

Environmental Monitoring Report

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Maldives: Greater Male Waste-to-Energy Project

Part A: Main Report

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	–	Currency 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
PMD CSC	–	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 cubicmetre

NOTE

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

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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 (Alifu Alifu Atoll), South Atoll (Alifu Dhaalu 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:

4.1. **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.

4.2. **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 October 2023 to 31st December 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

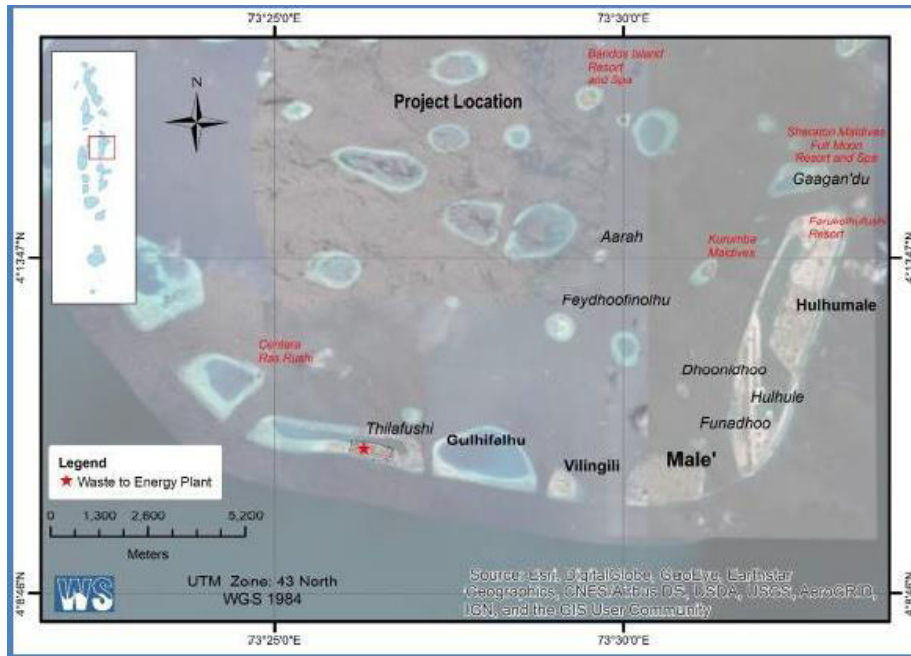
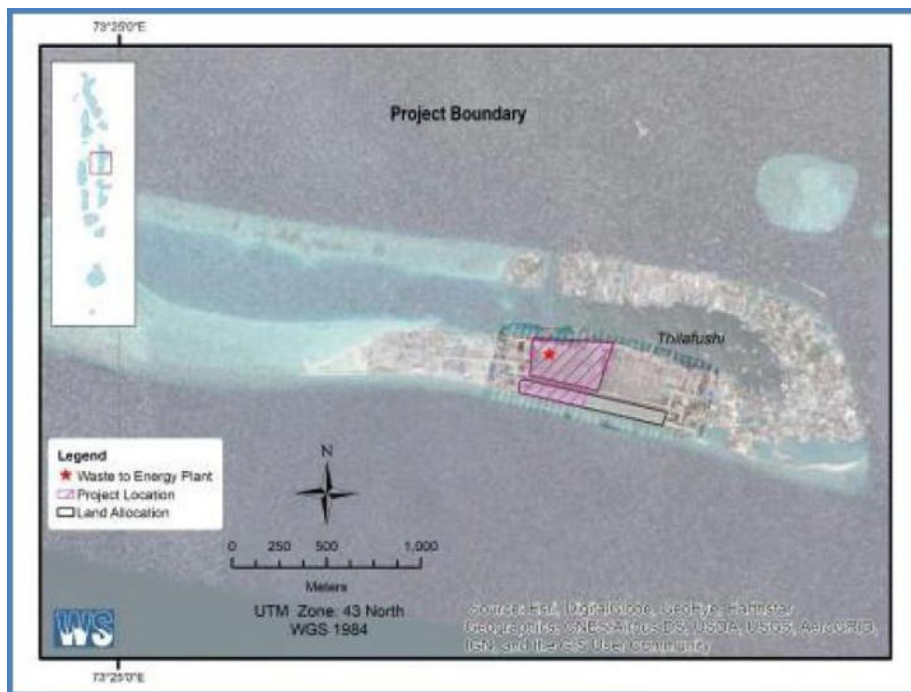


Figure 2: Proposed WTE Site in Thilafushi



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 (PMD CSC).

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:

10.1. Consultants for implementation and monitoring. PMU is assisted by the Environmental specialist consultants of PMDCSC in environmental safeguards.

10.2. 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.

10.3. 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, the position of Environmental Officer (National) in PMDCSC, which had been vacant since September 1, 2023, has been filled. The new Environmental Officer (National) in PMDCSC was contracted on December 12, 2023. The HSE Manager of the DBO left his position on 24th December 2023. Present Environment Manager of DBO has been assigned the role of HSE manager from 24th December 2023 and recruitment of new environment manager is in process. According to the DBO contractor's obligations, three health and safety inspectors and three environmental inspectors must be on site. However, there are two subordinates for environment and health and safety. As site work is now on one shift, one environmental inspector and two health and safety inspector are also 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 (Fichtner GmbH& 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)	Mariyam Rifqa	+9607799374 maryam.rifqa@outlook.com	Contract signed on 12 th December. 2023 PMDSC's Site Engineer (Sofi Ismail) was responsible for supervision on EHS aspects for this quarter before joining of Rifqa.
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 contractor's engineer by URBASER on 15 March 2022
4	HSE Manager	Senol Kircalli	senol.kircaali@aawte.com	Left his position on 24 th December 2023.

No	Positions	Name of the expert/staff	Contact Number & Email	Remarks
				Environmental Manager, Sedat Cot has been assigned the role on permanent basis..
5	Environmental Manager/HSE Manager	Sedat Cot	sedat.cot@aawte.com	<p>Joined on 16 August 2023 as replacement of Mr Ta Hoa Binh.</p> <p>Appointed as HSE Manager from 24th December 2023.</p> <p>A new Environmental manager will join the project from January Onwards.</p>
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 7 September 2023 and technical evaluation is in the process.	-	-	Consultant will be finalized in next quarter.
4	Individual Environmental Monitor	Independent external monitor for environment category A project	Contract signed. Site visits ongoing	Vista Environnent 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%	Design, EIA and documentation, <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 Pre-construction / construction works <ul style="list-style-type: none"> ▪ Dewatering and cutting of spun piles on going. ▪ Preparation for foundation works for bunker area and main area on going. ▪ Additional staff quarters and labor quarters construction ongoing ▪ Preparation for spun pile static loading for turbine area. ▪ Ware house and reinforcement workshop extension work ongoing. 	<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 ▪ Bunker area excavation to 3.7m below ground level completed and sheet piling completed ▪ Spun pile driving, splash coating and welding at turbine (third line area) completed. ▪ Spun pile cutting for bunker area completed ▪ Completion of ▪ Lean concrete for pile caps at main process building of WTE plant completed

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 construction phase and summary of environmental monitoring reports will be submitted to MoCCEE 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 are submitted to EPA. The last report was submitted on 10th December 2023.
Dewatering Permit	Dewatering permits for WtE Building excavation have been obtained from URA on 25.10.23, 17.11.23 and 21.12.23 and 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 monthly 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 HDC (URBANCO) on 18.10.23, 26.11.23 and 03.12.23 as its one-time validity for 14 days (excluding government and public holidays) only. The permit is renewed after every 14 days.	<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 with this requirement.
Desalination plant registration and License to operate desalination plant from the URA	Yet to be obtained as same 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. 	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.

V. COMPLIANCE STATUS WITH ENVIRONMENTAL REQUIREMENTS

A. Compliance with Loan Covenants

15. 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	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

Loan Agreement	Covenant	Compliance Status	Proposed actions, if any requirements from the draft EIA)
	<p>provisions that require the contractors to:</p> <ul style="list-style-type: none"> a) comply with the measures relevant to the contractor set forth in the EIA and the EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report; b) make available a budget for all such environmental measures; and, 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>Schedule 4, paragraph 8</p> <p>Safeguards Monitoring and Reporting</p>	<p>The Borrower, through the Project Executing Agency and the Implementing Agency, shall do the following:</p> <ul style="list-style-type: none"> 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>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>	<p>-</p>

Loan Agreement	Covenant	Compliance Status	Proposed actions, if any
	<p>b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project 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

16. The 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 EIA report has been further 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 the detailed design.

17. 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

18. The EIA including the EMP has been included in the bid documents as well as in the DBO Contract for implementation and compliance.

VI. STATUS OF EMP IMPLEMENTATION

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

19. Table 8 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 8: Field Verification Visits by Safeguards Supervision and Monitoring Staff

No	Position of staff/expert	Name	Date of visit	Purpose 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	Dr Ibrahim Mohamed	12 th , 24 th October, 13 th , 21 st November, 13 th , 16 th , 17 th , 18 th December	Inspection	WtE facility construction site in Thilafushi	Yes
2	PMDCSC; Site Engineer	Sofi bin Ismail	Deputed on project site on full time basis.	Supervision		
3	PMDCSC: Deputy Team Leader	Naahee Nazim	12 th , 24 th October, 6 th , 13 th , 21 st November, 13 th , 16 th , 17 th December	Inspection		
4	PMDCSC: International Environment Safeguard	Sunil Gupta	16 th and 17 th December	EMP monitoring		
5	PMDCSC: Local Environment Safeguard	Rifga	From 13 to 17 December	EMP monitoring		
6	ADB- OHS safeguard	Sandeep Uttarwar	From 13 to 17 December	OHS assessment		

20. 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 October, November and December 2023 are enclosed as Appendix-2.

B. Implementation of Design and Pre-construction Stage EMP

21. Table 9 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 9: 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
Category of compliance				<p><i>“Complied”, “Being complied”, “Partially complied”, “Not complied”</i></p>
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 	<ul style="list-style-type: none"> ▪ Quarterly marine ecological monitoring conducted and includes benthic surveys ▪ The intake and outfall locations identified in the initial design still remains. However, the depth and locations may change due to proposed reclamations work by Maldivian authority in same area and will be determined in detailed design phase. ▪ Hot water discharge 	<p>Being complied</p> <ul style="list-style-type: none"> ▪ The contractor is undertaking the baseline monitoring of marine ecology and marine water quality on quarterly basis. ▪ Contractor has indicated that intake and outfall locations will be changed further away from the shoreline into deeper water. ▪ PMDCSC has requested Contractor to remodel for the changed location of the intake and outfall via letter sent on 01 September 2023.

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
		<p>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.</p> <ul style="list-style-type: none"> ▪ 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. 	<p>temperature will be maintained at 3°C</p> <ul style="list-style-type: none"> ▪ Dispersion modelling will be carried out once detailed design is finalized and approved 	<ul style="list-style-type: none"> ▪ Remodeling will be done as part of the detail design which is prepared by the Contractor.
Location of ambient air quality monitoring stations	Improper sampling locations leading to underestimated ambient air quality condition and health risk to people.	<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"> ▪ Output of air dispersion modelling ▪ Ambient air quality monitoring station sites map and historical windrose diagrams and other meteorological data ▪ Results of monitoring of ambient air quality. 	<p>Being complied:</p> <ul style="list-style-type: none"> ▪ Seven locations have been fixed and ambient air quality monitoring has been conducted on once in month basis in line with Preconstruction Environment Monitoring Plan considering EMP of EIA report. ▪ For construction phase, CEMP has been approved having all details.
Locating proper drainage system around the facility	Disturbance to and impedance of flow	<ul style="list-style-type: none"> ▪ To prepare and implement wastewater management, dewatering and storm water drainage plan. 	<ul style="list-style-type: none"> ▪ Wastewater management, dewatering and 	<p>Being Complied as:</p> <ul style="list-style-type: none"> ▪ The site has a sewerage treatment

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
	in natural drainage around the island.	<ul style="list-style-type: none"> ▪ 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. 	storm water drainage plan.	<p>plant and the discharge water from the plant is tested monthly.</p> <ul style="list-style-type: none"> ▪ Dewatering is carried out with permits and a sedimentation pond is build. Sedimentation from dewatering is mitigated via silt screens in pond and regular observations carried out at discharge point. ▪ Waste water from concrete batching plant is also discharged into a sedimentation tank and water is reused. ▪ No disturbance to natural drainage from site construction activities. ▪ Final drainage plans for the roads, and facilities, as well as runoff, are to be finalized as part of the detail design.

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
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 integrated in detailed design. 	Complied and completed-- Geotechnical report has been approved and all recommendations implemented during construction activities.
	Failure of site to withstand climate change, including extreme weather events.	<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. 	<ul style="list-style-type: none"> ▪ CVRA report ▪ Recommendations of the CVRA report integrated in detailed design. 	Being complied as CVRA will be conducted during the detailed design stage.

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
	<p>Failure of piles in the existing municipal waste dumped by WAMCO near the project site.</p>	<ul style="list-style-type: none"> ▪ 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. 	<ul style="list-style-type: none"> ▪ Physical condition of the slope of piles of municipal waste dumped 	<p>Complied during period and is an ongoing process</p> <ul style="list-style-type: none"> ▪ The site boundary facing eastern side of dumping site of WAMCO has been shifted away by approx. 20m and a fence has been installed. ▪ The slope of the dump is being reinforced with concrete waste and edges are hardened. At the same time naturally growing vegetation like grass and bushes/trees are stabilizing the slope towards the site boundary. ▪ Communication system is in place to resolve the related issue with WAMCO on immediate basis.

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
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 hazardous / halogenated organic components in wastes. - In-house Solid Waste Management Plan. - Occupational Health and Safety Plan following international best practices on occupational health and safety such as 	<ul style="list-style-type: none"> ▪ CEMP has been approved in December 2022. However, H&S plan has been approved in May-22. ▪ HSE plans as mentioned in CEMP are in place (refer Table 10 for status) ▪ Activity wise method statements relevant for the construction activities on site, such as MS for excavations, piling works etc., and SOPs such as Operation of Batching Plant are in place which include HSE aspects like hazard risk assessment, measures, PPEs etc. 	Being complied <ul style="list-style-type: none"> ▪ CEMP and H&S plan are to be revised and updated as part of the detail design

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
		<p>those in IFC EHS Guidelines on Waste Management Facilities.</p> <ul style="list-style-type: none"> - 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, however permitting is an ongoing process with renewals and new permits as per progress</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 via 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. 	<ul style="list-style-type: none"> ▪ As per maps showing utilities and likely disruptions, live power cable of STELCO is passing through project site 	<p>Being complied</p> <ul style="list-style-type: none"> ▪ Relocation of live cable of STELOC is still pending. PMU has engaged with HDC and STELCO 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

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"> ▪ Identify the list of affected utilities and operators and coordinate closely with relevant government departments. 		<p>of STELCO for dewatering from excavated area with mitigation measures. Also, extra spun piles are laid over ground above the cables, and the outfall water pipes run through the spun piles, so as to avoid excavation works and any damage to the cable below. Cable is located 1m below ground level.</p>
<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>Being complied</p> <ul style="list-style-type: none"> ▪ A site organization plan was submitted in May 2022 and was approved by the PMU before mobilization and pre-construction activities on site were 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.

