

Environmental Monitoring Report

PUBLIC

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Quarterly Report (July to September 2023)
November 2023

Maldives: Greater Male Waste-to-Energy Project

Prepared by the Ministry of Environment, Climate Change and Technology for the Ministry of Finance and the Asian Development Bank (ADB).

CURRENCY EQUIVALENTS

(As of 1 November 2023)

Currency unit	–	Equivalent
1 MVR	=	\$ 0.065
\$1.00	=	MVR15.46

ABBREVIATIONS

ADB	–	Asian Development Bank
CVRA	–	climate vulnerability and risk assessment
DBO	–	design-build-operate
EA	–	executing agency
EIA	–	environmental impact assessment
EMP	–	environmental management plan
EPA	–	Environmental Protection Agency
ER	–	employer’s representative
IA	–	implementing agency
IEE	–	initial environmental examination
MoECCT	–	Ministry of Environment, Climate Change and Technology
MoF	–	Ministry of Finance
MTCC	–	Maldives Transport and Contracting Company
PMDSC	–	project management, design and construction supervision consultant
PMU	–	project management unit
URA	–	Utility Regulatory Authority of the Maldives
WAMCO	–	Waste Management Corporation Limited
WTE	–	waste-to-energy

WEIGHTS AND MEASURES

°C	degree Celsius
dB	decibel
tpd	tons per day
cm	centimetre
km	kilometre
kg	kilogram
MW	megawatt
kW	kilowatt
µg/L	microgram per litre
µg/m ³	microgram per cubic metre

NOTE

In this report, "\$" refers to United States dollars.

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TABLE OF CONTENTS

I.	INTRODUCTION	1
A.	Greater Male Waste-to-Energy Project	1
B.	Project Outcome and Outputs	1
C.	Environmental Category.....	2
D.	About this Report.....	2
II.	PROJECT IMPLEMENTATION ARRANGEMENTS.....	4
A.	Project and Safeguards Implementation Arrangements	4
B.	Status of staff resources	5
III.	PROJECT IMPLEMENTATION STATUS.....	7
A.	Status of Bidding and Contract Award	7
B.	Implementation Status	8
IV.	COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS.....	9
A.	Status of Clearances	9
V.	COMPLIANCE STATUS WITH ENVIRONMENTAL REQUIREMENTS	10
A.	Compliance with Loan Covenants	10
B.	Status of Environmental Assessment, Reports, and Approval.....	13
C.	Safeguards in Bid Documents and Contracts	14
VI.	STATUS OF EMP IMPLEMENTATION.....	20
A.	Details of site visits/field verifications by Safeguard Staff	20
B.	Implementation of Design and Pre-construction Stage EMP	21
C.	Implementation of Construction Stage EMP	31
D.	Implementation of Health & Safety COVID-19 Plan	46
E.	Key Site Observations and Action Taken	46
F.	Unanticipated Impacts	49
VII.	ENVIRONMENTAL MONITORING.....	49
A.	Monitoring Activities - Proposed and Conducted	49
B.	Monitoring Results.....	51
IX.	TRAINING AND CAPACITY BUILDING ACTIVITIES.....	64
X.	PUBLIC CONSULTATION	67
XI.	GRIEVANCE REDRESS MECHANISM	67
A.	Grievance Redress Mechanism.....	67
B.	Grievance Redress Committee (GRC).....	68
C.	Complaints Received.....	68
I.	FINDINGS & RECOMMENDATIONS.....	69
A.	Findings and Recommendations	69

LIST OF TABLES

Table 1: Subprojects/Packages	2
Table 2: Environmental Safeguards Team.....	5
Table 3: Status of Contract Packages	7
Table 4: Implementation Status of Civil Works Contract Packages	8
Table 5: Status of Statutory Clearances	9
Table 6: Status of Compliance with Loan Covenants	11
Table 7: Status of the EIA Report.....	14
Table 8: Compliance to the EHS Clauses in the Contract.....	14
Table 9: Field Verification Visits by Safeguards Supervision and Monitoring Staff	20
Table 10: Design/Pre-Construction Mitigation Measures Implementation & Compliance.....	22
Table 11: Status of Plans to be included in the CEMP	31
Table 12: Construction Mitigation Measures Implementation & Compliance.....	34
Table 13: Site Observations and Current Status	47
Table 14: Details of Construction related incidents (Reporting Period).....	48
Table 15: Construction related incidents.....	48
Table 16: Additional Baseline Data Gathering During Design/Pre-construction Stage.....	49
Table 17: Description of Ambient Air Quality Sampling Stations	51
Table 18: Results of Ambient Air Quality Sampling, July, August and September 2023	52
Table 19: WHO Air quality Standards for parameters monitored.....	52
Table 20: Description of Noise Sampling Stations.....	53
Table 21: Results of Ambient Noise Level Measurements.....	54
Table 22: Results of Marine Water Quality Sampling, August 2023	57
Table 23 Groundwater Quality Results, August 2023.....	60
Table 24: Water quality for domestic supply of water used in construction camp during July-23	61
Table 25: Water quality for domestic supply of water used in construction camp during August and September -23	62
Table 26: Treated Wastewater Quality from WWTP/STP during July, August and September-23	63
Table 27: Training and Capacity building activities conducted	65
Table 28: Key Issues and Proposed Remedial Actions	69

LIST OF FIGURES

Figure 1: Project Implementation Area	3
Figure 2: Ambient Air Quality Sampling Sstations	51
Figure 3: Noise Sampling Stations	54
Figure 4: Marine Water Quality Sampling Stations.....	56
Figure 5: Groundwater Sampling Stations	59

APPENDICES

- Appendix 1 Status of permits applicable during construction and copies of permits obtained during reporting period.
- Appendix 2 Site Inspection Reports by PMDCSC from July to September 2023, including Site Inspection Photos
- Appendix 3 Results of Monitoring (Air Quality, Noise, Water and Waste water Quality)
- Appendix 4 Marine ecology survey report conducted in July 2023
- Appendix 5 Other Site Photos (from Contractor)
- Appendix 6 Brief of Public consultation conducted by PMU on 3rd July 2023

I. INTRODUCTION

A. Greater Male Waste-to-Energy Project

1. The project will establish a sustainable regional solid waste treatment system in the Greater Malé capital region by (i) developing treatment (proven waste-to-energy [WTE] technology), recycling and disposal infrastructure; (ii) strengthening institutional capacities for sustainable solid waste services delivery and environmental monitoring; and (iii) improving public awareness on WTE and reduce-reuse-recycle (3Rs). The project is designed to reduce disaster risk and improve climate change resilience while creating a cleaner environment and reducing greenhouse gas (GHG) emissions.

2. The Greater Malé capital region and its outer islands (see Figure 1 for the project implementation area) suffer from inadequate collection and haphazard disposal of solid waste leading to environmental pollution and deteriorating livability. The project area covers 32 inhabited islands in the North Ari Atoll (AlifuAlifu Atoll), South Atoll (AlifuDhaalu Atoll), Malé' Atoll (Kaafu Atoll) and Vaavu Atoll, including the capital city of Malé, with a total population of 295,000 (53% of Maldives) as stated by the National Bureau of Statistics (2018), Maldives Population Projections 2014-2054.

3. Lack of a sustainable system to manage the 836 tons per day (tpd) of solid waste (Feasibility Study, 2018) generated in the project area resulted in waste spillage into the ocean, and open dumping and burning of garbage at the 30-year-old, 10-hectare dumpsite on Thilafushi Island which has no pollution control measures, creating a public health and environmental hazard. Plumes of smoke visible from the capital Malé, the international airport and nearby resorts compromise air quality and pose nuisance to residents and tourists, while leachate and plastics contaminate the surrounding marine environment. This poses a critical threat to tourism and fisheries, both of which rely heavily on the country's pristine environment and are cornerstones to Maldives' economy. This project will establish a sustainable regional solid waste treatment and disposal system. Proposed project site is shown in Figure 2.

B. Project Outcome and Outputs

4. The project will have two outputs and Table 1 presents the subprojects and/or packages:

- (i) **Output 1:** Disaster- and climate-resilient regional waste management facility developed. This will include (i) a 500 tpd WTE plant with 15-year operations and maintenance (O&M) contract, including two treatment lines of 250 tpd each, energy recovery and air pollution control (APC) system; and (ii) a landfill for safe disposal of APC residues and non-marketable bottom ashes. The facility is expected to export 10.5 megawatt (MW) of electricity to the grid and will be designed to accommodate a third 250 tpd treatment line, required to respond to further demand increase. All facilities will adopt disaster- and climate-resilient features such as raised floor elevations, flood-proof mechanical and electrical equipment and landfill cells, and enhanced drainage systems.
- (ii) **Output 2:** Institutional capacity in sustainable solid waste management (SWM) services delivery (WTE) and environmental monitoring strengthened and public awareness on WTE and 3Rs improved. This will include (i) capacity building support in monitoring sustainable WTE operations, including the Ministry of Environment, Climate Change and Technology (MoECCT) and the Environmental Protection Agency (EPA)

institutional capacity strengthening and training to monitor WTE O&M and environmental standards; (ii) public awareness on WTE and 3Rs in Greater Malé improved; and (iii) project management and supervision consultant support provided.

Table 1: Subprojects/Packages

No.	Subproject / package	Type of contract
1	WTE plant and auxiliary facilities of plant with 15 years O&M contract	Design-Build-Operate (DBO)
2	Project management and supervision	Consulting services contract
3	Community awareness consultant	Consulting services contract
4	Individual Environmental Monitor	Consulting services contract
5	Joint Crediting Mechanism Auditor	Consulting services contract

C. Environmental Category

5. The project is classified as environmental category A according to Safeguard Policy Statement (SPS) 2009 of the Asian development Bank (ADB) due to construction and operation of a large WTE facility which may have potential significant adverse impacts. This project is classified as a Schedule D project by the Environmental Protection Agency (EPA), Republic of Maldives based on the Regulation on the Preparation of Environmental Impact Assessment (EIA) Report (2012/R-27). The Approval/Decision Statement for this project has been received from the EPA on 21 January 2020 and extended until December 2021. As site preparation work and demarcation work and site levelling work started within the EIA extension period, the EIA is valid till the end of project construction phase and operation phase. However, any change or any new activity which require permit should follow a screening process with the EPA. As such an addendum was prepared for construction and operation of a domestic sewerage treatment plant which was not covered in the EIA.¹

D. About this Report

6. This is the quarterly environmental monitoring report (QEMR) prepared by the Project Management Unit (PMU), the Ministry of Environment, Climate Change and Technology (MoECCT), for the monitoring period from 1st July 2023 to 30th September 2023. This QEMR provides the status of project implementation, presents the preparation and implementation of environmental management, details of mitigation and monitoring actions, and status reports of compliance with the environmental management plan (EMP) and ADB loan covenants. This report covers the contract packages implemented under this project.

¹ According to EIA regulation 2012 validity of EIA is one year and can only be extended once for another year. Before validity of decision statement expires, construction related work such as site clearance and mobilization of equipment and materials can be carried out. EPA considers such preliminary works as site activities as project initiation. Once a project is initiated within the validity period of EIA decision statement validity period of the permit will remain.

Figure 1: Project Implementation Area

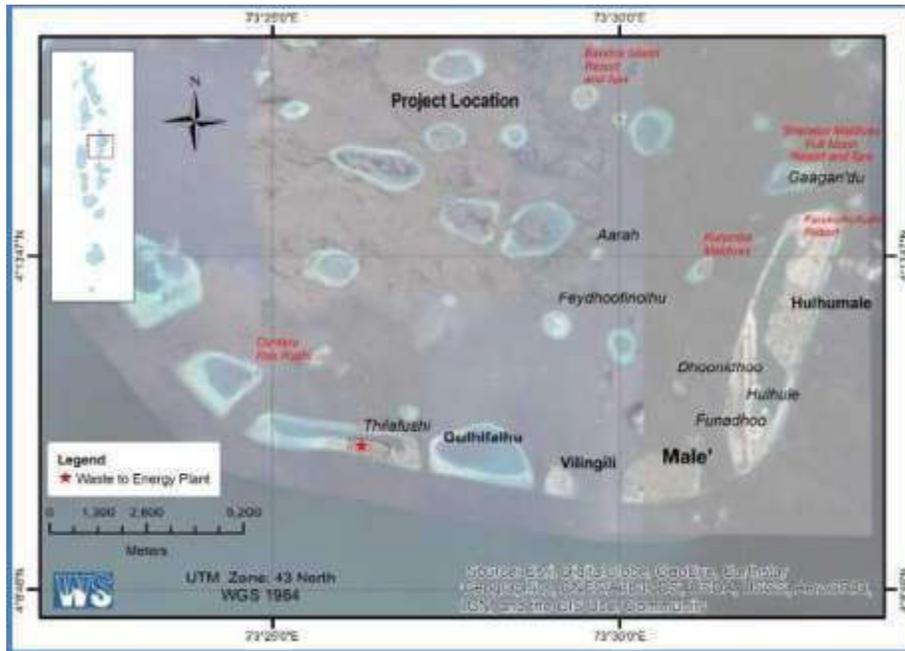
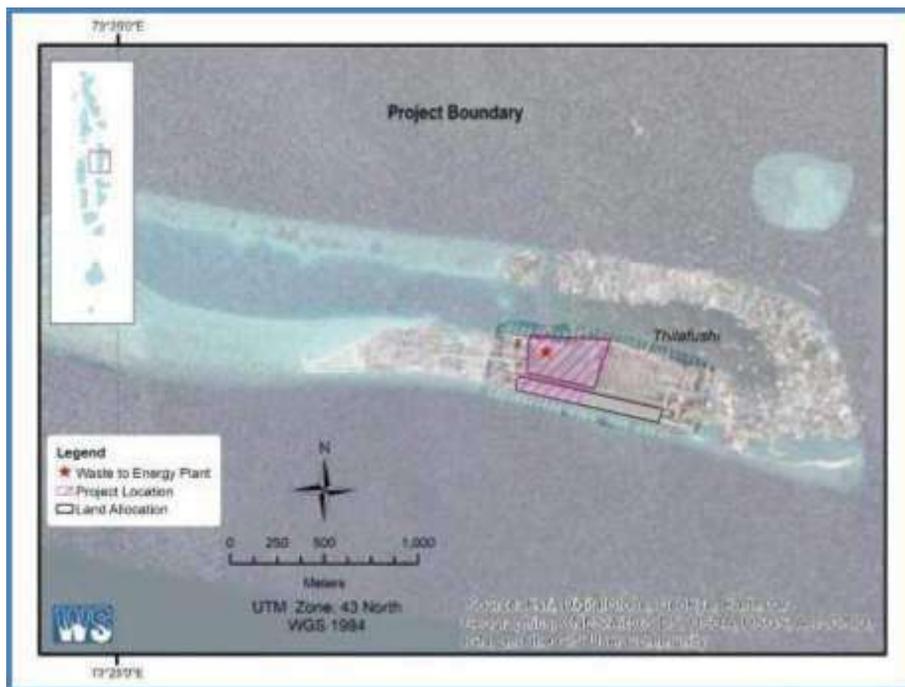


Figure 2: Proposed WTE Site in Thilafushi



II. PROJECT IMPLEMENTATION ARRANGEMENTS

A. Project and Safeguards Implementation Arrangements

7. The project's executing agency (EA) is the Ministry of Finance (MoF), while the implementing agency (IA) is the MoECCT. The PMU at the MoECCT will assist in: (i) project management; and (ii) function as project implementation unit to assist in day-to-day project implementation and operation of water supply, water resource management, and capacity building components.

8. A project steering committee (PSC), with membership comprising of officials from relevant ministries, representatives from other relevant institutions/agencies, provides overall policy and strategic guidance to the Project and ensures collaboration among central level agencies. The PSC is Chaired by the Minister, MoECCT (or a senior official designated by the Minister), and representative from MOF, Ministry of National Planning and Infrastructure, Ministry of Housing and Urban Development, Waste Management Corporation Limited (WAMCO), Ministry of Tourism, Ministry of Health, Ministry of Gender, Family and Social Services, Local Government Authority, Environmental Protection Agency, State Electric Company Limited (STELCO), and the Malé City Council.

9. MoECCT, through the PMU, is responsible for ensuring the project's compliance with the ADB loan covenants. Headed by the Project Director PMU is having overall responsibility and for the day-to-day implementation of the project. The PMU is staffed with technical, financial, safeguards, capacity building/governance and procurement officers to manage all technical, procurement, safeguards, and loan account administration. The PMU's key technical and managerial staff are supported by the Project Management Design and Construction Supervision Consultant (PMDSCS).

10. PMU is responsible for the implementation of this project in compliance with ADB's SPS 2009 and the applicable government rules and regulations. PMU, through a Safeguards Specialist, oversees the implementation and monitoring of environmental safeguards and is responsible for implementation, monitoring, reporting and compliance with safeguards related ADB loan covenants. PMU is supported by various experts, and the details of consultants, DBO contractor and monitoring experts involved in the project are given below:

- (i) Consultants for implementation and monitoring. PMU is assisted by the Environmental specialist consultants of PMDCSC in environmental safeguards.
- (ii) DBO Contractor. The WTE plant will be designed, constructed, operated, and maintained by a single contractor using the DBO contract. The O&M period under the DBO Contract will be 15 years. The DBO Contractor is responsible for the implementation of the EMP at all stages of the project. The DBO Contractor includes a full-time Environmental Specialist with extensive experience.
- (iii) External monitoring. As required by SPS 2009 for a category A project, an Independent External Monitor (IEM), an environmental expert has been contracted for this project to verify its monitoring information and reports directly to ADB. The IEM shall not be involved in the day-to-day project implementation or supervision of the project but will closely coordinate his/her site visits and work with the PMU.

B. Status of staff resources

11. **Current status.** Table 2 shows the environmental safeguards staff engaged at all levels in the project including project agencies, consultants, contractors, and monitoring personnel. As of the end of this reporting period, except the position of environmental officer (national) in PMDCSC which is vacant since September 1, 2023, all other positions in PMU, PMDCSC and the DBO contractor have been filled. The recruitment for environmental officer position is in process. According to the DBO contractor's obligation three health and safety inspectors and three environmental inspectors must be on site. Currently there is a HSE manager who has two subordinates for environment and health and safety. As site work is now on one shift, two environmental inspectors and two health and safety inspectors are on site.

Table 2: Environmental Safeguards Team

No	Positions	Name of the expert/staff	Contact Number & Email	Remarks
A PMU				
1	Social and Environmental Safeguards Specialist	Ibrahim Mohamed	+9609811114 ibrahim.mohamed@environment.gov.mv	-
B PMDCSC (FichtnerGmbH& Co. KG together with Renewable Energy Maldives)				
1	Team Leader	Javier Varon	+34608147897 Javier.varon@fichtner.es	-
2	Project Manager	Maximilian Schrade	+601112201489 Maximilian.schrade@fichtner.de	-
3	Environmental Expert (international)	Sunil Chandra Gupta	+91- 9759955477, 9412230242 heenagrawal1@yahoo.co.uk	-
4	Environmental Officer (national)	Ahmed Aslam	+9607957003 aslam-11@hotmail.com	Due to resignation, this position is vacant from Sep 1, 2023. Process to recruit new candidate is on. PMDSC has selected a candidate and PMU has send for approval of ADB. PMDSC's Site Engineer (Sofi Ismail) will conduct EHS monitoring until EO is recruited and mobilized on site.
C DBO Contractor (URBASER SA)				
1	Project Manager, URBASER (DBO contractor)	Javier Gamero Sutil	+34914122000 / +34 914122907 jgamero@urbaser.com	-
2	EHS Manager, URBASER (DBO contractor)	Roshan Thomas	+960 911 0165 rthomas@urbaser.com	-
3	Contractor's Engineers (Project Manager)	Raymond Lee	+6590057789 rlee@ramboll.com	Ramboll as a company has been contracted as

No	Positions	Name of the expert/staff	Contact Number & Email	Remarks
				contractor's engineer by URBASER on 15 March 2022
4	HSE Manager	Senol Kircalli	senol.kircaali@aawte.com	-
5	Environmental Manager	Sedat Cot	sedat.cot@aawte.com	Joined on 16 August 2023 as replacement of Mr Ta Hoa Binh
6	HS manager	Dhamothara Kannan	+9609188331 dhamu@aawte.com	-
7	Environmental Consultant (national)	Dr. Mahmood Riyaz	+9607890307 mahmood.riyaz@gmail.com	-
D	Independent External Monitor			
1	Independent environmental monitoring expert	Nicholas Skinner	nick.skinner@vistaenvironment.com 0046736504583	-

III. PROJECT IMPLEMENTATION STATUS

A. Status of Bidding and Contract Award

12. The project has five contract packages. Details of contract packages are given in Table 3.

Table 3: Status of Contract Packages

No.	Package Number/Name	Project components	Status	Name of contractor	Duration of contract	Contract start date
1	DBO a WTE plant in Thilafushi	WTE plant and balance of plant with 15 years O&M	Contract awarded	Urbaser SA	18.5 years	10 October 2021
2	Project management, design and construction supervision	Project management, design and construction supervision	Contract awarded	Fichtner GmbH & Co. KG and Renewable Energy Maldives (REM)	66 months	30 January 2022
3	Community/Public Awareness consultant	Community Awareness consultant	Four consulting organizations have been shortlisted on the basis of EOI on March 6 2023 and the proposals were submitted on 7September 2023	-	-	Proposals will be evaluated in October 2023 and firm will be hired in November 2023.
4	Individual Environmental Monitor	Independent external monitor for environment category A project	Contract signed	Vista Environment AB -Nicholas Skinner	60 months	19 December 2021
5	Joint Crediting Mechanism (JCM) Auditor	To validate proposed JCM project and verify GHG emissions reduction	Not advertised yet and to be hired in Q3 of 2024	-	-	-

B. Implementation Status

13. Implementation status of awarded civil work contract packages is presented in Table 4.

Table 4: Implementation Status of Civil Works Contract Packages

No.	Package	Progress during reporting period	Cumulative progress as of 30 September 2023	List of main activities/works conducted during reporting period	Activities / Components completed to date
1	WTE plant and balance of plant with 15 years O&M.	Design: 11.05% Construction: 3.18% Procurement 3.77% Overall Progress 3.61%	Design: 48.85% Construction: 5.77% Procurement 20.27% Overall Progress 12.37%	<p><i>Design, EIA and documentation,</i></p> <ul style="list-style-type: none"> • Detailed design of foundation and boiler components ongoing • Geotechnical investigation report revision on going • EIA update completed • Monitoring of ambient air quality, noise level, ground water and marine water quality • Preparation /review / finalization of HSE Plans • Dewatering permits for WtE Building excavation from URA and excavation permits from Urbanco (HDC) for main process building and bunker <p>Pre-construction / construction works</p> <ul style="list-style-type: none"> • Spun piling works ongoing • Installation of the prefabricated worker accommodation building-2 ongoing • Installation of the dewatering pumps line ongoing • Sheet piling and preparation for excavation of the main process area and Bunker area 	<ul style="list-style-type: none"> • Concept design • Permitting design • EIA Update • Installation fence around the project site, • Installation of wastewater treatment plant (WWTP) • Labor camp phase one completed and operationalized

IV. COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

A. Status of Clearances

14. Details of clearances, permits and approvals required for the implementation of the projects, status, and further actions required for compliance are presented in Table 5 and copy of each permit obtained during reporting period is enclosed as Appendix-1.

Table 5: Status of Statutory Clearances

Clearance/Permit Required	Status	Further Actions/Remarks
DBO Contract		
Environmental Clearance from EPA	<ul style="list-style-type: none"> Decision Statement (DS) obtained on 21 January 2020 and extended until 31 December 2021 EIA Addendum for commissioning of domestic Wastewater Treatment Plant (WWTP) at the WtE site has been approved by EPA and the documents were sent to URA for approval on 23 February 2023. URA issued the permit for operation of STP vide letter dated 12 April 2023. 	<ul style="list-style-type: none"> There is no need to apply or renew for the construction phase as site clearance and levelling works started on 28 December 2021 by the contractor and has been informed to EPA. As site works already started no renewal of permit required from EPA. Site works undertaken after levelling involved securing of required Government permits, boundary fencing, setting up of project site office. Monitoring program outlined in the EIA are being implemented during pre-construction phase and construction phase and summary of environmental monitoring reports will be submitted to MoECCT as outlined in paragraph 8 of the Decision Statement. Failure to submit may result in the suspension or revocation of the permit. All quarterly environmental monitoring reports which include all details of monitoring is submitted to EPA. The last report was submitted on 5th July 2023.
Dewatering Permit	Dewatering permits for WtE Building excavation have been obtained from URA on 20.08.23 and 21.09.23 as its one-time validity is 28 days only.	<ul style="list-style-type: none"> Must be obtained from the Maldives Utility Regulatory Authority (URA) after every 28 days till completion of dewatering. Samples of water to be discharged into sea must be tested for parameters as specified by URA on regular basis. For dewatering permit the required water quality tests are conducted and results submitted as per compliance requirement.
Sewerage and wastewater treatment permit from the Utility Regulatory Agency (URA).	<ul style="list-style-type: none"> Permit vide ref no 485-TE/PRIV/2023/233 dated 12 April 2023 has been obtained from URA to start operation of domestic WWTP Unit has started operation from May 2023. Submission of monthly testing report from the discharge point of unit to the URA has been started from June 2023. 	<ul style="list-style-type: none"> For discharging of treated grey water or black water to sea or ground, permit is required. Permit has been obtained Monthly testing report from discharge point of unit is to be submitted to URA on regular basis. Monthly reports of treated water quality are submitted to URA

Clearance/Permit Required	Status	Further Actions/Remarks
Operation of DG sets	<ul style="list-style-type: none"> Application has been submitted to URA and a temporary permit is given via an official email. At present DG sets of total capacity 200 KW are being used at project site while anticipated total capacity of DG sets is 600 KW during construction phase. 	Maldives Utility Regulatory Authority (URA). The URA has given a conditional approval to operate gen sets on 18 th September 2023 via an official email. All requirements are fulfilled by contractor, but final approval is pending due to URA being unable to process fees. Hence, waiting for this issue to be resolved by URA.
Excavation	Permits for excavation of area for WtE bunker and process building have been obtained from Urbanco (HDC) on 31.07.23, 26.08.23 and 24.09.23 as its one-time validity is 14 days (excluding government and public holidays) only.	<ul style="list-style-type: none"> Must be obtained from the Urbanco (HDC) after every 14 days till completion of excavation. Need to comply with conditions as stipulated in permit. The conditions state that no disturbance should be to reclamation work ongoing on Thilafushi western part and cable relocation work on site. Contractor has complied to this requirement.
Desalination plant registration and License to operate desalination plant from the URA	Not yet due Will be required during the operation stage	For the desalination plant, it is required to submit the EIA Decision Note for EIA report and completed application forms with all details of the plant to be registered must be submitted to URA. A copy of the relevant section of this EIA may be appended to the forms as justification for the desalination plant.
Fire Safety (Kitchen and Worker Accommodation)	<ul style="list-style-type: none"> Permit from MNDF (Fire Approval Letter) has been obtained on 15 February 2023 for accommodations and offices at the camp site for the construction phase. Inspection was conducted by MNDF on 3.07.23 for verification of firefighting system installed for compliance with standards. Letter dated 5 July 2023 on findings of same is enclosed in the Appendix-1 	Maldives National Defense Force (MNDF) has provided permit for fire safety to camp facilities in operation including kitchen and workers accommodation. No fire hydrants required according to local regulations. Refer MNDF letter attached in Appendix

V. COMPLIANCE STATUS WITH ENVIRONMENTAL REQUIREMENTS

A. Compliance with Loan Covenants

17. The status of compliance with environmental safeguard related loan covenants is given in Table 6. All loan covenants are being complied with.

Table 6: Status of Compliance with Loan Covenants

Loan Agreement	Covenant	Compliance Status	Proposed actions, if any
Schedule 4, paragraph 4 Environment	The Borrower, through the Project Executing Agency and the Implementing Agency, shall ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Borrower relating to environment, health and safety (b) the Environmental Safeguards; and (c) all measures and requirements set forth in the EIA, the EMP, and any corrective or preventative actions set forth in a safeguards monitoring report.	Being complied. PMU is continuously monitoring to ensure that Project activities follow all applicable laws and regulations and the Safeguards Specialist of the PMU ensures that all measures and requirements set forth in the EIA and EMP are complied with.	-
Schedule 4, paragraph 6 Human and Financial Resources to Implement Safeguards Requirements	The borrower shall make available necessary budgetary and human resources to fully implement the EMPs.	Being complied. The Social and Environmental Safeguard Specialist and PMDCSC are assisting PMU in monitoring and in reviewing of documents and approval process.	-
Schedule 4, paragraph 7 Safeguards-Related Provisions in Bidding Documents and Works Contracts	The Borrower through the Project Executing Agency and the Implementing Agency, shall ensure that all bidding documents and contracts for Works contain provisions that require the contractors to: (a) comply with the measures relevant to the contractor set forth in the EIA and the	Complied. All bidding documents related to the project included the EIA and the EMP, and compliance have been ensured by the Safeguards Specialist, PMU.	Any updated version of the EIA will be provided to the Contractor. Contractor shall be required to comply with all relevant requirements in the updated EIA (including any new requirements not included in the draft EIA and/or any amended requirements from the draft EIA)

Loan Agreement	Covenant	Compliance Status	Proposed actions, if any
	<p>EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report;</p> <p>(b) make available a budget for all such environmental measures; and,</p> <p>(c) provide the Borrower with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the EIA and the EMP.</p>		
<p>Schedule paragraph 8</p> <p>Safeguards Monitoring Reporting</p>	<p>4, and</p> <p>The Borrower, through the Project Executing Agency and the Implementing Agency, shall do the following:</p> <p>(a) submit quarterly Safeguards Monitoring Reports to ADB during construction of the project facilities and semi-annual Safeguards Monitoring Reports thereafter, and disclose relevant information from such reports to affected persons promptly upon submission;</p> <p>(b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project</p>	<p>Being complied. Environmental monitoring reports are submitted to ADB accordingly and the Independent External Monitor has been engaged on 19 December 2021 to verify the monitoring information of the project. Any breach or potential breach will be reported.</p>	-

Loan Agreement	Covenant	Compliance Status	Proposed actions, if any
	<p>that were not considered in the EIA and the EMP, promptly inform ADB of this occurrence of each risks or impacts, with detailed description of the event and proposed corrective action plan;</p> <p>(c) no later than 3 months after the Effective Date, engage qualified and experienced external experts or qualified NGOs under a selection process and terms of reference acceptable to ADB, to verify information produced through the project monitoring process and facilitate the carrying out of any verification activities by such external experts; and,</p> <p>(d) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP promptly after becoming aware of the breach.</p>		

B. Status of Environmental Assessment, Reports, and Approval

18. The draft Environmental Impact Assessment (EIA) Report has been cleared by ADB and disclosed in their website in July 2020 as complying with the requirements of SPS 2009. The draft EIA updated by the DBO Contractor considering the approved concept design and baseline environment monitoring results during pre-construction activity, reviewed, and cleared by PMDCSC / PMU and submitted to ADB. Updated EIA report has been cleared by ADB. Table 7 presents the status of the EIA report.

Table 7: Status of the EIA Report

No.	Package	Status		Remarks
		Concept Design	Detailed Design	
1	WTE plant	EIA update considering change in power production from 10 MW to 13 MW capacity and the required additional baseline data, as well as the environmental monitoring results during pre-construction activity has been submitted to ADB.	In the process EIA will be further updated with reflect the detailed design	<ul style="list-style-type: none"> • Draft EIA disclosed in ADB website in December 2019 • Updated draft EIA disclosed in ADB website in March 2020 and July 2020 provide explanatory notes for the updates. • The updated EIA is disclosed by ADB on 11th September 2023 • Draft and updated EIA reports also disclosed on implementing agency / project website. • Also, EIA update with air quality dispersion modeling, thermal plume modeling, and other appropriate updates will be done based on the detailed design by the DBO Contractor after finalizing detailed design.

19. The link for the EIA update disclosed in July 2020 at the ADB website is <https://www.adb.org/projects/documents/mld-51077-003-eia-2> while the link for the project website is <https://www.environment.gov.mv/v2/en/download/10368>. The link for EIA updated in August 2023 in ADB website is <https://www.adb.org/projects/documents/mld-51077-003-eia-3> and link from Project website is https://mymaldiveshome.environment.gov.mv/knowledge_articles/environmental-impact-assessment-greater-male-waste-to-energy-project-waste-to-energy-plant-part-a/

C. Safeguards in Bid Documents and Contracts

20. The EIA has been included in the bid documents as well as in the DBO Contract. Table 8 presents the specific EHS clauses in the Contract and the status of compliance.

Table 8: Compliance to the EHS Clauses in the Contract

Items in the Contract	Description	Status
5.11 Contractors EMP:		
1. General	The Contractor shall prepare a Contractors Environmental Management Plan (CEMP) describing specific design features that will ensure environmental protection and setting out the working methods, management, and mitigation and monitoring measures that will be put in place, for each of the various construction activities, during the implementation of the Works.	<p>Following are in process and status of same are as per given in Table 11:</p> <ol style="list-style-type: none"> 1. Development of various plans/documents as referred to in CEMP. 2. Development of ESMS including SOPs and Checklists for CEMP

Items in the Contract	Description	Status
	<p>The scope of the CEMP shall address all of the issues itemised in the project EMP contained with the Environmental Impact Assessment as listed in Appendix 3.2. The CEMP shall be consistent with the environmental management plan (EMP) in the EIA report of the project. The CEMP shall have the same level or stricter set of measures than those included in the EMP.</p> <p>The CEMP shall consider ISO 14001 when detailing the environmental management system in place.</p>	<p>and H&S plan in alignment with ISO 14001 and ISO 45001, respectively.</p> <p>3. Documents will be reviewed by PMU through PMDCSC.</p>
2. Environmental Manager and Officers	<p>The Contractor shall appoint an Environmental Manager who shall be permanently based on the Site for the full duration of the Works from the date of the Contractor's mobilization until the commissioning of Works has been completed. In addition, the Contractor shall appoint at least one Environmental Officer for every shift during construction period that shall be trained accordingly. The Contractor shall ensure that no construction activities shall be without the Environmental Manager and/or one Environmental Officer on duty.</p>	<p>Following have been appointed on a fulltime basis by contractor at site:</p> <ol style="list-style-type: none"> 1. Mr Roshan Thomas, HSE Manager, URBASER (DBO contractor) joined the project site on 7 May 2023. 2. Mr Senol Kircalli, HSE Manager (EPC contractor) 3. Mr Sedat COT -Environment Manager (EPC Contractor)
3. Commitment	<p>The Contractor shall ensure that his Project Manager, Environmental Manager, and all key personnel including but not limited to professional engineers, site supervisors and all persons responsible for directing work on the site are provided with appropriate training to ensure their understanding and compliance with the requirements of the CEMP.</p>	<ul style="list-style-type: none"> • Ongoing and need to continue training regularly.
4. Submission of CEMP	<p>The CEMP shall be submitted to the Employer's Representative on the date indicated in sub-chapter 5.5 (Phasing Requirements) and no construction work shall be carried out on Site until the CEMP has been approved by the Employer's Representative.</p> <p>If the Contractor fails to apply the CEMP or in any way fails to exercise due care of the natural environment, the Employer's Representative will arrange necessary measures to be implemented by others and to recover the cost from payments due to the Contractor.</p> <p>This section of the specification shall prevail over any other section in the event of ambiguity or conflict in requirements for environmental protection or treatment of social issues.</p>	<p>CEMP, CEMP Guide, Pre-Construction Monitoring-Baseline Data Gathering Plan have been approved. However, Following are in process of preparation, review and approval and status of same are given in Table 11:</p> <ul style="list-style-type: none"> • Development of various plans/documents as referred to in the CEMP. • Development of ESMS including SOPs and Checklists for CEMP and H&S plan in alignment with ISO 14001 and ISO 45001, respectively.
5. Equipment	<p>The Contractor shall mobilize on-site the required field equipment for environmental monitoring as necessary to demonstrate compliance with the requirements of the CEMP.</p> <p>All laboratory and test equipment shall comply with the relevant standards of the International Standards Organization (ISO).</p>	<p>It is being done via external agencies and laboratory in line with the method statement given as Appendix of CEMP.</p>
6. Content of the CEMP	<p>The CEMP shall, inter alia:</p> <ul style="list-style-type: none"> • Describe the features of the Contractor's 	<p>CEMP, CEMP Guide, Pre-Construction Monitoring-Baseline Data Gathering Plan have been</p>

Items in the Contract	Description	Status
	<p>design that will ensure environmental protection;</p> <ul style="list-style-type: none"> ● Describe how the Contractor will address all the issues and recommendations of the project EMP; ● Identify the key environmental risks associated with all aspects the Contractor's construction activities, including: <ul style="list-style-type: none"> ○ dust emissions ○ emissions from equipment and vehicles ○ noise and vibration impact from construction traffic ○ risks from exploitation of sand, aggregates and rip rap materials ○ risks from spills/contamination of soil and groundwater ○ risks from soil handling ○ risks to surface water quality; ● Detail all site-specific measures that the Contractor will implement during construction to manage and mitigate the identified environmental risks; ● Describe the Contractor's procedures for monitoring and reporting compliance with the CEMP; ● Detail the members of the Contractor's staff who will responsible for implementing the mitigation measures in the CEMP and monitoring compliance; ● Describe the Contractor's stakeholder grievance mechanism for environmental matters. 	<p>approved. However, Following are in process of preparation, review and approval and status of same are given in Table 11:</p> <ul style="list-style-type: none"> ● Development of various plans/documents as referred to in the CEMP. ● Development of ESMS including SOPs and Checklists for CEMP and H&S plan in alignment with ISO 14001 and ISO 45001, respectively.
7. Monitoring and Reporting	<p>The CEMP shall be monitored on a monthly basis. The Contractor shall include a report on compliance with the CEMP in its Monthly progress reports.</p> <p>a) Should any environmental incidents be observed or reported by the workers, this shall be reported to the Employer's Representative immediately.</p>	<ul style="list-style-type: none"> ● Environmental monitoring is being carried out as per pre-construction monitoring plan and CEMP. ● Implementation and monitoring of CEMP is being conducted by Contract engineer of DBO contractor and PMDCSC on regular basis and findings are reported in monthly progress report by DBO contractor and HSE site inspection reports by PMDCSC.
5.12 Health and Safety Plan:		
1. General	<p>The Contractor shall prepare a Health and Safety plan (H&S plan) describing all specific features that will ensure the health and safety of the Contractor's Personnel and Employer's Personnel on Site and persons who may visit the Site. The H&S plan shall be aligned with ISO 45001.</p> <p>The plan will cover all types of construction activities during the implementation of the Works. The scope of the H&S plan shall address all of the issues itemised and committed in the National legal context with regard to:</p> <ul style="list-style-type: none"> ● Labour ● Occupational and Community Health and Safety 	<p>All activities towards full compliance (including improvement of quality of documents already prepared) are ongoing. Plan has been approved by PMDCSC and PMU, however:</p> <ul style="list-style-type: none"> a) The H&S Plan is to be improved to ensure alignment with ISO 45001. Revised H&S Plan will be reviewed and approved by PMDCSC and PMU. b) Relevant stand-alone plans as mentioned in the CEMP are in process of finalization.

Items in the Contract	Description	Status
	and shall be aligned with international best practice standards. A H&S plan shall be in force at all times during the Contract.	c) Alignment of SOPs and Checklists with ISO 45001 for supervision, monitoring and review are yet to be submitted for review and acceptance.
8. Health and Safety Manager and Officers	<p>The Contractor shall appoint a Health and Safety Manager who shall be permanently based on the Site for the full duration of the Works from the date of the Contractor's mobilization until the commissioning of Works has been completed. In addition, the Contractor shall appoint at least one full time Health and Safety Officer (or equivalent) for every shift during the construction period and during the full duration of the Operation Service. The Contractor shall ensure that no construction activities or plant operation shall be without the Health and Safety Manager and/or one Health and Safety Officer on duty.</p> <p>The Health and Safety Manager holds the power within the Contractor's organization to be able to suspend the Works if considered necessary in the event of health and safety non-conformities, and to allocate all resources, personnel and equipment required to take any corrective action considered necessary.</p>	<ul style="list-style-type: none"> • Following have been appointed on fulltime basis by contractor at site till the end of the contract period: <ol style="list-style-type: none"> 1. Mr Roshan Thomas, HSE Manager URBASER (DBO contractor) joined the project site on 7 May 2023. 2. Mr SenoKircalli, HSE Manager, EPC Contractor 3. Mr Dhamothara Kannan-H&S Manager, EPC Contractor 4. Mr Yusuf Dulger, H&S Engineer, EPC contractor 5. Mr Muhammet Reha, H&S Inspector, EPC Contractor
9. Commitment	<p>The Contractor shall ensure that all the personnel on site comply with the requirements of the approved H&S Plan.</p> <p>The Contractor shall provide H&S training to the Contractor's Personnel and Employer's Personnel as necessary to ensure safe practices and compliance with the requirements of the H&S Plan.</p>	<ul style="list-style-type: none"> • Draft HSE plans are being followed while revision and finalization of HSE plans are in progress • Trainings are conducted but need to provide additional training for subcontractors on site. • Need improvement through design and implementation of more effective training module toolbox talks as construction team is responsible for implementation of CEMP, H&S plan and other management plans
10. The H&S plan	<p>The H&S plan shall detail all site-specific measures the Contractor shall implement during the construction period to identify, manage and reduce all risks to health and safety. The H&S Plan shall include measures to prevent accidents, arrangements for first aid and arrangements for emergency response. The plan shall be designed to ensure the protection of all Contractor's Personnel, the Employer's Personnel and all other persons who may visit the Site. The H&S Plan shall be consistent with the EIA report and applicable IFC EHS Guidelines.</p> <p>The Health and Safety Plan shall include, but not be limited to, a description of how the Contractor will,</p>	<ul style="list-style-type: none"> • All activities towards full compliance (including improvement of quality of documents already prepared) are ongoing. Plan has been approved by PMDCSC and PMU, however: <ol style="list-style-type: none"> a) The H&S Plan is to be improved to ensure alignment with ISO 45001. Revised H&S Plan will be reviewed and approved by PMDSC and PMU. b) Relevant stand-alone plans as mentioned in the CEMP are in process of finalization and status of same are as

Items in the Contract	Description	Status
	<p>a) Carry out all its health and safety responsibilities as required under the applicable law;</p> <p>b) Provide medical staff; first aid facilities and supplies; sick bay and means of emergency transfer to hospital facilities</p> <p>c) Provide ongoing health and safety training for the Contractor's Personnel and Employer's Personnel;</p> <p>d) Develop and manage all required health and safety monitoring and reporting procedures;</p> <p>e) Manage all health and safety claims.</p> <p>The H&S plan shall be submitted to the Employer's Representative on the date indicated in Section 5.6 (Contractor's documents) and no physical work shall be carried out until the H&S plan has been approved by the Employer's Representative.</p>	<p>per details given in Table 11.</p> <p>c) Alignment of SOPs and Checklists with ISO 45001 for supervision, monitoring and review are yet to be submitted for review and acceptance.</p>
11. Measures to be taken in event of H&S non-compliance	If the Contractor fails to apply the H&S plan or in any way fails to exercise due care, the Employer's Representative will arrange necessary health and safety measures to be implemented by others and to recover the cost from payments due to the Contractor.	No non-compliance so far
12. Reporting	<p>The Contractor shall include a report on accidents on site, and health and safety compliance in its monthly progress reports.</p> <p>Should any Health and Safety incidents be observed or reported by the workers, this shall be reported to the Employer's Representative immediately.</p>	Being complied. One near miss incident has been reported on 1.08.23 and details of same are given in Table 15.
6.5 Health, Safety, Environmental and Social Requirements (operation)		
6.5.1 Health and Safety on Site		
1. Health and Safety on Site	<p>The Contractor undertakes to comply, and to ensure its subcontractors comply, with the Health and Safety Plan (Operations).</p> <p>The contents of the Health and Safety Plan (Operations) shall be as described in Chapter 6.4.10.</p>	To be developed just before the completion of construction phase.
2. H&S Manager	<p>The Contractor shall appoint a Health & Safety Manager (the "H&S Manager") who shall be permanently based on the Site for the full duration of the Operation Service. The H&S Manager shall fulfil the role of Accident Prevention Officer under GCC sub clause 6.7 (Health and Safety) and shall also oversee medical personnel, first aid arrangements and supplies, sick bay and readiness to evacuate serious cases.</p> <p>The H&S Manager shall have the authority within the Contractor's organization to be able to allocate such any resources, personnel and equipment as are required to correct H&S relating deficiencies.</p> <p>During the shift cycles, the H&S Manager shall be represented by a suitably trained shift staff that shall be supervising all H&S related matters.</p>	To be developed just before the completion of construction phase.

