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- Upscaling of the existing RO plant (with borehole)
 - Location and capacity of RO plant.
 - Details of water production process from intake treatment to distribution.
 - Details of product water storage from RO.
 - Method of feed water intake for RO process, their advantages and justification.
 - Disposal of concentrated brine, selection of location and reason for choosing the location and justification.
 - Properties of product water quality and method for monitoring the water quality during operational stage.
 - Details of vegetation clearance if any.
- Construction of Dirt Roads
 - Types and quantity of vegetation to be removed.
 - Details of vehicles and machinery proposed for vegetation clearance and levelling works.
- Construction of new infrastructure (accommodation block, recycling facility, bulk waste storage facility, hazardous waste storage facility, new waste storage bunker, store room 3, and incinerator maintenance room) and upgrading of infrastructure (extension of existing waste processing bunker and extension of existing utility building)
 - Location and size of each proposed infrastructure.
 - Details of vegetation clearance if any.
- Project phasing; project schedule and life span;
- Employment implications;
- Number of construction workers;
- Recruitment process for workers;
- Accommodation facilities;
- Food;
- Services and facilities for workers;
- Construction equipment and machineries and materials;
- Changes to materials and resource use, such as energy consumption;
- Electricity needs and utility providers during construction and operation stage;
- Sewage generation and sewage management;



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- Backup arrangement for utilities;
- Solid waste production, storage, disposal and recycling; and
- Describe the health and safety measures;
- Provide a summary of all the project inputs and outputs;

Task 2 Description of the environment

Assemble, evaluate and present the environmental baseline data on the project area and relevant boundaries. Identify baseline data gaps and identify studies and the level of detail to be carried out by consultant. As such all baseline data must be presented in such a way that they can be usefully applied to future monitoring. The report should outline detailed methodology of data collection utilized.

All data must be collected as per the requirements of the EPA Data Collection Guideline (published on www.epa.gov.mv).

The baseline data shall be collected before proposed new development and from all benchmarks established in the first phase of the project, with additional baseline data as required. All survey locations shall be referenced with Geographic Positioning System (GPS) including water sampling points, reef surveys, and vegetation surveys and terrestrial fauna surveys where applicable and appropriate. Information should be divided into the categories shown below:

Physical environment

- General description of geomorphology of the formation of coral islands, information on climatic data such as wind, rainfall and tide, currents and near-shore sediment transport
- Shoreline survey of the entire island including low tide line (beach toe), high tide line (beach berm), vegetation line and other significant features of the shoreline (e.g. beach rock formation, erosion scarps in appropriately scaled map (compare with the survey carried in association with project preparatory works).
- Determination of the elevation of the island with respect to mean sea level (MSL) with at least two benchmarks established on the island.
- Beach profiles from locations where profiles have been taken previously (if any)



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An indication of the quality and quantity of water resources in the vicinity of the project site should be given including spatial and temporal monitoring to accurately characterize baseline groundwater characteristics and present water use. If the project is likely to use or affect local sources of groundwater, provide a description of groundwater resources in the area in terms of:

- geology
- aquifer type - such as confined, unconfined
- depth to and thickness of the aquifers
- depth to water level and seasonal changes in levels
- interaction with surface water o sources of recharge
- current access (bores) to groundwater resources
- likely quantitative groundwater yield.
- Groundwater assessment pH, salinity, Electrical Conductivity, Dissolved ammonia, phosphate, sulfate, zinc, TSS. (from at least three locations of the island)

Biological environment

- Terrestrial habitat description in general to include categorization of major and significant vegetation types.
- Soil quality assessment including general characterization of the soil structure, drainage, soil and, phosphorous adsorption capacity and permeability,
- A list of description of terrestrial flora and fauna to include residential and migratory birds, mammals and reptiles where applicable,
- Qualitative and quantitative assessment of the reef with appropriate reference locations (3) to include types of corals, major types of invertebrates, and major fish species, grouped at major trophic levels,
- Seawater quality around the island including pH, salinity, TDS, turbidity, dissolved oxygen, phosphate, ammonia and TSS (from all locations from which baseline data was taken and also from all outfall locations).



- Identify marine and terrestrial environmentally sensitive sites such as breeding or roosting grounds for (e. g. sea turtles and sea birds) within and boundary area of the project development site.

Air quality

- Describe the topography and climate of the air shed. Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models. Describe the existing air quality within the air shed and at the nearest and adjacent inhabited islands and on the nearest and adjacent resorts

Noise Amenity

- Describe noise sources contributing to ambient noise levels (day/night) at the nearest and adjacent inhabited islands and ambient noise levels (day/night) on the nearest and adjacent uninhabited¹. Sensitive noise receptors adjacent to all project components should be identified and typical background noise estimated based on surveys at representative sites. A justification for an ambient noise baseline (dbA) at the nearest and adjacent inhabited islands should be provided.

Socio-economic environment

- Describe the natural features and landscapes of the project site which may have a cultural significance (day and night).
- Describe the visual amenity from the nearest and adjacent uninhabited islands
- Describe any structures on the project site which may have cultural or religious significance.

4. Legislative and Regulatory Considerations

Outline the project's consistency with the existing national, state, regional and local planning that apply to the project include reference to relevant statutory and non-statutory plans, planning policies, guidelines, strategies and agreements as appropriate. Outline the pertinent policies, regulations and standards governing project location, land use, environmental quality, and public health and safety. This should cover information on legal requirements specific to the project, such as permits to be taken under the Environmental Impact Regulations (2012) and other relevant institutions. There should be a brief



description on the process (and law) pertaining to the allocation of land to development projects, in general, and to the RWMF, in particular. Issues related to land acquisition and resettlement should be addressed, stating no impact or minimal impact. The report also should indicate whether a study or public consultation has been (or should be) undertaken to assess willingness / ability to pay.

5. Stakeholder Consultation

The consultation process should provide opportunities for stakeholders and community involvement and education. It may include interviews with individuals, government institutions, public communication activities, interest group meetings, production of regular summary information and updates (i.e. newsletters), and other consultation mechanisms to encourage and facilitate active public consultation. Stakeholder consultation processes for all parts of the ESIA should be integrated. Sufficient information about the development and the consultation process should be provided to the stakeholders and the community at an early stage and in accessible and culturally appropriate ways. Information about the development should inform the community about the benefits, disadvantages, trade-offs, potential issues and implications as required, enabling them to formulate their views. The following stakeholders must be consulted:

- Ministry of Environment and Energy (MEE)
- Environmental Protection Agency (EPA)
- Waste Management Corporation (WAMCO)
- Raa Atoll Council, Lhaviyani Atoll Council, Baa Atoll Council, Noonu Atoll Council
- Island Council of Inamaadhoo (the nearest inhabited island).

Information about the consultation processes conducted and their results should be provided including:

- the methodology adopted, a list of the stakeholders consulted during the program and how their involvement was facilitated,
- the processes conducted to date and the future consultation strategies and programs including those during the operational phase of the project,
- indicate how consultation involvement and outcomes were integrated into the ESIA,
- recommendations on how the project might address concerns raised during public consultation.

6. Determination of Potential Impacts



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Identify the major issues of environmental and social concern and indicate their relative importance to the design of the project. Distinguish construction and post-construction phase impacts, significant positive and negative impacts, and direct and indirect impacts. Identify impacts that are cumulative, unavoidable or irreversible. Special attention should be paid to:

Site preparation, construction and commissioning: Site clearing impacts including the area to be cleared (m^2), how waste from land clearing would be managed, measures that would be taken to comply with the *Regulation on Cutting Down, Uprooting, Digging Out and Export of Trees and Palms from One Island to Another* including locations for relocating trees, source of obtaining new plants to comply with planting two or more trees for each mature tree cut down, compensation plan if any trees owned by the local community needs to be cut down.

The impacts associated with the proposed development including a full description of the relevant parts and nature of the works, an indicative construction timetable, including expected commissioning and start-up dates and hours of operation, and a description of major work programs for the construction phase, including an outline of construction methodologies. If fill material is required, the quantity and sourcing of borrow materials, and transport and storage, construction site management, noise, fugitive dust, solid waste disposal, traffic and employment.

Commissioning impacts: including a description of the regional waste management facility commissioning process.

RWMF operation: Describe solid waste management activities during operations, with particular reference to waste collection, transport, sorting, incinerator loading, and disposal of incinerator ash. Characteristics of any hazardous materials resulting from or involved in the project, indicating appropriate management strategies (e.g. handling, storage, treatment, disposal). Impacts associated with bulk storage in the fuel storage tanks and distribution of petroleum or petroleum-related products should also be emphasized.

Air Quality: Characterize the nature of emissions to air likely to be produced during the construction and operations of the upgraded infrastructure at the RWMF, including emissions during operation of heavy machinery and equipment.



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Water Resources: Provide details of potential impacts on the quality of groundwaters and seawater. Particular reference must be made to potential groundwater and seawater pollution during fuel storage and transportation. Additionally, chemical and physical properties of wastewater including leachate from ash disposal, the potential of wastewater to contaminate groundwater resources, and impact on current and future potential groundwater usage from the proposed development shall be highlighted. Describe the pollution control equipment and design features of the proposed development for prevention and minimization of contamination of groundwater resources.

Natural Environment: The proximity of the facility to any sensitive areas should be described. Describe measures to be taken to avoid and minimize potential adverse impacts of the proposal on sensitive terrestrial and aquatic environments. Describe potential issues relevant to sensitive areas, or areas which may have low resilience to environmental change arising from the construction, operation of the project including clearing, salvaging or removal of vegetation. Areas of special sensitivity include wetlands, wildlife breeding or roosting areas, and habitat of threatened plants, animals and communities. The capacity of the environment to assimilate discharges/emissions should be assessed. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible. The discussion should cover all likely direct and indirect environmental harm due to the project on flora and fauna particularly sensitive areas. If construction and operation of the project are likely to cause adverse impacts on sensitive areas or areas which may have low resilience to environmental change describe environmental offsets that would counterbalance the impact on these values.

Noise Amenity: Describe the impacts of noise generated during the construction and operation of the proposed facility on RWMF operators, nearest and adjacent inhabited islands and nearest and adjacent resorts or uninhabited islands with potential future use for resort development. An analysis of noise impacts should include the estimated noise levels generated by the proposed development assessed against typical background levels on the islands, and the impact of noise at all potentially sensitive receivers compared with the *World Bank General Environmental, Health, and Safety (EHS) Guidelines*. If noise is likely to cause an adverse impact propose measures to minimize or eliminate these effects, including details of any screening, lining, enclosing or bunding of facilities, or timing schedules for construction and operations.

Socio-cultural: Describe the impacts of the proposed development on the natural features and landscapes of the project site which may have cultural significance and which may impact on nearest and



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adjacent islands with potential future use for resort development. Use sketches, diagrams, elevation drawings to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations.

- Describe measures to be taken to avoid and minimize potential adverse impacts of the proposal on visual amenity. Justify the land clearing activities with particular reference to potential for minimizing intrusion of the visual amenity of the proposed development activities.
- Describe the impact of the proposed development on any structures which may have cultural or religious significance. Describe measures to be taken to avoid, manage or mitigate potential impacts on these structures during construction and operation of the proposed development.

7. Alternatives to proposed project

Indicate project alternatives and examine alternative ways of doing things (in terms of process) and compare and contrast the possible locations for the development site (list alternatives sites) with particular reference to the “do nothing” option which represents current conditions, and Options as described in the Best Practical Environmental Options Final Report. This section must include a comparison of the technologies and methods for management and control of contaminants which may potentially impact on the environment including alternatives for ash disposal.

8. Develop an Environmental Management Plan (mitigation /monitoring)

The Project's environmental management plan (EMP) should consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures. The EMP should be presented in matrix form in line with World Bank Group General Health and Safety Guidelines. More specifically, the EMP includes the following components:

Mitigation: The EMP should identify feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan should include offset measures if mitigation measures are not feasible, cost-effective, or sufficient. Specifically, the Plan should:

- identify and summarizes all anticipated significant adverse environmental impacts
- (air, groundwater and physical cultural resources (as applicable);



- describe each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, including:
 - general operating procedures for managing and mitigation risks to the environment from general facility operations including waste collection, transport, incinerator loading, hazardous waste handling, fuel transfer and storage, litter management disposal of incinerator ash and residues.
 - manufacturer's operational guidelines specifically outlining safety and emission control procedures as well as recommended maintenance practices.
 - general operating procedures for implementing back-up measures that will act in the event of failure of primary measures to minimize the likelihood of adverse air impacts.
 - general operating procedures for implementing backup measures that will act in the event of uncontrolled release to waters due to system or catastrophic failure, or from unforeseen unpredicted weather conditions (abnormal rainfall).
 - estimate any potential environmental impacts of these measures; and
 - provide linkage with any other mitigation plans required for the project.

Monitoring: Provide (a) a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and (b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation. Specifically, the plan should address physical groundwater quality, air emissions; and physical cultural resources (as applicable).

Capacity Development and Training: Specifically, the ESMP should provide a specific description of institutional arrangements—who is responsible for carrying out the mitigation and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training). To strengthen environmental management capability in the agencies responsible for implementation, most ESMPs cover one or more of the following additional topics: (a) technical assistance programs, (b) procurement of equipment and supplies, and (c) organizational changes.



9. REPORTING

The ESIA report will be concise and limited to significant environmental issues. The main text will focus on findings, conclusions and recommended actions supported by summaries of the data collected. The ESIA report will be organized according to the outline below.

- Executive Summary
- Introduction to Assignment
- Description of Proposed Project
- Methodology Used
- Policy, Legal and Administrative Framework
- Description of the Environment/Social (Baseline Assessment)
- Significant Environmental and Social Impacts (Impact Assessment)
- Analysis of Project Alternatives
- Environmental and Social Management Plans (mitigation and monitoring)
- Conclusions and recommendations

Timeframe for Submitting the Addendum – The developer must submit the completed Addendum to the Environmental Impact Assessment within 6 months.

16th December 2018



Appendix 3 Land Acquisition Letter



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

دَعَا

عَرَفُوا بِمَدْرَسَتِهِ

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سَرِیَرَه مُر: 1-ED/438/2017/35

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فَوَيْلٌ لِلْمُصَلِّينَ إِذَا دُخِرَ فِي السَّجْدِ

مہر جسٹس سید سرفراز حسین 438-WMPC/1/2017/27 (6 دسمبر 2017) سید، ج
 جسٹس سید سرفراز حسین 1-ED/438/2017/26 (26 نومبر 2017) سید، سولہ فروری 2018ء۔

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Appendix 4 Master Plan of RWMF at Vandhoo

Facilities proposed to be developed under this ESIA are marked with an asterisk

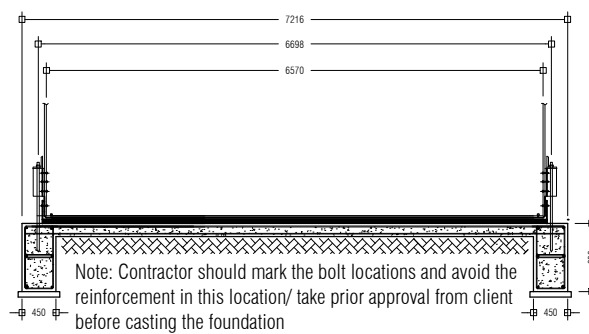
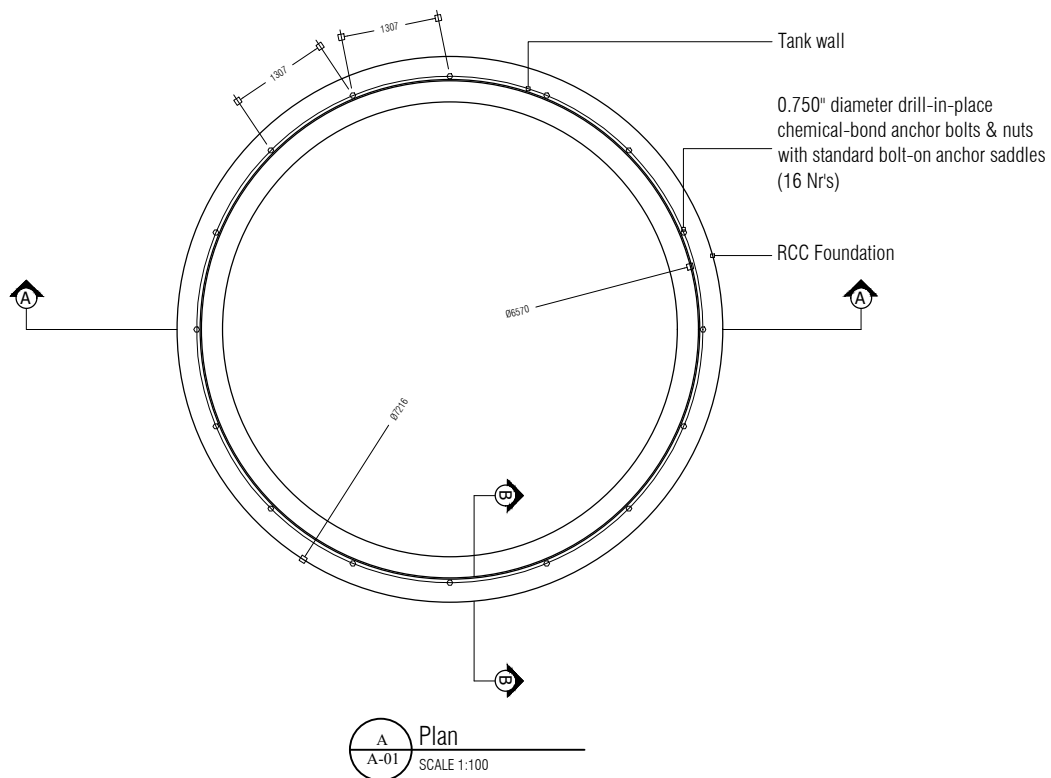
Appendix 5 Details of Water Storage Tanks


CONSTRUCTION OF 2NOS OF 200 CBM WATER STORAGE TANKS
R. VANDHOO



PREPARED BY:
MALDIVES CLEAN ENVIRONMENT PROJECT
MINISTRY OF ENVIRONMENT AND ENERGY

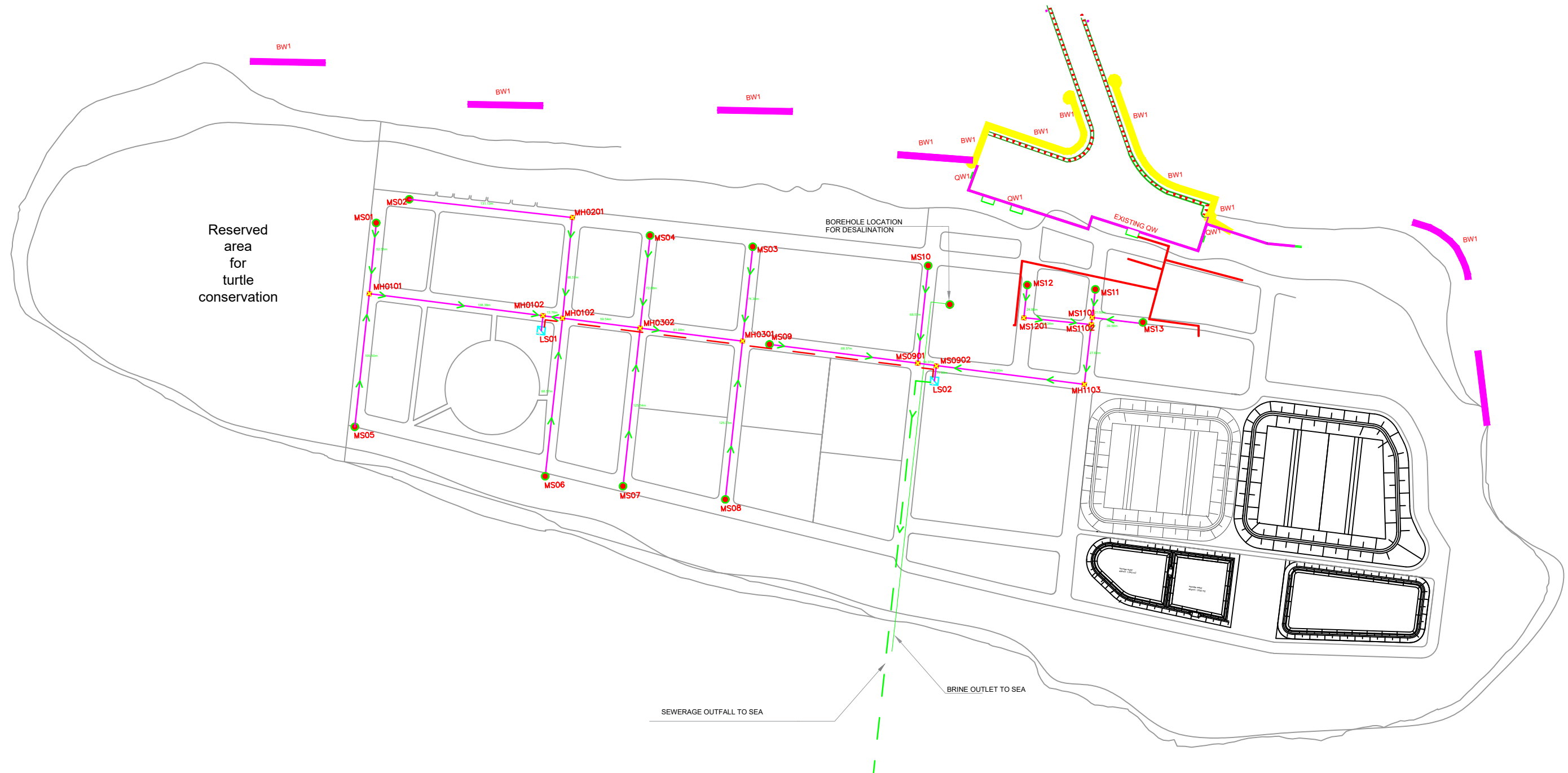
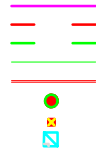
2018



APPROVED BY	PROJECT	DESIGN BY	AMENDMENTS
 MCEP MINISTRY OF ENVIRONMENT AND ENERGY GREEN BUILDING, HANDHUVAREE HIGUN, MAAFANNU, MALE' (20392), REPUBLIC OF MALDIVES. TEL: +960-3018431, +960-3018300, FAX: +960-328301	CONSTRUCTION OF 02NOS OF 200 CBM WATER STORAGE TANKS R. VANDHOO	AFRAZ	
	TITLE	STRUCTURE BY	
	PLAN AND SECTION	AFRAZ	
	CLIENT DEPARTMENT	DRAWN BY	
	WMPC DEPARTMENT	AFRAZ	
	PAPER SIZE A4	SCALE 1:100	
	PAGE NO. 01	DWG NO. VNDADWATER A1-01	
		DATE 14.11.2018	

Appendix 6 Map of Sewer, Water & Fuel Network

SEWERAGE LAYOUT



PROJECT : RAA. VANDHOO PROJECT: COASTAL PROTECTION WORKS DESIGN CLIENT : MINISTRY OF ENVIRONMENT AND ENERGY	CONSULTANT : HUSSAIN SHAHEED DRAWN BY : LEEN CHECKED BY : HUSSAIN SHAHEED	TITLE :AS GIVEN SCALE AS GIVEN PROJECT NO: DATE:3 NOV 2018 PG NO.
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Appendix 7 Specifications of Diesel Storage Tanks

GEOMETRY / DESCRIPTION – ITEM 1 – Diesel Tanks		
Tank Quantity:	2	
Construction Method:	TC Rolled Tapered Panel (RTP) Bolted Design	
Material of Construction:	Carbon Steel	
Nominal Inside Diameter:	21.54 feet	6.57 meters
Nominal Eave Height:	20.69 feet	6.30 meters
<i>Note: Nominal eave height is measured from bottom of base angle to top of eave angle.</i>		
Bottom Style:	Flat Steel Floor for placement on concrete foundation – Floor materials supplied by Tank Connection. Concrete foundation designed, supplied, & installed by others.	
Roof Style:	Steel cone with 2" rise to 12" run (9.46° slope)	
Roof Support Style:	Self-supported with internal rafters	
Freeboard:	12 inches	305 millimeters
Usable Capacity:	53,656 US gallons	203 cubic meters
Empty Weight (each tank):	16,596 pounds	7,528 kilograms

TANK COMPONENTS / ACCESSORIES (per tank, unless noted)	
Qty:	Description
1	Tank Connection logo (installed on top ring)
1	Liquid tank nameplate
1	Set of plastic push caps to cover hardware on exterior tank shell and deck
-----	Anchor bolts are not required by design
1	20" Diameter mushroom ventilator with aluminum bird screen
1	20" Diameter combination manway / pressure relief valve
1	24" Diameter shell manway with bolt-on hinged cover
3	2" Diameter 150# RFSO single flanged nozzle
1	4" Diameter internal 90-degree mitered elbow w/ weir cone & external 150# RFSO flanged nozzle for overflow
1	Full deck perimeter guardrail – NON-OSHA – HDG (TC Standard Construction)
1	External caged ladder with lockable hoop – NON-OSHA – HDG – Intermediate rest platforms excluded – Includes safety chain at entrance point(s) (TC Standard Construction)
1	Liquid level indicator w/ gauge board & high visibility target – Full travel – Metric display (mechanical, float-type)
1	Lot of ½" thick asphalt impregnated fiberboard between tank bottom & concrete foundation
1	Lot of 4 mil polyethylene sheeting between foundation & fiberboard / tank bottom
1	Set of tank drawings shown in both imperial & metric dimensions (1 hardcopy, 1 pdf electronic format)
1 ONLY	Assembly Kit – including (3) Drift Pins, (3) Standard Adhesive Applicators, (2) Small Adhesive Applicators, (4) Small Adhesive Applicator Tips, (3) 9/16" Reamers, (2) Paint Roller Handles, (3) Paint Roller Pads, & (4) Plastic Spatulas

SEALANTS / GASKETS / HARDWARE – ITEM 1	
Roof Gasket:	Buna Nitrile
Sidewall Sealant:	Sika 201
Bottom Sealant:	Sika 201
Hardware:	Grade 8 bolts with flat washers & hex nuts. Hardware is factory coated with plating technology designed for long life and superior corrosion protection.