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
				<p>This was to avoid any risks arising from falling objects from the edge of the dumpsite towards the site.</p> <ul style="list-style-type: none"> ▪ Domestic wastewater treatment plant is now installed and in operation. ▪ Additionally, solid waste is managed as given in the plan and environmental baseline monitoring is conducted as well. ▪ As the site is now in construction phase, CEMP guide, CEMP, H&S plan and construction environment monitoring plans are in place, refer to Table 10. ▪ The compliance is being verified by regular site inspections carried out by PMDCSC and PMU. Details are provided in the Appendix-2. In addition, monthly

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
				<p>HSE reports are also provided by the DBO/EPC contractor.</p> <ul style="list-style-type: none"> ▪ Since the beginning of construction, the storage areas have been clearly indicated as per site organization plan and are utilized accordingly. Also, all waste is managed according to the site organization plan. ▪ For excavation work, requisite facilities such as storage area for excavated soil, retention tank and discharge pipeline to the sea for dewatering have been approved, implemented and monitored.
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 	Permits issued to quarries/sources of materials	<p>Being complied</p> <ul style="list-style-type: none"> ▪ Most material is imported from overseas, as it is not available locally. Only internationally accepted suppliers

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
		<p>should be properly examined and mitigated as necessary</p> <ul style="list-style-type: none"> ▪ 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). 		<p>are/will be used for supply of materials. 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.</p> <ul style="list-style-type: none"> ▪ As per present estimate, no additional soil will be required for levelling of the project site or for construction.
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. 	All materials will be transported to project site via sea as per dedicated delivery routes provided by maritime authorities.	<p>Being complied</p> <ul style="list-style-type: none"> ▪ 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

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
				<p>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> <ul style="list-style-type: none"> ▪ There is one main port that is used by all parties on the island, and sometimes this has been used by the contractor as well as unloading at the quay wall depending on the type of material being unloaded.
Final Detailed Design Components	Air and marine water pollution due to inappropriate components	<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. 	Detailed design that uses recommendations including discharge emission of the EIA	The Detailed design is in progress hence not all details can be confirmed, however:

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
	included in the detailed design.	<ul style="list-style-type: none"> - Use of stack height recommended in the EIA. If circumstances based on the recommended stack height is to be changed (e.g., change in dimensions of the WTE plant building structure), ensure to use a stack height that is based on a new modeling calculation. - 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. 	report on discharge of waste material to air, water and soil.	<ul style="list-style-type: none"> ▪ Best practice for incineration and air pollution control is applied as per contract ▪ Stack height to be confirmed during modelling update ▪ CEMS is included ▪ Leachate plant is designed for maximum expected amounts ▪ The capacity of the landfill is sufficient to take the APCr but not the bottom ash which is why the PMDCSC has repeatedly pointed towards the necessity to legitimate the use of bottom ash in construction. ▪ Sampling ports for water and flue gas are standard requirements and will be implemented.
Additional Baseline Environmental Data Gathering	Inaccurate predicted impacts and proposed measures due to lack of robust	<ul style="list-style-type: none"> ▪ 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 	Results of monthly ambient air quality measurements (TSP, PM ₁₀ , PM _{2.5} , SO _x , NO _x).	<ul style="list-style-type: none"> ▪ Complied and completed for preconstruction phase in line with approved

Field or Activity	Potential Impact/Issue	Mitigation Measures	Parameter/Indicator of Compliance	Status of Mitigation Measures implementation and Compliance
	<p>baseline environmental data will lead to unforeseen environmental pollution or damage.</p>	<p>(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).</p> <ul style="list-style-type: none"> - 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 noise level measurements (L_{eq} daytime and L_{eq} 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>Results of marine underwater ecology monitoring 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>Preconstruction Environment Monitoring plan.</p> <ul style="list-style-type: none"> - Preconstruction environment monitoring plan and CEMP have been prepared considering details given EMP of EIA report.

C. Implementation of Construction Stage EMP

1. Status of HSE Plans mentioned in CEMP

22. The status of plans as on 31 December 2023 is given in Table 10. However in response to justification for exemption of submission of certain HSE plans mentioned in approved CEMP submitted by DBO vide letter MDV-20231206-URB-MME-LT-0102 dated 6.12.23, PMDCSC vide letter no 4169A01/330/088 dated 18.12.23, accepted the justification with conditions for exemption of submission only for HSE plans such as Archeological Findings Management, Infrastructure Safety and Erosion Control Procedure while rejected the exemption for Tool and Technique to review the CEMP, Regulatory Compliance Evaluation Procedure and ESMS.

Table 10: Status of HSE Plans mentioned in the CEMP

Sn	Documents	Status	Remarks
CEMP Plans- Category1			
1	Occupational Health and Safety Management	As part of H&S 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.	
3	Noise/Vibration Management		
4	Waste Management Plan		Accepted with comments by PMDCSC
5	Soil Management plan	Accepted with comments by PMDCSC	
6	Traffic Management plan	Accepted with comments by PMDCSC	
7	Stakeholder Engagement Plan	Accepted with comments by PMDCSC	
8	Spillage Control and Containment Plan	Accepted with comments by PMDCSC	
9	Grievance Redressal Mechanism Plan	Accepted with comments by PMDCSC	
10	Marine and Beach Area Management Plan	Accepted with comments by PMDCSC	
11	Chemicals and Hazardous Material Management Plan	Accepted with comments by PMDCSC	
12	Emergency Response Plan	Accepted with comments by PMDCSC	
13	Security Management Plan	Accepted by PMDCSC	
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 by PMDCSC	
17	Management Procedures for Occupational & Environmental Accidents as Incident reporting and investigation procedure	Accepted with comments by PMDCSC	

Sn	Documents	Status	Remarks
18	Tool and Technique to review the CEMP	Not submitted	Targeted to be approved as part of the revised CEMP.
CEMP Plans- Category2			
19	Archeological Findings Management	Exempted from submission	Due to the nature of Thilafushi Island being a reclaimed land.
20	Flora & Fauna Management	Submitted and PMDCSC asked for revision	Targeted to be approved by 29 th February 2024
21	Human Resources Management	Accepted with comments by PMDCSC	Targeted to be approved by 31 th January 2024
22	Regulatory Compliance Evaluation Procedure	Not submitted	Targeted to be approved by 29 th February 2024
23	Procedure for Corrective & Proactive Actions	Accepted with comments by PMDCSC	Targeted to be approved by 31 th January 2024
24	Training Procedure and Plan	Accepted with comments by PMDCSC	
25	Infrastructure safety	Exempted from submission	Infrastructure safety is/will be addressed by implementing the matter in the various plans and applying design codes and approved method statements
26	Erosion Control Procedure	Exempted from submission	Erosion control procedures are and will be addressed in relevant construction procedures and method statements
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 29 th February 2024.

2. Implementation of Construction Environment Management Plan (CEMP)

23. Table 11 presents the status of the EMP implementation during the construction works which is based on Environmental Management Plan Matrix from the EIA Report which was disclosed in ADB website as well as in the project website.

Table 11: Construction Mitigation Measures Implementation & Compliance

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
Category of compliance					<p><i>“Complied”, “Being complied”, “Partially complied”, “Not complied”</i></p>
Overall project site management	<ul style="list-style-type: none"> ▪ Poor Environmental management by DBO Contractor ▪ Poor/inadequate compliance of EMP of EIA report 	<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 separately on Environment and H&S 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. ▪ H&S plan to be aligned with ISO 45001 and CEMP to 	<ul style="list-style-type: none"> ▪ Compliance of CEMP and H&S plan in line with contractual obligations ▪ Manpower as indicated in bidding documents and final contract documents. ▪ Competency of hired manpower. ▪ Implementation of CEMP and H&S plan <ul style="list-style-type: none"> • Inspections on regular basis • Record keeping • Training for capacity building 	<ul style="list-style-type: none"> ▪ DBO contractor has hired a full time HSE manager on site. ▪ The EPC contractor has hired an HSE manager, a health and safety manager and an environment manager. ▪ Only two H&S inspectors are on site. ▪ Requisite three Environment officers are yet to be recruited. ▪ CEMP is undergoing revision as per ERQ table 5-16 “update CEMP concurrently with the detailed design” ▪ H&S plan is undergoing revision as it is not align with ISO 45001 	<p>Partially complied due to following:</p> <ul style="list-style-type: none"> ▪ Balance of HSE professionals are to be recruited. ▪ CEMP and H&S plan need to be revised.

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		<p>be aligned with ISO 14001</p> <ul style="list-style-type: none"> ▪ 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. 			
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"> ▪ Compliance to CEMP. ▪ No disturbance to normal day-to-day movement of locals at the port and in the island. 	<ul style="list-style-type: none"> ▪ Traffic management plan as part of CEMP is in place. ▪ A dedicated quay wall is exclusively made available for contractor; however there are challenges in loading and unloading from the quay due to presence of a ship wreck within the footprint of the quay designated. Therefore, main port of Thilafushi is currently used for transportation of construction equipment and raw 	<p>Being Complied:</p> <ul style="list-style-type: none"> ▪ Contractor is implementing mitigations measures in light of the shipwrecks which are causing logistic challenges that require to divert some of the materials to be unloaded elsewhere.

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				<p>materials to the site. The unloading and loading take place during nighttime and daytime.</p> <ul style="list-style-type: none"> ▪ Subcontractor Villa has been engaged for supply of construction material for batching plan which has its own private port. ▪ Efforts are being made to make the dedicated quay accessible by removing the shipwrecks. 	
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, domestic water, all type of solid waste 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. 	<ul style="list-style-type: none"> ▪ Compliance of various relevant plans mentioned in CEMP ▪ Relevant Method statements such as dewatering plan, Operation of STP etc. ▪ Areas for stockpile storage of fuels and lubricants and waste materials; ▪ Marine water quality testing 	<ul style="list-style-type: none"> ▪ Relevant plans such as soil management plan, waste management plan, Marine Beach Area plan, Spill Control and Containment Plan, Environment monitoring plan etc. mentioned in CEMP are in place. ▪ STP is in operation and treated discharge is being tested once in a 	Being complied

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> ▪ 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 bunded 110%. ▪ Take precautions to minimize the overuse of water ▪ Divert all wash water generated from site into sedimentation 		<p>month for relevant parameter.</p> <ul style="list-style-type: none"> ▪ Sedimentation pond is providing retention time for discharge of water from dewatering before discharging into the sea and quality of discharge is being tested once in a month for given parameter as per local regulation. ▪ Dedicated storage for fuel and chemicals is present and is properly made with bunds and polythene covers. ▪ Solid Waste management system in place. ▪ Soil management system in place. ▪ System for Dewatering is in place. ▪ System for STP operation is in place. ▪ Quarterly water quality monitoring is conducted. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>ponds prior to discharge to canals.</p> <ul style="list-style-type: none"> ▪ 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. ▪ Conduct water quality monitoring at least quarterly or as necessary. 			
Dust and air pollution	Work during dry season and transporting construction materials, Operation of DG sets 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 	<ul style="list-style-type: none"> ▪ Compliance to CEMP and H&S plan ▪ Location of stockpiles. ▪ Number of complaints received. ▪ Heavy equipment and machinery including DG sets with air pollution control devices. ▪ A certification that vehicles are compliant with Maldives vehicle emission standards. ▪ Ambient air quality monitoring. 	<ul style="list-style-type: none"> ▪ Stockpiles are on designated areas ▪ All vehicles are registered according to local regulations and tested for roadworthiness before registration. ▪ No onsite air quality monitoring as part of OHS monitoring, however dedicated baseline monitoring around the site is carried out on regular basis. ▪ No point sources emission monitoring 	Partially complied as: <ul style="list-style-type: none"> ▪ There are no systems in place to measure emissions from machinery/ equipment and vehicles on regular basis. However, DBO contractor is preparing a plan for OHS monitoring including onsite air quality monitoring.

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>kilometers per hour (kph).</p> <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ▪ 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 		<ul style="list-style-type: none"> ▪ PMDCSC can confirm that Contractor is applying these mitigation measures such as spray water for unloading, using dust masks etc. in accordance with method statements and SOPs. ▪ CEMP and H&S plan are in place but require updating as part of the detail design. ▪ 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>monitor these activities and act to apply the mitigation if dust production becomes significant.</p> <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 			

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> ▪ 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. 			
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 	<ul style="list-style-type: none"> ▪ Compliance to CEMP and H&S plan ▪ Compliance of SOPs on installation and operation ▪ Monitoring of source emission as per design details ▪ Regular inspection and monitoring as per design manual ▪ Number of complaints 	<ul style="list-style-type: none"> ▪ The batching plant in operation is installed with built-in air pollution and dust control system for fugitive emissions and dust from loading area as per Guidelines for concrete batching plants, 2016 by EPA, Maldives. However as per guidelines, no emission standards are prescribed. ▪ Operation is being carried out in compliance with SOPs which address all mitigation measures as mentioned 	Partially complied <ul style="list-style-type: none"> ▪ DBO contractor is preparing a plan for OHS monitoring including onsite air quality monitoring.

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>and treated as necessary prior to discharge.</p> <ul style="list-style-type: none"> ▪ 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 bunded 110%. Storage facilities should be as specified in the appropriate international standard and should include equipment to extract dust and completely contain any spillage from leaks. 		<ul style="list-style-type: none"> ▪ CEMP and H&S plan are in place. ▪ Stockpiles areas have been protected with surrounded metal sheet walls. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
Noise pollution	Temporary increase in noise level and vibrations by construction heavy equipment/machinery, operation of batching plant, DG sets, and the transportation of materials, equipment and people including workers	<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 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 	<ul style="list-style-type: none"> ▪ Compliance of CEMP and H&S plan ▪ Compliance of SOPs on installation and operation of batching plant ▪ Noise level measured at daytime and nighttime at pre-determined locations at site. ▪ Number of complaints received. 	<ul style="list-style-type: none"> ▪ DG sets are provided with noise enclosures. ▪ Ambient Noise level is measured only outside the project site at five stations within the immediate vicinity on monthly basis. ▪ However, no onsite noise level and source noise level (1 m from source) monitoring is carried out. ▪ CEMP and H&S plan in place but require updating as part of the detail design. ▪ Contractor is in the progress of hiring a third party to undertake inspections related to fitness of machinery. Third party has been approved by PMDCSC in Q1 2024. 	Partially complied <ul style="list-style-type: none"> ▪ DBO contractor is preparing a plan for OHS monitoring including onsite noise monitoring.

