects involved minimal civil works”, will be followed for the formulation of this ESCP (Refer Appendix 2 for copy of TOR). The chapters of this report are as per the structure given in this TOR and include the following:

1. Executive summary
2. Introduction
3. Project Description and study area
4. Existing Site description
5. Mitigation Plan and grievance redress mechanism
6. Consultation with Island Council
7. Monitoring programme
8. Conclusion

### 3 Project Description

The Island Waste Management Centre (IWMC) at Maamendhoo in Faafu atoll was constructed in 2017. Based on the EMP formulated for the project (CDE Consulting, 2017), the primary activities to be carried out in the IWRMC includes:

- Receive domestic waste and commercial waste
- Receive hazardous waste that originate from household activities
- Separation of received waste
- Retrieval of recyclable resources
- Redistribution of recyclable resources
- Storage and transfer of received waste
- Monitoring of waste movement and maintenance of records of that movement
- The control of the aspects of the IWRMC and its operations that may affect the environment
- Management of the IWRMC to ensure the safety of the public, the operators and the environment

The proposed project involves enclosure of the existing compost slab area and undertaking the required utility connections (power and water) to the structure. Once this is completed, an organic waste converter machine will be installed at the area to undertake mechanical composting of organic waste through an aerobic system. Fire safety equipment such as CO<sub>2</sub> and water-based fire extinguishers will be supplied and installed as part of the contract, if not already installed at the existing IWMC.

The existing IWRMC is on southeastern end of the island. The location of the existing IWRMC and hence the proposed project is shown in Figure 1. Figure 2 shows the images of site as it is at present. Figure 3 shows the layout of the site with compost slab demarcated.

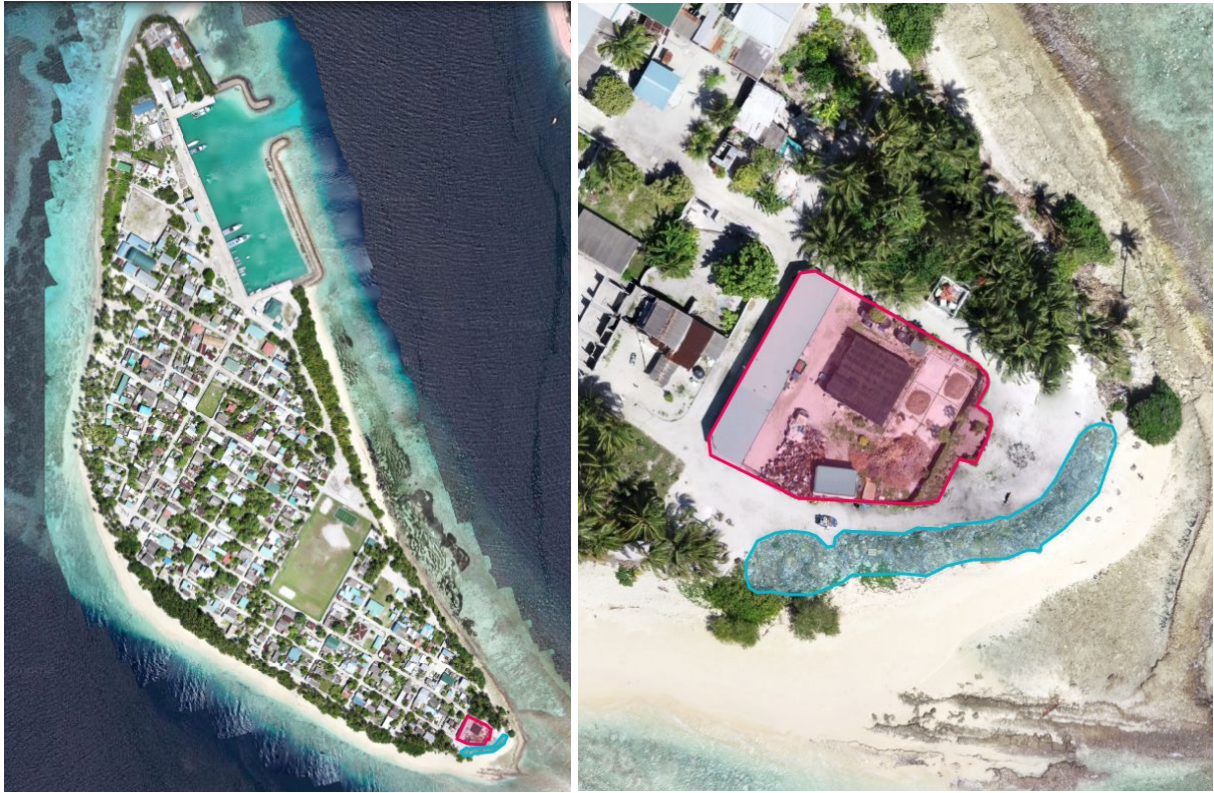
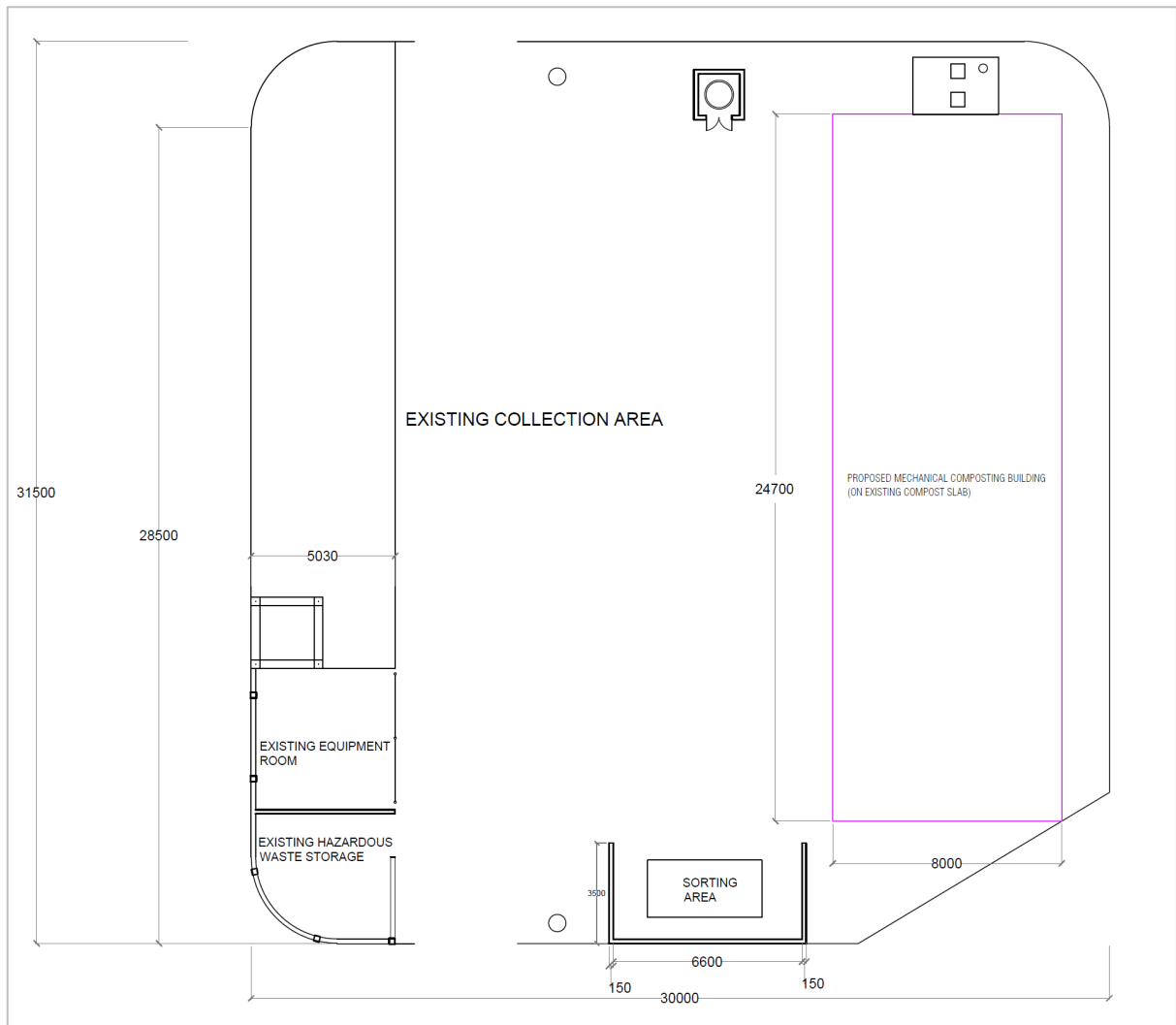


Figure 1. Location of existing IWRMC and project site (red highlight) and open dumping area (blue polygon)



Figure 2. Images of the waste management site at present



**Figure 3. Site layout of the existing IWRMC showing the proposed mechanical composting building area (pink outline) (large scale drawing given in Appendix 3)**

The civil works of the proposed project is anticipated to be completed within 3 months. Table 1 gives a schedule for the work as provided by the proponent.

**Table 1. Work schedule for the civil works related to the project**

Activity	Month 1	Month 2	Month 3
<b>Mobilization of construction materials</b>			
<b>Civil works</b>			
Construction of walls and roof			
Fixing of doors and windows			
Installation of water tap – internal pipping via the existing GW well			
Connecting electricity – installing sockets, lights and exhaust fan			
Installation of fire-safety equipment			
<b>Demobilization</b>			

### 3.1 Inputs

Workforce for the project is comprised of 1 site supervisor, 1 engineer and 8 laborers. The workforce will be accommodated through rental of houses and/or guesthouses. If travelling to the island during COVID 19 pandemic, workforce will abide by all quarantine and safety guidelines issued by HPA at the time.

Electricity, water and sewerage required for the workers will be arranged via the existing facilities available on the island as the workforce will be accommodated in existing houses and/or guesthouses.

Electricity and non-potable water are available at the existing IWMC, which the workers can use during working hours. Mineral water bottles or rainwater will be used for drinking purposes.

### 3.2 Construction methodology

The materials and machinery proposed to be used for the construction work are as given below:

- Construction materials:
  - Concrete
  - Cement
  - Sand
  - Flood lights
  - G.I. pipes
  - Metal sliding doors
  - Emulsion paint
  - Lysaght Roofing Sheet
  - 3 phase power sockets
  - Ceiling fan
  - Timber
  
- Machinery:
  - pickups or trucks (for land transport of construction material)
  - Concrete mixing machine
  - Concrete supply pump and pipe

Construction of the structure enclosing the compost slab will be carried out as per regular civil works methodology. Once constructed a water pump will be installed to connect water to the mechanical composting area from the groundwater well. Water will be piped to the area through internal pipeline. Water taps will be installed in the mechanical composting area. Power connections will be made from the existing power distribution board at the IWRMC.



### 3.2.1 Design of Aerobic system (composting machine)

Waste estimates for the island as reported in CDE Consulting (2017) was 0.7 tonnes per day, mainly composed of domestic municipal waste. Of this, 66% was reported to be compostable (hence approximately 0.46 tonnes).