Items in the Contract	Description	Status
3. Health and Safety and Emergency Response Training	<p>The Contractor shall provide health and safety training for each of the Contractor's Personnel (including the staff of its subcontractors) and shall keep records of such training.</p> <p>The training activities shall be as specified in the approved Health and Safety Plan and approved Emergency Response Plan. They shall include (as applicable):</p> <ul style="list-style-type: none"> a) Induction training for all Contractor's Personnel; b) Ongoing job-specific technical training; c) Emergency response training; and d) First aid training for designated first aid staff. 	To be developed just before the completion of construction phase.
4. Fire fighting	<p>The Contractor shall</p> <ul style="list-style-type: none"> a) Prepare and be able to implement a fire response plan (which will form part of the Emergency Preparedness Plan); b) Regularly inspect, test and maintain all firefighting installations and equipment; c) Provide sufficient firefighting water according to the legal requirements; and d) Train and inform periodically its staff, the Employer's dedicated staff and other authorities about the implemented firefighting measures and plans. 	<ul style="list-style-type: none"> • Permit from MNDP (Fire Approval Letter) has been obtained on 15 February 2023 for accommodations and offices at the camp site for the construction phase. • Draft Emergency Preparedness Plan is in place (which is yet to be accepted by PMDCSC and subsequently by PMU). • Training for staff on regular basis has been conducted on site.
6.5.2 Contractor's Environmental Management Plan (Operations)		
1. CEMP (Operations)	<p>The Contractor shall update the Environmental Management Plan presented in the project Environmental Impact Assessment (EIA) in Appendix 3.2 in order to make it relevant to the Operation Service.</p> <p>The Operation Service activities described in the CEMP shall follow the structure, norms, and standards defined in Chapter 5.1 and 6.1. and shall be consistent with and shall not relax conditions and requirements as per the EMP included in the EIA.</p>	Not due yet.
2. Environmental Manager	<p>The Contractor shall appoint an Environmental Manager who shall be permanently based on the Site for the full duration of the Operation Service. The Environmental Manager shall fulfil the role defined under GCC sub clause 4.18 (Protection of the Environment) and in addition, be responsible for accident and illness response arrangements.</p> <p>During the shift cycles, the Environmental Manager shall be represented by a suitably trained shift staff that shall be supervising all environmental related matters.</p> <p>The roles Health and Safety Manager and Environmental Manager as well as the corresponding shift members (described in Chapter 6.5.1) may be vested in a single individual.</p> <p>The Environmental Manager shall ensure that all</p>	To be complied after completion of construction.

Items in the Contract	Description	Status
	key Contractor's personnel including but not limited to professional engineers, site supervisors and all persons responsible for directing work on the site are familiar with the CEMP and are required to adhere to its requirements.	
3. Provisions to be included in the CEMP	The Contractor shall consider the particular environment and location of the Site and shall pay particular attention shall be included, but not limited, to the following items below: <ul style="list-style-type: none"> a) Air emissions and dust control; b) Noise & vibration control; c) Effluent management; d) Waste management; e) Hazardous substance handling and storage management, including spill contingency; f) Erosion, soil & vegetation management; g) Traffic management; h) Recruitment and labour management, including the skills development and local procurement; i) Flooding and natural hazards j) Storm water management. 	Not yet due

VI. STATUS OF EMP IMPLEMENTATION

A. Details of site visits/field verifications by Safeguard Staff

21. Table 9 provides the details of field/construction site visits conducted by the environmental safeguards' officers/experts for supervision and monitoring. The purpose of the site visits was to ensure compliance to contractual obligations on the HSE aspects including the status of documents (CEMP, CEMP Guide, H &S Plan, SOPs and others) for pre-construction and construction period, and the HSE requirements during pre-construction and construction period etc.

Table 9: Field Verification Visits by Safeguards Supervision and Monitoring Staff

No	Position of Environmental Safeguards staff/expert	Name	Date of visit	Name of work sites visited	Indicate if the onsite environmental staff of the contractor is available onsite during the visit
1	PMU Safeguards Specialist <u>PMDSC</u> Local Environment Safeguard Professional Deputy Team Leader	Ibrahim Mohamed Ahmed Aslam Naahee Nazim	a) 1.07.23 b) 12.07.23 c) 17.07.23 d) 25.07.23 e) 1.08.23 f) 24.08.23 g) 03-04.09.23 h) 19.09.23	WtE facility construction site in Thilafushi	Deputy Team Leader, DBO contractor, Environmental Manager and HSE manager were present onsite

22. The inspections included assessments of signages, compliance on personal protective equipment usage, heavy machinery operation procedures and logs of activities. Also, the verification of baseline environmental monitoring is also part of the scope of work. Reports onsite inspections done by the PMDCSC in July, August, and September 2023 are enclosed as Appendix 2.

B. Implementation of Design and Pre-construction Stage EMP

23. Table 10 presents the status of the EMP implementation during the design and pre-construction stage. Table 10 was based on Table 64 (Environmental Management Plan Matrix) from the EIA (July 2020) which was disclosed in ADB website as well as in the project website. The design EMP being implemented and mitigation measures shall be duly integrated into the project detailed design.

Table 10: Design/Pre-Construction Mitigation Measures Implementation & Compliance

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures Implementation and Compliance
Invitation for Bids	<ul style="list-style-type: none"> Bidding documents are issued without the EMP and/or the EIA prepared for the project 	<ul style="list-style-type: none"> No bidding documents shall be issued without having the mitigation measures and monitoring requirements in the EIA report included in the safeguard clauses of technical specifications in bidding and contract documents. 	<ul style="list-style-type: none"> Bidding and contract documents include safeguard provisions 	Complied and completed
Locating intake and outfall of cooling/thermal water.	<ul style="list-style-type: none"> Damage to reef and marine ecology around Thilafushi island due to high temperature and high dissolved solids concentration. 	<ul style="list-style-type: none"> If necessary, undertake coral and benthic study following Reef Check protocol. Confirm that the pre-identified best location for intake and outfall is acceptable to the DBO Contractor. If changes are planned, the DBO Contractor shall ensure that withdrawal of cooling water and discharge of cooling water will have no or minimum impact to underwater ecosystem. Contract documents to include performance guarantee by the facility that hot water discharge shall have maximum temperature difference of 3 degrees Celsius from the ambient temperature. Undertake hot water dispersion modeling along the planned area of discharge. Ensure that this area is with no or least marine species that could be affected based on the underwater ecology study (as described above). If there will be changes in the location of cooling water discharge location, the DBO Contractor shall conduct confirmatory numerical modeling for brine discharge—both near and far-field, covering all 4 seasons (2 monsoon and 2 inter-monsoon) to ensure the location of discharge will not have significant impact to marine environment. Ensure that design considers achievement of proper mixing and rapid dilution within a small area around the outfall. Consider in the design of the combined outfall for hot water and treated wastewater to minimize impact to marine ecosystem. 	Planned and implemented (modeling has been carried out considering 4 seasons)	Being complied <ul style="list-style-type: none"> The contractor is undertaking the additional baseline monitoring of marine ecology and water quality on quarterly basis. No change as of yet even in concept design for the locations of the water intake and outfall Concept design ensures the parameters are complied within this limit. DBO contractor will undertake modelling if any changes in location are made.
Location of ambient air quality monitoring stations	Improper sampling locations leading to underestimated ambient air quality	<ul style="list-style-type: none"> To prepare and implement point sources emission and fugitive emission plan including SOPs and checklists during construction phase following standards 	<ul style="list-style-type: none"> Output of air dispersion modelling 	Being complied <ul style="list-style-type: none"> Additional baseline ambient air quality data gathering is ongoing on

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
	condition and health risk to people.	<p>prescribed in IFC General EHS guidelines as a part of ESMS</p> <ul style="list-style-type: none"> • Contract documents to include performance guarantee for the facility that emissions comply with applicable standards. • Collect/Conduct meteorological data on daily basis for various seasons of the year to map projected wind directions, speeds at any season during plant operations. • Design smoke stacks with height that will ensure emissions will have no or minimum impact to surrounding receptors within the direct and indirect impact zones. • Undertake air dispersion modeling to show and understand the behavior and movement of components of flue gas from the stacks. • Based on the dispersion modeling, identify the appropriate sampling locations for ambient air quality in Thilafushi island and other islands nearby, if necessary and practical. • Undertake baseline ambient air quality data gathering with due consideration of the direction of flow of smoke from the existing dumpsite 	<ul style="list-style-type: none"> • Ambient air quality monitoring station sites map and historical windrose diagrams and other meteorological data • Results of monitoring of ambient air quality 	<p>a monthly basis since October 2022 at seven locations identified in the EIA (July 2020). Data gathering started in August 2022 but as methodology was changed to make it more efficient, data collection from October 2022 is accepted.</p> <ul style="list-style-type: none"> • Concept design ensures compliance • Air dispersion modelling to be conducted during detailed design stage
Locating proper drainage system around the facility	Disturbance to and impedance of flow in natural drainage around the island.	<ul style="list-style-type: none"> • To prepare and implement wastewater management, dewatering and storm water drainage plan including SOPs and checklists during construction phase as a part of ESMS. • Identify and demarcate drainage lines within and around the WTE site, including approach roads. Ensure that these channels do not disturb or impede natural flow of storm water from the island to the sea. • Provide cross drainage structures wherever necessary along the new approach roads. • Integrate the above considerations in the final drainage plan for the project site. 	<ul style="list-style-type: none"> • Wastewater management, dewatering and storm water drainage plan including SOPs and checklists 	<p>Being complied</p> <p>Final drainage plans will be submitted in detailed design stage</p>
Physical integrity of proposed project site.	Failure of site to withstand proposed project infrastructures.	<ul style="list-style-type: none"> • Integrate results of geotechnical study undertaken to the design of project infrastructures. 	<ul style="list-style-type: none"> • Geotechnical study report. • Recommendations of geotechnical study 	<p>Being complied</p> <p>Geotechnical report has been approved in this reporting period.</p>

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
	<p>Failure of site to withstand climate change, including extreme weather events.</p> <p>Failure of piles in the existing municipal waste dumped by WAMCO near the project site.</p>	<ul style="list-style-type: none"> • Undertake and include results of climate vulnerability and risk assessment (CVRA) in the design of the project. • Provide site protections based on the risks identified in the CVRA. • Coordinate with WAMCO to ensure the stability of the municipal dumpsite. • To prepare and implement mitigation measures and emergency response plan including SOPs and checklists during construction phase. 	<p>integrated in detailed design.</p> <ul style="list-style-type: none"> • CVRA report • Recommendations of the CVRA report integrated in detailed design. • Physical condition of the slope of piles of municipal waste dumped 	<p>CVRA to be conducted during the detailed design stage.</p> <p>Being complied</p> <p>The site boundary facing eastern side of dumping site of WAMCO has been shifted away by approx. 20m and a fence has been installed.</p>
Work program and pre-approved plans	Unprecedented and multiple environmental impacts due to poor or inappropriate plans integrated in the design of the project.	<ul style="list-style-type: none"> • Develop the following plans (but not limited to) that shall be included in the final detailed design and implemented during construction stage: <ul style="list-style-type: none"> ○ Construction Waste Management Plan. ○ Occupational Health and Safety Plan following international best practices on occupational health and safety such as those in Section 4.2 of IFC EHS Guidelines on Construction and Decommissioning Activities. ○ Construction Camp Development and Management Plan. ○ Spill Control and Containment Plan ○ Marine and Beach Area Construction Work Plan ○ Erosion Control Plan for pipeline works ○ Traffic Management Plan including via sea around the construction site to ensure easy access and passage of workers and employees of establishments at two sides of the project site. • Develop the following plans or manuals that shall be utilized during operation stage: <ul style="list-style-type: none"> ○ Operation and Maintenance Manual ○ Waste Screening Procedure / Plan to ensure all waste inputs to the facility comply with quantity and quality requirements, including accounting of 	<ul style="list-style-type: none"> • Work plans included in the final detailed design of the project • Work schedule for each plan included in the overall schedule of project implementation. 	<p>Being complied</p> <ul style="list-style-type: none"> • Activities towards full compliance are ongoing. • CEMP has been approved by the PMDCSC and the PMU with conditions in December 2022. However, H&S plan has already been approved. • Many plans as referred in CEMP have been submitted by DBO contractor to PMDCSC for review and acceptance and contractor is following the draft plans while they were being revised and yet to be accepted. • Status of HSE plans till date are given in Table 11.

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
		<p>hazardous / halogenated organic components in wastes.</p> <ul style="list-style-type: none"> ○ In-house Solid Waste Management Plan. ○ Occupational Health and Safety Plan following international best practices on occupational health and safety such as those in IFC EHS Guidelines on Waste Management Facilities. ○ Spill Control and Containment Plan. ○ Emergency and Disaster Preparedness and Response Plan. 		
Consents, permits, clearances, no objection certificate (NOC), etc.	Stoppage of activities due to lack of permits or clearances and compliance to applicable provisions of local regulations	<ul style="list-style-type: none"> ● Obtain all necessary consents, permits, clearance, NOCs, prior to start of civil works. ● Ensure the compliance as required 	<ul style="list-style-type: none"> ● Clearances and approvals ● Compliance report 	<p>Being complied</p> <ul style="list-style-type: none"> ● Status of Permits is as per details enclosed in Appendix-1 ● URA has permitted to operate Generator sets by an email.
Shifting of Utilities	Damage to existing utilities that will disturb operations of establishments or businesses near the site.	<ul style="list-style-type: none"> ● Identify and include locations and operators of these utilities in the detailed design to prevent unnecessary disruption of services during the construction phase. ● Prepare a contingency plan to include actions to be taken in case of unintentional interruption of services, such as the following: <ul style="list-style-type: none"> ○ In case of water supply disruption, provide temporary water supply source for the affected establishments. ○ In case of power interruption, provide prior notice to affected establishments. If interruption is unscheduled due to unforeseen incidents, provide a standby generator set to serve as temporary power supply to affected establishments. ● Identify the list of affected utilities and operators and coordinate closely with relevant government departments. 	<ul style="list-style-type: none"> ● Maps showing utilities and likely disruptions 	<p>Being complied</p> <ul style="list-style-type: none"> ● No utilities are running through the site except the live power cable of STELCO. Relocation of this cable is still pending. PMU has engaged with various stakeholders and held meetings regarding the relocation of the cable. ● To avoid delay in construction, DBO contractor has laid above ground water pipeline crossing the live power cable of STELCO for dewatering from

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
<p>Locating sites for construction work, camps, areas for stockpile, storage, and disposal</p>	<p>Increased level of impact or pollution due to location of worker camp, raw material storage areas and temporary waste/spoil storage sites</p>	<ul style="list-style-type: none"> • Except disposal sites, all the work sites (camps, storage, stockpiles etc.) will be located within the selected site. • No construction camp shall be located on the beach or overwater. • Material shall be brought to site as and when required, and temporary storage of material (pipe, sand etc.,) shall be made near the work site. • No temporary storage shall be located at the lagoon section • Waste shall be disposed in existing approved disposal sites; any new sites shall be developed considering siting guidelines, maintained, and operated accordingly 	<ul style="list-style-type: none"> • Use of preapproved sites for construction work camps, areas for stockpile, storage, and disposal • Waste Management Plan 	<p>excavated area with mitigation measures.</p> <p>Being complied A site organization plan was submitted in May 2022 and was approved by the PMU before mobilization and pre-construction activities on site was permitted. The project site layout has been approved. A temporary shift of 20 meter around the eastern side facing the WAMCO waste dump is carried out. This was to avoid any risks arising from falling objects from the edge of the dumpsite towards the site. As per the site plan a domestic wastewater treatment plant is now being installed and operated. Additionally, solid waste is managed as given in the plan and environmental baseline monitoring also conducted. As the site is now in construction phase, CEMP guide, CEMP, H&S plan and construction environment monitoring plan are in place. The compliance is being verified by regular site inspections carried out by PMDCSC and PMU on a regular basis. Details are</p>

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
				<p>provided in the Appendix2. In addition, monthly reports are also provided by the DBO/EPC contractor.</p> <p>Since the Spun piling work, as part of construction, the storage areas are already identified in the site organization plan being utilized. Also, all waste is managed according to the site organization plan.</p> <p>For excavation work, requisite facilities such as storage area for excavated soil, retention tank and discharge pipeline to sea for dewatering have been approved.</p>
Sourcing of construction materials	Environmental impacts (air, water, soil, biodiversity, etc.) at the source.	<ul style="list-style-type: none"> • Obtain construction materials for this project from the licensed quarries acceptable to government. • For new borrow sites to borrow fill material and backfill material, prior permission must be obtained from Maldives EPA, and the environmental impacts of the operation should be properly examined and mitigated as necessary • Make efforts to minimize the overall material requirement for the project by adopting various approaches –balanced cut and fill, re-use as much excavated material from this project as possible • Submit to PMU monthly, documentation (materials quantities with source). 	Permits issued to quarries/sources of materials	<p>Being complied</p> <ul style="list-style-type: none"> • As most materials are imported from abroad, as it is not available locally. Only internationally accepted suppliers are/will be used to obtain materials used. The government of Maldives does not maintain a register of licensed parties. Hence, PMU verifies supplier's information before material approval is given to contractor

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
				<ul style="list-style-type: none"> Soil management plan has been submitted and reviewed by PMDCSC and is under process of modification (refer Table 11 for details)
Delivery route for construction materials and equipment	Port congestion at Thilafushi due to transport of construction equipment and raw materials at site	<ul style="list-style-type: none"> Identify a separate berth location for loading and unloading construction heavy equipment and raw materials that will not disrupt day-to-day activities in the island. Avoid use of the common ports being used by locals. If no other areas available, execute agreement with WAMCO to use WAMCO's berths/docking ports when delivering heavy equipment and big-sized construction materials to the site. 	Maps showing delivery routes.	<p>Being complied</p> <p>A dedicated berthing facility and quay wall are provided to the contractor which includes a 30-meter buffer zone from the quay wall. The existing debris and shipwrecks are to be moved away from this site before bulk materials are brought in, to ensure there are no obstacles during the unloading process. The space was sufficient for materials brought in for ongoing construction activities, but may hinder if large quantities are to be unloaded. Two shipwrecks are removed and two still remain. This area is exclusively allocated for the use of contractor and will be available throughout the construction period.</p>
Final Detailed Design Components	Air and marine water pollution due to inappropriate components included in the detailed design.	<ul style="list-style-type: none"> Ensure the final detailed design will integrate the following mandatory requirements: <ul style="list-style-type: none"> Use of best practical incineration technology as recommended in the EIA. Use of stack height recommended in the EIA. If circumstances based on the recommended stack height is to be changed (e.g., change in 	Detailed design that uses recommendations of the EIA report on discharge of waste material to air, water and soil.	<p>Being complied</p> <p>Detailed design is in progress</p>

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
		<p>dimensions of the WTE plant building structure), ensure to use a stack height that is based on a new modeling calculation.</p> <ul style="list-style-type: none"> ○ Installation of air pollution control device that will ensure emissions in compliance with the emission standards as indicated in the EIA. ○ Ensure to include installation of a continuous monitoring system (CEMS) as a mandatory requirement in the design. ○ Appropriate sampling port at the stack for random grab sampling activities. ○ Leachate treatment plant designed based on (i) maximum expected volume of leachate generated, and (ii) full capacity operation of the WTE plant. ○ Residual waste landfill designed based on (i) maximum volume of fly ash and bottom ash generation, and (ii) full capacity operation of the WTE plant. ○ Provision of a sampling port for thermal water (heated cooling water) at appropriate and accessible location along the cooling water line. 		
Additional Baseline Environmental Data Gathering	Inaccurate predicted impacts and proposed measures due to lack of robust baseline environmental data will lead to unforeseen environmental pollution or damage.	<ul style="list-style-type: none"> ● During the detailed design phase of the project, in particular, the DBO Contractor shall: <ul style="list-style-type: none"> ○ Undertake ambient air quality and noise level measurements (monthly), marine water and ground water quality analysis, and marine underwater ecology survey (quarterly) on first year after DBO contractor mobilization, at the identified sampling locations in the EIA report (and any other locations in and around Thilafushi island as may be deemed by the DBO Contractor as important sampling locations). ○ follow required sampling methodologies, including appropriate averaging time for ambient air quality and noise level measurements as indicated in the WHO standards; and ○ include results of analyses in the updating of the EIA, and consider these results in the final detailed design of the project as applicable. 	<p>Results of monthly ambient air quality measurements (TSP, PM₁₀, PM_{2.5}, SO_x, NO_x).</p> <p>Results of monthly noise level measurements (Leq_{daytime} and Leq_{night-time} in dBA).</p> <p>Results of quarterly marine and groundwater quality analysis (to follow parameters used in the first sampling activities).</p>	<p>Being complied</p> <ul style="list-style-type: none"> ● Baseline data is gathered according to the methodology and standards from the EIA (July 2020) starting in October 2022 onwards on a monthly basis. A method statement for monitoring was agreed and approved by the PMDCSC as part of the CEMP. ● Air quality monitoring started in October 2022 and is conducted on a monthly basis. Initial monitoring carried out in

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
			<p>Results of marine underwater ecology survey to be conducted once during pre-construction period and quarterly during construction period (to follow parameters, methodologies and locations used in the first set of surveys in the EIA process).</p>	<p>August 2022 was not conducted for a 24-hour sampling as required by the World Bank Group Environment, Health, and Safety (EHS) General Guidelines 2007, hence the PMU advised the contractor to follow the appropriate sampling procedures.</p> <ul style="list-style-type: none"> • Noise level monitoring started in November 2022 and is conducted on monthly basis. • Quarterly-based marine and ground water samplings were conducted in November, 2022, February 2023 and May 2023 • Underwater marine ecology survey was conducted in December 2022, and July 2023. • Waste water quality from STP/WWTP are being monitored on monthly basis from discharge point.

C. Implementation of Construction Stage EMP

1. Preparation of Contractor's Construction Stage EMP (CEMP)

25. The draft CEMP has been cleared/conditionally approved by PMDCSC and PMU on 7 December 2022 and is currently under revision /modification. As per the letter no 4169A01/330/051 of 20 May 2023, the PMDCSC has divided the plans and procedures into two categories and has instructed the DBO Contractor to only submit all category 1 documents before the start of piling work and all category 1 plans were submitted to PMDCSC for review and approval. The balance of HSE plans (i.e., category 2 documents) and ESMS are targeted to be approved by 31 October 2023.

26. The DBO contractor follows the draft plans while revisions are ongoing. The status of plans as of 30 September 2023 is given in Table 11.

Table 11: Status of Plans to be included in the CEMP

Sn	Documents	Status	Remarks
CEMP Plans- Category1			
1	Occupational Health and Safety Management	As part of HSE plan, it was approved by PMDCSC/PMU in May 2022	
2	Air Quality Management including fugitive and point source emission	As a part of approved pre-construction monitoring plan and CEMP, environmental baseline monitoring is carried out on a regular basis.	In process of modification and targeted to be approved by 31 October 2023
3	Noise/Vibration Management		
4	Waste Management Plan	Submitted and PMDCSC asked for revise and resubmit	
5	Soil Management plan	Submitted and PMDCSC asked for revise and resubmit	
6	Traffic Management plan	Submitted and PMDCSC asked for revise and resubmit	
7	Stakeholder Engagement Plan	Submitted and PMDCSC asked for revise and resubmit	
8	Spillage Control and Containment Plan	Submitted and PMDCSC asked for revise and resubmit	
9	Grievance Redressal Mechanism Plan	Submitted and PMDCSC asked for revise and resubmit	
10	Marine and Beach Area Management Plan	Submitted and PMDCSC asked for revise and resubmit	
11	Chemicals and Hazardous Material Management Plan	Submitted and PMDCSC asked for revise and resubmit	
12	Emergency Response Plan	Submitted and PMDCSC asked for revise and resubmit	
13	Security Management Plan	Submitted and PMDCSC asked for revise and resubmit	
14	COVID-19 Management Plan	Accepted with comments by PMDCSC	
15	Construction Camp Development Plan	Accepted with comments by PMDCSC	
16	Public Health, Security and Safety Management Plan	Accepted with comments by PMDCSC	

Sn	Documents	Status	Remarks
17	Management Procedures for Occupational & Environmental Accidents as Incident reporting and investigation procedure	Submitted and PMDCSC asked for revise and resubmit	
18	Tool and Technique to review the CEMP	Not submitted	Targeted to be approved by 31 October 2023.
CEMP Plans- Category2			
19	Archeological Findings Management	Not submitted	DBO contractor has requested via email to delete it as it is not applicable to project site. However, PMU/PMDCSC has been principally agreed and asked DBO contractor to provide justification via official letter for approval and update CEMP accordingly.
20	Flora & Fauna Management	Not Submitted	Targeted to be approved by 31 October 2023
21	Human Resources Management	Submitted and under review by PMDCSC	Targeted to be approved by 31 October 2023
22	Regulatory Compliance Evaluation Procedure	Not submitted	targeted to be approved by 31 October 2023
23	Procedure for Corrective & Proactive Actions	Submitted and PMDCSC asked for revise and resubmit	In process of modification and targeted to be approved by 31 October 2023
24	Training Procedure and Plan	Submitted and PMDCSC asked for revise and resubmit	targeted to be approved by 31 October 2023
25	Infrastructure safety	Not submitted	targeted to be approved by 31 October 2023
26	Erosion Control Procedure		
ESMS			
1	ESMS including SOP checklists to be developed and reviewed on a regular basis considering ADB Safeguard Policy Statement 2009, IFC EHS Guidelines, IFC Performance Standards, and international good practices and guidelines (i.e., ISO 9001: 2008 – Quality Management System, ISO 14001: 2015 – Environment Management System, ISO 45001: 2018 – Occupational Health and Safety) Management System).	Not submitted	Targeted to be approved by 31 October 2023.

2. Implementation of Construction State EMP (CEMP)

24. Table 12 presents the status of the EMP implementation during the construction works. Table 12 was based on Environmental Management Plan Matrix from the EIA Report which was disclosed in ADB website as well as in the project website. The EMP will be implemented, and mitigation measures shall be duly integrated into the project detailed design.

Table 12: Construction Mitigation Measures Implementation & Compliance

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
Physical Characteristics					<i>“Satisfactory”</i> <i>“Partially satisfactory”</i> <i>“Unsatisfactory”</i>
Overall project site management	Poor environmental management by DBO Contractor	<ul style="list-style-type: none"> Designate one full time and qualified Environment, Health and Safety (EHS) Manager who will be in charge of overall EMP implementation and other tasks as required in the EIA report. He/She shall be in place from the day of mobilization of DBO contractor. In addition to the EHS Manager, designate one qualified trained engineer on EHS and EMP/SEMP implementation for every shift during construction stage who will assist the EHS Manager (either in his/her presence or absence) at all times. Coordinate with the PMU on confirmatory surveys determined during design stage that need to be conducted once the DBO Contractor is selected; and complete these studies as required with support of external experts. 	<ul style="list-style-type: none"> Included in manpower requirements as indicated in bidding documents and final contract documents. Hired EHS Manager and selected engineers trained on EHS and EMP/SEMP implementation based on required qualifications. 	The EPC contractor has hired an HSE manager, a health and safety manager and an environmental manager. HSE inspectors are also on site. DBO contractor needs to strengthen OHS management at EPC / subcontractor level.	Partially satisfactory
Marine Traffic	Port congestion at Thilafushi due to transport of construction equipment and raw materials at site	<ul style="list-style-type: none"> Avoid using the docking ports used by the local people and industries in Thilafushi when transporting construction heavy equipment and raw materials at the site. Transport and unload heavy equipment and raw materials at nighttime when marine traffic is low within and around the island. Utilize the exclusive docking port area being used by WAMCO. 	<ul style="list-style-type: none"> No disturbance to normal day-to-day movement of locals at the port and in the island. 	As a dedicated quay wall is exclusively made available for contractor there is no need to use any other ports or quay walls. So, use of ports for public use will be utilized only if there is a need.	Satisfactory
Topography landforms, geology, and soils and river morphology and hydrology	Raw materials for construction (e.g. sand, gravel or crushed stone) will be extracted from sources	<ul style="list-style-type: none"> Utilize readily available sources with environmental clearance and license. Borrow areas and quarries comply with environmental requirements. Coordinate with local authorities for quarrying at various parts of Maldives where these raw materials are sourced. Alternative sources should be identified. 	Records of sources of materials	All construction materials are imported and PMU approves materials and suppliers	Satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
	causing changes in topography and landforms (if on land such as other islands in Maldives) or river morphology and hydrology (if on the river in other countries).				
Marine water quality	Trenching and excavation, run-off from stockpiled materials and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and degradation in the quality of marine water around Thilafushi.	<ul style="list-style-type: none"> • Implement spoils management plan. • Reuse excess spoils and materials. • Temporary storage areas for excess spoils prior to disposal should be located as far as possible from the edge of the island or seawalls. • Disposal site in designated areas only. • Earthworks during dry season. Avoid earthworks during heavy rainy days, especially during monsoon season, to prevent run-off. • Stockyards are covered when possible and provided with drainage canals around. • Install temporary silt traps or sedimentation basins along drainage leading to the lagoon and sea. • Fuel, other petroleum products, and toxic and hazardous chemicals or substances stored at storage areas away from water drainage and protected by impermeable lining and banded 110%. • Take precautions to minimize the overuse of water • Divert all wash water generated from site into sedimentation ponds prior to discharge to canals. • During excavations, water accumulation in the pits / should be disposed of only after being diverted in sedimentation basis or equivalent and clarified prior to discharge. 	<ul style="list-style-type: none"> • Areas for stockpile storage of fuels and lubricants and waste materials; • Number of silt traps installed along trenches leading to water bodies; • No visible degradation to nearby drainage, water bodies due to construction activities • Marine water quality testing 	<ul style="list-style-type: none"> • Dedicated storage for fuel and chemicals is present and is properly made with bunds and polythene covers. • There are no trenches leading to water bodies. • At current status all rain water percolates as the area is open ground mainly. • All dewatering water 	Satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> Conduct water quality monitoring at least quarterly or as necessary. 		<p>discharged in to sea is according to local regulation and sedimentation pond is used to trap sediments.</p> <ul style="list-style-type: none"> Quarterly water quality monitoring is conducted 	
Dust and air pollution	Work at the dry season and transporting construction materials may increase dust, carbon, monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons in air environment	<ul style="list-style-type: none"> Use of physical controls such as water sprays, covers, compaction, screening, enclosure, windbreakers, binders and/or road surfacing to avoid or minimize airborne dust from construction activities and vehicle movements. Undertake water spraying several times of the day or as often as needed especially on windy days / dry seasons. Cover delivery trucks during transport. Construction vehicle's speed limited to 30 kilometers per hour (kph). Prohibition of open burning of solid waste. Minimize stockpile height. If dust generation is significant, provide a dust screen of appropriate height Workers and staff should be provided with dust masks & instructed to use them on site Conduct work in stages to reduce dust impacts; clearing and then conducting construction in only a portion of the site at a time. Control access to work area, prevent unnecessary movement of vehicles, workers, public trespassing into work areas; limiting soil disturbance will minimize dust generation Contractor's environmental manager should monitor these activities and act to apply the mitigation if dust production becomes significant. 	<ul style="list-style-type: none"> Location of stockpiles. Number of complaints from sensitive receptors. Heavy equipment and machinery with air pollution control devices. A certification that vehicles are compliant with Maldives vehicle emission standards. Ambient air quality tests. 	<ul style="list-style-type: none"> Stockpiles are on designated areas No complaints received in this reporting period All vehicles are registered according to local regulations and tested for roadworthiness before registration No onsite air quality monitoring, but dedicated baseline monitoring around the site is carried out In this reporting period dust was minimal as 	Satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> • Use tarpaulins to cover loose material (soil, sand, aggregate) when transported by trucks • Clean wheels and undercarriage of haul trucks prior to leaving construction site/quarry • Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition • Ensure that all the construction equipment, machinery is fitted with pollution control devices, which are operating correctly. • Ensure that only those vehicles and equipment in good condition, and are in good maintenance are used for project construction • Vehicles / equipment should have a valid permits or licenses issued by relevant government agency. • Maintain record of these permits or licenses of all vehicles at all times for ready inspection at the work sites. 		the rainy season is now keeping the ground wet most of the time.	
Dust and air pollution	Degradation of ambient air due to operations of concrete batching plant.	<ul style="list-style-type: none"> • Ensure that batching plant is installed with built-in air pollution and dust control system for fugitive emissions and dust from loading area. • Provide dust screen around the components that generate emissions or fugitive dusts. • Ensure that plant is well operated and maintained at all times according to O&M manual of batching plant (provided by the equipment manufacturer). • The concrete loading area is equipped with a leak-proof concrete floor, from which all drainage is collected and treated as necessary prior to discharge. • Mixer trucks and mixer drums are washed out only in a designated area, which should be equipped with a leak-proof floor, from which drainage is collected and treated as necessary. • All chemicals used in concrete preparation are properly stored, whether dry, in powder or granular form, or as liquids, at storage areas away from water drainage and protected by impermeable lining and banded 110%. Storage facilities should be as specified in the appropriate international standard and should include 	<ul style="list-style-type: none"> • Visual inspection. • Visual inspection report. 	<ul style="list-style-type: none"> • Concrete batching plant is not operational and is under construction. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		equipment to extract dust and completely contain any spillage from leaks.			
Noise pollution	Temporary increase in noise level and vibrations by excavation equipment, and the transportation of materials, equipment and people.	<ul style="list-style-type: none"> • Prepare work schedule and consult with local community and administration. • Maintain low noise levels. Noise level at the boundary of site shall not exceed 70 dB(A) during day and 50 dB(A) during night unless necessary to carry out construction works. • When possible, schedule noisy works at nighttime when most establishments in Thilafushi are closed. Minimize any high noise-generating activities during the daytime. • Use low noise generating equipment. Use modern vehicles and machinery with low noise emissions. Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptor. • Minimize drop heights for construction materials. • No use of horns unless necessary. • Avoid loud random noise from sirens, air compression, etc. • Avoid using multiple high noise generating equipment and activities simultaneously. • Install temporary or portable acoustic barriers around stationary construction noise sources. • Warning signs in noise hazard areas. • Identify vibration risk to nearby structures. Take caution working in such areas. • Conduct noise level monitoring at least every quarter or as necessary. 	<ul style="list-style-type: none"> • Number of complaints from sensitive receptors; • Use of silencers in noise-producing equipment • Use of sound barriers or enclosures for generators, if any; • Noise level measured at daytime and nighttime at pre-determined locations at site. 	<ul style="list-style-type: none"> • No complaints received in this reporting period. • Noise level is measured outside the facility in a station within the immediate vicinity. 	Satisfactory
Aesthetics	Indiscriminate disposal of solid waste (construction and domestic) around the site.	<ul style="list-style-type: none"> • Prepare and implement a Construction Waste Management Plan (CWMP) to identify specific steps on handling and disposal of all solid waste from construction activities, including the following: <ul style="list-style-type: none"> ○ Reuse as much waste sand in this project as possible; 	<ul style="list-style-type: none"> • Number of complaints from sensitive receptors; • Worksite clear of all types of wastes • Worksite clear of any wastes 	<ul style="list-style-type: none"> • Waste is segregated in worksite and transported to WAMCO facility 	satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
	Interference with the enjoyment of the area and creation of unsightly or offensive conditions	<ul style="list-style-type: none"> ○ Finding alternative beneficial uses for any unused sand, for example as infill in other construction works; ○ Disposal of debris and bulky solid waste materials after construction stage. ○ Minimizing stockpile size. ○ Clearing wastes regularly. ○ Avoiding stockpiling of excess spoils. ○ Covering delivery trucks during transportation. ○ Cleaning roads. ○ Using screening enclosure shade cloth, temporary walls around construction site. ○ Cleaning site regularly. ○ Following the principle of “Reduce, Reuse, Recycle, and Recover”. ● When applicable, solid wastes from the site shall be returned to the manufacturer of raw materials they were generated from, or dispose as per their specifications. ● Hazardous waste shall be stabilized, encapsulated, and disposed as per internationally accepted practices. Provision will be made for secure storage of hazardous waste. ● Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed of in approved disposal sites and/or third-party sources approved by Maldives EPA. ● Prohibit burning of construction and/or domestic waste; ● Ensure that wastes are not haphazardly thrown in and around the project site; provide proper collection bins, and create awareness to use the dust bins. ● Conduct site clearance and restoration to original condition after the completion of construction works. 	<ul style="list-style-type: none"> ○ unutilized materials, and debris ● Transport route and worksite cleared of dirt 		
Biological Characteristics					
	Threat to marine and terrestrial species, or other marine	<ul style="list-style-type: none"> ● Implement the Marine and Beach Area Construction Work Plan. ● Implement the Erosion Control Plan for pipeline works. ● Ensure that all construction activities are conducted strictly within the site footprint (including offices, car 	<ul style="list-style-type: none"> ● Visual site inspection. ● Visual site inspection reports. ● Marine water quality tests. 	<ul style="list-style-type: none"> ● Beach Area plans are being reviewed and finalized 	satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
	<p>animals due to</p> <p>(iii) poaching or leisure catching by workers in the project area, and</p> <p>(ii) marine pollution.</p>	<p>parking and other activities that might normally be located in an exterior contractor's area).</p> <ul style="list-style-type: none"> • Prohibit any deliberate killing or harming of animals on or off-site; any hunting or fishing at the site or in nearby areas by site personnel; preventive actions shall be put in place by contractor for protected marine species. • Ensure that all construction work or other activities near the site perimeter are conducted with particular care and include measures to reduce noise and dust to minimum possible. • Create awareness in all site staff & workers on the importance of the marine animals/species and plants around the site and their vulnerability. • To protect site personnel, training should also be provided to enable them to recognize, and deal safely and humanely with all animals that may be encountered. • Implement the Spill Control and Containment Plan. • Marine works should be scheduled to occur in the north east monsoon season when the sea conditions are calmer to limit the spread of sediment around this operation. • Conduct the excavation, and deposit the excavated material in a more controlled manner minimizing the area that is disturbed. • Avoid the need to re-excavate by choosing right time (calmed sea conditions again), and quickly lowering the pipes into trench and refilling. • Limit the size of the construction area on the beach and to avoid any encroachment outside the specified area. • Monitor the turbidity & DO levels due to spread of sediment throughout the trenching operation and work should be stopped if levels exceed pre-determined values as per the guideline below: <ul style="list-style-type: none"> ○ The turbidity of the water is to be measured (ISO 7027) at the edge of the construction zone during trenching and backfilling activities; ○ When the turbidity exceeds the minimum of the background turbidity plus 20% or 100 NTU, the 	<ul style="list-style-type: none"> • Marine and Beach Area Construction Work Plan • Erosion Control Plan for pipeline works • Spill Control and Containment Plan 	<ul style="list-style-type: none"> • No sources for poaching and as food is provided on camp area and hence poaching is not a threat • Workers are prohibited from catching any animals or poaching • Workers are instructed to report any sightings of animals such as sea birds, reptiles or 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		trenching is to cease until the turbidity returns to the background level plus 10%.			
Socio-economic Characteristics					
Existing provisions for pedestrians and other forms of transport	<p>Potential road closures due to construction activities.</p> <p>Hauling of construction materials and operation of equipment on-site can cause traffic problems.</p>	<ul style="list-style-type: none"> • Implement the Traffic Management Plan that will elaborate the following: <ul style="list-style-type: none"> ○ Suitable transportation routes. ○ Safe passage for vehicles and pedestrians. ○ Temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours. ○ Scheduling of material deliveries on low traffic hours, particularly at night time when most establishments in Thilafushi island are already closed. • Erect and maintain barricades if required. • Consult with business and institutions for work schedules. • Erect display boards around strategic locations about nature, duration of construction and contact for complaints and/or issues about the project. • Complete quickly any work that is near adjacent establishments. • Restore damaged properties and utilities. 	<ul style="list-style-type: none"> • Traffic Management Plan. Traffic route during construction works, including number of permanent signs, barricades, and flagmen on worksite; • Number of complaints from sensitive receptors; • Some signage placed at the subproject location. • Number of walkways, signage, and metal sheets placed at subproject location 	<ul style="list-style-type: none"> • For construction materials roads are not frequently used as most materials are currently brought by sea • Minimal movement within the Island as raw materials are directly transported to site by ship. 	
Socioeconomic status	Staffing will be required during construction. This can result in an increase in local revenue.	<ul style="list-style-type: none"> • Engage the local workforce. If not available in Thilafushi Island, engage workers from nearby islands including Malé if available and sufficiently qualified. • Secure construction materials from local market, whenever available. 	<ul style="list-style-type: none"> • Employment records; • Records of sources of materials • Records of compliance with labor act of Maldives. 	<ul style="list-style-type: none"> • Locals are not recruited as it is difficult to recruit locals, but local vendors are used as subcontractors. • Workers grievance mechanism is established and workers complaints are 	Partially satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
				<p>recorded and addressed</p> <ul style="list-style-type: none"> Workers from subcontractors need better management and monitoring as well as proper background checks and trainings 	
Other amenities for community welfare	Civil works may result in an impact to the sensitive receptors such as residents, businesses, and the communities. Excavation may also damage infrastructure located alongside the roads.	<ul style="list-style-type: none"> Before any excavation work, reconfirm location and nature of existing infrastructure, if any, identified during detailed design stage. Minimize repeated disturbance to locals by integrating forms of infrastructures such as temporary safe walkways in areas with ongoing excavation works. Provide alternate routes in the area if necessary, to allow smooth movement of workers and vehicles in the area. Inform through continuous meaning consultations with local people about nature, duration and possible impacts of the construction and integrate their concerns. Promptly relocate infrastructure materials if found to be obstructing or disturbing free movement of local people. Take prior permission from local authority for water use. Restore damaged properties and utilities to pre-work conditions. 	<ul style="list-style-type: none"> Number of complaints from sensitive receptors 	<ul style="list-style-type: none"> As the site is located on an industrial island no local communities within the vicinity. Nearby facilities are informed of heavy machinery use There is no significant infrastructure within the immediate vicinity of the project. A power cable is running through the site and will be removed 	Satisfactory
Community health and safety	Construction works will impede the access of	<ul style="list-style-type: none"> Restrict work force in designated areas. Identify stockyard areas in consultation with local administration. 	<ul style="list-style-type: none"> The number of permanent signs, barricades, and flagmen on 	<ul style="list-style-type: none"> Signage is placed within the site 	Satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
	residents and business in limited cases. Construction works will raise danger to community people.	<ul style="list-style-type: none"> • Work on private land to require written permission of landowners. • Prefer small mechanical excavator for excavation works. • Prohibit alcohol and drugs on site. • Prevent excessive noise. • Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work. • Follow international best practices on community health and safety such as those in Section 4.3 of IFC Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities. These requirements are discussed in Section VI of the EIA report. • Maintain a complaint logbook in workers camp and act promptly of complaints. 	<ul style="list-style-type: none"> worksites per Traffic Management Plan. • Number of complaints from sensitive receptors. • Number of walkways, signs, and metal sheets placed at the subproject location. • Agreement between contractor and WAMCO in case of using WAMCO's property for storage or use. • Agreement between contractor and private property owners in case of using the latter's land for storage and use. 	<ul style="list-style-type: none"> • No complaints received in this reporting period • No requirement for storage. 	
Work site and Workers Health and Safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards,	<ul style="list-style-type: none"> • Comply with labor act of Maldives. • Implement the Occupational Health and Safety Plan, which shall follow all occupational health and safety requirements discussed in Section VI of the EIA report. • Provide compulsory health and safety orientation training to all new workers to ensure that they are apprised of Occupational Health and Safety Plan including rules of work, use of personal protective equipment (PPE), preventing injury to fellow workers, etc. • Restrict public access to worksites. • Provide PPE to workers and ensure their effective usage. For example, require workers to (i) wear ear plugs while in noise hazard areas, and (ii) wear high visibility clothes or reflectorized vests at all times. • Document procedures to be followed for site activities. • Maintain accident reports and records. 	<ul style="list-style-type: none"> • Occupational Health and Safety Plan • Equipped first-aid stations • Medical insurance coverage for workers • Number of accidents • Records of supply of uncontaminated water • Condition of eating areas of workers • Record of orientation training • Availability of personal protective 	<ul style="list-style-type: none"> • OHS plan is being approved in May 2022. • A clinic is set up on camp with a doctor and nurse and basic equipment for first aid • A speedboat is kept on standby to transport any injured worker who needs hospital 	Partially Satisfactory

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
	which can arise from working at height and excavation works.	<ul style="list-style-type: none"> • Make first aid kits readily available. • Maintain hygienic accommodation in work camps. • Ensure uncontaminated water for drinking, cooking and washing. • Ensure clean eating areas. • Ensure sanitation facilities are readily available. • Provide medical insurance coverage for workers. • Provide orientation for guest visitors. • Ensure that visitors do not enter hazard areas unescorted. • Ensure moving equipment is outfitted with audible backup alarms. • Chemical and material storage areas need to be marked clearly. Display MSDS, train staff on storage and handling. • Hearing protection equipment enforced in noisy environment. • Conduct of daily toolbox talks to reiterate repeatedly all the above measures and prioritize safety briefings; leanings from previous incidents, their causes and risks, and other safety procedures as may be identified. • Conduct periodic safety audit, identify and remove potential hazards. • Ensure that qualified first aid is provided at all times; equipped first-aid stations shall be easily accessible throughout the work sites and camps. • For works in the marine environment, ensure that: <ul style="list-style-type: none"> ○ all persons engaged in the marine construction are competent swimmers. ○ Lifejackets are provided to workers and worn at all times. ○ Properly functioning ship-to-shore communications are provided. ○ No work during rough sea conditions. ○ Emergency rescue team is available at all times at the site during the marine work (such as rescue boat with divers). • Provide caution & information boards (traffic, safety, information etc.,) 	<p>equipment at construction site</p> <ul style="list-style-type: none"> • Percentage of moving equipment outfitted with audible back-up alarms • Signage for storage and disposal areas • Condition of sanitation facilities for workers • Report summary on daily toolbox talks for workers. 	<p>facilities and a stretcher is provided.</p> <ul style="list-style-type: none"> • First aid training is regularly conducted • Records on daily toolbox talks maintained • Records of regular cleaning of staff common areas, toilets and medical clinic was not maintained • All expatriate workers undergo medical check for work permit purposes. <p>Following areas require improvement:</p> <ul style="list-style-type: none"> • Inadequate barricading and safety signage, in construction areas, and inadequate supply of PPEs in health clinic for COVID emergency. • presence of live electrical 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> • Do not allow unauthorized / public entry into work sites / facilities • Undertake all necessary public safety measures, precautions • Ensure proper maintenance and cleanliness of the site and facilities Demarcate assembly area for emergencies • Provide medical aid facilities (first aid, doctor on call etc.,) 		<ul style="list-style-type: none"> • cable on the ground, • Housekeeping issues (waste and material storage), • Risk due to smoke from existing dumpsite • 	
Labor Camps	Indiscriminate environmental impact and pollution due to labor camps	<ul style="list-style-type: none"> • Avoid establishing labor camps by employing local workers as far as possible. • In unavoidable cases, establish camp within the site; and implement the Construction Camp Development and Management Plan (CCDMP). • Follow the layout plan included in the CCMP. • The CCDMP will consider all construction camp requirements discussed in Section VI of the EIA report, which, among others, are the following: <ul style="list-style-type: none"> ○ The camp, if possible in Thilafushi Island, is at least 50 m away from water bodies. ○ Clear separation of the workers living areas from material storage areas and work sites with fencing and separate entry and exit ○ Provision of proper liquid waste and solid waste collection, treatment and disposal system. ○ Provision of drinking water, water for other uses, and sanitation facilities (e.g. separate toilets for men and women). ○ Livability at the highest standards possible at all times; living quarters provided with standard materials, space, and proper lighting and ventilation. ○ Fire safety, medical facilities. 	<ul style="list-style-type: none"> • Visual inspection. • Visual inspection reports. • CCDMP 	<ul style="list-style-type: none"> • The camp is setup and maintained according to local regulations and ADB SPS and IFC guidelines 	Satisfactory

D. Implementation of Health & Safety COVID-19 Plan

27. Appendix 14 of EIA (July 2020) is on Standard Operating Procedure in Response to 2019 Corona Virus Disease prepared by the PMU, MoECCT as required by ADB in its advisory note on protecting the safety and wellbeing of workers and communities from COVID-19². This has been referred to in the preparation of the Health & Safety (H&S) COVID-19 Plan by the DBO Contractor. The DBO Contractor's Health & Safety COVID-19 Plan has been prepared, finalized and approved by PMU/PMDCSC.