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		barriers to minimize sound impact to surrounding sensitive receptor. <ul style="list-style-type: none"> ▪ 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. 			
Aesthetics	<ul style="list-style-type: none"> ▪ Indiscriminate disposal of solid and liquid waste 	<ul style="list-style-type: none"> ▪ Prepare and implement a 	<ul style="list-style-type: none"> ▪ Compliance of various plans 	<ul style="list-style-type: none"> ▪ Relevant plans mentioned in 	Being complied

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	(construction and domestic) around the site.	<p>Construction Waste Management Plan (CWMP) to identify specific steps on handling and disposal of all solid waste from construction activities, including the following:</p> <ul style="list-style-type: none"> ▪ Reuse as much waste sand in this project as possible; ▪ 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 	<p>mentioned in CEMP</p> <ul style="list-style-type: none"> ▪ Relevant Method statements as mentioned for section on marine water quality. ▪ Number of complaints received; ▪ 	<p>CEMP as mentioned for section on marine water quality are in place.</p> <ul style="list-style-type: none"> ▪ All type of solid waste generated are being collected, stored and disposed off in compliance with waste management plan and collected by WMACO for disposal on regular basis. ▪ STP is in operation and discharge from dewatering is being provided retention time in sedimentation pond before discharge into the sea. ▪ Quality of discharges from STP and sedimentation pond are being tested on monthly basis as per local regulations. ▪ Housekeeping is carried out on regular basis. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>walls around construction site.</p> <ul style="list-style-type: none"> ▪ 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. 		<ul style="list-style-type: none"> ▪ Kitchen is in operation to provide food to all workers and staff on site. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> ▪ 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. 			
Amenities for community	<ul style="list-style-type: none"> ▪ Transportation of men and materials via sea and land ▪ Potential road closures due to construction activities. ▪ Hauling of construction materials and operation of equipment on-site can cause traffic problems. 	<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 	<ul style="list-style-type: none"> ▪ Compliance of various relevant plans mentioned in CEMP ▪ Relevant Method statements and procedures are in place. ▪ Number of complaints received; ▪ Feedback via public consultation 	<ul style="list-style-type: none"> ▪ Plans such as Traffic management plan, stakeholder engagement plan, GRM plan, Camp construction and development plan etc. mentioned in CEMP are in place ▪ Minimal movements within the Island as raw materials are directly transported to site via sea. ▪ Most of workers stay/will stay in the camp within project site. Most of the 	<p>Being complied</p> <ul style="list-style-type: none"> • No public complaints have been registered. • Public consultation as stakeholder engagement is yet to be conducted.

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		<p>on low traffic hours, particularly at night time when most establishments in Thilafushi island are already closed.</p> <ul style="list-style-type: none"> ▪ 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. 		<p>time public ferry will be used for transportation of men to project site.</p> <ul style="list-style-type: none"> ▪ Most of raw construction materials are unloaded at designated area i.e. port area. ▪ All equipment/machinery and vehicles are/will be parked within project site. ▪ The project site boundary is demarcated, and adequate barricaded with fencing ▪ Display board sare placed at gate to provide information of nature, duration of construction and contact for complaints and/or issues about the project. 	
Marine and terrestrial ecology	Threat to marine and terrestrial species, or other marine animals due to	<ul style="list-style-type: none"> ▪ Implement the Marine and Beach Area Construction Work Plan. 	<ul style="list-style-type: none"> ▪ Compliance of various relevant plans mentioned in CEMP ▪ Relevant Method statements such 	<ul style="list-style-type: none"> ▪ Relevant plans such as draft flora and fauna management plan, soil management plan, waste 	<p>Being complied</p> <ul style="list-style-type: none"> ▪ Flora and Fauna management plan is to be finalized.

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
	<p>1. poaching or leisure catching by workers in the project area, and</p> <p>2. (ii) marine pollution.</p>	<ul style="list-style-type: none"> ▪ Implement the Erosion Control Plan for pipeline works. ▪ Ensure that all construction activities are conducted strictly within the site footprint (including offices, car parking and other activities that might normally be located in an exterior contractor's area). ▪ 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 	<p>as dewatering plan, Operation of STP etc.</p> <ul style="list-style-type: none"> ▪ Areas for stockpile storage of fuels and lubricants and waste materials; ▪ Monitoring of ground water and Marine water quality 	<p>management plan, Marine Beach Area plan, Spill control and catchment plan Environment monitoring plan etc are in place.</p> <ul style="list-style-type: none"> ▪ Thilafushi Island is almost devoid of terrestrial flora and fauna and as per IBAT study, no endangered species has been identified. ▪ No source for poaching as food is cooked in kitchen for everyone staying and/or working at project site. No cooking by workers is allowed within project site. ▪ Marine ecology monitoring at selected points of water intake and discharges during operation is being carried out on quarterly basis. ▪ Temporary fencing of project site with entry gates has been provided. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>dust to minimum possible.</p> <ul style="list-style-type: none"> ▪ 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 		<ul style="list-style-type: none"> ▪ All construction activities except laying of pipelines for water intake and discharges are/will be within project site. ▪ Others mitigation measures are same as given for marine water quality. ▪ Sedimentation pond for dewatering activities is installed to ensure quality of discharge is in line with the requirements. Regular laboratory checks are performed and random visual and odor inspection are performed. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>a more controlled manner minimizing the area that is disturbed.</p> <ul style="list-style-type: none"> ▪ 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 			

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		<p>and backfilling activities;</p> <ul style="list-style-type: none"> - When the turbidity exceeds the minimum of the background turbidity plus 20% or 100 NTU, the trenching is to cease until the turbidity returns to the background level plus 10%. 			
Socioeconomic status	<ul style="list-style-type: none"> ▪ Recruitment of manpower and procurement of construction materials during construction. ▪ Procurement of raw material to prepare food items in kitchen and others of daily usages. ▪ Visit of various international experts to project site and some of staff of DBO contractor is staying in Male on rented accommodations. 	<ul style="list-style-type: none"> ▪ Engage the local workforce to the maximum possible extent. ▪ Procure construction materials from local market, wherever available. 	<ul style="list-style-type: none"> ▪ Compliance of various relevant plans mentioned in CEMP ▪ Number of complaints received; ▪ Feedback during public consultation 	<ul style="list-style-type: none"> ▪ Human resource policies and procedures, Grievance Redressal Mechanism plan, , Stakeholder engagement plan etc. are in place ▪ Based on availability, preference is given to locals but local vendors are used as subcontractors for supply of workers and materials. ▪ Availability of local workers is almost impossible hence at present, all workers engaged 	<p>Being complied</p> <ul style="list-style-type: none"> ▪ No public complaints have been registered. ▪ Public consultation as stakeholder engagement is yet to be conducted.

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
				<p>are expatriates workers.</p> <ul style="list-style-type: none"> ▪ Grievance Redressal mechanism for workers and public is in place. ▪ Stakeholder engagement plan for public consultation is in place. 	
Other amenities for community welfare	Construction works may result in an impact to the public property, ecology, infrastructural facilities, resources etc.	<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 	<ul style="list-style-type: none"> ▪ Compliance of various relevant plans mentioned in CEMP ▪ Number of complaints received. ▪ Feedback during public consultation ▪ Environment monitoring conducted on regular basis. ▪ EIA update on the basis of design details 	<ul style="list-style-type: none"> ▪ As the site is located on an industrial inhabited island with mainly industrial activities, hence community welfare applies only to a limited extent. ▪ Efforts are on to re locate the live electrical cable of STELCO which is passing the project site. Till then adequate mitigation measures are being taken to protect the same ▪ Plans such as Flora & Fauna management plan, Traffic management plan; 	<p>Being complied</p> <ul style="list-style-type: none"> ▪ No public complaints have been registered. ▪ Public consultation as stakeholder engagement is yet to be conducted. ▪ Relocation of live power cable of STELCO passing through the project site

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>consultations with local people about nature, duration and possible impacts of the construction and integrate their concerns.</p> <ul style="list-style-type: none"> ▪ 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. 		<p>Grievance Redressal Management Plan, Stakeholder Engagement plan etc as part of CEMP are in place.</p> <ul style="list-style-type: none"> ▪ All relevant permits are in place and relevant authorities and nearby facilities are informed of construction works ▪ Others are same as described in other section of table. 	
Community health and safety	Construction works may have impact on public health and safety mainly during transportation of men and materials and pollution generated.	<ul style="list-style-type: none"> ▪ Restrict work force in designated areas. ▪ Identify stockyard areas in consultation with local administration. ▪ Work on private land to require written permission of landowners. ▪ Prefer small mechanical excavator for excavation works. 	<ul style="list-style-type: none"> ▪ Compliance to CEMP and H&S plan. ▪ Relevant Method of statements and SOPs ▪ Number of complaints received. ▪ Feedbacks during public consultation 	<ul style="list-style-type: none"> ▪ As the project site is located on an industrial inhabited island with mainly industrial activities, hence community health and safety is confined mainly to workers working in other industrial activities.. ▪ Most of the construction activities except transportation of 	<p>Being complied</p> <ul style="list-style-type: none"> ▪ No public complaints have been registered. ▪ Public consultation as stakeholder engagement is yet to be conducted.

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> ▪ 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 		<p>construction materials from jetty and port area are/will be executed within project site which is barricaded with temporary fencing. Entry is restricted by providing security guards at each entry gate.</p> <ul style="list-style-type: none"> ▪ Plans such as Public Health, safety and Security, Traffic management plan, Grievance Redressal Management Plan, Stakeholder Engagement plan, Human Resource Management Procedures H&S plan, Emergency Response plan and other plans as mentioned in other section on management of pollution are in place. ▪ Activity wise method statements and SOPs are in place. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		promptly of complaints.		<ul style="list-style-type: none"> ▪ Environment monitoring outside the project site has been carried out on regular basis. ▪ Traffic movement via road is confined to island only for limited use as defined in section on Marine traffic. ▪ All workers and most of staff are staying in camp area only. 	
Work site and Workers Health and Safety	High probability of OHS risk to workers during various construction activities such as excavation.	<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 	<ul style="list-style-type: none"> ▪ Compliance to H&S plan, CEMP and relevant contractual obligations. ▪ Compliance of relevant method of statements and SOPs ▪ Complaints received via GRM ▪ OHS monitoring 	<ul style="list-style-type: none"> ▪ H&S plan is being approved in May 2022 and is to be revised ▪ Plans such as, Security Management Plan, Traffic management plan, Incident reporting and investigation procedure Grievance Redressal Management Plan, Emergency Response plan, COVID-19 management plan and other plans as mentioned in other 	Being complied: <ul style="list-style-type: none"> ▪ Presence of live power cable of STELCO passing through the project site ▪ Smoke due to fire incidents observed in adjacent existing solid waste dumpsite of WAMCO. ▪ Activity wise work site and workers' health and safety is covered in the relevant method statements.

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>personal protective equipment (PPE), preventing injury to fellow workers, etc.</p> <ul style="list-style-type: none"> ▪ 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. ▪ Make first aid kits readily available. ▪ Maintain hygienic accommodation in work camps. ▪ Ensure uncontaminated water for drinking, cooking and washing. ▪ Ensure clean eating areas. 		<p>section on management of pollution as mentioned in CEMP are in place.</p> <ul style="list-style-type: none"> ▪ Activity wise method of statements and SOPs are in place. ▪ No OHS monitoring including dust and noise at project site is in place. ▪ British standards are partially followed especially for PPEs. ▪ 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 facilities and a stretcher is provided. ▪ First aid training is regularly conducted ▪ Records on daily toolbox talks maintained 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> ▪ 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 		<ul style="list-style-type: none"> ▪ Adequate hygienic is maintained in kitchen, dining hall and accommodation. ▪ Security arrangements are adequate. ▪ 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. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<p>procedures as may be identified.</p> <ul style="list-style-type: none"> ▪ 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). 			

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> ▪ Provide caution & information boards (traffic, safety, information etc.,) ▪ 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.,) 			
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. 	<ul style="list-style-type: none"> ▪ Compliance of H&S CEMP. ▪ Visual inspection reports. ▪ Complaints received via GRM 	<ul style="list-style-type: none"> ▪ Plans such as Construction Camp and Development Plan, Waste Management Plan, Human Resource Management Procedure, GRM Plan, H&S plan etc are in place. ▪ The camp is setup and maintained according to local regulations and ADB SPS and IFC guidelines. 	Being complied but needs further improvements such as feedback of action taken related to complaints (refer to section X.B)

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		<ul style="list-style-type: none"> ▪ The CCDMP will consider all construction camp requirements discussed in Section VI of the EIA report, which, among others, are the following: ▪ 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, 		<ul style="list-style-type: none"> ▪ Potable ROs have been provided to drinking water supply points and drinking water quality is monitored on regular basis. ▪ Recreation facilities such as indoor games, TV, gymnasium etc. are in place. ▪ Food to all is cooked in kitchen and provide in dining hall. ▪ Housekeeping is carried out on regular basis. ▪ Regular inspections have been carried out as per plan. ▪ Internal GRM is in place. 	

Field or Activity	Potential Impact / Issue	Mitigation Measures	Parameter / Indicator of Compliance	Status of Mitigation Measures implementation	Compliance
		space, and proper lighting and ventilation. <ul style="list-style-type: none"> ▪ Fire safety, medical facilities. 			

D. Implementation of Health & Safety COVID-19 Plan

24. 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-19. 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 with comments by PMU/PMDCSC.

25. 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.






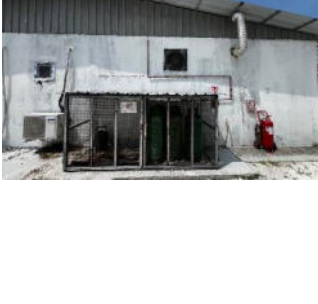
E. Key Site Observations and Action Taken





26. Details of some of findings/observations based on weekly site walk down reports, inspection reports, OHS expert ADD's visit, etc. are given in Table 12 with specific details on status in line with reports enclosed as Appendix-2 and Appendix-4. However, major Key issues identified for actions are listed as per given below:

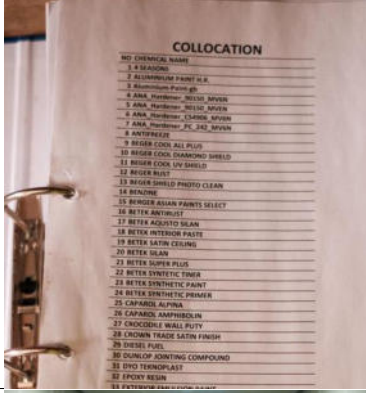




- a) Inadequacy observed on status of documents, implementation, practices, monitoring, records keeping, training, supervision at project site etc.
- b) Submission of pending HSE plans and ESMS for approval as per details mentioned in Table-11.
- c) Need of revision of existing CEMP and H&S plan
- d) Recruitment of remaining HSE personnel as per contract
- e) OHS monitoring
- f) PMDCSC need to improve on-site inspection and supervision by having more effective project manual.
- g) 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 presence of live electrical cables of STELCO (passing through project site)
- h) Public consultation as part of stake holder engagement needs to be conducted
- i) Appointment of Public Awareness consultant by PMU
- j) Training needs to be provided to all key personal including Project Manager, Environmental Manager, and all key personnel including but not limited to professional engineers, site supervisors etc.