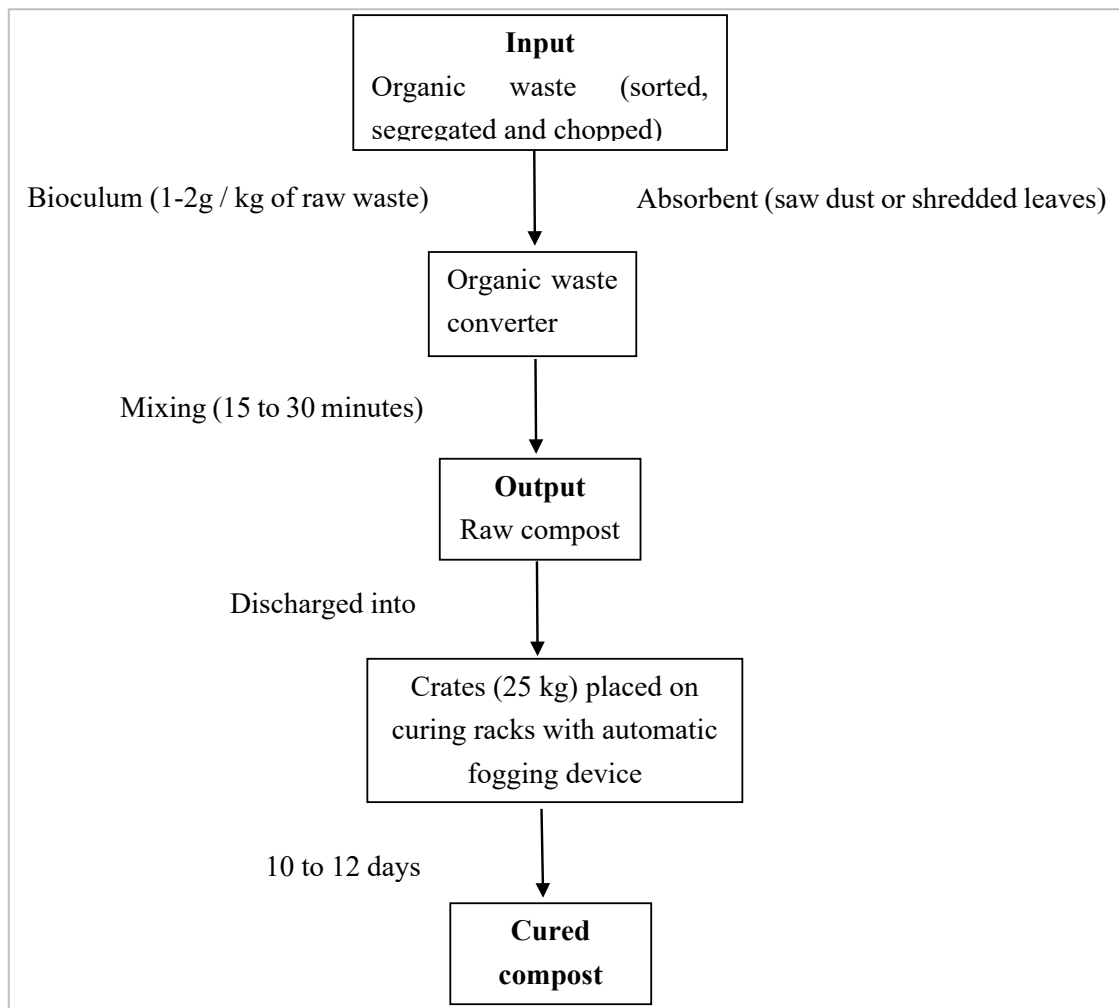
The proposed technology for composting is through use of an aerobic system, which involves in-vessel composting in the Organic Waste Converter (OWC) machine. The OWC can compost all types of organic waste including kitchen and food waste (both raw and cooked), green waste.

The organic waste is sorted and segregated and the chopped waste is added to the OWC machine, together with the Bioculum (a bacteria powder formulated with 5 different *Bacillus* species). The Bioculum improves the natural aerobic process. The Bioculum is added at the rate of 1-2g/kg of raw waste. If needed, an absorbent such as saw dust or shredded leaves can also be added at this stage to bring the mix to the desired moisture (40-45%).

The OWC unit is then operated for a period of 15 to 30 minutes, depending on size of unit and batch size. During this time the waste, Bioculum and absorbent are mixed to achieve a homogenous consistency.

At the end of the cycle, the raw compost is discharged into crates of 25kg capacity and these crates are then placed in curing racks for a period of 10 to 12 days. The curing racks are equipped with an automatic fogging device that maintains moisture content at the correct level thereby ensuring curing is completed.

At the end of the curing period, the crates are emptied with the cured compost ready for use; however, after emptying the crate, leaving the cured compost for a further seven days enhances the composts maturity, providing a higher quality product. Typically, the cured compost amounts to approximately 25 – 35%, by weight, of the raw waste input. Flow diagram of the process is given in Figure 4.



**Figure 4. Flow diagram of the process of the OWC machine**

The amount of waste that can be processed through the OWC each day is determined by the operating hours. This provides flexibility during times of unexpectedly high inputs or following unanticipated outages. It also allows increasing throughputs to be accommodated at minimal cost. The components of the system which require critical sizing is the curing system; however, additional racks and/or crates require only small areas of land and modest capital expenditure.

The compost generated through the project can be used for agricultural purposes on the island or even packed and sold, thus generating an income for the island.

### **3.2.2 Waste management during construction**

Demolition work is not included within the scope of works of this project and hence, minimal construction and demolition waste are expected to be generated. Construction waste may include materials slightly hazardous in nature such as used thinners and paint cartons which will be properly sealed and stored at the existing hazardous waste storage room of the IWRMC for further treatment and or disposal via exiting arrangements.

## 4 Existing Site Condition

Site visit to assess the condition of the existing waste management site was made on the 16<sup>th</sup> of January 2021.

### 4.1 Existing IWRMC site

The existing IWRMC site is in good condition and quite clean. Waste was sorted and kept in respective storage areas. There was very little littering at the site or in the areas around the site. At present, the waste which can be burnt are being disposed outside the IWRMC and burnt occasionally for disposal (Figure 5).



**Figure 5. Garbage collected outside the IWRMC**

Waste quantities as per segregation types are given in Table 2, where volume has been estimated based on the area occupied by the waste and the height of pile. Figure 6 shows segregated waste stored in the IWRMC. Construction waste is not disposed at the IWRMC, but to the western side of the island (Figure 7).

**Table 2. Waste quantities as per segregation categories present at the site**

Type of waste	Estimated volume (m <sup>3</sup> )	Estimated collection duration
Scrap metal (to be exported)	288	6 months
Plastic	50	6 months
Cans	30	6 months
Glass	18	6 months
Green waste	96	2 months



**Figure 6. Segregated waste stored at different areas of the existing IWRMC**



**Figure 7. Areas of the island where construction and demolition waste have been disposed**

The existing compost slab was in good condition, especially for one which is constantly in use. The slab was slightly cracked and concaved. The existing groundwater well at the site was also in good condition, although the water was slightly saline. In addition to the groundwater well, there is also a freshwater tank on site, used for rainwater harvesting. Figure 8 shows the existing compost slab and groundwater well.



**Figure 8. Existing compost slab (left) and groundwater well (right)**

## 4.2 Natural and human threats and interventions

Maamendhoo is a small island located at the southern side of Laamu Atoll, sits just inside the *Hithadhoo Kandu* (channel). The island is exposed to swell waves received from the channel which is the main hydrodynamic regime effecting the littoral movement of the island. The harbor facility at Maamendhoo was completed in 2009, which has affected the erosion pattern of the island.

Although sand movement is observed, erosion levels are high while accretion levels are low. Erosion prone areas are observed on the northwestern side and southeastern side of the island (within close proximity to project site) (Figure 9). Figure 10 shows beach at erosion prone areas of the island.



Figure 9. Erosion prone areas of L. Maamendhoo (red outline) (large scale map given in Appendix 4)



**Figure 10. Beach adjacent to the IWRMC where erosion is being experienced**

In terms of human induced threats, construction is at present being carried out in the adjacent block to the project site (Figure 11). However, given that this is a small scale construction project, no threats are envisaged due to this project on the IWRMC. On the other hand, the island community is also facing some difficulties due to the present condition of the site, in terms of smoke from open burning reaching residential areas, mosquito breeding at the site due to stagnant water bodies and inconveniences due to other pests.



**Figure 11. Construction site adjacent to IWRMC site**

## **5 Mitigation Plan**

All development projects will inevitably have an impact on the environment, both negative and positive. There are a number of actions that can be taken to minimize or avoid impacts altogether. Mitigation measures are selected to reduce or minimise the severity of any predicted adverse environmental effect and improve the overall environmental performance and acceptability (lower environmental damage) of the project from the perspective of construction and operation. Impacts due to the project based on the assessment principles followed are foreseen as low to moderately negative and moderately positive.

Mitigation measures have been proposed for significant environmental impacts that are associated with the project, both during construction and operational phase. These are discussed with respect to various components and their likely impacts on physical, biological (within the project area), and social and economic environment (health, culture and economy) (Table 3). Translation of the proposed ESMP in Dhivehi is given in Appendix 5 of this report.



**Table 3. Mitigation measures proposed for the project (ESMP matrix)**

Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
Construction phase	Impact on marine and terrestrial environment during handling and transport of construction materials	<ul style="list-style-type: none"> <li>• Ensure all materials being transferred are packed properly with no loose materials</li> <li>• Monitor oil spills and maintain machinery</li> </ul>	Contractor (implementation) Proponent (supervision)	N/A	N/A	
	Impact on environment due to improper storage	<ul style="list-style-type: none"> <li>• Storage areas for construction materials should have an impermeable surface and should be covered</li> <li>• Materials should be stored in appropriate containers</li> <li>• Area should be regularly monitored for any leaks</li> <li>• Storage facility should be setup within project site to minimise vehicle movements</li> </ul>	Contractor (implementation) Proponent (supervision)	N/A	N/A	
	Impact on flora, fauna and groundwater due to handling of construction related materials and equipment	<ul style="list-style-type: none"> <li>• Ensure workforce are trained and supervised to handle materials during transfer, and unloading so as to minimize accidental spills, littering etc.</li> <li>• Ensure materials are properly packed and any oil/fuel is</li> </ul>	Contractor (implementation) Proponent (supervision)	N/A	N/A	Pre-construction – site preparation phase

Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		properly stored in containers used for that purpose				
	Sociocultural impact due to arrival of workforce	<ul style="list-style-type: none"> <li>• Workforce should be sensitized to the social norms and acceptable behaviour of the Maldivian culture.</li> <li>• Workforce should be fully aware of the Do's and Don'ts of the Maldivian culture.</li> <li>• Establish the Grievance Redress Mechanism (GRM) given in this report</li> </ul>	Contractor (implementation) Proponent (supervision)	Grievance Redress Mechanism given Section 9.4 to be enforced.	N/A	Council / MCEP PMU staff to be assigned as focal points hence no additional cost for implementation of GRM
	Noise pollution	<ul style="list-style-type: none"> <li>• Operate machinery during day time hours (6am to 6pm)</li> </ul>	Contractor (implementation) Proponent (supervision)	N/A	N/A	
	Air pollution / Dust	<ul style="list-style-type: none"> <li>• Regularly maintain machinery so as to reduce emissions.</li> <li>• Provide workers with masks and other required gear</li> <li>• Regular watering of site to minimize dust (after work everyday)</li> </ul>	Contractor (implementation) Proponent (supervision)	As per operational manual of machinery	N/A	Should be included in the construction contract
	Impact on groundwater table and groundwater quality	<ul style="list-style-type: none"> <li>• Extract only quantity of water required for the civil works.</li> </ul>	Contractor (implementation) Proponent (supervision)	N/A	N/A	
	Impact on health and safety of workforce	Operational Health and Safety measures	Contractor / Island Council (implementation) Proponent (supervision)	Contract to provide Health and Safety Plan	N/A	Should be included in the

Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		<ul style="list-style-type: none"> <li>• Ensure workers are well briefed on the health and safety measures to be followed during the project</li> <li>• Ensure work force are given all the appropriate safety equipment and gear required for the work (safety hats, boots, glasses, masks and gloves)</li> <li>• Display PPE requirement board at site which should the PPE required by the workers when carrying out different tasks of the construction work</li> <li>• Ensure set up of easy access toilets, wash basins at the site. either through rental from nearby area or installation of a portable toilet.</li> <li>• Provision of regular meal breaks and an onsite resting area for the workers, where they can rest during the breaks</li> <li>• Ensure provision of first aid kit on site ensure readily available transfer in instances of emergency use</li> </ul>				construction contract

Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		<ul style="list-style-type: none"> <li>• Ensure workforce are accommodated in appropriate quarters where they are not cramped.</li> <li>• All staff handling hazardous waste should be given the proper protective gear (protective eye gear, protective gloves )</li> </ul> COVID 19 related preventative measures <ul style="list-style-type: none"> <li>• Ensure that there is set number of workers in each room so as to allow social distancing</li> <li>• Ensure that workforce follows all HPA guidelines at all times, with respect to COVID 19 pandemic.</li> <li>• Measures should be in place to undertake daily temperature checks of workforce and enable social distancing at the accommodation facilities and work site.</li> </ul>				
	Impact on public health and safety	<ul style="list-style-type: none"> <li>• Clearly demarcate project area with metal pipe fencing and roofing sheets</li> <li>• Ensure public does not have access to the project site and</li> </ul>	Contractor (implementation) Island Council	N/A	N/A	Should be included in the project cost

Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		<p>appropriate signs are put up at the required areas</p> <ul style="list-style-type: none"> <li>Establish Grievance Redress mechanism given in the report. Information displaying contact details of the focal points (Tier 1 and Tier 2) should be displayed on the project board, council notice board and via posters displayed in public areas. QR code for downloading the forms and information on GRM should be given in each of the media used.</li> </ul>				
	Fire safety	<ul style="list-style-type: none"> <li>Ensure connections to power facility are established by trained and competent personnel</li> <li>Ensure construction workforce are trained in firefighting so as to address any fire hazards promptly</li> <li>A portable fire extinguisher should be used at the site.</li> </ul>	Contractor (implementation) Island Council	Firefighting equipment should be included as part of equipment inventory of IWRMC	Should be included in the project cost	
	Waste Management During Construction Phase	<ul style="list-style-type: none"> <li>Construction waste produced should be reused for the construction of the IWRMC as much as possible. The remaining</li> </ul>	Contractor / Island Council (implementation) Proponent (supervision)	N/A	N/A	Should be included in the project cost

Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		<p>reusable materials such as (metal bars and roofing sheets) should be given to the island community or the island council free of cost.</p> <ul style="list-style-type: none"> <li>• Green waste to be sundried and left at the forest area for natural decomposition.</li> <li>• Any remaining construction waste shall be temporarily stored and taken out of the island to a RWMF at the time of demobilizing.</li> <li>• Hazardous waste generated should be collected and stored in sealed containers</li> <li>• Area where hazardous waste is stored should have an impermeable surface (such as concrete layer, metal sheet) and should be clearly marked with warning signs</li> </ul>				

<b>Operational phase</b>	Impacts due to waste spillage during transfer of waste from households to the centre	<ul style="list-style-type: none"> <li>• Identify correct way in which waste should be left for collection (properly closed bags with no leakage)</li> <li>• Ensure transport vessel carrying the waste carries only a set load</li> <li>• Vessels should be enclosed on all sides to prevent spills</li> <li>• Setup of appropriate bins at identified locations</li> <li>• Provision of proper and complete training to IWRMC operators (in all aspects of operations)</li> <li>• Provision of all required PPE to the staff of IWRMC</li> <li>• Protective clothing, gloves, respiratory face masks and slip-resistant shoes are recommended for waste transport workers and hard-soled safety shoes for all workers to avoid puncture wounds to the feet.</li> <li>• Noise protection gear such as ear muffs should be provided to all workers operating or working within vicinity of loud equipment</li> <li>• Provision of hard hats for workers operating or working within vicinity of heavy mobile equipment, and at the discharge</li> </ul>	Waste Facility Operator Island Council	Operational plan should be prepared and IWRMC should be registered and licensed by EPA as per Waste Management Regulation.	Should be included in the project cost  PPE to be included in project cost	
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Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		location for collection trucks, include provision of hard hats				
	Impacts due to machine malfunction	<ul style="list-style-type: none"> <li>• Provision of proper and complete training to IWRMC operators (in all aspects of operations and machine maintenance)</li> <li>• Undertake routine maintenance of machinery as per the manual</li> <li>• 1 year stock of bioculum and other spare parts that might be required for the routine functioning of the OWC machine should always be maintained.</li> </ul>	Waste Facility Operator Island Council	N/A	N/A	Should be included in project cost
	Impact on groundwater resource due to leachate and wastewater processing	<ul style="list-style-type: none"> <li>• Ensure drains are cleaned regularly to prevent clogs</li> <li>• Organic waste brought to the IWRMC must be prepared for composting / composted on a regular schedule</li> </ul>	Waste Facility Operator Island Council	Associated with operation	N/A	
	Litter, odour and vectors	<ul style="list-style-type: none"> <li>• Sort waste brought to IWRMC and compost organic waste regularly.</li> <li>• Store inorganic waste and other bulk waste in their allocated storage areas</li> <li>• Undertake volume reduction via glass crushing, metal can baling,</li> </ul>	Waste Facility Operator Island Council	N/A	N/A	



Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		plastic shredding, wood chipping etc. <ul style="list-style-type: none"> <li>Arrange regular disposal of inorganic waste through transportation to the RWMF</li> </ul>				
	Socio-cultural conflicts	<ul style="list-style-type: none"> <li>Hiring of locals (especially from within the island community) to operate and manage the IWRMC and implement the Island Waste Management Plan</li> <li>Establish the Grievance Redress Mechanism given in this report. Information displaying contact details of the focal points (Tier 1 and Tier 2) should be displayed on the project board, council notice board and via posters displayed in public areas. QR code for downloading the forms and information on GRM should be given in each of the media used.</li> </ul>	Waste Facility Operator Island Council	Costs associated with the contract	Not known	Should be included in project cost
	Workplace safety	<ul style="list-style-type: none"> <li>Set up of all required sign boards as per the Waste Management regulation</li> </ul>	Waste Facility Operator Island Council	Fire safety equipment to be supplied and installed as part of the contract: <ul style="list-style-type: none"> <li>50KG DCP Trolley (2)</li> </ul>		

Phase	Potential Environmental impacts	Proposed mitigation measures	Institutional responsibility (implementation and supervision)	Estimated quantities required and material specifications recommended	Cost estimates	Comments
		<ul style="list-style-type: none"> <li>Ensure all firefighting equipment required for the facility are in place and in good condition</li> </ul>		<ul style="list-style-type: none"> <li>50LTR Foam Trolley (1)</li> <li>Wet Chemical 6Ltr with Cabinet for hazardous waste area (1)</li> <li>Water 9Ltr with Cabinet for Office Area – Outside (1)</li> <li>CO2 2KG with Cabinet for Office Area – Outside (1)</li> </ul>		
	Impact on resources	<ul style="list-style-type: none"> <li>Prepare a plan to switch on the compactors and shredders depending on the incoming waste stream to conserve electricity.</li> <li>Ensure that all equipment is serviced and kept clean daily, to reduce the amount of water required for cleaning.</li> <li>Work shall be planned to be carried out during day times.</li> <li>Use solar lights in the premises.</li> </ul>	Waste Facility Operator Island Council	N/A	N/A	Should be included in project cost

## 5.1 Grievance Redress Mechanism (GRM)

The Maldives Clean Environment Project has formulated a Grievance Redress Mechanism (GRM) for these projects, which would facilitate the receiving and addressing of any grievances which may arise during both the construction and operational phase of the project. The mechanism has two tiers, whereby Tier 1 will be facilitated by the Island Council and Tier 2 by the MCEP.

The Island Council were briefed about the mechanism during the stakeholder consultation meeting held with them regarding the project and operations of the IWRMC. The Council have also been requested to identify a focal point for managing the GRM at Tier 1. Details of focal point identified by the Council are:

- Ms. Habeeba Ali
  - Director
  - Contact number: 9726451

Tier 2 will be managed by the MCEP, with the Environmental and Social Safeguards Specialist as the focal point.

Table 4 below gives the details of the GRM formulated by MCEP.

**Table 4. Grievance Redress Mechanism for the project, formulated by the PMU**

<b>Tiers of Grievance Mechanism</b>	<b>Nodal Person for Contact</b>	<b>Contact Communication and other facilitation by the project</b>	<b>Timeframe to address grievance</b>
First Tier: Island Council	Island Council will be the first point of contact for any grievances.  The staff designated as the waste management focal point by the island council will manage grievances on behalf of the council.	GRM should be publicly displayed in the construction site as well as the council office. GRM should also be outlined in official website and/or social media pages of Council, ME (and/or the project), including contact details of the nodal person in each tier.  Grievances can be addressed informally by contacting the council through email / telephone / in person.  If the grievance cannot be resolved informally, an aggrieved party must submit a complaint on the Tier I Complaint Form. A copy of the form (with the council seal) should be provided to the aggrieved party as evidence of receipt.  Electronic version of the complaint form should be available from the	15 working days

		<p>websites and/or social media pages of ME and the council. Physical copies of the form should be available from the council front office.</p> <p>Council will provide assistance to fill the form for those who cannot write.</p> <p>The council should keep separate registries for informal and formal complaints and maintain records of all complaints received.</p> <p>The council will discuss the matter with all relevant stakeholders (Farmers, Fishermen, School, Health Center, Women’s Development Committee etc.), where deemed necessary and attain views of them. If such meetings are arranged, the date, time, location or venue, list of participants (with contact details) and a summary of the main outcome of the consultation must be annexed to the written decision issued by the council.</p> <p>If the complaint is resolved within 15 working days, the council must communicate the decision to the aggrieved party in writing.</p> <p>The aggrieved party must acknowledge the receipt of decision and submit their agreement or disagreement with the decision within 10 working days.</p> <p>If no acknowledgement is submitted from the aggrieved party within this period, then the decision will be considered as accepted.</p> <p>If a complaint requires more time to address, this requirement must be communicated to the aggrieved party in writing and the aggrieved party must consent and sign-off the request for the extension to take</p>	
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		<p>effect. An extension can be made to an additional 15 working days.</p> <p>The staff designated as the waste management focal point by the island council will manage and provide feedback for grievances submitted to the council.</p>	
<p>Second Tier: Ministry of Environment (ME)</p>	<p>Environmental and Social Safeguards officer at the Project Management Unit (PMU)</p>	<p>If the grievance cannot be resolved through Tier 1 to the satisfaction of the aggrieved party or if the issue is outside the jurisdiction of the council (issues related to RWMF), an aggrieved party may submit a complaint on the Tier 2 Complaint Form.</p> <p>A copy of the form (with ME seal) should be provided to the aggrieved party as evidence of receipt. Electronic version of the complaint form should be available from the websites and/or social media pages of ME and the council. Physical copies of the form should be available from the council and ME front office.</p> <p>A copy of the Tier 1 Complaint Form should be submitted with the Tier 2 Complaint Form.</p> <p>ME will forward the grievance to PMU.</p> <p>PMU screens the grievance and determine if its related to MCEP. If it is unrelated, the aggrieved party must be notified in writing and the way forward must be outlined to them including the necessary government institutions to follow up.</p> <p>Environment and Social Safeguards Officer at the PMU will be the contact person in processing a grievance through the Second Tier.</p> <p>PMU will discuss the matter with EPA and other relevant institutions, where deemed necessary and attains</p>	<p>15 working days</p>

		<p>views of them. PMU will also arrange site visits and hold onsite discussions and meetings if necessary.</p> <p>The PMU will be responsible to ensure that there is no cost imposed on the aggrieved person, due to the grievance mechanism at the second tier.</p> <p>If the complaint is resolved within 15 working days, the PMU must communicate the decision to the aggrieved party in writing. The aggrieved party must acknowledge the receipt of decision and submit their agreement or disagreement with the decision within 10 working days. If no acknowledgement is submitted from the aggrieved party, then the decision will be considered as accepted.</p> <p>If a complaint requires more time to address, this requirement must be communicated to the aggrieved party in writing and the aggrieved party must consent and sign-off the request for the extension to take effect. An extension can be made to an additional 15 working days. If the grievance is not resolved to the satisfaction of the aggrieved party within 15 working days of submission of the grievance to tier 2 then the aggrieved party may notify the ME, in writing, of the intention to move to tier 3.</p>	
<p>Third Tier: Judiciary Power / Assistance to Vulnerable Persons beyond the Project's Grievance Redress Mechanism</p>	<p>Judiciary system is an option for an aggrieved person and/or community in case that the other tiers have not been effective</p>	<p>The legal system is accessible to all aggrieved persons.</p> <p>Assistance from the PMU of MCEP is available only for vulnerable person(s)* as per this grievance mechanism.</p> <p>In cases where vulnerable person(s) are unable to access the legal system, the Attorney General's office will provide legal support to</p>	<p>As per established Judicial Procedure</p>

		<p>the vulnerable person(s). The PMU must assist the vulnerable person(s) in getting this support from Attorney General's Office. PMU must also ensure that there is no cost imposed on the aggrieved person if the person belongs to the vulnerable groups. The list of vulnerable groups is as defined in the footnote but may be further defined by MEE.</p> <p>The verdict of the Courts will be final.</p>	
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\*Vulnerable person(s): A vulnerable person(s) for the purpose of this project is a person who is poor, physically or mentally disabled/handicapped, destitute, disadvantaged for ethnic or social reasons, an orphan, a widow, a person above sixty years of age, or a woman heading a household.