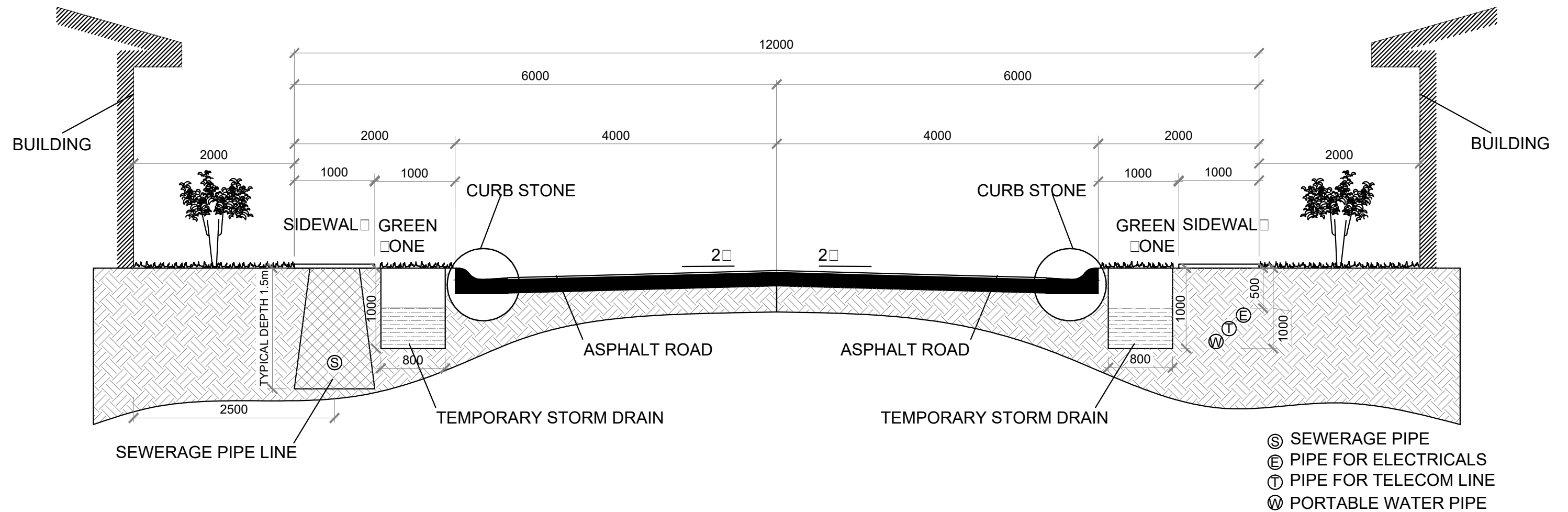
GEOMETRY / DESCRIPTION – ITEM 2 – Water Tanks		
Tank Quantity:	2	
Construction Method:	TC Rolled Tapered Panel (RTP) Bolted Design	
Material of Construction:	Carbon Steel	
Nominal Inside Diameter:	21.54 feet	6.57 meters
Nominal Eave Height:	20.69 feet	6.30 meters
<i>Note: Nominal eave height is measured from bottom of base angle to top of eave angle.</i>		
Bottom Style:	Flat Steel Floor for placement on concrete foundation – Floor materials supplied by Tank Connection. Concrete foundation designed, supplied, & installed by others.	
Roof Style:	Steel cone with 2" rise to 12" run (9.46° slope)	
Roof Support Style:	Self-supported with internal rafters	
Freeboard:	12 inches	305 millimeters
Usable Capacity:	53,656 US gallons	203 cubic meters
Empty Weight (each tank):	16,659 pounds	7,556 kilograms

TANK COMPONENTS / ACCESSORIES (per tank, unless noted)	
Qty:	Description
1	Tank Connection logo (installed on top ring)
1	Liquid tank nameplate
1	Set of plastic push caps to cover hardware on exterior tank shell and deck
-----	Anchor bolts are not required by design
1	20" Diameter mushroom ventilator with aluminum bird screen
1	24" Square roof manway with lockable hinged cover
1	24" Diameter shell manway with bolt-on hinged cover
3	2" Diameter 150# RFSO single flanged nozzle
1	4" Diameter internal 90-degree mitered elbow w/ weir cone & external 150# RFSO flanged nozzle for overflow
1	Full deck perimeter guardrail – NON-OSHA – HDG (TC Standard Construction)
1	External caged ladder with lockable hoop – NON-OSHA – HDG – Intermediate rest platforms excluded – Includes safety chain at entrance point(s) (TC Standard Construction)
1	Liquid level indicator w/ gauge board & high visibility target – Full travel – Metric display (mechanical, float-type)
1	Lot of ½" thick asphalt impregnated fiberboard between tank bottom & concrete foundation
1	Lot of 4 mil polyethylene sheeting between foundation & fiberboard / tank bottom
1	Set of tank drawings shown in both imperial & metric dimensions (1 hardcopy, 1 pdf electronic format)
1 ONLY	Assembly Kit – including (3) Drift Pins, (3) Standard Adhesive Applicators, (2) Small Adhesive Applicators, (4) Small Adhesive Applicator Tips, (3) 9/16" Reamers, (2) Paint Roller Handles, (3) Paint Roller Pads, & (4) Plastic Spatulas

SEALANTS / GASKETS / HARDWARE – ITEM 2	
Roof Gasket:	White EPDM strip gasket – 3/32" thick
Sidewall Sealant:	High performance moisture-cured elastomeric sealant
Bottom Sealant:	High performance moisture-cured elastomeric sealant
Hardware:	Plastic encapsulated grade 8 bolts with flat washers & hex nuts. Hardware is factory coated with plating technology designed for long life and superior corrosion protection. Tank bottom hardware includes plastic encapsulated nuts.

Appendix 8 Typical Road Section & Cross Section of Paving Details

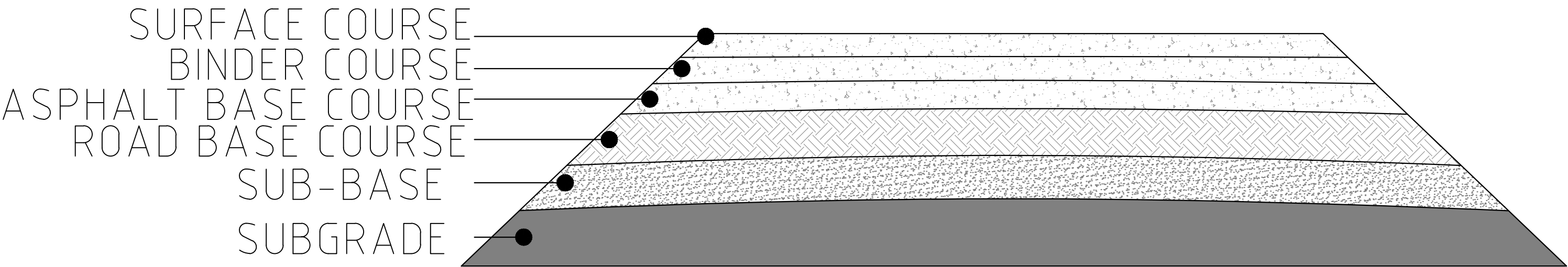
TYPICAL ROAD SECTION



TYPICAL ASPHALT ROAD SECTION (12m)

PROJECT : RAA. VANDHOO PROJECT: COASTAL PROTECTION WORKS DESIGN	CONSULTANT : HUSSAIN SHAHEED DRAWN BY : LEEN CHECKED BY : HUSSAIN SHAHEED	TITLE : AS GIVEN SCALE : AS GIVEN PROJECT NO.: DATE: 3 NOV 2018 PG NO.
CLIENT : MINISTRY OF ENVIRONMENT AND ENERGY		

ASPHALT ROAD PAVING DETAIL



ASPHALT ROAD PAVING DETAIL

PROJECT: RAA. VANDHOO PROJECT: COASTAL PROTECTION WORKS DESIGN CLIENT: MINISTRY OF ENVIRONMENT AND ENERGY	CONSULTANT: HUSSAIN SHAHEED DRAWN BY: LEEN CHECKED BY: HUSSAIN SHAHEED	TITLE: AS GIVEN SCALE: AS GIVEN PROJECT NO: DATE: 3 NOV 2018 PG NO.
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Appendix 9 Project Work Schedule

R.VANDHOO UPGRADING WORKS - PHASE 01										
DRAFT SCHEDULE OF WORKS										
Serial No.	PARTICULARS	QUANTITY	Bidding document completed	Publish IFB in National Gazette and UNDB	Deadline for Submission of bids	Evaluation Completed	Intention to Award	Contract Award	Sign Contract	Completion Date
1	Extension of existing waste processing bunker 1	1	17 01 2019	20 01 2019	3 02 2019	10 02 2019	13 02 2019	25 02 2019	4 03 2019	26 05 2019
2	Construction of additional waste storage bunker	1	17 01 2019	20 01 2019	3 02 2019	10 02 2019	13 02 2019	25 02 2019	4 03 2019	26 05 2019
3	Bulk waste storage facility	1	24 01 2019	27 01 2019	10 02 2019	17 02 2019	20 02 2019	4 03 2019	11 03 2019	2 06 2019
4	Hazardous waste storage facility	1	24 01 2019	27 01 2019	10 02 2019	17 02 2019	20 02 2019	4 03 2019	11 03 2019	2 06 2019
5	Proposed recycling facility with storage for recyclables	1	24 01 2019	27 01 2019	10 02 2019	17 02 2019	20 02 2019	4 03 2019	11 03 2019	2 06 2019
6	New staff quarters (accomodation) with mess	1	24 01 2019	27 01 2019	10 02 2019	17 02 2019	20 02 2019	4 03 2019	11 03 2019	2 06 2019
7	Extension of Utility Building (to accommodate additional genset)	1	17 01 2019	20 01 2019	3 02 2019	10 02 2019	13 02 2019	25 02 2019	4 03 2019	26 05 2019
8	Construction of Incinerator maintenance room (for tools and critical spares)	1	24 01 2019	27 01 2019	10 02 2019	17 02 2019	20 02 2019	4 03 2019	11 03 2019	2 06 2019
9	Construction of Store Room 3 (for spares)	1	17 01 2019	19 01 2019	2 02 2019	9 02 2019	12 02 2019	24 02 2019	3 03 2019	25 05 2019
10	Construction of additional water tanks (250m3 x 2 nos) with distribution network	1	17 01 2019	18 01 2019	1 02 2019	8 02 2019	11 02 2019	23 02 2019	2 03 2019	24 05 2019
11	Relocation and upgrading of fuel storage (100m3 x2 nos)	1	17 01 2019	18 01 2019	1 02 2019	8 02 2019	11 02 2019	23 02 2019	2 03 2019	24 05 2019
12	Rehabilitation of the existing landfill and leachate pond (with pumps)	1	31 01 2019	3 02 2019	17 02 2019	24 02 2019	27 02 2019	11 03 2019	18 03 2019	25 05 2019
13	Upgrading/upscaling of the existing fire protection system (include additional buildings)	1	31 01 2019	3 02 2019	17 02 2019	24 02 2019	27 02 2019	11 03 2019	18 03 2019	9 06 2019
14	Guest Accommodation	2	28 02 2019	3 03 2019	17 03 2019	24 03 2019	27 03 2019	8 04 2019	15 04 2019	7 07 2019

Appendix 10 Occupational Health & Safety Procedure

Extracted from the O&M procedure of WAMCO for the RWMF at Vandhoo.

CHAPTER 6 - OCCUPATIONAL HEALTH AND SAFETY

6.1. OVERVIEW

RWMF treats health and safety of its employees as its number one priority. All management and employees are thoroughly instructed and integrated into the comprehensive safety philosophy when first hired. Each employee is fully responsible to fully understand their job and responsibility to never place themselves or their coworker in harm's way.

Employees will receive further policy instructions and safety training through monthly facility meetings which includes not only operation related matters but also health and safety. Advanced training will be issued to employees assigned specific tasks. Employees should direct any questions, inquiries or accidents to their direct supervisor or plant manager's attention immediately. Emergency telephone numbers will be placed near all telephones and at the various facilities and plants.

6.2. FACILITIES HAZARDS

RWMF receive hazardous wastes generated from households and medical establishments. Although the quantities of hazardous wastes are small, yet hazardous in nature and requires special handling to avoid toxic exposure that can cause harm to employees as a result of direct contact. Normal facility operations can, however, at times produce potential safety hazards to employees working in the vicinity of certain equipment. These hazards include but not limited to:

- 1- Noise from the various vehicles such as loaders, bulldozers, etc., as well as parts of plants / facilities including MRF, incinerator and balers;
- 2- High temperatures at vicinity of certain areas of the incineration plant, or exposure to direct sunlight in a hot day for extended period of time, etc.;
- 3- Loading of certain types of "sharp" recyclables such as aluminum cans or glass in processing lines at MRF or balers.
- 4- Toxic emissions / vapors emitted due to heat, decomposition, etc.
- 5- Potentially dangerous situations can also occur around any processing equipment that is made up of moving parts.

Accordingly, the goals of the facility management in regards to personnel health and safety include the following:

1. To describe all types of health and safety hazards that exists at various facilities to employees;
2. To familiarize the employees with the safety measures and equipment to be used;
3. To explain all safety procedures;
4. To explain Occupational Safety and Health guidelines as per GOM policies and relevant programs in that regards that are designed to limit hazards to employees; and
5. To explain Fire Fighting Procedures, Explosion Prevention Procedures in the event an accident occurs.

6.3. EMPLOYEE SAFETY STANDARDS

RWMF regards the safety of its employees to be of paramount importance. Therefore, it is the policy of WAMCO/RWMF to assure the personal safety and health of each employee. The prevention of occupational induced injuries and illnesses is given precedence over operating productivity whenever necessary.

A safety and health program conforming to the best practices for the waste sector shall be adopted. To be successful such a program must embody the proper attitudes toward injury and illness prevention on the part of supervisors and employees. It also requires cooperation in all safety and health matters, not only between supervisor and employee, but also between each employee and his / her co-workers. Only through such a cooperative attitude can a safety program be established and preserved.

RWMF objective is an Occupational Health and Safety centered program that will reduce the number of injuries and work-related illnesses to an absolute minimum. The goal is zero accidents and injuries. Every practical step is taken to provide safe working conditions and to encourage safe working practices in addition to meeting all legal requirements.

To achieve these goals, hazardous conditions in all work areas that can produce injuries shall be identified and communicated to employees, with the corresponding measures to avoid such injuries.

Cooperation in detecting hazards and, in turn, controlling them is essential. Supervisors / plant managers must be informed immediately of any hazardous situation beyond the employee's ability to correct.

All employees are required to do the following:

1. Report all injuries, no matter how minor it is to your supervisor immediately;
2. Get first aid promptly;
3. Do not attempt to administer first aid unless supervisor is present;
4. Report any unsafe condition or practice to your supervisor;
7. Keep all aisles, passageways, platform, and stairways clear of all obstructions;
8. Keep your work area clean and orderly;
9. Perform all work in a safe and orderly manner as per procedures and policies;
10. Materials must be properly stacked to avoid creating hazards;
11. At recyclables storage warehouses, bales are to be stacked not more than four (4) high;
12. Do not fail to stop, look and listen before you step into a trucking aisle;
13. Use only marked aisles when walking through facilities;
14. Do not take short cuts through departments or process areas;
15. Do not climb conveyors, railings or balers;
16. Drivers of motor vehicles must stop and sound the horn at cross aisles and where vision is obstructed;
17. Sound horn when backing up;
18. Only the authorized / assigned operator rides on a vehicle and no passengers allowed;
19. Only licensed personnel may operate motorized vehicles and equipment;
20. Work within prescribed weight limitations when lifting or pushing;

21. Do not wear ties, loose clothing, jewelry, or other items which could "catch" in moving equipment and create a hazard;
22. Do not block access to fire extinguishers or fire hoses with equipment or materials;
23. Do not interfere with firefighting operations;
24. All combustible, flammable materials or liquids must be stored in approved safety containers and in designated storage areas;
25. Use assigned tools and follow prescribed methods for each job;
26. Do not use defective tools or equipment;
27. Guards are placed on moving machinery for your protection;
28. Do not operate unless all guards are in place and machinery is cleared of objects and people;
29. Never clean, oil, or adjust any machinery while in motion unless that's the process;
30. Observe all Danger, Safety, and no Smoking signs; and
31. Smoking is prohibited within all facilities and is only allowed in areas that have "smoking areas" posters.

6.4. FACILITY SAFETY RULES AND REGULATIONS

The following is prohibited:

1. Endangering the safety and health of other employees;
2. Engaging in sabotage, espionage or restricting of operation;
3. Damage to or theft of equipment, facility, etc. or that of another employee as well as the operation of any machine except by an authorized employee is prohibited;
4. Bringing weapons into the facility;
5. The use, possession, promotion, purchase, transfer, sale, distribution, manufacture of unauthorized or illegal drugs, or the misuse of any legal drugs, alcohol, or other chemical substances or any combination thereof on any WAMCO premises or sites is strictly prohibited;
6. Sexual Harassment;
7. Failure to wear eye safety protection at all times in all facility areas;
8. Failure to wear proper footwear or failure to wear prescribed safety equipment;
9. Employees are expected to wear proper dress;
10. Habitual tardiness, unexcused absences, or leaving the facility without permission;
11. Smoking is prohibited inside the facility;
12. Violation of any criminal law; and
13. Failure to adhere to MEE / WAMCO policies and procedures.

6.5. SAFETY MANAGEMENT

The RWMF Manager are responsible for directing the overall safety program for each of their respective facilities.

Safety Program Functions include but not limited to the following:

1. Advise management on steps to improve the safety and fire prevention programs;
2. Assist supervision in accomplishing facility safety responsibilities;
3. Collaborate with relevant agencies on safety and health and fire protection matters;
4. Supervise the operation of the first aid;
5. Maintain records of safety performance and costs; and
6. WAMCO's Head of Operations shall assist the facility manager(s) by inspecting and advising on safety features of proposed purchases on new machines, new processes, new material, new or altered building facilities, and personal protective equipment.

Daily Safety Checklist shall include but not limited to the following:

1. Each morning the plant manager or responsible staff shall conduct a safety inspection of all facility equipment passage ways, fire extinguishers, first aid kits, and storage areas, using the Safety Checklist prepared for each facility / plant at RWMF.
2. If there are no problems with an item on the list, the "OK" column is checked. If there is a problem the "Needs Action" column is checked. Any problem is noted and the proper personnel is notified for immediate action.
3. Along with preventative and emergency maintenance the maintenance employee is responsible for assisting in the inspection of mechanical equipment.
4. Prior to startup, the plant manager will also make sure that all proper safety equipment is being worn by employees.
5. The maintenance manager will promptly review, assess, repair, or recommend alternatives to the operators' concerns as pointed out on the daily logs.

Machine Operator Safety:

- 1- All machine operators should be trained and have a copy of the equipment's safety features. This outlines the do's and don'ts of the machine. It will also address where all emergency shut-offs are and safety limit switches.
- 2- If any equipment does not have an operating manual or safety information on it, operators are responsible to inform Facility Operations Manager who will contact and request it immediately from the manufacturer.
- 3- Copies of all the facility's equipment safety items should be posted or placed near the equipment. Additionally, this information shall be kept in the facility safety book. This book is to be stored in an easily accessible area and made available to anyone entering the facility. Some equipment operators are required to have an additional specialized form of training. A copy of proof of this training shall be kept in the employees file and a master list for all equipment shall be kept in the Plant Safety book. Machine operators should be instructed not to operate their equipment without the proper guards being in place.
- 4- Mechanics may be required to operate equipment without the guards on, since they understand safety needs and have been trained to perform their jobs safely.
- 5- Only WAMCO trained and certified operators will be allowed to operate equipment. Each operator should study, know and, above all, follow all guidelines. No employee is to operate any equipment without the

supervisor's knowledge and approval. The following are minimum standards of safety in the operation of equipment.

- a. Check equipment to see that it is in safe operating condition. If in doubt, contact your supervisor and do not operate until approval is given;
- b. Do not speed, and do not stop suddenly;
- c. Slow down at intersections;
- d. Be on the alert for fellowmen / pedestrians (in case of Islands waste management systems);
- e. Do not attempt to exceed the capacity of your equipment by carrying loads which are too heavy or unbalanced;
- f. Operators should face their destination. If unable to see over the load the vehicle should be driven backwards;
- g. Never leave a vehicle unattended;
- h. When parked buckets or blades will be flat to the ground, shift levers in neutral, and the brakes set; and
1. Never allow anyone to ride in buckets or blade.

Employee Responsibilities:

1. Know and observe all rules and regulations relating to occupational safety and health;
2. Know and follow all standard operating procedures, including Job Safety Analysis for each occupation;
3. Properly use prescribed protective equipment;
4. Maintain protective equipment in acceptable conditions;
5. Report to your supervisor conditions or procedures which are considered a hazard to health or safety;
6. Practice good personal hygiene habits;
7. Report ALL injuries immediately to your supervisor; and
8. Report sickness or injury occurring while on duty to Supervisor before leaving for the day.

Accidents/Injuries

Procedures followed in the event of an accidental injury in the facility are naturally dependent on the type and severity of the injury. Listed below are the procedures to follow for two scenarios:

a- Major Injuries - Outside Medical Attention

Required: CALL emergency and Supervisor & Facility Manager notification

- The injured employee or an employee nearby will either alert the Supervisor or Plant Manager using a facility or cellular phone.
- As the injury necessitates first aid shall be administered immediately. The supervisor will notify immediately the Plant Manager, and a speed boat will be called to transfer the injured employee to nearest hospital for treatment.
- In parallel the supervisor / plant manager will contact the injured employee's designated emergency contact person.
- Once the injured employee has been transported to the hospital, the reporting and investigation procedures will begin.

b- Minor Injuries – In Plant Medical Attention Necessary:

Required: Supervisor or Manager Notification

- Either the injured employee or an employee nearby will alert the supervisor who will then perform first aid if necessary. After first aid is performed the employee will be instructed to go to the break room.
- If hospitalization is required the supervisor or assignee will order speed boat to transport injured employee to the nearest hospital.
- Should the employee's injury require to go home however, are incapable of transporting themselves a supervisor or assignee will transport the employee. An employee injured on the job is entitled to all benefits following employment contract / GOM regulations in that regards.

First Aid

The first aid kit in the First Aid area is equipped to cover basic first aid needs. All first aid cases must be referred to facility management.

The Plant Manager is responsible for:

1. All in-house first aid treatment;
2. The maintenance of adequate first aid equipment;
3. Decisions concerning case referral to the hospital in coordination with the facility personnel; and
4. Ensuring that emergency calls are made immediately when required.

Accident Reports

- Immediately following a work-related injury requiring more than first aid, or a work-related illness, Occupational Injuries and Illnesses form is completed. This form lists the name of the employee, department and description of the illness or injury.
- Whenever there is an injury which requires medical attention a WAMCO Accident Report is completed. The report includes accident description, preventative actions taken, witnesses, equipment involved, unsafe conditions which led to the accident, other factors which contributed to the accident, and recommendations and comments to avoid similar accidents to happen again. A copy of the Accident Report will be sent to the MEE's focal point / project manager within 24 hours of the incident.
- Unsafe conditions which lead to any accident in the facility are to be immediately corrected to prevent further accidents / injuries. The administration of first aid will be recorded and maintained for all incidents.
- After an accident occurs and reports are completed an investigation by the plant manager will follow.

Occupational Health & Safety Committee

It is highly recommended the establishment of Occupational Health and Safety Committee (OHSC). The HSC main objective is to ensure facilities are safe and healthy working conditions for the staff. The main functions of the Committee include but not limited to the following:

- Research and analyze hazards;
- Make suggestions to eliminate hazards;
- Accident investigations and suggest preventative measures;
- Provide safety training and maintain training records;

During the monthly facility meetings held, health and safety committee members (if different from facility meetings members) shall be invited to discuss related issues. Frequency of addressing these issues can vary according to facility size and needs and can be as frequent as weekly. It is recommended to have it weekly at the Regional Facility level and on monthly basis at Islands level.

Personal Protective Equipment (PPE) Policy

PPE policy is one of the most important policies that have to be in place, given it protects staff from injuries / hazards at work. Rule of thumb, the best way to avoid hazards and minimize injuries at waste management facilities in general, is by wearing at all times the PEE gear.

WAMCO requires all employees to wear PPE at all times while in facilities areas. Specific PPE and training will be issued for non-routine, maintenance, or specific work / tasks identified as hazardous by WAMCO.

PPE gear includes the following:

1. Hard Hats;
2. Safety Glasses/Goggles;
3. Ear Plugs/Muffs;
4. Dust Masks;
6. Gloves; and
7. Safety Footwear

Operator's Licenses

No employee shall be allowed to operate any equipment, plant, vehicle or machinery without prior specialized training conducted by licensed operator (national or international). Such trained staff shall be utilized by WAMCO as specialized trainers who will carry out / conduct training to other Colleagues / staff throughout the Country.

Periodical training shall be given to those trained operators as recommended by Manufacturers in case of new developments, updates, etc. to ensure the trained operators are up to date with new information, procedures, processes, etc.

Blood-borne Pathogens Policy

WAMCO shall have in place blood borne pathogens policy which mandates all staff working in close proximity to waste to have all necessary vaccinations, which are renewed as needed at WAMCO's cost.