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

Table 12: Site Observations and Current Status

Aspect	Site Observation / Finding	Site photographs	Action to be taken	Current status	Date of completion
Access to storage area blocked by materials	Area around the storage area lacks accessibility due to piled up materials (12 th October 2023)		Clear the area.	Cleared and access made possible. Closed date: 18th December 2023	
Fuel Storage on site	Fuel storage on site needs to be improved and is not adequate (12 th October 2023).		Sheltered area with retaining wall and proper leak proof floor to be constructed.	Fuel storage area has been constructed and in use. Closed Date: 24 th October 2023	
LPG Gas Cylinders used in Kitchen area	The piping and placement of the valves on the LPG gas cylinders for the kitchen were not practical and requires immediate corrective measures. (14 th December 2023).		To ensure, that valves should be approachable and closed easily in case of a leak.	Corrective measures are taken and the emergency valve is now accessible. Closed Date: 20 th December 2023	

Aspect	Site Observation / Finding	Site photographs	Action to be taken	Current status	Date of completion
Chemical Storage Area	Emergency spill kit is contained within a bin like the garbage bins used, and the kit inside was not readily usable as some dust had accumulated on the kit. (14 th December 2023).		Immediate corrective measures to be taken, including better marking on the bin, and cleaning the emergency kit and keeping it ready.	Bins are marked and emergency kit is cleaned Closed Date: 20 th December 2023	
Electrical DB at site	Improper electrical DB setup. To be isolated and secured. Only accessible by authorized person.		Immediate corrective measures were advised to be taken to enclose with cabinet and lock.	Electrical main panel is enclosed with cabinet and lock to prevent unwanted access and responsible person posted Closed date: 23/11/2023	
Dewatering detention pond	Noticed active mosquito larvae breeding on the dewatering detention pond. Without mitigation might lead to dengue fever. 11/10/2023		General awareness is to be planned for Saturday Toolbox meeting regarding stagnant water accumulation and necessary precautions to prevent water pooling which may cause mosquito larvae.	<ul style="list-style-type: none"> • Toolbox has been conducted. • As the Dewatering started and water is flowing there are no mosquito larvae is found. Closed date:26/10/2023	

Aspect	Site Observation / Finding	Site photographs	Action to be taken	Current status	Date of completion
Chemical Storage Area	Inadequate MSDS records. Date of Observation was 11/10/2023		To update and ensure all chemical stored have valid MSDS. MSDS shall be visible for all chemical storage areas.	MSDS in the storage area is updated Closed date: 9/11/2023	
Staff Accommodation	No emergency light on escape doors in office and in accommodation area of camp site 11/11/2023		Escape doors need to be provided emergency light.	Emergency light has been installed at staff accommodation corridor and office Closed date: 24/11/2023	
Overall site	Power cable connection not fully secured. Risk during rain as connection is not watertight. Placement on the ground might increase risk of electrical shock during rain Observation made on 11/11/2023		Immediate corrective measures were advised to be taken to rectify the issue.	Power Cables are elevated from the ground Closed date: 24/11/2023	

Aspect	Site Observation / Finding	Site photographs	Action to be taken	Current status	Date of completion
<p>Bar Bending Yard</p>	<p>Observed the suction pump at bunker was installed without any filtration system in place. Possible spike in turbidity value for discharged water. Contractor to test and verify the discharged water quality.</p> <p>Observation 2.12.2023</p>		<p>As a control measure, water samples are to be collected and tested regularly for TSS also</p>	<p>As a control measure, water samples were collected and tested regularly since the commencement of dewatering on a monthly basis. The findings have been communicated to concerned parties and stakeholders. The laboratory results for turbidity reveal that the values of dewatering effluent have not surpassed the established limits.</p> <p>TSS will be added from next month sampling.</p> <p>Closed Date 21/12/2023</p>	

F. Project Construction related Accidents and Incidents

27. Table 13 below presents details of work-related incidents reported from the project pre-construction and construction activities.

Table 13: 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)	2	0	2
Near miss cases	2	0	2
Total	4	0	4

G. Unanticipated Impacts

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

VII. ENVIRONMENTAL MONITORING

A. Monitoring Activities - Proposed and Conducted

29. 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.

30. 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 have been carried out as per details provided in Table 14. Sampling and testing have been carried out based on the method of statement enclosed as Appendix of the CEMP.

31. OHS related air quality and noise monitoring was not carried out this period. The Contractor has informed PMU that noise monitoring will begin from February 2024 and procurement of additional equipment for air quality and gas analyzers will begin. Additionally, the contractor has agreed to submit a detailed monitoring plan for OHS related monitoring.

Table 14: Additional Baseline Data Gathering During 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) 09-12 October 2023 2) 21-24 November 2023 3) 11-14 December 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) 16-17 October 2023 2) 18-19 November 2023 3) 16-17 December 2023
Marine water quality	Heavy metals (As, Cr ⁺⁶ , Cu, Ni, Pb, Zn, Hg, Cd), nitrite, pH, turbidity, and BOD ₅ etc.	Marine water samples to be collected from seven sampling stations - SW1, SW2, SW3, SW4, SW5, SW6, and SW7 (Refer Figure 4)	Quarterly sampling	Marine water samples were collected from seven sampling stations - SW1, SW2, SW3, SW4, SW5, SW6, and SW7 on 12 th November 2023.
Groundwater quality	Oil and grease, fecal coliform, presence of petroleum, pH,	<ul style="list-style-type: none"> ▪ Water samples to be collected from the eight 	Quarterly sampling	<ul style="list-style-type: none"> ▪ Groundwater Samples were collected from seven sampling stations -

Assessment	Parameters	Location	Frequency	Status
	Heavy metals (As, Cr ⁺⁶ , Cu, Ni, Pb, Zn, Hg, Cd), etc	<p>monitoring locations (Refer Figure 5)</p> <ul style="list-style-type: none"> For each location, the sample was collected from mid-water level 		<p>GW1, GW2, GW3, GW4, GW6, GW7 and GW8 on 12th November 2023. Sample from location GW3 (Raagundaa Engineering Premises) was not accessible for sample collection.</p>
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 12 November 2023, 18 October 2023, and 3 December 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 18 October, 12 November and 03 December 2023 Parameters have been revised in compliance with National Waste Water Quality Guidelines 2007 and IFC General EHS Guidelines from August 2023 onwards.
Discharge water quality from dewatering	Fecal Coliform, pH, Total Dissolved Solids, Dissolved Oxygen, Turbidity, Total Hydrocarbon, Electrical Conductivity, Salinity, Hydrogen Sulphide, Oil & Grease, Ammonia, Nitrites and Phosphates	As discharge point of retention pond into sea	Monthly sampling	Grab sample was collected on 18 October, 12 November and 03 December 2023
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 17 October 2023

B. Monitoring Results

1. Ambient Air Quality

32. As shown in Table 15, there were three sampling events during this reporting period- 1) 9-12 October 2023, 2) 21-24 November 2023, and 3) 11-14 December 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 by AirQoon Sensor. Parameters measured with sensor devices consist of the averages of instantaneous measurements taken at 1-minute intervals and reported on hourly and 24-hourly basis.

33. 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 15 gives the description of the sampling stations while Table 16 shows the results of ambient air quality sampling in April 2023, May 2023, and June 2023. Table 17 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 15: 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 16: Results of Ambient Air Quality Sampling, October, November and December 2023

Parameters	AQ1			AQ2			AQ3			AQ4			ASR2			ASR3			ASR5		
	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
PM ₁₀ (µg/m ³)	12.0	4.3	10.20	9.3	4.6	11.72	10.5	2.1	9.36	3.9	3.0	6.12	14.4	1.1	8.96	11.3	3.6	8.76	13.3	3.7	3.0
PM _{2.5} (µg/m ³)	9.9	4.7	9.41	7.7	3.8	11.41	8.7	1.9	9.17	3.7	2.9	6.11	12.3	1.1	8.65	8.6	3.4	8.63	9.1	3.5	2.98
SO ₂ (µg/m ³)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1	ND	ND	ND	ND	ND	ND	ND	ND
NO ₂ (µg/m ³)	1.6	12.8	1.42	ND	ND	ND	ND	2.9	ND	ND	ND	11.12	8.2	ND	ND	9.7	9.1	ND	6.4	ND	ND
TSP (µg/m ³)	19.1	7.8	17.84	10.8	5.8	14.86	11.7	4.2	11.94	6.1	4.7	9.76	22.9	1.6	11.63	18.0	5.6	11.25	48	6.2	4.20
Monitoring dates: October (9-12 October 2023) November (21- 24 November 2023) December (11-14 December 2023) Averaging time is 24 hours																					

Table 17: 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		-

34. From Table 16, 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).

35. 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.

36. 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.

37. 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

38. Ambient noise level measurements were conducted from, 16-17 October 2023, 18-19 November 2023, and 16-17 December 2023, at five sampling stations identified in the EIA (July 2020). These are NQ1 to NQ5 (refer to Table 18 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 18.

Table 18: 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.
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	This station was selected as it is located at the proposed facility

Station Identifier	Location	Description and rationale
	73°26'14.4 E	

Figure 4: Noise Sampling Stations

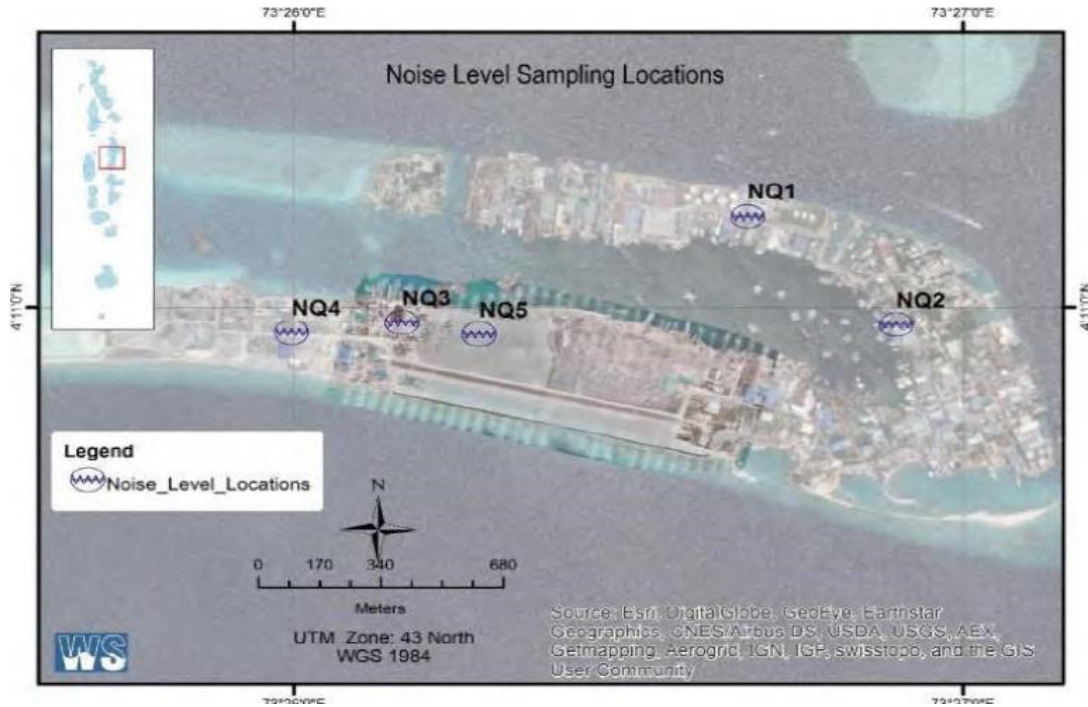


Table 19: Results of Ambient Noise Level Measurements

Station	Measured from 16-17 October 2023		Measured from 18-19 November 2023		Measured from 16-17 December 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	59	54	61	52	61	53
NQ2	55	50	55	49	58	49
NQ3	55	52	62	61	61	64
NQ4	60	59	64	53	56	42
NQ5	57	48	50	40	50	48
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

39. Measurements of noise levels are conducted for duration of 5 minutes in one hour at each location and L_{eq} values are reported on hourly basis for 24 hours. Considering the hourly L_{eq} values, daytime L_{eq} (from 7 hrs to 22 hrs) and night time L_{eq} (from 22 hrs to 7 hrs) are calculated.

40. 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 October to December 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

41. For the additional baseline data gathering, marine water quality sampling was done on 12th November 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 20). 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 20) 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 Table 20 and Appendix 3.

Figure 5: Marine Water Quality Sampling Stations

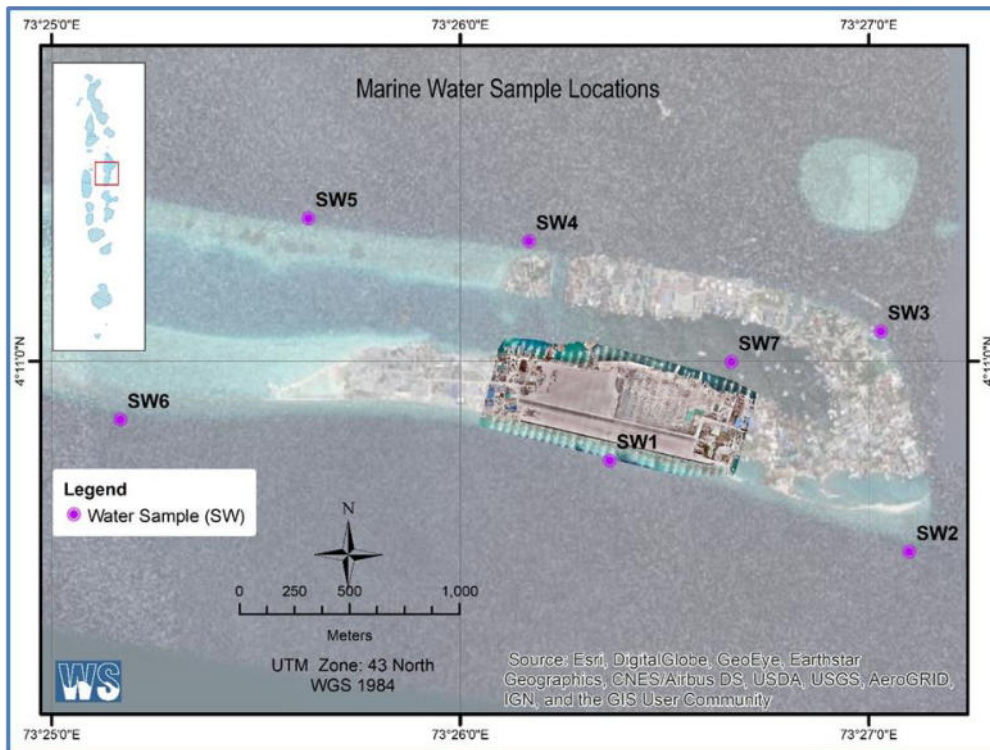


Table 20: Results of Marine Water Quality Sampling, November 2023

Parameters	Date of sampling: 12 November 2023							Unit	Approved Marine water quality standard of Maldives EPA
	SW1	SW2	SW3	SW4	SW5	SW6	SW7		
Temperature indoor/laboratory	27.8	28.1	29.6	27.4	27.8	27.6	27.9	°C	18-32
Salinity	34	34	35	38	34	33	34	%	
TSS	24	26	28	32	26	25	27	mg/L	
Oil & Grease	ND	ND	ND	ND	ND	ND	ND	mg/l	
Feecal Coliform	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	MPN/10 0 ml	
Nitrite (as NO ₂)	1.4	1.46	1.5	1.9	1.6	1.4	1.46	mg/L	None proposed
pH at 24°C	7.1	7.5	7.5	7.3	7.2	7.3	7.3	-	8-8.3
COD	17	18	22	25	19	21	18	mg/L	
BOD ₅ at 20 °C	4	4	5	3	4	4	2	mg/L	<2mg/L
Turbidity	3	3	2.8	2.7	3	2.6	3.5	NTU	3 – 5 NTU (max)
Electrical Conductivity at 25°C	50,220	50,526	52,020	53,740	51,500	51,490	50,680	µS/cm	48994-62350
Total inorganic Nitrogen	5.6	5.7	6.1	5.2	5.7	5.3	3.7	mg/L	None proposed
Total Phosphates (as PO ₄ ³⁻)	0.8	0.9	1.1	0.9	0.8	0.7	0.6	mg/L	1
Sulfide	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/l	NA
Ammonia	2.2	2.2	2.4	2.2	2.3	2.3	2.3	mg/l	
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/L	NA
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/L	NA
Lead	<0.025	<0.025	0.022	0.028	<0.017	0.017	0.022	mg/L	NA
Hexavalent Chromium (asCr ⁶⁺)*	0.005	0.005	0.005	0.005	<0.005	<0.005	0.005	mg/L	NA
Total Chromium	0.034	0.039	0.033	0.039	0.031	0.031	0.033	mg/L	NA

Parameters	Date of sampling: 12 November 2023							Unit	Approved Marine water quality standard of Maldives EPA
	SW1	SW2	SW3	SW4	SW5	SW6	SW7		
Mercury	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	mg/L	NA
Nickel	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	mg/L	NA
Zinc	0.045	0.043	0.047	0.041	0.035	0.039	0.034	mg/L	NA
Copper	0.013	0.013	0.014	0.012	0.012	0.012	0.012	mg/L	NA

42. As per Table 19, values ranged for EC from 53,740 $\mu\text{S}/\text{cm}$ to 51,490 $\mu\text{S}/\text{cm}$, for nitrite from 1.4 mg/L to 1.9 mg/L, and for total inorganic nitrogen from 6.1-3.7 mg/L. While pH values ranged from 7.1 to 7.5. Also, BOD₅ values ranged from 2 mg/L to 5 mg/L while COD values ranged from 17 mg/L to 25 mg/l. Levels of heavy metals in all the sampling stations were found to be low to below the detection limit.