In March 2022, the government lifted most of the COVID-19 restrictions such as the mandatory use of facial masks. However, measures identified in the COVID-19 plan are in place in project sites and workplaces. Common measures are provision of wash stations, use of facial masks in confined workplaces, use of personal protective equipment, screening of workers, information/posters on COVID-19 at the worksites, etc.

E. Key Site Observations and Action Taken

28. Following Table 13 provides a summary of safeguards and health and safety related findings from the monitoring conducted and reported by DBO and PMDCSC through monthly progress reports from July to September 2023. Action taken and current status is presented in Table 14.

- (i) Inadequate barricading in construction areas, presence of live electrical cables on the ground, inadequate safety signage,
- (ii) Inadequate PPEs
- (iii) Housekeeping issues (waste and material storage),
- (iv) Risk to health for workers due to possible incidental release of smoke resulting from fire in the existing waste dumping site adjacent to project site and appropriate measures must be in place in emergency response plan. PMU is coordinating with WAMCO to include fire safety of dump and bale storage area, adjacent to the site. PMU has requested for an emergency response plan and an SOP from WAMCO. Details of this will be updated in the next report.
- (v) Site records need to be improved. Format to be approved by the PMDCSC as part of HSE plans and ESMS.

²<https://www.adb.org/sites/default/files/publication/614811/safety-well-beingworkers-communities-covid-19.pdf>.

Table 13: Site Observations and Current Status

Aspect	Site Observation / Finding	Site photographs	Action taken	Current status
Work site EHS	Inadequate barricading in construction areas		Reported the status and mitigation measures to EPC/DBO.	Measures taken to ensure the construction areas are barricaded off better and safety tape and visible barricading in place.
Waste collection and sorting	Waste in the waste collection area needs to be sorted, and labels to be placed on the bins.		Reported the status and mitigation measures to EPC/DBO.	Labels placed on all bins, sorting of waste practice.
Work site EHS	Stagnant water seen, and has potential for mosquitoes breeding.		Reported the status and mitigation measures to EPC/DBO.	EPC more vigilant on such cases and any potential stagnant water collecting areas addressed as soon as possible.
Storage on site	Fuel storage on site needs to be improved, and is not adequate.		Sheltered area with retaining wall and proper leak proof floor to be constructed.	Fuel storage area has been constructed and in use.

D. Project Construction related Accidents and Incidents

30. Table 15 below presents details of work-related incidents reported from the project pre-construction and construction activities.

Table 14: Details of Construction related incidents (Reporting Period)

Date of occurrence of incident	Description of incident	Consequence of incidents	Action taken by contractor	Present status
1 st August 2023 [17:10pm] At construction site	The pile drive was using a dummy to drive the pile deeper for the final termination. After final termination while pulling out the dummy, it hit the pile drive guide post alignment forcefully due to uncontrolled swinging, causing the guide post nut to break and fall off.	Damage to pile drive machine while no injury to workers.	The area was immediately cordoned off to prevent unauthorized entry and following actions were taken: <ul style="list-style-type: none"> • Repaired guide post alignment. • Preventive inspection and maintenance before use. • Provision of 3 U-bolts for securing wire rope and ensure that all U bolts should be attached in same direction. • On site job training 	All hazards and risk associated with the equipment have been mitigated.

Table 15: Construction related incidents

Particulars	Number of cases (previous reporting period)	Number of cases (this reporting period)	Cumulative up to end of this reporting period
Minor / first aid cases	0	0	0
Major accidents	0	0	0
Fatal accidents	0	0	0
Accidents (only damage to assets, does not involve personnel injuries)	0	1	1
Near miss cases	1	1	2
Total	1	2	3

F. Unanticipated Impacts

26. No unanticipated environmental impacts were encountered during the pre-construction/design stage.

VII. ENVIRONMENTAL MONITORING

A. Monitoring Activities - Proposed and Conducted

31. Considering the findings of the EIA study report (July 2020), environment baseline monitoring is carried out as per details given in Pre-Construction Environmental Monitoring Plan and CEMP during construction. Environmental monitoring activities will be carried out for one year during the design stage.

32. Environmental monitoring of ambient air quality, marine water quality, groundwater quality, ambient noise levels, wastewater quality from the discharge point of the WWTP/STP, and water quality proposed to be used for construction and camp and marine ecology survey has been carried out as per details provided in Table 19. Sampling and testing have been carried out based on the method of statement enclosed as Appendix of the CEMP.

Table 16: Additional Baseline Data Gathering During Design/Pre-construction Stage

Assessment	Parameters	Location	Frequency	Status
Ambient air quality	TSP, PM ₁₀ , PM _{2.5} , NO ₂ and SO ₂	Total of 7 monitoring locations (Refer to Figure 2) <ul style="list-style-type: none"> • AQ1 (downwind direction of the proposed project site) • AQ2 (crosswind direction of the plume) • AQ3 (crosswind direction of the smoke plume from the existing dump site at Thilafushi. • AQ4 (Vilingili as a control site) • ASR2 • ASR3 • ASR5 	Monthly sampling	Ambient air quality samplings were undertaken on the following dates: <ol style="list-style-type: none"> 1) 17-19 July 2023 2) 8-11 August 2023 3) 19-21 September 2023
Ambient noise level	L _{eq} daytime and L _{eq} nighttime	Total of 5 monitoring locations (Refer to Figure 3)	Monthly sampling	Noise level sampling was undertaken on the following dates: <ol style="list-style-type: none"> 1) 19-20 July 2023 2) 14-15 August 2023 3) 25-26 September 2023
Marine water quality	Heavy metals (As, Cr ⁺⁶ , Cu, Ni, Pb, Zn, Hg, Cd), nitrite, pH,	Marine water samples to be collected from seven sampling stations - SW1, SW2, SW3, SW4, SW5,	Quarterly sampling	Marine water samples were collected from seven sampling stations - SW1, SW2, SW3, SW4, SW5,

Assessment	Parameters	Location	Frequency	Status
	turbidity, and BOD ₅ etc.	SW6, and SW7 (Refer Figure 4)		SW6, and SW7 on 7 August 2023.
Groundwater quality	Oil and grease, fecal coliform, presence of petroleum, pH, Heavy metals (As, Cr ⁺⁶ , Cu, Ni, Pb, Zn, Hg, Cd), etc	<ul style="list-style-type: none"> Water samples to be collected from the eight monitoring locations (Refer Figure 5) For each location, the sample was collected from mid-water level 	Quarterly sampling	<ul style="list-style-type: none"> Groundwater Samples were collected from seven sampling stations - GW1, GW2, GW3, GW4, GW6, GW7 and GW8 on 7 August 2023. Sample from location GW5 could not be collected as the well was covered. However, on facilitation by PMU, WAMCO has permitted sample collection from same location and sample will be collected and tested in the next quarterly monitoring.
Water quality proposed to be used for construction and other activities	pH, EC, TSS, fecal coliform, total coliform, aerobic plate count, Fe, Cd, As, Pb, Hg, Nitrate,etc.	<ul style="list-style-type: none"> Supply line of Male Water and Sewerage Company Supply network at project site. 	Monthly	<ul style="list-style-type: none"> Grab sample was collected on 5 July 2023, 7 August 2023, and 18 September 2023 Parameter have been revised in compliance with supply water quality standard as prescribed by URA from August 2023 onwards.
Treated wastewater quality from WWTP/STP to be discharged into sea	pH, COD, BOD ₅ , heavy metals, EC, etc	<ul style="list-style-type: none"> At discharge point from the WWTP/STP to the receiving body of water 	Monthly sampling	<ul style="list-style-type: none"> Grab sample was collected on 5 July, 7 August and 18 September 2023 Parameters have been revised in compliance with National Waste Water Quality Guidelines 2007 and IFC General EHS Guidelines from August 2023 onwards.
Marine ecology survey	Live coral and fish	In and around locations (M8, M9 and M10) at 5 and 10 m depth as referred in EIA and CEMP	Once During the Pre – Construction Phase & Quarterly During the Construction Phase	Survey was conducted on 26 July 2023

B. Monitoring Results

1. Ambient Air Quality

33. As shown in Table 16, there were three sampling events during this reporting period - 1) 17-19 July 2023, 2) 8-11 August 2023, and 3) 19-21 September 2023. Measurements of parameter such as PM₁₀, PM_{2.5}, SO₂, NO₂, and TSP were done by using air quality monitoring station-based online sensor technology.

34. Ambient air quality sampling was conducted at seven locations: 6 locations at Thilafushi (AQ1, AQ2, and AQ3 identified as baseline stations in the EIA and the ASR2, ASR3 and ASR5 based on the AERMOD study in the EIA), and one location at Villingili (AQ4) as control station. Figure 3 shows the ambient air quality sampling stations. Table 17 gives the description of the sampling stations while Table 18 shows the results of ambient air quality sampling in April 2023, May 2023, and June 2023. Table 19 provides description of WHO air quality standard. Detailed reports on ambient air quality sampling conducted are given in Appendix 3.



Figure 3: Ambient Air Quality Sampling Stations

Table 17: Description of Ambient Air Quality Sampling Stations

Location	Description	Distance to Project Site (WtE facility construction) meter
AQ1	Represents dense industrial area	650
AQ2	Represents dense industrial area	1,000
AQ3	Represents dense industrial area	500
ASR2	Represents dense industrial area	700
ASR3	Represents dense industrial area	500
ASR5	Represents dense industrial area	1,000
AQ4	Represents residential area with moderate urbanisation	4,500

Table 18: Results of Ambient Air Quality Sampling, July, August and September 2023

Parameter s	AQ1			AQ2			AQ3			AQ4			ASR2			ASR3			ASR5		
	Jul	Aug	Sep	Jul	Aug	Sep	Jul	Aug	Sep	Jul	Aug	Sep	Jul	Aug	Sep	Jul	Aug	Sep	Jul	Aug	Sep
PM ₁₀ (µg/m ³)	6.32	5.47	1.46	3.22	5.67	1.64	2.51	8.2	8.2	3.31	5.93	5.93	32.97	5.07	5.07	3.05	7.78	7.78	1.87	6.07	6.07
PM _{2.5} (µg/m ³)	5.4	4.54	1.31	2.36	4.72	1.52	2.08	7.45	7.45	2.85	4.51	4.51	31.06	4.4	4.4	2.34	6.72	6.72	1.44	4.74	4.74
SO ₂ (µg/m ³)	ND	2.0	2.0	ND	ND	ND	9.59	ND	ND	ND	ND	ND	ND	ND	ND						
NO ₂ (µg/m ³)	8.73	0.95	ND	3.78	1.73	ND	7.72	10.14	10.14	4.59	ND	ND	8.05	1.74	1.74	4.55	ND	ND	6.55	2.61	2.61
TSP (µg/m ³)	9.65	8.29	2.18	4.73	8.59	2.56	3.79	12.72	12.72	5.07	8.79	8.79	51.70	7.04	7.04	4.53	11.91	11.91	2.78	8.37	8.37
Monitoring dates: July (17- 19 th July 2023) Aug (8-11 th August 2023) Sep (19-21 September 2023) Averaging time is 24 hours																					

Table 19: WHO Air quality Standards for parameters monitored

Parameters	Averaging time	LOQ ¹	WHO Global Air Quality Guidelines 2021
PM ₁₀ (µg/m ³)	24 hours		45 µg/m ³
PM _{2.5} (µg/m ³)	24 hours		15 µg/m ³
SO ₂ (µg/m ³)	24 hours	<0.5 ppb (1.3µg/m ³)	40 µg/m ³
NO ₂ (µg/m ³)	24 hours	<0.5 ppb (0.94µg/m ³)	25 µg/m ³
TSP (µg/m ³)	24 hours		-

36. In the EIA (July 2020), ambient air quality monitoring was conducted in four locations (AQ1, AQ2, AQ3 and AQ4). Monitoring at AQ1 was conducted from 25-31 March 2019, at AQ2 from 20-25 August 2019, at AQ3 from 19-25 March 2019 and at AQ5 from 3-9 March 2019 by using online Aeroqual series 500 monitors and sensors.

37. From Table 18 to Table 20, results of ambient air quality conducted during this reporting period show that at all locations, all are within the limits set by the WHO Global Air Quality Guidelines 2021 (reference of the IFC EHS Guidelines 2007) except PM_{2.5} value reported at ASR2 sampling location during July 2023. Higher value of PM_{2.5} at ASR2 is attributed to local activities such as industrial and ship movement including maintenance adjacent to sampling location.

38. Variations in the ambient air quality results compared to the baseline measurements in the EIA (July 2020) may be attributed to the microclimate of the monitoring locations that may have background pollution sources as Thilafushi is an industrial site where various types of industrial works are conducted in addition to the local activities, and meteorological conditions at the time of sampling.

39. Male and Hulhumale are located in the E-N quadrant of the Thilafushi island. Based on the meteorology of the area, more specific to monthly variations, easterly winds are predominant from December to February. In March, it is a combination of easterly and NW winds, while westerly winds are predominant for the rest of the year. Two monsoon seasons are observed in Maldives: The Northeast (*Iruvai*) and the Southwest (*Hulhangu*) monsoon. The southwest monsoon lasts from May to September and the northeast monsoon occurs from December to February. The transition period of southwest monsoon, which is the driest part of the year, occurs between March and April while that of northeast monsoon occurs between October and November.

2. Noise level monitoring

40. Ambient noise level measurements were conducted from 19-20 July 2023, 14-15 August 2023 and 25-26 September 2023 at five sampling stations identified in the EIA (July 2020). These are NQ1 to NQ5 (refer to Table 20 for description of the sampling stations and Figure 4 for location map). Thilafushi is considered an industrial area and the EPA has no noise level standards, thus, results of ambient noise level measurements were referred to the WB-IFC EHS Guidelines April 2007 (Table 1.7.1) of 70 dBA for both daytime and night-time. Hourly noise levels were measured during daytime and night-time using a handheld instrument. Results of noise sampling are presented in Table 21.

Table 20: Description of Noise Sampling Stations

Station Identifier	Location	Description and rationale
NQ1	4°10'26.4 N 73°28'59.9 E	The station was selected as it represents a major industrial location of the island and is also located close to the harbour. The location lies north of the proposed facility on the opposite side of the lagoon.
NQ2	4°10'56.6 N 73°26'53.3 E	The station was selected as it represents a major industrial location of the island. The location lies east of the proposed facility on the opposite side of the lagoon. The location has various industrial activities in its proximity
NQ3	4°10'58.3 N 73°26'09.6 E	This station was selected as it is located near the boundary of the proposed WTE facility.

Station Identifier	Location	Description and rationale
NQ4	4°10'57.3 N 73°25'59.4 E	This station was selected as it is located west of proposed WTE facility. The area has less development and less activity during the daytime.
NQ5	4°10'57.3 N 73°26'14.4 E	This station was selected as it is located at the proposed facility



Figure 4: Noise Sampling Stations

Table 21: Results of Ambient Noise Level Measurements

Station	Measured from 19-20 July 2023		Measured from 14-15 August 2023		Measured from 25-26 September 2023	
	Noise level (dBA) daytime	Noise level (dBA) night-time	Noise level (dBA) daytime	Noise level (dBA) night-time	Noise level (dBA) daytime	Noise level (dBA) night-time
NQ1	60.6	46.1	59.3	51.3	58.9	54.5
NQ2	58.0	45.8	55.0	51.3	56.6	51.6
NQ3	61.1	44.9	57.9	47.4	62.1	60.7
NQ4	57.9	44.4	54.3	42.2	56.4	45.1
NQ5	59.8	44.5	49.3	43.0	47.5	41.6
WHO Guidelines Value for Noise Levels Measured Out of Doors (One Hour L_{Aeq} in dBA) Source: Guidelines for Community Noise. WHO. 1999	70	70	70	70	70	70

41. Results of ambient noise levels were found to be within the applicable standards for commercial and industrial areas during the reporting period i.e., from July to September 2023. Compared to the ambient noise levels measured on 25 August 2019 in the same sampling stations

from the EIA (July 2020), monitored noise levels were found in same range, however variations in the results may be attributed to the commercial and industrial activities at the time of measurements.

3. Marine Water Quality

42. For the additional baseline data gathering, marine water quality sampling was done on 7 August 2023 from the same seven locations identified in the EIA (July 2020) given in Figure 5 below. Laboratory analysis of marine water was done by the Bureau Veritas Laboratory, Sri Lanka for the following parameters - heavy metals (As, Cr, Cu, Ni, Pb, Zn, Hg, Cd), total nitrogen, nitrites, pH, turbidity, five-day biochemical oxygen demand (BOD)₅ etc (Table 22). The samples were brought to Sri Lanka and delivered to the laboratory within 24 hours from the field sampling. All the samples are kept in ice boxes to maintain the appropriate temperature and to conserve the samples. In-situ recording of pH, dissolved oxygen (DO), and electrical conductivity (EC) for each sample was conducted by using a handheld Hach SensION +MM156 water quality measurement meter. These results (Table 22) show compliance to the Maldivian Marine Monitoring Standards [Reference: Great Barrier Reef Marine Park Authority (2009) Outlook Report 2009]. Laboratory test results of marine water samples are given in Appendix 3.

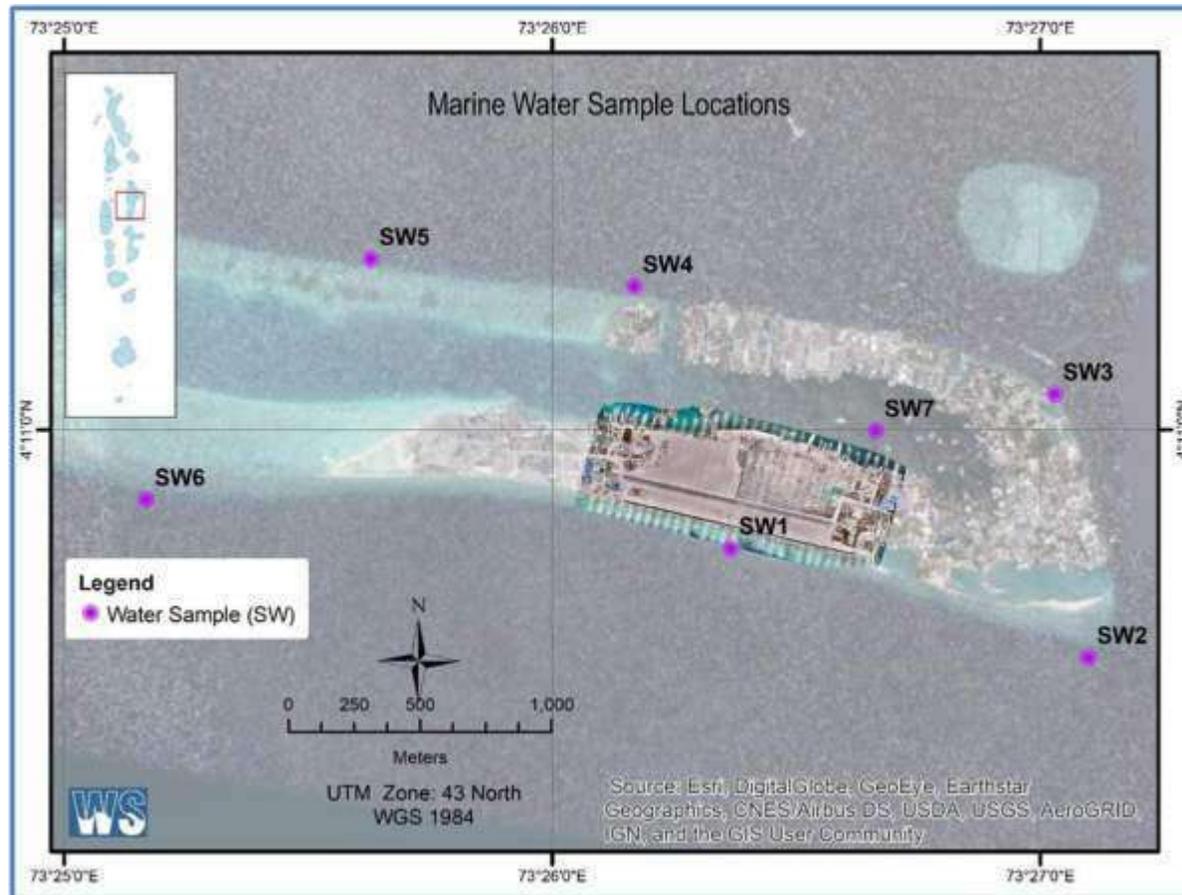


Figure 5: Marine Water Quality Sampling Stations

Table 22: Results of Marine Water Quality Sampling, August 2023

Parameters	Date of sampling: 7 August 2023							Unit	Approved Marine water quality standard of Maldives EPA
	SW1	SW2	SW3	SW4	SW5	SW6	SW7		
Temperature indoor/laboratory	19.8	19.0	19.3	19.3	19.3	19.0	19.3	°C	18-32
Salinity	3.4	3.8	3.5	3.8	3.8	3.8	4.0	%	
TSS	14.0	15.0	13.0	11.0	17.0	18.0	19.0	mg/L	
Oil & Grease	ND	ND	ND	ND	ND	ND	ND	mg/l	
Feecal Coliform	ND	ND	ND	ND	ND	ND	ND	MPN/100 ml	
Nitrite (as NO ₂)	0.02	0.1	0.02	0.02	0.02	0.02	0.02	mg/L	None proposed
pH at 24°C	7.2	7.5	7.6	7.7	7.7	7.7	7.6	-	8-8.3
COD	37	38	36	33	38	38	43	mg/L	
BOD ₅ at 20 °C	9	11	9	8	12	12	13	mg/L	<2mg/L
Turbidity	0.2	0.2	0.2	0.2	0.2	0.2	0.2	NTU	3 – 5 NTU (max)
Electrical Conductivity at 25°C	67500	72180	68940	66960	71280	73260	76860	µS/cm	48994-62350
Total inorganic Nitrogen	12.4	13.1	12.4	12.0	12.4	12.4	12.1	mg/L	None proposed
Total Phosphates (as PO ₄ ³⁻)	0.05	0.06	0.03	0.05	0.05	0.05	0.05	mg/L	1
Sulfide	ND	ND	ND	ND	ND	ND	ND	mg/l	NA
Ammonia	ND	ND	ND	ND	ND	ND	ND	mg/l	
Arsenic	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Cadmium	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Lead	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Hexavalent Chromium (asCr ⁶⁺)*	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Total Chromium	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Mercury	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Nickel	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Zinc	ND	ND	ND	ND	ND	ND	ND	mg/L	NA
Copper	ND	ND	ND	ND	ND	ND	ND	mg/L	NA

43. As per Table 22, values ranged for EC from 66,960 $\mu\text{S}/\text{cm}$ to 76,860 $\mu\text{S}/\text{cm}$, for nitrite from 0.02 mg/L to 0.1 mg/L, and for total inorganic nitrogen from 12.0-13.1 mg/L. While pH values ranged from 7.2 to 7.7. Also, BOD₅ values ranged from 8 mg/L to 13 mg/L while COD values ranged from 33 mg/L to 43 mg/l. Levels of heavy metals in all the sampling stations were found to be below the detection limit.

44. From the EIA (July 2020), samples were collected from the same locations on 3 July 2018. Values of temperature (24.2°C), nitrate (0.3 mg/L to 0.5 mg/L), oil & grease (less than 2 mg/L), salinity (36 ppt to 37 ppt), free ammonia (ND to 0.05 mg/L), and BOD₅ (ND to 1 mg/L) were similarly within the prescribed standards. The pH values ranged from 8.2 to 8.4 which is slightly higher than the limit of 8.3 in all the sampling stations except in SW7. Heavy metals, except for Zn (ND to 0.008 mg/L for SW2, SW3, SW6 & SW7), were tested to be below the detection limit. Variations in the results of marine water quality (Table 22) compared to the results from the EIA (July 2020) may be attributed to the environmental conditions at the time of sampling.

4. Groundwater Quality

45. Environmental monitoring of groundwater quality for the pre-construction period was conducted on 7 August 2023. Water samples were collected from the eight monitoring stations identified in the EIA (July 2020) except at GW5 (refer to Figure 6 for locations). For each location, the sample was collected from mid-water level and brought for laboratory testing in Sri Lanka. General sampling procedure involves washing the glass sampling bottles with water from the sampling points. For microbial tests, samples were collected in sterile glass bottles and tested in the laboratory of Male' Water and Sewerage Company (MWSC). Table 23 presents the analytical results of groundwater quality with detailed test results given in Appendix 3.

46. Ground water quality is not akin to drinking water standards as the island is originally reclaimed using waste and various sites have industrial activities. Water treatment will be required if groundwater in Thilafushi is to be used as drinking water.

47. Results from Table 23 show that levels of heavy metals were found below detection limit while other parameter are: Electrical conductivity (415 $\mu\text{S}/\text{cm}$ at GW1 to 72540 $\mu\text{S}/\text{cm}$ at GW2), pH (7.1 at GW2 to 7.8 at GW3 and GW4), nitrate (ND at all locations except at GW1 (6 mg/L) and GW2 (15 mg/l) etc. While PAH were reported ND at all locations. As use of ground water in Thilafushi is not permissible except in toilet flushing tanks there is no specific standard for ground water quality. Wells closer to the sea show high conductivity and wells near dumpsite show higher contamination of nitrates.

48. From the EIA (July 2020), samples were collected in the same sampling stations on 2 April 2019. Values of PAH, oil & grease, and heavy metals were found to be below the detection limit while for other parameters are: TDS (794 mg/L in GW1 to 12,946 mg/L in GW3), electrical conductivity (1.39mS/cm in GW1 to 25mS/cm in GW6), total coliform (4 MPN/100 ml in GW8 to >2,420 MPN/100 ml in GW1, GW3, GW5, and GW7), pH(7.1 in GW5 to 8.0 in GW4), chloride (183mg/L in GW1 to 6,325mg/L in GW6), and nitrate (1.7mg/L in GW1 to 34.5 mg/L in GW6).



Figure 6: Groundwater Sampling Stations

5. Water quality proposed to be used for construction and camp

49. One grab sample during each month of quarter from July to September 2023 was collected from the supply line network of MWSC (Male Water and Sewerage Company) at the project site and was analyzed for limited parameter as per details given in Table 24 for July-23 and Table 25 for August and September -23. Parameter listed in Table 24 and 25 are well within the acceptable limits. Due to error in sampling for coliform, data is not reported, and DBO instructed to conduct testing properly and report. Detailed report is enclosed as Appendix 3.

Table 24: Water quality for domestic supply of water used in construction camp during July-23

Test Parameter	Unit	Results	Acceptable Limits* Supply Water Quality Standards (5 December 2022) from the Utility Regulatory Authority
Date of sampling		5 July 2023	
Iron as Fe	mg/L	ND	< 0.3
Manganese as Mn	mg/L	ND	< 0.1
Nitrate (as NO ₃ -)	mg/L	2.0	<50
Arsenic as As	mg/L	ND	< 0.01
Cadmium as Cd	mg/L	ND	< 0.003
Lead as Pb	mg/L	ND	< 0.01
Chloride (as Cl ⁻)	mg/L	57.7	< 200
Mercury as Hg	mg/L	ND	<0.001
pH	--	7.1	6.5-8.5
Turbidity	NTU	0.2	< 1.0
Electrical Conductivity	µs/cm	756	<1000
Total Phosphates	mg/L	ND	< 5.0
Total Suspended Solids	mg/L	14	5-750

Table 25: Water quality for domestic supply of water used in construction camp during August and September -23

Test Parameter	Unit	Results		Acceptable Limits* Supply Water Quality Standards (5 December 2022) from the Utility Regulatory Authority
		7 August 2023	18 September 2023	
Date of sampling		7 August 2023	18 September 2023	
Physical Appearance		Clear	Clear	
pH	--	7.4	7.3	6.5-8.5
Turbidity	NTU	0.2	0.2	< 1.0
Residual Free Chlorine	mg/l	<0.01	<0.01	
Electrical Conductivity	µs/cm	525	505	<1000
Total Hardness	mg/l	6	7	
Total Suspended Solids	mg/L	10	8	5-750
Total Dissolved Solids	mg/L	293	264	5-750
Iron as Fe	mg/L	ND	ND	< 0.3
Hydrogen Sulphide	mg/L	<0.01	<0.01	
Ammonia	Mg/l	>0.1	<0.1	
Nitrate (as NO ₃ -)	mg/L	3.0	2	<50
Chloride (as Cl ⁻)	mg/L	58.6	61.2	< 200

6. Treated Wastewater Quality from WWTP/STP discharged into Sea

50. One grab sample of treated wastewater was collected during each month of quarter from July to September 2023 from discharge point of WWTP/STP in operation at the project site and analyzed for limited parameter as per details given in Table 26.

51. Quality of treated wastewater is well within the acceptable limits except for parameter for total nitrogen, which is recorded slightly higher than the limit (18.2 mg/l against the limit of 15 mg/l). DBO contractor has been notified for the same. Detailed report is enclosed as Appendix3.

Table 26: Treated Wastewater Quality from WWTP/STP during July, August and September-23

Parameters	Unit	Results	Acceptable Limits National Wastewater Quality Guidelines URA (August 2023)	Acceptable limits as per IFC General EHS Guidelines 2007
		Range for 3 months		
Total coliform	MPN/100 ml	7 - 4	-	400
Total suspended solids	mg/L	8 -12	30	50
Residual free Chlorine	mg/L	<0.01		
Temperature	°C	16 -18		-
Physical Appearance		Turbid		
pH at 25°C	--	6 - 7.1	5-9.5	6-9
Nitrate (as NO3-)	mg/L	0.05 - 5.7		-
Ammonia –N	mg/L	0 - 2		
Sodium as Na	mg/L	1.2 - 1.4		
Sulfide	mg/L	0 - 0.1		
Sulphate	mg/L	1 - 2		
Chloride	mg/L	49 - 200		
Ortho Phosphates	mg/L	0.1 - 0.2	10	2
Surfactants	mg/l	4.6 - 6.8		
Oil and grease	mg/L	ND	5	10
Electrical Conductivity	µs/cm	129 - 1025	---	-
Chemical Oxygen Demand	mg/L	22 - 50	50	125
Biological Oxygen Demand 20°C	mg/L	5-30	40	30
Dissolved Oxygen	mg/L	6.9 - 7.4		-
Calcium	mg/L	<1		
Phenolic Compounds	mg/l	<0.01		
Arsenic as As	mg/L	<0.001		-
Cyanide	mg/L	<0.001		-
Fluoride	mg/L	0.01		-
Zinc as Zn	mg/L	<0.001- <0.05		-
Cadmium	mg/L	<0.001 to <0.01		-
Total nitrogen	mg/L	18.2	15	10

7. Marine ecology assessment survey

52. As part of site environmental baseline monitoring , 3rd marine ecological survey for reef benthic cover and fish population was conducted on 26th July 2023 at locations M10 (This location has been identified in the EIA report as a potential alternative for the discharge of brine water and waste water.), M9 (This location was identified as an alternative for brine discharge and wastewater outfall) and M8 (The site is the location that will be used for discharge of waste water from the brine outfall as described in the EIA) as shown in Figure 6.



Figure 6. Underwater Marine Survey Locations (M8, M9 and M10)

53. A standard approach, established by the Maldives EIA community and approved by the Environmental Protection Agency (EPA), was employed to study benthic cover and fish populations. The survey employed GPS locations, transects surveys conducted at two depths: 5m and 10m at each station (M8, M9 and M10 – as detailed in an earlier report). The methods followed were those outlined by Hodgson et.al (2006) in Reef Check Instruction Manual: A Guide to Reef Check Coral Reef Monitoring. Three transects of 20 m length were laid, one after the other along the reef, ensuring the transect falls to the specific depth. A quadrant of size 0.5 x 0.5 m was laid sequentially on the transect, and photo images were taken with the quadrant in the center. Details of findings of survey are as per given in Appendix-4

IX. TRAINING AND CAPACITY BUILDING ACTIVITIES

54. Details of DBO/EPC Contractor-driven trainings are given in Table 27 and photos are shown in Appendix 5. Need improvement through design and implementation of more effective training module including requirements of ADB SPS, IFC Performance Standards and IFC General EHS Guidelines, toolbox talks as construction team is responsible for implementation of CEMP, H&S plan and other management plans. PMDSC is instructed to conduct regular trainings to all construction and supervision staff.

Table 27: Training and Capacity building activities conducted

No	Date	Training Activity	Training Objective	Venue and Duration	Target Group	Number of participants (male, female)
By EPC Contractor						
1	05.07.23	Lifting and Rigging Safety	Lifting Hazards, Types of slings and gears, Signal Technique, Inspection, Rigger Responsibility, signage and barricading, swing radius	WtE Site Thailafushi, 2hrs	Site Workers	6, Male
2	08.07.23	Power and Hand Tools training	Types of Power tools, Types of hazards, Control Measures, Inspection, PPE, Records	WtE Site Thailafushi, 1hrs	Site Workers	27, Male
3	10.07.23	Working at Height Safety	What is working at height, hazards, Risk Assessment, Training, Fall prevention, PPE, Supervision, Inspection of PPE	WtE Site Thailafushi, 1hrs	Site Workers	32 Male
4	11.7.23	Noise Awareness Training	What is Noise, how to reduce noise, Exposure hours, PPE, Training	WtE Site Thailafushi, 1hrs	Site Workers	6 Male
5	12.07.23	First Aid Training	First Aid, CPR, Response	WtE Site Thailafushi, 2hrs	Security officer	6, Male
6	13.07.23	Fire Watcher Training	What is Fire, Type of Fire and extinguisher agents, Fire watcher's role and responsibility	WtE Site Thailafushi, 1hrs	Site Workers	4, Male
7	18.07.23	Security Management Training	Security Management system, Communication, Security incidents reporting	WtE Site Thailafushi, 2hrs	Security officer	6, Male
8	22.07.23	Flag Man Training	Flag Man requirements, signaling method, Responsibility, Safe distance, Visible to Operate	WtE Site Thailafushi, 1hrs	Site Workers	6, Male
9	25.07.23	Firefighting Training	What is Fire, Type of Fire and extinguisher agents, Emergency Response Plan	WtE Site Thailafushi, 2hrs	Security Officer	8, Male
10	25.07.23	Scaffolding Safety	Scaffolding requirements, Inspection, Scaff tag, PPE requirements, Working at height Training,	WtE Site Thailafushi, 1hrs	Site Workers	11 Male
11	27.07.23	Chemical Handling	What is chemical, Hazardous of chemical, Entry Route, Control Measures, PPE, Training	WtE Site Thailafushi, 1hrs	Site Workers	14 Male
12	06.08	PPE Awareness	Types of PPE, Selection of PPE, Training, Care	WtE Site Thailafushi, 1 hrs	Site Workers	40 Male

No	Date	Training Activity	Training Objective	Venue and Duration	Target Group	Number of participants (male, female)
	.2023		about PPE			
13	07.08.23	OJT- Safe Pile Drive Operation	Safe Distance from moving equipment, Use of tagline for controlling load, PPE	WtE Site Thailafushi, 30 minutes	Site Workers	7, Male
14	09.08.23	OJT- Rigging Training	Lifting Hazards, Types of slings and gears, Signal Technique, Inspection, Rigger responsibility, signage and barricading, swing radius	WtE Site Thailafushi, 30 minutes	Site Workers	4, Male
15	13.08.23	Emergency Response Training	Types of Emergencies, Roles and Responsibility, Emergency Rescue Equipment, Evacuation Route, Communication, Assembly Point, Head Count	WtE Site Thailafushi, 1hrs	Security Officer	8, Male
16	26.08.23	GRM	Scope of GRM, GRM structure, how to raise a GRM, Solving GRM, Feedback, Records	WtE Site Thailafushi, 1 hrs	Site Workers	20 Male
17	02.09.23	Lifting and Rigging Safety	Lifting Hazards, Types of slings and gears, Signal Technique, Inspection, Rigger responsibility, signage and barricading, swing radius	WtE Site Thailafushi ,1hrs	Site Workers	12, Male
18	02.09.23	Fire Watcher Training	What is Fire, what Type of Fire and extinguisher agents, Fire watcher's role and responsibility	WtE Site Thailafushi ,1hrs	Site Workers	4, Male
19	06.09.23	Manual Handling Training	What is Manual Handling, Technique, Hazards, Mitigation, Training, PPE	WtE Site Thailafushi ,1hrs	Site Workers	10, Male
20	10.09.23	Flagman training	Signaling, Responsibility, Communication with operator, Signaling Device, PPE	WtE Site Thailafushi ,30 Minutes	Site Workers	4, Male
21	13.09.23	PPE Awareness Training	Type of PPE, Selection of PPE, Training, Care about PPE	WtE Site Thailafushi ,1hrs	Site Workers	10, Male
22	16.09.23	GRM Awareness Training	GRM Procedure, Complaint Channel, Resolution Process	WtE Site Thailafushi ,1hrs	Site Workers	10, Male
23	25.09.23	Fire Watcher Training	What is Fire, what Type of Fire and extinguisher agents, Fire watcher's role and responsibility	WtE Site Thailafushi ,1hrs	Site Workers	10, Male

X. PUBLIC CONSULTATION

55. MoECCT, through the PMU, is continuing to conduct meaningful consultations during project implementation. PMU has conducted consultations on 3 July 2023 and details of same are given in Appendix 6. A total of 13 persons (9 male and 4 female) from 8 institutions participated in the consultation meeting. The project team briefed participants on the current status of the project, safeguard, grievance redress mechanism the project etc., and responded to various queries of the participants.

56. The PMU will be supported by a PACCB consultant a consulting firm that will help to generate awareness and strengthen skills in waste collection, segregation, composting, recycling, and O&M targeting the poor and the women, including community awareness campaign for strengthening disaster risk reduction and climate change readiness. The PACCB consultant will be responsible for the information, education, and communications initiatives and public awareness on waste-to-energy. The recruitment of PACCB consultant is ongoing and four organizations have been shortlisted based on the EOI and the RFP for the same is in process. The four firms shortlisted has been requested to submit RFP and after evaluation a firm will be selected. The RFP due date is end of August 2023.

XI. GRIEVANCE REDRESS MECHANISM

A. Grievance Redress Mechanism

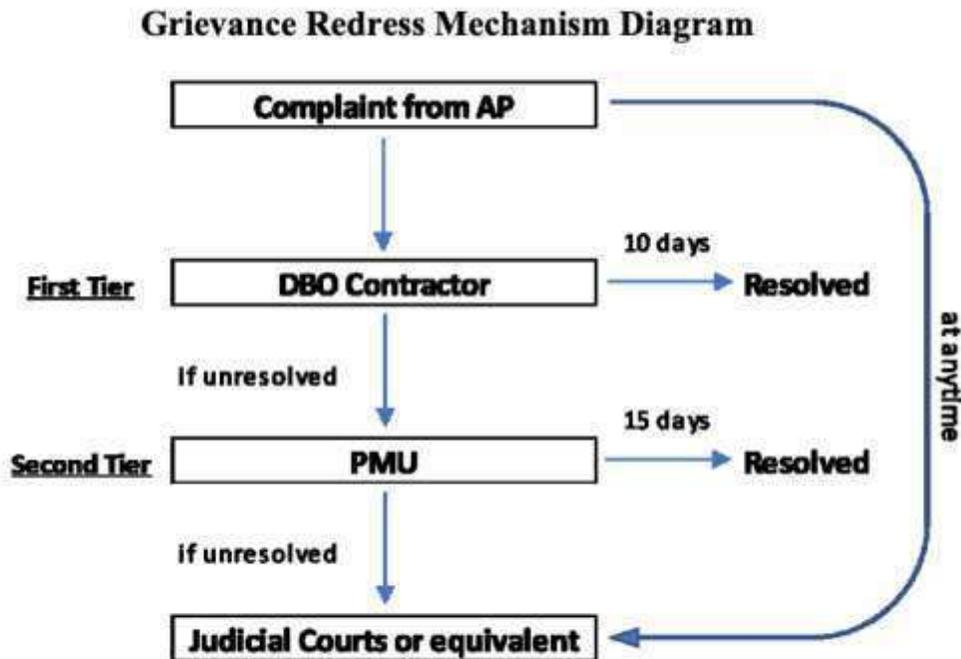
59. Project level grievance redress mechanism (GRM) has been established for the Project and is shown in Figure 7 below. Grievance Redress Committees are also in place at the PMU and DBO Contractor levels. The PMU (MoECCT) has approved and published the GRM (July 2022) on its website and released the government notification of the same on 30 March 2023 as per links.³

60. Aside from the project GRM, the DBO contractor has also set up an internal GRM to receive and address grievances/complaints from its staff/workers. The guideline for the workers' GRM is being prepared for review and approval of the PMU/PMDSC.

61. The DBO Contractor/EPC Contractor has installed sign boards on the GRM as shown in Figure 8 at the project site, which include details of focal persons, and contact phone numbers. GRM boxes with complaint forms are also provided at the entry gates of the project site.

³en: <http://www.environment.gov.mv/v2/en/download/19326> , and
dv: <http://www.environment.gov.mv/v2/dv/download/19328>

Figure 7: Grievance Redress Mechanism Flow Chart



B. Grievance Redress Committee (GRC)

62. As per the system in place, a GRC for each tier in the GRM has been established. In the 1st tier, the grievances will be handled by the GRC under the Thilafushi DBO Contractor which is composed of the Contractor's Project Manager, Contractor's Resident Engineer, Contractor's Environmental/H&S Officer, and one representative from the PMDSC. At the 2nd tier, grievances will be dealt with by the GRC consisting of the Project Manager/Director of PMU, Environment and Social Safeguard Specialist of PMU, Civil Engineer of PMU and IEC Specialist of PMU. Trainings were conducted on the implementation of the GRM for contractor and contractor has prepared an internal GRM aligning with the GRM mechanism of the project. Since no grievances were reported, no GRC meeting of 2nd tier has been conducted in this reporting period.

C. Complaints Received

63. No complaint has been received for this reporting period. There have been no complaints in previous reporting periods too.

I. FINDINGS & RECOMMENDATIONS

A. Findings and Recommendations

65. The environmental clearance has been received from the EPA and has been extended until 31 December 2021. There is no need to apply or renew as the site clearance and levelling works started on 28 December 2021 by the contractor and the EPA has been informed.

66. The draft CEMP has been prepared and submitted by the DBO Contractor and was conditionally approved by the PMU/PMDSC on 7 December 2022. As per details given in Table-11, HSE management plans and the ESMS including the SOPs and checklists as referred to in the approved CEMP are still being finalized by the DBO Contractor and the EPC Contractor.

67. Additional site mobilization, baseline data gathering on ambient air quality, ambient noise level, & marine water quality including HSE trainings and Construction activities such as spun piling works and excavation works were conducted during this reporting period. Table 28 presents the key issues and proposed remedial actions.