Fire Fighting

- 1- Every employee is responsible for reporting a fire. A fire witnessed inside the facility or any buildings on WAMCO managed facility must be reported immediately to a supervisor. If the fire is located in the employee's work area it should be reported to his immediate supervisor. The supervisor is responsible for calling emergency and notifying the Plant / facility Manager.
- 2- Only under the plant manager, or facility manager's discretion, will trained personnel proceed to extinguish and control the fire. This procedure will continue until the fire is extinguished, fire personnel arrive or fire becomes uncontrollable. If, in the opinion of management, the fire is beyond safety limits all personnel will be evacuated from the facility.
- 3- Given that this subject is of utmost importance, a thorough report needs to be prepared, policy and standard operating procedure developed and required training is given. These will include but not limited to the following:
 - a. Fire Alarm and Evacuation Procedures
 - b. Firefighting Equipment
 - c. Firefighting equipment Inspection
 - d. Plant-Wide Training Program
 - e. Fire Evacuation Safety Plan
 - f. Fire Equipment Location Log
 - g. Portable Fire Extinguishers Inspection and maintenance Guidelines
 - h. Automatic Fire Detector Requirements
 - i. Responsibility staff
 - j. Fire Alarm Inspection Procedures
 - k. Emergency Evacuation Procedures

Appendix 11 Survey Maps of Bathymetry, Vegetation Line, Shoreline & Drone Map

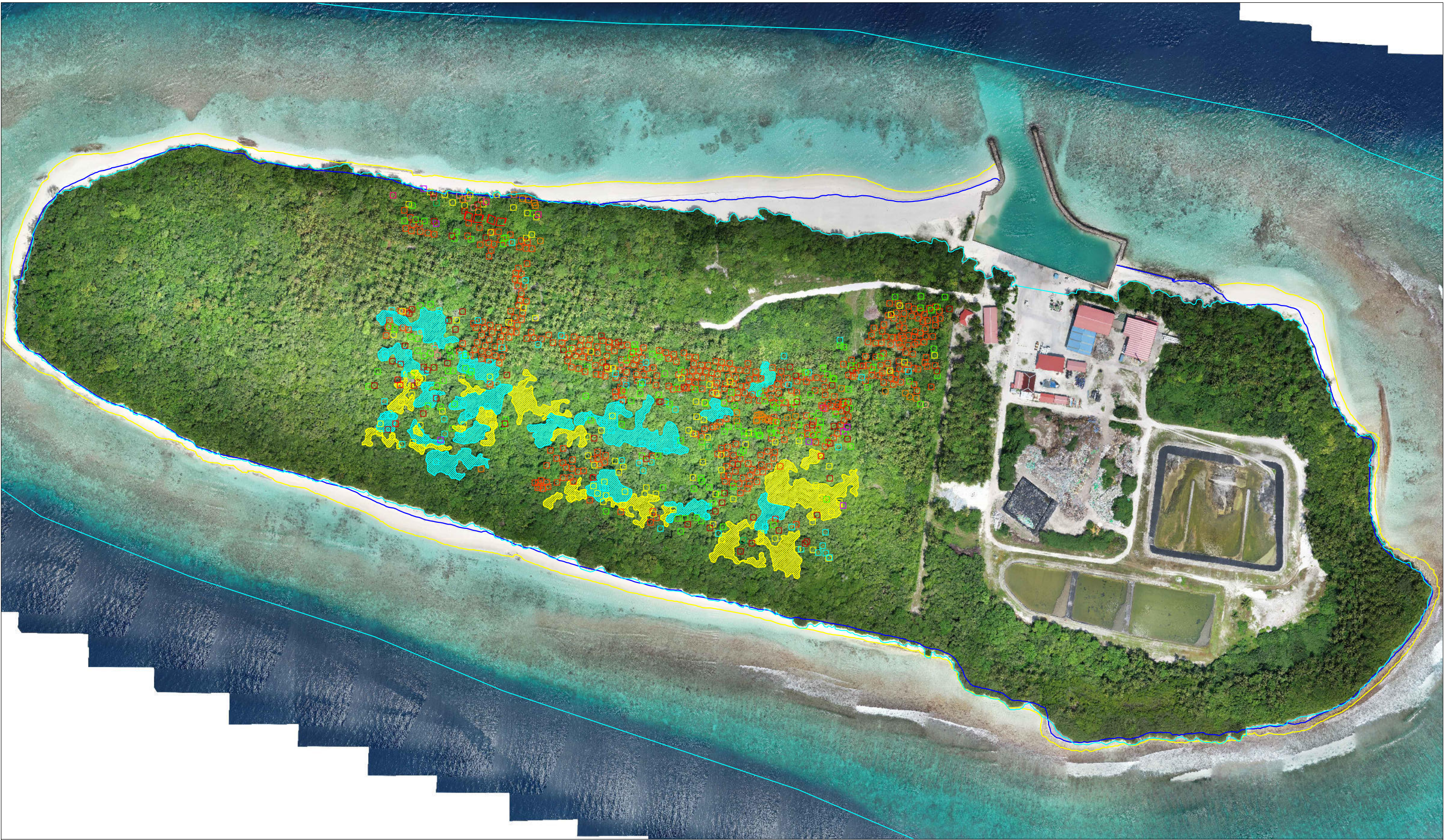


R.VANDHOO SHORELINE SURVEY AND GEO-REFERENCED DRONE IMAGE

ADMINISTRATIVE INFORMATION

ATOLL NAME	RAA
ISLAND NAME	R.VANDHOO
PLACE NAME	VANDHOO WASTE MANAGEMENT FACILITIES





R.VANDHOO TREE SURVEY

ADMINISTRATIVE INFORMATION

ATOLL NAME	RAA
ISLAND NAME	R.VANDHOO
PLACE NAME	VANDHOO WASTE MANAGEMENT FACILITIES

LEGEND:-

- Pandanus tree

■

Coconut palm

■

Sea hibiscus

■

Corkwood
- Sea lettuce

■

Country Almond

■

Nit pitcha

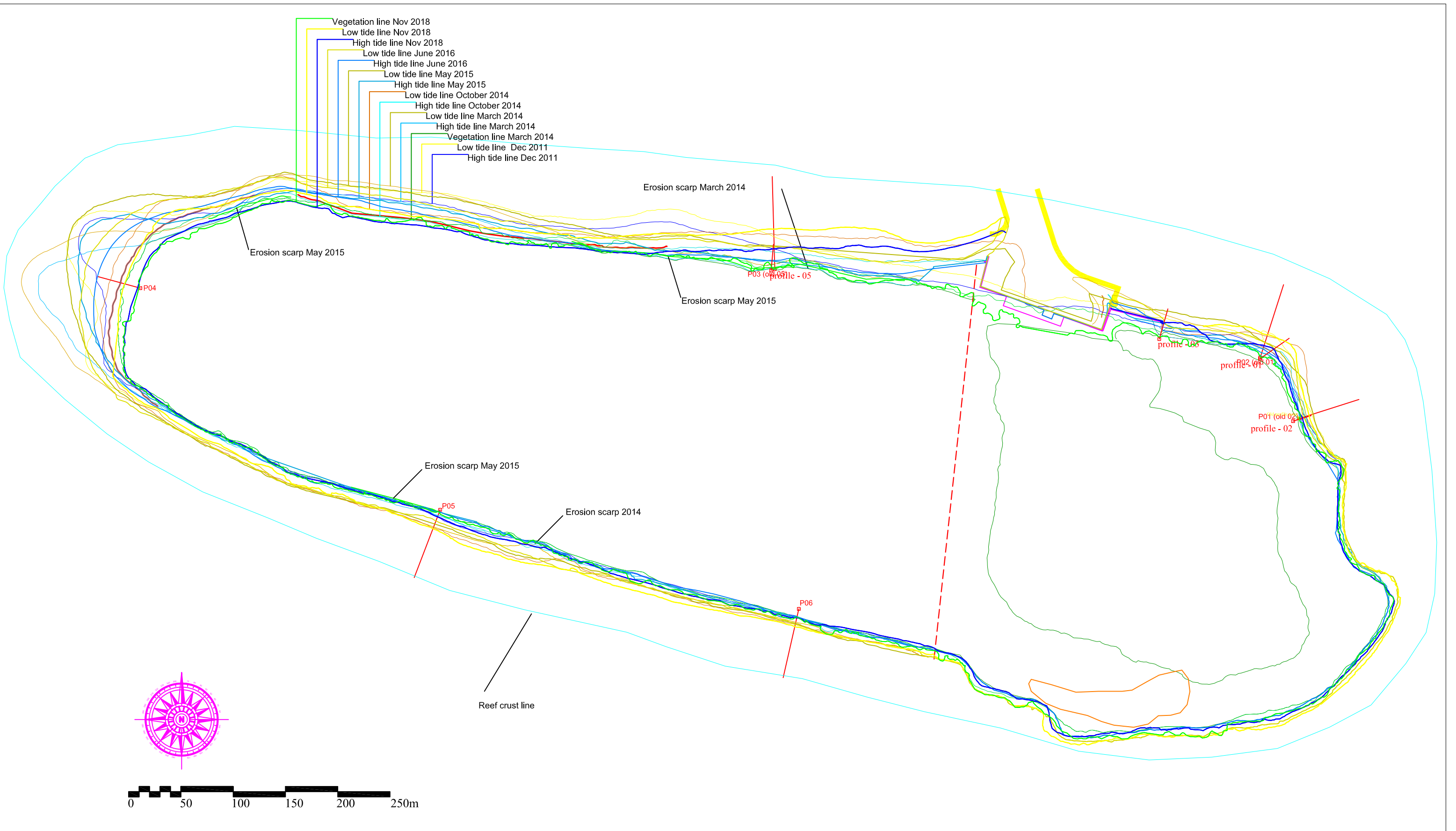
■

False Elder
- Alexander laurelwood

■

Banyan tree





R.VANDHOO SHORELINE COMPARISON MAP

ADMINISTRATIVE INFORMATION

ATOLL NAME	RAA
ISLAND NAME	R.VANDHOO
PLACE NAME	VANDHOO WASTE MANAGEMENT FACILITIES

Low tide line October 2014	High tide line May 2015
High tide line October 2014	Low tide line May 2015
Low tide line March 2014	High tide line June 2016
High tide line March 2014	Low tide line June 2016
Vegetation line March 2014	High tide line Nov 2018
Low tide line Dec 2011	Low tide line Nov 2018
High tide line Dec 2011	Vegetation line Nov 2018



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

Appendix 12 Complete List of Coral Species Observed During Survey Period

Complete list of coral species observed during the surveys done for the 2014 monitoring survey and the 2018 ESIA survey, across all reef sites.

Coral Genus	RS1		RS2		RS3
	2014	2018	2014	2018	2018
Acropora (Digitate)	0	0	0.26	0.25	0.50
Astreopora	1.80	0	0	0	0.13
Echinopora	0.78	0	0	0	0
Favia	5.90	0.38	0.26	0.88	0.25
Favites	1.01	0.63	1.54	0.63	1.13
Fungia	0	0.13	0	0	0.25
Galaxea	0.26	0	0	0.13	0.38
Goniastrea	2.05	0.50	2.30	0.13	0.88
Goniopora	0	0.13	0	0	0
Leptastrea	0.51	0	0	0	0
Leptoria	2.05	0	0	0	0
Lobophyllia	0.26	0	0	0	0
Montipora	2.06	0	0.25	0	0
Oxypora	0.26	0	0	0	0
Pavona	1.54	0	0	0	0
Platygyra	0	0	0.79	0	0
Pocillopora	5.88	0.38	1.55	0.38	1.00
Poritres (Branching)	0	2.88	0	0.38	0
Poritres (Massive)	35.71	49.75	34.68	29.13	7.25
Psammacora	0	0.13	0	0	0
Symphyllia	0	0	0	0	0.38
Turbinaria	0	0.13	0	0	0

Appendix 13 Water test Reports of MWSC

WATER QUALITY TEST REPORT
 Report No: 500181055

Customer Information:

Land & Marine Environment Resources
 H.Azum
 Ameenemagu
 Male' MALE

Report date: 27/11/2018
 Test Requisition Form No: 900186412
 Sample(s) Received Date: 22/11/2018
 Date of Analysis: 22/11/2018 - 26/11/2018

Sample Description	Vandhoo R1	Vandhoo R2	Vandhoo R3	TEST METHOD	UNIT
Sample Type	Sea Water	Sea Water	Sea Water		
Sample No	83201918	83201919	83201920		
Sampled Date	16/11/2018	16/11/2018	16/11/2018		
PARAMETER	ANALYSIS RESULT				
Physical Appearance	Clear with particles	Clear with particles	Clear with particles		
Total Suspended Solids	<5 (LoQ 5 mg/L)	<5 (LoQ 5 mg/L)	<5 (LoQ 5 mg/L)	Method 8006 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L
Turbidity *	0.162	0.156	0.165	HACH Nephelometric Method (adapted from HACH 2100N Turbidimeter User Manual)	NTU
Nitrogen Ammonia	<0.02 (LoQ 0.02 mg/L)	0.03	0.03	Method 8038 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L
Sulphate *	3550	3400	2850	Method 8051 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L
Phosphate *	0.26	0.10	0.08	Method 8048 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L

Keys: mg/L : Milligram Per Liter, NTU : Nephelometric Turbidity Unit

Checked by



Aminath Shahidha
 Senior Laboratory Technician

Approved by



Mohamed Eyman
 Assistant Manager, Quality

Notes: Sampling Authority: Sampling was not done by MWSC Laboratory

This report shall not be reproduced except in full, without written approval of MWSC

This test report is ONLY FOR THE SAMPLES TESTED.

~ Information provided by the customer

*Parametres accredited by DAC under ISO / IEC 17025:2005

***** END OF REPORT *****

WATER QUALITY TEST REPORT
 Report No: 500181056

Customer Information:
 Land & Marine Environment Resources
 H.Azum
 Ameenemagu
 Male' MALE

Report date: 27/11/2018
 Test Requisition Form No: 900186412
 Sample(s) Received Date: 22/11/2018
 Date of Analysis: 22/11/2018 - 26/11/2018

Sample Description	Vandhoo BE	Vandhoo BW	Vandhoo W	TEST METHOD	UNIT
Sample Type	Ground Water	Ground Water	Ground Water		
Sample No	83201921	83201922	83201923		
Sampled Date	16/11/2018	16/11/2018	16/11/2018		
PARAMETER	ANALYSIS RESULT				
Physical Appearance	Pale yellow with particles	Pale yellow with particles	Pale yellow with particles		
Total Suspended Solids	285	82	<5 (LoQ 5 mg/L)	Method 8006 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L
Nitrogen Ammonia	0.03	0.46	0.06	Method 8038 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L
Sulphate *	<10 (LoQ 10 mg/L)	<10 (LoQ 10 mg/L)	270	Method 8051 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L
Phosphate *	0.10	0.12	0.22	Method 8048 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L
Zinc	0.05	0.02	0.04	Method 8009 (Adapted from HACH DR5000 Spectrophotometer procedure Manual)	mg/L

Keys: mg/L : Milligram Per Liter

Checked by



Aminath Shahidha
 Senior Laboratory Technician

Approved by



Mohamed Eyman
 Assistant Manager, Quality

Notes: Sampling Authority: Sampling was not done by MWSC Laboratory
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 ~ Information provided by the customer
 *Parametres accredited by DAC under ISO / IEC 17025:2005

***** END OF REPORT *****

Appendix 14 List of Stakeholders Consulted



Ministry of Environment
Maldives Clean Environment Project

Meeting Attendance Sheet

Subject: R. Vandhoo ESIA Consultation Meeting

Date: 19th December 2018

Venue: Green Building, Ministry of Environment

Time: 10:30

Room: Auditorium

#	ORGANISATION	NAME	DESIGNATION	CONTACT NUMBER	ID CARD No.	E-MAIL ADDRESS	SIGNATURE
1	N. Atoll Council	Ali Zafir	Council President	7779736	A207317	ali.zafir@gmail.com	
2		Hawwa Zahira	Asst. Project Officer	9748999 / 7707025	A246439	hawwaz999@gmail.com	
3	R. Atoll Council	Ahmed Mohamed Waheed	Council Member	7742968	A123266	ahmedmohamedw@gmail.com	
4		Fathuhulla Ismail	Director General	9794867	A092543	fathuhullaismail@gmail.com	
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Environmental Impact Assessment Report for upgrading of Infrastructure at Regional Waste Management Facility Zone 2,

Raa Vandhoo

Stakeholder Consultation Meeting

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Environmental Impact Assessment Report for upgrading of Infrastructure at Regional Waste Management Facility Zone 2,

Raa Vandhoo

Stakeholder Consultation Meeting

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Appendix 15- Turtle Management Plan

Prepared by the Maldives Environmental Management Project (PMU) of the Ministry of Environment.

Sea Turtle Management Plan

Regional Waste management Facility at Vandhoo, Raa atoll



July 2014

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Introduction

This management plan is developed in order to provide a clear strategy and an action plan protecting turtle nesting beach at Vandhoo that has been declared as protected since 2006 under the Presidential Decree protecting all five species of sea turtles in the Maldives. It is the intent of this management plan to provide a balance between the needs of residents and visitors and threatened and endangered sea turtles.

Five of the world's eight remaining sea turtle species--the Green, Hawksbill Loggerhead, Leatherback, , and Olive Ridley are found in coastal waters of Maldives. Two of these species, Green and Hawksbill nest in the Maldives.

Sea turtles spend most of their lives in the ocean, feeding in sea grass beds, and other shallow coastal areas. Almost all the islands, where there is less human interference are reported with some level of nesting. Several types of human activities can interfere with nesting activity and the ability of hatchlings to find their way into the islands. Despite the protection of sea turtle in various forms from export ban to harvesting ban has been imposed long time ago, as early as 1980s. Despite this harvesting of adults and collection of eggs for local consumption is ongoing. Vandhoo has been historically regarded as an important nesting ground for hawksbill turtle nesting. A Regional Waste Management Facility construction project has been approved by the Government of Maldives with IDA financing by WB despite the island beach has been declared as protected by Ministry of Fisheries and Agriculture. The developments especially coastal developments at Vandhoo are likely to cause impact on turtle nesting. Increased human activity due to operation of the facility is also likely to cause some impacts.

To address these problems a turtle management plan has been proposed in the ESIA report that has been approved by EPA of Maldives and environmental safeguard division of WB.

The objective of this management plan is to provide a framework for implementing management action as follows

1. Protection and preservation of the beach within the boundary of the project area
2. Control access to the beach
3. Total stop on egg harvesting
4. Provide public education and outreach programs to nearby community and public in general
5. Strict enforcement of existing legislations of turtle protection
6. Control beachfront lighting

This plan addresses light management measures, public outreach, enforcement and additional activities which impact sea turtle nesting. The purpose is to prevent interference with sea turtle nesting habitat while addressing public safety concerns.

Status and Distribution

Of the eight species of sea turtles, five are known to occur in the Maldives. They are:

- Green turtle (*Chelonia mydas*);

- Hawksbill turtle (*Eretmochelys imbricata*);
- Olive Ridley turtle (*Lepidochelys olivacea*);
- Loggerhead turtle (*Caretta caretta*) and
- Leatherback turtle (*Dermochelys coriacea*).

Green turtle (*Chelonia mydas*)

Green turtles (velaa) are found throughout the archipelago. Confirmed nesting from several atolls of Maldives was reported by Frazier et al (1984). Adults as well as immature turtles are found throughout the archipelago.

It is difficult to estimate the population size due to the dispersed nature of nesting beaches. The islands are relatively small, scattered and isolated, making them difficult to monitor. There are very scanty data relevant to nesting in the country. Nesting spoors observed indicated several hundred turtles nest yearly (Frazier et al., 1984). Turtle statistics compiled by MOFA (1988-2008) provide an annual summary of turtles nesting and caught in the country. The data are incomplete, and where Olive Ridleys occur they are likely to be lumped with Green turtles.

Available information indicates more nesting in the north and eastern side of the archipelago (Frazier et al., 1984). Evidently there are more reported nesting islands in the north than south of the country. Analysis of incomplete turtle data indicates that in terms of the number of islands used for nesting the north of the archipelago is the most important region. However the numbers of nesting females and egg counts (reproductive activity) are much greater in the south.

Hawksbill turtle (*Eretmochelys imbricata*)

Hawksbill turtles forage and nest throughout the Maldives. Turtles of all sizes are found throughout the archipelago. As for *Chelonia mydas*, data available for *Eretmochelys imbricata* are inadequate. Nesting evidently occurs in all atolls. The number of nesting reported was over 18,400 between 1988 and 1995 (EPCS/MOFA, 1996). The number of turtles caught for the same period was over 14,500. Total numbers are believed to have decreased in recent years (Frazier et al., 1984; Didi, 1993).

Nesting occurs throughout the archipelago. Nests are made in the same areas as those of *C. mydas*, and are concentrated on the narrow stretches of beaches from the beach crest to approximately 10m inland.

Olive Ridley (*Lepidochelys olivacea*)

No nesting has been reported, nor have any gravid females been seen (Frazier et al., 1984). No particular season has been reported for these turtles to be more frequently observed. However, within the Maldives as a whole they appear to be commonest offshore (Anderson and Waheed, 1990; Ballance et al., 1996). They also appear to be much more common in the north of Maldives than in the south.

In summary, within the Maldives, Olive Ridleys are not known to nest; they are commonest offshore and in the north; and (from the only four specimens measured) they are sub-adults. It seems likely therefore that the Olive Ridleys that do occur in the Maldives may be migrants from the major nesting areas in the northern Indian Ocean, such as India (Orissa) and/or Pakistan.

Loggerhead turtle (*Caretta caretta*)

This species is very rare in the Maldives. There is only one confirmed record of the Loggerhead turtle in the Maldives: a female specimen with a carapace length of 76cm, photographed by Hassan Didi in 1981 (Frazier et al., 1984).

No information is available on population structure, population size, breeding or feeding biology in the Maldives.

Leatherback turtle (*Dermochelys coriacea*)

This species is rare in Maldives. However, it is recognized locally as a distinct species and is known as “musimbi.” The descriptions given by local people who have seen it are distinctive: large size (>1m length) with ridges down the back.

On local accounts, sightings of this turtle are rare. A person of more than 60 years of age who lived on Gaadhoo (Laamu Atoll), one of the best turtle nesting islands, had never seen a musimbi (Frazier et al., 1984). Each of the few people who have seen this turtle has seen no more than one.

No quantitative data are available for population structure, population size, breeding and feeding biology.

Legislation

The Ministry of Fisheries and Agriculture has statutory responsibility for the rational and sustainable management of all living marine resources within the Exclusive Economic Zone (EEZ) of the Maldives.

A number of legislative actions in the Maldives have been undertaken specifically for marine turtle conservation. The parliament passed the first such bill (No. 24/78) on 6 February 1978, prohibiting the capture of Hawksbill turtles under two feet (61cm) in carapace length and other turtles less than two and half feet (76cm) carapace length. Bill no. 31/79 prohibited the export of any unprocessed product of Hawksbill turtles; while the export of processed ornamental jewelry made from tortoiseshell was permitted. In conjunction with the Bill no. 24/78, the then Ministry of Fisheries released a circular (by-law) banning the sale and display of turtles below the size limit specified in the Bill. This regulation became effective from 1 April 1980.

The most recent legislative measure to conserve turtles came into effect from January 2006, as an extension of a previous 10 year moratorium which ended in June 2005. This decree came into effect under section 10 of Fisheries Law no. 5/87.

Management Strategies

At present there are three major controls on the exploitation of sea turtles in the Maldives:

1. A ten-year ban on the catching or killing of sea turtles in the country, from June 1995.

2. Extension of first moratorium (1995-2005) for another 10 years (2006 -2016)
3. 14 priority nesting beaches protected under 2006 to 2016 moratorium (see below)
4. A ban on the importation of turtles and turtle products into the country, starting August 1995.
5. A ban on the sale of turtle and turtle products in the country, starting January 1996.

Institutional arrangements

The Ministry of Fisheries and Agriculture (MOFA) is legally responsible for the conservation of sea turtles in the Maldives. The present level of trained people available in the Marine Research Centre (MRC) of MOFA is inadequate to carry out a countrywide conservation and awareness programs.

International collaborations

Maldives has been engaged in sea turtle conservation and management efforts in the international community and multilateral organization. As such Maldives has been engaged with FAO and IUCN with their regional efforts (Indian Ocean) on conservation and management of Turtles. The most important effort is Maldives becoming a signatory to IOSEA MOU in 2010 as 31st member to the group. IOSEA MOU though legally not binding is an effort by member countries to reverse the negative impacts faced by sea turtle species in the Indian Ocean and South East Asia Region. Maldives is not yet party to Convention on Migratory Species (CMS) which also covers sea turtles.

Habitat protection

The recent ban on catching of sea turtles for 10 years does not include a ban on collection of turtle eggs from all nesting beaches. The exploitation of eggs still continues.

The Maldives as yet has few marine reserves as conservation areas except a few protected dive sites. It is important to protect the already identified nesting beaches from exploitation. It is therefore important to develop management plans for the protected nesting beaches for management and conservation measures to be effective. To that end, efforts are made from the relevant institutions to impose a nation-wide ban on egg harvesting.

Important nesting sites

Although turtle egg harvesting is legal generally in the Maldives, 14 islands are legally protected under the 10 year moratorium that became effective from January 2006 (Table 1). Eleven islands are designated as protected beaches effective January 2006. Protection of three islands, Gan, Gaadhoo and Kandoodhoo became effective January 2007.

Table 1 Egg harvesting (take) banned islands in the Maldives since 2006.

Island	Atoll	Status
Gan	Gaaf Dhaal	Uninhabited/Agricultural
Kandoodhoo	Tnaa	Inhabited
Gaadhoo	Laam	Inhabited
Miriyandhoo	Baa	Uninhabited
Muiree	Haa Dhaal	Uninhabited/Agricultural
Maamaduvvaree	Baa	Uninhabited/agriculture
Funaddoo	Thaa	Industrial
Vaikaramuraidhoo	Haa Dhaal	Uninhabited/Agriculture
Maaddoo	Baa	Uninhabited
Kanimeedhoo	Thaa	Uninhabited/Agriculture
Furaveri	Raa	Resort
Mulidhoo	Haa Alif	Uninhabited/Agriculture
Olhugiri	Baa	Uninhabited/ Protected Area
Vandhoo	Raa	Industrial/Regional Waste Management Facility

National level threats to sea turtles

Direct take of eggs and turtles

Despite the ban on harvesting of sea turtles in 1995 (nation wide) and harvesting of eggs from specific islands (see table 1) under a moratorium for 10 years that became effective in 2006 there is little effort on enforcement. Hence, considered as a delicacy and also a traditional food eggs and turtles are readily taken on nesting beaches. Nesting seasons and sites, as well as feeding areas, are well known to the local fishermen and other folks.

Increased Human Presence

All the islands in the Maldives are state owned. Traditionally, islands that are not inhabited (no permanent settlement) are 'leased' (a traditional form locally called 'varuvaa') to local people where only coconut harvesting, crop farming and turtle egg harvesting etc. However, human populations are growing rapidly and this expansion is exerting increasing pressure on island resources. Although there are over thousand islands in the archipelago increased lease of islands for recreational and commercial use (tourism and non tourism purpose) are posing pressure on beaches.

Coastal Construction

Due to the small size of the islands, tourist hotel development and some infrastructure are often on the beach affecting nesting habitat to such activities (e.g., beach and shoreline control activities such as breakwater, revetments and groynes), beach recreation, and other forms of disturbance to turtles.