43. 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

44. Environmental monitoring of groundwater quality for the pre-construction period was conducted on 12 November 2023. Water samples were collected from the eight monitoring stations identified in the EIA (July 2020) except at GW3 (refer to Figure 6 for locations). Due to non-accessibility of location GW3, sampling could not be carried out. 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 21 presents the analytical results of groundwater quality with detailed test results given in Appendix 3.

45. 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.

46. Results from Table 23 show that levels of heavy metals were found below detection limit while other parameters are: Electrical conductivity (126 $\mu\text{S}/\text{cm}$ at GW1 to 48,600 $\mu\text{S}/\text{cm}$ at GW2), pH (7.2 at GW2 to 7.7 at GW4), nitrate (at GW1 (4 mg/L) and GW2 (29 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.

47. 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 (1.39 mS/cm in GW1 to 25 mS/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 (183 mg/L in GW1 to 6,325 mg/L in GW6), and nitrate (1.7 mg/L in GW1 to 34.5 mg/L in GW6).

Figure 6: Groundwater Sampling Stations



Table 21: Groundwater Quality Results, August 2023

Parameters	Results of Groundwater Quality Sampling								Unit
	Date of Sampling: 12 November 2023								
	GW 1	GW2	GW 3	GW4	GW 5	GW 6	GW 7	GW 8	
Turbidity	2.2	2.3	Not collected as the well could not be accessed	0.9	9.6	2.9	3.3	3.6	NTU
pH	7.5	7.2		7.7	7.4	7.9	8	8.2	-
Iron	ND	ND		ND	ND	ND	ND	ND	mg/L
Manganese (as Mn)	ND	ND		ND	ND	ND	ND	ND	mg/L
Arsenic (as As)	ND	ND		ND	ND		ND	ND	mg/L
TSS	7	142		8	46	5	ND	ND	mg/L
Electrical Conductivity at 25 °C	126	48,600		296.3	397.8	526	452	302	µS/cm
Fecal Coliform	<1.8	<1.8		<1.8	<1.8	<1.8	<1.8	<1.8	MPN/100 ml
Oil and Grease	ND	ND		ND	ND	ND	ND	ND	mg/l
Nitrate (as NO ⁻³)	4	29		6	1.1	2.5	1.6	6	mg/l
Cadmium (as Cd)	ND	ND		ND	ND	ND	ND	ND	mg/L
Lead (as Pb)	ND	ND		ND	ND	ND	ND	ND	mg/L
Mercury (as Hg)	ND	ND		ND	ND	ND	ND	ND	mg/L
Total Phosphates (as PO ₄ ³⁻)	ND	ND		ND	ND	ND	ND	ND	mg/L
Chlorides	53.8	207.8		39.2	79.2	56.8	49	45.8	mg/L
Polycyclic Aromatic Hydrocarbons (PAH)									
Naphthalene	ND	ND		ND	ND	ND	ND	ND	µg/l
Benzo[a] anthracene	ND	ND		ND	ND	ND	ND	ND	µg/l
Acenaphthylene	ND	ND		ND	ND	ND	ND	ND	µg/l
Acenaphthene	ND	ND		ND	ND	ND	ND	ND	µg/l
Fluorene	ND	ND		ND	ND	ND	ND	ND	µg/l
Phenanthrene	ND	ND		ND	ND	ND	ND	ND	µg/l
Pyrene	ND	ND		ND	ND	ND	ND	ND	µg/l
Chrysene	ND	ND		ND	ND	ND	ND	ND	µg/l
Benzo [b]fluoranthene	ND	ND		ND	ND	ND	ND	ND	µg/l
Benzo[k]fluoranthene	ND	ND		ND	ND	ND	ND	ND	µg/l
Dibenzo [a,h]anthracene	ND	ND		ND	ND	ND	ND	ND	µg/l
Benzo[g,h,i]perylene	ND	ND		ND	ND	ND	ND	ND	µg/l
Benzo[j]fluoranthene	ND	ND		ND	ND	ND	ND	ND	µg/l
Benzo[a]pyrene	ND	ND		ND	ND	ND	ND	ND	µg/l
Benzo[e]pyrene	ND	ND		ND	ND	ND	ND	ND	µg/l
Indenol [1,2,3-cd]pyrene	ND	ND		ND	ND	ND	ND	ND	µg/l

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

48. One grab sample during each month of quarter from October to December 2023 was collected from the supply line network of MWSC (Male Water and Sewerage Company) at the project site. Samples were analyzed for limited parameter as per details given in Table 22 and findings of same are well within the acceptable limits. Detailed report is enclosed as Appendix3.

Table 22: Water quality for domestic supply of water used in construction camp during October- December -23

Test Parameter	Unit	Results			Acceptable Limits* Supply Water Quality Standards (5 December 2022) from the Utility Regulatory Authority
		18 October 2023	12 November 2023	3 December 2023	
Date of sampling		18 October 2023	12 November 2023	3 December 2023	
Physical Appearance		Clear	Clear	Clear	-
pH	--	6.3	6.7	7.6	6.5-8.5
Turbidity	NTU	<0.1	0.4	0.5	< 1.0
Residual Free Chlorine	mg/l	<0.1	<0.01	<0.01	-
Electrical Conductivity	µs/cm	386	479	497.3	<1000
Total Hardness	mg/l	23	9	10	
Total Suspended Solids	mg/L	5	2	2	5-750
Total Dissolved Solids	mg/L	259	267	272	5-750
Iron as Fe	mg/L	0.05	ND	ND	< 0.3
Hydrogen Sulphide	mg/L	<0.01	<0.01	<0.01	-
Ammonia	Mg/l	<0.1	<0.1	<0.1	-
Nitrate (as NO ₃ -)	mg/L	1.5	2	ND	<50
Chloride (as Cl ⁻)	mg/L	25.4	38.1	44.6	< 200
Fecal Coliform	MPN/100 ml	ND	ND	ND	0/100 ml
Total Coliform	MPN/100 ml	ND	ND	ND	0/100 ml
E.Coli	MPN/100 ml	ND	ND	ND	0/100 ml

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

49. One grab sample of treated wastewater was collected during each month of quarter from October to December 2023 from discharge point of WWTP/STP in operation at the project site and analyzed for limited parameter as per details given in Table 23.

50. Quality of treated wastewater of three samples is well within the acceptable limits prescribed by IFC General EHS Guidelines. However, quality of treated wastewater of all three samples is also well within limits prescribed by URA except of TSS and COD for samples collected in October-23. Detailed report is enclosed as Appendix3.

Table 23: Treated Wastewater Quality from WWTP/STP during October, November and December-23

Parameters	Unit	Results			Acceptable Limits National Wastewater Quality Guidelines URA (August 2023)	Acceptable limits as per IFC General EHS Guidelines 2007
		October 2023	November 2023	December 2023		
Total coliform	Org/ ml	280	27	24	-	400
Total suspended solids	mg/L	43	13	26	30	50
Residual free Chlorine	mg/L	<0.01	<0.01	<0.01		
Temperature	°C	4.5	28	28.1		-
Physical Appearance		ND	ND	ND		
pH at 25°C	--	7.3	7.2	7.1	5-9.5	6-9
Nitrate (as NO ₃ -)	mg/L	4.2	3.2	5.5		-
Ammonia –N	mg/L	3.2	2.8	3.6		
Sodium as Na	mg/L	45	39	35		
Sulfide	mg/L	0.1	0.1	0.1		
Sulphate	mg/L	34	34	36		
Chloride	mg/L	42	44	48		
Ortho Phosphates	mg/L	1.5	0.5	0.8	10	2
Surfactants	mg/l	1.2	0.6	ND		
Oil and grease	mg/L	3	ND	1	5	10
Electrical Conductivity	µs/cm	1059	1340.5	1301.7	---	-
Chemical Oxygen Demand	mg/L	70	45	48	50	125
Biological Oxygen Demand 20°C	mg/L	15	16	19	40	30
Dissolved Oxygen	mg/L	6.2	6.2	6		-
Calcium	mg/L	56	46	43		
Phenolic Compounds	mg/l	0.008	0.008	0.01		
Arsenic as As	mg/L	0.001	0.001	0.001		-
Cyanide	mg/L	0.1	0.1	0.1		-
Fluoride	mg/L	0.72	0.12	0.14		-
Zinc as Zn	mg/L	0.22	0.22	0.29		-
Cadmium	mg/L	0.002	0.002	0.002		-

Total nitrogen	mg/L	ND	ND	ND	15	10
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i. Discharge water quality from de-watering

51. One grab sample of discharge water from dewatering was collected during each month of quarter from discharge point of retention pond and analyzed for limited parameter to comply with requirements of local regulations as per details given in Table 26. However, no limit for discharge quality has been prescribed by local regulations. Detailed report is enclosed as Table 24 and Appendix 3.

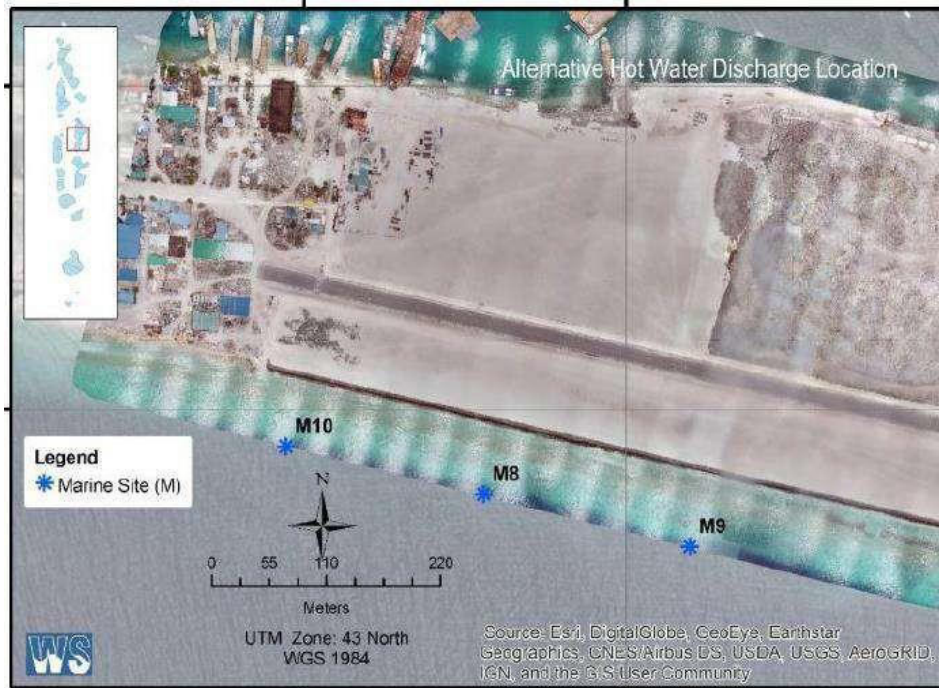
Table 24: Discharge Water Quality from Dewatering during October, November and December-23

Parameters	Unit	Results		
		October 2023	November 2023	December 2023
Fecal Coliform	MPN/100ml	ND	ND	ND
pH	pH	7.7	7.1	7.3
Temperature	°C	25.3	27.3	27.8
Total Dissolved Solids	mg/1	15150	24,000	25,900
Dissolved Oxygen	mg/1	6.2	6.6	6.4
Turbidity	NTU	2.5	7.2	2.6
Total Hydrocarbon	ppm	<0.1	<0.1	<0.1
Electrical Conductivity	us/CM	22611	39,200	47,170
Salinity	ppm	3.8	3.1	3.8
Hydrogen Sulphide	mg/1	0.25	0.05	<0.01
Oil& Grease	mg/1	0.09	1	2
Ammonia	mg/1	2.6	0.7	1.2
Nitrites	mg/l	<2.0	4.52	5.54
Phosphates	mg/l	0.09	0.03	0.09

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 17th October 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 7: 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

VIII. TRAINING AND CAPACITY BUILDING ACTIVITIES

54. Details of DBO/EPC Contractor-driven trainings are given in Table 25 and photos are shown in Appendix 5.

Table 25: 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	04.10.2023	Working at Height	What is working at, Hazards, Working at height Requirements PPE, Training,	WtE Site Thailafushi, 1hr	Site Workers	18, Male
2	08.10.2023	PTW Workshop	Scope of PTW, Purpose PTW, Types of PTW, Responsibility, Associated Certificates, Duration of Permit, Training	WtE Site Thailafushi, 2hr	Site Staff/ PTW Holder	15, Male
3	09.10.2023	Fire Watcher Training	Hazards, Basic Tools safety rules, PPE Inspection, Maintenance	WtE Site Thailafushi, 1hrs	Site Workers	10, Male
4	12.10.2023	Power and Hand Tools Safety	GRM Procedure, Complaint Channel, Resolution Process, Feedback	WtE Site Thailafushi, 1hrs	Site Workers	10, Male
5	21.10.2023	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	10, Male
6	24.10.2023	Emergency Response Training	Type of Emergency, Fire Siren, Assembly Point, Escape Route, Emergency Contact Numbers. Headcount	WtE Site Thailafushi, 1hrs	Site Workers	17, Male
7	15.10.2023	GRM Awareness Training	GRM Procedure, Complaint Channel, Resolution Process,	WtE Site Thailafushi, 1hrs	Site Workers	10, Male