Table 28: Key Issues and Proposed Remedial Actions

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility
1	Non-availability of Environmental officer (national) in PMDCSC since 1 st July 2023.	<ul style="list-style-type: none"> • Expedite consultant's mobilization (recruitment is in process, waiting for ADB approval) • Until mobilized, the tasks are delegated to PMDCSC's site engineer 	30 th November 2023	PMDSC	PMU
2	Pending finalization and approval of various HSE plans and ESMS including SOPs and checklists	<ul style="list-style-type: none"> • Finalize HSE plans, ESMS and SOPs • Ensure implementation of draft plans 	31 st October 2023	DBO Contractor (preparation) PMDSC (approval)	PMU
3	Improvement in on-site EMP implementation (inadequate barricading, safety signage, electrical safety, PPEs etc.)	<ul style="list-style-type: none"> • Improve overall site management, standard and safe and practices, housekeeping and regular training to workers and supervisors • DBO EHS staff to conduct daily walk through of the site, and note issues for immediate rectification. • PMDCSC to enhance field supervision and 	Immediate and continuous compliance	DBO and PMDCSC	PMU

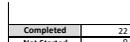
No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility
		<p>monitoring of health and safety</p> <ul style="list-style-type: none"> Enhance workers and supervisors training to identify work site risks and safety issues and reporting. 			
4	Smoke emissions and fire risk from the existing waste dump and bales storage	<ul style="list-style-type: none"> PMU to follow up with WAMCO and ensure that risk is eliminated, and an emergency response plan is put in place. 	Immediately	PMU	MOEFCT
5	Site ambient environmental monitoring (air and noise) not conducted	<ul style="list-style-type: none"> Conduct air and noise monitoring at the site. Locate the sampling stations within the site considering down-wind direction Location, frequency and parameters shall be as per the environmental monitoring plan 	31 st December 2023	DBO	PMDSC and PMU
6	Inadequate training and capacity building activities	<ul style="list-style-type: none"> Prepare a training plan on implementation and monitoring of CEMP. The training plan should cover all levels and all project agencies (workers, supervising staff, technical and monitoring staff, management etc.). This should include regular (such as daily TBT, monthly, quarterly etc.) to be conducted by Contractor EHS manager, PMDCSC staff and external experts (If needed on specific topics). Plan should clearly spell out – objective of training, topics to be covered, target group, frequency, training venue, and the trainer. Conduct periodic training of technical, 	31 st December 2023	PMDSC	PMU

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility
		supervision and EHS staff of contractor, PMU			
7	Inadequate training subcontractors of EPC contractor on HSE issues and further training of EPC contractors' team.	<ul style="list-style-type: none"> • Training procedure plan, training calendar plan, SOPs and checklists will be prepared by the DBO/EPC contractors to implement, review, and modify the training program on a regular basis. 	Immediate and continuous compliance	DBO contractor with the guidance of PMDCSC	PMU
8	PACCB consultants work delayed	<ul style="list-style-type: none"> • Speed up the hiring process (final bid evaluation and contract signing). • Until consultants are hired, PMU to conduct public awareness 	31 st December 2023	<ul style="list-style-type: none"> • PACCB consultants with approval from PMU 	PMU

**Appendix 1 Status of permits applicable during construction and copies of permits
obtained during reporting period**



DESIGN, BUILD AND OPERATE OF A WASTE TO ENERGY FACILITY AT K. THILAFUSHI ISLAND, MALDIVES



Completed	27
Not Started	9
In progress	1
total	37

Project Name: DESIGN, BUILD AND OPERATE OF A WASTE TO ENERGY FACILITY AT K. THILAFUSHI ISLAND
 Project Manager Name: Mr. CIWAN

No	Agency/Authority	Permit	Planned Submission Date	Actual Submission Date	Expected Approval Date	Actual Approval Date	Status	Progress/Comments	Permit Requirements	Focal Point	Updates (25.05.2023)	Link
1a	HDC	Construction Permit <u>(Main Building)</u>	2/18/2023		3/4/2023		Not Started	<ul style="list-style-type: none"> First, layout of facility to be submitted Each building drawings can be submitted separately for permitting 7 to 14 days of approval 	<ul style="list-style-type: none"> Final Layout Structural Drawings Architectural Drawings 2 Authorized Architect and 2 Authorized Engineer signature will be required 	HDC Husain Ziyath Director - Planning and Development 778 87 41 ziyath@hdc.com.mv		
1b	HDC	Construction Permit <u>(Other Buildings)</u>	5/15/2023		5/29/2023		Not Started	<ul style="list-style-type: none"> Each building drawings can be submitted separately for permitting 7 to 14 days of approval 	<ul style="list-style-type: none"> Final Layout Structural Drawings Architectural Drawings 2 Authorized Architect and 2 Authorized Engineer signature will be required 			
2	HDC	Boundary fencing permit	4/26/2022	5/22/2022	5/29/2022	6/7/2022	Completed	<ul style="list-style-type: none"> Submitted for HDC approval on 22.05.2022 Submission No: HDC(161)-MNS/H14/2022/00049 	<ul style="list-style-type: none"> Site Handover Form Fence Design 			
3	EPA	Environmental Clearance	1/31/2023		2/14/2023		Not Started	<ul style="list-style-type: none"> An addendum will be issued for EIA report after design is completed 	<ul style="list-style-type: none"> Additional Baseline Data reports to be submitted 	Musab Sabree Assistant Engineer 9838006 musab.sabree@epa.gov.mv		
4	URA	Dewatering Permit for Excavation of Banker	4/15/2023		4/29/2023	5/25/2023	Completed		<ul style="list-style-type: none"> Water Quality Test Report Site Plan Foundation Plan+Section Construction Permit EIA Decision Statement Pump Details Road Closure Permit Work Schedule 	Water & Sewerage Mohamed Shujan Assistant Oceanographic Observer 7772026 mohamed.shujan@ura.gov.mv	06/15/2023 to 13/07/2023	
5	STELCO	Approval for grid connectivity (Temporary Power Connection)	4/3/2022	4/5/2022	17.05.2022	5/15/2022	Completed		<ul style="list-style-type: none"> Reg. Copy of Land (Site Handover Document) Agreement Stamp of Ministry Registration copy of company Panel board approval (if necessary) 	Hussain Ageel Naseer Assistant Service Engineer 744 74 17 Hussain.AgeelNaseer@stelco.com.mv		
6	STELCO	Approval for grid connectivity (Permanent Power Connection)	12/31/2024		1/14/2025		Not Started	<ul style="list-style-type: none"> Request for clarification submitted. 	<ul style="list-style-type: none"> Single Line Diagram STELCO approval for equipments to be used Load calculations URA approval Licensed URA Engineer signature will be required 			
7	URA	Approval for Power Supply	12/31/2024		1/14/2025		Not Started			URA - Power/Energy Ahmed Jazaan Assistant Engineer 970 74 72 ahmed.jazaan@ura.gov.mv		
8	MWSC	Water Supply and Sewerage (Temporary Connection)	4/3/2022	4/5/2022	5/26/2022	6/8/2022	Completed	<p>Water Connection</p> <p>Temporary water connection completed. (400 m far away from site boundary)</p> <p>Excavation permit obtained from HDC on 14.06.2022 to start piping work from water meter to the site boundaries.</p> <p>Sewerage Connection</p> <p>Design works are going on for temporary discharge line. EIA Addendum and URA approval will be obtained before installation of the temporary sewerage connection.</p>	<ul style="list-style-type: none"> Reg. Copy of Land (Site Handover Document) Stamp of Ministry Registration copy of company 	Ahmed Hamad Customer Relation Manager 995 63 43 ahmed.hamad@mwsc.com.mv		
9	MWSC	Water Supply and Sewerage (Permanent Connection)	12/31/2024		1/14/2025		Not Started					
10	HDC	Agreement to commit to the safety measure around the construction area	2/18/2023		3/4/2023		Not Started			HDC (Online Submission)		
11	MNDF	No Objection from FRS (Fire Rescue Services Department) (Temporary)	2/7/2023		2/21/2023		Not Started			MNDF Fire Rescue Services Department Colonel Abdulla Zuhury a.zuhury@mndf.gov.mv		
12	MNDF	No Objection from FRS (Fire Rescue Services Department) (Permanent)	1/1/2025		1/15/2025		Not Started			MNDF Fire Rescue Services Department Colonel Abdulla Zuhury a.zuhury@mndf.gov.mv		
13	Ministry of Defence	Fire protection system for Office and Accomodation		1/2/2023		15/02/2023	Completed			Ahmad Shan Mansoor Permanent Secretary		
14	Ministry of Defence	Fire protection system for Kitchen and Worker Accomodation		4/23/2023		7/5/2023	Completed			Hassan Zameel deputy Minister		
15	HDC	Excavation Permit (LAYING SEWAGE PIPE)				2/20/2023	Completed			ADAM AZMEE		
16	HDC	Excavation Permit (Laying water pipe from water meter to site boundary)				8/3/2023	Completed			ADAM AZMEE		
17	HDC	Laying water discharging pipe from site boundary to the sea				6/22/2023	Completed			ADAM AZMEE		
18	HDC	Road closing permit (LAYING SEWAGE WATER PIPE FROM UNDER THE ROAD)				19/02/2023	Completed			Ahmed		
19	URA	SEWAGE TREATMENT PLANT (THILAFUSHI WASTE TO ENERGY PROJECT)		6/3/2023	12/4/2023	12/4/2023	Completed	Please also note that you will be required to submit the monthly wastewater test results to URA.		Aminath Mohamed Director Secretariat@ura.gov.mv +9603332488		
20	HDC	Partial Construction Permit for Spun Piles (ERQ – Table S.17 – Item 1- Construction Permit)		15/3/2023	10/4/2023	5/11/2023	Completed		<ol style="list-style-type: none"> Site Organization Plan WIE Building Facade WIE Building Plan & Section Geotechnical Evaluation Report WIE Building Spun Piles Layout 			
21	MNHPI	foundation systems of WIE Building		16/04/2023		5/4/2023	Completed					
22	URA	Cable Approval		25/01/2023		5/8/2023	Completed					
23	URA	Grid Code		2/4/2023			In Progress					Cable Approval: 386
24	HDC	Excavation permit for WIE Bunker & Process building				7/31/2023	Completed					
25	URA	Dewatering Permit for Excavation of Banker		8/20/2023		8/20/2023	Completed					
26	HDC	Excavation permit for WIE Bunker & Process building				8/26/2023	Completed					
27	URA	Dewatering Permit for Excavation of Banker		9/18/2023		9/21/2023	Completed					
28	HDC	Excavation permit for WIE Bunker & Process building		9/18/2023		9/24/2023	Completed					
29	HDC	Dewatering Location Permit		10/2/2023		10/15/2023	Completed					
30	HDC	Excavation permit for WIE Bunker & Process building		10/11/2023		10/18/2023	Completed					
31	URA	Dewatering Permit for Excavation of Banker		10/22/2023		10/23/2023	Completed					

HDC(161)-MNS/H2/2023/00802

ISSUED

Approved at 31/07/2023 02:31:04

DETAILS

NAME

URBASER S.A.

IDENTIFICATION

FC00242021

REQUEST

Excavation Permit

GENERAL INFO

REQUESTED BY

Power of Attorney

PERMIT LOCATION

K. Thilafushi -S7-01 (WTE DBO Facility)

LOT NUMBER

S7-01 Thilafushi (WTE DBO Facility)

LOT OWNER

Ministry of Environment Climate Change and Technology

AGREEMENT NUMBER

(AGR)438-WPMC/PRIV/2021/71

CONSTRUCTION PERMIT NUMBER

BUILDING USAGE PERMIT

EXCAVATION DETAILS

PURPOSE OF EXCAVATION

Waste to Energy Facility-WtE Building Construction

LOCATION/ROAD NAME

K. Thilafushi -S7-01

DEPTH

500 cm

PERMIT TYPEF

PERMANENT

SERVICE PROVIDER

UTILITY PERMIT NO

REGISTERED CONTRACTOR INFO

CONTRACTOR NAME

URBASER S.A.

CONTRACTOR ADDRESS

Waste to Energy Facility K. Thilafushi

CONTRACTOR PHONE NO

9552422

CONTRACTOR NIDREG NO

FC00242021

REMARKS

NOTE:

FOR OFFICE USE ONLY:

SITE STATUSREMARKS

We hereby grant permission to excavate the area stated/highlighted in the location map submitted with the application as per the conditions below. • Any dewatering works should not disrupt the reclamation project works of China Harbor Engineering Company's. • Should not disrupt the relocation works of Thilafushi MV cable. • This permit is valid for 14 days (excluding



MINISTRY OF DEFENCE
MALE',
REP OF MALDIVES.

No: 28-LA-1/PRIV/2023/593

Date: 5th July 2023

Mr. Senol Beken,
Managing Director of Alke – Alkatas Joint Venture Pvt Ltd,
Alke – Alkatas Joint Venture Pvt Ltd,

Dear Mr. Senol Beken,

With reference to your letter number AAJV-2023/003 sent on 26th April 2023.

As per your request, the Fire Safety inspection of the temporary accommodation block and kitchen of employees working on the "Waste to Energy Facility on K. Thilafushi" Project was conducted by the Fire and Rescue Service of the Maldives National Defence Force on 03rd July 2023.

The fire safety inspection has revealed that the fire extinguishers and fire blankets installed at the sites mentioned are in good condition and meet the standard set by the Fire and Rescue Service

Thank you.

Yours Sincerely,

Hassan Zameel
Deputy Minister

**Appendix 2 Site Inspection Reports by PMDCSC from July to September 2023,
including Site Inspection Photos**



Site Inspection Report

No.: SI-23-19

by the Employer's Representative

Date and Time of the Visit	Conducted by [ER]	Signature	Witnessed by	Signature
12 th July 2023, 10:05 hrs	Nahee Nazim – Deputy Team Leader		Sathiyaraj Arunachalam - Deputy Project Manager – Urbaser	

General Observations

Sn	Particulars	Details / Remarks	Witnessed by	Reference
1	Change in construction methodology with reference to same given in EIA report, if any	-	-	-
2	Not anticipated/accounted project specific activity (ies) and impacts observed which were not considered in EIA study report, if any, either on site or adjacent by the Contractor or other stakeholders.	-	-	-
3	Any activity or sign observed within and adjacent to project site which may lead to soil and ground & marine water contamination	Presence of Shipwrecks adjacent to quay wall and movement of speed boats, ships (medium and large) on the route and adjacent to quay wall of island . Leachate and run off water from waste dumping site of WAMCO adjacent to project site. Waste disposed by others adjacent to project site.	Sathiyaraj Arunachalam – D.B.O Dhamu, HSE Manager, EPC Contractor Bin, Environment Manager, EPC	-
4	Total number of man power at project as per attendance register on date of visit a) DBO contractor (office) b) EPC contractor (office-Indirect) c) EPC contractor (office-direct) d) EPC contractor (on site) e) HO - Management team f) Maldivian workers g) Sub -contractor (s) h) Security(3 rd party)	Total of 85 workers deployed. 3 15 25 21 3 3 12 6	Sathiyaraj Arunachalam – D.B.O	-
5	Others, if any	Presence of 350 KVA DG, and additional generators placed around the site, to be approved by URA before it can be used.	Sathiyaraj Arunachalam – D.B.O	-

Progress Observations

No.	Particulars	Details / Remarks	Witnessed by	Reference
1	Fencing and Perimeter	Perimeter fencing completed.	Sathiyaraj Arunachalam – D.B.O	Photo 18
2	Temporary facilities	Work on the temporary facilities on going. Toilets and accommodation buildings still under construction.	Sathiyaraj Arunachalam – D.B.O	Photo 18,19
3	Piling Works	Piling works for the bunker area and the main process building in progress. 1 st part of the pile driving is on going. 38% of work completed. Welding work for the 2 nd part of the pile continues, welding repair works and cleaning of the welded joints on going. 32% of work completed.	Sathiyaraj Arunachalam – D.B.O	Photo 14,15,16
4	Excavation and Dewatering	Excavation works have not started yet. Dewatering equipment has started to arrive on site.	Sathiyaraj Arunachalam – D.B.O	Photo 11
4	Removal of Shipwrecks (Urbanco)	Removal of the shipwrecks in the lagoon has been started by Urbanco.	Sathiyaraj Arunachalam – D.B.O	Photo 13,17
5	Removal of Buried Cable (Urbanco)	No activities have been started within the site premises.	Sathiyaraj Arunachalam – D.B.O	-

Environmental Observations

Sn	Particulars	Details / Remarks	Witnessed by	Reference
1	Status of adequacy of compliance of CEMP and ESMS including SOPs in place applicable to construction activities visited on the basis of assessment made on randomly basis, on site or adjacent. ¹	No documented plan and SOP was in place for activities presently conducted as part of pre-construction activities. However, for construction phase, various plans and SOPs as part of ESMS as mentioned in CEMP are yet to be finalized.	Sathiyaraj Arunachalam – D.B.O	-
2	Status of adequacy of environment monitoring as envisaged in CEMP on the basis of assessment made on randomly basis.	Being conducted as scheduled. However justification for variations observed need to be provided.	-Do-	-
3	Status of adequacy of level of understanding of environment hazards and corresponding designed mitigation measures of construction team including supervisors and workers on site or adjacent on the basis of assessment made on randomly basis.	Adequacy on subject is found inadequate and not in line with ADB category A project requirements. Need to design more effective training module including tool box talk as construction team is/will be responsible for implementation of CEMP, H&S plan and other management plans	-Do-	-
4	Status of adequacy of record keeping including data reported in monthly environment report on the basis of assessment made on randomly basis.	Site log book in form of loose sheets (register should be maintained) was maintained and format of same was found inadequate as all details were not captured. Also as per contract's obligation, format is to be approved by the ER.	-Do-	-

¹aspects includes (but not limited to) solid wastes (hazardous and non-hazardous including construction, plastic, E-waste, battery and bio-medical) management, Storage and handling of construction materials, waste water (from domestic and construction activities and run off due to rain) management, Air emission (from mainly DG sets, diesel driven machinery and equipment, Raw mix plant, fugitive, vehicular movement, etc.) management, management of construction noise level etc.

Health and Safety Observation

Sn	Aspects	Details / Remarks	Witnessed by	Reference
Labour - health, safety and welfare				
1	Status of adequacy of HSE /Occupational Health and Safety management plan and ESMS including SOPs applicable to construction activities visited on the basis of randomly assessment made. ²	No formal documented plan was in place and practices in place were found inadequate for pre construction phase. However following observations were made: <ul style="list-style-type: none"> Impacts/risks to workers due to presence of dumping site have not been identified and inadequate mitigation measures were in place. No risk management and monitoring plan was in place to deal with air pollutants emitting from dumping site Documents on subject were under process of finalization for getting approval of ER/PMU for construction phase. Presence of live electrical cable supplying electricity to project from STELCO and internal found on ground. 	Sathiyaraj Arunachalam – D.B.O Dhamu, HSE Manager, EPC Contractor Bin, Environment Manager, EPC Contractor	-
2	Status of adequacy of HSE monitoring as envisaged in CEMP, HSE Plan, ESMS & SOPs etc.	Documents on subject as part of CEMP, HSE Plan and SOPs as part of ESMS are yet to be submitted for approval of ER/PMU	-DO-	-
3	Status of adequacy of on-site Emergency Preparedness and Response on the basis of randomly assessment made (emergency response team, safety committee, fire fighting, mock drills, assembly point, evacuation, accident/incident reporting etc.)	No formal document and SOPs on subject was in place for pre construction phase and system in place was found inadequate. Assembly point established and inadequate safety signage were in place however no safety committee is in place. Inadequate medical aid facilities (e.g. availability of stretcher and medicinal, medical evacuation etc) at health center located within project site though full time qualified doctor has been posted.System in place needs improvement to meet the requirements.However documents on subject are under preparation for construction phase.	-DO-	-
4	Status of adequacy of workers accommodations including fresh water for drinking & others, hygienic with reference to waste water and domestic solid waste management and other welfare facilities (e.g. Kitchen/food, medical, toilets, recreation, shelters, spray of mosquitoes and odour repellent etc.) maintained at project site on the basis of randomly assessment made.	Worker's accommodations including toilets at project site are still under construction.	-DO-	-
5	Status of adequacy of housekeeping within project site on the basis of randomly assessment made.	No documented plan/SOP on the subject was in place. But, site is kept generally clean and organized. However, storage yards and solid waste storage sites need improvements in management.	-DO-	-
6	Status of adequacy of security management(availability of adequate number of security guards, fencing of project site, procedure(s) to allow entry for visitors and workers etc. understanding of role of security guards as per contract) of project site on the basis of randomly assessment made.	Gates in place, and visitors register in form of loose sheets (proper register is to be maintained) maintained. Security guards in place at both entry points to the site. CCTV system is installed. Adequate lighting needs to be provided around the site.	-DO-	-

²e.g assessment of activity wise associated hazards, work permit, PPEs, first aid, tool box talk, barricading, COVID-19, electrical safety etc.

7	Status of adequacy of handling of workers complaint(s) received on HSE, human resources and welfare aspects as per complaint register kept at site on the basis of randomly assessment made.	Box placed for for internal grievance redress mechanism. Reportedly it was on adhoc basis and no record on same was made available.	-DO-	-
8	Status of adequacy of record keeping including data reported in monthly HSE report on the basis of randomly assessment made.	Site log books in form of loose sheets (should be kept in register) were maintained and format was found inadequate as all details are not captured. Also as per contract's obligation, format is to be approved by the ER.	-DO-	-
Community- health, safety and welfare				
9	Status of adequacy of Community Health and Safety plan and ESMS including SOPs on the basis of randomly assessment made (mainly during transportation of men, materials and machinery, influx of workers from other places, contamination of air, land and marine water and ecology, if any etc.)	No documented system was in place and as per verbal discussion with DBO and EPC contractor, system in place was found inadequate on subject for pre-construction phase. However pre-construction environment baseline monitoring is being carried out as per CEMP on regular basis. However, for construction phase, various plans and SOPs as part of ESMS mentioned in CEMP and H&S plan are yet to be finalized for approval from ER/PMU.	-DO-	-
10	Status of adequacy of off-site Emergency Preparedness and Response on the basis of randomly assessment made (e.g. response team, mock drills, mutual aids, evacuation plan, accident/incident reporting etc.)	No documented system was in place for pre-construction phase and as per verbal discussion with DBO and EPC contractor, system in place was found inadequate to deal with offsite emergencies. However, plan and SOPs on subject are under process of finalization for getting approval of ER/PMU for construction phase.	-DO-	-
12	Status of adequacy of handling of community complaint(s) received on Environment, HSE and welfare aspects on the basis of randomly assessment made.	Grievance Redressal Mechanism Plan on subject is yet to be approved by ER/PMU. However, system in place was not adequate, and needs improvement to comply with ADB requirements. To comply with contract's obligations, community engagement plan is yet to be submitted for getting approval of ER/PMU.	-DO-	-

Site Photos



Photo 01 by Naahee 12/07/23 11:45hrs.
Concrete mixing machines on site.



Photo 02 by Naahee 12/07/23 11:48hrs.
Xypex stock on site, stored in hazardous chemical storage area. Stock maintained for completion of work.

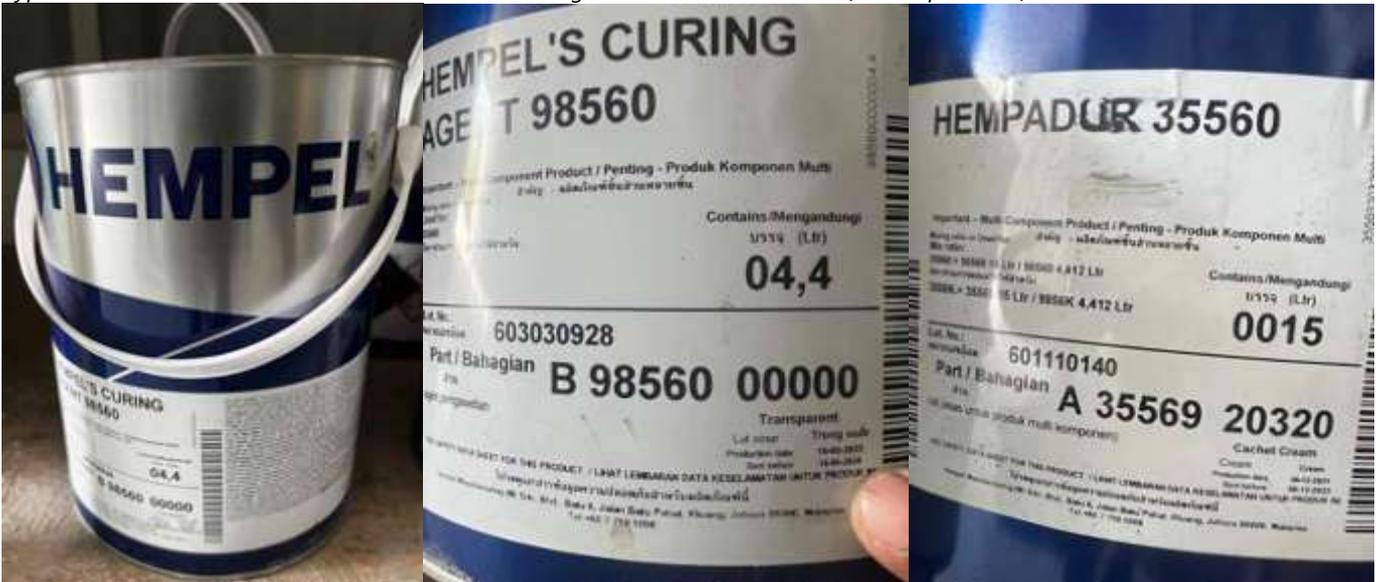


Photo 03 by Naahee 12/07/23 11:50hrs..
Paint for the welded areas also on site, and enough stock maintained and stored in the hazardous chemical store.



Photo 04 by Naahee 12/07/23 11:52hrs.
Main material store on site, organized and managed by store keeper.



Photo 05 by Naahee 12/07/23 11:44hrs.
Waste sorting and storage area, lacks signage and requires better management.



Photo 06 by Naahee 12/07/23 11:45hrs.
Water leak seen on the water tank, yet to be fixed.



Photo 07 by Naahee 12/07/23 11:45hrs.
Materials stored outside the storage tent, needs to be removed and cleared for site safety.



Photo 08 by Naahee 12/07/23 12:10hrs.
Wamco landfill, new C&D waste being disposed at this corner close to the site boundary.



Photo 09 by Naahee 12/07/23 12:15hrs.
Materials and equipment on site, needs to be better managed and unused equipment and material to be cleared.



Photo 10 by Naahee 12/07/23 11:48hrs.
Pipes for the dewatering well point system has arrived on site.



Photo 11 by Naahee 12/07/23 11:50hrs.
Pumps for the dewatering well point system has arrived on site.



Photo 12 by Naahee 12/07/23 11:55hrs.
Better storage for fuel is required to prevent accidental leaks and spillage as well as sun shade to be provided.



Photo 13 by Naahee 12/07/23 13:52hrs.
Urbanco (HDC) has started the removal of the shipwrecks, some of the smaller wrecks being cleared away.



Photo 14 by Naahee 12/07/23 12:43hrs.
Bunker area and main building spun pile driving works continues.



Photo 15 by Naahee 12/07/23 12:44hrs.
Bunker area and main building spun pile driving works continues.



Photo 16 by Naahee 12/07/23 12:45hrs.
Bunker area and main building spun pile driving works continues.



Photo 17 by Naahee 12/07/23 12:47hrs.
Urbanco (HDC) has started the removal of the shipwrecks, some of the smaller wrecks being cleared away.



Photo 18 by Naahee 12/07/23 12:48hrs.
Main storage building and laydown area.



Photo 19 by Naahee 12/07/23 12:49hrs.
Main storage building and laydown area.



Photo 20 by Naahee 12/07/23 12:55hrs.
Waste sorting and collection area.

Company Name		Employee	Visitor	Rota. Off	Demob.	Total POB (Personal on Board)	Accommodation Site Camp	Normal (hrs)	Overtime (hrs)	Total (hrs)
Office	DBO Representative	3	0	0	0	3	0	27	0	27
	HO – Management Team	3	0	0	0	3	0	27	0	27
	Subcontractor indirect	0	0	0	0	0	0	0	0	0
Site	EPC Contractor direct staff	30	0	0	0	30	30	270	0	270
	EPC Contractor indirect staff	18	0	0	0	18	17	162	0	162
	EPC Contractor direct site workers	19	0	0	0	19	20	171	0	171
	Security (Gage)	6	0	0	0	6	0	54	0	54
	ELS (Spun pile contractor)	12	0	0	0	12	11	108	0	108
	Medical Leave	0	0	0	0	0	0	0	0	0
	Absent	0	0	0	0	0	0	0	0	0
	Vacation	4	0	0	0	4	0	0	0	0
	Grand Total Site POB	91	0	0	0	91	78	819	0	819

ALKE ALKATAS JV	HAZARDOUS MATERIAL RESOURCES								
	Concrete Admixture	Bitumen Material	Formwork Oil	Epoxy Material	Diesel	Fuel Oil	Paint	Antirust	Isolation Solution Material
Daily	0	0	0	0	300.0 lt	0	0	0	0
Monthly	0	0	0	0	3700.0 lt	0	0	0	0
TOTAL	0 lt	90.0 kg	0 lt	0 lt	33,197.0 lt	2509.0 lt	1363.0 lt	140.0 lt	0 lt

ALKE ALKATAS JV	WASTE GENERATION RESOURCES								
	Plastic Waste	Paper Waste	Kitchen Waste	Waste Oil	Sewage Sludge	Waste Water	Construction Waste	Metal Waste	Wood Waste
Daily	0.003 tons	0.002 tons	0.006 tons	0	0	0	0	0	0
Monthly	0.048 tons	0.041 tons	0.072 tons	0	0	0	0	0	0
Project Total	1.616 tons	0.423 tons	1.398 tons	0.0 tons	4.8 tons	19.20 tons	3.89 tons	0.82 tons	1.827 tons

CONSTRUCTION ACTIVITIES ON SITE				
12 th July 2023			Next Day Plan	
Progress	Estimated Completion Date	Construction Activities	Construction Activities	
38%	30 th August 2023	16 no.s of 12m length Spun Piles installation completed SP-001, SP-005, SP-009, SP-012, SP-013, SP-016, SP-017, SP-020, SP-021, SP-024, SP-028, SP-032, SP-036, SP-040, SP-048	Spun Pile installation of the WtE Building will continue.	
38%	30 th August 2023	Spun pile shifting to the pile locations is ongoing.	Spun pile shifting of the piles to location will continue.	
32%	15 th August 2023	5 no.s Spun Piles welding were completed.	Spun pile welding works will continue.	
		The cleaning and repair works is ongoing in the welded joint of the spun piles is on going.	The cleaning and repair works is ongoing in the welded joint of the spun piles will continue.	

PERMIT TO WORK							
PTW No.	Issue Date	Permit Holder	Area Authority	Location	Task Description	Expiry Date	Status
HW00018	8 th July 2023	Yucel Cakir	Burak Ozdemir	Campsite and mobilization area	Welding, tuck welding, isolation with flame gun, steel cutting, concrete cutting, grinding.	14 th July 2023	Open
HW00019	8 th July 2023	Amos Chinniah	Burak Ozdemir	Piling works Area	Pile welding, fabrication.	14 th July 2023	Open
CW00025	8 th July 2023	Haji Quali Gechaman	Burak Ozdemir	Sedimentation pond area	Excavation of sedimentation pond and pipe lines.	14 th July 2023	Open
CW00026	8 th July 2023	Yucel Cakir	Burak Ozdemir	Campsite and mobilization area	Concrete casting, stone works, mason works, painting, material handling, electrical works, piping works, scaffolding, site cleaning.	14 th July 2023	Open
CW00027	9 th July 2023	Sanjeeva Jayaratna	Burak Ozdemir	Piling works area	Pile driving, paint coating, material handling and shifting, welding area shelter preparation, equipment maintenance.	15 th July 2023	Open
HW00020	11 th July 2023	Sanjeeva Jayaratna	Burak Ozdemir	Piling works area	Pile welding, fabrication.	17 th July 2023	Open

LIST OF MAJOR EQUIPMENT										
Description	U.M.	AAJV				Subcontractors				Rental
		Laydown area		Site		Laydown area		Site		
		Working	Standby	Working	Standby	Working	Standby	Working	Standby	
TOTAL	N.	0	0	12	0	0	0	0	7	0
Pickup	N.	0	0	1	0	0	0	0	0	0
Car	N.	0	0	1	0	0	0	0	0	0
Excavator	N.	0	0	0	0	0	0	0	1	0
180 kVA Genset	N.	0	0	1	0	0	0	0	0	0
Portacabin	N.	0	0	1	0	0	0	0	0	0
JCB	N.	0	0	1	0	0	0	0	0	0
Concrete Mixer	N.	0	0	1	0	0	0	0	0	0
Mobile Crane	N.	0	0	1	0	0	0	0	0	0
200 kVA Genset	N.	0	0	3	0	0	0	0	0	0
Forklift	N.	0	0	1	0	0	0	0	0	0
Piling Machine 400mm	N.	0	0	0	0	0	0	0	0	0
Welding Generator	N.	0	0	0	0	0	0	0	2	0
Tower Crane	N.	0	0	0	0	0	0	0	0	0
Piling Machine 600mm	N.	0	0	0	0	0	0	0	1	0
385 kVA Genset	N.	0	0	1	0	0	0	0	0	0
Power Genset	N.	0	0	0	0	0	0	0	1	0
Cutting Machine	N.	0	0	0	0	0	0	0	1	0
Compressor	N.	0	0	0	0	0	0	0	1	0
Trailer	N.	0	0	0	0	0	0	0	0	0

SITE RESOURCES			
Material	Unit	Qty	Storage Location
Concrete Admixture	Liter	0	-
Bitumen Material	Kg	126	Chemical Store
Formwork Oil	Liter	0	-
Epoxy Material	Liter	0	-
Diesel	Liter	0	-
Fuel Oil	Liter	0	-
Paint	Liter	45	Chemical Store
Antirust	Liter	70	Chemical Store
Isolation Solution	Kg	0	-
Thinner	Liter	15	Chemical Store
Cement	Kg	1500	Warehouse
Sand	Kg	2000	Warehouse
Hempel Welding Paint (A 35569)	Liter	60	Chemical Store
Hempel Welding Paint (B 98560)	Liter	17.6	Chemical Store
Hempel Thinner	Liter	20	Chemical Store

SPUN PILE INSTALLATION									
Location	Lower Pile no.	Casting Date	Pile Length	Splice joint Welding	Splash Zone Paint	Upper Pile No.	Casting Date	Pile Length	Remarks
SP-001	60029	18/02/2023	12m	-	-	-	-	-	OK
SP-005	60092	18/01/2023	12m	-	-	-	-	-	OK
SP-009	60029	13/01/2023	12m	-	-	-	-	-	OK
SP-012	60026	17/01/2023	12m	-	-	-	-	-	OK
SP-013	60034	11/02/2023	12m	-	-	-	-	-	OK
SP-016	60028	17/01/2023	12m	-	-	-	-	-	OK
SP-017	60033	11/02/2023	12m	-	-	-	-	-	OK
SP-020	60029	17/01/2023	12m	-	-	-	-	-	OK
SP-021	60022	21/01/2023	12m	-	-	-	-	-	OK
SP-024	60036	17/01/2023	12m	-	-	-	-	-	OK
SP-028	58641	08/02/2023	12m	-	-	-	-	-	OK
SP-032	60074	10/02/2023	12m	-	-	-	-	-	OK
SP-036	60027	20/01/2023	12m	-	-	-	-	-	OK
SP-040	60028	15/02/2023	12m	-	-	-	-	-	OK
SP-044	60002	19/01/2023	12m	-	-	-	-	-	OK
SP-048	60001	19/01/2023	12m	-	-	-	-	-	OK

SPUN PILE WELDING								
Welding Joint No.	Pile Location	1 st Pile	2 nd Pile	Weld Starting Date	Weld Completion Date	Condition of Weld (VI)	Selection for PT	Selection for MPI
JT/PW/58625B,58681A/123	BU-001	58625B	58681A	12/07/2023	12/07/2023	OK	-	-
JT/PW/58322B,58136A/122	BU-016	58322B	58136A	12/07/2023	12/07/2023	OK	-	-
JT/PW/58307B,58090A/121	BU-017	58307B	58090A	12/07/2023	12/07/2023	OK	-	-
JT/PW/58440B,60035A/120	BU-018	58440B	60035A	12/07/2023	12/07/2023	OK	-	-
JT/PW/58442B,60062A/119	BU-019	58442B	60062A	12/07/2023	12/07/2023	OK	-	-



Site Inspection Report

No.: SI-23-25

by the Employer's Representative

Date and Time of the Visit	Conducted by [ER]	Signature	Witnessed by	Signature
19 th September 2023, 10:35 hrs – 13:00 Hrs	Nahee Nazim – Deputy Team Leader		Sathiyaraj - Deputy Project Manager – Urbaser	

General Observations

Sn	Particulars	Details / Remarks	Witnessed by	Reference
1	Change in construction methodology with reference to same given in EIA report, if any	-	-	-
2	Not anticipated/accounted project specific activity (ies) and impacts observed which were not considered in EIA study report, if any, either on site or adjacent by the Contractor or other stakeholders.	-	-	-
3	Any activity or sign observed within and adjacent to project site which may lead to soil and ground & marine water contamination	Presence of Shipwrecks adjacent to quay wall and movement of speed boats, ships (medium and large) on the route and adjacent to quay wall of island . Leachate and run off water from waste dumping site of WAMCO adjacent to project site. Waste disposed by others adjacent to project site.	Sathiyaraj – D.B.O Dhamu, HSE Manager, EPC Contractor	-
4	Total number of man power at project as per attendance register on date of visit a) DBO contractor (office) b) EPC contractor (office-Indirect) c) EPC contractor (office-direct) d) EPC contractor (on site) e) HO - Management team f) Maldivian workers g) Sub -contractor (s) h) Security(3 rd party)	Total of 85 workers deployed. 3 19 31 21 2 3 18 8	Sathiyaraj – D.B.O	-
5	Others, if any	Presence of 350 KVA DG, and additional generators placed around the site, to be approved by URA before it can be used.	Sathiyaraj – D.B.O	-

Progress Observations

No.	Particulars	Details / Remarks	Witnessed by	Reference
1	Temporary facilities	Work on the temporary facilities on going. Toilets and accommodation buildings still under construction. Fencing, guard houses, CCTV systems, storage facilities, kitchen, laundry, gym as well as the waste water treatment plant are in operation.	Sathiyaraj – D.B.O	
2	Site Preparation	Spun piles for ground improvement are being driven into the project site area as per design. Sheetpiling work around the bunker area has started. Concrete batching plant installation work has started.	Sathiyaraj – D.B.O	-
3	Excavation & Dewatering	Shallow excavation work for the foundations have begun, dewatering sedimentation pit has been constructed. Equipment for the well point dewatering system has arrived on site. Installation of the pumps and pipeline has started.	Sathiyaraj – D.B.O	-

Environmental Observations

Sn	Particulars	Details / Remarks	Witnessed by	Reference
1	Status of adequacy of compliance of CEMP and ESMS including SOPs in place applicable to construction activities visited on the basis of assessment made on randomly basis, on site or adjacent. ¹	No documented plan and SOP was in place for activities presently conducted as part of pre-construction activities. However, for construction phase, various plans and SOPs as part of ESMS as mentioned in CEMP are yet to be finalized.	Sathiyaraj – D.B.O	-
2	Status of adequacy of environment monitoring as envisaged in CEMP on the basis of assessment made on randomly basis.	Being conducted as scheduled. However justification for variations observed need to be provided.	Sathiyaraj – D.B.O	-
3	Status of adequacy of level of understanding of environment hazards and corresponding designed mitigation measures of construction team including supervisors and workers on site or adjacent on the basis of assessment made on randomly basis.	Adequacy on subject is found inadequate and not in line with ADB category A project requirements. Work on designing a more effective training module including tool box talk as construction team is/will be responsible for implementation of CEMP, H&S plan and other management plans is ongoing.	Sathiyaraj – D.B.O	
4	Status of adequacy of record keeping including data reported in monthly environment report on the basis of assessment made on randomly basis.	Site log book in form of loose sheets (register should be maintained) was maintained and format of same was found inadequate as all details were not captured. Also as per contract's obligation, format is to be approved by the ER.	Sathiyaraj – D.B.O	-

¹aspects includes (but not limited to) solid wastes (hazardous and non-hazardous including construction, plastic, E-waste, battery and bio-medical) management, Storage and handling of construction materials, waste water (from domestic and construction activities and run off due to rain) management, Air emission (from mainly DG sets, diesel driven machinery and equipment, Raw mix plant, fugitive, vehicular movement, etc.) management, management of construction noise level etc.

Health and Safety Observation

Sn	Aspects	Details / Remarks	Witnessed by	Reference
Labour - health, safety and welfare				
1	Status of adequacy of HSE /Occupational Health and Safety management plan and ESMS including SOPs applicable to construction activities visited on the basis of randomly assessment made. ²	No formal documented plan was in place and practices in place were found inadequate for pre construction phase. However following observations were made: Impacts/risks to workers due to presence of dumping site have not been identified and inadequate mitigation measures were in place. No risk management and monitoring plan was in place to deal with air pollutants emitting from dumping site Documents on subject were under process of finalization for getting approval of ER/PMU for construction phase. Presence of live electrical cable supplying electricity to project from STELCO runs within the site boundary.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
2	Status of adequacy of HSE monitoring as envisaged in CEMP, HSE Plan, ESMS & SOPs etc.	Documents on subject as part of CEMP, HSE Plan and SOPs as part of ESMS are being prepared and submitted for approval of ER/PMU, however yet to be implemented fully on site.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
3	Status of adequacy of on-site Emergency Preparedness and Response on the basis of randomly assessment made (emergency response team, safety committee, fire fighting, mock drills, assembly point, evacuation, accident/incident reporting etc.)	No formal document and SOPs on subject was in place for pre construction phase and system in place was found inadequate. Assembly point established and inadequate safety signage were in place however no safety committee is in place. Adequate medical aid facilities (e.g. availability of stretcher and medicine, medical evacuation etc) at health center located within project site and full time qualified doctor and nurse has been posted. System in place needs improvement to meet the requirements. However documents on subject are under preparation for construction phase.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
4	Status of adequacy of workers accommodations including fresh water for drinking & others, hygienic with reference to waste water and domestic solid waste management and other welfare facilities (e.g. Kitchen/food, medical, toilets, recreation, shelters, spray of mosquitoes and odour repellent etc.) maintained at project site on the basis of randomly assessment made.	Worker's accommodations including toilets at project site are still under construction for future expansion, and deemed sufficient for the current workers on site. Fresh water supply is from MWSC utility pipeline and drinking water filters are being used, along with bottled drinking water. Waste collection bins have been placed and collected to the main waste collection area and handed over to WAMCO for disposal. A gym and recreational area has been completed and is in use. Designated smoking areas and shelters have been established. Waste water treatment plant is operational.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
5	Status of adequacy of housekeeping within project site on the basis of randomly assessment made.	No documented plan/SOP on the subject was in place. But, site is kept generally clean and organized. However, storage yards and solid waste storage sites need improvements in management.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-

²e.g assessment of activity wise associated hazards, work permit, PPEs, first aid, tool box talk, barricading, COVID-19, electrical safety etc.

6	Status of adequacy of security management (availability of adequate number of security guards, fencing of project site, procedure(s) to allow entry for visitors and workers etc. understanding of role of security guards as per contract) of project site on the basis of randomly assessment made.	Gates in place, and visitors register in form of loose sheets (proper register is to be maintained) maintained. Security guards in place at both entry points to the site. CCTV system is installed. Adequate lighting needs to be provided around the site. CCTV monitor should be provided for the security guard room.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
7	Status of adequacy of handling of workers complaint(s) received on HSE, human resources and welfare aspects as per complaint register kept at site on the basis of randomly assessment made.	Box placed for for internal grievance redress mechanism. Reportedly it was on adhoc basis and no record on same was made available.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
8	Status of adequacy of record keeping including data reported in monthly HSE report on the basis of randomly assessment made.	Site log books in form of loose sheets (should be kept in register) were maintained and format was found inadequate as all details are not captured. Also as per contract's obligation, format is to be approved by the ER.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
Community- health, safety and welfare				
9	Status of adequacy of Community Health and Safety plan and ESMS including SOPs on the basis of randomly assessment made (mainly during transportation of men, materials and machinery, influx of workers from other places, contamination of air, land and marine water and ecology, if any etc.)	No documented system was in place and as per verbal discussion with DBO and EPC contractor, system in place was found inadequate on subject for pre-construction phase. However pre-construction environment baseline monitoring is being carried out as per CEMP on regular basis. However, for construction phase, various plans and SOPs as part of ESMS mentioned in CEMP and H&S plan are yet to be finalized for approval from ER/PMU.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
10	Status of adequacy of off-site Emergency Preparedness and Response on the basis of randomly assessment made (e.g. response team, mock drills, mutual aids, evacuation plan, accident/incident reporting etc.)	No documented system was in place for pre-construction phase and as per verbal discussion with DBO and EPC contractor, system in place was found inadequate to deal with offsite emergencies. However, plan and SOPs on subject are under process of finalization for getting approval of ER/PMU for construction phase.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-
12	Status of adequacy of handling of community complaint(s) received on Environment, HSE and welfare aspects on the basis of randomly assessment made.	Grievance Redressal Mechanism Plan on subject is yet to be approved by ER/PMU. However, system in place was not adequate, and needs improvement to comply with ADB requirements. To comply with contract's obligations, community engagement plan is yet to be submitted for getting approval of ER/PMU.	Sathiyaraj – D.B.O Dhamu - HSE Manager, EPC	-

Site Photos



Photo 01 19/10/23 10:44hrs.