Construction-related threats to sea turtle nesting beaches, from beach armoring activities can result in lack of access to such areas, in the erosion of adjacent sandy beaches. Clearing and stabilizing beach sediments and beach vegetation (which accelerates erosion); and the use of heavy construction equipment on the beach, which can cause sand compaction or beach erosion are other impact areas negatively affecting sea turtle nesting.

Beach nourishment is becoming a common requirement in one island, one hotel resort concept tourism development in the Maldives. The nourishment or replacement of beaches diminished by seawalls, storms, or coastal development can reduce sea turtle hatching success by deeply burying incubating eggs, depositing substrate often not the same on the beach change sediment characteristics affecting the incubation of sea turtle eggs. Obstruction to females coming ashore to nest by machinery, pipeline may also be a potential problem

Nest Predation

There are no large predators of turtles from landside as there are no such animals in the Maldives Therefore; loss of eggs to non-human predators is not problem in the islands of Maldives. Domestic animals, such as cats, as well as wild species such as rats, birds, and crabs can be a problem.

Artificial Lighting

Artificial lighting on the beaches especially tourist resort islands are of the increase and have potential problem to both nesting adults and hatchlings. Hatchling sea turtles find their way to the sea using a sophisticated suite of cues primarily associated with ambient light levels. Hatchlings become disoriented and misdirected in the presence of artificial lights behind their hatching site. These lights cause the hatchlings to orient inland, whereupon they fall prey to predators and die of exhaustion or exposure in the morning sun. Nesting adults are also sensitive to light and can become disoriented after nesting, heading inland and then dying in the heat.

Beach Mining

Sand and coral rubble use to be removed from beaches of inhabited islands for construction purposes. Beach sand mining is currently banned mainly due to the vulnerability of island shorelines to erosion from changing climate and associated effects. The extraction of sand from beaches has the potential to destabilize the coastline (e.g., reduces protection from storms), removes beach vegetation through extraction or flooding and, in severe cases, eliminates the beach completely. When mining occurs on or behind a nesting beach, the result can be the degradation or complete loss of nesting beach.

Exotic Vegetation

Non-native vegetation has the potential to overgrow and displace native beach vegetation through shading and/or chemical inhibition. Dense new vegetation shades nests, potentially altering natural

hatchling sex ratios as temperature of the sediment where the nesting pits are located determines sex. Thick root masses can also entangle eggs and hatchlings.

Disease and Parasites

There are no data to understand extent to which disease or parasites affects the sea turtles or eggs in either wild or captive. It is noteworthy to know only a couple of captive hatching and grow out (head start) efforts to rehabilitate sea turtles in the country.

Fisheries related mortality

There used to be active fishing of sea turtles some 50 years back by using lead sinkers with hook. This practice is now rare and few. Accidental catch in fisheries is virtually nil. The dominant fisheries by gear are pole and line and hand lines. Long line fisheries for tuna are limited to license offshore fishing. There are no data available if any are accidentally caught (direct eating of bait targeted for tuna). Mortality associated with entanglement in active and abandoned fishing gear has not been documented. Incidental entanglement of Olive Ridley turtles on net attachments associated with Fish Aggregating Devices (FAD) deployed by Ministry of Fisheries has been reported. But the numbers and frequencies of such incidents are not appropriately reported and documented. Significant numbers of Olive Ridley turtles entangled in 'ghost nets' have been reported from the Maldives indicating the level of threat to sea turtles due to presence of these nets in the coastal water of Maldives that's are not locally sourced but from coastal margin countries of Indian Ocean.

Predation from sea

Marine predators are of large sharks, can consume a full-size sea turtle. Predation on hatchlings is can be relatively high and, the animals most often implicated are coastal and sharks, pelagic fish and seabirds.

Extreme weather events

There are no extreme weather events such as hurricanes and cyclones recorded in the Maldives. However, strong weather events such as tropical storms, and associated waves can play a role in changing the shape and size of the beaches. In addition, Indian monsoon related seasonal changes in current patterns could change beaches, degrading turtle nesting habitat, and change adult and hatchling turtle movements on affected beaches.

Threats at Vandhoo

Vandhoo has been identified as an important nesting beach among other several beaches after review of sea turtle egg harvesting data collected by MOFA. As a result Vandhoo was included among 14 islands where egg harvesting is formally banned since 2006. However, lack of appropriate enforcement, monitoring and surveillance it is believed egg harvesting continued.

15 hectares of land including beach from Vandhoo (38 hectares) has been officially allocated for setting up a Waste Management Facility for the region where Vandhoo is located. The rest of the island (23 hectares) is allocated for industrial used and outside of the control of Waste Management Facility. The entire beach of the island has been surveyed in February 2012 to estimate the nesting intensity. Although there was evidence of past nesting in the upper shoreline there was not very much nesting of recent times. Recent nesting was recorded on the northern side beach of the island. It was estimated that less than 10 individuals nest annually. This survey revealed and visual observation lead to conclude there is still egg harvesting going on whenever there is nesting. This is also verified by the information collected through the discussion with community members of nearby island who visit Vandhoo to collect eggs. According their feedback Vandhoo used to be a popular egg-harvesting site several years back but the number of eggs and nesting they see currently has significantly reduced.

With this information and direct observation it is safe to say that direct take of eggs despite the small amount they can take still continue to be the most important threat to the existing nesting turtles at Vandhoo. There is anecdotal information that direct take of adults can also be a significant threat.

Environmental awareness and education is an integral part of this management plan. It is evident that there is little public awareness of the local community in terms of the need for turtle conservation. Informed public can be a powerful force in promoting the protection of sea turtles, and in endorsing and seeking to support sustainable choices made by the RWMF.

Implementation of the plan

Outlined activities of the management plan are given in Tables 2. The table provide specific focus areas of the management plan, their conservation requirement and specific management action that shall be taken with their priority level, responsibility agency and scheduled time/

Table 2. Detailed action plan proposed for protection of beach and nesting adults and eggs.

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
1. Nesting environment	1.1 Protect and manage turtles and eggs on nesting beaches of the island especially beach within the boundary of RWMF	1.1.1 Eliminate directed take of turtles and their eggs	1.1.1.1 Reduce direct take of eggs and adults through monitoring and surveillance since WMF will not have direct public access (controlled by security).	High	RWMF, MEE and MoFA to monitor	From construction phase and continued through during the entire operation phase
			1.1.1.2 Reduce directed take of turtles through public education and information - Education of the public as to the value of conserving sea turtles is a very effective way of sustaining recovery efforts and providing support for enforcement of management regulations. Raise awareness of the nearby island (e.g. Innamaadho, Rasmaadhoo) as they frequent to the rest of Vandhoo. Advocate to follow the management direction proposed for RWMF	High	MEE, MoFA to prepare	Priority awareness in 2015-2015 and continuous
		1.1.2 Increase enforcement of laws protecting turtles by	1.1.2.1 Increase enforcement of protective laws protecting turtles by law enforcement and the courts. - Lack of	High	MEE and MoFA working in association	Priority awareness in 2015-2015 and

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
		law enforcement by the courts.	adequate support for law-enforcement activities, which protect sea turtle populations, is common, yet it must be understood that enforcement is as important as any other resource management activities. Enforcement, judicial, and prosecutorial personnel must receive instruction about sea turtles and the importance of protecting turtle populations.		with prosecutors and island magistrates	continuous
		1.1.3 Ensure that coastal construction activities avoid disruption of nesting and hatching activities - Coastal construction must be monitored to minimize impact on turtle beaches, both during construction, particularly during the nesting and hatching season and in the long-term.	1.1.3.1 Construction equipment must not be allowed to operate on the beach, remove sand from the beach, or in any way degrade nesting habitat. Nighttime lighting of construction areas should be prohibited during nesting and hatching seasons or a non-intrusive lighting system should be put in place. In the long-term, structures should not block the turtle's access to the beach, change beach dynamics, or encourage human activities that might interfere with the nesting process. Monitoring their activities as well as putting a physical barrier such as a fence containing them within the facility area should manage movement by facility workers.	Medium (no beach construction except harbour basin)	EPA and MoFA to monitor	Should be completed by end 2014

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
			Ensure that no beach lights are erected on the beach. Harbor front lights shall be appropriately designed and set			
		1.1.4 Reduce effects of artificial lighting on hatchlings and nesting females - Because sea turtles (especially hatchlings) are strongly attracted to artificial lighting, lighting near nesting beaches should be placed in such a manner that light does not shine on the beach. If not, turtles may become disoriented and stray from their course.	1.1.4.1 Implement, enforce, evaluate lighting regulations or other lighting control measures where appropriate - Shielding of the light source, screening with vegetation, placing lights at lowered elevations and in some cases the use of limited spectrum low wavelength lighting (e.g. low pressure sodium vapor lights) are possible solutions to beach lighting problems.	High	EPA and MoFA to monitor Project engineer to ensure the requirements in place by the contractor during construction Facility manager to ensure implementation of actions during operations	2014 and Continuous
		1.1.5 Collect biological information on nesting turtle populations - The collection of basic biological information on nesting is critical for	1.1.5.1 Monitor nesting activity to determine number of nesting females, and determine population size Nesting beaches identified by standardized surveys during the nesting season.	High	MEE and MoFA to monitor using experts	Initially 5 years as priority (to establish status and trends. If there is rehabilitation

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
		making intelligent management decisions. Monitoring nesting success can help to identify problems at the nesting beach or elucidate important areas for protection. Analyzing population recruitment can help in understanding population status.	Establish long-term monitoring of annual nesting on the beach using standard methodology. Because of long maturity times for turtles, quantifying trends in population sizes and effectiveness of any program may take a generation time to be reflected in the annual numbers of nesters. Monitoring should thus be recognized as a long-term undertaking.			potential biological monitoring shall be continuous.
			1.1.5.2 Evaluate nest success and implement appropriate nest-protection measures. One of the simplest means to enhance populations is by increasing hatchling production at the nesting beach. The first step to such an enhancement program is to determine the nesting / hatching success and to characterize factors which may limit that success. Once those limiting factors are determined, protection or mitigation measures can be implemented. If nests must be moved to prevent loss from erosion or other threats, natural rather than artificial incubation should be employed.	High	MEE and MoFA to monitor and take actions using experts	Initially 5 years as priority (to establish status and trends. If there is rehabilitation potential biological monitoring shall be continuous.
	1.2 Protect and manage nesting habitats - The nesting habitat must be	1.2.1 Prevent the degradation of nesting habitats caused by sea	1.2.1.1 Eliminate sand and coral rubble removal and mining practices on nesting beaches - Beach mining severely affects a	Medium (No sand mining anticipated)	EPA and MoFA to monitor MEE to	NA

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
	protected to ensure future generations of the species. Increased human presence and coastal construction can damage nesting habitat resulting in reduced nest success or reduced hatchling survival. Once key nesting beaches are identified, they may be secured on a long-term basis in an assortment of ways. These may include conservation easements or agreements, lease of beaches, and in some cases, fee acquisition. Certain beaches may be designated as natural preserves. In some cases education of island users may serve to adequately secure nesting beaches.	walls, revetments, sand bags, other erosion-control measures, jetties and breakwaters	nesting beach by reducing protection from storms, destroying native vegetation directly or indirectly and may completely destroy a nesting beach. Protective legislation and public education must be used to protect the substrate of the beaches.		conduction education programs	
		- Beach armoring techniques to protect beachfront from wave action may actually degrade nesting habitats by eroding beaches and preventing nesting by preventing access to nesting sites or preventing digging of the nest on the site. Guidelines on the proper placement of such structures must be proposed. Jetties and breakwaters	1.2.1.2 Develop beach-landscaping guidelines which recommend planting of only native vegetation, not clearing stabilizing beach vegetation and evaluating the effects as appropriate - Non-native vegetation may prevent access to nesting sites, prevent adequate nest digging, exacerbate erosion or affect hatchling sex ratios by altering incubation temperatures. Native vegetation, however, plays an important role in stabilizing the beach and creating the proper microclimate for nests.	Medium (No non native vegetation are included as part of landscaping. Natural Vegetation buffer (50m wide) around the facility is maintained	RWMF operator, MoFA with MEE	NA
		impede the natural movement of sand and add to erosion problems in neighboring beaches. Regulations regarding	1.2.1.3 Ensure that beach replenishment is compatible with maintaining good quality nesting habitat - Sand on sea turtle beaches has particular properties, which affect hatching success (ie. compaction, gas diffusion, temperature). Any addition or replacement of sand may change these	Low (no beach replenishment is planned, natural shoreline is maintained except	MoFA	NA

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
		beach construction and beach armoring should be reviewed to ensure that such measures are restricted if adverse impacts to nesting are anticipated.	properties and make it more difficult for females to nest or reduce hatchling success. As such, beach replenishment should be carefully considered, use materials similar to the native sands and be carried out outside the nesting season.	harbour basin and associated revetments.		
			1.2.1.4 Implement non-mechanical beach cleaning alternatives - Hand raking of beach debris, rather than using heavy machinery, should be encouraged on nesting beaches where cleaning is done for aesthetic reasons. The use of heavy machinery can adversely affect hatchlings directly and their nesting habitat.	Low (no beach cleaning is planned). Any debris associated with construction cleared as it is produced. No operational debris is anticipated.	EPA and MoFA to monitor Implemented by the construction contractor and facility operator	NA
			1.2.1.5 Prevent vehicular driving on nesting beaches - Driving on active nesting beaches should be forbidden. Vehicles cause destabilization of beaches, threaten incubating nests and leave tire ruts that hatchlings have difficulty crossing. The facility areas should be demarcated with a fence.	Low (No vehicle driving is anticipated on the beach. Vehicle operation shall be restricted to	EPA and MoFA to monitor Construction engineer to ensure it is part of the designs and facility operator	NA

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
				daytime.	should ensure maintenance of the fence	
2. Marine environment	2.1 Protect and manage turtle populations in the marine habitat - Protection of turtles in the marine environment is a priority that is often overlooked as enforcement is difficult and quantification of the issues are generally problematic. However, 99% of a turtle's life is spent at sea; thus, conservation and management must include significant efforts to protect turtles at that time.	2.1.1 Eliminate directed take of turtles	2.1.1.1 Reduce directed take of turtles through public education and information - While increased law enforcement will be effective in the short term, without support of the local populace, regulations will become ineffective. Education of the public as to the value of conserving sea turtles is a very effective way of sustaining recovery efforts and providing support for enforcement of management regulations.	High	MoFA with MEE to conduct education programs	Continuous
			2.1.1.2 Maintain the enforcement of protective laws on the part of law enforcement and the courts - One of the major threats identified for turtle populations is the illegal harvest of turtles both on the nesting beach and in the water. Rigorous efforts in law enforcement should be undertaken immediately to reduce this source of mortality. Such efforts need to include training of enforcement personnel in the importance of protecting turtles, as well as supplying such personnel with adequate logistical support (boats,	High	MoFA	Continuous

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
			communication and surveillance equipment etc.). Judges and prosecutors must also be educated in the importance of these matters.			
		2.1.2 Determine distribution, abundance, and status in the marine environment - Lack of accurate information on distribution and abundance was one of the greatest threats to sea turtle populations. Most existing information is anecdotal or obsolete and where new information is available, it uniformly indicates that populations are vastly smaller than commonly believed. Therefore, gathering of basic information on distribution and	2.1.2.1 Determine the distribution and abundance of post-hatchlings, juveniles and adults - While little is known about the distribution of nesting beaches for the turtles across Maldives, even less is understood about distribution of foraging adult and juvenile populations. Quantitative surveys of foraging areas to determine abundance, and to identify essential habitat are of significant importance for restoration of populations.		MoFA	2014-2020 and continuous
			2.1.2.2 Determine growth rates and survivorship of hatchlings, juveniles, and adults, and age at sexual maturity - Understanding the rates of growth and survivorship of turtle populations is crucial to the development of appropriate population models. Such models are important in understanding population status and how best to efficiently apply management efforts, in restoring depleted populations.		MoFA	NA (no hatchery planned at the facility)
			2.1.2.3 Identify current or potential		MoFA	2014-2020

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
		abundance should take a very high priority in the long-term conservation of the turtles.	threats to adults and juveniles on foraging grounds - Little is known about threats to foraging populations.			
		2.1.3 Reduce the effects of entanglement and ingestion of marine debris - Entanglement due to abandoned or unmonitored fishing gear, as well as the ingestion of man-made debris such as solid waste is a significant problem in the marine environment.	2.1.3.1 Evaluate the extent to which turtles ingest persistent debris and become entangled - Once the problem of marine debris has been identified and quantified, it is important to implement (and enforce) a program to reduce the amount of debris in the marine environment,. The MEMP solid waste management program in the Northern Province once is full operation is expected to remove this problem		EPA, MoFA and MEE to monitor	NA (part of long term program beyond the scope and funds available for this project)
		2.1.4 Protect and manage marine habitat, including foraging habitats – Hawksbills are primarily pelagic, although they often enter nearshore waters. Human activities, which	2.1.4.1 Identify important marine habitats - These areas are unknown for this species and represent a high priority research need.		MoFA	Continuous
			2.1.4.2 Ensure the long-term protection of marine habitat - Once marine habitats are identified, sea turtle range, refugia and foraging habitats need to be protected to ensure longterm survival for the species.	High	MoFA	Continuous

Focus area	Conservation requirement	Management Actions		Priority	Responsibility	Timeline
		degrade important habitat, must be limited.	Habitats identified as important or critical should be designated as marine sanctuaries or reserves, while others may require close monitoring. The public needs to be educated on the importance of preserving these habitats.			
			2.1.4.3 Prevent the degradation of marine habitat caused by environmental contaminants such as sewage and other pollutants - The effect of such pollution on turtles has not been evaluated. However, turtles are likely prone to concentrating such contaminants within their tissues because of their position in the food web.	High	MoFA	Continuous
			2.1.4.4 Prevent the degradation or destruction of important habitats caused by coastal erosion and siltation - These processes, often made worse by large coastal construction, disrupt vital trophic processes, reducing productivity and reducing species diversity. Minimum water standards entering the sea must be maintained. Land-use decisions must take this into account and associated projects where erosion and siltation occur must be monitored.	High	MoFA with the support of EPA	Continuous

Control access to the beach

With the current operation setup the island is accessible to the general public. Access to the island is restricted where facility security personnel will seek access to the island. Staff and facility operator will have access to the beach. To restrict access to the beach the management of the facility shall set boundaries (restricted) to the beach as given in Figure 1. The primary area marked in the figure is most important areas where access to the beach shall be strictly controlled. Vegetation buffer can act as a natural fence restricting access to the beach. Secondary area is less important with less access restriction.

Total stop on egg harvesting

Stopping harvesting of eggs where there are any nesting in this area shall be a priority. If nesting occur the nest shall be demarcated or marked for monitoring purpose. Information on emerging hatchlings, hatching success shall be documented as given in Table 2.

Public education and outreach programs

Public involvement ranges from influencing legislation and policy to volunteering (monitor and protect nests, report sightings or infractions, etc.) and donating to conservation causes. Raising public awareness of the plight of sea turtles is crucial to sea turtle survival. Perhaps the most important aspect of public education and outreach is that informed community are likely to be more responsive to and accepting of the various conservation actions taken by the project and various elements of turtle conservation efforts.

Ministry of Fisheries and Agriculture in association with Ministry of Environment and Energy and Environmental Protection Agency can develop a variety of informative programs on sea turtles and the local environment for the enjoyment and intellectual stimulation of the community especially adolescents and school children. These programs can be tailored to meet the needs and desires of the community including child-friendly activities. In addition printed material, audio visuals on turtle biology, laws, and other management action interested groups from the community such as members of environmental clubs, school children can even experience direct encounters with sea turtles on turtle nesting, turtle tracks" which availability of such opportunity when it arises in Vandhoo in partnership with trained local experts (conservation groups, government environmental officers. Such field visits can even focus on nesting turtles and can focus on nesting turtles or emerging hatchlings. In the case of hatchlings, students may be asked to participate directly in hatching survival by forming a line that shields the tiny turtles from disorienting.

Enforcement of existing legislations of turtle protection

This is a general but an important requirement for management program to be a success. Although part of Vandhoo is restricted to public under its current operation (RWMP area) the rest of the island and beach has public access. It is important egg harvesting (violation at Vandhoo) if it happens if there is evidence the law is enforced provided there is evidence that can be proved at court of law. Police and magistrates at local level should support and be proactive in enforcement of conservation related laws.

Control beachfront lighting

Beach lighting is already limited to the harbor area. Management should identify that existing harbor lights are set as turtle friendly.

Proposed boundaries of Management Plan



Additional information for ESIA report for upgrading of infrastructure at regional waste management facility zone II, Raa Vandhoo

ENVIRONMENT – Comments from Task Team

1. The ESIA has identified the need for management of the buffer zone and designation of additional areas as part of the Vandhoo Turtle Management Plan, these recommendations need to be incorporated in to the management plan and updated according and implemented in parallel by WAMCO under the supervision of the MEE and EPA, this includes the installation of appropriate signage as per the plan and monitoring over time.

PMU- This is already on-going. A Turtle Conservation sign board has been prepared and installed in Vandhoo RWMF. Similar boards will be developed and placed to demarcate the green buffer zones as well as the wetland area.

2. All recommendations on RWMC operations, along with ancillary facility operations need to be used to update the Vandhoo RWMC operational ESMP and this should be resubmitted to the Bank for review.

PMU- This will be done as confirmed by the PMU.

3. The Bank strongly agrees with the recommendations made by the EPA to redesign the ancillary facilities within the existing facilities to ensure the buffer areas along the island and managed as much as possible. For all site clearances adequate compensatory planning in other parts of the Island must be undertaken. The PMU has confirmed that the recommendations have been taken up by WAMCO and the MEE already and redesigning has taken place, these should be included in the final ESIA once comments are addressed.

PMU - It is not possible to undertake all of the 2:1 replantation in Vandhoo due to limited availability of barren land. However, road sides will be utilized for this purpose as much as possible.

Consultant - The consultant has recommended to replant removed coconut palms to the buffer area, on either sides of the roads as well as at the barren area shown on Fig 44 of the report as a mitigation measure. Additionally, relocation of palms to nearby inhabited islands was also recommended. Potential inhabited islands include R. Dhuvaaafaru and B. Eydhafushi. The minimum height of palms which could be relocated is 6 m, there is no maximum specified height, however, it is highly recommended to relocate younger palms.

4. While the ESIA indicates that the existing sewage and waste water management system will suffice for the construction influx, it has not been evaluated in detail the need for a sewage treatment and management system on site, it is not clear how the current treatment will be able to suffice with are larger influx of workers to the site during expanded operations and this will be essential and needs to be part of the proposed activities. It is recommended the team explores options such as composting toilets and other such environmental sound management options available which will be suitable for the site as it may be more cost

effective and the ESIA needs to detail out the current mechanisms of treatment and if it is suitable as well.

PMU- The contractors will not be based in R. Vandhoo. They will be accommodated in neighboring Innamaadhoo and Rasmaadhoo island. Daily transport to and from these islands will be arranged by the PMU. On site temporary huts will be developed by the contractors to be utilized as resting areas and storage of construction materials in a space shown by ME and WAMCO. Current proposed location for this is the area between the existing accommodation block and the Dhiraagu antenna. The existing toilets and showers in the facility will be made accessible to the contractor for daily use.

5. It is recommended that the ESMP be worded in a compliance and action-oriented manner to facilitate the contractor and operator to ensure sound implementation. The guidance provided in the World Bank Group Environmental Health and Safety Guidelines for SWM Facilities (WBG EHS) guidelines presented in Annex 12, Annex 10 and the attached Generic EMPs shared with the PMU, on 8th June 2018 on construction of ancillary need to be used as the main sources of guidance to outline mitigation measures for specific operational impacts that will be identified for the ancillary constructions. These should be used when the ESMPs are being updated and the ESMP.

PMU - The mitigation table presented in Table 29 of the Report is already in table format and done in an action-oriented matter. The PMU will however, recommend the consultant to distinguish between primary and secondary responsible parties as several parties have been mentioned specific to each activity.

Consultant - Revised mitigation table (Table 1) with defined primary and secondary responsible parties is presented in Appendix 1 of this report.

6. The ESMP needs to present mitigation measures and recommendations for onsite traffic management in order to ensure that the construction works, and any associated vehicular movements do not clash with the operations of the facility as both will happen in parallel. While the PMU has confirmed that overall safety signage will be procured for the site the ESMP should recommend the required signage and provide examples of best practice safety and vehicular movement standards to be used.

Consultant- Mitigation measures for road traffic is given in revised Table 29 in Appendix 1 of this document (Table 1)

7. An onsite traffic management plan for construction must be prepared and the staff on site should be briefed of its content. There should be clearly defined and non-conflicting plans for works to be conducted during operations set up, construction areas should be fenced out to operational staff and proper safety signage should be used.

PMU - Refer to comment number 4 for site setup arrangement. The PMU will also hire a site supervisor to oversee the works undertaken by contractors and manage potential conflicts. The supervisor will also be assigned the responsibility to ensure contractors implement the ESMP.

Consultant - Mitigation measures for road traffic is given on revised Table 29 on Appendix 1 of this report.

8. The ESMP appears to miss some of the key social elements while focusing more on the environmental aspects.

PMU- This is a general statement made. Social issues relevant to the project are discussed in the report. Environmental safeguards are emphasized as they directly impact the outcome of the project.

ENVIRONMENT- Comments from RSA

9. Executive Summary: this section should contain the summary main elements of ESIA such as ESMP, impact analysis, institutional arrangement, project components, stakeholder consultation etc. they are currently missing in the section.

Consultant- Please refer to Appendix 2 for revised Executive Summary

10. Condition of existing facility is analysed in Section 2.4. Please explain how the identified issues will be addressed in the project or outside of the project by PIU, WAMCO or Ministry of Environment.