No	Date	Training Activity	Training Objective	Venue and Duration	Target Group	Number of participants (male, female)
			Feedback			
8	5.11.23	Emergency Response Training	Type of Emergency, Fire Siren, Assembly Point, Escape Route, Emergency Contact Numbers. Headcount	WtE Site Thailafushi, 1hr	Site Workers	25, Male
9	8.11.23	Manual Handling Training	What is Manual Handling, Teechnique, Hazards, Mitigation, Training and PPE	WtE Site Thailafushi, 1hr	Site Workers	20, Male
10	11.11.2023	Scaffolding Safety Training	What is Scaffolding, Risk Assessment, Control measures, Working at height, PPE, Training	WtE Site Thailafushi, 1hr	Site Workers	10, Male
11	13.11.2023	Incident Reporting Procedure Training	What is incident, Type of Incident, Reporting Procedure, Documents and Records	WtE Site Thailafushi, 1hr	Site Workers	17, Male
12	20.11.2023	Lifting and Rigging Safety	Lifting Hazards, Types of slings and gears, Signal Technique, Inspection, Rigger Responsibility, signage and barrication, swing radius	WtE Site Thailafushi, 1hr	Site Workers	10, Male
13	10.12.2023	Flagman Training	Flag Man requirements, Signaling method, Responsibility, Safe distance, Visible to Operate	WtE Site Thailafushi, 1hrs	Site Workers	20, Male
14	12.12.2023	Security Management Training	Security System, Responsibility, Entry and exit Procedure for Visitors and Equipment, Emergency Response	WtE Site Thailafushi, 2hrs	Security Officers	8, Male
15	14.12.2023	Risk Assessment Procedure	Why is required to do Risk Assessment, What is Risk	WtE Site Thailafushi, 1hrs	Site Staff	5, Male

No	Date	Training Activity	Training Objective	Venue and Duration	Target Group	Number of participants (male, female)
			Assessment, Identify the Hazards, Evaluate the Risks, Who might be harmed, Control measures, Review			
16	23.12.2023	Driving Safety	Defensive Driving, Obey Speed Limit and signals, Work zone and driving safety considerations, Safe Distance, Blindspot, Inspection of vehicle and equipment.	WtE Site Thailafushi, 1hrs	Divers and Operators	6, Male
17	14.02.2023	Incident Reporting Procedure	Incident Reporting Protocol, Importance of incident reporting, Types of incident, Investigation Procedure, Case Study	WtE Site Thailafushi, 1hrs	Site staff	5, Male
18	23.12.2023	HSE Re Induction	HSE Policy and Objective, Site Safety Rules, Emergency Response, PPE, Incident Reporting, Risk Assessment,	WtE Site Thailafushi, 1hrs	Site workers	6, Male
19	24.12.2023	Vector Based Diseases Awareness Training	What are the vector-based diseases, Precautions, and Control Measures	WtE Site Thailafushi, 30 minutes	Site Workers/ Staff	80, Male

55. Table 26 provides details of training plan to be conducted by DBO contractor during January, 2024. PMDSC is in the process of revising project manual in which details of system to conduct regular trainings to all construction and supervision staff will be clearly defined.

Table 26: Training and Capacity building activities to be conducted during January 2024

Sn	Month	Trainings to be provided	Training Objective	Venue and Duration	Target Group
1	January-24	Chemical Handling	Hazards of chemicals, Entry route of chemicals, Control measures MSDS, PPE	WtE Site Thailafushi,	Site Workers
2	January-24	Working at Height	What is working at height, hazards, Risk Assessment, Fall prevention, PPE, Supervision,	WtE Site Thailafushi,	Subcontractor
3	January-24	Noise Awareness	What is Noise source of Noise, Noise Protection, PPE	WtE Site Thailafushi,	Site Workers
4	January-24	Food Safety	HACCP, Hygenic, Pest control, Temperature Control, First In First Out Procedure	WtE Site Thailafushi,	Kitchen Staffs

IX. PUBLIC CONSULTATION

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 firms are shortlisted and are now undergoing clarifications on the shortlisting. PCCB consultant is estimated to be finalized in next quarter.

57. During this period PMU conducted public awareness and communications of the project and details are given below:

- On October 24, 2024, PMU IEC Specialist participated as a panelist at the #MaldivesSHiFT Stakeholder Meeting in Malé. The session highlighted insights into Maldives' investment in waste-to-energy technology, specifically emphasizing the benefits of our project via the implementation of a WtE plant at Thilafushi. The event garnered participation from key industry officials representing over 15 government and inter-agencies. Five expert panelists delivered presentations on topics such as a study on street litter, waste segregation, marine litter, and plastic pollution.
- On November 21, 2023, the newly appointed Minister for Climate Change, Environment, and Energy, Thoriq Ibrahim, along with a group of media officials, toured the Thilafushi Regional Waste Management Facility and the adjacent construction at the DBO Waste-to-Energy site. The visit received extensive press coverage, with numerous articles disseminated, highlighting progress in sustainable solid waste management in the Maldives supported by the project. The Information, Education, and Communication (IEC) specialist conducted interviews, contributing to media engagement efforts.
- DBO contractor has planned a stakeholder engagement during February 2024.

X. GRIEVANCE REDRESS MECHANISM

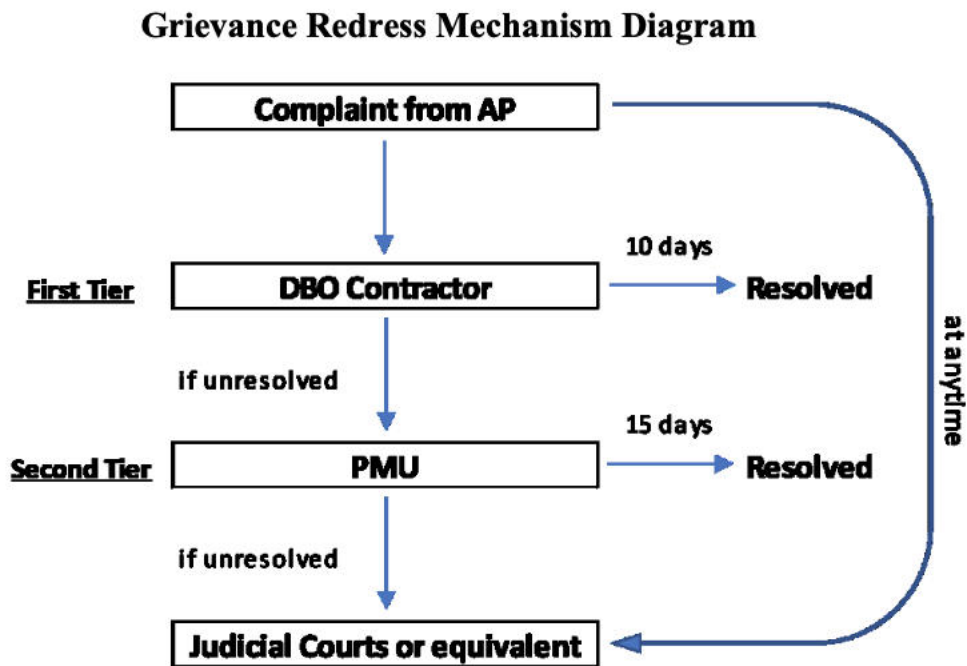
A. Grievance Redress Mechanism

58. 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

59. Aside from the project GRM, the DBO contractor has also setup an internal and external GRM to receive and address grievances/complaints from its staff/workers and public. However, GRM plan has been accepted with comments.

60. 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.

Figure 8: Grievance Redress Mechanism Flow Chart



61. 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 and/or EPC 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

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

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. Since no complaint was reported, no GRC meeting of 1st tier and 2nd tier has been conducted in this reporting period.

B. Complaints Received

62. No complaint has been received for this reporting period from public. However, Table 27 provides details of complaints from workers/staff which have been received and are being addressed by the Contractor.

Table 27: Details of Complaints received and Status

S n	Grievance Register Reference no	Type of Grievance	Date of receipt	Complainant name	Mode of communication	Subject /Nature of Complaint	Grievance Dealing Parties/ Department	Date of Acknowledged	Action Taken	Status/ Pending/Completed	Feedback from Complainant	Reason for delay Grievance solution
1	AAJV-FRM-0020	Food	1-Oct-23	Anonymous	Written	We request for vinegar and olive oil on cafeteria tables.	Camp Chief	02-Oct-23	06-Oct-23	Completed	Not received from complaints	NA
2	AAJV-FRM-0021	Food	12-Oct-23	Anonymous	Written	Food is extremely tasty	Camp Chief	13-Oct-23	13-Oct-23	Completed		
3	AAJV-FRM-0022	Food	5-Nov-23	Anonymous	Written	Very happy with the service provided.	Camp Chief	06-Nov-23	06-Nov-23	Completed		
4	AAJV-FRM-0023	Food	5-Nov-23	Anonymous	Written	We are so appreciate from foods and services.	Camp Chief	06-Nov-23	06-Nov-23	Completed		
5	AAJV-FRM-0024	Food	2-Dec-23	Ali Kilic	Written	I Request You to Add Red Beetroot to your meals.	Camp Chief	03-Dec-23	06-Dec-23	Completed		
6	AAJV-FRM-0025	Food	2-Dec-23	Kenan Kilic	Written	I Request You to Add Red Beetroot to your meals.	Camp Chief	03-Dec-23	06-Dec-23	Completed		
7	AAJV-FRM-0026	Food	2-Dec-23	Yucel Cakir	Written	I Request You to Add Red Beetroot to your meals	Camp Chief	03-Dec-23	06-Dec-23	Completed		

XI. FINDINGS AND RECOMMENDATIONS

A. Findings and Recommendations

63. The environmental clearance from the EPA 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.

64. The CEMP was conditionally approved by the PMU/PMDSC on 7 December 2022. As per details given in Table 10, most of HSE plans have been either accepted/approved or accepted with comments while Flora and Fauna management plan has been reviewed and asked to resubmit. While three documents namely Tool and Technique to review CEMP, Regulatory Compliance Evaluation Procedure and ESMS are yet to be submitted by DBO contractor for review. Final approval of CEMP will be given once all HSE plans are submitted and approved.

65. Fluctuation and vacancy of HSE expert positions is an ongoing problem all parties involved in the project are facing leading to challenges and discontinuity. PMDCSC's environmental expert position could be filled in December 2023, after being vacant for 5 months. DBO's HSE expert left the project in December 2023 but could be replaced immediately by Sedat Cot, as mentioned in Table 2.

66. Additional site mobilization, baseline data gathering on ambient air quality, ambient noise level, and 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 and Table 29 present key issues identified in previous quarter and key issues identified and proposed remedial actions based on findings for this quarter respectively.

Table 28: Status of Key Issues identified in previous QEMR (July to September-23)

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
1	Non-availability of Environmental Safeguard (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 	30.11.2023	PMDCSC	PMU	Staff has been deputed on 13 th December 2023 onwards
2	Pending finalization and approval of various HSE plans and ESMS	<ul style="list-style-type: none"> ▪ Finalize HSE plans and ESMS 	31.10.2023	DBO Contractor	PMDCSC /PMU	<ul style="list-style-type: none"> ▪ Status as on 31 December 2023 has been provided in Table 10. ▪ Comments have been shared with DBO contractor and reminders have been sent for pending documents
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, standards 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 monitoring of health and safety ▪ Enhance workers and supervisors training to identify work site risks and safety issues and reporting. 	Immediate and continuous compliance	DBO contractor	PMDCSC /PMU	<ul style="list-style-type: none"> ▪ Contractor was reminded via official letter to mobilize suitable experts as required in the Contract. ▪ PMDCSC is revising their procedures as part of project manual to have more effective inspection and supervision at project site including imparting need-based training.

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
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 well managed and an emergency response plan is put in place. 	Immediately	PMU	MOCCEE	On November 15 th WAMCO conducted a meeting to present their emergency response plans and agreed to conduct a joint fire drill with DBO/EPC contractor. WAMCO has assured PMU that daily inspections are conducted for any signs of fire and WAMCO has facilities to activate their emergency response plan
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 	Immediately	DBO contractor	PMDCSC and PMU	DBO is still preparing OHS monitoring plan but has assured to PMU in the March Monthly Progress Meeting that noise monitoring will start from March 2024.
6	Inadequate training and capacity building activities	<ul style="list-style-type: none"> ▪ Prepare a training plan on implementation and monitoring of H&S plan and CEMP. The training plan should cover all levels and all project agencies (workers, supervising staff, technical and monitoring staff, management etc.). 	31.12.2023	PMDCSC	PMDCSC /PMU	PMDCSC is revising project manual to identify and conduct need base trainings.

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
		<p>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.</p> <ul style="list-style-type: none"> ▪ Conduct periodic training of technical, supervision and EHS staff of contractor, PMU 				
7	<p>Inadequate training subcontractors of EPC contractor on HSE issues and further training of EPC contractors' team.</p>	<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. 	<p>Immediate and continuous compliance</p>	<p>DBO contractor with the guidance of PMDCSC</p>	<p>PMDCSC /PMU</p>	<ul style="list-style-type: none"> ▪ Refer Table 25 and 26 for training provided to workers during this quarter and to be provided in month of January-24 respectively. ▪ Document on HSE Training Procedure has been approved (refer Table 10 for status). ▪ PMDCSC is revising project manual to have more effective inspection on trainings conducted by DBO contractor

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
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 	31.12.2023	PMU	PMU	The firms are evaluated and PMU has shortlisted firm, but are now under clarification and negotiation stage. In the meantime, PMU conducts public awareness and engagements.