## 6 Stakeholder consultation - Island Council

Consultation with the Island Council was held via Google meet on the 19<sup>th</sup> of January 2021. Details of participants of the meeting are given in Table 5.

**Table 5. Details of participants of consultation meeting with Island Council**

Office	Name	Designation	Contact details
L. Maamendhoo Island Council	Hussain Habeeb Ali	Council President	9999259
	Yoosuf Irufaan	Vice President – Council	9777784
	Mariyam Hathma	Municipal Service Officer	9999438
	Habeeba Ali	Director	
LaMer Group Pvt Ltd	Aishath Abdulla	Senior Planner	7987809

Consultation meeting with the Island Council commenced with the EIA Consultant giving a description of the proposed project and the operations of the composting machine. The consultant then enquired about the current waste management practices and thoughts of the council with respect to the proposed project. Points discussed are given below (feedback in italics):

- EIA Consultant: how is waste management carried out at present and is there an Island Waste Management Plan?
  - *At present organic waste collected is composted using Windrow Composting method. Food waste mixed with green waste and piled up or put in layers on a compost bed (leaf layer and waste layer). The mixture is turned weekly and full cycle is finished in 7 weeks. Compost is packed and sold to nearby inhabited islands and resorts. Currently composting is on-hold due to ongoing COVID-19 pandemic*
- The consultant explained the proposed mechanical composting technology, as they were not aware of the proposed project in detail. Operational and maintenance requirements were also explained briefly.
  - *Council asked about the other components of the project; would there be a building for the machine and what the power requirement for the proposed machine would be. At present they are experiencing power shortage even for using other machines in the WMC, such as crushers. However, FENAKA is planning to upgrade the system, hence they will only be able to cater to the needs of the project once the upgrade is done. They further enquired when the project would be commenced.*
  - *In response Consultant made the below clarifications:*
    - a) *The proposed work also includes construction of the structure to enclose the compost slab; hence 4 walls and roofing*
    - b) *The Consultant is not aware of the power requirement at the time of the meeting*
    - c) *The project will take 3 moths to complete and is expected to start as soon as the relevant documentations such as the ESCP is complete.*



- Consultant explained about the Grievance Redress Mechanism (GRM), and requested the council to nominate a focal point who will implement at Tier 1 at council level.
- Consultant also explained the training component of the project, that the Ministry of Environment will provide to the identified person(s) from the island
  - *Council wanted to clarify if the training will be carried out online or in person and if more than one person can be trained. They highlighted that the staff who would be in charge of the composting would be under a 1 year contract and if they leave, they would want someone more permanent working in the council to be able to train the next staff for the required work.*

## 6.1 Consultations Plan

The brief plan below (Table 6) provides a guidance on how consultations can be carried out during the construction and operation of the proposed project to ensure the concerns and feedback from the council are addressed throughout the project. Consultation meetings can be carried out at each phase of the project.

**Table 6 Consultation Plan for council**

<b>Project Phase</b>	<b>Discussion Points</b>	<b>No. of meetings</b>
Mobilisation	Discuss the workplan and support required from the council/proponent	1
Construction phase	Discuss the progress, concerns and feedbacks	2
	Discuss about how the training of staff to operate the machinery will be carried out	1
Operation and Maintenance	Meeting to handover the operation to island council	1

In addition to the above meetings, meetings shall be arranged on request if need be from both sides; the council and the proponent to ensure the whole process is carried out in a participatory manner.

## 7 Monitoring Program

Monitoring is the systematic collection of information over a long period of time. It involves the measuring and recording of environmental variables associated with the development impacts. Monitoring is needed to:-

- Compare predicted and actual impacts;
- Test the efficiency of mitigation measures;
- Obtain information about responses of receptors to impacts;
- Enforce conditions and standards associated with approvals;
- Prevent environmental problems resulting from inaccurate predictions;
- Minimize errors in future assessments and impact predictions;
- Make future assessments more efficient;
- Provide ongoing management information; and
- Improve EIA and monitoring process.

Impact and mitigation monitoring are carried out to compare predicted and actual impacts occurring from project activities to determine the efficiency of mitigation measures. This type of monitoring is targeted at assessing human impacts on the natural environment. Impact monitoring is supported by an expectation that at some level anthropogenic impacts become unacceptable and action will be taken to either prevent further impacts or re-mediate affected systems.

Table 7 shows the monitoring work to be carried out for the construction and operational phase of the project. Commitment to carrying out and financing the mitigation and monitoring work is given in the proponent's declaration at the beginning of the report.

**Table 7. Monitoring work to be carried out during the different phases of the project**

<b>Proposed mitigation measure</b>	<b>Parameters to be monitored</b>	<b>Location</b>	<b>Measurements</b>	<b>Frequency of monitoring</b>	<b>Responsibility</b>	<b>Cost (MRf)</b>
<b>Pre-construction phase</b>						
Monitor oil spills	Spill events	Sea/land	Logs of spill events	After every event	Contractor	N/A
<b>Construction phase</b>						
<b>Workforce health and safety</b>	Daily temperature checks General health and wellbeing of workforce	Project site	Logs of any illness amongst workforce	Daily	Contractor	Part of the contract
<b>Operational phase</b>						
<b>Monitor spills during the waste collection and disposal process</b>	Spill assessments during collection, transfer, with IWRMC and transfer to RWMF Littering around the island	IWRMC site and transport route Around the island	Logs of spills and type Logs of littering incidents (date, location and type of waste)	Spill logs after every incident Littering monitoring every 3 months	IWRMC operator / Island Council	Part of operational cost
<b>Monitor IWRMC operations</b>	Waste generated and disposed quantities	IWRMC	Daily logs of waste generated Composting logs with details of input/output quantities Logs of disposal of inorganic waste	Daily / for every incidence of disposal of inorganic waste	IWRMC operator / Island Council	Part of operational cost
<b>Grievance redress mechanism</b>	Monitor grievances by the community or other personnel	Whole island	Log of grievances filed and how these were handled	Continuous process	Island Council / MCEP	Included in operational cost

## 7.1 Reporting Procedures and Implementation Schedule

The reporting procedures and schedule is for the various monitoring components are given in Table 7 below.

**Table 8. Reporting schedule for the monitoring programme**

Phase	Deliverables	Responsibility	Accountability
Construction phase	Monitoring report (as per format provide by MCEP Safeguards Specialist) submitted every 3 months or earlier based on date of invoice submission by the Contractor which should include the following: <ul style="list-style-type: none"> <li>• Log of spill events during material transfer</li> </ul>	Contractor	MCEP
Operational phase	Monitoring report submitted once a year (as per format provide by MCEP Safeguards Specialist) which should include the following: <ul style="list-style-type: none"> <li>• Logs of spill / littering assessments</li> <li>• Waste quantification logs</li> <li>• Compost quantification logs</li> <li>• Outcomes of grievances filed</li> </ul>	IWMRC Operator / Island Council	MCEP

## 8 Conclusion

This report gives the findings of the assessment for the formulation of an Environmental and Social Code of Practice for projects involving minimal civil works, for the proposed project by the Ministry of Environment through the Maldives Clean Environment Project to pilot in-vessel composting in Maamendhoo, Laamu Atoll. The findings of the assessment shows that overall the project has low negative impacts on the environment.

The proposed method of composting, which will be done in the machine itself is predicted to have minimal negative impacts as it greatly overcomes the issues faced by other methods of composting such as windrow-composting. The method has several benefits, some of which that have been reported are:

- Simple and convenient to operate without the need for constant attention;
- Short processing times ensures economic in use with low energy consumption;
- Requires minimal maintenance;
- Beneficial to the environment;
- Overcomes the problems of odour, leachate generation and ground water contamination associated with traditional methods of waste disposal

All development projects will inevitably have an impact on the environment, both negative and positive. Mitigation measures are selected to reduce or minimise the severity of any predicted adverse environmental effect and improve the overall environmental performance and acceptability of the project. Mitigation measures have been proposed for significant environmental impacts that are associated with the project, both during construction and operational phase and these have been given in the ESMP given in the report. Some measures include:

- Provision of adequate training in proper method of handling of machinery and materials during both construction and operational phase
- Provision of adequate training in proper method of handling of waste during collection and disposal during operational phase
- Provision of all protective gear to workers during both construction and operations
- Implementation of the Grievance Redress Mechanism which has been formulated by the proponent, both during construction and operations

Monitoring programme identified in the report will enable the proponent to assess whether the mitigation measures which have been identified in the report are effective. Early identification of negative impacts will enable the proponent to rectify the course of activities.

In order to further minimise and manage environmental and social impact associated with the project the following are recommended:

1. Adherence to all relevant legislations, regulations, guidelines and standards during construction and operation phase;
2. Establish environmental and occupational health and safety procedures for all relevant components;
3. Installation of renewable energy sources at IWRMC, such as solar panels to source power for operations;
4. Carryout regular consultations with the island council during construction and operation stage of the project.
5. Carryout awareness raising campaigns to increase awareness of the general public regarding proposed work
6. Ensure adequate training is given to IWRMC staff in operations and maintenance of the new compost machine so as to ensure proper implementation of the project at all phases.
7. Encourage continued participation of women, especially during operational stage
8. Ensure proper supervision and inspection of the IWRMC at regular intervals
9. Carry out some form of coastal protection work at shoreline near project site to prevent further erosion

In the context of the above conclusions and recommendations, with due consideration to the environmental components identified above and the extent of the project activities and their likely and predicted impacts identified, with proposed mitigation measures and monitoring followed, it is concluded that the project is feasible and justified. Furthermore, the positive benefits due to the project, both to the environment and island community outweigh the negative effects on the environment during the project.

## **Acknowledgements**

The consultant acknowledges the contribution provided by the team members in this report for the valuable contribution to the report and especially at the field. The consultant also acknowledges the assistance provided by the PMU of MCEP. Appreciation also to the Island Council of Maamendhoo, especially the Council President, Mr. Hussain Habeeb Ali who is also the appointed focal point for the project, for their continuous assistance during the project report formulation and survey work.

CVs of team members are given below.