Waste collection area within the site boundary, labels have been placed and waste has been sorted.



Photo 02 by 19/10/23 10:48hrs.

WAMCO C&D waste being dumped close to the site boundary fence.



Photo 03 19/10/23 10:49hrs.

Waste collection bag, needs better waste management and all waste to be collected and moved to the bin area.



Photo 04 19/10/23 10:50hrs.
New Spun pile head prepared and made ready for casting.



Photo 05 19/10/23 10:59hrs.
Shallow excavation works continue in the process building area, all spun piles have been terminated and cut to length.



Photo 06 19/10/23 11:00hrs.
Sheetpiling works around the bunker area completed, and shallow excavation work continues in the building area.



Photo 07 19/10/23 11:05hrs.
Sedimentation pit for the dewatering works have been prepared, and made ready.



Photo 08 19/10/23 12:10hrs.
Sheetpiling works around the bunker area completed, and shallow excavation work continues in the building area.



Photo 09 19/10/23 11:17hrs.
On site lab under construction.



Photo 10 19/10/23 14:02hrs.
Weekly HSE meeting with ER, DBO and EPC representatives being conducted on site.



Photo 11 19/10/23 11:19hrs.
Grievance and redress box placed either the site work camp.

Company Name		Employee	Visitor	Rota. Off	Demob.	Total POB (Personal on Board)	Accommodation Site Camp	Normal (hrs)	Overtime (hrs)	Total (hrs)	
Office	DBO Representative	3	0	0	0	3	0	27	0	27	
	HO – Management Team	2	0	0	0	2	0	18	0	18	
	Subcontractor indirect	0	0	0	0	0	0	0	0	0	
Site	EPC Contractor direct staff	30	0	0	0	30	30	270	0	270	
	EPC Contractor indirect staff	20	0	0	0	20	20	180	0	180	
	EPC Contractor direct site workers	44	0	0	0	44	44	396	0	396	
	Security (Gage)	8	0	0	0	8	0	72	0	72	
	ELS (Spun pile contractor)	12	0	0	0	12	0	108	0	108	
	Subcontractor (Electrician)	0	0	0	0	0	0	0	0	0	
	Medical Leave	1	0	0	0	1	0	0	0	0	
	Absent	0	0	0	0	0	0	0	0	0	
	Vacation	2	0	0	0	2	0	0	0	0	
	Grand Total Site POB		119	0	0	0	119	94	1071	0	1071

ALKE ALKATAS JV		HAZARDOUS MATERIAL RESOURCES								
		Concrete Admixture	Bitumen Material	Formwork Oil	Epoxy Material	Diesel	Fuel Oil	Paint	Antirust	Isolation Solution
Daily		0	0	0	0	500.0 lt	0	0	0	0
Monthly		0	0	0	0	18250.0 lt	0	0	0	0
Project Total		0.0 lt	90.0 kg	0.0 lt	0.0 lt	69,497.0 lt	2509.0 lt	1363.0 lt	140.0 lt	0.0 lt

ALKE ALKATAS JV		WASTE GENERATION RESOURCES								
		Plastic Waste	Paper Waste	Kitchen Waste	Waste Oil	Sewage Sludge	Waste Water	Construction Waste	Metal Waste	Wood Waste
Daily		0.003 tons	0.001 tons	0.010 tons	0	0.06 tons	6.70 tons	0	0	0
Monthly		0.066 tons	0.039 tons	0.244 tons	0	3.36 tons	201.00 tons	0	0	0.065 tons
Project Total		1.794 tons	0.519 tons	1.962 tons	0.0 tons	11.77 tons	627.90 tons	3.89 tons	0.82 tons	1.892 tons

CONSTRUCTION ACTIVITIES ON SITE			
12 th July 2023		Next Day Plan	
Progress	Estimated Completion Date	Construction Activities	Construction Activities
97%	01 st October 2023	Installation of the temporary sheet pile support elements (concrete blocks) and installation of the dewatering pumps line have been continued in the Bunker Area.	Temporary sheet pile works of the bunker area will continue.
17%	15 th October 2023	Installation of the concrete batching plant is ongoing.	Installation of the concrete batching plant will continue.
12%	20 th November 2023	5 piles (SP-004, SP-008, SP-012, SP-016, SP-020) head cutting were completed.	Installation of dewatering pumps line will continue on Bunker Area.
12%	15 th December 2023	Excavation works of the WtE Building have been continued. Spun pile tack welding works have been continued.	Excavation works of the WtE Building will continue.

PERMIT TO WORK							
PTW No.	Issue Date	Permit Holder	Area Authority	Location	Task Description	Expiry Date	Status
CW00111	24 th Sept 23	M. Yunus Karaja	Hikmet Buluttekini	Laboratory Container	Lifting, scaffolding work (working at height) material handling, concrete pouring.	30 th Sept 23	Closed
CW00112	24 th Sept 23	Ram Niwas	Hikmet Buluttekini	Warehouse Site	General maintenance for equipments	30 th Sept 23	Closed
CW00114	26 th Sept 23	M. Juma Islam	Hikmet Buluttekini	Main Process Area	Pile cutting, preparation for pile cap	2 nd Oct 23	Open
CW00115	26 th Sept 23	Haji Quali	Hikmet Buluttekini	Batching Plant Area	Concrete work. Form work, Steel fixing	2 nd Oct 23	Open
CW00116	26 th Sept 23	Burak Saglam	Hikmet Buluttekini	Bunker/Main Process Area	Spun pile driving, sheet pile driving, installation of sheet pile support elements, pile head repairing, lifting activity, excavation	2 nd Oct 23	Open
CW00117	26 th Sept 23	Kenan Kilic	Hikmet Buluttekini	Warehouse Site	Warehouse site Landscaping	2 nd Oct 23	Open
HW00053	26 th Sept 23	Haji Quali	Hikmet Buluttekini	South Sedimentation pond	Welding, Cutting, Grinding and preparation of container.	2 nd Oct 23	Open
HW00054	26 th Sept 23	Burak Saglam	Hikmet Buluttekini	Bunker/Main Process Area	Sheet pile cutting and welding activity, spun pile welding.	2 nd Oct 23	Open
CW00118	30 th Sept 23	Amos Chinniah	Hikmet Buluttekini	Accommodation Camp Area	Fabrication, lifting, material handling, scaffolding work, installation of prefabricated panels.	6 th Oct 23	Open

LIST OF MAJOR EQUIPMENT											SITE RESOURCES			
Description	U. M.	AAJV				Subcontractors				Rental	Material	Unit	Qty	Storage Location
		Laydown area		Site		Laydown area		Site						
		Working	Standby	Working	Standby	Working	Standby	Working	Standby					
TOTAL	N.	2	0	10	4	0	0	7	8	0	Concrete Admixture	Liter	0	-
Pickup	N.	0	0	1	0	0	0	0	0	0	Bitumen Material	Kg	126	Chemical Store
Car	N.	0	0	1	0	0	0	0	0	0	Formwork Oil	Liter	0	-
Excavator	N.	0	0	1	0	0	0	1	1	0	Epoxy Material	Liter	0	-
180 kVA Genset	N.	0	0	1	0	0	0	0	0	0	Diesel	Liter	0	-
Trailer	N.	1	0	0	0	0	0	0	0	0	Fuel Oil	Liter	0	-
JCB	N.	0	0	1	0	0	0	0	0	0	Paint	Liter	45	Chemical Store
Concrete Mixer	N.	0	0	0	1	0	0	0	0	0	Antirust	Liter	70	Chemical Store
Mobile Crane	N.	0	0	1	0	0	0	1	0	0	Isolation Solution	Kg	0	-
200 kVA Genset	N.	0	0	1	0	0	0	0	0	0	Cement	Kg	1500	Warehouse
Forklift	N.	1	0	0	0	0	0	0	0	0	Sand	Kg	2000	Warehouse
Backhoe Loader	N.	0	0	0	1	0	0	0	0	0	Hempel Welding Paint (A 35569)	Liter	80	Chemical Store
Welding Generator	N.	0	0	0	0	0	0	3	3	0	Hempel Welding Paint (B 98560)	Liter	20	Chemical Store
Tower Crane	N.	0	0	0	0	0	0	0	0	0				
Piling Machine 600mm	N.	0	0	0	0	0	0	0	0	1				
385 kVA Genset	N.	0	0	1	0	0	0	0	0	0				
Power Genset	N.	0	0	0	0	0	0	0	0	0				
Cutting Machine	N.	0	0	0	0	0	0	0	0	1				
Mobile Tower Light	N.	0	0	0	1	0	0	0	0	0				
Vibratory Hammer	N.	0	0	0	0	0	0	0	1	0				
Compressor	N.	0	0	0	0	0	0	1	2	0				
Diesel Tanker	N.	0	0	1	0	0	0	0	0	0				
Dump Truck	N.	0	0	0	1	0	0	0	0	1				

Appendix 3 Results of Monitoring (Air Quality, Noise, Water and Waste water Quality)

Ambient Air Quality

Month July -2023

1. INTRODUCTION

This report has been prepared with the aim of determining the air quality in the sensitive receptors located in the impact area of the The Greater Malé Waste to Energy Project. Air quality results were determined for PM₁₀, PM_{2.5}, NO₂, SO₂ and TSP parameters.

2. MEASUREMENT METHODS

PM₁₀, PM_{2.5}, TSP, SO₂, and NO₂ parameters were monitored by using air quality monitoring stations based on sensor technology. The US EPA refers to the term 'air sensor' as a class of non-regulatory technology that is low-cost, portable, capable of measuring several pollutants simultaneously, and often easier to operate than regulatory stations. For example, monitoring air pollution with reference measurement methods (regulatory stations) requires skilled operators to maintain and calibrate measuring instruments. On the other hand, air sensors describe the hardware and software set that can be operated without human intervention and enable unskilled users to monitor air pollution without additional technical knowledge.

Sensor specifications which are used for measurement study are shown below.

Parameter		Unit	Value
SO ₂	Sensitivity	nA/ppm at 2ppm SO ₂	275 to 520
	Range	ppm limit of performance warranty	100
	Linearity	error at 100ppm SO ₂ , linear at zero and 10ppm SO ₂	0 to -2
NO ₂	Sensitivity	nA/ppm at 2ppm NO ₂	-200 to -650
	Range	ppm NO ₂ limit of performance warranty	20
	Linearity	ppb error at full scale, linear at zero and 20ppm	
Particles (PM ₁₀ , PM _{2.5} and TSP)	Mass concentration precision	%	5
	Mass concentration range	µg/m ³	0 to 1000
Temperature	Typ. temperature accuracy	°C	0.45
	Operating temperature range	°C	-10 to 50
	Response time (τ63%)	s	<60
Humidity	Typ. relative humidity accuracy	%RH	4.5
	Operating relative humidity range	%RH	0 to 100
	Response time (τ63%)	s	20
All	Temperature Range	°C	-30 to 50
	Humidity Range	% RH	5 to 99

The accuracy of these low-cost sensors is as critical as measuring the air quality. With the smart calibration process, low-cost sensors are corrected and accurate compared to reference stations. The Smart Calibration Algorithm consists of the below operational steps shown figure below.



2.1. FIELD APPLICATION

This section describes how the measurements, the general methodology of which is given above, are applied in the field.

Preliminary Preparations

Preliminary preparations for air quality measuring stations with sensors include factory calibrations and field calibrations. Factory calibrations are provided by the sensor manufacturer. Stations capable of making reference measurements were used for field calibrations, as described above. For this purpose, a 1-month comparison measurement was carried out at a reference station in the Turkish air quality monitoring network and the calibration factors were applied.

During Measurements

Air quality measurements were made with four sets of devices.

AQ1, AQ3, AQ4, ASR3 and ASR5 measurements were conducted on the first day,

AQ2, and ASR2 measurements were conducted on the second day.

The locations of the sampling points are determined in the macro scale ESIA report. A site visit was made and a location was determined at the micro scale where the devices would be placed.

Measurements were made at a height of 1.5 to 4 meters from the ground, depending on the suitability of the sampling point.

24-hour measurements were made at each point. Parameters measured with sensor devices consist of the averages of instantaneous measurements taken at 1-minute intervals.

After Measurements

The values after the measurements were taken by reading directly on the air quality measuring devices with sensors.

3. MEASUREMENT LOCATION

For the Preconstruction baseline environmental assessment of the ambient air quality was conducted at seven locations: 6 locations at Thilafushi (AQ1, AQ2, and AQ3 in the EIA and the ASR 2, ASR3 and ASR5 recommended for monitoring in the EIA Report) and one location at Villingili (AQ4).

Table 2 Sampling Point Coordinates and Sampling dates

No	Location	Description	Distance to Source (meters)
1	AQ1	Represents dense industrial area	650
2	AQ2	Represents dense industrial area	1000
3	AQ3	Represents dense industrial area	500
4	ASR2	Represents dense industrial area	700
5	ASR3	Represents dense industrial area	500
6	ASR5	Represents dense industrial area	1000
7	AQ4	Represents dense housing and population area	4500



Figure 1 Sampling Points on satellite Map

4. LEGAL FRAMEWORK

Within the scope of the project, particle matter (PM₁₀-PM_{2.5}), NO₂, SO₂ AND TSP emissions were monitored. It is known that Maldives does not have a national air quality policy. Therefore, international standards were used for the evaluation. WHO defines limit values in “Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide” document. European Union directives also have limit values for air pollution prevention (EU Council Directive 2008/50/EC relating to health based standards and objectives for a number of pollutants in ambient air). Germany has an air pollution control regulation titled "Technical Instructions on Air Quality Control" (Technische Anleitung zur Reinhaltung der Luft) and commonly referred to as the TA Luft and determines the limit values to protect the general public and the neighborhood against harmful effects of air pollution on the environment. Comparison of these limit values and chosen parameters and values for the modeling study according to these standards are shown in Table 3.

Table 3. Limit Values Stipulated in the International Legislation

Pollutant	Averaging Period	TA Luft	EU	WHO Ambient Air Quality Guideline Value	Project Standards
Particulate Matter <10 µm (PM ₁₀)	24 hours	50 µg/m ³	50 µg/m ³	45 µg/m ³	45 µg/m ³
	1-year	40 µg/m ³	40 µg/m ³	15 µg/m ³	15 µg/m ³
Particulate Matter <2.5 µm (PM _{2.5})	24 hours	-	-	15 (not to be exceeded more than 3-4 times a year)	15 µg/m ³
	1-year	-	20	5	5 µg/m ³
Nitrogen Dioxide (NO _x)	1-hour	200 µg/m ³	200 µg/m ³	-	200 µg/m ³
	24 hours	-	-	25 µg/m ³	25 µg/m ³
	1-year	40 µg/m ³	40 µg/m ³	10 µg/m ³	10 µg/m ³
Sulphur Dioxide (SO ₂)	1-hour	350 µg/m ³	350 µg/m ³	-	350 µg/m ³
	24 hours	125 µg/m ³	125 µg/m ³	40 µg/m ³	40 µg/m ³
	1-year	50 µg/m ³	-	-	50 µg/m ³
TSP*	-	-	-	-	-

*There is no limit value for TSP.

5. RESULTS

5.1. Meteorological Conditions

The meteorological measurement results conducted during the measurement period were obtained from the airport meteorology station and are presented in the table below.

Table 4 Meteorological Conditions

Date	Weather measuring Time	T°C	Atm pressure in mmHg	Wind speed km/h	Wind direction	Air Humid %	Precipitation (mm)	Condition
17th Jul 2023	2-5 AM	26-27	29.8	16	West	85	3.6-7	Partly cloudy
	8-11 AM	27	29.8	8-10	West	76	0.5-1	Partly sunny
	14-17 PM	28	29.8	8-11	West	83	0.0	Scattered clouds
	20-23 PM	28°	29.8	9-11	West	81	0.2	Passing clouds
18th Jul 2023	2-5 AM	27	29.8	13-21	West	81	0.5-8	clouds
	8-11 AM	26-27°	29.8	15-20	West	85	2.7-5	Partly sunny
	14-17 PM	26-27	29.8	20-21	West	76	3.8	Brocken clouds
	20-23 PM	26-27	29.8	21-23	West	83	3.8-7	Passing clouds
19th Jul 2023	2-5 AM	26-27	29.8	16-19	West	81	1.2-4.1	Rainy
	8-11 AM	26	29.8	16-18	West	85	1.9-2.2	Sunny/partial cloudy
	14-17 PM	27	29.8	16-17	West	76	0.4	Intensive sunlight
	20-23 PM	28	29.8	15	West	83	0.2	Partial cloud

Device Code: AIRS-1								
Location	Sampling Date	Air Quality Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP	Humidity (%)	Temperature (°C)
AQ1	2023-7-17 15:00:00	20,62	15,71	26,76	15,01	30,59	54,84	33,28
	2023-7-17 16:00:00	26,17	26,03	48,94	0,10	41,69	73,29	29,87
	2023-7-17 17:00:00	4,37	3,58	28,85	0,00	6,60	77,41	28,88
	2023-7-17 18:00:00	5,17	4,27	21,72	0,00	7,82	78,16	28,68
	2023-7-17 19:00:00	4,94	3,98	9,71	0,00	7,44	78,75	28,53
	2023-7-17 20:00:00	5,04	4,45	7,64	0,00	7,77	78,74	28,44
	2023-7-17 21:00:00	4,08	3,41	4,07	0,00	6,19	79,17	28,32
	2023-7-17 22:00:00	4,20	3,42	2,61	0,00	6,33	79,68	28,18
	2023-7-17 23:00:00	4,12	3,42	3,53	0,00	6,24	80,39	28,02
	2023-7-18 00:00:00	4,39	3,65	3,53	0,00	6,66	81,40	27,89
	2023-7-18 01:00:00	4,40	3,52	1,86	0,00	6,61	81,60	27,79
	2023-7-18 02:00:00	4,59	3,75	3,23	0,00	6,93	82,66	27,73
	2023-7-18 03:00:00	4,41	3,62	2,27	0,00	6,66	82,26	27,82
	2023-7-18 04:00:00	4,30	3,53	2,36	0,00	6,50	80,60	28,68
	2023-7-18 05:00:00	4,19	3,31	0,00	0,00	6,28	65,76	32,84
	2023-7-18 06:00:00	8,21	8,00	8,09	0,00	12,99	61,99	33,91
	2023-7-18 07:00:00	4,66	3,92	8,56	0,00	7,09	71,55	32,20
	2023-7-18 08:00:00	5,36	4,45	3,44	0,00	8,11	70,57	31,94
	2023-7-18 09:00:00	4,26	3,49	4,15	0,00	6,43	69,59	32,06
	2023-7-18 10:00:00	5,39	4,10	0,68	0,00	8,00	66,49	33,21
2023-7-18 11:00:00	4,40	3,68	5,23	0,00	6,68	70,07	31,99	
2023-7-18 12:00:00	4,29	3,70	3,23	0,00	6,56	69,31	32,07	
2023-7-18 13:00:00	4,73	4,24	3,50	0,00	7,31	67,53	32,36	
2023-7-18 14:00:00	5,39	4,47	5,62	0,00	8,17	66,71	32,63	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
24 h Average		6,32	5,40	8,73	0,63	9,65	73,69	30,31
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 6 Measurement Results for Location 2

Device Code: 223								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ2	2023-7-18 15:00:00	2,42	1,84	7,43	0,00	3,60	85,55	27,85
	2023-7-18 16:00:00	1,93	1,29	4,74	0,00	2,78	85,36	27,78
	2023-7-18 17:00:00	6,80	6,57	2,65	0,00	10,75	84,62	27,54
	2023-7-18 18:00:00	4,12	3,51	13,66	0,00	6,29	95,39	25,80
	2023-7-18 19:00:00	1,87	1,32	8,00	0,00	2,72	95,80	25,42
	2023-7-18 20:00:00	2,63	2,57	6,75	0,00	4,17	94,39	25,90
	2023-7-18 21:00:00	1,44	1,22	3,58	0,00	2,19	93,99	26,35
	2023-7-18 22:00:00	1,16	1,04	1,06	0,00	1,79	92,54	26,51
	2023-7-18 23:00:00	2,10	2,03	1,84	0,00	3,32	91,78	26,70
	2023-7-19 00:00:00	1,36	1,22	1,23	0,00	2,10	90,42	26,91
	2023-7-19 01:00:00	0,99	0,88	2,43	0,00	1,53	88,06	26,88
	2023-7-19 02:00:00	2,09	1,66	5,38	0,00	3,13	91,36	26,78
	2023-7-19 03:00:00	1,65	1,47	3,41	0,00	2,55	90,32	26,73
	2023-7-19 04:00:00	1,37	1,27	1,02	0,00	2,14	88,92	26,95
	2023-7-19 05:00:00	2,03	1,50	0,57	0,00	2,99	82,72	29,50
	2023-7-19 06:00:00	18,46	11,13	3,77	0,00	26,01	95,27	25,19
	2023-7-19 07:00:00	2,76	1,81	9,36	0,00	3,96	99,21	23,89
	2023-7-19 08:00:00	6,05	4,00	8,21	0,00	8,69	99,95	24,84
	2023-7-19 09:00:00	4,40	2,73	2,82	0,00	6,24	99,03	24,83
	2023-7-19 10:00:00	2,84	1,96	1,05	0,00	4,11	97,12	25,15
	2023-7-19 11:00:00	1,82	1,23	0,57	0,00	2,63	93,31	26,13
	2023-7-19 12:00:00	2,53	1,74	0,13	0,00	3,66	88,64	27,32
2023-7-19 13:00:00	1,72	1,07	0,26	0,00	2,44	81,68	27,75	
2023-7-19 14:00:00	2,72	1,63	0,81	0,00	3,84	85,08	27,54	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3,22	2,36	3,78	0,00	4,73	91,27	26,51
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 7 Measurement Results for Location 3

Device Code: AIRS-2								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ3	2023-7-17 15:00:00	2,03	1,52	8,16	0,00	3,00	70,69	31,89
	2023-7-17 16:00:00	2,08	1,59	15,55	0,00	3,09	78,20	29,55
	2023-7-17 17:00:00	2,28	1,89	12,80	0,00	3,45	81,90	28,84
	2023-7-17 18:00:00	2,21	1,71	8,23	0,00	3,29	82,74	28,62
	2023-7-17 19:00:00	1,86	1,43	7,03	0,00	2,77	84,16	28,48
	2023-7-17 20:00:00	2,03	1,53	4,92	0,00	3,00	85,08	28,44
	2023-7-17 21:00:00	2,29	1,76	3,16	0,00	3,41	85,77	28,15
	2023-7-17 22:00:00	2,16	1,89	6,82	0,00	3,32	90,09	27,04
	2023-7-17 23:00:00	1,91	1,58	1,97	0,00	2,90	88,85	27,36
	2023-7-18 00:00:00	1,73	1,43	1,63	0,00	2,61	87,39	27,52
	2023-7-18 01:00:00	1,59	1,31	0,84	0,00	2,41	86,37	27,64
	2023-7-18 02:00:00	1,57	1,28	0,91	0,00	2,37	85,66	27,66
	2023-7-18 03:00:00	1,53	1,26	0,64	0,00	2,31	85,29	27,58
	2023-7-18 04:00:00	1,67	1,41	1,82	0,00	2,54	85,63	27,71
	2023-7-18 05:00:00	2,18	1,64	0,04	0,00	3,22	73,23	31,51
	2023-7-18 06:00:00	1,93	1,44	0,00	0,00	2,85	58,77	36,29
	2023-7-18 07:00:00	2,86	2,66	0,06	0,21	4,47	53,84	38,39
	2023-7-18 08:00:00	1,74	1,36	0,72	0,00	2,59	55,28	37,77
	2023-7-18 09:00:00	3,93	3,84	2,13	0,00	6,22	52,10	38,96
	2023-7-18 10:00:00	1,17	1,00	6,07	0,00	1,79	55,22	37,38
	2023-7-18 11:00:00	4,98	4,19	16,56	0,00	7,57	63,93	34,77
	2023-7-18 12:00:00	7,17	6,36	47,86	0,00	11,05	91,82	26,53
	2023-7-18 13:00:00	3,39	2,69	21,73	0,00	5,08	84,78	27,55
2023-7-18 14:00:00	3,83	3,07	15,65	0,00	5,75	84,78	28,02	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		2,51	2,08	7,72	0,01	3,79	77,15	30,57
Daily Limit Values	TA Luft	50	-	-	-	-	-	-
	EU	50	-	-	-	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 8 Measurement Results for Location 4

Device Code: 221								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperatur e (°C)
ASR2	2023-7-18 15:00:00	2,68	2,17	13,03	0,00	4,03	70,24	31,39
	2023-7-18 16:00:00	5,72	5,64	19,09	0,00	9,08	76,64	29,32
	2023-7-18 17:00:00	0,89	0,70	15,06	0,00	1,32	79,85	28,58
	2023-7-18 18:00:00	0,83	0,62	12,60	0,00	1,23	82,28	28,40
	2023-7-18 19:00:00	0,89	0,66	8,09	0,00	1,31	82,80	28,29
	2023-7-18 20:00:00	0,99	0,78	6,43	0,00	1,47	82,94	28,11
	2023-7-18 21:00:00	1,03	0,80	8,06	0,00	1,53	84,42	28,00
	2023-7-18 22:00:00	0,89	0,73	5,40	0,00	1,34	84,45	27,91
	2023-7-18 23:00:00	0,82	0,64	2,03	0,00	1,22	84,66	27,76
	2023-7-19 00:00:00	0,87	0,65	2,25	0,00	1,28	85,02	27,71
	2023-7-19 01:00:00	1,03	0,76	1,74	0,00	1,51	84,84	27,66
	2023-7-19 02:00:00	1,02	0,78	3,11	0,00	1,51	85,57	27,72
	2023-7-19 03:00:00	0,93	0,71	2,21	0,00	1,38	85,34	27,76
	2023-7-19 04:00:00	0,88	0,68	1,83	0,00	1,31	85,49	27,86
	2023-7-19 05:00:00	0,87	0,65	0,04	0,00	1,28	63,09	34,61
	2023-7-19 06:00:00	1,03	0,73	0,00	0,00	1,51	55,22	37,45
	2023-7-19 07:00:00	2,77	2,21	1,50	0,00	4,16	54,91	38,04
	2023-7-19 08:00:00	2,44	1,96	2,48	0,00	3,67	56,38	37,38
	2023-7-19 09:00:00	25,06	14,04	0,00	1,27	34,81	36,83	37,79
	2023-7-19 10:00:00	119,01	106,07	5,64	44,28	183,79	36,70	36,44
	2023-7-19 11:00:00	612,80	597,97	30,43	184,62	970,68	59,51	25,77
	2023-7-19 12:00:00	4,03	2,62	23,74	0,00	5,77	57,55	24,05
	2023-7-19 13:00:00	2,15	1,59	15,08	0,00	3,17	56,57	23,62
2023-7-19 14:00:00	1,69	1,37	13,32	0,00	2,55	57,16	23,53	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		32,97	31,06	8,05	9,59	51,70	70,35	29,80
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 9 Measurement Results for Location 5

Device Code: 222								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR3	2023-7-17 15:00:00	2,81	1,70	2,14	0,00	3,96	85,97	27,76
	2023-7-17 16:00:00	3,16	1,91	4,30	0,00	4,45	87,43	27,47
	2023-7-17 17:00:00	4,55	2,72	5,41	0,00	6,40	91,33	27,08
	2023-7-17 18:00:00	4,68	2,80	3,12	0,00	6,58	91,94	26,68
	2023-7-17 19:00:00	2,75	1,72	0,85	0,00	3,91	88,61	27,08
	2023-7-17 20:00:00	2,24	1,40	1,53	0,00	3,18	89,36	27,08
	2023-7-17 21:00:00	2,68	1,70	3,37	0,00	3,82	91,50	26,72
	2023-7-17 22:00:00	1,91	1,35	6,54	0,00	2,78	92,98	26,23
	2023-7-17 23:00:00	1,85	1,23	1,79	0,00	2,66	91,58	26,30
	2023-7-18 00:00:00	1,50	1,06	1,00	0,00	2,19	90,58	26,24
	2023-7-18 01:00:00	1,94	1,27	1,90	0,00	2,78	91,79	26,50
	2023-7-18 02:00:00	1,75	1,19	0,97	0,00	2,53	90,21	26,59
	2023-7-18 03:00:00	2,09	1,34	0,98	0,00	2,98	90,98	26,55
	2023-7-18 04:00:00	2,15	1,35	0,41	0,00	3,05	89,65	26,85
	2023-7-18 05:00:00	2,00	1,27	0,00	0,00	2,85	72,48	31,71
	2023-7-18 06:00:00	2,26	1,64	0,00	0,00	3,32	62,20	34,59
	2023-7-18 07:00:00	3,78	3,60	0,00	0,00	5,94	55,52	36,96
	2023-7-18 08:00:00	9,54	9,49	1,72	0,00	15,20	55,76	36,79
	2023-7-18 09:00:00	10,93	10,92	3,67	0,00	17,43	56,15	36,30
	2023-7-18 10:00:00	1,83	1,72	7,82	0,00	2,86	56,06	36,50
	2023-7-18 11:00:00	1,32	0,89	15,61	0,00	1,90	60,66	34,88
	2023-7-18 12:00:00	1,85	1,48	15,74	0,00	2,77	64,37	33,81
	2023-7-18 13:00:00	1,55	1,15	14,77	0,00	2,28	66,69	32,86
	2023-7-18 14:00:00	2,07	1,36	15,51	0,00	2,97	71,60	31,77
Hourly Limit Values	TA Luft	-	-	200	200	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3,05	2,34	4,55	0,00	4,53	78,56	30,05
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Device Code: 221								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR5	2023-7-17 15:00:00	2,13	1,61	10,93	0,00	3,16	71,89	31,41
	2023-7-17 16:00:00	1,52	1,23	17,05	0,00	2,29	79,19	29,21
	2023-7-17 17:00:00	1,57	1,17	15,33	0,00	2,31	82,12	28,30
	2023-7-17 18:00:00	1,53	1,05	9,61	0,00	2,21	83,96	28,06
	2023-7-17 19:00:00	1,64	1,15	6,82	0,00	2,38	83,42	27,98
	2023-7-17 20:00:00	1,52	1,04	4,11	0,00	2,19	84,11	27,94
	2023-7-17 21:00:00	1,55	1,10	2,76	0,00	2,26	83,43	27,90
	2023-7-17 22:00:00	1,49	1,02	3,86	0,00	2,15	84,41	27,72
	2023-7-17 23:00:00	1,69	1,19	3,55	0,00	2,47	84,23	27,64
	2023-7-18 00:00:00	1,38	1,15	6,01	0,00	2,10	85,73	27,26
	2023-7-18 01:00:00	1,63	1,33	5,83	0,00	2,46	87,41	26,94
	2023-7-18 02:00:00	1,36	1,21	4,92	0,00	2,11	88,79	26,77
	2023-7-18 03:00:00	1,61	1,18	3,29	0,00	2,36	89,29	26,90
	2023-7-18 04:00:00	1,73	1,24	1,30	0,00	2,53	88,17	27,39
	2023-7-18 05:00:00	1,95	1,32	0,12	0,00	2,81	72,87	31,92
	2023-7-18 06:00:00	2,28	1,62	0,00	0,00	3,33	60,65	35,77
	2023-7-18 07:00:00	2,80	1,95	0,00	0,00	4,07	56,23	37,81
	2023-7-18 08:00:00	1,97	1,44	0,16	0,00	2,89	54,39	38,42
	2023-7-18 09:00:00	1,87	1,69	2,50	0,00	2,90	53,49	38,61
	2023-7-18 10:00:00	1,48	1,05	4,54	0,00	2,16	53,62	38,20
	2023-7-18 11:00:00	1,86	1,36	15,66	1,03	2,73	57,84	36,25
	2023-7-18 12:00:00	3,35	2,67	15,82	0,00	5,02	61,64	34,73
	2023-7-18 13:00:00	1,86	1,72	12,24	0,00	2,90	63,84	33,83
	2023-7-18 14:00:00	3,09	3,04	10,71	0,00	4,91	66,70	32,67
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		1,87	1,44	6,55	0,04	2,78	74,06	31,23
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Device Code: 223								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ4	2023-7-17 15:00:00	4,00	3,40	7,16	0,00	6,10	69,43	31,90
	2023-7-17 16:00:00	4,99	4,75	13,97	0,00	7,85	76,35	29,76
	2023-7-17 17:00:00	4,00	3,73	10,79	0,00	6,25	79,99	28,94
	2023-7-17 18:00:00	4,26	3,90	7,58	0,00	6,63	80,83	28,76
	2023-7-17 19:00:00	3,73	3,43	3,54	0,00	5,81	81,14	28,70
	2023-7-17 20:00:00	3,84	3,50	2,61	0,00	5,96	81,24	28,68
	2023-7-17 21:00:00	6,85	5,07	4,27	0,00	10,10	85,04	27,48
	2023-7-17 22:00:00	4,20	3,57	10,50	0,00	6,40	93,99	25,72
	2023-7-17 23:00:00	3,82	3,12	4,56	0,00	5,77	92,12	26,01
	2023-7-18 00:00:00	3,16	2,59	1,00	0,00	4,77	89,08	26,51
	2023-7-18 01:00:00	2,77	2,47	1,17	0,00	4,28	88,39	26,95
	2023-7-18 02:00:00	3,07	2,67	2,00	0,00	4,71	89,36	27,14
	2023-7-18 03:00:00	3,26	3,04	2,74	0,00	5,09	89,76	27,22
	2023-7-18 04:00:00	5,10	4,88	3,24	0,00	8,03	89,17	27,17
	2023-7-18 05:00:00	2,88	2,61	0,31	0,00	4,47	80,14	29,80
	2023-7-18 06:00:00	2,56	2,17	0,00	0,00	3,90	64,28	34,26
	2023-7-18 07:00:00	2,60	2,17	0,00	0,00	3,95	63,69	34,56
	2023-7-18 08:00:00	2,10	1,71	0,00	0,00	3,16	60,61	35,89
	2023-7-18 09:00:00	1,71	1,42	0,67	0,00	2,60	58,73	36,39
	2023-7-18 10:00:00	1,86	1,53	4,57	0,00	2,81	60,27	35,84
	2023-7-18 11:00:00	2,04	1,58	8,03	0,00	3,04	63,28	34,87
	2023-7-18 12:00:00	2,05	1,60	3,12	0,00	3,06	61,98	35,07
	2023-7-18 13:00:00	2,22	1,71	7,49	0,00	3,30	64,67	34,12
2023-7-18 14:00:00	2,45	1,87	10,74	0,00	3,64	68,54	33,19	
Hourly Limit Values	TA Luft	-	-	200	350		-	-
	EU	-	-	200	350		-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-		-	-
Average		3,31	2,85	4,59	0,00	5,07	76,34	30,62
Daily Limit Values	TA Luft	50	-	-	125		-	-
	EU	50	-	-	125		-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40		-	-

6. ASSESSMENT

The air quality measurement study was carried out with the aim of determining the air pollutants on ambient air quality. Results were assessed according to the TA LUFT, EU Council Directive 2008/50/EC and WHO limit values and this report was prepared. According to air quality measurement studies, background air quality values are comply with air quality standards.

Month August -2023

5. RESULTS

5.1. Meteorological Conditions

The meteorological measurement results conducted during the measurement period were obtained from the airport meteorology station and are presented in the table below.

Table 4 Meteorological Conditions

Date	Weather Measuring Time	Temp (°C)	Atm Pressure (mmHg)	Wind speed (km/h)	Wind direction	Air Humid (%)	Precipitation rain volume (mm)	Condition
8.Aug.2023	2-5 AM	29	759	22	Northwest	74	1.2	Partly clear & brief precipitation
	8-11 AM	30	759	18-19	Northwest	75	0.2	Mostly cloudy
	14-17PM	32	758	18-19	Northwest	70	0.3	Mostly cloudy
	20-23PM	30	759	16-17	Northwest	71	0.3	Mostly cloudy
9.Aug.2023	2-5 AM	29	759	21-22	West	81	1.2	Partly cloudy & brief rain
	8-11 AM	28	760	19-20	Northwest	83	0.4	Mostly cloudy
	14-17PM	31	759	19-20	Northwest	77	0.1	Partly cloudy
	20-23PM	29	759	20-21	Northwest	81	1.4	Partly clear & light rain
10.Aug.2023	2-5 AM	27	760	17-18	Northwest	87	1.4	Partly cloudy & brief rain
	8-11 AM	29	760	18-19	Northwest	80	0.5	Partly clear & light rain
	14-17PM	31	760	22-23	Northwest	80	0	Mostly cloudy
	20-23PM	29	759	23-24	Northwest	77	0.3	Mostly cloudy

5.2. Monitoring Results

Table 5 Measurement Results for Location 1

Device Code: 223								
Location	Sampling Date	Air Quality Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP	Humidity (%)	Temperature (°C)
AQ1	08.08.2023 15:00:00	3.82	3.11	ND	ND	5,76	69,50	31,73
	08.08.2023 16:00:00	3.72	2.92	1.25	ND	5,55	69,84	31,65
	08.08.2023 17:00:00	4.11	3.49	8.12	ND	6,26	74,44	30,01
	08.08.2023 18:00:00	3.96	3.36	6.25	ND	6,03	80,04	28,75
	08.08.2023 19:00:00	3.97	3.45	4.1	ND	6,09	81,64	28,29
	08.08.2023 20:00:00	3.73	3.17	ND	ND	5,68	82,63	28,05
	08.08.2023 21:00:00	3.97	3.27	ND	ND	6,00	83,78	28,00
	08.08.2023 22:00:00	6.91	5.23	ND	ND	10,23	86,80	27,14
	08.08.2023 23:00:00	10.54	9.62	ND	ND	16,38	96,90	24,58
	09.08.2023 00:00:00	9.57	9	ND	ND	15,00	91,94	26,28
	09.08.2023 01:00:00	3.38	3.02	ND	ND	5,22	85,86	26,84
	09.08.2023 02:00:00	3.79	3.2	ND	ND	5,78	84,34	27,04
	09.08.2023 03:00:00	4.31	3.46	ND	ND	6,48	86,13	27,06
	09.08.2023 04:00:00	4.19	3.4	ND	ND	6,31	84,08	27,19
	09.08.2023 05:00:00	6.37	4.53	ND	ND	9,30	91,16	26,41
	09.08.2023 06:00:00	6.66	5.29	ND	ND	9,98	90,63	26,52
	09.08.2023 07:00:00	3.02	2.33	ND	ND	4,49	80,50	28,49
	09.08.2023 08:00:00	3.95	3.26	ND	ND	5,97	77,06	29,63
	09.08.2023 09:00:00	7.52	7.07	ND	ND	11,78	69,45	31,99
	09.08.2023 10:00:00	5.46	4.5	ND	ND	8,26	67,23	32,91
09.08.2023 11:00:00	6.18	5.01	ND	ND	9,31	67,19	33,06	
09.08.2023 12:00:00	5.47	4.16	ND	ND	8,11	66,02	33,47	
09.08.2023 13:00:00	6.81	5.75	ND	ND	10,37	65,21	33,70	
09.08.2023 14:00:00	9.82	7.47	ND	ND	14,57	87,18	27,41	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
24 h Average		5,47	4,54	0,95	0,02	8,29	79,98	29,01
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Figure 2 Measurement Graphs for Location AQ1

Table 6 Measurement Results for Location 2

Device Code: 223								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ2	10.08.2023 16:00:00	5.15	4.24	13.22	4.24	7,78	74,12	30,97
	10.08.2023 17:00:00	5.4	4.61	8.71	ND	8,25	81,69	28,48
	10.08.2023 18:00:00	5.16	4.34	9.2	1.36	7,84	83,10	28,08
	10.08.2023 19:00:00	5.1	4.32	4.19	ND	7,78	82,58	28,03
	10.08.2023 20:00:00	4.97	4.19	1.11	ND	7,56	83,54	28,00
	10.08.2023 21:00:00	5.21	4.45	ND	ND	7,96	85,56	27,94
	10.08.2023 22:00:00	5.22	4.43	ND	ND	7,95	85,47	27,87
	10.08.2023 23:00:00	5.15	4.24	ND	ND	7,78	74,12	30,97
	11.08.2023 00:00:00	5.31	4.56	ND	ND	8,12	87,53	27,54
	11.08.2023 01:00:00	5.41	4.58	ND	ND	8,24	84,91	27,64
	11.08.2023 02:00:00	5.49	4.68	ND	ND	8,38	86,11	27,51
	11.08.2023 03:00:00	5.53	4.79	ND	ND	8,47	86,65	27,45
	11.08.2023 04:00:00	5.62	4.89	ND	ND	8,62	86,67	27,56
	11.08.2023 05:00:00	6.22	5.29	ND	ND	9,48	86,40	27,52
	11.08.2023 06:00:00	6.73	5.53	ND	ND	10,17	85,63	27,80
	11.08.2023 07:00:00	6.4	5.27	ND	ND	9,67	77,78	29,79
	11.08.2023 08:00:00	6.12	4.96	2.2	ND	9,22	73,44	31,33
	11.08.2023 09:00:00	6.05	4.8	1.13	ND	9,06	67,02	33,43
	11.08.2023 10:00:00	6.13	4.94	ND	ND	9,22	66,97	33,77
	11.08.2023 11:00:00	6.43	5.35	ND	ND	9,75	71,51	32,23
11.08.2023 12:00:00	6.46	5.27	ND	ND	9,74	67,41	33,02	
11.08.2023 13:00:00	6.35	5.04	ND	ND	9,51	67,20	33,25	
11.08.2023 14:00:00	6.03	4.91	ND	ND	9,10	68,40	32,54	
11.08.2023 15:00:00	4.35	3.5	ND	ND	6,54	71,33	30,57	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		5,67	4,72	1,73	0,28	8,59	78,55	29,72
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Figure 3 Measurement Graphs for Location AQ2

Table 7 Measurement Results for Location 3

Device Code: 224								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ3	08.08.2023 15:00:00	8.4	8.27	35.09	13.2	13,34	65,66	32,40
	08.08.2023 16:00:00	22.67	22.64	25.34	7.13	36,15	66,41	32,27
	08.08.2023 17:00:00	13.08	12.8	25.05	19.67	20,73	70,77	30,72
	08.08.2023 18:00:00	22.93	22.93	24.95	7.14	36,58	75,99	29,56
	08.08.2023 19:00:00	7.45	7.19	15.27	ND	11,77	78,00	28,93
	08.08.2023 20:00:00	4.3	4.01	9.71	ND	6,72	78,98	28,69
	08.08.2023 21:00:00	7.13	6.71	11.06	ND	11,18	80,66	28,46
	08.08.2023 22:00:00	8.26	6.76	8.33	ND	12,47	84,22	27,56
	08.08.2023 23:00:00	25.57	24.34	15.87	ND	40,22	95,79	24,92
	09.08.2023 00:00:00	8.46	8.1	4.68	ND	13,33	90,96	26,39
	09.08.2023 01:00:00	3.39	3.16	ND	ND	5,30	84,72	26,96
	09.08.2023 02:00:00	3.83	3.36	ND	ND	5,89	82,75	27,29
	09.08.2023 03:00:00	4.01	3.31	1.51	ND	6,06	83,96	27,41
	09.08.2023 04:00:00	4.44	3.54	1.17	ND	6,66	81,60	27,57
	09.08.2023 05:00:00	6.5	4.61	9	ND	9,48	89,24	26,77
	09.08.2023 06:00:00	4.98	3.44	2.93	ND	7,21	85,08	27,82
	09.08.2023 07:00:00	2.78	2.01	ND	ND	4,07	65,42	32,69
	09.08.2023 08:00:00	4.16	4.01	2.02	ND	6,56	68,20	31,77
	09.08.2023 09:00:00	3.86	3.74	ND	ND	6,10	61,25	34,02
	09.08.2023 10:00:00	4.34	3.73	2.34	ND	6,64	59,55	34,76
	09.08.2023 11:00:00	6.35	6.04	8.45	ND	9,99	62,12	34,09
	09.08.2023 12:00:00	4.72	3.34	5.26	ND	6,88	64,50	33,19
	09.08.2023 13:00:00	5.41	4	2.81	ND	7,97	61,77	34,17
	09.08.2023 14:00:00	9.66	6.72	31.11	ND	14,03	84,58	27,75
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		8,20	7,45	10,14	2,00	12,72	75,92	29,84
Daily Limit Values	TA Luft	50	-	-	-	-	-	-
	EU	50	-	-	-	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 8 Measurement Results for Location 4