Table 29: Key Issues identified and Proposed Remedial Measure

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
1	Inadequacy observed on status of documents, implementation, practices, monitoring, records keeping, training etc.	<ul style="list-style-type: none"> ▪ PMDCSC shall have more effective inspections via walk downs, site inspections and audits by having specific details on role and responsibility of team, on schedule of site walk down, inspections and audits etc. ▪ PMDCSC to monitor training provided by DBO/EPC and to impart training to all key personal including Project Manager, Environmental Manager, and all key personnel including but not limited to professional engineers, site supervisors etc. on need basis ▪ Include a dedicated PMDCSC OHS representative on site to enable efficient monitoring and implement efficient corrective measures ▪ Revise project manual by PMDCSC to have more 	31 st March 2024	PMDCSC	PMU	<ul style="list-style-type: none"> ▪ PMDCSC is in the progress of updating the project manual including updated checklist for auditing and monitoring. ▪ Upon request from PMU, PMDCSC has submitted a proposal for an additional key expert position under the PMDCSC Contract. Proposal is pending with PMU

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
		<p>effective supervision and inspection</p> <ul style="list-style-type: none"> ▪ DBO contractor to ensure regular inspections, supervision and monitoring of implementation of CEMP and H&S plan by HSE professionals. ▪ DBO contractor to recruit remaining HSE personnel as per contract i.e. three environment officers and one H&S inspector. ▪ CEMP and H&S plan are to be revised. 	31 st March 2024	DBO contractor	PMU/ PMDCSC	
2	Submission of pending HSE plans	<ul style="list-style-type: none"> ▪ To get pending documents as referred in Table-10 for review and approval ▪ PMDCSC need to facilitate and follow up with DBO contractor 	31 st March 2024	DBO contractor	PMDSC /PMU	
3	OHS monitoring	<ul style="list-style-type: none"> ▪ Plan for OHS monitoring need to be in place and DBO contractor is preparing the same. ▪ Need to conduct ambient air quality and noise level on site. DBO contractor agreed to conduct the 	31 st March 2024	DBO contractor	PMDSC /PMU	

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
		same in the month of March				
4	Smoke emissions and fire risk from the existing waste dump site of WAMCO	PMU to follow up with WAMCO and ensure that risk is managed, and an emergency response plan is put in place.	Immediately	PMU	MOCCEE	
		DBO to review and update existing emergency plan, if any based on observations/ findings made during incident	Immediately	DBO	PMD CSC /PMU	
5	Risk due to presence of live electrical cables of STELCO (passing through project site)	PMU to follow up with HDC and STELCO for realignment and ensure that risk is managed, and an emergency response plan is put in place.	Immediately	PMU	MOCCEE	
6	Public consultation as part of stake holder engagement needs to be conducted	DBO is planning to conduct in February 2024.	29 th February 2024	DBO contractor	PMU	
7	Appointment of Public Awareness consultant by PMU	<ul style="list-style-type: none"> ▪ Speed up the hiring process (final bid evaluation and contract signing). 	31st March 2024	PMU	PMU	

No	Key Issue / Concern	Remedial/Corrective Measures	Target date	Implementation Responsibility	Monitoring responsibility	Status of implementation from last reporting period on pending issues identified
		<ul style="list-style-type: none"> ▪ Until consultants are hired, PMU to conduct public awareness 				

Environmental Monitoring Report

PUBLIC

Project Number: 51077-003
Quarterly Report (October - December 2023)
February 2024

Maldives: Greater Male Waste-to-Energy Project

Part B: Appendices

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

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

PERMITS



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



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

Completed	22
Not Started	9
In progress	1
total	32

No	Agency/Authority	Permit	Planned Submission Date	Actual Submission Date	Expected Approved Date	Actual Approved Date	Status	Progress/Comments	Permit Requirements	Focal Point	Updates (25.05.2023)
1a	HDC	Construction Permit (Main Building)	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 seperately 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 	HDC Hussain Ziyath Director - Planning and Development 778 87 41 ziyath@hdc.com.mv	
1b	HDC	Construction Permit (Other Buildings)	5/15/2023		5/29/2023		Not Started	<ul style="list-style-type: none"> ~ Each building drawings can be submitted seperately 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 Issued. 	<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 9838806 musab.sabree@epa.gov.mv	
4	URA	Dewatering Permit for Exavation 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 Shujuan Assistant Oceanographic Observer 7772026 mohamed.shujuan@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 Jazlaan Assistant Engineer 970 74 72 ahmed.jazlaan@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 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. HDC(161)-MNS/H2/2022/00393 Permit approved. Works will start by 07.08.2022</p> <p>Sewerage Connection 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		5/7/2023	Completed	-	-	Hassan Zameel duputy 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	-	-	

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 Direcor Secretariat@ura.gov.mv +9603332488
20	HDC	Partial Construction Permit for Spun Piles (ERQ – Table 5.17 – Item 1- Construction Permit)	15/3/2023	10/4/2023	5/11/2023	Completed		1) Site Organization Plan 2) WtE Building Facade 3) WtE Building Plan & Section 4) Geotechnical Evaluation Report 5) WtE Building Spun Piles Layout	
21	MNHPI	foundation systems of WtE 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			
24	HDC	Exavation permit for WtE Bunker & Process building			7/31/2023	Completed			
25	URA	Dewatering Permit for Exavation of Banker	8/20/2023		8/20/2023	Completed			
26	HDC	Exavation permit for WtE Bunker & Process building			8/26/2023	Completed			
27	URA	Dewatering Permit for Exavation of Banker	9/18/2023		9/21/2023	Completed			
28	HDC	Exavation permit for WtE Bunker & Process building	9/18/2023		9/24/2023	Completed			
29	HDC	Dewatering Location Permit	10/2/2023		10/15/2023	Completed			
30	HDC	Exavation permit for WtE Bunker & Process building	10/11/2023		10/18/2023	Completed			
31	URA	Dewatering Permit for Exavation of Banker	10/22/2023		10/23/2023	Completed			

HDC(161)-MNS/DW/2023/00059

APPLICATION SUBMITTED

DETAILS

NAME

URBASER S.A.

IDENTIFICATION

FC00242021

REQUEST

De-watering Location permit

GENERAL INFO

REQUESTED BY1

POWER OF ATTORNEY

APPLICANT ADDRESS1

Waste to Energy Facility K. Thilafushi

AGREEMENT NUMBER1

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

TIN NUMBER1

1142381GST501

PERMIT TYPE1

NEW

DEWATERING PERMIT NUMBER FOR RENEWAL/ADDITIONAL PIPELINE ONLY1

DRAWING APPROVAL OR CONSTRUCTION PERMIT NUMBER1

HDC(161)-MNS/H2/2023/01013

EXCAVATION PERMIT NUMBER1

HDC(161)-MNS/H2/2023/00689

LOCATION INFO

LOCATION1

PLOT

LOT NUMBER

K. Thilafushi -S7-01

DURATION & ADDITIONAL INFO

ESTIMATED DURATION FOR DEWATERING1

180

FOUNDATION DEPTH1

5 m

NUMBER OF PIPELINES1

2



PAYMENT DETAILS (RATES ARE MVR 2.00 METER/DAY FOR A PIPELINE AND MVR 10.00 METER/DAY FOR RAMP)

PIPELINE LENGTH

AMOUNTDAYMVR

TOTAL

RAMP-LENGTH

AMOUNTDAY

TOTAL

PERMITTED DURATION FOR PIPELINERAMP

GST AMOUNT

GRAND TOTAL

NOTE

FOR OFFICE USE (MONITORING & INSPECTION)

PIPELINERAMP INSTALLATED DATE

RAMPIPELINE PERMIT EXPIRY DATE

POST INSPECTION SITE STATUS

INSPECTOR NAME

INSPECTOR SIGN

REMARKS

CUSTOMER NAME

CUSTOMER SIGN

PAYMENT DETAILS OF EXCEEDING DURATION

DEWATERING PERMIT END DATE

ROAD-CLOSING-DATE-FOR-RAMP/PIPELINE-REMOVAL

EXCEEDED DURATION

NO OF PIPELINES

PIPELINE LENGTH

RAMP FEE

TOTAL

SLIP REMARKS

NOTE1

ACTIONS

DOCUMENTS

LOT/RH/FLAT REGISTRY/AGREEMENT COPY (COVER PAGE, FIRST TWO PAGES AND THE SIGNATORY PAGE)



ID CARD COPY OR REGISTRATION COPY/SOLE PROPRIETORSHIP REGISTRATION COPY



URA DEWATERING PERMIT



POWER OF ATTORNEY DOCUMENT



LOCATION MAP



485-AP/PRIV/2023/636

දෙමළු කිරීමේ ඉඩපත

DEWATERING PERMIT

Work Site: Waste to Energy Facility in K. Thilafushi

Owner of the work: MECCT

Contractor: Alke-Alkatas Joint Venture Pvt. Ltd.

Application Form no: DW23162-2

Permit Duration: 28 Days

Start Date: 23.10.2023 12PM

End Date: 20.11.2023 12PM

Issued Date: 23.10.2023

දෙමළු කිරීමේ ඉඩපත
Approved by



Utility Regulatory Authority

ලංකා විදුලි බලාපොරොත්තු
පාලන ආයතන



EXCAVATION PERMIT
HDC(161)-MNS/H2/2023/01103
11/10/2023 05:39:51



APPROVED

APPLICANT NAME
URBASER S.A.

IDENTIFICATION
FC00242021

MOBILE NUMBER
7522866

APPROVED DATE
18/10/2023

GENERAL INFO

REQUESTED BY
Power of Attorney

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

LOT/UNIT
S7-01 (WTE DBO Facility)

LOT OWNER
Ministry of Environment Climate Change and Technology

EXCAVATION DETAILS

PURPOSE OF EXCAVATION
Waste to Energy Facility-WtE Building construction work

LOCATION/ROAD NAME
K. Thilafushi -S7-01

DEPTH
500 cm

PERMIT TYPE
PERMANENT

REGISTERED CONTRACTOR INFO

NAME
URBASER S.A.

ADDRESS
Waste to Energy Facility K. Thilafushi

PHONE NO.
9676559

IND/REG NO.
FC00242021

REMARKS

NOTE:
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 Habor Engineering Company's. • Should not disrupt the relocation works of Thilafushi MV cable. • This permit is valid for 14 days (excluding government and public holidays). • This permit is renewal of slip of the permit HDC(161)-MNS/H2/2023/01013 approved on 24/09/2023. • The renewing of the slip will incur a fine of MVR 100 (including 8% GST). • HDC inspectors should be informed via hotline (Hulhumale :7973535, Thilafushi & Gulhifalhu : 7940794) before progression and all instructions given by inspector should be followed, pertaining to rules and regulations of HDC. • Follow the guidelines of relevant authorities while attending to the works.

FOR OFFICE USE ONLY:

PRE INSPECTION SITE STATUS/REMARKS:

INSPECTOR NAME:

DATE:

SIGN:

POST INSPECTION SITE STATUS/REMARKS:

INSPECTOR NAME:

DATE:

SIGN:

AUTHORIZED SIGNATORY

ADAM AZMEE

HDC(161)-MNS/DW/2023/00072

ISSUED

App at 20/11/2023 03:33:28

DETAILS

NAME

URBASER S.A.

IDENTIFICATION

FC00242021

REQUEST

De-watering Location permit

GENERAL INFO

REQUESTED BY1

POWER OF ATTORNEY

APPLICANT ADDRESS1

Waste to Energy Facility K. Thilafushi

AGREEMENT NUMBER1

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

TIN NUMBER1

1142381GST501

PERMIT TYPE1

RENEWAL

DEWATERING PERMIT NUMBER FOR RENEWAL/ADDITIONAL PIPELINE ONLY1

HDC(161)-MNS/DW/2023/00059

DRAWING APPROVAL OR CONSTRUCTION PERMIT NUMBER1

HDC(161)-MNS/H2/2023/01013

EXCAVATION PERMIT NUMBER1

HDC(161)-MNS/H2/2023/01166

LOCATION INFO

LOCATION1

PLOT

LOT NUMBER

K. Thilafushi -S7-01

DURATION & ADDITIONAL INFO

ESTIMATED DURATION FOR DEWATERING1

180

FOUNDATION DEPTH1

5 m

NUMBER OF PIPELINES1

2

NOTE

PAYMENT DETAILS (RATES ARE MVR 2.00 METER/DAY FOR A PIPELINE AND MVR 10.00 METER/DAY FOR RAMP)

PIPELINE LENGTH

52.37

AMOUNTDAYMVR

209.48

TOTAL

5865.44

RAMP-LENGTH

AMOUNTDAY

TOTAL

PERMITTED DURATION FOR PIPELINERAMP

28

GST AMOUNT

469.24

GRAND TOTAL

6334.68

NOTE

FOR OFFICE USE (MONITORING & INSPECTION)

PIPELINERAMP INSTALLATED DATE

RAMPIPELINE PERMIT EXPIRY DATE

POST INSPECTION SITE STATUS

INSPECTOR NAME

INSPECTOR SIGN

REMARKS

CUSTOMER NAME

CUSTOMER SIGN

PAYMENT DETAILS OF EXCEEDING DURATION

DEWATERING PERMIT END DATE

ROAD-CLOSING-DATE-FOR-RAMP/PIPELINE-REMOVAL

EXCEEDED DURATION

NO OF PIPELINES

PIPELINE LENGTH

RAMP FEE

TOTAL

SLIP REMARKS

NOTE1

SLIPS

OPEN SLIP

ACTIONS

DOCUMENTS

DEWATERING LOCATION MAP



POWER OF ATTORNEY DOCUMENT



ID CARD COPY OR REGISTRATION COPY/SOLE PROPRIETORSHIP REGISTRATION COPY



LOT/RH/FLAT REGISTRY/AGREEMENT COPY (COVER PAGE, FIRST TWO PAGES AND THE SIGNATORY PAGE)



LOCATION MAP



URA DEWATERING PERMIT



PAYMENTS

RAMP PAYMENT (P177639)

MVR 6334.68

Paid

ADMIN FEE (P176664)

MVR 216

Paid

Excavation Permit



App at 09/11/2023 07:14:33

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 (WTE DBO Facility)

LOT OWNER

Ministry of Environment Climate Change and Technology

AGREEMENT NUMBER

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

CONSTRUCTION PERMIT NUMBER

FA(PP)2023-066

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

9980679

CONTRACTOR NIDREG NO

FC00242021

REMARKS**NOTE:**

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 Habor Engineering Company's. •Should submit detail drawing including depth details to Urbanco after completion of the works. • Should not disrupt the relocation works of Thilafushi MV cable. • This permit is valid for 14 days (excluding government and public holidays). • This permit is renewal of slip of the permit HDC(161)-MNS/H2/2023/01013 approved on 18/10/2023. • The renewing of the slip will incur a fine of MVR 100 (including 8% GST). • HDC inspectors should be informed via hotline (Hulhumale':7973535, Thilafushi & Gulhifalhu : 7940794) before progression and all instructions given by inspector should be followed, pertaining to rules and regulations of HDC. • Follow the guidelines of relevant authorities while attending to the works.

FOR OFFICE USE ONLY:

SITE STATUSREMARKS

PRE INSPECTION BY

DATE

INSPECTOR SIGN

POST INSPECTION SITE STATUSREMARKS

INSPECTOR NAME

DATE:

SIGN

SLIPS

OPEN SLIP

ACTIONS

DOCUMENTS

LOT/RH/FLAT REGISTRY/AGREEMENT COPY (COVER PAGE, FIRST TWO PAGES AND THE SIGNATORY PAGE)



LOCATION MAP



ID CARD COPY OR REGISTRATION COPY/SOLE PROPRIETORSHIP REGISTRATION COPY



CONTRACTOR NID OR COMPANY REGISTRATION



POWER OF ATTORNEY DOCUMENT



NATIONAL CONTRACTOR REGISTRATION COPY



PAYMENTS

RENEWAL FEE (P174887)

MVR 108

Paid

ADMIN FEE (P172824)

MVR 108

Paid

485-AP/PRIV/2023/685

දෙවැනි මහල, පාලන කොට්ඨාසය, කොළඹ 05

DEWATERING PERMIT

Work Site: Waste to Energy Facility in K. Thilafushi

Owner of the work: MECCT

Contractor: Alke-Alkatas Joint Venture Pvt. Ltd.