PMU- The issues will be addressed as follows:

- *Lack of offloading facility – The capacity of the harbour will be increased and upgraded through government funds. ME has received funding for this from the local government budget and will be initiated after taking the required environmental permits from EPA. The ESIA addendum will be shared with World Bank since this will be a linked project.*
- *Temporary storage capacity is too low - this will be addressed through the current upgrading project through the extension of waste processing bunker 1, construction of additional waste storage bunkers etc.*
- *Lack of component storage space- this will be addressed through the current project as mentioned above.*
- *Technical issues - this has not been addressed at the time of the preparation of the referenced report (Mostafa, 2018). However, a qualified site engineer is now in Vandhoo, trained by Michealis, so this issue has been resolved.*
- *Shortage of staff - new staff have been recently recruited to Vandhoo including 10 laborers and 2 utility officers, while recruitment process has been initiated for 2 engineers and 3 drivers. These staff are sourced from neighboring islands, Inamaadhoo and Rasmaadhoo to which daily ferry services are provided by WAMCO. The issue of limited availability of on-site accommodation will be addressed through the current project.*

- *Delay in waste collection - WAMCO has temporarily suspended receiving waste from Zone 2 islands until the end of April 2019, to manage the stockpiled waste at the facility as well as to make the island communities aware of the standard for packaging waste that are accepted at the RWMF. The guideline developed by WAMCO specifies the type of waste accepted and not accepted at Vandhoo RWMF and gives information on how it has to be packed / processed at island level prior to regional transfer. A copy of this is given in Appendix 3 for reference.*
11. Upscaling of the existing RO plant is planned in the project. Please explain how to reduce, treat and discharge RO concentrate to mitigate the impacts associated with concentrate discharge into ocean.
PMU- This has already been covered in the report. Please refer to page 7-105 which mentions that sewer outfall will be extended beyond the reef edge and the area where outfalls are constructed is a high mixing zone therefore it is classified as a minimal negative change and BEI of page 9-113.
12. Please include a section to explain the Safeguard Policies triggered for the project. Section 3.10 should be World Bank requirement not IFC.
PMU and Consultant - Refer to page 39 of the ESAMF that covers safeguards policies triggered for MCEP and reflect this in the supplementary document. Section 3.10 is revised to align with WB requirement.

Revision of section 3.10

3.10 WB Safeguard Requirements

The World Bank has a number of Operational Policies (OPs) and Bank Procedures (BPs) concerning environmental and social issues, which together are referred to as the Bank's Safeguard Policies'. If, during the development of a project, it is considered that it is possible that a proposed project activity could be the subject of one of the safeguard policies, that policy is considered to have been "triggered"(ESAMF, 2016). As such, WB Safeguard Policies triggered for this project are summarized below:-

3.10.1 Environmental Assessment (OP/BP 4.01)

As per the scope of the MCMP, the project is categorized as an Environmental Category A in relation to environmental assessment (EA) requirements, and the project triggers the Environmental Assessment safeguard policy (OP/BP 4.01)(ESAMF, 2016).

While the overall project is environmentally beneficial, physical interventions to establish a sound SWM system will lead to significant environmental impacts and need to be stringently mitigated and managed within the context of the project (ESAMF, 2016).

An Environmental and Social Assessment and Management Framework (ESAMF) will serve as a roadmap outlining the prerequisite environmental and social screening and assessments that will need to be undertaken for all project activities, as per the national environmental

legislations of the Maldives and the Bank's OP4.01 and other triggered safeguards policies. The ESAMF will apply to all components of the project. All subsequent individual assessments ESIAs/ESMPs will be prepared by the client and submitted for bank approval before any civil works and/or land take (ESAMF, 2016).

3.10.2 Natural Habitats (OB/BP 4.04)

OP/BP 4.04 – Natural Habitats was triggered because all of the country's islands are surrounded by coral reefs which are significant natural habitats. The overall project will not conduct any activities within designated protected areas and project interventions will facilitate in mitigating pollution and degradation of such ecosystems due to inappropriate SWM. Adequate measure to screen, identify and mitigate any potential impacts to coral reefs, island vegetation and associated fauna and flora will be included in the ESAMF. As the current practices of SWM are detrimental to natural habitats, the proposed actions will help the project islands manage solid waste better and reduce the negative impacts associated with waste generation (ESAMF, 2016).

3.10.3 Involuntary Resettlement (OP/BP 4.12)

OP/BP 4.12 – Involuntary Resettlement was triggered because it was considered that some of the potential investments, for example the construction and expansion of IWMCs, could lead to future chance find of involuntary loss of crop, land taking as a small percentage of communities rely on surrounding land for agriculture and livelihood. These issues have been taken into consideration whilst developing the ESAMF. The screening protocols and mitigation guidelines outlined will ensure that any interventions considered in future will not cause involuntary resettlement. As an 'insurance' for this issue, an outline Resettlement Policy Framework (RPF) has been provided in the ESAMF, so that if any resettlement issues should arise they can be resolved satisfactorily. All subsequent individual social assessments, including ESIAs/ESMPs, will be prepared and by the client and submitted for bank approval before any civil works and/or land take (ESAMF, 2016).

13. According to a turtle nesting site survey, the nesting pits were observed all around the island rather than confined in the turtle conservation area specified in the Masterplan. Please give the analysis on the loss of turtle nesting sites and propose the concrete measures to minimize, reduce, mitigate and compensate such habitat loss.

PMU - This ESIA should be read like an addendum or supplement to the ESIA of R. Vandhoo RWMF (NIRAS, 2012), which was approved by the World Bank and the Maldives EPA prior to establishment of the facility through World Bank funded MEMP project. The only reason for preparing a separate ESIA for the upgrading works was because 5 years has passed since the approval of original ESIA which is the permissible limit for application to an Addendum as per local EIA regulation of the Maldives. The issues highlighted here is addressed in the 2012 ESIA and reflected in the STMP which is actually a part of the original ESIA, but has been referenced here also for further information.

14. Please explain the operational flow from receiving the wastes to waste disposal and how to treat and discharge leachate from the landfill. Please also clarify the emission/discharge

standards to be applicable to the emission from incineration and leachate discharge, and ambient quality for air, surface water, soil and groundwater etc.

PMU - Refer to what has been stated in response number 13. Incinerator and other associated facilities have already been developed (completed in 2015) through MEMP and is extensively discussed and covered in the ESIA of R. Vandhoo RWMF (NIRAS, 2012) including emissions standards and ambient air quality of neighboring islands. Filters and scrubbers were incorporated into the system design. Please refer to the original ESIA. It is also covered in Operational ESMP of Vandhoo RWMF (Zuhair, 2018), also approved by the World Bank.

15. Consultation: There are many concerns raised through consultation meetings. Please add the response to each issue raised to explain how to address them. Section 6.6 notes that the most of these issues will be addressed but please clarify which issues will be addressed through the project and through the ministry of environment, WAMCO or other parties, and which issues would remain unresolved.

Consultant - Refer to Appendix 4 for recommended solutions to issues raised during consultations.

16. Through the consultation, the potential livelihood impacts due to the loss of access to forest resources in Vandhoo were also identified. Please explain how the potential livelihood impacts will be mitigated/compensated.

PMU - The site was decided during the time of MEMP and not through the current project. The livelihood issue mentioned would have been discovered during the initial project as well. This was revisited and discussed with ME and WAMCO during stakeholder consultation through the current ESIA, however, both parties recommended not to allow islanders to freely access the facility-based island due to security concerns as well as concerns of potential increase in illegal harvesting of hawksbill turtles and their eggs.

Consultant - As identified in Table 2 (Appendix 4) It is recommended to make Vandhoo accessible to the women of neighboring islands on a certain day of the week decided by WAMCO or fortnightly at a designated time for collecting coconut leaves. Alternatively, WAMCO can collect coconut leaves and bring it to the harbour on a certain day of the week / fortnightly so that interested parties from neighboring islands can come at their own boats to collect.

17. As suggested in the comments from EPA, A contingency plan for the project should be prepared to respond to the potential emergency situation. The key requirements of a contingency plan should be explained in ESIA, and more detailed plan should be prepared by the contractor and operator.

PMU-

As mentioned in the ESIA, the contingency plan is included in the Operations and Management plan of WAMCO prepared in 2018 for Vandhoo RWMF.

The master plan has been revised according to the comments from EPA as well to incorporate the issues highlighted by the consultant in the ESIA. The updated master plan is attached in Appendix 7 of this report. The changes are detailed below:-

1. *Guest and consultant accommodation block have been relocated to southwest side of the island adjacent to the proposed staff accommodation area. Only a 2.4m wide walkway will provide access from the staff accommodation area to the guest and consultant accommodation block.*
 2. *The width of the road is reduced to 10m by taking out the proposed green zone and side walk from one side of the road.*
 3. *Route of the roads have been revised consistent to figure 43 of the ESIA report. As such, the main road will not extend up to the staff accommodation area, instead a 3m narrow connecting road will provide access to this area.*
 4. *The connecting road to 11F and 14A where a banyan tree is located will be deviated in future to protect this tree. The banyan tree has been clearly marked in the MP, while the subject road will not be developed during this phase of the project.*
18. Sea Turtle Management Plan is attached to ESIA. Please explain in the ESIA main text who is the owner of the plan and how to implement the plan and monitor implementation. Multiple parties such as MoFA, EPA, RWMF and MEE are responsible for the management measures. The plan was agreed among those responsible parties? Please include the budget to implement the plan and how the budget will be secured. Implementation, coordination and monitoring mechanism should be also explained.
- PMU - As explained before, this plan is not a new thing, it's part of the original Vandhoo ESIA (NIRAS, 2012), as such, the recommended buffers etc have already been maintained. As the operator of the facility STMP will be implemented by WAMCO. ME and the project will assist to further strengthen implementation of STMP like preparing sign boards for the extension areas and conducting awareness session for staffs.*
19. Mitigation measures (Table 29)- Please add the potential impacts and mitigation measures etc. for the following aspects:
- Soil erosion and ocean pollution due to the construction activities
 - Air pollution and noise generation because of the incinerator and landfill operation.
 - *Soil erosion was not identified as a potential impact due to the proposed upgrades to RWMF at Vandhoo since no shoreline developments are proposed.*
 - *Ocean pollution is expected to be negligible as the only possibility of ocean pollution is during material transfer. Since no construction activities will be conducted near the shoreline, construction waste is not expected to make its way into the ocean. Moreover, as the facility is a waste management facility, all waste generated during construction*

will be handled within the island itself. Nevertheless, mitigation table on Appendix 1 of this report is updated to reflect this.

- *As mentioned above, the incinerator is already developed and air quality issues are extensively discussed and covered through the original Vandhoo ESIA (NIRAS, 2012). The incinerator is not a part of the upgrading works and hence is not included in the scope of works of this ESIA.*

20. The budget to implement ESMP (Proposed measures in table 29) should be costed and included in the project cost.

PMU - The ESMP will be implemented by different contractors. The bidders will be requested to consider implementation of the ESMP during cost calculations when preparing bid documents. The PMU would like to highlight that this is outside the scope of the works of the consultant. As mentioned, the TOR of the ESIA was approved by the safeguards team of the world bank, in addition to EPA. Hence, we feel that bringing this at this stage is not practical.

21. Institutional arrangement, and supervision and reporting mechanism are missing in the document. Please explain.

PMU- Requested WB for further clarification on this.

22. **Environmental issues of existing facilities.** The ESIA has identified several environmental and health issues associated with existing operation of Regional Waste Management Facility such as improper segregation of waste, incompatibility of waste with the incinerator, leachate ponds filled with rainwater, etc. it is not clear whether these issues will be addressed through the proposed Project and ESMP is silent on these issues.

PMU - Refer to response number 10. In addition to this, a sorting line will be purchased through the project. Once the international incinerator specialist is selected (process already initiated according to PM), the specification for sorting line will be developed and advertised.

23. **Respiratory diseases in workers associated with the incinerator.** Currently, the ESMP is mainly focused on the proposed project facilities but not on the issues related to the existing facilities such as incinerator. For example, it is written that the health of the workers was affected by the operation of the incinerator, however “since any works related to the incinerator is not in the scope of the proposed upgrade, these will not be discussed in further detail” (Section 7.3.2). This is not the correct approach. The ESMP should also discuss the issues associated with the existing operation of incinerator.

PMU - As explained earlier this document should be read as an addendum to the original Vandhoo ESIA (NIRAS, 2012). The impacts associated with the incinerator has already been covered through the original ESIA. The proposed works are for the extension of the facility to cater for the limitations identified in operations such as increasing the waste storage capacity and on-site accommodation capacity of the facility. Health and safety measure have also been covered further in the operational ESMP (Zuhair, 2018).

24. **Air Pollution Control System for the incinerator.** The ESIA has predicted that the operation of the incinerator will cause significant air pollution on the Innamaadhoo island that is located about 1.7 km to the north of Vandhoo. The ESIA suggested installing a system with a proper Air Pollution Control system which includes Electrostatic Precipitator and multiple scrubbers, spray – dryer and baghouse or other similar combinations. But none of these recommendations are reflected in the proposed project design and the ESMP.

PMU - This has already been covered through the original ESIA (NIRAS, 2012). All the mitigation measures mentioned have been already implemented. The incinerator has proper air filtration and wet scrubber systems installed through the original project.

25. **Concerns of the communities of nearby islands.** During consultations, the communities have expressed several concerns with the ongoing waste management practices. It is not clear how these concerns are related to the proposed project, and they will be addressed. Please present these concerns in a tabular form and mention how they will be addressed.

The upgrading project is designed to specifically address these issues. For instance, regular waste collection is not happening due to the RWMF not having adequate capacity to store waste. Other community related concerns raised during stakeholder consultation meetings are addressed under point no. 15 and given in Appendix 4 of this document.

26. **Ecosystem services of the Vandhoo island.** Vandhoo island provides several ecosystem services to the nearby island communities through coconut plantations, forestry and recreation. ESMP should propose adequate measures to address the impacts on these ecosystem services.

The RWMF is not accessible to island communities since the commencement of the operations of the facility. Most of the coconut palms that has to be removed for the proposed extension works will be relocated to a nearby inhabited islands like R. Dhuvaafaru and thereby these ecosystem services will be preserved to a certain degree.

In order to still facilitate use of ecosystem services Vandhoo, Vandhoo could be made accessible to the women of neighboring islands on a certain day of the week decided by WAMCO or fortnightly at a designated time for collecting coconut leaves.

Alternatively, WAMCO can collect coconut leaves and bring it to the harbor on a certain day of the week/fortnightly so that interested parties from neighboring islands can come at their own boats to collect.

27. **Standards for Wastewater Discharges (Brine) from the RO Plant.** Please include relevant national or international standards on the quality of wastewater discharges to be maintained from the RO plant. Wastewater discharges shall be monitored to ensure compliance with these standards. Also please refer to the World Bank Group Environmental Health and Safety Guidelines for the relevant standards.

Consultant - There is no standard specified by EPA for discharge water quality for brine (wastewater) from RO plant. However, RO wastewater can be only discharged to the marine environment (seawater) away from reef proper. Moreover, the proposed project proposes a

very small-scale RO plant (50 tons/day), and as water is discharged to an open waterbody at a high mixing zone, it is not expected to have a significant impact on the marine environment. Nevertheless, environmental monitoring plan (Table 30 of Addendum) specifies bi-annual monitoring of seawater quality from different locations around the island, SW4 of which coincides the brine outfall location.

28. **Budget for ESMP implementation.** ESMP has proposed measures such as green belts around the project facilities, the buffer zone around the beaches, fencing around the turtle nesting pits, fencing around the harbour to prevent waste spills moving into the sea, and so on. These are all seems to be high-cost items. Please include the budget for these measures in the ESMP and in the Project to ensure that they can be implemented under the project.

PMU and Consultant - Green belts and buffer zones are already maintained on Vandhoo. The estimated cost of fencing around the harbour is approximately USD 10,000.

29. **Capacity building.** Please include capacity building programs on environmental, health and safety awareness to the project workers.

PMU and Consultant - Capacity building programs have been included as a mitigation measure during operational phase of the project (Table 1 given in Appendix 1 shows the. Revised mitigation table).

30. **Monitoring. Please strengthen the monitoring program.** It should cover all the environmental, health and safety issues identified it in the ESMP matrix.

Consultant- A monitoring component for verifying the level of implementation of the mitigation measures during construction and operational phase, which would cover the health and safety measures, are included in the revised monitoring table (Table 3) in Appendix 5 of this document.

31. **Monitoring Reports.** An annual monitoring report is proposed in the ESMP. The monitoring report should be prepared monthly during the construction period. Please note that the proposed project activities will be constructed over only six months. The monitoring reports should include environmental issues associated with construction activities.

PMU- Monitoring will be done every month during the construction phase and the implementation of the mitigation measures recorded in interim reports, but the final monitoring report of construction phase will be produced at the end of the construction phase as proposed in the ESIA. The interim monitoring sheets can be shared with the bank monthly if required.

SOCIAL- Comments from Task Team

1. 2.2 Land ownership – Last sentence – Shouldn't it be a transfer letter (as opposed to land acquisition)?
PMU- The term "land acquisition" has been used as this was how the process was referred to in the TOR provided to the Consultant. The initial report discusses in detail, how the process is undertaken.
2. 3.10 and 3.10.1 Refers to IFC requirements.
PMU and Consultant- The section has been updated. Please refer to response 12 of environment section of this report.
3. 6.1 Outcomes from previous consultations – Any possibility of summarizing the findings in this report?
PMU - A summary is already provided!
4. 6.2.1 and 6.2.2 Consultations with Atoll Council and adjoining island – Serious issues raised pertaining to lack of consultation or awareness prior to taking over of land that historically belonged to them. Another issue is the loss of income as claimed by the women of the adjoining island.
PMU - This is not applicable to the scope of this project.
5. MITIGATION MEASURES? Section 6.6 seem to indicate that the recommended mitigation measures for the above issues will be described under section 11 of this report. However, the report concludes in Chapter 10. Regardless of the Chapters, mitigation measures for the above issues seem to be missing and should NOT BE CLEARED pending revision.
Consultant- The mitigation of all identified impacts is thoroughly discussed under section 9.1 of the Addendum report. The incorrect Section number was giving due to a typing error.
6. Also, a translation of the land acquisition (or transfer) letter should be attached.
Consultant- Translation of the land acquisition/transfer letter is provided in Appendix 8 of this report.
7. Chapter 9 presents an environmental management plan but not a social management plan – No mitigation measures proposed, for example, to deal with the influx of labor as a result of the expansion (of activities), GRM, facilities for potential women workers – leading to GBV, etc, etc.
PMU and Consultant- Mitigation measures for the social issues are addressed in the revised mitigation table (Table 1 of this document) on Appendix 1. The proposed GRM is provided in Appendix 6.

SOCIAL-Comments from RSA

1. 2.2 Land acquisition. Please clarify the terms of handing the island over to the Ministry of Environment (ME), in particular, timing and access.

PMU- Please refer to the date of the letter. Initially 15 hectares of land from Vandhoo was approved for developing the RWMF (on August 2010), which is the existing footprint of the facility. Later the entire island was handed over to ME for Waste Management activities by the President's Office on 8 March 2017. An English translation of this letter is provided as requested. See Appendix 8.

2. 2.6.2 Workforce during the construction phase. Are workers likely local (within Raa Atoll) or external? Do you have an indication of the number of labor requirement?

PMU- We do not know this at this stage since it depends on the selected contractors.

3. 2.7.2 Human resource plan (during the operation phase). Are the workers likely local or external? Are the skills available locally? Do you plan to train locals to hire as staff?

PMU- We do not know this at this stage since it depends on the selected contractors. There is no issue of local skill shortage in the construction sector. Operation of the facility will be carried out by WAMCO, who employ both locals and foreigners, although their focus is on hiring locals, who will then be trained by them.

4. 3.4 Leasing of Uninhabited Island. What is the handover arrangement for Raa Atoll vis a vis the Law on Uninhabited Island? Will the Council be given an amount equivalent to 2 years worth of payment for lease? Or will it be given back balance of its payment for remaining part of the lease (or Varuvaa) agreement?

PMU and Consultant - The island of Raa Vandhoo is state-owned and is not owned by the Atoll Council even though it is indicated in the report that the island was previously leased to them by MoFT. It is a decision made by the President's Office in 2017 and is outside the scope of this project. The island was allocated free of charge, therefore, compensation will not be required.

5. 4.6 Socio-economic environment or baseline. ESIA should include overall socio-economic baseline of Raa Atoll. Please including overall populations, breakdown by gender, age, and ethnicity, level of education, vulnerable groups, livelihoods, incomes, Raa Atoll council structure and capacity, other local institutions/associations, on-going conflicts (if any), local conflict resolution mechanism, etc. Does the population include migrant workers? If so, how many? Also, indicate gender and sectors in which they are employed.

PMU - As mentioned earlier, a comprehensive ESIA and a Social Assessment was conducted for the original Vandhoo RWMF project, which covers most of what has been mentioned here. As this is only an extension to the original project, we do not think that this has to be again studied and extensively covered in the current ESIA which should be read as an addendum to the original ESIA (NIRAS, 2012). Please refer to the aforementioned documents.

6. 5.7 Socio-economic environment. ESIA needs to discuss the access and use of Vandhoo by Raa Atoll Council residents. It appears the Raa Atoll residents have had access to Vandhoo. What are (or were, since the consultation seems to indicate the residents no longer have access) their access rights, including use of resources (such as coconut leaves, according to stakeholder consultations), fishery (land for boat yard, according to the consultations), leisure (picnic, according to the consultations), etc.? What have been their access rights, and how will (or did) it change after the handover?
PMU- The facility cannot be allowed to use for picnics due to safety and security concerns. As suggested in response number 16 of Environment Section it can be recommended to give limited access to women for the purpose of collecting coconut leaves or WAMCO can collect coconut leaves and bring it to the harbour on a certain day of the week / fortnightly so that interested parties from neighboring islands can come at their own boats to collect. A possible alternative boat building yard is recommended to be developed in Vandhoo RWMF and leased to the boat builders of nearby islands on need basis.
7. 7. Impact assessment. This section also needs to assess the negative social impact, i.e., on loss of livelihoods. What is the income loss? Are there mitigation measures? What are potential alternative arrangements or livelihoods for the loss of resource or land use. How do you monitor the implementation? What are the costs for the implementation of alternative arrangements/livelihoods and monitoring?
Although the decision by the government to hand over the entire island to ME for waste management purpose is outside the scope of this project, we will request the consultant to suggest some social mitigation measures. It is to be noted that not only World Bank funded projects will take place in Vandhoo, and the government plans to implement the masterplan through various funding agencies as well Government funds. Also see response to comment 6 above.
8. Grievance redress mechanism. There is no section on grievance redressal. Please include.
A GRM similar to the bank approved GRM for MCEP specific for this project is attached on Appendix 6 of this report.
9. Appendix 3. Land Acquisition Letter. Can you also include translation in English?
An English translation is provided as requested. See Appendix 8 of this document.

ENVIRONMENT- Comments from RSA (10 June 2019)

1. Executive Summary: Please include ESMP table in Appendix 2

Normally the entire ESMP mitigation matrix is not included in the Executive Summary.

2. Turtle nesting site: The only information provided in the original EIA prepared in 2012 is the following paragraph: “The beach was reported (Turtle nesting reports, MOFA 2006) as a nesting location for hawksbill turtles (*Eretmochelys imbricata*), none observed. It is rumoured that turtle eggs are still collected and consumed in the Maldives, even if forbidden by law.” Since the ESIA for upgrading of Vandhoo RWMF prepared in 2018 recognizes the existence of nesting pits all around the island, the proper analysis on the potential impacts on turtle nesting and necessary mitigation measures should be included in ESIA documents. The information is currently missing.

Please refer to Appendix 15 (page 10-145) of the ESIA 2019 for the Turtle Management Plan. The Turtle Management Plan was originally proposed as part of the Environmental Monitoring Report for the RWMF at Vandhoo, Raa Atoll (Zahir, 2014).

3. Please explain the operational flow from receiving the wastes to waste disposal and how to treat and discharge leachate from the landfill. This information is not found in the original EIA (NIRAS, 2012). The original EIA also states that “chemical treatment is mentioned, and the treated effluent is required to comply with ‘Effluent Standards for Landfill in the US – MSW Landfills.’” The details of the chemical treatment process and applicable standards should be provided.

The operational flow of waste management activities is provided in Appendix 9. Bi-annual testing of effluents at the landfill cells for pH; TSS; Ammonia; Zinc Benzoic acid; Phenols are included in the monitoring programme. Please refer to this.

The standard used for comparison will be “Effluent Standards for Landfill in the US – MSW Landfills” as reflected in table 4 of the WBG EHS Guideline for WM facilities.

Table 4—Effluent Standards for Landfills in the US					
Parameter	Units	Guideline ^c			
		Hazardous Waste Landfills		MSW Landfills	
		Daily Max	Monthly Avg.	Daily Max	Monthly Avg.
BOD ₅		220	56	140	37
pH		6-9	6-9	6-9	6-9
Total Suspended Solids	mg/L	88	27	88	27
Ammonia (as N)	mg/L	10	4.9	10	4.9
Arsenic	mg/L	1.1	0.54		
Chromium	mg/L	1.1	0.46		
Zinc	mg/L	0.535	0.296	0.20	0.11
α -Terpineol	mg/L	0.042	0.019	0.033	0.016
Aniline	mg/L	0.024	0.015		
Benzoic Acid	mg/L	0.119	0.073	0.12	0.071
Naphthalene	mg/L	0.059	0.022		
p-Cresol	mg/L	0.024	0.015	0.025	0.014
Phenol	mg/L	0.048	0.029	0.026	0.015
Pyridine	mg/L	0.072	0.025		
Source: U.S. EPA Effluent Guidelines for Centralized Waste Treatment, 40 CFR Part 437.					

As many air pollution control devices use water for gas cleaning, and generate wastewater that contains the pollutants removed from the flue gas, the following treatment methods are recommended to prevent, minimize, and control water effluents:

- Minimize discharge of process wastewater to the extent possible while maintaining required air emission control;*
- Treat wastewater before discharge (e.g., using settling, precipitation of metals, and neutralization).*

- The potential livelihood impacts due to the loss of access to forest resources in Vandhoo: Two options are “recommended”. However, mitigation measures should be determined and clearly proposed with costs, schedule and responsibility.

The cost for relocating the coconut palms that falls in the proposed roads and accommodation / guest consultant blocks are included within the scope of works of road

construction. As such, palms below 30ft in length that cannot be replanted in Vandhoo will be removed and translocated to the nearby island of Raa Dhuvaafaru for replantation. The estimated cost for road construction including translocation of palms is USD 95,000.

5. The contingency plan is NOT included in the Operations and Management Plan prepared by WAMCO in September 2018. The key requirements of a contingency plan should be explained in ESIA, and the more detailed plan should be prepared by the contractor and operator.

Provided in Appendix 11

6. The adequate response was not provided. Please explain in the ESIA main text the owner of the Sea Turtle Management plan, and how to implement the plan and monitor implementation. Multiple parties such as MoFA, EPA, RWMF and MEE are responsible for the management measures. The plan was agreed among those responsible parties? Please include the budget to implement the plan and how the budget will be secured. Implementation, coordination and monitoring mechanism should be also explained. Original EIA does not include Sea Turtle Management Plan.