Device Code: 222								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR2	08.08.2023 15:00:00	7.65	6.95	3.31	ND	10,64	66,90	32,43
	08.08.2023 16:00:00	4.85	4.23	1.12	ND	6,73	68,73	31,81
	08.08.2023 17:00:00	5.27	4.63	0.1	ND	7,31	72,21	30,56
	08.08.2023 18:00:00	7.95	7.71	ND	ND	11,11	77,97	29,18
	08.08.2023 19:00:00	4.31	3.9	ND	ND	5,99	81,13	28,38
	08.08.2023 20:00:00	3.54	3.24	ND	ND	4,93	82,84	28,06
	08.08.2023 21:00:00	4.24	3.82	1	ND	5,89	83,06	28,08
	08.08.2023 22:00:00	5.39	4.36	1.57	ND	7,44	84,58	27,64
	08.08.2023 23:00:00	7.31	6.77	ND	ND	10,18	99,58	24,24
	09.08.2023 00:00:00	4.45	3.98	ND	ND	6,18	97,81	25,33
	09.08.2023 01:00:00	3.31	3.05	ND	ND	4,61	91,84	25,86
	09.08.2023 02:00:00	3.48	3.05	ND	ND	4,83	87,89	26,36
	09.08.2023 03:00:00	3.76	3.18	3.83	ND	5,21	88,57	26,66
	09.08.2023 04:00:00	3.83	3.21	5.57	ND	5,30	86,18	26,79
	09.08.2023 05:00:00	5.51	4.11	2.31	ND	7,57	91,38	26,53
	09.08.2023 06:00:00	5.36	4.29	0.34	ND	7,40	91,72	26,49
	09.08.2023 07:00:00	2.57	2.07	ND	ND	3,55	76,00	29,97
	09.08.2023 08:00:00	3.39	2.89	1	ND	4,70	72,17	31,20
	09.08.2023 09:00:00	6.75	6.26	0	ND	9,40	65,25	33,56
	09.08.2023 10:00:00	4.75	4.19	ND	ND	6,59	60,62	35,23
	09.08.2023 11:00:00	5.12	4.15	1.1	ND	7,07	62,77	34,66
	09.08.2023 12:00:00	4.84	3.71	3.7	ND	6,66	63,04	34,35
	09.08.2023 13:00:00	5.73	4.7	ND	ND	7,92	64,49	33,79
	09.08.2023 14:00:00	8.41	7.21	1.2	ND	11,65	77,28	29,03
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		5,07	4,40	1,74	0,00	7,04	78,92	29,42
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 9 Measurement Results for Location 5

Device Code: 223								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR3	09.08.2023 15:00:00	8.11	6.64	0.24	ND	12,24	91,16	26,33
	09.08.2023 16:00:00	6.15	5.35	1.3	ND	9,43	86,03	27,43
	09.08.2023 17:00:00	6.9	5.6	ND	ND	10,40	83,96	28,57
	09.08.2023 18:00:00	5.19	4.36	ND	ND	7,89	81,63	28,23
	09.08.2023 19:00:00	6.15	4.91	ND	ND	9,22	83,77	27,68
	09.08.2023 20:00:00	6.04	4.84	0.95	ND	9,07	86,48	27,53
	09.08.2023 21:00:00	5.82	4.75	ND	ND	8,78	86,56	27,73
	09.08.2023 22:00:00	6.26	4.98	ND	ND	9,39	84,29	27,75
	09.08.2023 23:00:00	40.51	39.41	ND	ND	64,11	94,51	26,21
	10.08.2023 00:00:00	10.81	9.92	ND	ND	16,83	91,49	26,10
	10.08.2023 01:00:00	4.29	3.78	ND	ND	6,60	87,90	25,96
	10.08.2023 02:00:00	5.21	4.45	ND	ND	7,95	88,79	26,53
	10.08.2023 03:00:00	6.28	5.39	ND	ND	9,60	90,07	26,80
	10.08.2023 04:00:00	11.4	8.45	ND	ND	16,80	95,73	25,62
	10.08.2023 05:00:00	5.4	4.66	ND	ND	8,27	91,53	26,06
	10.08.2023 06:00:00	5.4	4.66	ND	ND	8,27	90,83	26,64
	10.08.2023 07:00:00	4.65	3.91	1.46	ND	7,07	87,66	26,20
	10.08.2023 08:00:00	6.07	5	ND	ND	9,17	89,20	26,80
	10.08.2023 09:00:00	6.7	5.69	ND	ND	10,22	83,74	28,53
	10.08.2023 10:00:00	8.04	7.13	ND	ND	12,39	79,72	29,96
10.08.2023 11:00:00	6.24	5.28	ND	ND	9,51	76,81	30,38	
10.08.2023 12:00:00	5.23	4.16	ND	ND	7,84	68,83	32,89	
10.08.2023 13:00:00	4.68	3.95	ND	ND	7,12	56,82	36,36	
10.08.2023 14:00:00	5.15	4.05	ND	ND	7,70	66,58	33,77	
Hourly Limit Values	TA Luft	-	-	200	200	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		7,78	6,72	0,29	0,00	11,91	84,34	28,17
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 10 Measurement Results for Location 6

Device Code: 222								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR5	09.08.2023 16:00:00	7.04	5.35	9.1	ND	9,69	88,39	26,49
	09.08.2023 17:00:00	6.02	4.72	17.34	6.12	8,30	89,01	27,15
	09.08.2023 18:00:00	6.66	4.95	24.25	9.98	9,15	85,22	28,61
	09.08.2023 19:00:00	5.44	4.24	7.81	3	7,50	83,79	28,14
	09.08.2023 20:00:00	6.38	4.91	2.17	ND	8,79	85,38	27,66
	09.08.2023 21:00:00	6.6	5.02	ND	ND	9,08	88,41	27,43
	09.08.2023 22:00:00	5.9	4.58	ND	ND	8,13	88,62	27,55
	09.08.2023 23:00:00	6.28	4.87	ND	ND	8,65	85,66	27,68
	10.08.2023 00:00:00	8.06	6.17	ND	ND	11,10	96,70	26,18
	10.08.2023 01:00:00	6.39	4.87	ND	ND	8,79	94,14	25,96
	10.08.2023 02:00:00	4.48	3.71	ND	ND	6,20	89,35	25,99
	10.08.2023 03:00:00	5.3	4.29	ND	ND	7,32	90,86	26,44
	10.08.2023 04:00:00	5.86	4.68	ND	ND	8,09	92,54	26,65
	10.08.2023 05:00:00	10.89	8	ND	ND	14,96	97,70	25,49
	10.08.2023 06:00:00	5.4	4.55	ND	ND	7,48	94,77	25,72
	10.08.2023 07:00:00	5.17	4.36	ND	ND	7,16	94,97	26,17
	10.08.2023 08:00:00	4.38	3.56	ND	ND	6,05	89,77	26,07
	10.08.2023 09:00:00	6.07	4.82	ND	ND	8,37	92,55	26,64
	10.08.2023 10:00:00	5.78	4.68	ND	ND	7,98	86,39	28,48
	10.08.2023 11:00:00	6.78	5.19	ND	ND	9,33	81,33	30,15
	10.08.2023 12:00:00	5.62	4.39	ND	ND	7,75	76,93	30,88
10.08.2023 13:00:00	5.21	4.09	ND	ND	7,18	70,42	32,81	
10.08.2023 14:00:00	4.88	3.79	ND	ND	6,72	62,19	35,25	
10.08.2023 15:00:00	5.17	4.04	ND	ND	7,13	64,50	34,52	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		6,07	4,74	2,61	0,83	8,37	86,23	28,09
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 11 Measurement Results for Location 7

Device Code: 224								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ4	09.08.2023 16:00:00	5.73	4.36	ND	ND	8,50	87,80	26,76
	09.08.2023 17:00:00	6.14	4.51	ND	ND	9,03	85,26	27,84
	09.08.2023 18:00:00	5.21	4	ND	ND	7,75	82,47	28,21
	09.08.2023 19:00:00	6.47	4.84	ND	ND	9,56	85,56	27,63
	09.08.2023 20:00:00	6.31	4.76	ND	ND	9,34	88,01	27,37
	09.08.2023 21:00:00	7.98	5.64	ND	ND	11,64	87,50	27,78
	09.08.2023 22:00:00	6.95	5.02	ND	ND	10,19	86,30	27,85
	09.08.2023 23:00:00	8.4	6.1	ND	ND	12,32	91,39	26,78
	10.08.2023 00:00:00	6.38	4.73	ND	ND	9,40	91,29	26,40
	10.08.2023 01:00:00	5.88	4.37	ND	ND	8,67	86,51	26,55
	10.08.2023 02:00:00	4.51	3.61	ND	ND	6,77	86,08	27,01
	10.08.2023 03:00:00	5.53	4.21	ND	ND	8,21	88,90	27,22
	10.08.2023 04:00:00	7.79	5.63	ND	ND	11,42	95,63	25,63
	10.08.2023 05:00:00	5.25	4.27	ND	ND	7,91	90,41	26,45
	10.08.2023 06:00:00	4.84	4.03	ND	ND	7,34	88,55	27,27
	10.08.2023 07:00:00	6.07	4.63	ND	ND	9,01	91,63	25,63
	10.08.2023 08:00:00	5.74	4.58	ND	ND	8,61	91,71	26,06
	10.08.2023 09:00:00	5.68	4.61	ND	ND	8,56	88,30	27,30
	10.08.2023 10:00:00	6.35	4.99	ND	ND	9,49	86,92	28,12
	10.08.2023 11:00:00	5.79	4.48	ND	ND	8,62	83,76	28,78
10.08.2023 12:00:00	5.03	3.81	ND	ND	7,45	74,18	30,94	
10.08.2023 13:00:00	4.87	3.68	ND	ND	7,21	70,55	31,95	
10.08.2023 14:00:00	4.83	3.69	1.63	11.28	7,17	71,25	31,61	
10.08.2023 15:00:00	4.64	3.58	5.15	9.83	6,90	65,57	34,09	
Hourly Limit Values	TA Luft	-	-	200	350		-	-
	EU	-	-	200	350		-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-		-	-
Average		5,93	4,51	0,28	0,88	8,79	85,23	27,97
Daily Limit Values	TA Luft	50	-	-	125		-	-
	EU	50	-	-	125		-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40		-	-

6. ASSESSMENT

The air quality measurement study was carried out with the aim of determining the air pollutants on ambient air quality. Results were assessed according to the TA LUFT, EU Council Directive 2008/50/EC and WHO limit values and this report was prepared. According to air quality measurement studies, background air quality values are complied with air quality standards.

Month September -2023

5. RESULTS

5.1. Meteorological Conditions

The meteorological measurement results conducted during the measurement period were obtained from the airport meteorology station and are presented in the table below.

Table 4 Meteorological Conditions

Date	Weather Measuring Time	Temp (°C)	Atm Pressure (mmHg)	Wind speed (km/h)	Wind direction	Air Humid (%)	Precipitation rain volume (mm)	Condition
19.Sep.2023	2-5 AM	29	757	15	Northwest	79	0	Partly Cloudy
	8-11 AM	28	758	23	Northwest	84	0	Partly Sunny
	14-17PM	28	758	12	Northwest	84	0.7	Light Rain
	20-23PM	28	759	11	Northwest	83	0	Overcast
20.Aug.2023	2-5 AM	28	757	11	West	80	0	Passing Clouds
	8-11 AM	30	758	10	Northwest	78	0	Partly Sunny
	14-17PM	31	756	12	Northwest	81	0	Broken Clouds
	20-23PM	29	759	10	Northwest	85	0	Passing Clouds
21.Aug.2023	2-5 AM	29	757	15	Northwest	77	0.3	Passing Clouds
	8-11 AM	31	759	21	Northwest	83	0.1	Passing Clouds
	14-17PM	28	758	13	Northwest	86	0	Partly Sunny
	20-23PM	28	759	13	Northwest	86	0.1	Partly Clouds

5.2. Monitoring Results

Table 5 Measurement Results for Location 1

Device Code: 222								
Location	Sampling Date	Air Quality Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP	Humidity (%)	Temperature (°C)
AQ1	2023-9-20 11:00:00	1.39	1.18	ND	ND	1.98	81.32	28.20
	2023-9-20 12:00:00	1.88	1.78	ND	ND	2.90	82.05	27.77
	2023-9-20 13:00:00	1.28	1.14	ND	ND	1.84	78.82	27.90
	2023-9-20 14:00:00	1.81	1.77	ND	ND	2.82	78.87	28.10
	2023-9-20 15:00:00	1.51	1.38	2.65	ND	2.22	80.24	28.55
	2023-9-20 16:00:00	1.53	1.48	2.13	ND	2.37	81.89	28.99
	2023-9-20 17:00:00	1.49	1.36	2.45	ND	2.18	83.35	29.56
	2023-9-20 18:00:00	1.62	1.57	2.3	ND	2.52	89.85	30.17
	2023-9-20 19:00:00	1.92	1.79	1.55	ND	2.87	80.57	30.31
	2023-9-20 20:00:00	1.81	1.74	2.3	ND	2.82	81.23	29.93
	2023-9-20 21:00:00	1.61	1.45	ND	ND	2.36	79.56	31.12
	2023-9-20 22:00:00	1.48	1.29	ND	ND	2.23	86.43	30.45
	2023-9-20 23:00:00	1.7	1.46	ND	ND	2.46	85.34	30.64
	2023-9-21 00:00:00	1.23	1.07	2.5	ND	1.85	87.43	30.44
	2023-9-21 01:00:00	1.13	0.9	1.65	ND	1.56	82.23	29.80
	2023-9-21 02:00:00	1.16	1.08	2.72	ND	1.77	79.45	30.45
	2023-9-21 03:00:00	1.14	1	ND	ND	1.62	77.45	32.88
	2023-9-21 04:00:00	1.36	1.3	ND	ND	2.09	75.54	29.40
	2023-9-21 05:00:00	1.21	1.06	ND	ND	1.72	79.90	29.45
	2023-9-21 06:00:00	1.11	1.04	ND	ND	1.69	80.98	29.80
2023-9-21 07:00:00	1.36	1.16	ND	ND	1.94	83.34	30.79	
2023-9-21 08:00:00	1.41	1.1	ND	ND	2.06	84.23	29.51	
2023-9-21 09:00:00	1.44	1.14	ND	ND	2.02	82.28	29.23	
2023-9-21 10:00:00	1.57	1.27	ND	ND	2.32	81.65	29.24	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
24 h Average		1.46	1.31	0.84	0.05	2.18	81.83	29.70
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 6 Measurement Results for Location 2

Device Code: 224								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ2	2023-9-21 11:00:00	1.44	1.06	ND	3.24	2.12	90.30	34.13
	2023-9-21 12:00:00	1.45	0.99	ND	2.80	2.10	87.65	32.09
	2023-9-21 13:00:00	1.38	0.95	ND	2.23	1.99	84.51	31.19
	2023-9-21 14:00:00	1.24	1.11	ND	1.45	1.91	80.69	30.22
	2023-9-21 15:00:00	1.31	1.26	1.43	1.23	2.07	84.88	29.90
	2023-9-21 16:00:00	1.12	1.05	1.13	ND	1.75	85.36	30.31
	2023-9-21 17:00:00	0.59	0.49	ND	ND	0.89	77.65	29.91
	2023-9-21 18:00:00	0.52	0.39	ND	ND	0.77	79.77	29.69
	2023-9-21 19:00:00	0.62	0.43	ND	ND	0.90	78.45	29.68
	2023-9-21 20:00:00	0.73	0.50	1.10	ND	1.06	81.08	29.93
	2023-9-21 21:00:00	0.97	0.72	ND	ND	1.43	79.30	30.34
	2023-9-21 22:00:00	0.88	0.75	1.45	ND	1.34	76.12	28.71
	2023-9-21 23:00:00	0.88	0.82	1.76	ND	1.38	68.14	28.98
	2023-9-22 00:00:00	0.99	0.97	1.54	ND	1.57	64.16	29.38
	2023-9-22 01:00:00	1.51	1.50	2.40	ND	2.40	72.97	29.88
	2023-9-22 02:00:00	2.09	2.08	1.32	ND	3.33	73.51	29.53
	2023-9-22 03:00:00	2.63	2.62	1.55	ND	4.19	81.52	29.58
	2023-9-22 04:00:00	2.11	2.08	1.45	ND	3.35	85.21	26.70
	2023-9-22 05:00:00	2.46	2.38	2.13	ND	3.88	81.98	27.11
	2023-9-22 06:00:00	2.98	2.98	2.23	ND	4.76	81.04	26.71
	2023-9-22 07:00:00	2.85	2.84	1.97	ND	4.54	81.29	26.49
	2023-9-22 08:00:00	2.57	2.55	ND	ND	4.09	82.15	26.48
2023-9-22 09:00:00	2.24	2.23	ND	ND	3.57	82.82	26.73	
2023-9-22 10:00:00	3.81	3.81	ND	ND	6.08	82.25	27.14	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		1.64	1.52	0.89	0.46	2.56	80.12	29.20
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 7 Measurement Results for Location 3

Device Code: 223								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ3	2023-9-19 11:00:00	1.66	1.06	ND	ND	2.12	80.57	25.51
	2023-9-19 12:00:00	1.67	0.99	1.40	ND	2.10	81.11	25.78
	2023-9-19 13:00:00	7.67	7.19	2.62	4.01	1.99	89.12	26.18
	2023-9-19 14:00:00	4.52	4.01	2.08	3.74	1.91	83.72	26.68
	2023-9-19 15:00:00	7.35	6.71	2.46	3.73	2.07	75.74	26.33
	2023-9-19 16:00:00	8.48	6.76	2.98	ND	1.75	71.76	26.38
	2023-9-19 17:00:00	0.81	0.49	2.84	2.31	1.73	80.57	26.97
	2023-9-19 18:00:00	3.00	2.01	2.55	2.85	2.31	81.11	26.82
	2023-9-19 19:00:00	4.38	4.01	2.23	2.33	2.85	86.05	26.85
	2023-9-19 20:00:00	4.08	3.74	1.23	ND	2.33	88.68	27.09
	2023-9-19 21:00:00	4.56	3.73	4.16	1.66	1.43	86.90	27.71
	2023-9-19 22:00:00	1.10	0.75	3.86	1.67	1.34	83.72	28.56
	2023-9-19 23:00:00	1.10	0.82	4.34	ND	1.38	75.74	30.68
	2023-9-20 00:00:00	1.21	0.97	ND	ND	1.57	71.76	30.93
	2023-9-20 01:00:00	1.73	1.50	ND	ND	2.40	80.57	28.89
	2023-9-20 02:00:00	2.31	2.08	ND	ND	2.85	81.11	27.99
	2023-9-20 03:00:00	2.85	2.62	ND	ND	2.33	89.12	27.02
	2023-9-20 04:00:00	2.33	2.08	ND	ND	2.68	92.81	26.70
	2023-9-20 05:00:00	2.68	2.38	ND	ND	3.20	89.58	27.11
	2023-9-20 06:00:00	3.20	2.98	ND	ND	4.76	88.64	26.71
	2023-9-20 07:00:00	3.07	2.84	ND	ND	4.54	88.89	26.49
	2023-9-20 08:00:00	2.79	2.55	ND	ND	4.09	89.75	26.48
	2023-9-20 09:00:00	2.46	2.23	ND	ND	3.57	90.42	26.73
2023-9-20 10:00:00	4.03	3.81	ND	ND	6.08	89.85	27.14	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.30	2.85	1.36	0.93	2.64	84.05	27.24
Daily Limit Values	TA Luft	50	-	-	-	-	-	-
	EU	50	-	-	-	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 8 Measurement Results for Location 4

Device Code: 223								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR2	2023-9-20 11:00:00	2.72	2.67	2.46	1.88	4.31	80.52	27.98
	2023-9-20 12:00:00	2.28	2.24	1.92	ND	3.61	81.25	27.55
	2023-9-20 13:00:00	1.60	1.59	ND	ND	2.55	78.02	27.68
	2023-9-20 14:00:00	2.01	2.00	1.94	ND	3.20	78.07	27.88
	2023-9-20 15:00:00	3.17	1.88	ND	ND	3.01	79.44	28.33
	2023-9-20 16:00:00	3.22	1.99	2.58	ND	3.17	81.09	28.77
	2023-9-20 17:00:00	3.66	3.17	3.20	2.12	3.22	82.55	29.34
	2023-9-20 18:00:00	3.87	3.22	3.44	1.98	3.66	89.05	29.95
	2023-9-20 19:00:00	4.13	3.66	3.77	2.11	3.87	79.77	30.09
	2023-9-20 20:00:00	4.23	3.87	4.00	1.34	4.13	80.43	29.71
	2023-9-20 21:00:00	4.24	4.13	4.06	2.76	3.84	78.76	30.90
	2023-9-20 22:00:00	4.13	3.98	ND	ND	5.48	85.63	30.23
	2023-9-20 23:00:00	4.21	3.84	ND	ND	3.84	84.54	30.42
	2023-9-21 00:00:00	4.32	3.84	3.41	1.98	6.39	86.63	30.22
	2023-9-21 01:00:00	3.57	2.98	3.12	1.67	5.66	81.43	29.58
	2023-9-21 02:00:00	3.67	3.26	ND	ND	3.06	78.65	30.23
	2023-9-21 03:00:00	3.93	3.43	ND	ND	4.08	76.65	32.66
	2023-9-21 04:00:00	5.22	4.98	ND	ND	7.18	74.74	29.18
	2023-9-21 05:00:00	3.05	2.65	ND	ND	2.96	79.10	29.23
	2023-9-21 06:00:00	1.81	1.79	ND	ND	2.87	80.18	29.58
	2023-9-21 07:00:00	2.25	2.20	ND	ND	3.57	82.54	30.57
2023-9-21 08:00:00	2.10	1.95	1.89	1.30	3.27	83.43	29.29	
2023-9-21 09:00:00	1.93	1.83	1.91	ND	3.03	81.48	29.01	
2023-9-21 10:00:00	2.13	1.98	2.13	ND	3.33	80.85	29.02	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.23	2.88	1.66	0.71	3.89	81.03	29.48
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 9 Measurement Results for Location 5

Device Code: 224								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR3	2023-9-20 14:00:00	2.59	2.58	3.88	1.24	4.12	90.22	28.05
	2023-9-20 15:00:00	2.57	2.57	3.86	ND	4.10	89.50	28.00
	2023-9-20 16:00:00	3.02	3.02	ND	ND	4.82	89.81	27.85
	2023-9-20 17:00:00	2.77	2.77	ND	ND	4.42	90.44	27.79
	2023-9-20 18:00:00	2.75	2.75	ND	ND	4.39	90.05	27.76
	2023-9-20 19:00:00	2.61	2.60	3.91	1.78	4.16	91.83	27.67
	2023-9-20 20:00:00	2.56	2.56	3.84	2.56	4.09	90.93	27.68
	2023-9-20 21:00:00	2.24	2.24	3.36	4.51	3.57	85.11	28.07
	2023-9-20 22:00:00	1.92	1.92	2.88	3.04	3.07	82.00	28.95
	2023-9-20 23:00:00	1.81	1.81	2.72	3.45	2.89	78.35	30.00
	2023-9-21 00:00:00	1.76	1.76	ND	2.98	2.80	69.39	32.22
	2023-9-21 01:00:00	1.67	1.64	ND	ND	2.65	71.06	31.79
	2023-9-21 02:00:00	1.29	1.21	ND	ND	2.02	82.32	28.29
	2023-9-21 03:00:00	1.59	1.56	2.37	ND	2.53	80.37	28.22
	2023-9-21 04:00:00	1.56	1.56	ND	ND	2.49	76.14	28.88
	2023-9-21 05:00:00	3.49	2.74	4.86	ND	5.21	65.16	29.36
	2023-9-21 06:00:00	1.84	1.81	2.75	ND	2.92	69.68	24.15
	2023-9-21 07:00:00	2.15	2.13	ND	ND	3.42	85.91	23.11
	2023-9-21 08:00:00	2.18	2.18	ND	ND	3.48	85.30	23.87
	2023-9-21 09:00:00	2.12	2.11	3.18	ND	3.38	81.48	24.08
2023-9-21 10:00:00	2.23	2.23	3.35	ND	3.56	88.27	24.42	
2023-9-21 11:00:00	2.16	2.16	ND	ND	3.45	80.43	24.61	
2023-9-21 12:00:00	16.20	15.40	ND	ND	43.32	73.70	24.45	
2023-9-21 13:00:00	13.54	11.23	ND	ND	147.56	66.76	21.22	
Hourly Limit Values	TA Luft	-	-	200	200	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.28	3.11	1.71	0.82	11.18	81.43	27.10
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 10 Measurement Results for Location 6

Device Code: 222								
Location	Sampling Date	Results (µg/m ³)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
ASR5	2023-9-19 11:00:00	3.63	3.63	ND	ND	5.79	89.24	27.26
	2023-9-19 12:00:00	2.26	2.25	ND	ND	3.6	89.13	27.29
	2023-9-19 13:00:00	1.73	1.73	ND	ND	2.76	89.58	27.26
	2023-9-19 14:00:00	1.85	1.84	ND	ND	2.95	89.07	27.29
	2023-9-19 15:00:00	2.01	2	2.75	ND	3.2	88.79	27.28
	2023-9-19 16:00:00	2.1	2.1	2.60	ND	3.35	89.27	27.28
	2023-9-19 17:00:00	2.28	2.28	2.56	ND	3.63	89.05	27.35
	2023-9-19 18:00:00	2.56	2.55	2.24	ND	4.08	90.00	27.35
	2023-9-19 19:00:00	2.57	2.57	1.92	ND	4.1	90.16	27.42
	2023-9-19 20:00:00	2.91	2.9	1.81	ND	4.63	86.79	28.28
	2023-9-19 21:00:00	2.85	2.84	1.76	ND	4.55	77.07	30.65
	2023-9-19 22:00:00	4.79	4.78	1.64	ND	7.64	75.07	31.53
	2023-9-19 23:00:00	2.8	2.79	2.62	ND	4.46	84.97	29.10
	2023-9-20 00:00:00	6.06	6.05	2.08	ND	9.66	84.32	29.21
	2023-9-20 01:00:00	5.42	5.41	2.38	ND	8.64	76.12	31.32
	2023-9-20 02:00:00	2.35	2.35	2.98	ND	3.75	66.26	34.23
	2023-9-20 03:00:00	3.65	3.46	2.84	ND	5.73	60.90	35.49
	2023-9-20 04:00:00	6.86	6.63	2.55	ND	10.84	58.62	36.79
	2023-9-20 05:00:00	2.27	2.27	2.23	ND	3.62	57.37	37.47
	2023-9-20 06:00:00	2.19	2.18	ND	ND	3.49	61.45	35.60
	2023-9-20 07:00:00	2.82	2.81	ND	ND	4.49	72.07	32.16
	2023-9-20 08:00:00	2.41	2.41	ND	ND	3.84	80.50	29.88
	2023-9-20 09:00:00	2.16	2.15	ND	ND	3.44	82.93	28.92
	2023-9-20 10:00:00	2.31	2.3	ND	ND	3.68	86.12	28.70
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.04	3.01	1.46	0.00	4.83	79.79	30.21
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

Table 11 Measurement Results for Location 7

Device Code: 224								
Location	Sampling Date	Results ($\mu\text{g}/\text{m}^3$)					Ambient Conditions	
		PM ₁₀	PM _{2.5}	NO ₂	SO ₂	TSP (24 Hours Average)	Humidity (%)	Temperature (°C)
AQ4	2023-9-19 11:00:00	3.26	3.12	ND	0	5.13	65.65	33.59
	2023-9-19 12:00:00	2.99	2.94	3.40	0	4.75	67.90	32.55
	2023-9-19 13:00:00	3.03	2.97	3.13	0	4.81	66.05	33.23
	2023-9-19 14:00:00	4.12	3.96	4.79	0	6.50	67.11	32.71
	2023-9-19 15:00:00	3.07	3.03	2.63	0	4.87	65.18	33.26
	2023-9-19 16:00:00	3.33	3.20	6.11	0	5.26	67.72	32.16
	2023-9-19 17:00:00	3.73	3.67	14.64	0	5.93	79.26	29.38
	2023-9-19 18:00:00	9.07	8.98	12.02	0	14.42	83.41	28.40
	2023-9-19 19:00:00	4.03	3.91	9.92	0	6.37	85.50	27.97
	2023-9-19 20:00:00	5.97	5.92	10.98	0	9.50	90.78	26.59
	2023-9-19 21:00:00	5.51	5.51	8.17	0	8.79	90.36	26.77
	2023-9-19 22:00:00	3.83	3.76	1.74	0	6.08	86.99	27.47
	2023-9-19 23:00:00	4.07	3.64	2.82	0	6.29	87.96	26.51
	2023-9-20 00:00:00	4.70	3.96	4.70	0	7.15	94.40	25.76
	2023-9-20 01:00:00	2.97	2.34	2.33	0	4.45	92.67	24.92
	2023-9-20 02:00:00	3.18	2.85	6.20	0	4.92	94.27	25.21
	2023-9-20 03:00:00	3.63	3.12	2.40	0	5.55	93.88	25.50
	2023-9-20 04:00:00	3.54	2.93	2.54	0	5.37	93.68	26.05
	2023-9-20 05:00:00	2.62	2.28	ND	0	4.02	88.21	26.40
	2023-9-20 06:00:00	3.16	2.75	1.38	0	4.85	88.20	26.56
	2023-9-20 07:00:00	3.34	2.84	ND	0	5.10	87.23	27.56
	2023-9-20 08:00:00	3.88	3.23	3.23	0	5.88	77.97	29.09
	2023-9-20 09:00:00	4.48	4.41	ND	0	7.12	78.53	29.14
2023-9-20 10:00:00	3	2.96	ND	ND	4.77	65.41	33.35	
Hourly Limit Values	TA Luft	-	-	200	350		-	-
	EU	-	-	200	350		-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-		-	-
Average		3.94	3.68	4.30	0.56	6.16	81.60	28.76
Daily Limit Values	TA Luft	50	-	-	125		-	-
	EU	50	-	-	125		-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40		-	-

6. ASSESSMENT

The air quality measurement study was carried out with the aim of determining the air pollutants on ambient air quality. Results were assessed according to the TA LUFT, EU Council Directive 2008/50/EC and WHO limit values and this report was prepared. According to air quality measurement studies, background air quality values are complied with air quality standards.

Ambient Noise level

Month July -2023

2.2 NOISE LEVEL MONITORING REPORT

Environmental monitoring Report Pre-Construction–Stage WtE Facility
at Thilafushi

Noise Level Measurements (July 2023)

Prepared by: Mahmood Riyaz



29th July 2023

1. INTRODUCTION

This is the ambient noise level monitoring report prepared as part of the pre-construction environmental monitoring of the waste to energy (WtE) facility at Thilafushi, Maldives. This report presents methodologies and results of the ambient noise level measurements conducted to fulfill the requirements of the EIA and the Project Environmental Management Plan that is being developed to meet the anticipated environment impacts, health and safety, as well as to ensure the sustainability of the Project.

2. NOISE LEVEL

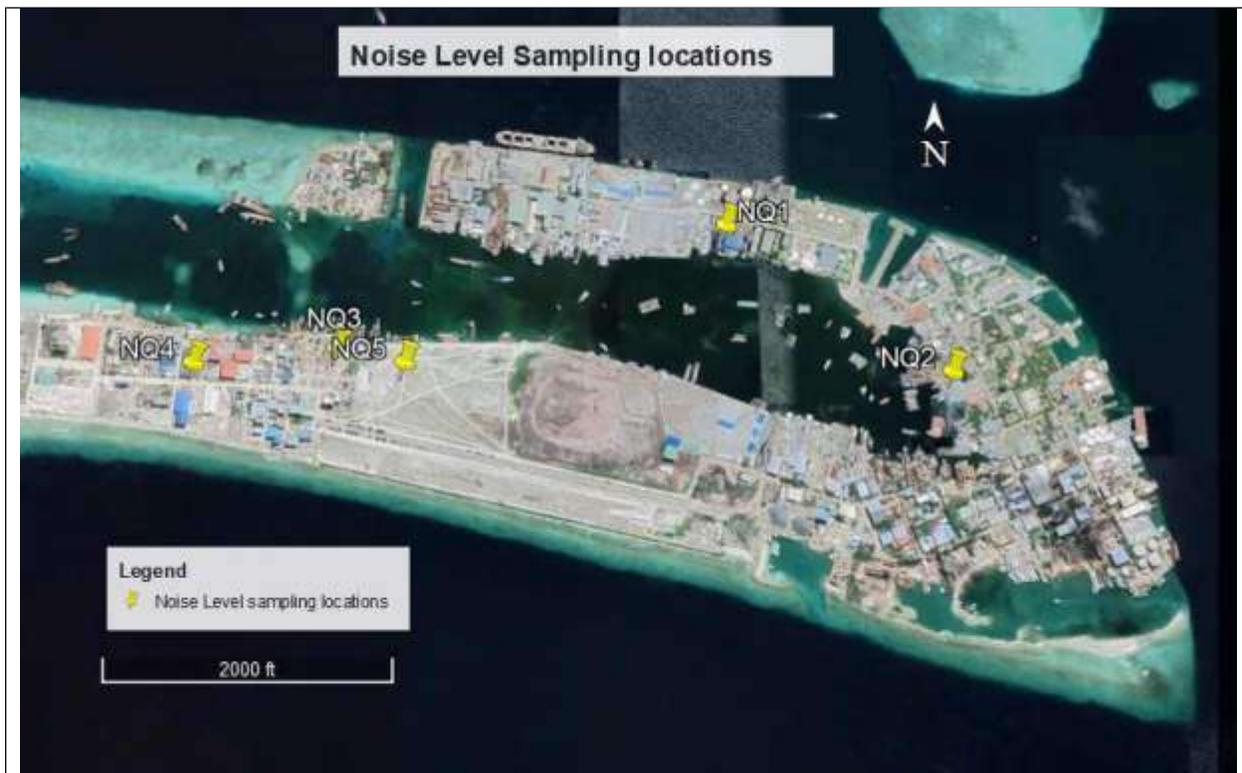
As part of the pre-construction monitoring of Thilafushi Waste to Energy facility, ambient noise levels measurements were repeated at the same five locations used in the EIA report. Ambient noise level measurement was done using a handheld sound level meter (ET-958 Professional Sound Level Meter) Measurements are recorded in NQ1, and NQ2 NQ3, NQ4 and NQ5 from 19st July 2023 10:45 to 20th July 2023 10:53 continuously for 24 hours. Table 1 summarizes the explanation on the selection of baseline monitoring stations given in the EIA report. **Figure 1** is the map that shows the sampling locations. Graph showing the noise levels in five locations is in **Figure 2**

At each station hourly 7-8 readings are recorded for a duration of 30-50seconds at each location. Average of ambient noise level in dB(A) was recorded and the average noise of each location is calculated Table 2. Ambient noise levels recorded with the EIA levels presented in the EIA report is given in Table 2

Table 1: Locations selected for Ambient Noise Level Measurements

Station name	Geographic Coordinates	Reason for selection
NQ1	4°10'26.4 N, 73°28'59.9 E	Included in the original EIA
NQ2	4°10'56.6 N, 73°26'53.3 E	Included in the original EIA
NQ3	4°10'58.3 N, 73°26'09.6 E	Included in the original EIA
NQ4	4°10'57.3 N, 73°25'59.4 E	Included in the original EIA
NQ5	4°10'57.3 N, 73°26'14.4 E	Included in the original EIA

Figure 1: Ambient noise level sampling locations



2.1 Results

Table 2: Noise measurement records in (dBA), 19- 20 July 2023 Thilafushi

NQ1		NQ2		NQ3		NQ4		NQ5	
Date and time)	dB(A	Date/time	dB(A	Date/time	dB(A	Date/time	dB(A	Date/time	dB(A
7/19/2023 11:00	57.8	7/19/2023 11:05	59.4	7/19/2023 10:45	63.2	7/19/2023 10:50	68.3	7/19/2023 10:55	66.1
7/19/2023 12:03	60.9	7/19/2023 12:10	63.2	7/19/2023 11:30	68.8	7/19/2023 11:45	54.2	7/19/2023 11:45	65.3
7/19/2023 13:03	56.4	7/19/2023 13:08	60.8	7/19/2023 12:33	70.3	7/19/2023 12:32	59.7	7/19/2023 12:43	59.2
7/19/2023 14:05	55.3	7/19/2023 14:15	55.3	7/19/2023 13:32	55.4	7/19/2023 13:35	60.4	7/19/2023 13:47	70.6
7/19/2023 15:10	60.7	7/19/2023 15:13	48.7	7/19/2023 14:33	52.8	7/19/2023 14:34	59.2	7/19/2023 14:43	68.9
7/19/2023 16:12	65.2	7/19/2023 16:15	56.2	7/19/2023 15:35	67.3	7/19/2023 15:32	60.5	7/19/2023 15:45	73.2
7/19/2023 17:15	52.3	7/19/2023 17:05	60.0	7/19/2023 16:33	70.2	7/19/2023 16:40	68.2	7/19/2023 16:50	55.3
7/19/2023 18:07	60.8	7/19/2023 18:05	57.8	7/19/2023 17:29	58.1	7/19/2023 17:39	55.2	7/19/2023 17:30	60.1
7/19/2023 19:08	70.4	7/19/2023 19:05	53.2	7/19/2023 18:32	65.2	7/19/2023 18:35	50.1	7/19/2023 18:32	50.1
7/19/2023 20:20	62.1	7/19/2023 20:08	49.3	7/19/2023 19:37	49.8	7/19/2023 19:36	49.8	7/19/2023 19:32	45.8
7/19/2023 21:16	56.8	7/19/2023 21:10	65.4	7/19/2023 20:23	50.1	7/19/2023 20:29	52.6	7/19/2023 20:35	50.9
7/19/2023 22:17	49.2	7/19/2023 22:18	42.1	7/19/2023 21:40	53.2	7/19/2023 21:32	45.3	7/19/2023 21:40	45.2
7/19/2023 23:10	43.1	7/19/2023 23:26	40.3	7/19/2023 22:50	51.5	7/19/2023 22:32	47.1	7/19/2023 22:45	43.7
7/20/2023 0:09	55.3	7/20/2023 0:27	45.2	7/19/2023 23:33	45.3	7/19/2023 23:32	45.1	7/19/2023 23:43	40.1
7/20/2023 1:20	49.8	7/20/2023 1:30	48.2	7/20/2023 0:25	40.1	7/20/2023 0:19	43.1	7/20/2023 0:45	49.0
7/20/2023 2:05	43.1	7/20/2023 2:28	43.0	7/20/2023 1:20	43.0	7/20/2023 1:25	50.2	7/20/2023 1:20	52.1
7/20/2023 3:15	46.2	7/20/2023 3:18	42.1	7/20/2023 2:18	47.8	7/20/2023 2:34	43.1	7/20/2023 2:30	55.7
7/20/2023 4:16	40.2	7/20/2023 4:17	45.3	7/20/2023 3:25	40.1	7/20/2023 3:32	40.6	7/20/2023 3:35	40.1
7/20/2023 5:18	42.1	7/20/2023 5:35	55.3	7/20/2023 4:35	47.2	7/20/2023 4:39	39.8	7/20/2023 4:35	40.5
7/20/2023 6:25	45.6	7/20/2023 6:32	50.8	7/20/2023 5:35	43.2	7/20/2023 5:32	40.1	7/20/2023 5:35	39.1
7/20/2023 7:19	60.8	7/20/2023 7:37	51.2	7/20/2023 6:35	45.8	7/20/2023 6:36	50.8	7/20/2023 6:35	40.2
7/20/2023 8:20	67.3	7/20/2023 8:30	55.7	7/20/2023 7:40	60.7	7/20/2023 7:30	59.6	7/20/2023 7:35	50.8
7/20/2023 9:10	53.2	7/20/2023 9:20	65.2	7/20/2023 8:37	65.8	7/20/2023 8:37	60.7	7/20/2023 8:35	65.9
7/20/2023 10:45	68.9	7/20/2023 10:53	68.3	7/20/2023 9:50	66.1	7/20/2023 9:56	64.2	7/20/2023 9:55	69.8
Average dB(A)	55.1		53.4		55.0		52.8		54.1
Daytime	60.6		58.0		61.1		57.9		59.8
Night time	46.1		45.8		44.9		44.4		44.5
WHO guideline for ambient noise level	70								

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ1 Thilafushi
Location	4°10'26.4 N, 73°28'59.9 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers with few thunderstorm	Temperature:31.4oC
Start time	7/19/2023 11:00		Wind 03-13 SE-S
End time	7/20/2023 10:45		Isolated showers

Date/time	dBA	Remarks noise level
7/19/2023 11:00	57.8	Quiet Office
7/19/2023 12:03	60.9	Conversation
7/19/2023 13:03	56.4	Quiet Office
7/19/2023 14:05	55.3	Quiet Office
7/19/2023 15:10	60.7	Conversation
7/19/2023 16:12	65.2	Conversation
7/19/2023 17:15	52.3	Quiet Office
7/19/2023 18:07	60.8	Conversation
7/19/2023 19:08	70.4	Restaurant
7/19/2023 20:20	62.1	Conversation
7/19/2023 21:16	56.8	Quiet Office
7/19/2023 22:17	49.2	Quiet Library
7/19/2023 23:10	43.1	Quiet Library
7/20/2023 0:09	55.3	Quiet Office
7/20/2023 1:20	49.8	Quiet Library
7/20/2023 2:05	43.1	Quiet Library
7/20/2023 3:15	46.2	Quiet Library
7/20/2023 4:16	40.2	Quiet Library
7/20/2023 5:18	42.1	Quiet Library
7/20/2023 6:25	45.6	Quiet Library
7/20/2023 7:19	60.8	Conversation
7/20/2023 8:20	67.3	Conversation
7/20/2023 9:10	53.2	Quiet Office
7/20/2023 10:45	68.9	Conversation

Average	55.1
Day time avr	60.6
Night time average	46.1

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ2 Thilafushi
Location	4°10'56.6 N, 73°26'53.3 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : isolated showers with few thunderstorms	Temperature:31.4oC
Start time	7/19/2023 11:05		Wind 03-13 SE-S
End time	7/20/2023 10:53		Isolated showers

Date/time	dBA	Remarks noise level
7/19/2023 11:05	59.4	Quiet Office
7/19/2023 12:10	63.2	Conversation
7/19/2023 13:08	60.8	Conversation
7/19/2023 14:15	55.3	Quiet Office
7/19/2023 15:13	48.7	Quiet Library
7/19/2023 16:15	56.2	Quiet Office
7/19/2023 17:05	60.0	Conversation
7/19/2023 18:05	57.8	Quiet Office
7/19/2023 19:05	53.2	Quiet Office
7/19/2023 20:08	49.3	Quiet Library
7/19/2023 21:10	65.4	Conversation
7/19/2023 22:18	42.1	Quiet Library
7/19/2023 23:26	40.3	Quiet Library
7/20/2023 0:27	45.2	Quiet Library
7/20/2023 1:30	48.2	Quiet Library
7/20/2023 2:28	43.0	Quiet Library
7/20/2023 3:18	42.1	Quiet Library
7/20/2023 4:17	45.3	Quiet Library
7/20/2023 5:35	55.3	Quiet Office
7/20/2023 6:32	50.8	Quiet Office
7/20/2023 7:37	51.2	Quiet Office
7/20/2023 8:30	55.7	Quiet Office
7/20/2023 9:20	65.2	Conversation
7/20/2023 10:53	68.3	Conversation

Average	53.4
Day time avr	58.0
Night time average	45.8

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ3 Thilafushi
Location	4°10'58.3 N, 73°26'09.6 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers with few thunderstorms	Temperature:31.4oC
Start time	7/19/2023 10:45		Wind 03-13 SE-S
End time	7/20/2023 9:50		Isolated showers

Date/time	dBa	Remarks Noise level
7/19/2023 10:45	63.2	Conversation
7/19/2023 11:30	68.8	Conversation
7/19/2023 12:33	70.3	Restaurant
7/19/2023 13:32	55.4	Quiet Office
7/19/2023 14:33	52.8	Quiet Office
7/19/2023 15:35	67.3	Conversation
7/19/2023 16:33	70.2	Restaurant
7/19/2023 17:29	58.1	Quiet Office
7/19/2023 18:32	65.2	Conversation
7/19/2023 19:37	49.8	Quiet Library
7/19/2023 20:23	50.1	Quiet Office
7/19/2023 21:40	53.2	Quiet Office
7/19/2023 22:50	51.5	Quiet Office
7/19/2023 23:33	45.3	Quiet Library
7/20/2023 0:25	40.1	Quiet Library
7/20/2023 1:20	43.0	Quiet Library
7/20/2023 2:18	47.8	Quiet Library
7/20/2023 3:25	40.1	Quiet Library
7/20/2023 4:35	47.2	Quiet Library
7/20/2023 5:35	43.2	Quiet Library
7/20/2023 6:35	45.8	Quiet Library
7/20/2023 7:40	60.7	Conversation
7/20/2023 8:37	65.8	Conversation
7/20/2023 9:50	66.1	Conversation

Average 55.0
 Day time avr 61.1
 Night time average 44.9

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ4 Thilafushi
Location	4°10'57.3 N,73°25'59.4 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers with few thunderstorms	Temperature:31.4oC
Start time	7/19/2023 10:50		Wind 03-13 SE-S
End time	7/20/2023 9:56		Isolated showers