## Curriculum Vitae

**Position** Environmental Consultant

**Name** Shahaama Abdul Sattar

**Address** G. Helengeli, Lily Magu  
Male', Rep. of Maldives

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[shahaama.sattar@gmail.com](mailto:shahaama.sattar@gmail.com)

**Date of Birth** 30 September 1980

**Nationality** Maldivian

**Education** **Master of Science (MSc)** in Fisheries Biology and Fisheries Management, University of Bergen. Bergen, Norway, 2004 - 2006  
**Bachelor of Science (BSc.)**, The Flinders University of South Australia, Adelaide, South Australia, 1999 - 2001

**Membership of Professional Associations** Small Island Research Group (SIRG) Maldives, Vice President

**Countries of Work Experience** Maldives

**Languages** **Dhivehi** Mother tongue  
**English** Fluent

### Employment Record

**From: 2008 - 2011**

Employer: Marine Research Centre, Ministry of Fisheries and Agriculture, Male', Maldives.  
Position: Fisheries Biologist

**From: 2006 to 2008**

Employer: Marine Research Centre, Ministry of Fisheries Agriculture and Marine Resources, Male', Maldives.  
Position: Senior Research Officer

**From: 2002 – 2004**

Employer: Marine Research Centre, Ministry of Fisheries Agriculture and Marine Resources, Male', Maldives.  
Position: Research Officer

**Line of work at MRC included:**

Assessment of the reef and grouper fisheries of Maldives, with surveys to monitor fisheries and fish species behavior. Compilation and analysis of data, for regular reviews and reporting and formation of management recommendations. Key role in the formulation of the Grouper Fisheries Management Plan / Grouper Fisheries and Export Regulation



Focal point for the IUCN funded project on identification of reef fish spawning aggregations in the Maldives through fishermen interviews (2007)

Secretariat and key organizer – Indian Ocean Cetacean Symposium 2009

Project Partner for Maldives for the Darwin Initiative Coral Reef Fish Project, Maldives

MRC Focal Point for the Atoll Ecosystem Conservation Programme, Ministry of Housing and Environment (2009 – 2011)

Participated in the Biodiversity Valuation survey of Baa Atoll Maldives carried out by AEC project and IUCN

**From: May 2011 – Dec 2012**

Employer: Darwin Reef Fish Project / Marine Research Centre (Maldives) and Marine Conservation Society (UK)

Position: Consultant, Darwin Reef Fish Project (4 year joint collaboration between MRC and MCS, UK)

Assess the various reef fisheries (grouper, aquarium and food fisheries) of the Maldives and aims to establish management plans for these fisheries. Provision of technical support and assistance to the project staff and MRC in implementing the project and formulation of the management plans.

**From: July 2011 – Dec 2011**

Employer: Bay of Bengal Large Marine Ecosystem Project

Position: BOBLME Sharks Working Group Coordinator

Coordinator for the Sharks WG of BOBLME project, and work with the focal points in the member countries, to assist in the formulation and implementation of their National Plans of Action for Sharks.

**From: June 2011 to Present**

Employer: Land and Marine Environmental Resource Group Pvt Ltd

Position: Environmental Consultant

**Workshops/Seminars Participated**

15-21 March 2003 - Training Workshop on the Implementation of Multilateral Agreements in the Conservation of Biodiversity with special focus on Marine Biodiversity. Kushiro, Japan

14-16 November 2006 – Sixth William R. and Lenore Mote International Symposium – Life history in Fisheries Ecology and Management. Sarasota, Florida

03-05 March 2008 – Olhugiri and Dhigalihaa Protected Areas Management Planning Workshop. Eydhafushi, Maldives

11 March 2008 – Applying the Ecosystem Approach to managing Atoll Ecosystems in the Maldives. Hulhule Island Hotel, Maldives

24-26 March 2008 – Regional Consultation on Preparation of Management Plans for Shark Fisheries. Beruwela, Sri Lanka

17-19 June 2008 – Workshop on Assessment and Management of the Offshore Resources of

South and Southeast Asia. Bangkok, Thailand

22-23 March 2009 – BOBP-IGO National Workshop on Monitoring, Control and Surveillance in Marine Fisheries. Male', Maldives

18 – 20 July 2009 – Indian Ocean Cetacean Symposium 2009. Paradise Island Resort and Spa, Maldives.

09-11 August 2009 – Second Regional Consultation on Preparation of Management Plans for Shark Fisheries. Kulhudhuffushi, Maldives

24-25 February 2010 – BOBLME Project – National Inception Workshop, Male', Maldives

2-3 June 2010 – BOBP-IGO Technical Advisory Committee – 5<sup>th</sup> Meeting, Male', Maldives

13-14 September 2010 – BOBLME Fisheries Assessment Working Group – 1<sup>st</sup> Meeting, Bangkok, Thailand

14-16 December 2010 – EWS-WWF 2<sup>nd</sup> Marine Conservation Forum for the Gulf Region In partnership with the Pew Environment Group – Local Actions for Global Challenges, Abu Dhabi, United Arab Emirates

18-19 January 2011 – Bay of Bengal Large Marine Ecosystem Project – Workshop on the Status of Marine Managed Areas in the Bay of Bengal, Penang, Malaysia

5-7 July 2011 – Bay of Bengal Large Marine Ecosystem Project – First meeting of the BOBLME Sharks Working Group, Male', Maldives

7-8 September 2011 – Workshop to formulate the Grouper Fisheries Management Plan, DRFP/MRC, Male', Maldives

15-17 September 2011 – SEAFDEC Special Meeting on Sharks Information Collection in Southeast Asia, Bangkok, Thailand

10 April 2014 - Stakeholder Consultation to present the National Plan of Action on the Conservation and Management of Sharks (NPOA-Sharks), Male', Maldives

## **Publications**

Sattar, S. A., Najeeb, A., Islam, F., Afzal, M. S. and Wood, E. (2012) Management of the grouper fishery of the Maldives, *Proceedings of the 12<sup>th</sup> International Coral Reef Symposium, Cairns, Australia, 9-13 July 2012, Session 13E* (in press)

Ushan, M., Wood, E., Saleem, M. and Sattar, S. A (2012) Maldives Sharkwatch Report for 2009 - 2010, *Proceedings of the 12<sup>th</sup> International Coral Reef Symposium, Cairns, Australia, 9-13 July 2012, Session 13D* (in press)

Sattar, S. A., Andréfouët, S., Ahsan, M., Adam, M. S., Anderson, C. R. and Scott, L (2012) Status of the Coral Reef Fishery in an Atoll under tourism development: the case of Central Maldives, *Atoll Research Bulletin 590*: 163-186

Sattar, S. A., Amir, H. and Adam, M. S. (2012) Reef fish tagging programme – Baa Atoll Pilot project, *Atoll Research Bulletin 590*: 187-200

BOBLME (2011) Report of the BOBLME Sharks Working Group, 5-7 July 2011, Male' Maldives,

*Prepared for the Bay of Bengal Large Marine Ecosystem Project by Sattar, S. A. and Anderson, R. C. Saleem, M., Sattar, S. A. (2009) Study on post-tsunami restoration and conservation projects in Maldives, Prepared for the International Union for Conservation of Nature.*

Tamelander, J., Sattar, S., Campbell, S., Hoon, V., Arthur, R., Patterson E. J.K., Satapoomin, U., Chandi, M., Rajasuriya, A. and Samoilys, M. (2009) Reef fish spawning aggregation in the Bay of Bengal: Awareness and Occurrence, *Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, Florida, 7-11 July 2008, Session 22*

Sattar, S. A., Jørgensen, C., Fiksen, Ø. (2008) Fisheries Induced Evolution of Energy and Sex Allocation. *Bulletin of Marine Science*, 83(1): 235-250

Sattar, S. A. (2008) Review of the Reef fishery of the Maldives, Marine Research Centre, Male', Maldives. 62 pp

Sattar, S. A. and M. S. Adam (2005) Review of the Grouper fishery of the Maldives with additional notes on the Faafu Atoll fishery. Marine Research Centre, Male', Maldives. 54 pp

### **Environmental Impact Assessments Reports and other studies**

The following are a selected list of the projects I have been involved in as an environmental consultant at LaMer Group Pvt Ltd.

<b>Name of assignment or project</b>	EIA for development of domestic airport facility at Funadhoo, Shaviyani Atoll
<b>Year</b>	2018
<b>Location</b>	Funadhoo, Shaviyani Atoll, Maldives
<b>Client</b>	Regional Airports, Ministry of Tourism
<b>Project features</b>	Development of domestic airport facility at Funadhoo
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA for agricultural development project at Hulhidhoo, Vaavu Atoll
<b>Year</b>	2017
<b>Location</b>	Hulhidhoo, Vaavu Atoll, Maldives
<b>Client</b>	Aarah Investments Pvt Ltd
<b>Project features</b>	Development of Hulhidhoo as a mix-use island with an agricultural (hydroponics) and tourism component
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA for development of 100 bed hospital at Addu City
<b>Year</b>	2017
<b>Location</b>	Addu City, Maldives
<b>Client</b>	Ministry of Housing and Infrastructure
<b>Project features</b>	Redevelopment of Equatorial Convention Centre as a 100 bed tertiary level hospital
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA for relocation of sewer outfalls at IGMH and Westpark area, Male' City
<b>Year</b>	2017
<b>Location</b>	Male', Maldives
<b>Client</b>	MWSC Pvt Ltd
<b>Project features</b>	Relocation of sewer outfalls at IGMH and Westpark area to industrial village area of Male'
<b>Positions held</b>	EIA team member

<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA for resort development at Islands I and E of Emboodhoofalhu Finolhu Development project
<b>Year</b>	2017
<b>Location</b>	Emboodhoofalhu Finolhu, Maldives
<b>Client</b>	Dream Islands Development Project
<b>Project features</b>	Development of reclaimed islands I and E of Emboodhoofalhu Finolhu as tourist resorts
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	Environmental Impact Assessment Report for aquatic animal quarantine facility at Hulhumale'
<b>Year</b>	2016
<b>Location</b>	Hulhule, Maldives
<b>Client</b>	Ministry of Fisheries and Agriculture
<b>Project features</b>	Setting up an animal quarantine facility within plant quarantine service area in Hulhule
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	Environmental Impact Assessment report for relocation of Male' Submarine cable landing
<b>Year</b>	2016
<b>Location</b>	Male', Maldives
<b>Client</b>	Dhiraagu
<b>Project features</b>	EIA related to relocation of the submarine cable from existing location to a new location
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	Socioeconomic Situation analysis of selected fishing communities as part of formulation of Master Plan for Sustainable Fisheries (MASPLAN)
<b>Year</b>	2015
<b>Location</b>	ADh. Mahibadhoo, F. Bilehdhoo, GA. Villingili, HA. Ihavandhoo, L. Gan, L. Maamendhoo, Lh. Naifaru, S. Maradhoo, Maldives, Maldives
<b>Client</b>	Ministry of Fisheries and Agriculture
<b>Project features</b>	Socioeconomic survey of selected islands, to undertake a situational analysis of the island communities
<b>Positions held</b>	Fisheries Management Consultant
<b>Responsibilities</b>	Carryout socioeconomic surveys in forms of group discussions and household surveys. Data collection and analysis and report formulation (trip reports and overall situational analysis).
<b>Name of assignment or project</b>	Development of Training material for project staff on mainstreaming and increasing awareness on climate change adaptation and mitigation measures in tourism operation
<b>Year</b>	2015
<b>Location</b>	Male', Maldives
<b>Client</b>	Ministry of Tourism
<b>Project features</b>	Mainstreaming and increasing awareness on climate change adaptation and mitigation measures in tourism operation
<b>Positions held</b>	Team member
<b>Responsibilities</b>	Material development and presentation
<b>Name of assignment or project</b>	Development of water supply and a sewerage system at Fuvahmulah
<b>Year</b>	2015
<b>Location</b>	Fuvahmulah, Gnaviyani atoll. Maldives
<b>Client</b>	Ministry of Environment and Energy
<b>Project features</b>	Setting up a water supply and a sewerage facility
<b>Positions held</b>	EIA team member