The primary responsible party for the implementation of the STMP during the operational phase will be WAMCO as they are the operators of the RMWF. However, the Ministry of Environment (ME) will be responsible for its implementation during the construction phase of the upgrading of infrastructure project, which is covered through MCEP project. In addition to this the project will facilitate in designing and printing of awareness materials such as billboards, flyers, leaflets etc. as well as conducting awareness sessions targeted for the staffs of the facility on turtle nesting sites and conservation through out the cause of the project. A part of the budget allocated for IEC campaign (overall USD 500,000.00) will be utilised for this purpose.

An updated version of the STMP exclusive to the current project is provided in Appendix 10.

7. If all the cost for ESMP implementation should be part of project/engineering cost and the bidder will need to propose such cost for proper ESMP implementation, this should be clarified in the document. PMU has to secure the budget required to the ESMP implementation. In terms of capacity building, in order to maintain the sufficient level of capacity building activities, the cost required for capacity building activities should be indicated.

Implementation of ESMP will be included in the BOQs and subsequently costed in the Bids submitted by the contractors. This is the standard procedure followed by MCEP for all the contracts.

Capacity building for solid waste management is covered through MCEP under component 1.2 for which a total budget of USD 1.97 million has been proposed for both Zone 2 and Zone 4&5. This component has programmes targeted for building the capacity of WAMCO, EPA, ME and Island Councils in waste management. USD 175,000.00 is specifically proposed for increasing waste management capacity at island level, which includes vocational training programmes and training for waste management staffs of the island councils.

8. This comment was not addressed. Please clarify the organizational structure/arrangement responsible for ESMP implementation, monitoring and supervision. Please also clarify what kinds of and how often monitoring/supervision reports will be prepared and submitted to whom.

Primary responsible party and secondary responsible parties, as well as reporting frequencies have been identified for each activity proposed in the mitigation matrix. Please refer to Appendix 1. Revised mitigation table.

9. As proposed in our response in 16, compensation should be given to the affected people for the ecosystem services provided by the Vandhoo island. Compensation methodology should be clarified and finalized.

Please note that the vegetation found at Raa Vandhoo do not belong to any particular individual and is state owned. Therefore, compensation is not required. As specified several times, the ecosystem services will be conserved as much as possible through the translocation of coconut palms to the nearby island of Raa Dhuvaafaru. The estimated number of vegetation for translocation is 70 coconut palms.

SOCIAL-Comments from RSA (10 June 2019)

1. Consultations: appendix 4 has a table showing the issues emerging from consultations and recommendations to address those as well as the responsible authority. Please clarify if these recommendations have been discussed with the relevant parties and as such are the recommendations going to be implemented in practice, since there is not budget or timeline?

Yes. The recommendations given in appendix 4 has been discussed with the relevant people. As mentioned, consultations were undertaken with the boat building communities of Inamaadhoo and Inguraidhoo island.

In regards to budget for implementation such as “providing facilities and equipment required to facilitate proper waste management at island levels by the proponent ME” please note that procurement is already on-going and will be completed before the end of 2019. USD 1 million has been allocated in MCEP for providing equipment to the IWMCs of Zone 2 islands, including waste management equipment, weighing scales and waste collection vehicles.

Likewise, the limitations in operations of the RWMF is also being address through MCEP, which itself is the primary purpose of this infrastructure upgrading project. A budget of USD 3.37 million has been allocated for upgrading the infrastructure at the facility and purchasing additional equipment needed for operations. The storage capacity of the facility will be increased through the project, while the limitations in operations would be resolved through purchasing of a mechanised sorting line, cranes for landing crafts, heavy vehicles for loading and unloading waste, an additional landing craft and a whaler for accessing islands without harbours or with shallow lagoons. The entire project is expected to be completed within a period of 1 year. The equipment will be purchased and delivered before the end of 2019.

An additional column has been added to table 2 given in Appendix 4 to indicated associated cost / budget.

2. Chapter 6 mentions that recommendations were discussed with project unit, but no other parties? For instance, there is a recommendation to ensure women can access the island to gather coconut leaves and husks, which is important for maintaining their livelihood.

The recommendations were discussed with the PMU, WAMCO, the boat building communities and the island councils of the neighbouring islands and has been reflected in the additional information document. Please refer again to the additional information document.

3. Change in resource use is mentioned in table 27 as an impact during operations phase, and revised mitigation table 1 in appendix table 29 only proposes as mitigation that WAMCO collects and sells the resources to people instead of letting them come to the island to do the collection themselves – will this not lower their ability to earn an income when they need to pay for the resources? This activity should also be monitored to ensure livelihoods are not adversely affected by this arrangement.

The revised mitigation table suggests that the coconut leaves are given free of cost to the communities rather than selling. Please refer again.

4. Another livelihood issue is related to plots for boat building or the recommendation to develop such a yard; who will finance/construct this? According to the revised mitigation table 1 in appendix 1, it seems the two communities affected by this are not fully in agreement on where this yard should be located.

The Green Fund of the GoM will finance this. Yes, so based on the consultation only Inamaadhoo community will be given the land for boatbuilding from Vandhoo as Inguraidhoo community wants to continue with what they have been practicing at island at present.

5. Workforce numbers estimates, can you please clarify if the workers are expected to be local or foreign?

This cannot be deduced at this stage. Please note that we will acquire letters from the selected contractors stating that staffs recruited for the project will be employed as per the Employment Act of the Maldives and proof of valid work permits for expatriate workers will be submitted within 10 days of awarding the contract and acknowledging that failure to adhere to these terms will result in the termination of the contract. This will also be reflected in the contract document under conditions of the contract.

6. GRM: in general, a person does not have to exhaust all the tiers of the GRM to access the national judicial system.

This is true.

7. Editorial note: Recommend removing consultants' CVs from the document.

The EIA regulation of the Maldives requires this.

Appendix 1. Revised mitigations table (Table 29 of the Addendum) is provided below. The revised components are in *blue italics*.

Table 1. Measures to mitigate/monitor potential impacts and occupational health risks during the construction and operational phase of the project

Activity	No.	Potential impacts	Mitigation Measures	Location/ Time frame	Monitoring*	Responsibility <i>P:Primary S:Secondary</i>
CONSTRUCTION PHASE						
Fuel storage and fuel dispersal to vehicles	PC2	Accidental spills of hydrocarbon on the island due to storage facility leaks	Construct concrete berms around the tank and fueling areas, install sumps to pump out spilled products, emergency warning spill alert equipment.	Fuel storage tank site/ Prior, during and after construction phase	Groundwater quality as specified in Table	<i>P:RWMF supervisor S: ME, WAMCO</i>
Maintenance and refueling of project support vehicles	PC3	Accidental spills of hydrocarbon on and under the island associated with motorized support-vehicles	Construct concrete line maintenance areas with capacity to collect and use-recycle used hydrocarbons. Ensure proper maintenance of machinery, appropriate workshop facilities, appropriate handling of all waste (store in a safe place for later removal / incineration in the incinerator).	Maintenance areas/ Prior, during and after construction phase	Groundwater quality as specified in Table	<i>P:Construction supervisor S:WAMCO, RWMF supervisor</i>
Laying of brine and sewer outfalls	BE1	Changes in live coral cover and contamination of seawater	Avoid trampling on areas outside of project boundary. Outfall pipes should be properly anchored to prevent pipeline movement, especially to prevent the pipes from drifting to the turtle conservation area.	Reef flat on southside/ during construction phase	Marine environment and seawater quality as specified in Table	<i>P:Construction supervisor S:WAMCO, RWMF supervisor</i>
Construction activities	EO4 EO5	Air pollution and noise impacts	Avoid unnecessary operation of machinery and equipment. Limit use of heavy machinery to project site only. Regular maintenance of machinery	Whole islands/ during construction phase		<i>P:Construction supervisor S:WAMCO, RWMF supervisor</i>
Clearing of vegetation in the project area and guest accommodation	BE5	Vegetation removed from most of the site	Erosion and dust control devices in place prior to construction. Ensure protection of the vegetation buffer zone along the coast (50 m wide) and around the wetland. The buffer should be 70 m in the area where the wetland is found. Coconut palms, if possible, to be moved from the cleared area to the buffer area. Vegetation falling outside project boundary shall not be	RWMF site/ During construction	None	<i>P:ME S:Construction supervisor</i>

			<p>harmd in any way. Coconut palms removed from the construction sites, if not replanted, should be taken to a nearby island and rehabilitated. An alternative option for road widths are described in section 8 in order to minimize the no. of coconut palms to be removed. Plant some of the cleared vegetation on either side of the roads as well as the areas shown on Fig 44 of the report.</p> <p>Beach front guest accommodation blocks are not recommended, instead, allocate guest rooms at the proposed staff accommodation block as discussed under project alternatives section.</p> <p>Few protected banyan trees were identified, one of which falls on a construction plot (Fig 44 of the report). It is recommended to shift the block to avoid the banyan tree. All banyan should be conserved during and operation of the facility.</p>			
Overall construction and operation of the project	BE6	Changes in turtle nesting patterns due to changes in beach areas due to construction, noise and lights	Document the relative importance of the beaches as nesting areas for each turtle species, if considered important, take measures such as infrared lights at night, turtle protection measures. No trespassing signs shall be enacted at the turtle conservation area and the area should not be disturbed by any means. Any exploitation, if reported shall be punished.	Turtle conservation area	None	<i>P:ME S:EPA, Construction supervisor</i>
<i>Road traffic</i>		<i>Risk of accidents as construction works and current operational works will happen simultaneously</i>	<i>Enact traffic signage on the roads where lanes cross over. Set the speed limit at 25 km/hour. Assign different lanes for construction vehicles and operational vehicles. Construction areas should be fenced out to operational staff with proper safety signage. Prior to commencement of construction works, proper onsite traffic management plan shall be prepared and staff on site shall be briefed on its content. Proponent (ME) shall hire a site</i>	<i>Construction site/ During construction phase</i>	<i>None</i>	<i>P:Construction supervisor S:WAMCO, RWMF supervisor</i>

			<i>supervisor to oversee the undertaken by contractors and manage potential conflicts. The supervisor shall ensure contractors implement the ESMP.</i>			
<i>Material transfer</i>		<i>Ocean pollution</i>	<i>Ensure any construction material does not make its way into the ocean. Keep the material properly and securely stocked on the supply vessel/barge.</i>	<i>Ocean transfer route/ During construction</i>	<i>None</i>	<i>Construction supervisor</i>
<i>Influx of laborers (especially foreign) for construction activities to neighboring islands Rasmaadhoo and Innamaadhoo</i>		<i>Social issues</i>	<i>Allocate a staff/ HR manager on each island.</i> <i>Brief the foreigners about the Maldivian culture.</i> <i>Encourage hire of local construction workers from the islands.</i>	<i>During construction</i>	<i>None</i>	<i>HR Manager of contractor</i>
OCCUPATIONAL HEALTH AND SAFETY RISKS DURING CONSTRUCTION						
Dust generated during construction		Worker's health may be affected	Provide masks to the worker where dust is prone in the work area	Site specific	During construction	<i>Construction supervisor</i>
Noise from machinery / construction		Worker's health may be affected	Workers should have protective gear including earmuffs.	Site specific	During construction	<i>Construction supervisor</i>
Work accidents		Worker's health may be affected	Establish and enforce appropriate safety rules and work routines and compulsory use of safety equipment (helmets, protective wear). First aid kit accessible on site, routines for emergencies established and known to all.	Site specific	During construction	<i>Construction supervisor</i>
OPERATIONAL PHASE						
Fuel storage and fuel dispersal to vehicles	PC5	Changes in hydrocarbon concentrations on the island due to possible leaks from storage facilities during operational phase	Construct concrete berms around the tank and fueling areas, install sumps to pump out spilled products, emergency warning spill alert equipment to alert o	Fuel storage tank site/ Prior to, and during operational phase		<i>P:EPA S:WAMCO RWMF supervisor</i>
Maintenance and refueling of project support vehicles	PC5	Changes in hydrocarbon concentrations on the island due to possible motor vehicle leaks and maintenance during operational phase	Construct concrete line maintenance areas with capacity to collect and use-recycle used hydrocarbons. Ensure proper maintenance of machinery, appropriate workshop facilities, appropriate handling of all waste /store in a safe place for later removal / incineration in the incinerator	Maintenance areas/ prior to, and during operational phase		<i>WAMCO RWMF supervisor</i>

Leaching from land-fill to ground water and / or the marine environment	PC4	Changes in groundwater chemistry due to leachates from the waste facility; Impact to the soil and potential groundwater/coastal water contamination	Adhere to the regular monitoring of soil and groundwater for leachates	Soil, groundwater and coastal waters/ During operation		WAMCO
Leakage / overflows from wastewater treatment	BE8	Changes in groundwater chemistry/ flora and fauna due to leachates and effluents from the waste facility	Maintain sufficient storage capacity; Regular monitoring of soil and groundwater for leachates, emergency procedures pre-defined in case of leakage. Maintain scrubbers of the RWMF	Soil, groundwater and coastal waters/ During operation		WAMCO
Wastewater treatment. Leakage from plant or insufficient cleaning of wastewater.	BE8	Contamination of soil, groundwater, seawater causing harm to people, flora, fauna.	Wastewater treatment plant designed to treat sanitary and other waste.	Soil, groundwater and coastal waters/ During operation		WAMCO
Release of brine and sewer wastewater into the lagoon	BE9	Loss of marine habitat, contamination of seawater quality	Treatment of wastewater prior to releasing into the lagoon. Ensure outfall pipes are intact and in place with rigid anchoring. Monitor water quality at the outfall areas and check for optimal range of parameters	During operation	Marine environment and seawater quality as specified in Table	P:WAMCO S:EPA
Operation of fuel farm and power house	PC5	Changes in groundwater chemistry. Risk of accidents.	Construct concrete berms around the tank and fueling areas, install sumps to pump out spilled products, emergency warning spill alert equipment. Follow MNDF's fuel handling procedure. Have emergency oil spill cleanup equipment available.	During operation	Groundwater quality as specified in Table	P:WAMCO S:EPA
Bulk storage of oils and waste oils	EO3	Changes in groundwater chemistry. Risk of accidents.	Construct concrete berms around the tank and fueling areas, install sumps to pump out spilled products, emergency warning spill alert equipment. Follow MNDF's fuel handling procedure. Have emergency oil spill cleanup equipment available.	During operation	Groundwater quality as specified in Table	P:WAMCO S:EPA
Changes in resource use from Vandhoo by neighboring islands	SC6	Impacts on livelihood of locals as an income generating facility was no longer available	Make Vandhoo accessible to the women of neighboring islands on a certain day of the week decided by WAMCO or fortnightly at a designated time for collecting coconut leaves. Alternatively, WAMCO can collect coconut leaves and bring it to the harbor	During operation	NONE	WAMCO

			<p>on a certain day of the week/fortnightly so that interested parties from neighboring islands can come at their own boats to collect.</p> <p>A possible alternative boat building yard is recommended to be developed in Vandhoo RWMF and leased to the boat builders of nearby islands on need basis.</p> <p>NOTE: Initial consultations with the boat building community of Inamaadhoo and Inguraidhoo were held by ME on 23 May 2019 to find out the support from these communities to the proposed. These consultations were lead by the Minster of Environment, Dr. Hussain Rasheed Hassan. The boat building community of Inguraidhoo is not in favour of this as they do not want to stay away from their families for long durations. Inamaadhoo community supports this idea as they do not want their families to get exposed to fiber and associated health risks.</p>			
Overall operation of the project	BE6	Changes in turtle nesting patterns due to changes in beach areas due to construction, noise and lights	Implement turtle management plan attached on Appendix 15 of this report. Restrict entry to turtle conservation area indicated through clear sign boards. Demarcate boundaries through fencing. Conduct regular briefing sessions to the staff at the facility. Regular monitoring through environmental officer recruited by the operator, WAMCO. Any exploitation, if reported shall be punished.	Turtle conservation area	NONE	<i>WAMCO</i>
Waste lost into the sea during transport		Visual impact (affecting tourism, people in general); impact on marine flora/fauna	Custom-built vessels with protective shields, preventing movement of light fractions. Vessels to follow existing regulations regarding transport vessels. Compulsory logbooks of all waste loaded and unloaded	Marine environment / sea- During transport	NONE	<i>P:Vessel operators S:WAMCO</i>
Waste lost into the sea during loading / unloading of waste		Visual impact (affecting tourism, people in general); impact on marine flora/fauna	Mesh fence and green belt towards the seaside, preventing movement of light fractions.	Transfer area between facility and sea/ During operation	NONE	<i>P:Vessel operators S:WAMCO</i>

			Custom-built vessels such as landing crafts, truck loads and compactors ensuring effective operation of the facility			
Visual impact of facility		Visual impact affecting tourist impression	Replanting and green belts, camouflaging the facility from distance, comply with the recommendation for vegetation buffer-zone, ensure area light is concealed (as far as possible) from the surroundings.	Surroundings of Vandhoo Island/throughout operation	NONE	<i>P:Design engineers S:WAMCO</i>
Operation of RO plant		Risk of distribution of improperly treated water	Properties of product water quality produced from the RO plant should be in compliance with EPA's guideline for drinking water quality. Prior to RO plant becoming operational, RO plant shall be registered at EPA and monitoring of product water shall be carried out as per the operating license. EPA to monitor whether reporting is being done by the operator.	During operation	As per operating license	<i>P:WAMCO S:EPA</i>
OCCUPATIONAL HEALTH AND SAFETY RISKS DURING OPERATION						
Waste unload and waste storage		Workers health may be affected	Reduce speed of vehicles, provide masks to the worker where dust is prone in the work area	Site specific	During operation	<i>P:Facility operator S:Safety officer</i>
Waste recycling activities (removing recyclables, toxic and hazardous waste)		Workers health may be affected	Workers should have protective gear including earmuffs.	Site specific	During operation	<i>P:Facility operator S:Safety officer</i>
Waste handling (from storage to incinerator)		Workers health may be affected	Establish and enforce appropriate safety rules and work routines and compulsory use of safety equipment (helmets, protective wear). First aid kit accessible on site, routines for emergencies established and known to all.	Site specific	During operation	<i>P:Facility operator S:Safety officer</i>
Landfill		Unpleasant working environment, potentially harmful (pathogens, toxics)	Protective equipment that ensures no direct contact between workers and waste	On site	During operation	<i>Facility operators</i>
Noise from operation of machinery for waste handling and power house		Unpleasant working environment	Appropriate earmuffs, protecting against noise	On site	During operation	<i>Facility operators</i>
Handling of waste (sorting of waste, handling for		Health hazard to the workers (pathogens, toxic / hazardous waste)	Protective equipment that ensures no direct contact between workers and waste.	On site	During operation	<i>P:Facility operator S:Safety officer</i>

recyclables and hazardous materials, work on the landfill)						
Accidents in the processes. <i>Environmental, health and safety awareness</i>		Injury due to poor handling or malfunctioning machinery and equipment. <i>Environmental pollution due to accidents.</i>	<i>Develop a Health and Safety Manual which includes well-developed and well enforced safety guidelines and streamlined processes for operation; compulsory safety training for all employees; compulsory use of adequate protective equipment. Access to first aid kit on site. Conduct routine capacity building programs to all staff working at Vandhoo RWMF.</i>	On site	During operation	<i>P:Facility operator S:Safety officer</i>
<i>Influx of labor as a result of the expansion (of activities)</i>		<i>Social issues</i>	<i>Have rigid HR management policy in place.</i>	<i>On site</i>	<i>During operation</i>	<i>P:Facility operator S:Safety officer</i>

Appendix 2. Revised Executive summary

PROJECT DESCRIPTION

The following Environmental and Social Impact Assessment (ESIA) is formulated to address the proposed upgrades to the existing Regional Waste Management Facility (RWMF) located on the island of Vandhoo in the Republic of the Maldives. The ESIA has been developed in accordance with the Environmental and Social Assessment Framework (ESAF) of the Maldives Environmental Impact Assessment Regulations (2012) and the World Bank requirement for a full Environmental Assessment to be undertaken for Category ‘A’ projects, which require a full ESIA. The ESIA contained herein aims to address those requirements.

The overall objective of the Environmental & Social Impact Assessment (ESIA) presented herein is to determine whether the project is feasible in terms of the non-mitigable social and environmental impacts that would offset positive contributions from the RWMF. The process used to develop this ESIA study follows the environmental reporting requirements for the proposed development of the RWMF on Vandhoo Island, Raa Atoll. A baseline for the most components of the proposed development had already been set by the initial ESIA process. Therefore, this report mainly aims to analyse the deviation from the baseline conditions through comparison of current conditions with that of the baseline conditions.

The main objective of the RWMF was to provide an alternative for the islands in the Northern Province to reduce the volume of waste that must be burned and dumped in an unsustainable manner by providing a RWMF that puts into practice the concept of waste separation and recycling, composting, and incineration of solid waste from islands in the Northern Province of the Maldives. However, the established facility at Vandhoo has failed to meet its ultimate goal due to lack of several facilities. As a result, upgrades to the existing facilities are proposed which are addressed in this ESIA.

PROJECT COMPONENTS

The proposed project is an upgrade of the existing waste management facility. Scope of work includes the following: -

- 1. Extension of existing waste processing bunker 1;*
- 2. Construction of additional waste storage bunker;*
- 3. Construction of hazardous waste storage facility;*
- 4. Construction of proposed recycling facility with storage for recyclables;*
- 5. Construction of new staff quarters (accommodation) with mess;*

6. *Extension of utility building (to accommodate additional genset);*
7. *Construction of incinerator maintenance room (for tools and critical spares);*
8. *Construction of store room 3 (for spares);*
9. *Construction of additional water tanks (250 m³ x 2 nos.);*
10. *Relocation and upgrade of fuel storage (100 m³ x 2 nos.);*
11. *Rehabilitation of the existing landfill and leachate pond (with pumps);*
12. *Upgrading/upscaling of existing fire protection system (include additional buildings);*
13. *Upscaling of existing RO plant (with borehole); and*
14. *Upscaling of the existing RO plant (with borehole).*
15. *Establishment of water and sewer network to the accommodation blocks.*

INSTITUTIONAL ARRANGEMENT

The proponent of the proposed project is the Government of Maldives, who will implement the project through the ME. Overall operating agency as well as the party enforcing environmental standards and regulations during operational phase for the project will be WAMCO. Financing of the project has already been secured through grant money from the World Bank.

STAKEHOLDER CONSULTATION

A stakeholder analysis was carried out during the scoping meeting to identify the relevant stakeholders of the proposed project. It was decided that all the Atoll Councils of Zone 2, the Ministry of Environment, EPA and the closest inhabited island to the RWMF shall be consulted regarding the project.

Major outcomes of the stakeholder consultation meetings are summarized below:-

- *The challenges of not fully being able to operate the system was highlighted by all parties.*
- *Lack of waste collection, handling and management at island levels were raised during Atoll Consultations. These include, lack of waste collecting vehicles and capacity, fee system not being feasible for smaller populations, issue of composting in islands, just one landing craft serving the whole region.*
- *R. Innamaadhoo and R. Rasmaadho raised concerns regarding livelihood impacts due to the loss of access to forest resources in Vandhoo.*
- *Comments from the implementing authority, ME and operator, WAMCO were mainly focused on the challenges faced up to date in operation of the current facility as it lacks many basic facilities required by a waste management facility.*

IMPACT ASSESSMENT

The ESIA examined two possible scenarios, namely, the potential impacts associated with:

- **Scenario 1:** *proposed upgrades to RWMF are established;*
- **Scenario 2:** *proposed upgrades to RWMF are not established and the facility is used as it is.*

The analysis of Scenario 2, the situation without the proposed project, indicates that there are 10 potentially significant negative changes that would seriously affect the Maldives and its people. Only 1 positive change were identified for Scenario 2. Although it should be evident that no construction impacts would be expected if the RWMF is not built, it is noteworthy that the RIAM analysis identified a total of 10 significant negative changes both inside and outside of the immediate project area if the RWMF is not built and made operational. The results of the analysis highlight the critical situation that is developing without immediate solutions to the solid waste issues facing the Maldives.

There are 16 potentially negative changes expected to occur if the RWMF is upgraded and operated. However, only one of the impacts are identified as a significant negative change (-D) and it is associated with extensive vegetation clearance. However, all of the negative changes associated with the construction and operation of the RWMF can either be reduced or considerably eliminated, provided that the Proponent and its contractors apply the best practice measures described in the Environmental and Social Monitoring Program (ESMP). The permanent elimination of vegetation on the building and road development areas is unavoidable and alternatives are proposed as a mitigation measure.

This notwithstanding, it is worth highlighting that there are 12 significantly positive changes associated with proposed upgrade to the existing RWMF at Vandhoo. Each potential change requires a corresponding baseline and mitigation measures, which are presented in Sections 6 and 7 respectively.

CONCLUSION

Based on the impact analysis, the ESIA concludes that the project is environmentally and socially viable, provided that the mitigation measures presented in Section 7 are closely followed. Additionally, monitoring is required for the priority impacts that are identified in Section 6.

Appendix 3. Waste collection, sorting and packaging guideline developed by WAMCO

GUIDELINES FOR TYPES OF WASTE ACCEPTED AT R. VANDHOO REGIONAL WASTE MANAGEMENT FACILITY

Waste Management Corporation Ltd.
(WAMCO)

Combustible waste



This includes materials that are not made of metal, glass, or fiber glass, such as paper, plastic, nappies, wood, leaves, etc. Combustible waste must be kept separate from sand, and also metal, glass, or fiber glass.

Tar



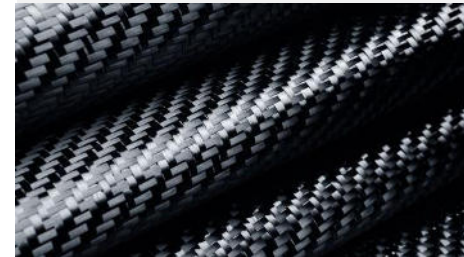
If tar, kept in closed containers, is brought to the facility, it will be accepted.

Metal



Products made of metal must be kept in a way that is easy to be picked up. It must also be kept separate from other types of waste.

Fiber



Products made of fiber such as mats, carpets, or resin products must be kept separate from sand and other waste types.

Heavy paper material



Heavy paper material such as cardboard boxes must be kept separate from other types of waste.