Date/time	dBA	Remarks Noise level
7/19/2023 10:50	68.3	Conversation
7/19/2023 11:45	54.2	Quiet Office
7/19/2023 12:32	59.7	Quiet Office
7/19/2023 13:35	60.4	Conversation
7/19/2023 14:34	59.2	Quiet Office
7/19/2023 15:32	60.5	Conversation
7/19/2023 16:40	68.2	Conversation
7/19/2023 17:39	55.2	Quiet Office
7/19/2023 18:35	50.1	Quiet Office
7/19/2023 19:36	49.8	Quiet Library
7/19/2023 20:29	52.6	Quiet Office
7/19/2023 21:32	45.3	Quiet Library
7/19/2023 22:32	47.1	Quiet Library
7/19/2023 23:32	45.1	Quiet Library
7/20/2023 0:19	43.1	Quiet Library
7/20/2023 1:25	50.2	Quiet Office
7/20/2023 2:34	43.1	Quiet Library
7/20/2023 3:32	40.6	Quiet Library
7/20/2023 4:39	39.8	Whisper
7/20/2023 5:32	40.1	Quiet Library
7/20/2023 6:36	50.8	Quiet Office
7/20/2023 7:30	59.6	Quiet Office
7/20/2023 8:37	60.7	Conversation
7/20/2023 9:56	64.2	Conversation

Average 52.8
 Day time avr 57.9
 Night time average 44.4

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ5 Thilafushi
Location	4°10'57.3 N, 73°26'14.4 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers with few thunderstorms	Temperature:31.4oC
Start time	7/19/2023 10:55		Wind 03-13 SE-S
End time	7/20/2023 9:55		Isolated showers

Date/time	dBA	Remarks Noise level
7/19/2023 10:55	66.1	Conversation
7/19/2023 11:45	65.3	Conversation
7/19/2023 12:43	59.2	Quiet Office
7/19/2023 13:47	70.6	Restaurant
7/19/2023 14:43	68.9	Conversation
7/19/2023 15:45	73.2	Restaurant
7/19/2023 16:50	55.3	Quiet Office
7/19/2023 17:30	60.1	Conversation
7/19/2023 18:32	50.1	Quiet Office
7/19/2023 19:32	45.8	Quiet Library
7/19/2023 20:35	50.9	Quiet Office
7/19/2023 21:40	45.2	Quiet Library
7/19/2023 22:45	43.7	Quiet Library
7/19/2023 23:43	40.1	Quiet Library
7/20/2023 0:45	49.0	Quiet Library
7/20/2023 1:20	52.1	Quiet Office
7/20/2023 2:30	55.7	Quiet Office
7/20/2023 3:35	40.1	Quiet Library
7/20/2023 4:35	40.5	Quiet Library
7/20/2023 5:35	39.1	Whisper
7/20/2023 6:35	40.2	Quiet Library
7/20/2023 7:35	50.8	Quiet Office
7/20/2023 8:35	65.9	Conversation
7/20/2023 9:55	69.8	Conversation

Average 54.1
 Day time avr 59.8
 Night time average 44.5

Month August -2023

Table 2: Noise measurement records in (dBA), 14- 15 August 2023 Thilafushi

NQ1		NQ2		NQ3		NQ4		NQ5	
Date and time)	dB(A)	Date/time	dB(A)	Date/time	dB(A)	Date/time	dB(A)	Date/time	dB(A)
8/14/2023 15:59	62.90	8/14/2023 14:59	55.25	8/14/2023 14:59	56.37	8/14/2023 14:59	55.70	8/14/2023 14:59	55.50
8/14/2023 16:59	59.22	8/14/2023 15:59	61.81	8/14/2023 15:59	61.61	8/14/2023 15:59	58.85	8/14/2023 15:59	53.48
8/14/2023 17:59	59.30	8/14/2023 16:59	56.15	8/14/2023 16:59	63.29	8/14/2023 16:59	55.74	8/14/2023 16:59	52.37
8/14/2023 18:59	57.51	8/14/2023 17:59	54.65	8/14/2023 17:59	61.51	8/14/2023 17:59	56.22	8/14/2023 17:59	51.75
8/14/2023 19:59	57.60	8/14/2023 18:59	53.06	8/14/2023 18:59	58.64	8/14/2023 18:59	54.97	8/14/2023 18:59	47.20
8/14/2023 20:59	56.05	8/14/2023 19:59	52.56	8/14/2023 19:59	49.78	8/14/2023 19:59	55.93	8/14/2023 19:59	44.67
8/14/2023 21:59	54.96	8/14/2023 20:59	52.30	8/14/2023 20:59	48.11	8/14/2023 20:59	55.34	8/14/2023 20:59	43.65
8/14/2023 22:59	51.64	8/14/2023 21:59	51.82	8/14/2023 21:59	48.74	8/14/2023 21:59	48.63	8/14/2023 21:59	44.84
8/14/2023 23:59	50.30	8/14/2023 22:59	51.86	8/14/2023 22:59	47.54	8/14/2023 22:59	43.89	8/14/2023 22:59	43.32
8/15/2023 0:59	50.74	8/14/2023 23:59	51.48	8/14/2023 23:59	47.21	8/14/2023 23:59	42.34	8/14/2023 23:59	42.95
8/15/2023 1:59	49.75	8/15/2023 0:59	51.47	8/15/2023 0:59	46.68	8/15/2023 0:59	40.11	8/15/2023 0:59	42.90
8/15/2023 2:59	49.89	8/15/2023 1:59	51.00	8/15/2023 1:59	47.01	8/15/2023 1:59	38.99	8/15/2023 1:59	43.52
8/15/2023 3:59	50.17	8/15/2023 2:59	50.73	8/15/2023 2:59	46.84	8/15/2023 2:59	39.29	8/15/2023 2:59	42.35
8/15/2023 4:59	50.47	8/15/2023 3:59	50.78	8/15/2023 3:59	46.97	8/15/2023 3:59	40.40	8/15/2023 3:59	41.89
8/15/2023 5:59	52.13	8/15/2023 4:59	51.42	8/15/2023 4:59	47.62	8/15/2023 4:59	40.12	8/15/2023 4:59	43.05
8/15/2023 6:59	51.87	8/15/2023 5:59	51.54	8/15/2023 5:59	47.49	8/15/2023 5:59	42.54	8/15/2023 5:59	42.10
8/15/2023 7:59	55.73	8/15/2023 6:59	51.17	8/15/2023 6:59	47.78	8/15/2023 6:59	45.27	8/15/2023 6:59	43.41
8/15/2023 8:59	59.53	8/15/2023 7:59	52.01	8/15/2023 7:59	50.72	8/15/2023 7:59	46.22	8/15/2023 7:59	47.02
8/15/2023 9:59	59.45	8/15/2023 8:59	53.61	8/15/2023 8:59	61.19	8/15/2023 8:59	52.98	8/15/2023 8:59	51.21
8/15/2023 10:59	60.49	8/15/2023 9:59	55.94	8/15/2023 9:59	61.76	8/15/2023 9:59	54.18	8/15/2023 9:59	54.49
8/15/2023 11:59	58.94	8/15/2023 10:59	54.35	8/15/2023 10:59	59.75	8/15/2023 10:59	56.56	8/15/2023 10:59	49.12
8/15/2023 12:59	58.70	8/15/2023 11:59	55.08	8/15/2023 11:59	63.57	8/15/2023 11:59	54.81	8/15/2023 11:59	50.27
8/15/2023 13:59	57.62	8/15/2023 12:59	53.51	8/15/2023 12:59	56.74	8/15/2023 12:59	47.34	8/15/2023 12:59	44.03
8/15/2023 14:02	68.20	8/15/2023 13:59	60.31	8/15/2023 13:23	57.70	8/15/2023 13:40	54.80	8/15/2023 13:21	45.85
Average dB(A)	56.0		53.5		53.5		49.2		46.7
Daytime	59.3		55.0		57.9		54.3		49.3
Night time	51.3		51.3		47.4		42.2		43.0
WHO guideline for ambient noise level	70								



Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ1 Thilafushi
Location	4°10'26.4 N, 73°28'59.9 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Generally fine weather all over the country	Temperature:30.6°C
Start time	8/14/2023 14:59		Wind 05-15 WNW
End time	8/15/2023 13:23		

Date/time	dBA	Remarks noise level
8/14/2023 15:59	62.90	Conversation
8/14/2023 16:59	59.22	Quiet Office
8/14/2023 17:59	59.30	Quiet Office
8/14/2023 18:59	57.51	Quiet Office
8/14/2023 19:59	57.60	Quiet Office
8/14/2023 20:59	56.05	Quiet Office
8/14/2023 21:59	54.96	Quiet Office
8/14/2023 22:59	51.64	Quiet Office
8/14/2023 23:59	50.30	Quiet Office
8/15/2023 0:59	50.74	Quiet Office
8/15/2023 1:59	49.75	Quiet Library
8/15/2023 2:59	49.89	Quiet Library
8/15/2023 3:59	50.17	Quiet Office
8/15/2023 4:59	50.47	Quiet Office
8/15/2023 5:59	52.13	Quiet Office
8/15/2023 6:59	51.87	Quiet Office
8/15/2023 7:59	55.73	Quiet Office
8/15/2023 8:59	59.53	Quiet Office
8/15/2023 9:59	59.45	Quiet Office
8/15/2023 10:59	60.49	Conversation
8/15/2023 11:59	58.94	Quiet Office
8/15/2023 12:59	58.70	Quiet Office
8/15/2023 13:59	57.62	Quiet Office
8/15/2023 14:02	68.20	Conversation

Average	56.0
Day time avr	59.3
Night time average	51.3



Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ2 Thilafushi
Location	4°10'56.6 N, 73°26'53.3 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Generally fine weather all over the country	Temperature:30.6°C
Start time	8/14/2023 14:59		Wind 05-15 WNW
End time	8/15/2023 13:59		

Date/time	dBA	Remarks noise level
8/14/2023 14:59	55.25	Quiet Office
8/14/2023 15:59	61.81	Conversation
8/14/2023 16:59	56.15	Quiet Office
8/14/2023 17:59	54.65	Quiet Office
8/14/2023 18:59	53.06	Quiet Office
8/14/2023 19:59	52.56	Quiet Office
8/14/2023 20:59	52.30	Quiet Office
8/14/2023 21:59	51.82	Quiet Office
8/14/2023 22:59	51.86	Quiet Office
8/14/2023 23:59	51.48	Quiet Office
8/15/2023 0:59	51.47	Quiet Office
8/15/2023 1:59	51.00	Quiet Office
8/15/2023 2:59	50.73	Quiet Office
8/15/2023 3:59	50.78	Quiet Office
8/15/2023 4:59	51.42	Quiet Office
8/15/2023 5:59	51.54	Quiet Office
8/15/2023 6:59	51.17	Quiet Office
8/15/2023 7:59	52.01	Quiet Office
8/15/2023 8:59	53.61	Quiet Office
8/15/2023 9:59	55.94	Quiet Office
8/15/2023 10:59	54.35	Quiet Office
8/15/2023 11:59	55.08	Quiet Office
8/15/2023 12:59	53.51	Quiet Office
8/15/2023 13:59	60.31	Conversation

Average	53.5
Day time avr	55.0
Night time average	51.3

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ3 Thilafushi
Location	4°10'58.3 N, 73°26'09.6 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather :Generally fine weather all over the country	Temperature: 30.6°C
Start time	8/14/2023 14:59		Wind 5-15 WNW
End time	8/15/2023 13:23		

Date/time	dBa	Remarks Noise level
8/14/2023 14:59	56.37	Quiet Office
8/14/2023 15:59	61.61	Conversation
8/14/2023 16:59	63.29	Conversation
8/14/2023 17:59	61.51	Conversation
8/14/2023 18:59	58.64	Quiet Office
8/14/2023 19:59	49.78	Quiet Library
8/14/2023 20:59	48.11	Quiet Library
8/14/2023 21:59	48.74	Quiet Library
8/14/2023 22:59	47.54	Quiet Library
8/14/2023 23:59	47.21	Quiet Library
8/15/2023 0:59	46.68	Quiet Library
8/15/2023 1:59	47.01	Quiet Library
8/15/2023 2:59	46.84	Quiet Library
8/15/2023 3:59	46.97	Quiet Library
8/15/2023 4:59	47.62	Quiet Library
8/15/2023 5:59	47.49	Quiet Library
8/15/2023 6:59	47.78	Quiet Library
8/15/2023 7:59	50.72	Quiet Office
8/15/2023 8:59	61.19	Conversation
8/15/2023 9:59	61.76	Conversation
8/15/2023 10:59	59.75	Quiet Office
8/15/2023 11:59	63.57	Conversation
8/15/2023 12:59	56.74	Quiet Office
8/15/2023 13:23	57.70	Quiet Office

Average 53.5
Day time avr 57.9
Night time average 47.4

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ4 Thilafushi
Location	4°10'57.3 N,73°25'59.4 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Generally fine weather all over the country	Temperature:30.6°C
Start time	8/14/2023 14:59		Wind 05-15 WNW
End time	8/15/2023 13:40		

Date/time	dBA	Remarks Noise level
8/14/2023 14:59	55.70	Quiet Office
8/14/2023 15:59	58.85	Quiet Office
8/14/2023 16:59	55.74	Quiet Office
8/14/2023 17:59	56.22	Quiet Office
8/14/2023 18:59	54.97	Quiet Office
8/14/2023 19:59	55.93	Quiet Office
8/14/2023 20:59	55.34	Quiet Office
8/14/2023 21:59	48.63	Quiet Library
8/14/2023 22:59	43.89	Quiet Library
8/14/2023 23:59	42.34	Quiet Library
8/15/2023 0:59	40.11	Quiet Library
8/15/2023 1:59	38.99	Whisper
8/15/2023 2:59	39.29	Whisper
8/15/2023 3:59	40.40	Quiet Library
8/15/2023 4:59	40.12	Quiet Library
8/15/2023 5:59	42.54	Quiet Library
8/15/2023 6:59	45.27	Quiet Library
8/15/2023 7:59	46.22	Quiet Library
8/15/2023 8:59	52.98	Quiet Office
8/15/2023 9:59	54.18	Quiet Office
8/15/2023 10:59	56.56	Quiet Office
8/15/2023 11:59	54.81	Quiet Office
8/15/2023 12:59	47.34	Quiet Library
8/15/2023 13:40	54.80	Quiet Office

Average 49.2
Day time avr 54.3
Night time average 42.2

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ5 Thilafushi
Location	4°10'57.3 N, 73°26'14.4 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Generally fine weather all over the country	Temperature:30.6°C
Start time	8/14/2023 14:59		Wind 05-15 WNW
End time	8/15/2023 13:21		

Date/time	dBA	Remarks Noise level
8/14/2023 14:59	55.50	Quiet Office
8/14/2023 15:59	53.48	Quiet Office
8/14/2023 16:59	52.37	Quiet Office
8/14/2023 17:59	51.75	Quiet Office
8/14/2023 18:59	47.20	Quiet Library
8/14/2023 19:59	44.67	Quiet Library
8/14/2023 20:59	43.65	Quiet Library
8/14/2023 21:59	44.84	Quiet Library
8/14/2023 22:59	43.32	Quiet Library
8/14/2023 23:59	42.95	Quiet Library
8/15/2023 0:59	42.90	Quiet Library
8/15/2023 1:59	43.52	Quiet Library
8/15/2023 2:59	42.35	Quiet Library
8/15/2023 3:59	41.89	Quiet Library
8/15/2023 4:59	43.05	Quiet Library
8/15/2023 5:59	42.10	Quiet Library
8/15/2023 6:59	43.41	Quiet Library
8/15/2023 7:59	47.02	Quiet Library
8/15/2023 8:59	51.21	Quiet Office
8/15/2023 9:59	54.49	Quiet Office
8/15/2023 10:59	49.12	Quiet Library
8/15/2023 11:59	50.27	Quiet Office
8/15/2023 12:59	44.03	Quiet Library
8/15/2023 13:21	45.85	Quiet Library

Average	46.7
Day time avr	49.3
Night time average	43.0

Month September -2023

Table 2: Noise measurement records in (dBA), 25 26 September 2023 Thilafushi

NQ1		NQ2		NQ3		NQ4		NQ5	
Date and time)	dB(A)	Date/time	dB(A)	Date/time	dB(A)	Date/time	dB(A)	Date/time	dB(A)
9/25/2023 13:19	47.04	9/25/2023 13:57	59.49	9/25/2023 13:59	61.23	9/25/2023 13:57	62.18	9/25/2023 13:58	54.73
9/25/2023 14:20	59.98	9/25/2023 14:57	56.27	9/25/2023 14:58	63.43	9/25/2023 14:57	57.74	9/25/2023 14:58	50.18
9/25/2023 15:20	64.46	9/25/2023 15:57	58.70	9/25/2023 15:58	63.46	9/25/2023 15:57	58.70	9/25/2023 15:58	54.31
9/25/2023 16:20	61.74	9/25/2023 16:57	58.67	9/25/2023 16:58	63.63	9/25/2023 16:57	52.59	9/25/2023 16:57	48.30
9/25/2023 17:20	60.29	9/25/2023 17:57	55.93	9/25/2023 17:58	65.01	9/25/2023 17:57	55.43	9/25/2023 17:57	48.31
9/25/2023 18:20	59.70	9/25/2023 18:56	63.04	9/25/2023 18:58	62.25	9/25/2023 18:57	53.35	9/25/2023 18:57	44.20
9/25/2023 19:20	58.66	9/25/2023 19:56	52.89	9/25/2023 19:58	61.03	9/25/2023 19:56	63.28	9/25/2023 19:57	45.21
9/25/2023 20:20	58.94	9/25/2023 20:56	51.82	9/25/2023 20:57	61.44	9/25/2023 20:56	47.23	9/25/2023 20:57	45.49
9/25/2023 21:20	58.24	9/25/2023 21:56	52.23	9/25/2023 21:57	60.91	9/25/2023 21:56	46.85	9/25/2023 21:57	44.40
9/25/2023 22:20	55.91	9/25/2023 22:56	52.31	9/25/2023 22:57	60.96	9/25/2023 22:56	42.17	9/25/2023 22:56	42.15
9/25/2023 23:20	57.54	9/25/2023 23:56	52.96	9/25/2023 23:49	60.64	9/25/2023 23:56	42.71	9/25/2023 23:56	39.63
9/26/2023 0:20	55.77	9/26/2023 0:59	50.84	9/26/2023 0:57	60.65	9/26/2023 0:56	43.13	9/26/2023 0:56	39.38
9/26/2023 1:20	51.55	9/26/2023 1:59	50.71	9/26/2023 1:57	60.55	9/26/2023 1:59	44.20	9/26/2023 1:56	39.76
9/26/2023 2:20	51.84	9/26/2023 2:59	50.99	9/26/2023 2:56	60.41	9/26/2023 2:59	44.59	9/26/2023 2:56	39.03
9/26/2023 3:20	51.34	9/26/2023 3:59	51.28	9/26/2023 3:56	60.41	9/26/2023 3:59	45.38	9/26/2023 3:56	40.77
9/26/2023 4:20	51.72	9/26/2023 4:59	51.21	9/26/2023 4:56	60.42	9/26/2023 4:59	45.52	9/26/2023 4:59	43.27
9/26/2023 5:20	52.31	9/26/2023 5:59	51.61	9/26/2023 5:56	60.91	9/26/2023 5:59	48.85	9/26/2023 5:59	41.75
9/26/2023 6:20	53.78	9/26/2023 6:58	51.79	9/26/2023 6:56	60.89	9/26/2023 6:59	47.61	9/26/2023 6:59	40.77
9/26/2023 7:20	54.61	9/26/2023 7:58	51.16	9/26/2023 7:56	62.40	9/26/2023 7:58	48.38	9/26/2023 7:59	44.33
9/26/2023 8:20	59.96	9/26/2023 8:58	59.25	9/26/2023 8:59	62.60	9/26/2023 8:58	52.47	9/26/2023 8:59	53.72
9/26/2023 9:20	61.21	9/26/2023 9:58	59.22	9/26/2023 9:59	62.27	9/26/2023 9:58	63.23	9/26/2023 9:59	45.29
9/26/2023 10:20	60.16	9/26/2023 10:58	60.17	9/26/2023 10:59	60.61	9/26/2023 10:58	50.96	9/26/2023 10:58	43.55
9/26/2023 11:20	61.72	9/26/2023 11:58	53.87	9/26/2023 11:59	60.83	9/26/2023 11:58	56.75	9/26/2023 11:58	49.67
9/26/2023 12:20	61.39	9/26/2023 12:57	51.62	9/26/2023 12:59	60.06	9/26/2023 12:58	66.41	9/26/2023 12:58	41.91
Average dB(A)	57.1		54.5		61.5		51.7		45.0
Daytime	58.9		56.6		62.1		56.4		47.5
Night time	54.5		51.6		60.7		45.1		41.6
WHO guideline for ambient noise level	70								

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ1 Thilafushi
Location	4°10'26.4 N, 73°28'59.9 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers and few thunderstorms	Temperature:31.4°C
Start time	9/25/2023 13:59		Wind 05-15 WNW
End time	9/26/2023 12:59		30 mph during showers

Date/time	dBA	Remarks noise level
9/25/2023 13:19	47.04	Quiet Library
9/25/2023 14:20	59.98	Quiet Office
9/25/2023 15:20	64.46	Conversation
9/25/2023 16:20	61.74	Conversation
9/25/2023 17:20	60.29	Conversation
9/25/2023 18:20	59.70	Quiet Office
9/25/2023 19:20	58.66	Quiet Office
9/25/2023 20:20	58.94	Quiet Office
9/25/2023 21:20	58.24	Quiet Office
9/25/2023 22:20	55.91	Quiet Office
9/25/2023 23:20	57.54	Quiet Office
9/26/2023 0:20	55.77	Quiet Office
9/26/2023 1:20	51.55	Quiet Office
9/26/2023 2:20	51.84	Quiet Office
9/26/2023 3:20	51.34	Quiet Office
9/26/2023 4:20	51.72	Quiet Office
9/26/2023 5:20	52.31	Quiet Office
9/26/2023 6:20	53.78	Quiet Office
9/26/2023 7:20	54.61	Quiet Office
9/26/2023 8:20	59.96	Quiet Office
9/26/2023 9:20	61.21	Conversation
9/26/2023 10:20	60.16	Conversation
9/26/2023 11:20	61.72	Conversation
9/26/2023 12:20	61.39	Conversation

Average	57.1
Day time avr	58.9
Night time average	54.5



Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ2 Thilafushi
Location	4°10'56.6 N, 73°26'53.3 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers and few thunderstorms	Temperature:31.4°C
Start time	9/25/2023 13:57		Wind 05-15 WNW
End time	9/26/2023 12:57		30 mph during showers

Date/time	dBA	Remarks noise level
9/25/2023 13:57	59.49	Quiet Office
9/25/2023 14:57	56.27	Quiet Office
9/25/2023 15:57	58.70	Quiet Office
9/25/2023 16:57	58.67	Quiet Office
9/25/2023 17:57	55.93	Quiet Office
9/25/2023 18:56	63.04	Conversation
9/25/2023 19:56	52.89	Quiet Office
9/25/2023 20:56	51.82	Quiet Office
9/25/2023 21:56	52.23	Quiet Office
9/25/2023 22:56	52.31	Quiet Office
9/25/2023 23:56	52.96	Quiet Office
9/26/2023 0:59	50.84	Quiet Office
9/26/2023 1:59	50.71	Quiet Office
9/26/2023 2:59	50.99	Quiet Office
9/26/2023 3:59	51.28	Quiet Office
9/26/2023 4:59	51.21	Quiet Office
9/26/2023 5:59	51.61	Quiet Office
9/26/2023 6:58	51.79	Quiet Office
9/26/2023 7:58	51.16	Quiet Office
9/26/2023 8:58	59.25	Quiet Office
9/26/2023 9:58	59.22	Quiet Office
9/26/2023 10:58	60.17	Conversation
9/26/2023 11:58	53.87	Quiet Office
9/26/2023 12:57	51.62	Quiet Office

Average 54.5
 Day time avr 56.6
 Night time average 51.6

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ3 Thilafushi
Location	4°10'58.3 N, 73°26'09.6 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather :Isolated showers and few thunderstorms	Temperature: 31.4°C
Start time	9/25/2023 13:59		Wind 5-15 WNW
End time	9/26/2023 12:59		30 mph during showers

Date/time	dBa	Remarks Noise level
9/25/2023 13:59	61.23	Conversation
9/25/2023 14:58	63.43	Conversation
9/25/2023 15:58	63.46	Conversation
9/25/2023 16:58	63.63	Conversation
9/25/2023 17:58	65.01	Conversation
9/25/2023 18:58	62.25	Conversation
9/25/2023 19:58	61.03	Conversation
9/25/2023 20:57	61.44	Conversation
9/25/2023 21:57	60.91	Conversation
9/25/2023 22:57	60.96	Conversation
9/25/2023 23:49	60.64	Conversation
9/26/2023 0:57	60.65	Conversation
9/26/2023 1:57	60.55	Conversation
9/26/2023 2:56	60.41	Conversation
9/26/2023 3:56	60.41	Conversation
9/26/2023 4:56	60.42	Conversation
9/26/2023 5:56	60.91	Conversation
9/26/2023 6:56	60.89	Conversation
9/26/2023 7:56	62.40	Conversation
9/26/2023 8:59	62.60	Conversation
9/26/2023 9:59	62.27	Conversation
9/26/2023 10:59	60.61	Conversation
9/26/2023 11:59	60.83	Conversation
9/26/2023 12:59	60.06	Conversation

Average 61.5
Day time avr 62.1
Night time average 60.7

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ4 Thilafushi
Location	4°10'57.3 N,73°25'59.4 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers and few thunderstorms	Temperature:31.4°C
Start time	9/25/2023 13:57		Wind 05-15 WNW
End time	9/26/2023 12:58		30 mph during showers

Date/time	dBA	Remarks Noise level
9/25/2023 13:57	62.18	Conversation
9/25/2023 14:57	57.74	Quiet Office
9/25/2023 15:57	58.70	Quiet Office
9/25/2023 16:57	52.59	Quiet Office
9/25/2023 17:57	55.43	Quiet Office
9/25/2023 18:57	53.35	Quiet Office
9/25/2023 19:56	63.28	Conversation
9/25/2023 20:56	47.23	Quiet Library
9/25/2023 21:56	46.85	Quiet Library
9/25/2023 22:56	42.17	Quiet Library
9/25/2023 23:56	42.71	Quiet Library
9/26/2023 0:56	43.13	Quiet Library
9/26/2023 1:59	44.20	Quiet Library
9/26/2023 2:59	44.59	Quiet Library
9/26/2023 3:59	45.38	Quiet Library
9/26/2023 4:59	45.52	Quiet Library
9/26/2023 5:59	48.85	Quiet Library
9/26/2023 6:59	47.61	Quiet Library
9/26/2023 7:58	48.38	Quiet Library
9/26/2023 8:58	52.47	Quiet Office
9/26/2023 9:58	63.23	Conversation
9/26/2023 10:58	50.96	Quiet Office
9/26/2023 11:58	56.75	Quiet Office
9/26/2023 12:58	66.41	Conversation

Average 51.7
Day time avr 56.4
Night time average 45.1

Thilafushi WtE Project Environmental Monitoring (Ambient Noise level)

Client	ALAKJV WtE	Station No	NQ5 Thilafushi
Location	4°10'57.3 N, 73°26'14.4 E	Consultant	Mahmood Riyaz
Technician	Hussain Fazeel	Weather : Isolated showers and few thunderstorms	Temperature:31.4°C
Start time	9/25/2023 13:58		Wind 05-15 WNW
End time	9/26/2023 12:58		30 mph during showers

Date/time	dBA	Remarks Noise level
9/25/2023 13:58	54.73	Quiet Office
9/25/2023 14:58	50.18	Quiet Office
9/25/2023 15:58	54.31	Quiet Office
9/25/2023 16:57	48.30	Quiet Library
9/25/2023 17:57	48.31	Quiet Library
9/25/2023 18:57	44.20	Quiet Library
9/25/2023 19:57	45.21	Quiet Library
9/25/2023 20:57	45.49	Quiet Library
9/25/2023 21:57	44.40	Quiet Library
9/25/2023 22:56	42.15	Quiet Library
9/25/2023 23:56	39.63	Whisper
9/26/2023 0:56	39.38	Whisper
9/26/2023 1:56	39.76	Whisper
9/26/2023 2:56	39.03	Whisper
9/26/2023 3:56	40.77	Quiet Library
9/26/2023 4:59	43.27	Quiet Library
9/26/2023 5:59	41.75	Quiet Library
9/26/2023 6:59	40.77	Quiet Library
9/26/2023 7:59	44.33	Quiet Library
9/26/2023 8:59	53.72	Quiet Office
9/26/2023 9:59	45.29	Quiet Library
9/26/2023 10:58	43.55	Quiet Library
9/26/2023 11:58	49.67	Quiet Library
9/26/2023 12:58	41.91	Quiet Library

Average	45.0
Day time avr	47.5
Night time average	41.6

Marine Water Quality

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 08 of 13
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Aug 08, 2023	
Reference Number: 74230478296	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
GW – 08 Cont.	Polycyclic Aromatic Hydrocarbons (PAH)*			
	Naphthalene*	ND	1	Satisfactory
	Benzo(a)anthracene*	ND	1	Satisfactory
	Acenaphthylene*	ND	1	Satisfactory
	Acenaphthene*	ND	1	Satisfactory
	Fluorene*	ND	1	Satisfactory
	Phenanthrene*	ND	1	Satisfactory
	Pyrene*	ND	1	Satisfactory
	Chrysene*	ND	1	Satisfactory
	Benzo(b)fluoranthene*	ND	1	Satisfactory
	Benzo(k)fluoranthene*	ND	1	Satisfactory
	Dibenzo(a,h)anthracene*	ND	1	Satisfactory
	Benzo(g,h,i)perylene*	ND	1	Satisfactory
	Benzo(j)fluoranthene*	ND	1	Satisfactory
	Benzo(a)pyrene*	ND	1	Satisfactory
Benzo(e)pyrene*	ND	1	Satisfactory	
Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory	
SW - 01	Salinity	3.4%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	14	150	Satisfactory
	Oil & Grease	ND	-	--
	Feecal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.02	05	Satisfactory
	pH	7.2	8.0-8.3	--
	Chemical Oxygen Demand	37	200	Satisfactory
	Biological Oxygen Demand	09	20	Satisfactory
	Turbidity	0.2	3-5, > 5 causes stress	Satisfactory
	Electrical Conductivity	67,500	2,500	--
	Total Inorganic Nitrogen	12.4	70	Satisfactory
	Total Phosphates (as PO ₄)	0.05	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19.8	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
Lead as Pb	< 0.001	0.5	Satisfactory	
Chromium VI	< 0.001	0.1	Satisfactory	
Total Chromium (as Cr)	< 0.001	0.5	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 09 of 13
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Aug 08, 2023				
Reference Number: 74230478296				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW - 01 Cont.	Mercury as Hg	< 0.001	0.02	Satisfactory
	Nickel as Ni	< 0.001	1	Satisfactory
	Zinc as Zn	< 0.005	2	Satisfactory
	Copper as Cu	< 0.001	0.5	Satisfactory
SW - 02	Salinity	3.8%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	15	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.1	05	Satisfactory
	pH	7.5	8.0-8.3	--
	Chemical Oxygen Demand	38	200	Satisfactory
	Biological Oxygen Demand	11	20	Satisfactory
	Turbidity	0.2	3-5, > 5 causes stress	Satisfactory
	Electrical Conductivity	72,180	2,500	--
	Total Inorganic Nitrogen	13.1	70	Satisfactory
	Total Phosphates (as PO ₄) ₃	0.06	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
	Lead as Pb	< 0.001	0.5	Satisfactory
	Chromium VI	< 0.001	0.1	Satisfactory
	Total Chromium (as Cr)	< 0.001	0.5	Satisfactory
Mercury as Hg	< 0.001	0.02	Satisfactory	
Nickel as Ni	< 0.001	1	Satisfactory	
Zinc as Zn	< 0.005	2	Satisfactory	
Copper as Cu	< 0.001	0.5	Satisfactory	
SW - 03	Salinity	3.5%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	13	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.02	05	Satisfactory
	pH	7.6	8.0-8.3	--
	Chemical Oxygen Demand	36	200	Satisfactory
	Biological Oxygen Demand	09	20	Satisfactory

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 10 of 13
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Aug 08, 2023				
Reference Number: 74230478296				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW - 03 Cont.	Turbidity	0.2	3-5, > 5 causes stress	Satisfactory
	Electrical Conductivity	68,940	2,500	--
	Total Inorganic Nitrogen	12.4	70	Satisfactory
	Total Phosphates (as PO ₄)	0.03	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19.3	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
	Lead as Pb	< 0.001	0.5	Satisfactory
	Chromium VI	< 0.001	0.1	Satisfactory
	Total Chromium (as Cr)	< 0.001	0.5	Satisfactory
	Mercury as Hg	< 0.001	0.02	Satisfactory
	Nickel as Ni	< 0.001	1	Satisfactory
	Zinc as Zn	< 0.005	2	Satisfactory
Copper as Cu	< 0.001	0.5	Satisfactory	
SW - 04	Salinity	3.8%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	11	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.02	05	Satisfactory
	pH	7.7	8.0-8.3	--
	Chemical Oxygen Demand	33	200	Satisfactory
	Biological Oxygen Demand	08	20	Satisfactory
	Turbidity	0.2	3-5, > 5 causes stress	Satisfactory
	Electrical Conductivity	66,960	2,500	--
	Total Inorganic Nitrogen	12	70	Satisfactory
	Total Phosphates (as PO ₄)	0.05	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19.3	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
	Lead as Pb	< 0.001	0.5	Satisfactory
Chromium VI	< 0.001	0.1	Satisfactory	
Total Chromium (as Cr)	< 0.001	0.5	Satisfactory	
Mercury as Hg	< 0.001	0.02	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 11 of 13
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Aug 08, 2023				
Reference Number: 74230478296				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW - 04 Cont.	Nickel as Ni	< 0.001	1	Satisfactory
	Zinc as Zn	< 0.005	2	Satisfactory
	Copper as Cu	< 0.001	0.5	Satisfactory
SW - 05	Salinity	3.8%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	17	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.02	05	Satisfactory
	pH	7.7	8.0-8.3	--
	Chemical Oxygen Demand	38	200	Satisfactory
	Biological Oxygen Demand	12	20	Satisfactory
	Turbidity	0.2	3-5, > 5 causes stress	Satisfactory
	Electrical Conductivity	71,280	2,500	--
	Total Inorganic Nitrogen	12.4	70	Satisfactory
	Total Phosphates (as PO ₄) ₃	0.05	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19.3	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
	Lead as Pb	< 0.001	0.5	Satisfactory
	Chromium VI	< 0.001	0.1	Satisfactory
	Total Chromium (as Cr)	< 0.001	0.5	Satisfactory
Mercury as Hg	< 0.001	0.02	Satisfactory	
Nickel as Ni	< 0.001	1	Satisfactory	
Zinc as Zn	< 0.005	2	Satisfactory	
Copper as Cu	< 0.001	0.5	Satisfactory	
SW - 06	Salinity	3.8%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	18	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.02	05	Satisfactory
	pH	7.7	8.0-8.3	--
	Chemical Oxygen Demand	38	200	Satisfactory
	Biological Oxygen Demand	12	20	Satisfactory
	Turbidity	0.2	3-5, > 5 causes stress	Satisfactory

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 12 of 13
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Aug 08, 2023				
Reference Number: 74230478296				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW – 06 Cont.	Electrical Conductivity	73,260	2,500	--
	Total Inorganic Nitrogen	12.4	70	Satisfactory
	Total Phosphates (as PO ₄)	0.05	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
	Lead as Pb	< 0.001	0.5	Satisfactory
	Chromium VI	< 0.001	0.1	Satisfactory
	Total Chromium (as Cr)	< 0.001	0.5	Satisfactory
	Mercury as Hg	< 0.001	0.02	Satisfactory
	Nickel as Ni	< 0.001	1	Satisfactory
	Zinc as Zn	< 0.005	2	Satisfactory
Copper as Cu	< 0.001	0.5	Satisfactory	
SW - 07	Salinity	4.0%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	19	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.02	05	Satisfactory
	pH	7.6	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	43	200	Satisfactory
	Biological Oxygen Demand	13	20	Satisfactory
	Turbidity	0.2	3-5, > 5 causes stress	Satisfactory
	Electrical Conductivity	76,860	2,500	--
	Total Inorganic Nitrogen	12.4	70	Satisfactory
	Total Phosphates (as PO ₄)	0.05	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
	Lead as Pb	< 0.001	0.5	Satisfactory
	Chromium VI	< 0.001	0.1	Satisfactory
	Total Chromium (as Cr)	< 0.001	0.5	Satisfactory
Mercury as Hg	< 0.001	0.02	Satisfactory	
Nickel as Ni	< 0.001	1	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 13 of 13
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Aug 08, 2023				
Reference Number: 74230478296				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW – 07 Cont.	Zinc as Zn	< 0.005	2	Satisfactory
	Copper as Cu	< 0.001	0.5	Satisfactory

17025 : 2017 by Sri Lanka Accreditation Board for conformity assessment.

Contact information for this report (Technical and General Inquiries and Feedback)

GENERAL INQUIRIES:		
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FEED BACK:		
KUMUDINI RATHNAYAKE – ASST. QA MANAGER	TEL: +94 768 229 455	E-MAIL: kumudinie.rathnayake@bureauveritas.com

REVIEWED BY: HIMASHA JAYAWARDENA

BUREAU VERITAS CONSUMER PRODUCTS SERVICES LANKA (PVT) LTD.
AUTHORIZED SIGNATORY

APPROVED BY:

RUWANI AMARASINGHE

ASSISTANT MANAGER –
FOOD & MICROBIOLOGY LABORATORY

END OF THE REPORT

Ground Water Quality

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 02 of 13
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Aug 08, 2023	
Reference Number: 74230478296	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
STP 01 Cont.	Surfactants	6.8	10	Satisfactory	
	Oil and Grease	ND	05	Satisfactory	
	Electrical Conductivity at 25°C	1025	<= Sea water	--	
	Chemical Oxygen Demand	28	50	Satisfactory	
	Biological Oxygen Demand	10	40	Satisfactory	
	Dissolved Oxygen	7.4	75	Satisfactory	
	Calcium as Ca	<01	80	Satisfactory	
	Phenolic Compounds	<0.01	01	Satisfactory	
	Arsenic as As	< 0.001	02	Satisfactory	
	Cyanide as Cn	<0.001	10	Satisfactory	
	Fluoride	0.01	01	Satisfactory	
	Zinc as Zn	<0.005	20	Satisfactory	
	Cadmium as Cd	<0.001	0.05	Satisfactory	
GW - 01	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	06	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	
	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	ND	5 - 750	Satisfactory	
	Feecal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.2	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	415	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	53.8	Max. 200	Satisfactory	
	Polycyclic Aromatic Hydrocarbons (PAH)*				
	Naphthalene*	ND	1	Satisfactory	
	Benzo(a)anthracene*	ND	1	Satisfactory	
	Acenaphthylene*	ND	1	Satisfactory	
	Acenaphthene*	ND	1	Satisfactory	
Fluorene*	ND	1	Satisfactory		
Phenanthrene*	ND	1	Satisfactory		
Pyrene*	ND	1	Satisfactory		

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023	
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 03 of 13	
Subcontracted By: Nsure (Pvt) Ltd					
Code Name: AAJV					
Date of Sample Received: Aug 08, 2023					
Reference Number: 74230478296					
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW - 01 Cont	Chrysene*	ND	1	Satisfactory	
	Benzo(b)fluoranthene*	ND	1	Satisfactory	
	Benzo(k)fluoranthene*	ND	1	Satisfactory	
	Dibenzo(a,h)anthracene*	ND	1	Satisfactory	
	Benzo(g,h,i)perylene*	ND	1	Satisfactory	
	Benzo(j)fluoranthene*	ND	1	Satisfactory	
	Benzo(a)pyrene*	ND	1	Satisfactory	
	Benzo(e)pyrene*	ND	1	Satisfactory	
	Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory	
GW - 02	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	15	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	
	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	24	5 - 750	Satisfactory	
	Feecal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.1	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	72540	Max. 1000	--	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	77.8	Max. 200	Satisfactory	
	Polycyclic Aromatic Hydrocarbons (PAH)*				
	Naphthalene*	ND	1	Satisfactory	
	Benzo(a)anthracene*	ND	1	Satisfactory	
	Acenaphthylene*	ND	1	Satisfactory	
	Acenaphthene*	ND	1	Satisfactory	
	Fluorene*	ND	1	Satisfactory	
	Phenanthrene*	ND	1	Satisfactory	
	Pyrene*	ND	1	Satisfactory	
Chrysene*	ND	1	Satisfactory		
Benzo(b)fluoranthene*	ND	1	Satisfactory		
Benzo(k)fluoranthene*	ND	1	Satisfactory		
Dibenzo(a,h)anthracene*	ND	1	Satisfactory		
Benzo(g,h,i)perylene*	ND	1	Satisfactory		
Benzo(j)fluoranthene*	ND	1	Satisfactory		

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 04 of 13
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Aug 08, 2023	
Reference Number: 74230478296	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW - 02 Cont.	Benzo(a)pyrene*	ND	1	Satisfactory	
	Benzo(e)pyrene*	ND	1	Satisfactory	
	Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory	
GW - 03	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	ND	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	
	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	09	5 - 750	Satisfactory	
	Feecal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.8	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	1819.8	Max. 1000	--	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	79.2	Max. 200	Satisfactory	
	Polycyclic Aromatic Hydrocarbons (PAH)*				
		Naphthalene*	ND	1	Satisfactory
		Benzo(a)anthracene*	ND	1	Satisfactory
		Acenaphthylene*	ND	1	Satisfactory
		Acenaphthene*	ND	1	Satisfactory
		Fluorene*	ND	1	Satisfactory
		Phenanthrene*	ND	1	Satisfactory
		Pyrene*	ND	1	Satisfactory
		Chrysene*	ND	1	Satisfactory
		Benzo(b)fluoranthene*	ND	1	Satisfactory
		Benzo(k)fluoranthene*	ND	1	Satisfactory
		Dibenzo(a,h)anthracene*	ND	1	Satisfactory
		Benzo(g,h,i)perylene*	ND	1	Satisfactory
	Benzo(j)fluoranthene*	ND	1	Satisfactory	
	Benzo(a)pyrene*	ND	1	Satisfactory	
	Benzo(e)pyrene*	ND	1	Satisfactory	
	Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023	
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 05 of 13	
Subcontracted By: Nsure (Pvt) Ltd					
Code Name: AAJV					
Date of Sample Received: Aug 08, 2023					
Reference Number: 74230478296					
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW – 04 Cont.	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	ND	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	
	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	07	5 - 750	Satisfactory	
	Feacal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	Ph at 25°C	7.8	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	1200	Max. 1000	--	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	60.4	Max. 200	Satisfactory	
	Polycyclic Aromatic Hydrocarbons (PAH)*				
	Naphthalene*	ND	1	Satisfactory	
	Benzo(a)anthracene*	ND	1	Satisfactory	
	Acenaphthylene*	ND	1	Satisfactory	
	Acenaphthene*	ND	1	Satisfactory	
	Fluorene*	ND	1	Satisfactory	
	Phenanthrene*	ND	1	Satisfactory	
	Pyrene*	ND	1	Satisfactory	
	Chrysene*	ND	1	Satisfactory	
	Benzo(b)fluoranthene*	ND	1	Satisfactory	
	Benzo(k)fluoranthene*	ND	1	Satisfactory	
Dibenzo(a,h)anthracene*	ND	1	Satisfactory		
Benzo(g,h,i)perylene*	ND	1	Satisfactory		
Benzo(j)fluoranthene*	ND	1	Satisfactory		
Benzo(a)pyrene*	ND	1	Satisfactory		
Benzo(e)pyrene*	ND	1	Satisfactory		
Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory		
GW – 06	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	ND	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023	
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 06 of 13	
Subcontracted By: Nsure (Pvt) Ltd					
Code Name: AAJV					
Date of Sample Received: Aug 08, 2023					
Reference Number: 74230478296					
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW – 06 Cont.	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	05	5 - 750	Satisfactory	
	Feecal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.5	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	980	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	77.8	Max. 200	Satisfactory	
	Polycyclic Aromatic Hydrocarbons (PAH)*				
	Naphthalene*	ND	1	Satisfactory	
	Benzo(a)anthracene*	ND	1	Satisfactory	
	Acenaphthylene*	ND	1	Satisfactory	
	Acenaphthene*	ND	1	Satisfactory	
	Fluorene*	ND	1	Satisfactory	
	Phenanthrene*	ND	1	Satisfactory	
	Pyrene*	ND	1	Satisfactory	
	Chrysene*	ND	1	Satisfactory	
	Benzo(b)fluoranthene*	ND	1	Satisfactory	
	Benzo(k)fluoranthene*	ND	1	Satisfactory	
Dibenzo(a,h)anthracene*	ND	1	Satisfactory		
Benzo(g,h,i)perylene*	ND	1	Satisfactory		
Benzo(j)fluoranthene*	ND	1	Satisfactory		
Benzo(a)pyrene*	ND	1	Satisfactory		
Benzo(e)pyrene*	ND	1	Satisfactory		
Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory		
GW - 07	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	ND	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	
	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	ND	5 - 750	Satisfactory	
	Feecal Coliform	<1.8	0	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023	
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 07 of 13	
Subcontracted By: Nsure (Pvt) Ltd					
Code Name: AAJV					
Date of Sample Received: Aug 08, 2023					
Reference Number: 74230478296					
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW – 07 Cont.	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.6	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	604.1	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	53	Max. 200	Satisfactory	
	Polycyclic Aromatic Hydrocarbons (PAH)*				
	Naphthalene*	ND	1	Satisfactory	
	Benzo(a)anthracene*	ND	1	Satisfactory	
	Acenaphthylene*	ND	1	Satisfactory	
	Acenaphthene*	ND	1	Satisfactory	
	Fluorene*	ND	1	Satisfactory	
	Phenanthrene*	ND	1	Satisfactory	
	Pyrene*	ND	1	Satisfactory	
	Chrysene*	ND	1	Satisfactory	
	Benzo(b)fluoranthene*	ND	1	Satisfactory	
	Benzo(k)fluoranthene*	ND	1	Satisfactory	
	Dibenzo(a,h)anthracene*	ND	1	Satisfactory	
	Benzo(g,h,i)perylene*	ND	1	Satisfactory	
	Benzo(j)fluoranthene*	ND	1	Satisfactory	
Benzo(a)pyrene*	ND	1	Satisfactory		
Benzo(e)pyrene*	ND	1	Satisfactory		
Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory		
GW - 08	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	ND	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	
	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	05	5 - 750	Satisfactory	
	Feacal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.6	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	550.8	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
Chloride (as Cl ⁻)	47.8	Max. 200	Satisfactory		