<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	Environmental Impact Assessment for soft coastal protection works at GDh. Thinadhoo
<b>Year</b>	2014
<b>Location</b>	GDh. Thinadhoo, Maldives
<b>Client</b>	Ministry of Environment and Energy
<b>Project features</b>	Beach Nourishment and Coastal protection
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	Beach Nourishment and Coastal Protection works at a private land at Praslin, Seychelles
<b>Year</b>	2014
<b>Location</b>	Praslin, Seychelles
<b>Client</b>	Ahmed Didi
<b>Project features</b>	Beach Nourishment and Coastal protection at Praslin, Seychelles
<b>Positions held</b>	Environmental assessment team member
<b>Responsibilities</b>	Preparation of the report submitted to the client
<b>Name of assignment or project</b>	1500 Housing Unit construction Project Maldives
<b>Year</b>	2014
<b>Location</b>	Fuvahmulah, Gadhdhoo, Hoadedhdhoo, Hithadhoo, Holhudhoo, Madaveli, Thinadhoo, Maldives
<b>Client</b>	Ministry of Housing and Infrastructure
<b>Project features</b>	Construction of Housing Units at the specified Islands
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Coastal modification at Robinson Club Maldives
<b>Year</b>	2013
<b>Location</b>	Ga. Funamaudua, Maldives
<b>Client</b>	Robinson Club Maldives, Maldives
<b>Project features</b>	Coastal modification at the NW side of the island, construction of geo-bag revetment and harbor basin maintenance dredging works
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for construction of gravity type waste water collection system at ADh Omadhoo
<b>Year</b>	2013
<b>Location</b>	ADh Omadhoo, Maldives
<b>Client</b>	ADh Omadhoo Island Council Office
<b>Project features</b>	Construction of gravity type waste water collection system and sea outfall pumping system
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for upgrading of Maldivian Gas Pvt Ltd Gas jetty
<b>Year</b>	2013
<b>Location</b>	Thilafushi, Maldives
<b>Client</b>	Maldivian Gas Pvt Ltd
<b>Project features</b>	Reconstruction of existing gas jetty head and expansion of jetty head
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Resort development at GDh Havvoodaa
<b>Year</b>	2013
<b>Location</b>	GDh Havvoodaa, Maldives
<b>Client</b>	Crystal Plaza Pvt Ltd, Maldives
<b>Project features</b>	Construction of a resort hotel and all the related amenities
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report

<b>Name of assignment or project</b>	EIA report for Coastal protection, coastal modification, beach nourishment, coral nursery setup and entrance channel maintenance dredging work
<b>Year</b>	2013
<b>Location</b>	Gili Lankanfushi, Maldives
<b>Client</b>	Gili Lankanfushi, Maldives
<b>Project features</b>	Coastal protection, coastal modification, beach nourishment, coral nursery setup and entrance channel maintenance dredging work
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Harbor development project at Dh. Maaenboodhoo
<b>Year</b>	2013
<b>Location</b>	Dh. Maaenboodhoo, Maldives
<b>Client</b>	Ministry of Housing and Infrastructure
<b>Project features</b>	Development of harbor facility (dredging of harbor basin, construction of wharfs and breakwater)
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Flood mitigation and reclamation work at Faresmaathoda
<b>Year</b>	2013
<b>Location</b>	GDh. Faresmaathodaa, Maldives
<b>Client</b>	United Nations Office for Project Services (UNOPS)
<b>Project features</b>	Construction of breakwater and reclamation of land
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Development of Domestic Airport Facility
<b>Year</b>	2012
<b>Location</b>	Th. Thimarafushi, Maldives
<b>Client</b>	Maldives Airports Company Limited
<b>Project features</b>	Construction of runway apron
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Wharf reconstruction and upgrading of existing berthing facility and slipway
<b>Year</b>	2012
<b>Location</b>	Thilafushi, Maldives
<b>Client</b>	Fuel Supply Maldives Pvt Ltd, Maldives
<b>Project features</b>	Reconstruction of wharf and upgrading of existing berthing facility and slipway
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Resort development at B. Kanifinolhu
<b>Year</b>	2012
<b>Location</b>	B. Kanifushi, Maldives
<b>Client</b>	Coastline Hotels and Resorts Pvt Ltd, Maldives
<b>Project features</b>	Construction of a resort hotel and all the related amenities
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for Borehole construction at Cyprea Mrine Food Fish Factory
<b>Year</b>	2012
<b>Location</b>	K. Himmafushi, Maldives
<b>Client</b>	Cyprea Marine Food Pvt Ltd, Maldives
<b>Project features</b>	Construction of a 8 inch borehole at factory premise
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report

<b>Name of assignment or project</b>	EIA report for resort development at K. Kudavillingili, Maldives
<b>Year</b>	2011
<b>Location</b>	K. Kudavilingili, Maldives
<b>Client</b>	Yacht Tours Pvt Ltd, Maldives
<b>Project features</b>	Construction of resort hotels and all the related amenities. In addition a large reclamation of the shoreline as additional land as part of the resort development is also part of the project
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report
<b>Name of assignment or project</b>	EIA report for development of city hotel, hospitality institute and resort development at Gasfinolhu and Bodufinolhu, L. Atoll
<b>Year</b>	2011
<b>Location</b>	L. Gan, Bodufinolhu and Gasfinolhu, Maldives
<b>Client</b>	Premier Equities Pvt Ltd, Maldives
<b>Project features</b>	Construction of a resort hotel and required amenities including a training hotel for hospitality industry
<b>Positions held</b>	EIA team member
<b>Responsibilities</b>	Preparation of the EIA report

## Referees

Dr. Mohamed Shiham Adam, PhD  
Marine Research Centre  
Ministry of Fisheries and Agriculture  
Male', Republic of Maldives  
Tel. No: +960 331 3681  
Email: [msadam@mrc.gov.mv](mailto:msadam@mrc.gov.mv)

Dr. Charles Anderson  
[anderson@dhivehinet.net.mv](mailto:anderson@dhivehinet.net.mv)  
[charles.anderson11@btinternet.com](mailto:charles.anderson11@btinternet.com)

## Certification

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes my qualifications, my experience, and me. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



Shahaama A. Sattar

Date: October 2018

## CURRICULUM VITAE

1. **POSITION:** Environment Analyst
2. **NAME OF FIRM:** LaMER Group Pvt.Ltd
3. **NAME:** Azim Musthag
4. **DATE OF BIRTH:** 13<sup>th</sup> December 1985
5. **NATIONALITY:** Maldivian
6. **PERSONAL ADDRESS:** M. Anthias, Fulooniya Magu, Malé, Maldives
7. **EDUCATION**  
Bachelor of Marine Science (Majoring in Marine Ecology),  
Griffith University, Queensland, Australia.  
  
DELF (Diplôme d'études en langue française) Level A1 and  
Level A2
8. **MEMBERSHIP OF PROFESSIONAL SOCIETIES:** Master Instructor with the Scuba Schools  
International (SSI).
9. **OTHER TRAINING:**  
Fish Watch Training Workshop conducted by Darwin Reef Fish  
Project initiated by the Marine Research Centre of Maldives in  
collaboration with Marine Conservation Society (UK) in 2009.  
  
IUCN Manta Ray Workshop in 2013.  
  
National Coral Reef Monitoring Framework monitoring protocols  
training in 2014 conducted by IUCN Maldives.
10. **COUNTRIES OF WORK EXPERIENCE:** Maldives and Australia
11. **LANGUAGE AND DEGREE OF PROFICIENCY:**  
English - Native or bilingual proficiency  
Dhivehi - Native or bilingual proficiency  
French - Limited working proficiency
12. **EMPLOYMENT RECORD:**  
2005 - 2011 Dive Instructor,  
Maldivers Diving Centre, Malé.  
  
2012 – 2014 Dive Instructor,  
Diveoceanus Dive Centre at Paradise Island Resort  
  
2017 - 2017 Research Assistant  
Griffith University, Gold Coast, Australia.  
  
2018 (Present) Environmental Analyst  
Lamer Pvt Ltd
13. **DETAILED TASKS ASSIGNED:** **WORK UNDERTAKEN THAT BEST ILLUSTRATES  
CAPABILITY TO HANDLE TASKS:**  
  
**Project:** Ecological surveys for the proposed, potential UNESCO  
biosphere reserves.  
**Year:** 2018



**Location:** Maldives  
**Client:** IUCN Maldives  
**Main project features:** Surveying of 5 reefs and 3 islands.  
**Position:** Consultant.  
**Activities performed:**  
Conducted ecological (marine and terrestrial) surveys at the proposed sites  
Data compilation and analysis  
Assisted in the final report development.

**Project:** Environmental Monitoring Report for resort development  
**Year:** 2018  
**Location:** Maldives  
**Client:** Pearl Atoll Pvt Ltd  
**Main project features:** Survey for the Environmental Monitoring Report  
**Position:** Environmental Analyst  
**Activities performed:**  
Conducted the marine component of the survey. The seawater quality analysis, sedimentation analysis, reef benthic surveys, and fish surveys.

**Project:** Environmental Impact Assessment Report for resort development  
**Year:** 2018  
**Location:** Bodufushi, Raa Atoll.  
**Client:** Alibey Maldives Pvt Ltd  
**Main project features:** EIA Survey for an addendum  
**Position:** Environmental Analyst  
**Activities performed:**  
Conducted the marine component of the survey. The seawater quality analysis, reef benthic surveys, and fish surveys.

**Project:** Environmental Impact Assessment for Coastal Protection and Entrance Clearance.  
**Year:** 2018  
**Location:** Bandos Island Resort, Kaafu Atoll.  
**Client:** Bandos Island Resort.  
**Main project features:** EIA Survey  
**Position:** Environmental Analyst  
**Activities performed:**  
Conducted the marine component of the survey. The seawater quality analysis, reef benthic surveys, and fish surveys.

**Project:** Third Addendum to the Environmental Impact Assessment Report  
**Year:** 2018  
**Location:** Enboodhoo Finolhu Lagoon  
**Client:** Dream Islands Development Pvt Ltd  
**Main project features:** Reclamation of Islands for Resort Development at Enboodhoo Finolhu Falhu, South Malé Atoll  
**Position:** Environmental Analyst  
**Activities performed:**  
Conducted the marine component of the survey. The seawater quality analysis, reef benthic surveys, and fish surveys.

**14. Certification:**

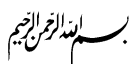
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



*[Signature of staff member or authorized representative of the staff]*

Date: 05<sup>th</sup> August 2018  
*Day/Month/Year*

Full name of staff member: Azim Musthag



## CURRICULUM VITAE (CV)

- 1. Full Name/ Address:** Aishath Abdulla
- 2. Date of Birth:** 10/09/1986                      **Nationality:** Maldivian
- 3. Education:** 2012 Masters in Environment & Development, University of Melbourne, Australia  
2010 BA (Hons) in Urban and Regional Planning, International Islamic University Malaysia, Malaysia
- 4. Membership of Professional Associations/Non-Governmental Organisations:** - Secretary of Small Island Research Group NGO
- 5. Other Training:** Attended the Expert Group Meeting (EGM) on: Urbanization in Small Island Developing States as an Urban Planner from the Maldives; at the United Nations in New York (June 2016)
- 6. Countries of Work Experience:** Maldives, Malaysia
- 7. Languages:** Dhivehi-Good, English-Good

### 8. Experience/ Employment Record (General)

February 2013- Present	Senior Planner: Work in environmental and planning consultancies, including preparation of plans, studies and EIA reports etc LAMER Group Pte Ltd Male' Maldives
November 2010 – January 2011	Urban Planner/ Acting- Business Development Manager: Work in handling and managing bidding processes, HR, project proposals, Marketing. Planning related projects Riyan Pte.Ltd Male' Maldives
May 2009 - July 2009	Urban Planner-Trainee ANZ PLANNERS SDN. BHD Selangor Malaysia

## **9. Specific Experience/ Employment Record (as per TOR requirements)**

### **Maldives Housing Market Needs and Assessment Study; Maldives Urban Development and Resilience Project (MUDRP)**

Year: September 2020-Ongoing

Client: Ministry of National Planning, Housing and Infrastructure

Position Held: Qualitative Analyst

Duties Rendered: Design, conduct and reporting of Consumer Research; mapping of existing regulatory and institutional frameworks related to housing and land in Maldives; provide input to the recommendations to develop national housing policy and housing strategy.

### **Developing International Port Facilities in the North or South of Maldives; Stage 2 Reports – Transshipment Hub in Ihavandhippolhu Atoll**

Year: July 2020

Location: Upper North Atoll, Maldives

Client: Ministry of Economic Development

Positions Held: Social Impact Assessment Consultant

Duties Rendered: Assessment of socio-economic setting and impacts, stakeholder consultations, public perception survey, social impact analysis and report writing.