Wood waste



This waste includes wood such as palm trees without leaves. This type of waste must be chopped as much as possible, kept in a way that is easy to be picked up. It must also be kept separate from sand and other types of waste.

Plastic



Plastic waste includes plastic bottles, plastic containers, regiform boxes, etc. Plastic waste must be separated in a way that it is easy to pick up, and must be kept separate from sand and other types of waste.

Glass



Including bottles and other products made of glass, this type of waste must be kept separate from other types of waste.

Construction & Demolition (C&D)



Construction and demolition (C&D) waste will not be accepted at this facility.

INFORMATION

All waste that is brought to R. Vandhoo Regional Waste Management Facility (RWMF) must be separated as per the guidelines outlined in this pamphlet.

Please note that waste brought to R. Vandhoo RWMF that does not adhere to the guidelines will not be accepted at this facility.

Head Office:	3 rd flr, Ma.Jambugasdhoshuge, K. Malé, Maldives
Phone:	3000581
Hotline:	1666
Email:	info@wamco.com.mv
Website:	www.wamco.com.mv



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المجلس الوطني لحقوق الإنسان

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- PET (پتھریل ڪوئو، ٽرسٽر ڪوئو، ٽرسٽر ڪوئو)
• HDPE (هائي ڊينسٽي پولي ايثيلين، ٽرسٽر ڪوئو، ٽرسٽر ڪوئو، ٽرسٽر ڪوئو، ٽرسٽر ڪوئو)
• PVC (پولي وائنيل ڪلورائيڊ، ٽرسٽر ڪوئو، ٽرسٽر ڪوئو، ٽرسٽر ڪوئو)

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Appendix 4. Recommended solutions to issues raised during Consultations

Table 2. The issues raised during consultation meetings and the recommended solutions

<i>Stakeholder</i>	<i>Issue</i>	<i>Recommendation</i>	<i>Responsible Authority</i>	<i>Implementation Cost / Budget</i>
<i>R. Rasmaadhoo and R. Innamaadhoo</i>	<ul style="list-style-type: none"> <i>Livelihood impacts including loss of forest resources in Vandhoo.</i> <i>Not being able to get land for boat yard by Innamaadhoo people which was already given by the atoll councils before it was decided to develop the whole island.</i> <i>Loss of a picnic island for Rasmaadhoo and Innamaadhoo.</i> 	<ul style="list-style-type: none"> <i>Make Vandhoo accessible to the women of neighboring islands on a certain day of the week decided by WAMCO or fortnightly at a designated time for collecting coconut leaves. Alternatively, WAMCO can collect coconut leaves and bring it to the harbor on a certain day of the week / fortnightly so that interested parties from neighboring islands can come at their own boats to collect.</i> <i>A possible alternative boat building yard is recommended to be developed in Vandhoo RWMF and leased to the boat builders of nearby islands on need basis.</i> <i>NOTE: Initial consultations with the boat building community of Inamaadhoo and Inguraidhoo were held by ME on 23 May 2019 to find out the support from these communities to the proposed. These consultations were lead by the Minister of Environment, Dr. Hussain</i> 	<i>WAMCO / Ministry of Environment</i>	<ul style="list-style-type: none"> <i>No cost involved.</i> <i>The Green Fund of Maldives is proposed to be utilized.</i>

		<i>Rasheed Hassan. The boat building community of Inguraidhoo is not in favour of this as they do not want to stay away from their families for long durations. Inamaadhoo community supports this idea as they do not want their families to get exposed to fiber and associated health risks.</i>		
<i>R. Atoll council</i>	<i>Communication gaps, information sharing gaps.</i>	<i>ME shall inform the Atoll councils prior to any development activities which may affect the livelihood of the islanders.</i>	<i>Ministry of Environment</i>	<ul style="list-style-type: none"> <i>No cost involved.</i>
<i>All atoll councils of Zone II</i>	<i>Lack facilities such as waste collecting vessels, capacity, a proper waste management system, lack of enough landing crafts.</i>	<i>Provide the facilities and equipment required to facilitate proper waste management at island levels by the proponent, ME.</i>	<i>Ministry of Environment</i>	<ul style="list-style-type: none"> <i>MCEP will finance this component. USD 1 million has been proposed.</i>
	<i>Fee system not being feasible for smaller islands.</i>	<i>Provide a subsidy by the government to smaller island councils for waste collection, as it will not be fair on the locals of smaller islands to raise the price of waste collection than bigger islands.</i>	<i>Govt. of Maldives / Ministry of Environment</i>	<ul style="list-style-type: none"> <i>Should be proposed in the approved GoM budget for each year.</i>
	<i>The frequency at which waste needs to be collected from the islands are not met as well as dissatisfaction over how WAMCO is running the existing process/ facility.</i>	<i>It is noted that this frequency cannot be met by WAMCO due to inadequacies in the current waste management system. It is predicted that this will be resolved once the proposed upgrades are brought to the existing facility.</i>	<i>WAMCO</i>	<ul style="list-style-type: none"> <i>Upgrading of infrastructure at the facility and purchase additional equipment required for operations will be</i>

				<i>financed by MCEP. A total of USD 3.37 million has been allocated for this.</i>
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Appendix 5. Revised environmental monitoring program is provided in Table 3 below. The revised components are in *blue italics*.

Table 3. Environmental monitoring program proposed for the waste management facility at Vandhoo (Revision of Table 30 of Addendum).

Component	Parameter	Monitoring location	Frequency	Responsible agency	Estimated yearly cost (USD)
Air quality	Particulate Matter (PM ₁₀), Carbon Monoxide (CO), NO _x , SO ₂	Direct emission measurement at powerhouse chimney	3 months after the start-up of powerhouse. Hereafter annually.	WAMCO	5,000
Effluents (Leachates)	BOD5; pH; TSS Ammonia; Zinc Benzoic acid; Phenols	At the landfill cells	Bi annually	WAMCO	1000
Ground-water	Temperature; pH; Electrical conductivity; TDS; TSS; DO; Ammonia; Phosphate; Sulfate; Zinc; Benzoic acid, Phenols, hydrocarbons	Borewell east Borewell west Well	quarterly	WAMCO	500.00
Reef	Coral cover (diversity) Algal cover Fish community (abundance and trophic groups)	SW1 SW2 SW3 SW4	Bi annual	WAMCO	1200.00
Seawater	Temperature; pH; Salinity Electrical conductivity; TDS; TSS; Turbidity Ammonia; Phosphate; Sulfate	SW1 SW2 SW3 SW4	Bi annual	WAMCO	500.00
Shoreline	High tideline; Low tideline Vegetation line	Shoreline of the island	Bi annual	WAMCO	1000.00
Human health	Vectors; Noise; Dust	At the facility, Systematic records according to the monitoring plans	As in the monitoring plans	Operator staff/ safety officer	NA
Waste	Waste loaded (from sources) and unloaded (at Vandhoo)	Tonnes of waste	Continuous	Waste provider; facility operator EPA controlling (samples)	

<i>Environmental safeguards, health and safety measures</i>	<i>Level of implementation of the mitigation measures suggested in this ESIA, especially implementation of guidelines given in Health and Safety Manual</i>	<i>At the facility during construction and operational phases</i>	<i>Continuous monitoring</i> <i>Submit Annual Audit</i>	<i>WAMCO</i>	<i>NA</i>
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Appendix 6. Grievance Redress Mechanism



Ministry of Environment

Male', Republic of Maldives.

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Grievance Redress Mechanism

Upgrading of Zone 2 Regional Waste Management Facility – R. Vandhoo

The table below provides details of grievance redress mechanism (GRM) developed for Zone 2 Regional Waste Management Facility located in Raa Atoll Vandhoo of the Republic of Maldives. The facility was initially developed under the World Bank funded Maldives Environment Management Project (MEMP) and is being operated by Waste Management Corporation Limited (WAMCO), a state-owned enterprise. However, certain limitations were identified during the operations of the facility and to address these issues the RWMF is proposed to be upgraded through the on-going Maldives Clean Environment Project (MCEP). The proposed GRM is, thus, based on the Environmental and Social Assessment and Management Framework (ESAMF) of MCEP and highlights the grievance redress procedure in place, identifying nodal point of contact, facilitation by the project and timeframes to address grievances.

Tiers of Grievance Mechanism	Nodal Person for Contact	Contact Communication and other facilitation by the project	Timeframe to address grievance
Construction Phase			
First Tier: Site Supervisor	The first point of contact for construction related grievances will be the site supervisor assigned by ME.	<p>The contact details (phone and email) of the person to contact to file a complaint (site supervisor) must be displayed in the project site board. The project board should also provide the QR code or link for downloading the GRM.</p> <p>Grievances can be addressed either through telephone, email or in person.</p> <p>The site supervisor should maintain log records of all complaints received, including date and time of the complaint and a summary highlighting the main issue and how the issue was resolved.</p> <p>The site supervisor should discuss the matter with the contractors and other concerned parties such as WAMCO and ME, where deemed necessary and attain views of them. If such discussions are held</p>	15 working days

		the details of people consulted should be maintained.	
Second Tier: Ministry of Environment (ME)	Environmental and Social Safeguards Specialist at the Project Management Unit (PMU) will be the focal point.	<p>If the grievance cannot be resolved through Tier 1 to the satisfaction of the aggrieved party, or if the grievance was not resolved during the designed time period, the aggrieved party may submit a complaint at tier 2. Tier 2 complaints shall be submitted via the designated complaint form (provide in Annex 1) which should give information about how the issue was addressed at tier 1. The form should be submitted via email to mcep@environment.gov.mv.</p> <p>The contact details (phone and email) of the nodal person at tier 2 should be displayed in the project site board. The project board should provide the QR code or link for downloading the complaint form.</p> <p>PMU will screen 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>PMU will discuss the matter with WAMCO, EPA and other relevant institutions, where deemed necessary and attains 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 decision must be communicated 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, then the decision will be considered as accepted.</p>	15 working days

		<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.</p> <p>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>	
Third Tier: Judiciary Power / Assistance to Vulnerable Persons beyond the Project's Grievance Redress Mechanism	Judiciary system is an option for an aggrieved person and/or community in case that the other tiers have not been effective	<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 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>	As per established Judicial Procedure
Operational Phase			
First Tier: WAMCO	Call center staffs, supervisors and Vandhoo RWMF Management	<p>The main grievances related to island level collection and operation of the facility during operational phase will be addressed through WAMCOs official helpline.</p> <p>Grievances can be address informally through phone (by dialing to 1666) or formally via email (1666@wamco.com.mv). All technical queries have to be addressed via email. The call center staff will provide appropriate guidance to the aggrieved party on how to submit technical queries.</p> <p>The call center staff will forward technical queries to the respective department within 24 hours of receiving the mail. The aggrieved party will also be</p>	As per the SOPS of WAMCO

		<p>notified of the receipt of the mail within 24 hours. The call center staff will regularly follow up with the department on the complaint and issue.</p> <p>Replies for non-technical queries will be drafted by the call center staff attending the matter and subsequently approved by the respective supervisor before being sent to the aggrieved party.</p> <p>Log records of all complaints will be maintained in the complaint's sheet of 1666 hotline.</p> <p>Further details of WAMCO's call center SOPs are provided in Annex 2.</p>	
Second Tier: EPA	Environmental Compliance and Assessment Department	<p>The aggrieved party can file a complaint to EPA, if grievances related to environmental compliance (issues such as waste spillage, stack emissions / air quality and turtle conservation), were not resolved to the satisfaction of the aggrieved party at tier 1.</p> <p>Grievances can be addressed either through EPA's hotline, Facebook page or in writing. Phone calls and messages received at the hotline will be logged into the online compliance system. If a complaint requires technical discussions, the subject issue will be immediately uploaded to the EPA viber group and discussed among relevant staffs. The rooted division or section will be referred in the online compliance system.</p> <p>Matters requiring assistance of environmental police will be discussed with them through their hotline.</p> <p>Senior staffs of EPA should be consulted when preparing written responses, where required.</p> <p>Further details of EPA's GRM system provided in Annex 3.</p>	As per SOP of EPA
Third Tier: Judiciary Power / Assistance to Vulnerable Persons beyond the	Judiciary system is an option for an aggrieved person and/or community in case that the other tiers have	<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>	As per established Judicial Procedure

Project's Grievance Redress Mechanism	not been effective	<p>In cases where vulnerable person(s) are unable to access the legal system, the Attorney General's office will provide legal support to 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.

APPENDIX 1

Tier 2 Complaint Form (Construction Phase)



Ministry of Environment

Male', Republic of Maldives.

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Complaint Form – Tier 2

Project Name: Upgrading of Zone 2 RWMF R. Vandhoo

Part 1: Applicant's Information

- a. Name:
- b. National Identity Card No:
- c. Address:
- d. Mobile No:
- e. Email Address:

Signature:

Part 2: Reason for Submitting the Form

- a. Not Satisfied with the decision received at Tier 1 GRM ☐
- b. Did not receive a response within the designated time-frame ☐

Part 3: Summary of GRM at Tier 1

- a. Date of filing the complaint:
- b. Mode of submission: Phone ☐ Email ☐
- c. Received a Response / Decision: Yes ☐ No ☐

specify date

If Yes provide a summary of the decision received:

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.....





d. Satisfied with the Response Received: Yes ☐ No ☐

If No specify:

i. Reason, and;

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.....
.....
.....

ii. Proposed solution:

.....
.....
.....
.....
.....

Note: Attach Additional Sheets where necessary

Part 4: For Office Use Only

Received by

Name: Designation:

Signature:

Date of Receiving the Complaint: Time of Receiving the Complaint:

Stamp



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

+ (960) 301 8300
+ (960) 301 8301
www.environment.gov.mv

Page 2 of 3

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މާފަންނު، މާލެ، 20392. ފޯން: 301 8300

secretariat@environment.gov.mv

[www.twitter.com/ENVgovMV](https://twitter.com/ENVgovMV)

www.facebook.com/environment.gov.mv



Note:

1. This is the Tier 2 of the Grievance Redress Mechanism of Zone 2 RWMF. After submitting a grievance at tier 1, if the aggrieved party is not satisfied with the decision by the Site Supervisor or if the complaint is not resolved within 15 working days, the aggrieved party can submit a complaint on the Tier 2 complaint form. Details of GRM and tier 2 complaint form will be made accessible from the QR code provided in project site board.
2. The form should be submitted via email, addressed to:
Maldives Clean Environment Project
Ministry of Environment, Green Building, Handuvaree Hingun, Maafannu, Male', 20392, Maldives.
Office (Direct): +(960) 3018442 | Office (PABX): +(960) 3018300
Email: mcep@environment.gov.mv | Web: www.environment.gov.mv
3. If the aggrieved party is not satisfied with the written decision issued by ME at tier 2, then the aggrieved party has the option to address the issue at tier 3.



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



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ގެ ދަށުން ދާއިރާތަކާ ބެހިގެން

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APPENDIX 2

WAMCO Call Center SOPS



Standard Operating Procedures

Department: Customer Service

Responsible Section: Call center

Dealing with 1666 calls

SOP Number:	CSD-001
Effective Date:	26 September 2018
Version:	1
Revised Date:	-
Approved by:	Fathimath Rasha

Purpose

This standard operating procedure describes the process that should be followed to deal with 1666 phone queries in a standardized manner, while building the knowledge base.

Procedure

Assigned staff from Call Center must carry out the following tasks.

Phone Queries

- Calls to the call centre must be answered within 3 rings.
- Always answer the call with a smile, with the Islamic greeting and identify yourself.
- Call should be answered immediately after picking up the phone.
- Listen to the query of the customer, patiently and politely.
- Answer should be given politely and patiently and information should be given free of factual errors.
- When speaking in Dhivehi, should use the politest form of the Dhivehi Language.
- Smile when talking to the customer.
- In case of an abusive caller, bring it to the attention of the supervisor immediately.
- Ask for ID card number/ Account number or registered phone number for verification before providing specific details about a customer.
- Use WAMCO's internal software to gather information about the customer. These software's include;
 - Veshifaara
- Give information only related to the caller.
- If the query requires clarification or assistance of staff from other departments, clarify the query from other departments before replying to the customer.
- Whenever a call is being put on hold, inform the **caller that the call is being put on hold** first.

- If the caller wants to speak to a specific staff or regarding a specific case, **inform the caller that you are forwarding the call** before putting it on hold. Give a brief summary of the call to the staff before transferring it. If the relevant staff is unavailable at the time, get caller's detail and mail the issue to the relevant staff or follow up later.
- Where an immediate response cannot be provided, note the contact details of the customer and inform him that he will be contacted with the details. Maintain a log of calls requiring follow up as per Attachment 1. Complete follow up within 1 hour.
- If the query is technical, request the customer to email to 1666@wamco.com.mv
- End the call with a Thank You.
- Before answering the next call, complete the log.
- The log should be complete, free of factual, grammatical, typographical and formatting errors.

Attachments

1. Follow-up Log

Attachment 1: Follow-up log

Account Number	Name	Contact	Query	Dept. to be contacted	Status



Standard Operating Procedures

Department: Customer Service

Responsible Section: Call Center

Dealing with 1666 Email Queries

SOP Number:	CSD-002
Effective Date:	26 September 2018
Version:	1
Revised Date:	-
Approved by:	Fathimath Rasha

Purpose

This standard operating procedure describes the process that should be followed to deal with queries regarding WAMCO products and services received through 1666 mail and other mails including letters in a standardized manner.

Procedure

Assigned staff from Customer service must carry out the following tasks.

- Check the mail at 08:30, 10:30, 13:00 and 15:30 hours. Log the emails to 'Email tracker log' as per format in Attachment 1. Log the letter/mails received through the entree the same. Codes are listed in Attachment 2.
- The log should be free of factual, grammatical, typographical and formatting errors.
- Urgent mails should be brought to Supervisors attention immediately.
- Supervisor or the appointed staff should assign the mails to individual staff. It should be done every day at 08:30hrs, 13:30hrs and 15:30hrs.
- Email tracker log should be saved under;
[Z:\Call Center\1666 Email](#)
- Before replying to the mail, check if the query is understandable. If not request the customer to provide further details. This should be done within 24 hours of receiving the mail. If contact number is available, call via **Veshifaara** and log the call. If not send a mail as below:
"Kindly provide us with your contact phone number as further clarification is required regarding the query."
- For technical queries, forward the mail to the relevant department for assistance. This should be done within 24 hours of receiving the mail. And this should be communicated to the customer within 24 hours. The mail can state;
"We would like to acknowledge that we have received your query."

Since there are certain issues to be addressed, we are currently examining them. We will get back to you as soon as possible. We apologize for any inconvenience that may cause due to this delay. If we need further details regarding your query, we will contact you.”

- For non-technical queries, draft a reply to the customer’s query with reference to the regulation and other policies/practices of WAMCO (where applicable) and get it approved by the Supervisor.
- Replies should attempt to answer the specific query instead of giving a general standard answer.
- All replies should be polite, and free of factual, typographical and grammatical errors.

All replies should be properly addressed, should contain the statements “A/C No: A170000XXX” and “Thank you for your query” at the beginning and “Hope that answers your query. Should you require further clarification, you may email us or call our hotline: **1666** during office hours (08:00 – 00:00hrs)” and “Thank You” at the very end (Attachment 3).

- If attachments are required, should ensure that the right documents are attached.
- Unless the reply is complicated, all mails received before 10:30 should be drafted and sent to the supervisor before 12:00hrs. All mails received before 15:00 should be drafted and forwarded to the supervisor by 17:00hrs.
- All mails send before 12:00hrs to the supervisor should be approved by 14:00hrs. And all mails send after that should be approved by 09:00hrs the following day.
- Once the draft is approved, send the reply to the customer within 1 hour of receiving the approval.
- Attention should be given to ensure that all internal communications are deleted before replying to the customer.
- The replied mail should be sent through webmail and ensure that it is saved under ‘replies’ in the 1666 mail inbox.
- The signature of the **staff** answering the mail should be included in the reply.
- The replies sent should be logged in **Veshifaara**.
- Bcc the replies to the relevant Supervisors and Managers/Directors.

Attachments

1. Email Log
2. Codes
3. Email Reply

Attachment 1: Email log

Reference Number	Email Received Date	Assigned Date	Sender	Issue	Assigned to	Forwarded to	Forwarded Date	Status (Replied/ Done/ Pending)	Date Replied to Customer	Method of reply (Email/ Phone)	Remarks
Email/Sep/2018/ 081	Sun 02-Sep-18 15:07	02-09-18	Mohamed Azim <axim2020@gmail.com>	Cancellation of household waste collection	Registration Department	CC to Rasha, BCC to Muna & Saleem	02-09-18	Done			

Attachment 2: Codes

Category	Code
Registration	RG
Household complaints	HC
Commercial complaints	CC
CAPS service	CS
General inquiries	GI
Calls being forwarded	CF

Attachment 3: Email Reply

A/C No: A1700003721

Dear Ali Shameem,

Thank you for your query and please accept our sincere apologies for the delay and inconveniences caused.

Kindly find attached the payment receipts for August, September and October 2017. You may use the above WAMCO A/C number to pay via AvasPay.

Should you require further clarification, please email us or contact **1666** during office hours (08:00 – 00:00hrs).

Thank you.

Best Regards
Customer Relations Department

Waste Management Corporation Limited (WAMCO)
Head Office, 02nd Floor, Ma. Jambugasdhoshuge,
Majeedhee Magu, Male', 20161, Maldives
Email: collection@wamco.com.mv
Phone: +(960) 1666, Fax: +(960) 3000584
Find us on our [website](#) | [facebook](#) | [twitter](#)





Standard Operating Procedures

Department: Customer Service

Responsible Section: Call center

Dealing with complaints

SOP Number:	CSD-003
Effective Date:	26 September 2018
Version:	1
Revised Date:	-
Approved by:	Fathimath Rasha

Purpose

This standard operating procedure describes the process that should be followed to deal with complaints to the '1666' hotline and email in a standardized manner.

Procedure

Assigned staff from Customer service must carry out the following tasks.

Complaints

- Complaints and compliance issues received through mail or call centre should be logged in "Veshifaara" and the respective log.
- Once a complaint or compliance issue is received, enter the complaint in the relevant log. Urgent complaints should be brought to the attention of the supervisor.
- Before entering the details to the log, customer details should be verified. (*eg:- ask for the registered customer name, contact number, Address, floor etc. for further verification*). All fields in the log should be completed.
- All complaints entered should be free of factual, typographical and grammatical errors.
- Tablet reports will be saved everyday by supervisors in 1666 tablet folder (*Z:\Tablet Report*). Once the daily report has been saved, the tablet status column in the complaint sheet should be updated.
- Where necessary, get back to the caller or ask the specific department to do so.
- Where an answer is required to be given to the customer, follow up with the department on the complaint/ issue – through email.
- Once the collection status has been updated to 'attended' from complaint sheet, call center staff should call back the customers for verification (within 1 hour) – previous days' sheet should be completed the next morning.
- Save all complaints received to 1666 mail under the **"complaints" folder in the 1666 inbox.**

- By 09:00 each Sunday, prepare a log of the complaints (from the calls and from emails) of the previous week and email it to Supervisors, Manager and Department Head by including it in the weekly summary.
- The complaint log should be saved under;
Z:\1666 hotline\Complaints sheet

Attachments

1. Log

Attachment 1:**Log (Household)**

#	ENTERED BY	TIME	ADRESS	STREET	CUSTOMER NAME	CONTACT	BL	ZO	FL	APT	DETAILS	HOUSEHOLD	TIME	CALL CENTRE	TIME	TABLET (25th Sep report)
1	Sheereen	11:06	M	Fehige	Miriyaas Magu	Ahmed Rasheed	7751511	296	5	4		ATTENDED	8:30	Attended	11:11	collected

Log (Commercial)

NO	Entered by	Time-In	Date	Customer Name	Road	Phone No	Survey (Y/N)	Collection days	Complaint	Status	Attended Time/Date	Remarks
01.09.2018												
1	Samiyya	11:15	01.09.2018	H.A.W Shop	Kalhu huraa magu	9777324	Y		3 days not collected	Collected		

APPENDIX 3

EPA Hotline SOP

Hotline Procedure of EPA

1. Hotline number will be managed by staffs on a weekly (7 days) rotation.
2. Hotline will be operated as follows:
 - Call receiving: 8 am to 8 pm
 - Messaging: 24hrs. Confirmation of the message should be sent to the sender for the messages received before 10 pm
3. Staff managing the hotline can attend the complaints received via message until 10 pm. Messages received after 10 pm should be attended next day – The same staff should attend the case even if the duty of hotline number is rotated to another staff.
4. The staff managing the hotline for the week will be tasked to log the messages and call received into to online compliance system.
5. EPA official viber group should be used to communicate if assistance from other sections are required. This should be recorded in the online compliance system.
6. Cases which require assistance from police should be immediately informed via police hotline. Environment police hotline: 9465619 Duty Officer number: 9888999
7. If required, letters should be drafted as advised by heads. For the complaints received after office hrs, letter should be written on the upcoming official day and this job should be handled by the staffs incharge of the hotline
8. The staff on call should record over time details (14:00 to 19:00)
9. If the on call staff is on sick leave or FRL it is the responsibility of the on call staff to handover the hotline phone to another staff.

Appendix 7. Updated Master Plan



MCEP
MINISTRY OF ENVIROMENT
GREEN BUILDING, HANDHUVAREE HIGUN,
MAAFANNU, MALE' (20392), REPUBLIC OF MALDIVES,
TEL: +960-3018431, +960-3018300, FAX: +960-328301

PROJECT		DESIGN BY	AMENDMENTS
REGIONAL WASTE MANAGEMENT FACILITY			REVISED AS PER EPA DECISION STATEMENT
R. VANDHOO			
TITLE		STRUCTURE BY	
MASTER PLAN (CURRENT PHASE DEVELOPMENTS IN MAGENTA)			
CLIENT DEPARTMENT		DRAWN BY	
WMPC DEPARTMENT		AFRAZ	
PAPER SIZE	A3	SCALE	1:3500
PAGE NO.	01	DWG NO.	VANDMPC-A1-03
		DATE	08.05.2019

Appendix 8. English Translation of Land Acquisition Letter

**Unofficial translation of the Land Acquisition Letter from the Office of the President
(Letter No.: 1-ED/438/2017/35, dated 8 March 2017)**

Minister of Environment and Energy Hon. Thoriq Ibrahim,

With reference to the letter number 438-WMPC/1/2017/27 (dated 6th March 2017) from your Ministry and letter number 1-ED/438/2017/26 (dated 26th February 2017) from the President's Office;

Given that Vandhoo in Raa Atoll has been leased to be developed as the Regional Waste Management Centre for Zone 1 (Haa Alifu, Haa Dhaalu and Shaviyani Atolls) and Zone 2 (Noonu, Raa, Baa and Lhaviyani Atolls), and given that in addition to the land already leased for this purpose, remaining area is also required for the functioning of the Regional Waste Management Facility, please find below, our response to your request for our advice regarding this matter.