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 08 of 13
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Aug 08, 2023	
Reference Number: 74230478296	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
GW – 08 Cont.	Polycyclic Aromatic Hydrocarbons (PAH)*			
	Naphthalene*	ND	1	Satisfactory
	Benzo(a)anthracene*	ND	1	Satisfactory
	Acenaphthylene*	ND	1	Satisfactory
	Acenaphthene*	ND	1	Satisfactory
	Fluorene*	ND	1	Satisfactory
	Phenanthrene*	ND	1	Satisfactory
	Pyrene*	ND	1	Satisfactory
	Chrysene*	ND	1	Satisfactory
	Benzo(b)fluoranthene*	ND	1	Satisfactory
	Benzo(k)fluoranthene*	ND	1	Satisfactory
	Dibenzo(a,h)anthracene*	ND	1	Satisfactory
	Benzo(g,h,i)perylene*	ND	1	Satisfactory
	Benzo(j)fluoranthene*	ND	1	Satisfactory
	Benzo(a)pyrene*	ND	1	Satisfactory
Benzo(e)pyrene*	ND	1	Satisfactory	
Indeno(1,2,3-cd) pyrene*	ND	1	Satisfactory	
SW - 01	Salinity	3.4%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	14	150	Satisfactory
	Oil & Grease	ND	-	--
	Feecal Coliform	<1.8	400	Satisfactory
	Nitrite (NO ₂)*	0.02	05	Satisfactory
	pH	7.2	8.0-8.3	--
	Chemical Oxygen Demand	37	200	Satisfactory
	Biological Oxygen Demand	09	20	Satisfactory
	Turbidity	0.2	3-5,> 5 causes stress	Satisfactory
	Electrical Conductivity	67,500	2,500	--
	Total Inorganic Nitrogen	12.4	70	Satisfactory
	Total Phosphates (as PO ₄)	0.05	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	<0.1	2 - 3	Satisfactory
	Temperature	19.8	18-32 °C	Satisfactory
	Arsenic as As	< 0.001	0.1	Satisfactory
	Cadmium as Cd	< 0.001	0.5	Satisfactory
Lead as Pb	< 0.001	0.5	Satisfactory	
Chromium VI	< 0.001	0.1	Satisfactory	
Total Chromium (as Cr)	< 0.001	0.5	Satisfactory	

Water Quality to be used for construction and Camp

Month July -2023

Report No: (7423)046-6513

Code Name: AAJV

Jul 13, 2023

Page 01 of 05

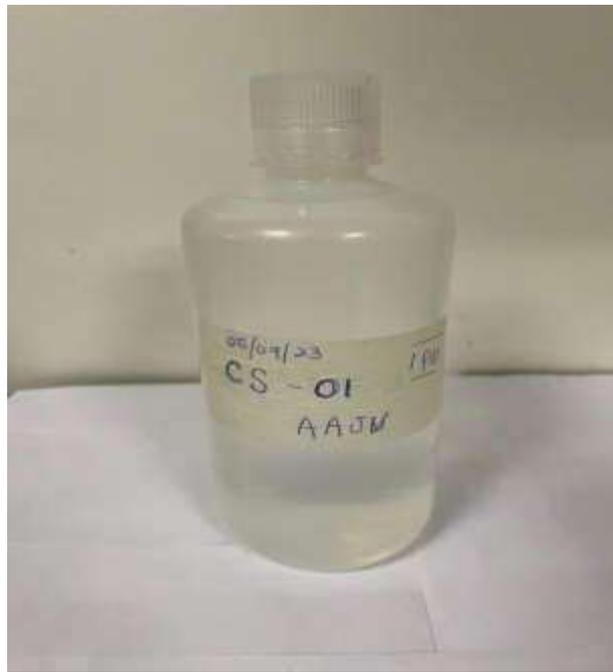
Customer: Alke Alkatas Joint Venture (Pvt) Ltd
Address : H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives
Date of Sample Received: Jul 06, 2023
Date of Testing Started: Jul 06, 2023
Date of Testing Completed: Jul 12, 2023
Sample Description: **Sample Received as:**
A water sample contained in sealed plastic bottle

Sample Identified by the Client as:

CS - 01 - WATER FOR CONSTRUCTION AND CAMP

Date of Sample Collection: 07.05.2023

Sample Drawn By BVCPS NO



**Bureau Veritas Consumer
Products Services Lanka (Pvt)
Ltd.**

No. 570, Galle Road, Katubedda, Moratuwa, Sri Lanka
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112622198 & 199
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TEST REPORT



Report No: (7423)046-6513

Code Name: AAJV

Jul 13, 2023

Page 02 of 05

TEST RESULTS

No.	Parameters	Results	Reference range **	LOQ	Unit	Test Method
1	Turbidity	0.2	Max. 1	-	NTU	APHA 23rd ed: 2017 :2130 B
2	Nitrate (as NO ₃ ⁻)*	02	Max. 50	-	mg/L	APHA 23rd ed: 2017: 4500 -NO ₃ -B
3	Iron (as Fe)	ND	Max. 0.3	-	mg/L	APHA 23rd ed: 2017: 3125 B(ICP
4	Manganese (as Mn) *	ND	Max. 0.1	-	mg/L	APHA 23rd ed: 2017: 3125 B(ICP
5	Arsenic (as As)	ND	Max. 0.01	-	mg/L	APHA 23rd ed: 2017: 3125 B(ICP
6	Cadmium (as Cd)	ND	Max. 0.003	-	mg/L	APHA 23rd ed: 2017: 3125 B(ICP
7	Lead (as Pb)	ND	Max. 0.01	-	mg/L	APHA 23rd ed: 2017: 3125 B(ICP
8	Mercury (as Hg)	ND	Max. 0.001	-	mg/L	APHA 23rd ed: 2017: 3125 B(ICP
9	Total Suspended Solids (TSS)	14	5 - 750	-	mg/L	APHA 23rd ed: 2017 : 2540D
10	Faecal Coliform	<1.8	0	-	MPN/100mL	APHA 23 rd Edition 9221 E
11	Total Coliform	<1.8	0	-	MPN/100mL	IS 5402 : 2012
12	Aerobic Plate Count	4.2 x 10 ¹	100	-	Cfu/ml	IS 5402 :2012
13	pH at 25°C	7.1	6.5 – 8.5	-	-	APHA 23rd ed: 2017: 4500H+B
14	Electrical Conductivity at25°C	756	Max. 1000	-	µS/cm	APHA 23rd ed: 2017: 2510 B
15	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	-	mg/L	APHA 23rd ed: 2017: 4500-PC
16	Chloride (as Cl ⁻)	57.7	Max. 200	-	mg/L	APHA 23rd ed: 2017: 4500-Cl- B

*Test not covered ISO 17025: 2017 by Sri Lanka Accreditation Board for conformity assessment.

Reference range **as per Supply Water Quality Standard, Environment Protection Agency, Maldives.

NOTE:

APHA: American Public Health Association,

SLS: Sri Lanka Standard,

ND: Not Detected,

µS/cm: micro Siemens per centimeter

LOQ: Limit of Quantification,

mg/L: milligrams per liter,

NTU: Nephelometric Turbidity Units, °C :Celcius,

MPN / 100mL- Most Probable Number per hundred milliliter,

APHA <1.8 MPN/100mL=Not Detected/100mL

COMMENT :The Testing Results revealed that Food hygiene of Tested Water Sample is Notsatisfactory as per the Reference range **specified as per Supply Water Quality Standard, Environment Protection Agency EPA, Maldives.

Month August -2023

Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 01 of 13
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Aug 08, 2023				
Reference Number: 74230478296				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
CS - 01	pH	7.4	6.5-8.5	Satisfactory
	Turbidity	0.2	< 1.0	Satisfactory
	Residual free chlorine*	<0.01	0.04-0.2	--
	Electrical Conductivity	525	<1000	Satisfactory
	Total Hardness	06	<75	Satisfactory
	Total Suspended Solids (TSS)	10	5-750	Satisfactory
	Total Dissolved solids	293	<500	Satisfactory
	Feacal Coliform	<1.8	0/100ml	Satisfactory
	Total Coliform	<1.8	0/100ml	Satisfactory
	Escherichia coli	<2/ Absent	0/100ml	Satisfactory
	Iron (as Fe)	ND	<0.3	Satisfactory
	Hydrogen Sulphide	<0.01	<0.05	Satisfactory
	Ammonia - N	<0.1	<0.5	Satisfactory
	Nitrate (as NO ₃ ⁻)*	03	<50	Satisfactory
	Chloride (as Cl ⁻)	58.6	<200	Satisfactory
Physical Appearance	Clear	Clear/Colorless	--	
STP 01	Total coliform	07	400	Satisfactory
	Total Suspended solids	12	150	Satisfactory
	Residual free chlorine*	<0.01	0.2-0.8	--
	Temperature	17.7	<44°C	Satisfactory
	Physical Appearance	Turbid	--	--
	pH at 25°C	7.1	5.0-9.5	Satisfactory
	Nitrate (as NO ₃ ⁻)*	5.7	Max. 50	Satisfactory
	Ammonia - N	02	10	Satisfactory
	Sodium as Na	1.2	200	Satisfactory
	Sulphide	0.1	1	--
	Sulphate as SO ₄	1.9	250	Satisfactory
	Chloride (as Cl ⁻)	57.7	200	Satisfactory
Ortho-Phosphate	0.2	10	Satisfactory	

**Bureau Veritas Consumer
Products Services Lanka (Pvt)
Ltd.**

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Month September -2023

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Sep 25, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 02 of 03
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Sep 18, 2023	
Reference Number: 74230479512	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
STP (Discharge Water)	Surfactants	4.6	10	Satisfactory
	Oil and Grease	ND	05	Satisfactory
	Electrical Conductivity at 25°C	639	<= Sea water	--
	Chemical Oxygen Demand	22	50	Satisfactory
	Biological Oxygen Demand	05	40	Satisfactory
	Dissolved Oxygen	7.2	75	Satisfactory
	Calcium as Ca	<01	80	Satisfactory
	Phenolic Compounds	<0.01	01	Satisfactory
	Arsenic as As	< 0.001	02	Satisfactory
	Cyanide as Cn	<0.001	10	Satisfactory
	Fluoride	0.01	01	Satisfactory
	Zinc as Zn	<0.001	20	Satisfactory
	Cadmium as Cd	<0.001	0.05	Satisfactory
CS (Const. Camp)	Physical Appearance	Clear	Clear/Colorless	
	pH	7.3	6.5-8.5	Satisfactory
	Turbidity	0.2	< 1.0	Satisfactory
	Free Chlorine	<0.01	0.04-0.2	Satisfactory
	Electrical Conductivity	505	<1000	Satisfactory
	Total Hardnes	7	<75	Satisfactory
	Total Suspended Solids	8	5-750	Satisfactory
	Total Dissolved Solids	264	<500	Satisfactory
	Total coliform	<1.8	0/100ml	Satisfactory
	Fecal coliform	<1.8	0/100ml	Satisfactory
	E.Coli	<2 / Absent	0/100ml	Satisfactory
	Iron as Fe	ND	<0.3	Satisfactory
	Hydrogen Sulphide	<0.01	<0,05	Satisfactory
	Ammonia	<0.1	<0,5	Satisfactory
	Nitrates	2	<50	Satisfactory
Chlorides	61.2	<200	Satisfactory	

Discharged Waste Water Quality from ETP/WWTP

Month July -2023

TEST REPORT



Jul 13, 2023
Page 03 of 05

Report No: (7423)046-6513

Code Name: AAJV

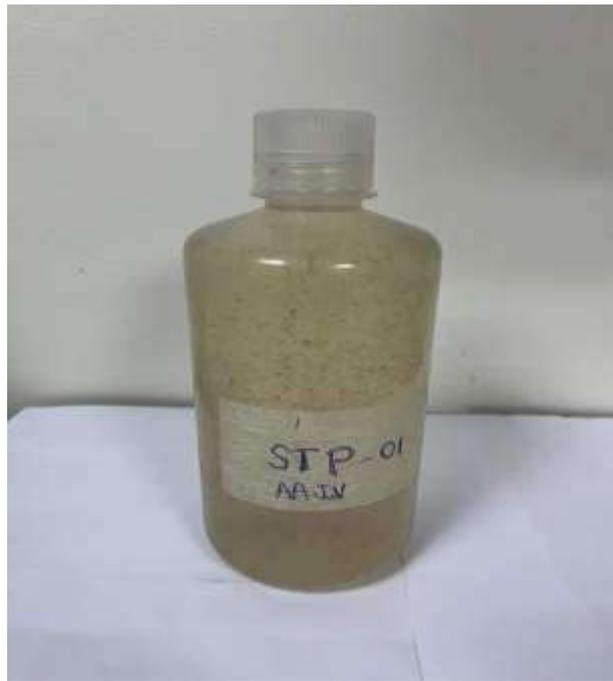
Customer: Alke Alkatas Joint Venture (Pvt) Ltd
Address : H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives
Date of Sample Received: Jul 06, 2023
Date of Testing Started: Jul 06, 2023
Date of Testing Completed: Jul 12, 2023

Sample Description: **Sample Received as:**
A water sample contained in sealed plastic bottle

Sample Identified by the Client as:
STP 01 - WASTEWATER TREATMENT PLANT

Date of Sample Collection: 07.05.2023

Sample Drawn By BVCPS NO



TEST REPORT



Report No: (7423)046-6513

Code Name: AAJV

Jul 13, 2023

Page 04 of 05

TEST RESULTS

No.	Parameters	Results	Reference range **	LOQ	Unit	Test Method
1	Total Nitrogen (as N)/NH ₄ -N	18.2	100	-	mg/L	APHA-4500-NH ₃
2	pH	6.4	6.5-8.5	-	--	APHA-4500-B
3	Nitrite (NO ₂)*	0.05	--	-	mg/L	APHA - 4500 NO ₂ -B
4	Arsenic as As	< 0.001	Max 0.001	-	mg/L	APHA-3120-B
5	Cadmium as Cd	< 0.001	Max 0.003	-	mg/L	APHA-3120-B
6	Lead as Pb	< 0.001	Max 0.01	-	mg/L	APHA-3120-B
7	Total Chromium (as Cr)	< 0.001	Max 0.05	-	mg/L	APHA-3120-B
8	Mercury as Hg	< 0.001	Max 0.001	-	mg/L	APHA-3120-B
9	Nickel as Ni	< 0.001	Max 0.02	-	mg/L	APHA-3120-B
10	Zinc as Zn	< 0.005	Max 5.0	-	mg/L	APHA-3120-B
11	Copper as Cu	< 0.001	Max 0.05	-	mg/L	APHA-3120-B
12	Dissolved Oxygen	6.9	Min 06	-	mg/L	APHA-4200-DO
13	Chemical Oxygen Demand	46	50	-	mg/L	APHA-5220-B
14	Biological Oxygen Demand 20°C	09	100	-	mg/L	APHA-5220-B
15	Hexavalent Chromium as Cr	< 0.01	0.05	-	mg/L	APHA-3500-Cr
16	Turbidity	0.1	<1.0	-	NTU	APHA-2130-B
17	Electrical Conductivity at 25°C	1296	--	-	µs/cm	APHA-2510-B
18	Total Phosphates (as PO ₄)	0.05	--	-	mg/L	APHA 23 rd :2017:4500-PC
19	Sulfide	<0.1	--	-	mg/L	APHA 4500-S2 D
20	Temperature (indoor/outdoor)	17.7	--	-	°C	APHA-2550

*Test not covered ISO 17025: 2017 by Sri Lanka Accreditation Board for conformity assessment.

Reference range **as per Supply Water Quality Standard, Environment Protection Agency, Maldives.

NOTE:

APHA: American Public Health Association,

SLS: Sri Lanka Standard,

ND: Not Detected,

µS/cm: micro Siemens per centimeter

LOQ: Limit of Quantification,

mg/L: milligrams per liter,

NTU: Nephelometric Turbidity Units, °C :Celcius,

MPN / 100mL- Most Probable Number per hundred milliliter,

APHA <1.8 MPN/100mL=Not Detected/100mL

COMMENT :The Testing Results revealed that Food hygiene of Tested Water Sample is Notsatisfactory as per the Reference range **specified as per Supply Water Quality Standard, Environment Protection Agency EPA, Maldives.

TEST REPORT



Report No: (7423)046-6513
Code Name: AAJV

Jul 13, 2023
Page 05 of 05

Contact information for this report (Technical and General Inquiries and Feedback)

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FEED BACK:		
KUMUDINI RATHNAYAKE – ASST. QA MANAGER	TEL: +94 768 229 455	E-MAIL: kumudinie.rathnayake@bureauveritas.com

REVIEWED BY: HIMASHA JAYAWARDENA

BUREAU VERITAS CONSUMER PRODUCTS SERVICES LANKA (PVT) LTD.
AUTHORIZED SIGNATORY

APPROVED BY:

RUWANI AMARASINGHE

ASSISTANT MANAGER –
FOOD & MICROBIOLOGY LABORATORY

END OF THE REPORT

Month August -2023

Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 01 of 13
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Aug 08, 2023				
Reference Number: 74230478296				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
CS - 01	pH	7.4	6.5-8.5	Satisfactory
	Turbidity	0.2	< 1.0	Satisfactory
	Residual free chlorine*	<0.01	0.04-0.2	--
	Electrical Conductivity	525	<1000	Satisfactory
	Total Hardness	06	<75	Satisfactory
	Total Suspended Solids (TSS)	10	5-750	Satisfactory
	Total Dissolved solids	293	<500	Satisfactory
	Feacal Coliform	<1.8	0/100ml	Satisfactory
	Total Coliform	<1.8	0/100ml	Satisfactory
	Escherichia coli	<2/ Absent	0/100ml	Satisfactory
	Iron (as Fe)	ND	<0.3	Satisfactory
	Hydrogen Sulphide	<0.01	<0.05	Satisfactory
	Ammonia - N	<0.1	<0.5	Satisfactory
	Nitrate (as NO ₃ ⁻)*	03	<50	Satisfactory
	Chloride (as Cl ⁻)	58.6	<200	Satisfactory
Physical Appearance	Clear	Clear/Colorless	--	
STP 01	Total coliform	07	400	Satisfactory
	Total Suspended solids	12	150	Satisfactory
	Residual free chlorine*	<0.01	0.2-0.8	--
	Temperature	17.7	<44°C	Satisfactory
	Physical Appearance	Turbid	--	--
	pH at 25°C	7.1	5.0-9.5	Satisfactory
	Nitrate (as NO ₃ ⁻)*	5.7	Max. 50	Satisfactory
	Ammonia - N	02	10	Satisfactory
	Sodium as Na	1.2	200	Satisfactory
	Sulphide	0.1	1	--
	Sulphate as SO ₄	1.9	250	Satisfactory
	Chloride (as Cl ⁻)	57.7	200	Satisfactory
Ortho-Phosphate	0.2	10	Satisfactory	

**Bureau Veritas Consumer
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112622198 & 199
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SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Aug 14, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 02 of 13
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Aug 08, 2023	
Reference Number: 74230478296	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
STP 01 Cont.	Surfactants	6.8	10	Satisfactory	
	Oil and Grease	ND	05	Satisfactory	
	Electrical Conductivity at 25°C	1025	<= Sea water	--	
	Chemical Oxygen Demand	28	50	Satisfactory	
	Biological Oxygen Demand	10	40	Satisfactory	
	Dissolved Oxygen	7.4	75	Satisfactory	
	Calcium as Ca	<01	80	Satisfactory	
	Phenolic Compounds	<0.01	01	Satisfactory	
	Arsenic as As	< 0.001	02	Satisfactory	
	Cyanide as Cn	<0.001	10	Satisfactory	
	Fluoride	0.01	01	Satisfactory	
	Zinc as Zn	<0.005	20	Satisfactory	
	Cadmium as Cd	<0.001	0.05	Satisfactory	
GW - 01	Turbidity	0.2	Max. 1	Satisfactory	
	Nitrate (as NO ₃ ⁻)*	06	Max. 50	Satisfactory	
	Iron (as Fe)	ND	Max. 0.3	Satisfactory	
	Manganese (as Mn) *	ND	Max. 0.1	Satisfactory	
	Arsenic (as As)	ND	Max. 0.01	Satisfactory	
	Cadmium (as Cd)	ND	Max. 0.003	Satisfactory	
	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	ND	5 - 750	Satisfactory	
	Feecal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.2	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	415	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	53.8	Max. 200	Satisfactory	
	Polycyclic Aromatic Hydrocarbons (PAH)*				
	Naphthalene*	ND	1	Satisfactory	
	Benzo(a)anthracene*	ND	1	Satisfactory	
	Acenaphthylene*	ND	1	Satisfactory	
	Acenaphthene*	ND	1	Satisfactory	
Fluorene*	ND	1	Satisfactory		
Phenanthrene*	ND	1	Satisfactory		
Pyrene*	ND	1	Satisfactory		

Month September -2023

Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Sep 25, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 01 of 03
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Sep 19, 2023				
Reference Number: 74230479512				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
Drinking Water	pH	7.7	6.5-8.5	Satisfactory
	Turbidity	0.2	< 1.0	Satisfactory
	Residual free chlorine*	<0.01	0.04-0.2	--
	Electrical Conductivity	23.9	<1000	Satisfactory
	Total Hardness	<01	<75	Satisfactory
	Total Suspended Solids (TSS)	<01	5-750	--
	Total Dissolved solids	14	<500	Satisfactory
	Total Coliform	<1.8	0/100ml	Satisfactory
	Feacal Coliform	<1.8	0/100ml	Satisfactory
	Escherichia coli	<2/ Absent	0/100ml	Satisfactory
	Iron (as Fe)	ND	<0.3	Satisfactory
	Hydrogen Sulphide	<0.01	<0.05	Satisfactory
	Ammonia - N	<0.1	<0.5	Satisfactory
	Nitrate (as NO ₃ ⁻)*	02	<50	Satisfactory
	Chloride (as Cl ⁻)	4.3	<200	Satisfactory
Physical Appearance	Clear	Clear/Colorless	--	
STP (Discharge Water)	Total coliform	04	400	Satisfactory
	Total Suspended solids	08	150	Satisfactory
	Residual free chlorine*	<0.01	0.2-0.8	--
	Temperature	16.5	<44°C	Satisfactory
	Physical Appearance	Turbid	--	--
	pH at 25°C	6.8	5.0-9.5	Satisfactory
	Nitrate (as NO ₃ ⁻)*	3.4	Max. 50	Satisfactory
	Ammonia - N	<01	10	Satisfactory
	Sodium as Na	1.4	200	Satisfactory
	Sulphide	0.1	1	--
	Sulphate as SO ₄	1.7	250	Satisfactory
	Chloride (as Cl ⁻)	49.3	200	Satisfactory
Ortho-Phosphate	0.1	10	Satisfactory	

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SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Sep 25, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 02 of 03
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Sep 18, 2023	
Reference Number: 74230479512	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
STP (Discharge Water)	Surfactants	4.6	10	Satisfactory
	Oil and Grease	ND	05	Satisfactory
	Electrical Conductivity at 25°C	639	<= Sea water	--
	Chemical Oxygen Demand	22	50	Satisfactory
	Biological Oxygen Demand	05	40	Satisfactory
	Dissolved Oxygen	7.2	75	Satisfactory
	Calcium as Ca	<01	80	Satisfactory
	Phenolic Compounds	<0.01	01	Satisfactory
	Arsenic as As	< 0.001	02	Satisfactory
	Cyanide as Cn	<0.001	10	Satisfactory
	Fluoride	0.01	01	Satisfactory
	Zinc as Zn	<0.001	20	Satisfactory
	Cadmium as Cd	<0.001	0.05	Satisfactory
CS (Const. Camp)	Physical Appearance	Clear	Clear/Colorless	
	pH	7.3	6.5-8.5	Satisfactory
	Turbidity	0.2	< 1.0	Satisfactory
	Free Chlorine	<0.01	0.04-0.2	Satisfactory
	Electrical Conductivity	505	<1000	Satisfactory
	Total Hardnes	7	<75	Satisfactory
	Total Suspended Solids	8	5-750	Satisfactory
	Total Dissolved Solids	264	<500	Satisfactory
	Total coliform	<1.8	0/100ml	Satisfactory
	Fecal coliform	<1.8	0/100ml	Satisfactory
	E.Coli	<2 / Absent	0/100ml	Satisfactory
	Iron as Fe	ND	<0.3	Satisfactory
	Hydrogen Sulphide	<0.01	<0,05	Satisfactory
	Ammonia	<0.1	<0,5	Satisfactory
	Nitrates	2	<50	Satisfactory
Chlorides	61.2	<200	Satisfactory	

Appendix 5 Other Site Photos (from Contractor)

Month August -2023



Design, Build and Operate of a Waste to Energy Facility at Thilafushi
Contract No: (AGR)438-WPMC/PRIV/2021/71

HSE MONTHLY REPORT

2. HSE Induction

11 AAJV Personals, 18 subcontractor Personals, 20 MoE/ ADB Personals and 6 visitors were provided HSE Induction



3. Training

- On 6th August PPE Awareness Training conducted
- On 7th August Onsite training was conducted for the safe operation of Pile drive
- On 9th August Onsite Training was conducted for Safe rigging Operation
- On 13th August Emergency Response Training was conducted for security personnel
- On 26th August GRM Awareness training was conducted



4.Tool Box Talk

This month 57nos Tool box was conducted including subcontractor
Topic was covered as below

- Manual Handling
- Health and Hygiene
- Slip, Trip & Fall hazards
- Working at height
- Adverse weather condition
- Emergency Response
- Assembly Point
- Safe use of ladder
- Electrical Hazards
- Power Tools
- Hot Work
- Chemical Handling
- Housekeeping
- PPE
- Lifting Hazards
- Welding, Cutting and Grinding Safety
- Safe Pile Drive Operation
- Noise
- Open Hole and Barricade and warning signage



5. DBO HSE Management Meeting

- On the 2nd, 9th, 16th, 23rd and 30th of August, DDO HSE Management Meeting was Conducted and the following topics were discussed
 - Tool Box Talk
 - Manpower and Site Activity
 - Security Arrangements at the site
 - Permit to Work System
 - Pending HSE Documents Approval
 - HR Policy Documents
 - HSE Training
 - HSE Inspection Tracker and NCR Status
 - Environmental Monitoring during the construction stage



6. Weekly HSE Inspection

On the 13th and 28th of August weekly HSE Inspections were carried out by the DBO Contractor, there was a total 11 observation and 5 NCRs raised during the weekly HSE inspection
A total of 39 action items were closed out for this month including NCRs



7. ADB/ISDB/ DBO MANAGEMENT VISIT

- On the 10th ADB Mission visited the site
- On the 16th Mr. Pablo from Urbaser visited the site
- On the 31st ISDB Visited the site



8. Internal Inspection

- Fire Extinguisher Inspection Carried out
- PPE inspection carried out
- Full Body Safety Harness Inspection carried out
- ladder inspection carried out
- Hand and Power tools inspection carried out
- Heavy Equipment Inspection carried out



9. Housekeeping

- There were 5 mass housekeeping carried out
- Daily housekeeping is carried out daily bas



10. Improvements / Good Practice



Pest control service carried out at camp facilities area

	ENVIRONMENTAL MONTHLY REPORT – AUGUST 2023	Document No	MDV-AAK-CEMPX- XX-RP-XXX-0007-000
		Rev. No / Date	01.09.2023
		Page No:	27/33

6 PICTURE DEMONSTRATE TO PHYSICAL ENVIRONMENT MONITORING IN PRE-CONSTRUCTION PHASE

6.1 AMBIENT AIR MONITORING IN AUGUST 2023



	ENVIRONMENTAL MONTHLY REPORT – AUGUST 2023	Document No	MDV-AAK-CEMPX- XX-RP-XXX-0007-000
		Rev. No / Date	01.09.2023
		Page No:	28/33

6.2 NOISE MONITORING IN AUGUST 2023



6.3 WATER FOR CONSTRUCTION AND WASTEWATER TREATMENT



	ENVIRONMENTAL MONTHLY REPORT – AUGUST 2023	Document No	MDV-AAK-CEMPX- XX-RP-XXX-0007-000
		Rev. No / Date	01.09.2023
		Page No:	29/33

6.4 CONDITION CAMP AND DISPOSAL AREA CONSTRUCTIONS



6.5 MARINE WATER MONITORING



	ENVIRONMENTAL MONTHLY REPORT – AUGUST 2023	Document No	MDV-AAK-CEMPX- XX-RP-XXX-0007-000
		Rev. No / Date	01.09.2023
		Page No:	30/33

6.6 GROUND WATER MONITORING



Appendix 6 Brief of Public consultation conducted by PMU on 3rd July 2023



Ministry of Environment, Climate Change and Technology
Male', Republic of Maldives

**Minutes of the Public Consultation Meeting for the Greater Malé Waste-to-Energy
(GMWTE) Project**

Subject/Ref	Information & Consultation Session on the "Greater Malé Waste-to-Energy" Project
Location	Green Building Auditorium Ministry of Environment, Climate Change & Technology Malé City
Date and Time	09:30 – 11:30 hrs. 3 rd July 2023
Project Representatives Present	<ol style="list-style-type: none">1. Dr. Ibrahim Mohamed – Environmental and Social Safeguards (ESS) Specialist, Greater Malé Waste-to-Energy Project2. Ahmed Azim – Information, Education & Communications (IEC) Specialist, Greater Malé Waste-to-Energy Project3. Javier Gamero Sutil – Urbaser Project Manager at Thilafushi Facility Project (DBO Contractor)
Number of Participants	9 Male, 4 Female

Agenda of the Meeting

1. Opening Remarks:
 - a. Brief introduction to the "Greater Malé Waste-to-Energy" project
 - b. Overview of the objectives and goals of the project
 - c. Explanation of the project's grievance redress mechanism (GRM) and engagement with the Project's Safeguards Expert
 - d. Progress update on the development of the Regional Waste Management Facility on Thilafushi Island
2. Keynote by Design, Build, Operate Contractor — Urbaser S.A.
 - a. Presentation by the WtE DBO Contractor on the waste-to-energy treatment plant
 - b. Introduction to advanced waste-to-energy technology and its benefits



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

- c. Explanation of the ash processing plant, landfill for fly ash residues, and leachate treatment plant
3. Public Consultation, Grievance Mechanism, and Closing Remarks
 - a. Open floor for attendees to share concerns, queries, and suggestions
 - b. Addressing environmental and social concerns
 - c. Wrap-up and closing remarks

Meeting Minutes

Opening Remarks by the Greater Malé Waste-to-Energy Project Management Unit (PMU)

- 1. The meeting was opened by Ahmed Azim – IEC Specialist for the Greater Malé Waste-to-Energy Project who provided an overview of the features of the GMWTE project:**
 - a. The Greater Male Waste-to-Energy Project (Phase 2 of the GMEIWMP) aims to create a sustainable waste treatment system in the Greater Malé region and nearby islands.
 - b. The project involves developing waste-to-energy technology, recycling and disposal infrastructure, improving waste services, and raising public awareness.
 - c. The project was approved in August 2020 and is implemented by the same agencies as part of Phase 1 of the project— The Greater Malé Environmental Improvement and Waste Management Project.
 - d. The Environmental Protection Agency and Utility Regulatory Authority play important roles in overseeing infrastructure development and waste management.
 - e. URBASER S.A. was awarded the design, build and operation contract in October 2021.
 - f. After completion of the construction phase (lasting 3.5 years), the government will be responsible for paying the operator (URBASER) for the operation and maintenance of the facility for 15 years.
 - g. Public awareness and behaviors play a vital role in the success and long-term sustainability of any solid waste management (SWM) system.



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

- h. In the project area of Zone 3 Maldives, it is important for residents to have a clear understanding of the new SWM system being implemented and their role in maintaining public and environmental health.
- i. Efforts are being made to inform the public about the changes from the current practice of dumping to the new SWM system, which includes the development of the largest waste-to-energy (WTE) facility in the Maldives.
- j. Residents have a part to play to ensure proper waste segregation to maximize the environmental, economic, and public health benefits of the SWM system.
- k. Substantial efforts are being made to facilitate this transition and manage the complexity of the new SWM system, including the brand new WTE facility undergoing development at Thilafushi Island.

2. Grievance Redress Mechanism and Safeguard Policies of the Project was detailed by the project's ESS Specialist Dr. Ibrahim Mohamed.

- a. The Greater Male Waste-to-Energy Project (Phase 2 of the GMEIWMP) is categorized as environmental category A, according to ADB SPS, due to the construction and operation of a large waste-to-energy (WTE) facility, which may have significant adverse impacts.
 - These impacts could extend beyond the immediate construction sites or facilities.
- b. The environmental impact assessment (EIA) findings are as follows:
 - The project will bring significant environmental benefits by eliminating open dumping and burning of solid waste in the project area.
 - During the construction phase, there won't be significant adverse environmental impacts, and any potential impacts can be managed effectively through the implementation of an Environmental Management Plan (EMP).
 - During the operation phase, potential impacts may arise in areas such as ambient air and marine water quality, noise levels, and occupational and community health and safety. However, the design-build-operate (DBO) contract includes performance guarantees to the contractor, aiming to avoid significant impacts and mitigate any remaining impacts through measures outlined in the EMP.



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

- There are no social impacts related to land loss, land fragmentation, physical displacement, loss of income, loss of productive land, potential income loss for fishermen, or hindrance to fishing activities and routes.
- The GMWTE includes a 2-Tier Grievance Redress Mechanism (GRM) which allows individuals or groups from project-affected communities to raise concerns and grievances about the project's social and environmental performance.
- The GRM aims to facilitate the resolution of these concerns and grievances.
- However, if someone is aggrieved, they always have the option to directly file a complaint through the country's legal or judicial system, which can be done independently or in parallel to the GRM.
- The GRM can address a range of grievances, including but not limited to noise pollution, air pollution from construction activities, contamination of water bodies, damage to coral and biodiversity, and misconduct by labor towards the local community (such as gender-based violence and sexual exploitation).
- Other issues that can be addressed include improper construction site management, inadequate waste disposal practices, safety concerns, and conflicts between the labor force and the local community.

Keynote by Design, Build, Operate Contractor — Urbaser S.A.

3. A keynote on the current progress of the waste-to-energy treatment plant at Thilafushi was delivered by Mr. Javier Gamero Sutil – Urbaser Maldives Project Manager

- a. Urbaser will design, build, and operate a 500 tpd waste-to-energy (WTE) plant with a 15-year operation and maintenance (O&M) phase.
- b. The WTE plant will consist of two treatment lines, each capable of processing 250 tons per day, with an initial capacity of 21 mg/hr. (168,000 mg/per year).
- c. The project will include a bottom ash treatment plant and engineered landfills for safe disposal.
- d. Waste delivery to the facility will be managed by WAMCO.



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

- e. An 8-megawatt surplus electricity recovery facility will be integrated to maximize energy generation.
- f. An air pollution control system will be implemented.
- g. Hazardous air pollution control residues and non-marketable bottom ashes will be disposed of in a landfill, meeting the standards of the EU Landfill Directive 2018/85/EC.
- h. The project will be implemented through a design-build-operate (DBO) contract, incorporating a construction phase and a 15-year O&M phase to enhance sustainability.
- i. The facility has the potential to accommodate a third 250 tpd treatment line to meet future demand.
- j. The WTE technology minimizes land requirements and produces renewable energy, addressing land and electricity constraints in the Maldives.
- k. All facilities will be equipped with disaster- and climate-resilient features such as raised floor elevations, flood-proof mechanical and electrical equipment, resilient landfill cells, and improved drainage systems.
- l. Current progress of the project:
 - Permits for site mobilization obtained: power connection, water connection, and fencing.
 - Preliminary works completed: topographical survey and soil investigation.
 - Partial completion of fencing, awaiting WAMCO.
 - Pre-construction monitoring completed.
 - Ongoing installation of temporary site offices and auxiliary buildings for mobilization.
 - Start of foundation work, including pile installation and excavation for dewatering.

Public Consultation, Grievance Mechanism and Closing Remarks.

The meeting then progressed to an interactive session whereby the participants were given the opportunity to ask questions, make comments, seek clarification, air their views, concerns and



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

recommendations for incorporation into the project development. Summary of feedback is detailed in Table 1.



Ministry of Environment, Climate Change and Technology
Male', Republic of Maldives

Table 1: Issues Raised and Responses to Concerns

Topic	Participant(s)	Issue Raised	Response
Project Site	Mohamed Imad, MNPHI	Enquired how the public can report a grievance on the project's activities when the site is on a fenced location away from Malé City	As the site area is a fenced area, people who may be impacted are generally people who work and visit Thilafushi industrial area. There is no large population who will be impacted by the construction work being carried out in the Thilafushi site.
Utility Services (Sewage, Power, Waste)	Suhail Jaufar, MWSC	Enquired about the sewage network in Thilafushi and if the WtE project site is connected to main water and sewer network	The labor camp setup has been completed, including an STP (sewage treatment plant) ensuring international best practices for sewage treatment. Currently, water is stored to cater for two working days. The contractor has received an operational permit from the URA, authorizing the operation of the STP. Additionally, a temporary biological treatment plant is in operation, with regular analysis conducted every two weeks to monitor discharge parameters. As part of the project's compliance with EU standards, plans are in place to establish a leachate treatment plant and a waste water treatment plant on-site in the operation phase, utilizing reverse osmosis and biological treatment methods.
	Ibrahim Miflal, Zerowaste	Enquired about the use of the	At the moment, the treated water is being discharged in to the open sea away from reefs edge. In the near



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

	Maldives – NGO	treated waste water on-site	future it will be used for cleaning, dust control, landscaping, and the water will be reused.
Project Design and Future Developments	Mohamed Imad, MNPHI	Enquired if the project design includes the provision for a visitor center	As the facility is being constructed at the site of an ongoing operation therefore, it is not safe for day-to-day visitors at the moment. However, there are provisions in the WtE facility for an auditorium and a walkway will be built to show the WtE facility in operation, once completed. Furthermore, the PMU is undertaking the development of a visitor center and supporting guidelines as part of the project's public awareness initiatives.
Landfill and Site Management	Ibrahim Miflal, Zerowaste Maldives – NGO	Enquired regarding the adequacy of the 15-year period for managing and operating a facility of this nature, including the ultimate state of the landfill upon the conclusion of the contract.	Urbaser will be managing it for 15 years, after which the Government of Maldives (GoM) will be taking over the operations. Furthermore, there will be a deliberate effort made by Urbaser to successfully transfer the operation skills back to the country for smooth handover. Furthermore, the 15-year period is more than sufficient to make a lasting positive impact on the challenges of waste management and treatment in the Maldives.
Air Quality, Environmental Concerns and Reporting	Ibrahim Miflal, Zerowaste Maldives – NGO	Enquired about the emissions and the environmental impact due to the steam released to the air and emission	The project aims to achieve minimal or negligible emissions. To ensure this, an emission monitoring system (EMS) will be installed at the plant. Additionally, an independent third-party will be involved in monitoring the emissions as part of the project. Urbaser already shares all relevant



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Male', Republic of Maldives

		control measures.	information related to the operations of its other WtE plants globally, following corporate policy. The EMS data from the Thilafushi facility will also be made publicly available. The reporting frequency of these systems will be determined based on regulatory requirements, and reports will be publicly available.
	Ahmed Afrah Ismail Zerowaste Maldives – NGO	Enquired about the number of air quality monitoring stations presently in use and if Gulhifalhu includes a station.	Seven air quality monitoring stations are operational, with six in Thilafushi and one in Villimalé. They collect monthly data and provide public statistical reports on air quality. Quarterly reports are submitted to the EPA and ADB for approval before being published on our website. No immediate plans for an AQM station in Gulhifalhu, but will be considered if necessary.
Foreseeable Risks and Safety	Ibrahim Miflal, Zerowaste Maldives – NGO	Enquired regarding potential risks to the project, specifically in terms of changes in public behavior and national policies.	The main challenge is the rising sea temperature, which can impact the efficiency of the turbine in the complex steam cycle designed for the plant. Efforts with the GoM are focused on increasing awareness among school children for proper waste segregation. Once operational, the facility will effectively manage waste and positively impact electricity production costs in the country.
		Enquired about the minimum calorific requirement	A total of 6,500 kJ of energy is required for the sustained operations of the plant. The initial study revealed that the waste



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

			composition at Thilafushi has a calorific value of 8,500 kJ.
		Enquired regarding the plans for operating the plant in the event of a reduction in waste quantity or if the waste exceeds the daily manageable capacity of 500 tons.	WAMCO has been baling waste at Thilafushi for 12 months, which will lead to a 3-year backlog to process when the WtE facility is operational. The bunker at the WtE facility has a 5-day storage capacity as well. To accommodate an increase in waste volume, WAMCO will continue waste baling or the project will consider activating the third line, capable of processing an additional 250 tons.
		Enquired regarding the funding for the 3 rd line	The project encompasses the construction of the bunker and all operational facilities required for the third line, excluding the turbine. Funding has not been secured at this time.
		Enquired on what could lead to a potential shut down of the plant	In the event of a fire in the bunker, automatic monitors and a fire program will be installed to ensure safety. Smoke detectors with a capacity of 20 liters per second are already installed. Water for fire suppression will be sourced from rainwater and desalinated water through a recycling system integrated into the facility. Additionally, a rainwater harvesting system will be constructed at the plant. These measures aim to enhance fire safety and utilize sustainable water sources for firefighting purposes.



Ministry of Environment, Climate Change and Technology

Male', Republic of Maldives

		Enquired regarding whether Urbaser Maldives, as a Spanish firm, is required to report emission data to the EU.	The EU Commission does not have the authority to impose fines on Urbaser in this context. As the contract is between Urbaser and the Government of Maldives (GOM), the company would be subject to local legislation and regulations.
Plant Maintenance and Servicing	Ahmed Afrah Ismail Zerowaste Maldives – NGO	Enquired regarding the operation of the plant for 11 months and on what will happen during the remaining month of the year.	The plant will be operational for 8,000hrs. per year. The plant will need to be turned off for routine maintenance, but it will be done systematically where one 250t line will continue to operate even during the maintenance period.
Corporate Social Responsibility and Employment	Mohamed Imad, MNPHI	Enquired on the number of locals who will be employed at the facility	Urbaser strives to employ local individuals for the project. However, it has been difficult to find locals willing to work at a waste treatment facility. To address this challenge, there are efforts being undertaken to engage local firms to subcontract certain aspects of the project, such as electricity works for the facility. This approach allows the project involve local businesses and contribute to the local economy while ensuring the successful implementation of the plant.



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Male', Republic of Maldives

Annex 1 — Photos of The Public Consultation



Photo 1: Public Consultation at Green Building Auditorium, Ministry of Environment, Climate Change & Technology



Photo 2: ESS Specialist Dr. Ibrahim addressing the participants



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Male', Republic of Maldives



Photo 3: Participants at the Public Consultation for the Greater Malé Waste-to-Energy Project



Ministry of Environment, Climate Change and Technology
 Male', Republic of Maldives

Annex 2 — Attendance List
 (next page)



Ministry of Environment and Energy
 Waste Management and Pollution Control Department
Meeting Attendance Sheet
 Public Consultation on GM WTE Project and GRM

Date: 3rd July 2023

Time: 0930 am

Venue: Ministry of Environment and Energy, Green Building

Room: 6th Floor Auditorium

#	ORGANISATION	NAME	DESIGNATION	CONTACT NUMBER	E-MAIL ADDRESS	SIGNATURE
1	WAMCO	Mohamed Akram	RD officer	7471533	mohamed.akram@wamco.com.mv	
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3	MWSE	Sulail Jaffer	AWNM	7427511	Sulail.jaffer@mwse.com.mv	
4	MWSE	Ahmed Hassan	Manager CL	998343	ahmed.hassan@mwse.com.mv	
5	Green Park	Shoaib	Director	9771341	Shoaib@parkley.tv	
6	KINDHI	MADHUP (MAD)	A CPE	778158		
7	Zeruwate Holdings	Brohim Mifal	Board member	7980958	ibrahim.mifal@gmail.com	
8	Zeruwate Holdings	Ahmed Aziz Jamil	Co founder	9690600	afza@zeruwateholdings.com	
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10	Mozed	husein@mozled.com	ENV manager	933886	husein@mozled.com	
11	MWCT	Yaseen Hussein Yameel	Program officer	7495509	yaseen.husein@environment.gov.mv	
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