### **Preparation of an Integrated Urban Development Master Plan for Addu City**

Year: October 2019-Onhold

Client: Addu City Council

Position Held: **Urban** Planner and Project Manager

Duties Rendered: Carry out consultations and assessments, preparation of plans, overall management of the project

### **Preparation of B. Hithaadhoo Land Use Plan**

Year: August 2019 to October 2019

Client: Hithaadhoo Island Council

Position Held: Planner

Duties Rendered: Community Consultations, land use planning and reporting

### **Preparation of Ga. Kondey Land Use Plan**

Year: March 2019 to July 2019

Client: Kondey Island Council

Position Held: Planner

Duties Rendered: Community Consultations, land use planning and reporting

### **Maldives Building Regulatory Capacity Assessment (BRCA), Building Regulation for Resilience Program**

Year: January 2018- October 2019

Location: Male', Maldives

Client: Ministry of National Planning and Infrastructure, Maldives

Positions Held: Urban Planner,

Duties Rendered: Technical contribution to BRCA Component 1 and 3 assessment for Maldives, and associated recommendation development. Material and technical support to 2. Participation and

facilitation of kick-off workshop in Maldives. Facilitation and logistical support for the Action-Planning Workshop in Maldives

**Environmental and Social Impact Assessment for the proposed North Upgrading of Infrastructure at North Regional Waste Management Facility Zone 2, Raa Vandhoo**

Year: December 2018 – January 2019

Location: Raa atoll Vandhoo, Maldives

Client: Ministry of Environment, Maldives

Positions Held: Urban Planner, Social Impact Assessment Consultant

Duties Rendered: Assessment of possible environmental and social impacts of the proposed upgrade at the WMC. Community consultations, social impact analysis and report writing

**Assessment of Climate Sensitive Natural Resources in Laamu Atoll and Preparation of Resources Maps**

Year: July 2016- July 2018

Client: UNDP

Position Held: Project Coordinator

Duties Rendered: Overall coordination of the project which includes project planning, keeping PMU updated on the progress of the project, facilitate the project team in addressing the issues, delays etc during the project.

**Preparation of R. Inguraidhoo Land Use Plan**

Year: March 2018 to May 2018

Client: Inguraidhoo Island Council

Position Held: Planner

Duties Rendered: Community Consultations, land use planning and reporting

**Development of Training Modules, Materials and Field Training; Organic Farming and Handicraft, Climate Change Adaptation Project (CCAP), Livelihood support program for wetland management**

Year: June 2017 to February 2018

Client: Ministry of Environment and Energy

Position Held: Project Leader

Duties Rendered: Development of training materials, project Coordination and Reporting

**Formulation of Coastal Protection Regulation, ICCRRIP Project**

Year: September 2014 to January 2015

Client: Ministry of Environment & Energy

Position Held: Project Coordinator

Duties Rendered: Consultations, Input in formulation of Regulation and reporting

**Developing a Handbook to Enhance the Capacity of Trainers to Increase the Resilience of People with Disabilities to DRR and CCA**

Year: 2016

Client: National Disaster Management Center

Position Held: Consultant

Duties Rendered: Review and analyze existing; provide input in relevant stakeholder consultations;

**Preparation of the handbook Preparation of AA. Feridhoo Land use plan**

Year: 2016

Client: Feridhoo Island Council  
Position Held: Planner  
Duties Rendered: Community Consultations, land use planning and reporting

**Preparation of K. Himmafushi Land use plan**

Year: February 2016 to March 2016  
Client: Himmafushi Island Council  
Position Held: Planner  
Duties Rendered: Community Consultations, land use planning and reporting

**Tool Kit and Training Materials for Increasing Awareness on Climate Change Adaptation & Mitigation Measures in Tourism Sector (Kaaf, Alif Alif, Alif Dhaal, Baa & Lhaviyani Atoll)**

Year: May 2015 to August 2015  
Client: Ministry of Tourism  
Position Held: Project manager  
Duties Rendered: Preparation of Materials, Conducting workshops

**Tool Kit and Training Materials for Increasing Awareness on Climate Change Adaptation & Mitigation Measures in Tourism Sector (For Tourism Staff)**

Year: December 2015 to February 2016  
Client: Ministry of Tourism  
Position Held: Project manager  
Duties Rendered: Preparation of Materials, Conducting workshops

**Situation Analysis for the formulation of Master Plan for Sustainable fisheries (MASPLAN)**

Year: February 2015 to March 2015  
Client: JICA  
Position Held: Consultant  
Duties Rendered: Community Consultations, Analysis and reporting

**Preparation of AA. Bodufolhudhoo Land use plan**

Year: May 2015 to June 2015  
Client: Bodufolhudhoo Island Council  
Position Held: Planner  
Duties Rendered: Community Consultations, land use planning and reporting

**Preparation of AA. Mathiveri Land Use Plan**

Year: June 2014 to July 2014  
Client: Mathiveri Island Council  
Position Held: Planner  
Duties Rendered: Community Consultations, land use planning and reporting

**Development of a National Framework/Plan on managing IDP's (internally displaced) persons/population caused by crises, emergencies and climate change**

Year: May 2014 –Dec 2014  
Client: UNDP/NDMC  
Position Held: Team Leader  
Duties Rendered: Overall project coordination and delivery

**Preparation of Disaster Management Plan for a Guest House**

Year: 2014

Client: Sea Side Lodge Guesthouse Manager, Hulhumale'

Position Held: Planner

Duties Rendered: Preparation of the disaster management plan according to the guidelines set by

**Perceptions and understandings of climate change and migration survey (K.Guraidhoo and R.Dhuvaafaru) carried out by a Norwegian Research Institute**

Year: August 2013 September 2013

Client: CICERO - Center for Climate and Environmental Research – Oslo; Norwegian Academic Institution

Position Held: Local Consultant

Duties Rendered: Assisted (CICERO to carry out the household survey, focus group discussions and the key informant interviews

**Review and Update the Detailed Island Risk Assessment in the Maldives prepared for HDh. Kulhudhuffushi and GDh. Thinadhoo**

Year: March 2013 to September 2013

Client: Ministry of Environment and Energy

Position Held: Social Planner/Project Coordinator

Duties Rendered: Review all relevant documents related to DIRAM study, study the social aspects impacting the risks of the islands and overall management of the project.

**Integration of Climate Change Risk Resilience into Land Use Planning**

Year: February 2011 to April 2011

Client: Ministry of Housing and Environment

Position Held: Planner/Project Coordinator

Duties Rendered: Provide input in planning perspective and also over all coordination of the project inclusive of conducting a workshop to present the findings

**Preparation of Heritage Action Plan and Preliminary Inventory**

Year: September 2011 to November 2011

Client: Department of National Heritage

Position Held: Team Leader

Duties Rendered: Proposed action plan for the protection and safeguarding of national heritage. Prepared a preliminary inventory of the existing tangible and intangible heritage of Maldives

**Preparation of Atoll and Island Development Plans for AA. Atoll**

Year: September 2011 to December 2011

Client: Secretariat of AA Atoll council

Position Held: Planner/ Project Manager

Duties: Manage and prepare the development plans

**Reviewing the Third Tourism Master Plan 2005-2011**

Year: December 2010 to October 2011

Client: Ministry of Tourism Arts and Culture

Position Held: Planner/Project Coordinator

Duties Rendered: Provide input in planning perspective and also over all coordination of the project inclusive of conducting a workshop to present the findings

**Preparation of a detailed Layout Plan for Tourism Zone (Asseyri Project)**

Year: December 2010 to February 2011

Client: Ministry of Tourism Arts and Culture

Position Held: Planner/Project Coordinator

Duties Rendered: Provide input in planning perspective through preparing the layout plan and also over all coordination of the project inclusive of conducting a workshop to present the findings

### **Appraisal of Hithadhoo Regional Hospital Development**

**Location:** S. Hithadhoo, Maldives

Year : November 2010

Client: OPEC Fund for International Development (OFID)

Position Held: Socio Assessment Specialist/Project Coordinator

Duties Rendered: Overall Coordination of the project and carry out social Impact assessment study.

### **Mapping study of infrastructure and resources for Youth**

**Location:**

Year : January 2010 to April 2010

Client: UNDP

Position Held: Assistant project coordinator

Duties Rendered: Assisting in overall coordination of the project

## **Professional Referees**

**Name:** Najfa Shaheem Raazee

**Position:** Project Manager of ICCRRIP Project, Ministry of Environment and Energy

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**Name:** Hamdhaan Zuhair

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**Name:** Ismail Abid

**Position:** Managing Director, Land and Marine Environmental Resource Group Pvt Ltd.

**Email Address:** [ismail.abid@lamer.com.mv](mailto:ismail.abid@lamer.com.mv)



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- CDE Consulting, 2017. *Maamendhoo Island Waste Management Centre - Environmental Management Plan*. Prepared for Maamendhoo Island Council, on behalf of United Nations Development Programme
- CITRES and MEECO, 2019. *Feasibility Study for a Regional Solid Waste Management System in Zone IV and V, Maldives - REPORT PHASE 2 – DRAFT 1 FINAL VERSION*. Prepared for Maldives Clean Environment Project - Ministry of Environment
- Falkland, T. 2001. *Report on Groundwater Investigations in Northern Development Region (ADB Regional Development Project)*. Report for Ministry of Planning and National Development. Maldives.
- MEE, 2016. *Environmental and Social Assessment and Management Framework (ESAMF) & Resettlement Policy Framework (RPF)* - Maldives Clean Environment Project. 203 pp
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# Appendices

## **Appendix 1 List of abbreviations**

EIA	-	Environmental Impact Assessment
EPA	-	Environmental Protection Agency
ESMP	-	Environmental and Social Management Plan
IWRMC	-	Island Waste Resource Management Centre
MCEP	-	Maldives Clean Environment Project
ME	-	Ministry of Environment
OWC	-	Organic Waste Converter
RWMF	-	Regional Waste Management Facility
TOR	-	Terms of Reference

**Appendix 2 Terms of Reference**

## TOR E: Environmental and Social Code of Practice for projects involving minimal civil works

- 1. Project Description:** Describe the project in terms of civil works required for the installation of the composting machine. This will only include enclosing the existing compost slab with four walls and a roof, and connecting electricity and water (via installation of a water tap from the existing groundwater well) to this building. A concept design of this building indicating its proposed location within the existing IWRMC shall be provided.

Provide details of the composting machine, which shall include the following.

- Concept design and process flow diagram of the composting machine.
  - Type and amount of waste that it can treat (food waste, green waste, paper etc. in mixed form or separated) and details of any products required for activation (such as bioculum) including its corresponding quantities to operate for a period of 1 year.
  - Solid and liquid bi-products and output of the process (wet / dry compost) including the method for their potential use and/or disposal.
- 2. Existing Site Condition:** Undertake a visual analysis of the existing IWRMC via a site visit. Information related to the types of waste currently stored at the IWRMC (if any) and their respective quantities, and the condition of the existing compost slab and groundwater well shall be provided.

Indicate if there are any apparent alarming concerns or threats towards long term sustainability of the IWRMC due to natural causes (such as coastal erosion and inundation) and human interventions (such as vibrations from planned nearby construction activities).

*Note: visual inspection either via video or photographs should only be done if physical travel is not possible owing to COVID19 restrictions.*

- 3. Mitigation Plan:** Provide mitigation plans separate for construction and operational phase by taking into account findings of the site condition analysis and potential impacts associated with the installation of the compost machine.

Mitigation measures proposed for construction phase should be focused in particular on occupational health and safety, public safety, labor code of conduct, dust management, noise, fire-safety and waste management. Adequate consideration shall be given to manage the COVID19 situation during

construction phase via daily temperature checks, cleaning procedures, shift roaster, arrangement for social distancing in labor camps, establishment of handwashing facilities at work site and labor camp etc.

Mitigation measures proposed for the operational should include the following in particular.