As specified in your letter, use of the infrastructure at the RWMF at R. Vandhoo for management of waste from both Zones 1 and 2 would be the most feasible and most cost effective option, as opposed to development of a separate RWMF for Zone 1. The President has thus approved the use of the remaining part of land on Vandhoo, for the RWMF for management of waste from both Zones 1 and 2 and instructed to advise your Ministry to this effect.

9 Jumaadul Akhir 1438

8 March 2017

Yours sincerely

Signed by:

Mohamed Hunaif

Undersecretary

Appendix 9. Operational Flow of Waste Management Activities

The operational flow of waste management activities for Zone 2 RWMF is proposed in the Operations and Management Plan of the facility (Mostafa, 2018). These activities start from the collection of waste from the IWMCs and ends with the final disposal or treatment at the regional facility. The following sections are extracted from the report.

2.3. Transfer from IWMCs to RSWMF

2.3.1. OMP for Islands with Accessible Harbor

The process for transfer from IWMCs to RSWMF for Islands with accessible harbor shall be as follows:

1. Recyclables (aluminum cans, paper / cardboard, plastics and glass) and final compost stored in 4-wheel 660 litre bins shall be mounted on the trolley which is towed using the three-wheeler electric motorcycles and transferred to the harbor mounting bay.
2. Once a month trip by the 80 to 120 tons medium size ship shall serve each Island.
3. The medium size vessel shall be equipped with the following:
 - a. Four static compactors (one compactor for each plastic, paper / cardboard, glass and aluminum cans);
 - b. Two static open containers for compost and bulk waste equipped with roll on/off plastic cover;
 - c. One static open container for E-waste;
 - d. Two static open containers for hazardous and medical waste equipped with roll on/off plastic cover; and
 - e. Fixed crane.
4. Crane lifts the 4-wheel bins and empty it's content in the assigned compactor / container using the mobile bin lifter in the vessel.
5. After loading onto the vessel all bins are emptied in their respective containers. The vessel then starts heading to next Island to be served, and the same process are followed until the vessel reaches its full capacity.
6. Once the medium size vessel is full, two alternatives are available, and the selection will depend primarily on engineering design of Saafu 1, logistics and costings, which are as follows:
 - **Alternative 1:** Medium size vessel will meet Saafu 1 vessel at a harbor, where the containers will be transferred to Saafu 1 using reach staker. In that case Saafu 1 will act as a transfer ship as well as to maximize the use and benefit from Saafu 1. The possibility of two containers on top of each other shall be examined since Saafu 1 has 250 tons capacity, which is ideal for "transfer station" concept. Such concept of two containers on top of each other has to be in consultation with Vessel's Manufacturer and Design Engineer to ensure safety and appropriateness.
 - **Alternative 2:** Direct the medium size vessel to the RSWMF.
7. Regarding bulk waste, E-waste and C&D waste, transfer will be done based on call service once the provided containers by WAMCO are full. Collection shall be done with the medium sized vessel equipped with a reach staker in that case and 6 to 8 empty containers (depending on the size and design of the vessel and layout of various components on board), in order to serve few Islands per trip only for other wastes such as bulk, E-waste and C&D waste depending on the number of containers at the Islands to be serviced. Again logistical planning by WAMCO will direct this task.

8. Excess green waste that cannot be fully utilized by the Islands shall be transported to Islands lacking green waste, to support in their composting process, during their periodical monthly waste collection visit. WAMCO will organize and plan such logistical transportation trips within its regular plan in order not to increase operational cost.

2.3.2. OMP for Islands without Accessible Harbor

The process for transfer from IWMCs to RSWMF for Islands without accessible harbor shall be as follows:

- 1- Stored recyclables (aluminum cans, paper / cardboard, plastics and glass) in the 2-wheel 120 liter bins (liftable manually by two labors), and final compost either bagged in reusable 20 kgs sacks or loaded into the 2-wheel 120 liter bins (Islands and WAMCO shall decide which is more operationally easier) shall be transferred to as close to the shore as possible by mounting them on the trolley which is towed using the three-wheeler electric motorcycles.
- 2- Each Island shall be served once a month by the **flat bottom whaler** which shall be loaded with empty 2-wheel 120 liter bins, which shall be unloaded to the shore and one bin at a time, and in case compost bags are more favorable, shall be lifted by two labors and loaded onto the flat bottom whaler. The bins shall be pushed on the steel ramp connecting the shore to the whaler. In case the steel ramp cannot be used, two labors will lift one container at a time from the shore and onto the whaler.
- 3- The flat bottom whaler will be directed to nearest location to meet with the medium size boat at a harbor. The bins are emptied onto the medium size boat using the crane, emptied into their relevant container using bin lifting equipment, and reloaded back empty into the whaler. The whaler continues its journey to the next Island or towed behind the medium size vessel to the next Atoll scheduled for service.
- 4- The flat bottom whaler will be towed behind the medium size vessel to arrive to the Zone / Atoll its serving and will be running between Islands without accessible harbor to serve them.
- 5- Once full, the whaler will be directed to the medium size vessel in order to unload onto the medium size vessel using the crane. The vessel then starts heading to next Island to be served, and the same process is followed until the vessel reaches its full capacity.
- 6- Once the medium size vessel is full, two alternatives are available, and the selection will depend primarily on engineering design of Saafu 1, logistics and costings, which are as follows:
 - Alternative 1: Medium size vessel will meet Saafu 1 vessel at a harbor, where the containers will be transferred to Saafu 1 using reach staker. In that case Saafu 1 will act as a transfer ship as well as to maximize the use and benefit from Saafu 1. The possibility of two containers on top of each other shall be examined since Saafu 1 has 250 tons capacity, which is ideal for “transfer station” concept. Such concept of two containers on top of each other has to be in consultation with Vessel’s Manufacturer and Design Engineer to ensure safety and appropriateness.
 - Alternative 2: Direct the medium size vessel to the RSWMF.
- 7- Regarding bulk waste, E-waste and C&D waste, Islands will store bulk waste and E-waste separately in either jumbo bags or 2 wheel 120 liter bins (depending on the quantities and size). For those Islands that a steel ramp can be used, will be provided with 4 wheel bins to be used to easily roll on / off onto the whaler which will be as close as possible to the shore. If ramp cannot be used, then jumbo bags shall be used and the load per bag should not exceed 50 kgs to be liftable by two to three labors. Collection will be done based on call service and not regular service or collection with other types of wastes (recyclables and compost).

- 8- Excess green waste that cannot be fully utilized by the Islands shall be transported to Islands lacking green waste, to support in their composting process, during their periodical monthly waste collection service. WAMCO will organize and plan such logistical transportation trips within its regular plan in order not to increase operational cost.

2.4. Regional Solid Waste Management Facility

This section is developed on the basis that the recommended additional facilities, machinery / equipment, and complete concept proposed in the field investigation report shall be implemented.

At the RSWMF, the following operation and management plan shall be followed:

- 1- Before arrival of the vessel at the RSWMF harbor, hook lift vehicles shall transfer empty and washed containers / compactors from their storage areas onto the harbor loading area in preparation for loading to the vessel for serving the Islands.
- 2- Saafu 1 vessel arrives at the RSWMF and the containers are unloaded onto the platform using the reach stacker. In case medium size vessel is used to transport the waste containers to the RSWMF, same equipment, namely reach staker shall be used to unload the containers onto the platform.
- 3- RSWMF shall be equipped with mobile crane by the harbor area which shall load the vessel with empty and washed containers / compactors, in preparation for the next transportation trip to the Islands.
- 4- The loaded containers are then lifted from the harbor platform by the hook lift vehicle and transferred and emptied at the assigned area within the RSWMF.
- 5- **Material Recovery Facility (MRF):** Typical MRFs are operated 6 days a week, 8 hrs a day or two shifts if needed. All containers (except containers carrying hazardous, compost and green waste shall be directed to their respective areas as presented in this section below) shall be transferred to the tipping floor area of the MRF. The details of the operation of the MRF shall be provided by the MRF's manufacturer / supplier given that numerous designs are available in the market, however, a general description of the operation process shall be presented in this section.
 - a- **Registration, inspection and weighing:** This shall be under the manifestation system, however until manifest system is developed, registration (source and type of waste), visual inspection to confirm waste type and any contamination, and weighing shall to be documented.
 - b- **Materials receiving area / tipping floor:** design, layout and operations are dependent on the type and quantity of materials received at the facility and how those materials are delivered to the facility. Given that segregated / pre-sorted waste shall be delivered to the MRF, there are several design options for the tipping floor, which may include one tipping area for wastes arriving in jumbo bags and containers (single-stream collection and delivery), two separate tipping areas on the tipping floor, one for recyclables and one for all other wastes (dual-stream collection and delivery), or up to three or more separate tipping areas / bunkers for recyclables, rejects and bulk wastes. Whatever the delivery mechanism (single-stream, dual-stream, or more) the major considerations in running an efficient receiving and staging operation include:
 - 1- Move delivery containers in and out of the tipping area as quickly as possible. This will lessen tipping floor congestion, maintain a safer working environment for the operators and drivers on the tipping floor as well as allow for quicker and more efficient movement of materials from receiving to staging to processing;
 - 2- Provide sufficient segregation between the various delivered materials streams to avoid or minimize cross-contamination. By minimizing cross-contamination of material streams

from the beginning less time and cost will be spent on sorting and processing materials, as well as minimize loading the incineration plant unnecessarily.

- 3- Move materials off the tipping floor and into sorting/processing in a direct and timely manner. This prevents backlogs of materials that increase the sorting and processing inefficiencies (increases in burden depths on the sorting line, decreased recovery of materials and increased production of residues, overtime labor in sorting and processing functions). Additionally, if there is an issue with dirt, mud and other such contaminants getting mixed in with materials sitting on the tipping floor or in pre-processing storage, material revenues could be negatively impacted.
 - 4- Provide enough incoming materials storage space (at least two days) in the vicinity of the MRF while at the same time not close to the incineration plant for avoiding fire hazard to the incineration plant. This will allow for extended storage over weekends/holidays or during planned / unplanned maintenance of equipment and accordingly shut down of the processing line.
- c- **Sorting stage:** The sorting of materials at a MRF is the heart of the MRF. Sorting process can be accomplished manually, mechanically or a combination of the two, it is usually the operational component of the MRF that is the largest cost center and offers the greatest potential for both short-term and long-term savings. These savings include increased revenue for higher quality material, cost savings from reduced residue disposal costs and decreased labor costs. The sorting process is also the component where quality control becomes an important consideration. RSWMFs shall have small MRFs (2 to 4 tons / hr.), which typically follow manual or semi-automated sorting techniques. Though there are opportunities in these types of operations to add equipment that will improve overall sorting efficiencies and offer long-term savings, due to the lower throughput of materials at small MRFs, the application of several mechanical sorting techniques need to be assessed from cost perspective in terms of CAPEX and OPEX. During the first 6 to 12 months of the operation, quality control by WAMCO operation team is crucial in order to monitor each received container, its destination and percentage of incompatible / unsorted material. Feedback shall be given to Islands that do not provide 100% segregated waste or contaminated waste, as this will greatly affect the operation and revenues at the RSWMF level for WAMCO.
- At the tipping floor manual presorting is carried out before the disk screens to remove troublesome materials. Large and heavy items such as tree logs, scrap metal sheets, cartoon boxes, etc. can damage disks. Shredded paper, film plastics, hangers and wire many become tangled in and clog disk screens.
 - Separate broken glass and other fines by running incoming material through a trommel before the disc screen.
 - Adjust disc spacing, deck inclination angle, and feed velocity to accommodate the various conditions of incoming containers to give time for staff to carry out sorting.
 - After manual sorting at tipping floor, the loader transfers the pre-sorted waste onto the conveyor belt for manual sorting by labors. Each type of material should be processed at a time, in order to avoid any contamination as described in above points.
 - Sorted material shall be collected in 660 liter bins, which shall be transferred to the bailing plant / station either manually or using forklifts, or mounted on trolley which shall have several bins mounted at a time.
- 5- **Bailing station / plant:** Records of the amount of incoming and outgoing waste must be kept for monitoring purposes and for regular validation of the facility mass balance.

- 6- Bailing plant shall be operated on batch basis. The same materials bins are lined up and loaded to the bailing plant, which shall compact and bail the recyclables, including plastics, paper and aluminum cans.
- 7- Glass shall be directed to its storage bay within the storage warehouse.
- 8- After compaction and bailing process, the forklifts transfer the bails for storage in its assigned storage area within the recyclables warehouse.
- 9- **Compost** containers are transferred to the refining, screening and bagging plant. The compost is loaded onto the loader which is then transferred to the conveyor belt onto screening followed by bagging. Bags are then stacked onto wooden pallets and transferred using forklifts to final compost storage areas within storage warehouse.
- 10- **Excess green waste** containers shall be directed to shredder area for shredding. Shredded green waste shall be loaded onto 660 liter or open containers, for temporary storage, followed by distribution from the RSWMF to the Islands that lack green areas, during the periodical monthly service visits.
- 11- **Incineration:** Incinerable inert / rejected recyclables / municipal hazardous / medical hazardous / shredded incinerable bulk waste shall be incinerated. Those materials shall be stored until quantity is sufficient for 24/7 incineration operation for at least 3 months period (unless the incinerable material is contaminated with organic / food waste, then it requires incineration within 2 to 3 days maximum, but such contamination should be avoided at all costs). The incinerable stored material shall be shredded and mixed well (hazardous material is excluded from such process) at the incineration plant's reception area in order to provide homogenous feedstock to the incineration plant.
- 12- **Hazardous municipal and medical wastes:** those materials shall be safely stored in red bags and its completely prohibited opening or shredding the bags. This material shall be stored in 660 liter bins, and fed to the incinerator in the middle of other mixed wastes in order to avoid lower calorific values of wastes fed to the plant.
- 13- After continuous operational period of the incineration plant, it's shutdown for regular maintenance and cleaning for few months (depending on incinerable quantities accumulation rate).
- 14- **Bulk waste:** shall be directed to bulk waste management and storage covered facility. Two processes are mainly carried out, namely sorting and storage. Materials that have a market such as old furniture, appliances, etc. should be considered for auctioning. Other incinerable materials that have no value / market shall be stored for shredding and incineration.
- 15- **Construction and demolition waste:** shall be directed to C&D area for sorting and storage. C & D waste need to be processed for construction material, but that requires a detailed stand-alone study and shall be done on the medium term as it requires planning. Until then storage will be the only viable solution.
- 16- **E-waste:** shall be directed to e-waste management and storage covered facility for sorting and storage. Sorting of precious metals verses plastics and other materials is generally carried out. This type of waste requires a stand-alone study and shall be done on the medium term. Until then storage will be the only viable solution. It is prohibited to dismantle any e-waste parts due to the hazardous nature of certain parts.
- 17- One year worth of bailed recyclables shall be auctioned / tendered.
- 18- Fly ash shall be bagged for final disposal at landfill cell. It will be mounted on wooden pallets, which shall be transported to the landfill cell using forklift and laid on the cells manually.
- 19- Bottom ash shall be bagged for either storage until processing later, or send to the sanitary landfill for final disposal. Within 6 to 12 month period WAMCO shall plan for utilizing the bottom ash in

construction bricks and additional source of revenue and / or among CSR activities to Inhabited Islands.

- 20- Records of the amount of incoming and outgoing waste must be kept for monitoring purposes and for regular validation of the facility mass balance. This will be carried out at entry to MRF facility, entry at bailing station / plant, entry at warehouses, and exit from warehouses to final destination (recyclables and compost to traders, incinerable material for incineration and fly & bottom ash for landfilling). This task is crucial to control incoming and outgoing movement of material within the facility, and ultimately out of the facility and final treatment. This task should be carried out by Quality control team. Manifestation system shall include such information.
- 21- **Leachate Collection and Treatment:** Leachate generated at the ash disposal landfill cell should be treated through the existing system which includes aerated lagoons, re-circulation, membrane filtration and sand filters. The exposed working face of the cell should be minimized, and perimeter drains and landfill cell compaction, slopes and daily cover materials should be used to reduce infiltration into the deposited waste.

Appendix 10. Updated Matrix for Sea Turtle Management

Following is a revised matrix of the Sea Turtle Management Plan exclusive to the current project derived from the Environmental Monitoring Report for the RWMF at Vandhoo, Raa Atoll (Zahir, 2014).

Activity and Associated Impacts	Protection and Preventive Action	Implementation Responsibility	Implementing Cost
Turtle Management Plan	<ul style="list-style-type: none"> Construction equipment must not be allowed to operate on the beach, remove sand from the beach, or in any way degrade nesting habitat. 	ME / Construction Site Supervisor	Included as part of the contract
	<ul style="list-style-type: none"> Night time lighting of the beach other than the harbor area should be prohibited during nesting and hatching seasons or a non-intrusive lighting system should be put in place. 	Environmental Officer / RWMF Manager	Included with the O&M cost
	<ul style="list-style-type: none"> Ensure that no beach lights are erected on the beach. Harbor front lights shall be appropriately designed and set. 	ME / Project Managers	
	<ul style="list-style-type: none"> Implement, enforce, evaluate lighting regulations or other lighting control measures where appropriate - Shielding of the light source, screening with vegetation, placing lights at lowered elevations and in some cases the use of limited spectrum low wavelength lighting (e.g. low-pressure sodium vapor lights) are possible solutions to beach lighting problems. 	ME / Project Managers	
	<ul style="list-style-type: none"> Ensure that structures do not block the turtle's access to the beach, change beach dynamics, or encourage human activities that might interfere with the nesting process. 	Environmental Officer	Included with the O&M cost
	<ul style="list-style-type: none"> Monitoring their activities as well as putting a physical barrier such as a fence containing them within the facility area should manage movement by facility workers. 	Environmental Officer	
	<ul style="list-style-type: none"> Identify nesting sites through seasonal monitoring and appropriately demarcate these areas. Place sign boards to indicate protected nature of the 	Environmental Officer	Covered through MCEP

	<p>beach. These sign boards should provide information on the prohibited activities and penalties for penalizing.</p> <ul style="list-style-type: none"> • Ensure that vehicular driving on nesting beaches are prohibited. • Maintain the required vegetation buffers adjacent to the protected beach through appropriate signages. • Ensure that only non-mechanical beach cleaning is undertaken. • Reduce directed take of turtles and harvesting turtle eggs through conducting public education and information sessions to the staffs of the facility and vessel operators. 	<p>RWMF Manager</p> <p>Environmental Officer</p> <p>RWMF Manager</p> <p>Environmental Officer</p>	<p>No cost involved.</p> <p>Included with the O&M cost</p> <p>No cost involved.</p> <p>Included with the O&M cost</p>
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Appendix 11. Emergency Plan

An emergency plan should be developed for the facility taking into account emergencies in waste handling and emergency control and response procedures. Following sections are recommended to be included in such a plan.

1. Emergency Waste Handling

The RWMF should establish Emergency Procedures for handling waste, considering circumstances where the incinerator and its associated WTE system is required to be shut-down for maintenance or due to a fault, and collection sea-vessels and vehicles operating at ground being grounded. In this regard, following actions are recommended.

- Maintain sufficient stock of critical spare parts required for the incinerator, WTE system, baling machine, CEMS and filters at all times.
- A stock of spare parts for vehicles and sea vessels must be made available at the facility at all times to be utilized when and where required. This is critical to ensure that the operational flow of the facility is not significantly impacted.
- In case of a major damage to operating vehicles and/or sea vessels, procedures must be in place for short-term renting of vehicles and/or vessels.
- If the plant is required to be kept shut down for long durations (for more than 5 consecutive days), the clients (in this case the island councils of Zone 2 region) must be briefed in writing about the case, providing the expected duration where services will be suspended and anticipated date for resuming services.
- If the plant requires emergency shutting down, incoming waste should be baled using the baling machine available at the facility.
- Establish procedures to undertake manual pre-sorting if the mechanized sorting line is damaged, until it can be repaired and brought back to operating conditions. In such cases, the work force assigned for sorting should be increased by temporarily transferring staffs from other departments.

2. Emergency Control and Response Procedures

2.1. Emergency Contacts

The telephone numbers of the emergency contacts must be displayed at different locations of the facility.

2.2. Fire

- Every employee is responsible for reporting a fire. A fire witnessed inside the facility or any buildings on WAMCO managed facility must be reported immediately to a supervisor. If the fire is located in the employee's work area it should be reported to his immediate supervisor. The supervisor is responsible for calling emergency and notifying the Plant / facility Manager.
- Only under the plant manager, or facility manager's discretion, will trained personnel proceed to extinguish and control the fire. This procedure will continue until the fire is extinguished, fire personnel arrive or fire becomes uncontrollable. If, in the opinion of management, the fire is beyond safety limits all personnel will be evacuated from the facility.
- Given that this subject is of utmost importance, a thorough report needs to be prepared, policy and standard operating procedure developed and required training is given. These will include but not limited to the following:
 - a. Fire Alarm and Evacuation Procedures
 - b. Firefighting Equipment
 - c. Firefighting equipment Inspection
 - d. Plant-Wide Training Program
 - e. Fire Evacuation Safety Plan
 - f. Fire Equipment Location Log
 - g. Portable Fire Extinguishers Inspection and maintenance Guidelines
 - h. Automatic Fire Detector Requirements
 - i. Responsibility staff
 - j. Fire Alarm Inspection Procedures
 - k. Emergency Evacuation Procedures

2.3. Explosions

Fires and explosions are closely related. One can easily be the cause or the result of the other. Explosions are most likely to occur in enclosed areas.

In the event of explosion, the Shift Supervisor, or designee, must do the following:

- Administer first aid if required;
- Call the Fire Department, CRRA and the Insurance Company;
- Alert Plant personnel;
- Locate and shut down possible sources of combustion (e.g. fuel and gas lines, flammable materials, etc.);

- Assess damage to property and mechanical equipment and file a report in written form.

Plant personnel must make every effort to minimize the possibility of explosion. Precautions are taken to prevent potentially explosive materials from entering the plant processing lines. Plant waste review and processing procedures minimize the likelihood of an explosion by segregating explosive materials from further processing.

Additionally, the following practices are in place to minimize the possibility of explosion:

- Strictly enforce no-smoking rules;
- Post signs indicating potential explosion hazard areas;
- Use positive mechanical ventilation prior to entering or when working in a potentially explosive or suspected oxygen deficient area.

2.4. Accidents and Injuries

Procedures followed in the event of an accidental injury in the facility are naturally dependent on the type and severity of the injury. Listed below are the procedures to follow for two scenarios:

a- Major Injuries - Outside Medical Attention

Required: CALL emergency and Supervisor & Facility Manager notification

- The injured employee or an employee nearby will either alert the Supervisor or Plant Manager using a facility or cellular phone.
- As the injury necessitates first aid shall be administered immediately. The supervisor will notify immediately the Plant Manager, and a speed boat will be called to transfer the injured employee to nearest hospital for treatment.
- In parallel the supervisor / plant manager will contact the injured employee's designated emergency contact person.
- Once the injured employee has been transported to the hospital, the reporting and investigation procedures will begin.

b- Minor Injuries – In Plant Medical Attention Necessary:

Required: Supervisor or Manager Notification

- Either the injured employee or an employee nearby will alert the supervisor who will then perform first aid if necessary. After first aid is performed the employee will be instructed to go to the break room.

- If hospitalization is required the supervisor or assignee will order speed boat to transport injured employee to the nearest hospital.
- Should the employee's injury require to go home however, are incapable of transporting themselves a supervisor or assignee will transport the employee. An employee injured on the job is entitled to all benefits following employment contract / GOM regulations in that regards.

c- First Aid

The first aid kit in the First Aid area is equipped to cover basic first aid needs. All first aid cases must be referred to facility management.

The Plant Manager is responsible for:

1. All in-house first aid treatment;
2. The maintenance of adequate first aid equipment;
3. Decisions concerning case referral to the hospital in coordination with the facility personnel; and
4. Ensuring that emergency calls are made immediately when required.

d- Accident Reports

- Immediately following a work-related injury requiring more than first aid, or a work-related illness, Occupational Injuries and Illnesses form is completed. This form lists the name of the employee, department and description of the illness or injury.
- Whenever there is an injury which requires medical attention a WAMCO Accident Report is completed. The report includes accident description, preventative actions taken, witnesses, equipment involved, unsafe conditions which led to the accident, other factors which contributed to the accident, and recommendations and comments to avoid similar accidents to happen again. A copy of the Accident Report will be sent to the MEE's focal point / project manager within 24 hours of the incident.
- Unsafe conditions which lead to any accident in the facility are to be immediately corrected to prevent further accidents / injuries. The administration of first aid will be recorded and maintained for all incidents.
- After an accident occurs and reports are completed an investigation by the plant manager will follow.

2.5. Hazardous Waste Management

RWMF receive hazardous wastes generated from households and medical establishments. Although the quantities of hazardous wastes are small, yet hazardous in nature and requires special handling to avoid toxic exposure that can cause harm to employees as a result of direct contact. Normal facility operations can, however, at times produce potential safety hazards to employees working in the vicinity of certain equipment. These hazards include but not limited to:

- Noise from the various vehicles such as loaders, bulldozers, etc., as well as parts of plants / facilities including MRF, incinerator and balers;
- High temperatures at vicinity of certain areas of the incineration plant, or exposure to direct sunlight in a hot day for extended period of time, etc.;
- Loading of certain types of “sharp” recyclables such as aluminum cans or glass in processing lines at MRF or balers.
- Toxic emissions / vapors emitted due to heat, decomposition, etc.
- Potentially dangerous situations can also occur around any processing equipment that is made up of moving parts.

Accordingly, the goals of the facility management in regards to personnel health and safety include the following:

- To describe all types of health and safety hazards that exists at various facilities to employees;
- To familiarize the employees with the safety measures and equipment to be used;
- To explain all safety procedures;
- To explain Occupational Safety and Health guidelines as per GOM policies and relevant programs in that regards that are designed to limit hazards to employees; and
- To explain Fire Fighting Procedures, Explosion Prevention Procedures in the event an accident occurs.