- **Odor Management:** Assess if the technology has an inbuilt odor management system and managed odors automatically.
- **Fluid and Discharges:** Will there be any fluid discharges from the proposed technology, will the machines require any extra piping space or water discharge systems or expansion of the existing leachate management system provided via the design, the consultants should propose suitable design requirements if so in the ESMP.
- **Waste Inputs:** Assess if the technology requires additional segregation of pre management of the incoming organic waste. Indicate specifically under the section on operational aspects of the ESMP what steps need to be taken specifically by the IWRMC operators in handling in coming waste to ensure it can be efficiently used in line with the proposed technology.
- **Energy Requirements and Efficiency:** The energy requirement to run the machinery and the status of energy efficiency of the machinery proposed should be assessed.
- **Sludge and Residuals:** The nature and amount of all residual material produced, solid and liquid should be assessed and recommend means by which it can be re-used and/or managed in the ESMP. If reuse is recommended the consultant should also recommend the requirements for routine monitoring of quality of the digestate and liquid residue for instance if it is recommended to be used in agricultural processes.
- **Safety features on the machinery:** such as presence of emergency stop buttons, emergency lights and/or alarms for emergency use are equipped to ensure the best level of safety should be present and the consultants should assess if the proposed technology, especially machinery include these in addition to proposing other safety features in the ESMP.

Cost the mitigation measures, equipment and resources required to implement those measures. An Environmental and Social Management Plan for the proposed project, identifying responsible persons, their duties and commitments shall also be given. The environmental and social management plan should be presented in matrix format, clearly indicting the responsible person, cost, equipment and resources required for each proposed action. In cases where impacts are unavoidable arrangements to compensate for the environmental and / or social effect shall be given.

Mitigation measures should be presented as a matrix consistent to the format provided below.

Proposed Mitigation Measures	Institutional Responsibilities (Implementation and Supervision)	Estimated Quantities Required and Material Specifications Recommended	Cost Estimates	Comments (e.g. secondary impacts)
<b>Detailed design and planning Phase</b>				
<b>Pre-Construction Phase -Site Preparation</b>				
<b>Construction Phase</b>				
<b>Operation and Maintenance Phase</b>				

The confirmation of commitment of the developer to implement the proposed mitigation measures shall also be included. The proposed ESMP matrix shall be translated to Dhivehi language and provided as an Annex to the report.

- Grievance Redress Mechanism (GRM):** Describe the proposed grievance redress mechanism of the project developed by the PMU and offer suggested improvements (if any). The focal point from the council for managing grievances shall be identified and his / her contact details provided. Describe how the GRM details will be publicly made available by displaying the details/contacts on a visibility board.
- Consultation with the Island Council:** Undertake consultation with the Island Council (via telephone or online means) to provided information regarding the proposed composting machine. The operations and maintains (O/M) requirements of the machine shall be specifically highlighted, since the council will be responsible for operating the machine. A summary of the major discussion and outputs of this consultation shall be provided.

Provide a brief consultations plan to recommend how the Island Council should be consulted further throughout the process from design, installation and O/M stage, so that their inputs/feedback are taken into consideration during the process.

- Monitoring Program:** The monitoring program should be brief and non-exhaustive, mostly limited to visual checks. Identify the critical issues requiring monitoring to ensure compliance to the proposed mitigation measures. Detail of the monitoring program including the physical and biological parameters for monitoring, cost commitment from responsible person to conduct monitoring in the form of a

commitment letter, detailed reporting scheduling, costs and methods of undertaking the monitoring program must be provided.

The monitoring program should give details of the following:

- Monitoring indicators to be measured for evaluating the performance of each mitigatory measure (for example national standards, engineering structures, extent of area replanted, etc.).
- Monitoring mechanisms and methodologies
- Monitoring frequency
- Monitoring locations
- Cost of monitoring
- Responsible party

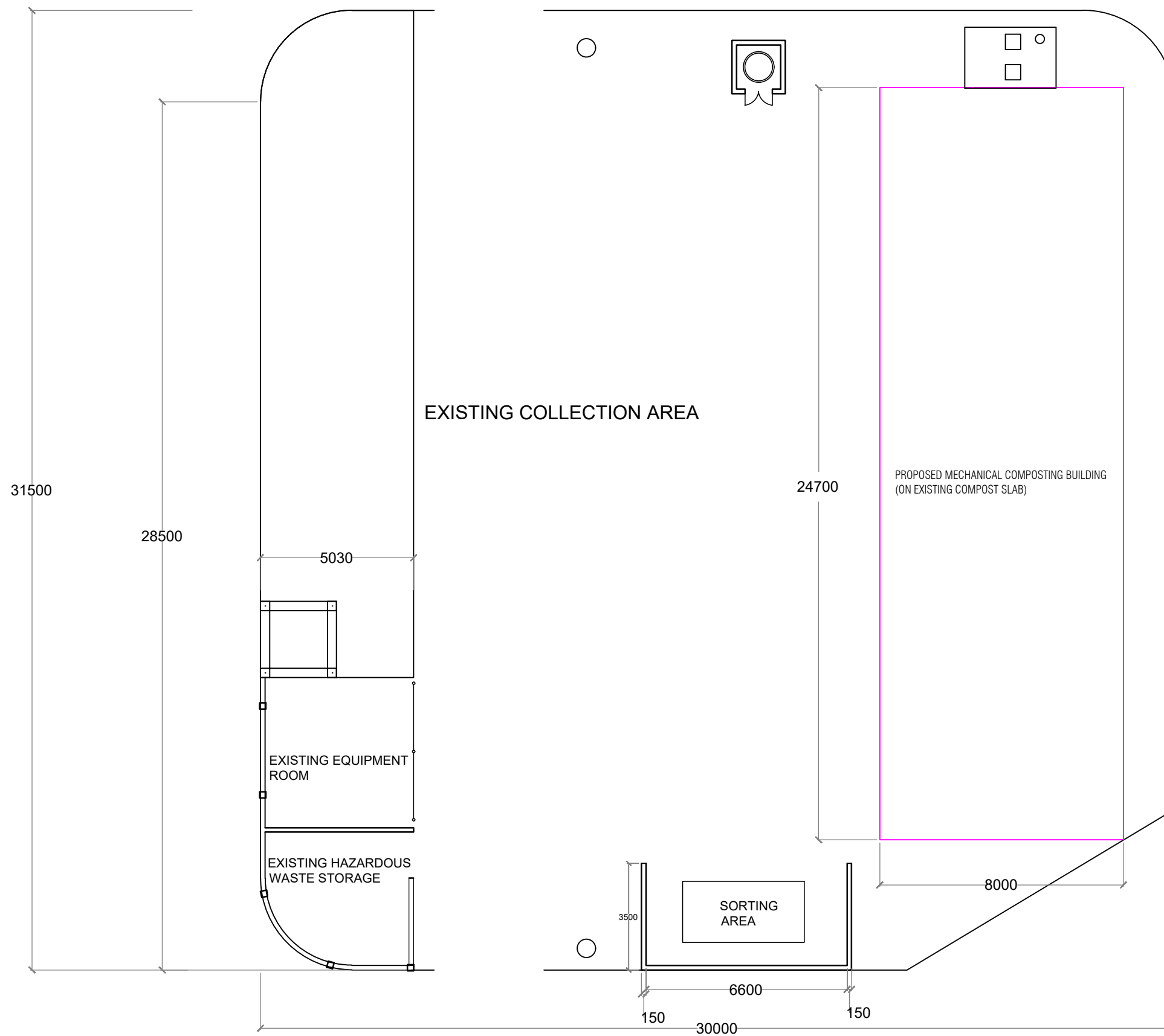
The recommended format for presenting the monitoring program is given below.

Proposed Mitigation Measure	Parameters to be monitored	Location	Measurements (Incl. methods & equipment)	Frequency of Measurement	Responsibilities (Incl. review and reporting)	Cost (equipment & Individuals)
<b>Detailed design and planning Phase</b>						
<b>Pre-Construction Phase</b>						
<b>Construction Phase</b>						
<b>Operation and Maintenance Phase</b>						

**Presentation-** The ESCP report, to be presented in digital format, will be concise and focus on mitigating significant environmental and social issues. The report shall include Dhivehi translations of the ESMP matrix. All raw data collected, should also be submitted in Raw form to the client in digital format.
















**Appendix 3 Site plan**



PREPARED BY	PROJECT	DESIGN BY	AMENDMENTS
	CONSTRUCTION OF MECHANICAL COMPOSTING BUILDING L.MAAMENDHOO		
	TITLE	STRUCTURE BY	
	FLOOR PLAN		
	CLIENT DEPARTMENT	DRAWN BY	
	WMPC DEPARTMENT	AFRAZ	
	PAPER SIZE A3	SCALE 1:150	
	PAGE NO. 01	DWG NO. CBMAAM-A1-01	
		DATE 05.10.2020	

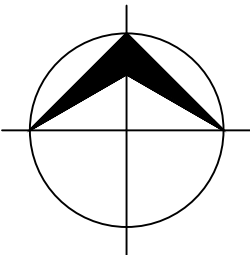
**Appendix 4 Map of Maamendhoo showing shoreline and erosion areas**

# MAP LEGEND

-  HIGH TIDE LINE (HWL)
-  LOW TIDE LINE (LWL)
-  VEGETATION LINE (VEG)
-  OLD ISLAND BOUNDARY LINE
-  EROSION LINE
-  BEACH ROCK
-  QUAYWALL
-  BREAK WATER/REVTMENT
-  ANTENNA
-  PUBLIC BLOCKS/BOUNDARY
-  UTILITY AND MUNICIPAL
-  IWRMC
-  OPEN DUMPING AREA



NORTH



Geodetic Parameter :  
 Zone : UTM Zone 43  
 Spheroid : WGS 1984  
 Vertical Datum : MEAN SEA LEVEL



## **Appendix 5 Translation of the Environmental and Social Management Plan (matrix)**













				<p>- <b>دوسه اوسه</b>  <b>سومره اوسه</b>  <b>چهارم اوسه</b>  <b>پنجم اوسه</b>  <b>ششم اوسه</b>  <b>هفتم اوسه</b>  <b>هشتم اوسه</b>  <b>نهم اوسه</b>  <b>دهم اوسه</b>  <b>یازدهم اوسه</b>  <b>چهاردهم اوسه</b>  <b>پانزدهم اوسه</b>  <b>شانزدهم اوسه</b>  <b>هجدهم اوسه</b>  <b>نوزدهم اوسه</b>  <b>بیستم اوسه</b></p>		
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				<p>لأرضيكم وسوياً</p> <p>حرفاً زائداً</p>		
	<p>التي لا تدركها العقول ولا تتصورها الأبصار</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p>	<p>التي لا تدركها العقول ولا تتصورها الأبصار</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p>	<p>التي لا تدركها العقول ولا تتصورها الأبصار</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p>	<p>التي لا تدركها العقول ولا تتصورها الأبصار</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p> <p>التي لا تدركها الأبصار ولا تتصورها العقول</p>		

				<p>זמנים וסוגים שונים של עבודות עבודות (עבודות)</p> <p>- עבודות שונות זמנים וסוגים שונים של עבודות זמנים וסוגים שונים של עבודות</p> <p>עבודות שונות עבודות שונות</p> <p>- עבודות שונות, עבודות עבודות שונות, עבודות</p> <p>עבודות שונות, עבודות עבודות שונות, עבודות</p> <p>עבודות שונות, עבודות עבודות שונות, עבודות</p> <p>עבודות שונות, עבודות עבודות שונות, עבודות</p> <p>עבודות שונות, עבודות עבודות שונות, עבודות</p>	
			-	<p>- עבודות שונות, עבודות עבודות שונות, עבודות עבודות שונות, עבודות</p> <p>- עבודות שונות, עבודות עבודות שונות, עבודות</p>	<p>עבודות שונות, עבודות עבודות שונות, עבודות עבודות שונות, עבודות</p> <p>עבודות שונות, עבודות עבודות שונות, עבודות</p>





			<p>- צ'טווענדע טאגס פונעם  טאג לאנדעס צווישן אראנס  צווישן לאנדעס פונעם  צווישן לאנדעס  - פון ארבעטצייט פון  צווישן טעג פונעם  צווישן טעג פונעם  צווישן טעג פונעם</p>		
		<p>- לאנדעס פונעם - אראנס  טאג פונעם</p>	<p>- פונעם פונעם פונעם  פונעם אראנס פונעם פונעם  פונעם פונעם פונעם פונעם  (פונעם פונעם פונעם פונעם)  פונעם פונעם פונעם פונעם  - פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם</p>	<p>פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם  פונעם פונעם פונעם פונעם</p>	