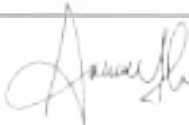
Application Form no: DW23162-3

Permit Duration: 28 Days

Start Date: 21.11.2023 12PM

End Date: 19.12.2023 12PM

Issued Date: 21.11.2023


උපකරණ පාලන පනතේ යටතේ
විදුලි සැපයීමේ පාලන කමිටුව

Approved by



Utility Regulatory Authority

උපකරණ පාලන පනතේ යටතේ
විදුලි සැපයීමේ පාලන කමිටුව

PERMITS



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



Completed	28
Not Started	9
In progress	1
total	38

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

No	Agency/Authority	Permit	Planned Submission Date	Actual Submission Date	Expected Approved Date	Actual Approved Date	Status	Progress/Comments	Permit Requirements	Focal Point	Updates (31.12.2023)
1a	HDC	Construction Permit (Main Building)	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 seperetely 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 	HDC Hussain Ziyath Director - Planning and Development 778 87 41 ziyath@hdc.com.mv	
1b	HDC	Construction Permit (Other Buildings)	5/15/2023		5/29/2023		Not Started	<ul style="list-style-type: none"> Each building drawings can be submitted seperetely 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 Issued. 	<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 9838806 musab.sabree@epa.gov.mv	
4	URA	Dewatering Permit for Exavation 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 Shujuan Assistant Oceanographic Observer 7772026 mohamed.shujuan@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 Jazlaan Assistant Engineer 970 74 72 ahmed.jazlaan@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 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. HDC(161)-MNS/H2/2022/00393 Permit approved. Works will start by 07.08.2022</p> <p>Sewerage Connection 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		5/7/2023	Completed	-	-	Hassan Zameel duputy 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	-	-	
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 Direcor Secretariat@ura.gov.mv +9603332488	
20	HDC	Partial Construction Permit for Spun Piles (ERQ – Table 5.17 – Item 1- Construction Permit)		15/3/2023	10/4/2023	5/11/2023	Completed		1) Site Organization Plan 2) WtE Building Facade 3) WtE Building Plan & Section 4) Geotechnical Evaluation Report 5) WtE Building Spun Piles Layout		
21	MNHPI	foundation systems of WtE 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				
24	HDC	Exavation permit for WtE Bunker & Process building				7/31/2023	Completed				
25	URA	Dewatering Permit for Exavation of Banker		8/20/2023		8/20/2023	Completed				
26	HDC	Exavation permit for WtE Bunker & Process building				8/26/2023	Completed				
27	URA	Dewatering Permit for Exavation of Banker		9/18/2023		9/21/2023	Completed				
28	HDC	Exavation permit for WtE Bunker & Process building		9/18/2023		9/24/2023	Completed				
29	HDC	Dewatering Location Permit		10/2/2023		10/15/2023	Completed				
30	HDC	Exavation permit for WtE Bunker & Process building		10/11/2023		10/18/2023	Completed				
31	URA	Dewatering Permit for Exavation of Banker		10/22/2023		10/23/2023	Completed				
34	HDC	Exavation permit for WtE Bunker & Process building		11/3/2023		11/9/2023	Completed				
33	HDC	Dewatering Location Permit		11/8/2023		11/20/2023	Completed				
35	URA	Dewatering Permit for Exavation of Banker		11/19/2023		11/21/2023	Completed				
36	HDC	Exavation permit for WtE Bunker & Process building		11/26/2023		12/3/2023	Completed				
37	HDC	Exavation permit for WtE Bunker & Process building		12/17/2023		12/25/2023	Completed				
39	URA	Dewatering Permit for Exavation of Banker		12/18/2023		12/24/2023	Completed				

HDC(161)-MNS/DW/2023/00079

ISSUED

App at 21/12/2023 06:55:18

DETAILS

NAME

URBASER S.A.

IDENTIFICATION

FC00242021

REQUEST

De-watering Location permit

GENERAL INFO

REQUESTED BY1

POWER OF ATTORNEY

APPLICANT ADDRESS1

Waste to Energy Facility K. Thilafushi

AGREEMENT NUMBER1

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

TIN NUMBER1

1142381GST501

PERMIT TYPE1

RENEWAL

DEWATERING PERMIT NUMBER FOR RENEWAL/ADDITIONAL PIPELINE ONLY1

DRAWING APPROVAL OR CONSTRUCTION PERMIT NUMBER1

HDC(161)-MNS/H2/2023/01013

EXCAVATION PERMIT NUMBER1

HDC(161)-MNS/DW/2023/00072

LOCATION INFO

LOCATION1

PLOT

LOT NUMBER

K. Thilafushi -S7-01

DURATION & ADDITIONAL INFO

ESTIMATED DURATION FOR DEWATERING1

150

FOUNDATION DEPTH1

5 m

NUMBER OF PIPELINES1

2

NOTE

PAYMENT DETAILS (RATES ARE MVR 2.00 METER/DAY FOR A PIPELINE AND MVR 10.00 METER/DAY FOR RAMP)

PIPELINE LENGTH

52.37

AMOUNTDAYMVR

209.48

TOTAL
5865.44

RAMP-LENGTH

AMOUNTDAY
469.24

TOTAL
6334.68

PERMITTED DURATION FOR PIPELINERAMP

GST AMOUNT

GRAND TOTAL

NOTE

FOR OFFICE USE (MONITORING & INSPECTION)

PIPELINERAMP INSTALLED DATE

RAMPIPELINE PERMIT EXPIRY DATE

POST INSPECTION SITE STATUS

INSPECTOR NAME

INSPECTOR SIGN

REMARKS

CUSTOMER NAME

CUSTOMER SIGN

PAYMENT DETAILS OF EXCEEDING DURATION

DEWATERING PERMIT END DATE

ROAD-CLOSING-DATE-FOR-RAMP/PIPELINE-REMOVAL

EXCEEDED DURATION

NO OF PIPELINES

PIPELINE LENGTH

RAMP FEE

TOTAL

SLIP REMARKS

NOTE1

SLIPS

OPEN SLIP

ACTIONS

DOCUMENTS

DEWATERING LOCATION MAP



LOCATION MAP



LOT/RH/FLAT REGISTRY/AGREEMENT COPY (COVER PAGE, FIRST TWO PAGES AND THE SIGNATORY PAGE)



ID CARD COPY OR REGISTRATION COPY/SOLE PROPRIETORSHIP REGISTRATION COPY



POWER OF ATTORNEY DOCUMENT



PAYMENTS

RAMP PAYMENT (P186129)

MVR 6334.68

Dewatering pipeline fee for 28 days

Paid

ADMIN FEE (P185169)

MVR 108

Paid

485-AP/PRIV/2023/748 :سرسره نمبر

دوسره لائسنس ديمتري ديسايمنت

DEWATERING PERMIT

دوسره لائسنس ديمتري ديسايمنت : ٠٧ ديسايمنت ديسايمنت ديسايمنت ديسايمنت

Work Site: Waste to Energy Facility in K. Thilafushi

دوسره لائسنس ديمتري ديسايمنت : ديسايمنت ديسايمنت ديسايمنت

Owner of the work: MCCEE

دوسره لائسنس ديمتري ديسايمنت : ديسايمنت ديسايمنت ديسايمنت ديسايمنت

Contractor: Alke-Alkatas Joint Venture Pvt. Ltd.

Application Form no: DW23162-4

دوسره لائسنس ديمتري ديسايمنت : ديسايمنت ديسايمنت ديسايمنت

Permit Duration: 28 Days

دوسره لائسنس ديمتري ديسايمنت : ديسايمنت ديسايمنت ديسايمنت

Start Date: 24.12.2023 12PM

دوسره لائسنس ديمتري ديسايمنت : ديسايمنت ديسايمنت ديسايمنت

End Date: 21.01.2024 12PM

دوسره لائسنس ديمتري ديسايمنت : ديسايمنت ديسايمنت ديسايمنت

Issued Date: 24.12.2023

دوسره لائسنس ديمتري ديسايمنت : ديسايمنت ديسايمنت ديسايمنت



دوسره لائسنس ديمتري ديسايمنت
Approved by

EXCAVATION PERMIT

HDC(161)-MNS/H2/2023/01258

26/11/2023 01:36:38

**APPROVED**

APPLICANT NAME

URBASER S.A.

IDENTIFICATION

FC00242021

MOBILE NUMBER

7522866

APPROVED DATE

03/12/2023**GENERAL INFO**

REQUESTED BY

Power of Attorney

PERMIT LOCATION

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

LOT/UNIT

S7-01 (WTE DBO Facility)

LOT OWNER

Ministry of Environment Climate Change and Technology**EXCAVATION DETAILS**

PURPOSE OF EXCAVATION

Waste to Energy Facility-WtE Building Construction

LOCATION/ROAD NAME

K. Thilafushi -S7-01

DEPTH

500 cm

PERMIT TYPE

PERMANENT**REGISTERED CONTRACTOR INFO**

NAME

URBASER S.A.

ADDRESS

Waste to Energy Facility K. Thilafushi

PHONE NO.

9980679

NID/REG NO.

FC00242021**REMARKS**

NOTE:

This permit is valid until the completion of excavation work as per the work schedule.**This is a renewal of permit no HDC(161)-MNS/H2/2023/01166 Approved on 09/11/2023.****The renewing of the slip will incur a fine of MVR 108 (GST 8% Included). Before progression, HDC inspectors should be informed via hotline (Hulhumale':7973535, Thilafushi & Gulhifalhu : 7940794) and all instructions given by inspector should be followed, pertaining to rules and regulations of HDC. Also follow the guidelines of relevant authorities while attending to the works.****FOR OFFICE USE ONLY:**

PRE INSPECTION SITE STATUS/REMARKS:

INSPECTOR NAME:

DATE:

SIGN:

POST INSPECTION SITE STATUS/REMARKS:

INSPECTOR NAME:

DATE:

SIGN:

AUTHORIZED SIGNATORY

ADAM AZMEE

**Appendix 2: Site Inspection Reports by PMDCSC from
October – December 2023, including Site Inspection
Photos**



Site Inspection Report

No.: SI-23-26

by the Employer's Representative

Date / Time of the Visit	Conducted by [ER]	Signature
12 th October 2023 10:35 hrs – 13:00 Hrs	Nahee Nazim Deputy Team Leader Fichtner / REM	

General Observations

Sn	Particulars	Details / Remarks	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.	-
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	-
5	Others, if any	Presence of 350 KVA DG, and additional generators placed around the site, conditional approval from URA has been obtained via email.	-

Progress Observations

No.	Particulars	Details / Remarks	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.	
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.	-
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.	-

Environmental Observations

Sn	Particulars	Details / Remarks	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.	-
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.	-
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.	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.	
4	Status of adequacy of record keeping including data reported in monthly environment report on the basis of assessment made on randomly basis.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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	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 runs within the site boundary. 	-
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.	-
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.	-
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.	-
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.	-
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.	-
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.	Boxes placed for for internal grievance redress mechanism.	-
8	Status of adequacy of record keeping including data reported in monthly HSE report on the basis of randomly assessment made.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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

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.	-
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.	-
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.	-

Site Photos



Photo 01 12/10/23 10:36hrs.

New workers accommodation building under construction within the construction camp area. Appropriate PPE was in place.



Photo 02 by 12/10/23 10:38hrs.

New workers accommodation building under construction within the construction camp area. Appropriate PPE was in place.



Photo 03 12/10/23 10:40hrs.
Inside the new accommodation building for workers.



Photo 04 12/10/23 10:45hrs.
Storage area, Construction camp view and the WAMCO landfill area and the Bale stacking area. The landfill corner is very close to the site boundary fence, and is currently being used. The bales are now placed about 26m from the site boundary fence.



Photo 05 12/10/23 10:50hrs.
Overhead view of the construction camp.



Photo 06 12/10/23 10:55hrs.
Overhead view showing the current onsite works.



Photo 07 12/10/23 11:00hrs.
Bunker area has been sheet piled and the wellpoint dewatering system installed, excavation has started.



Photo 08 12/10/23 11:08hrs.
Overhead view of the excavated soil stored in the laydown area, within the site boundary.



Photo 09 12/10/23 11:10hrs.

Shipwrecks next to the quay wall still remain, waste from the landfill blown into the ocean.

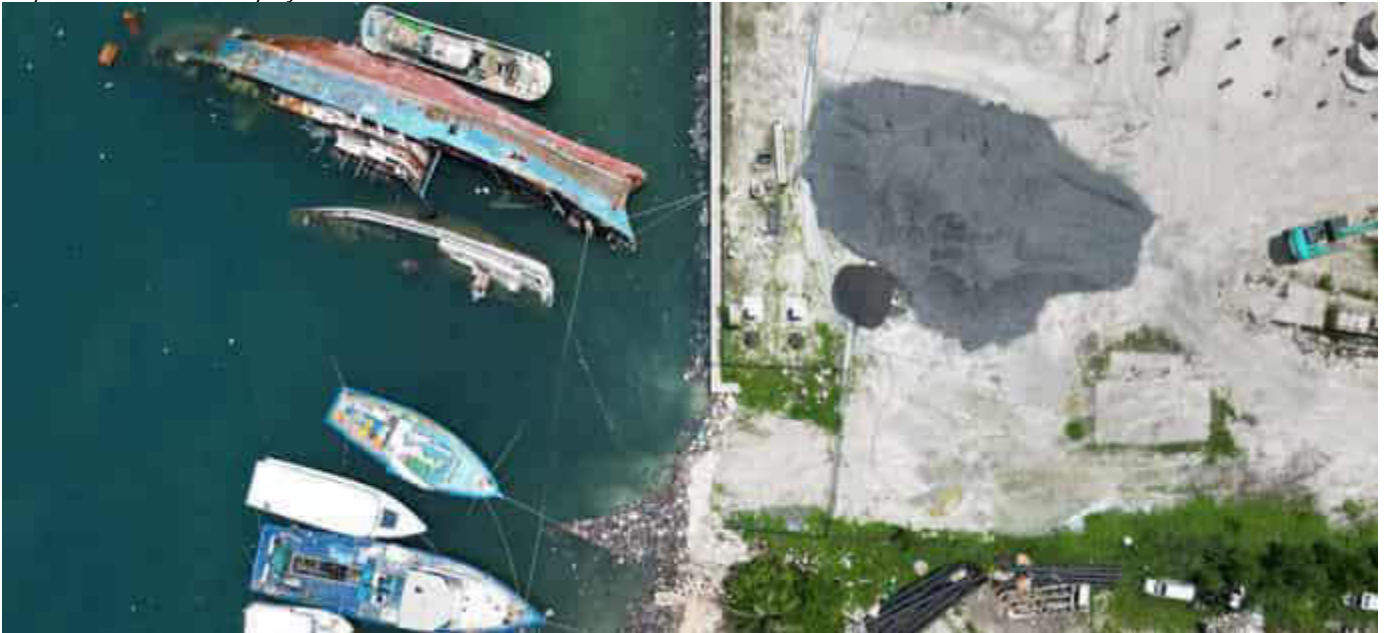


Photo 10 12/10/23 11:12hrs.

Shipwrecks next to the quay wall still remain, waste from the landfill blown into the ocean.



Photo 11 12/10/23 11:19hrs.

Overhead view of the bale stacking area, now stacked as close as 26m from the site boundary fence in front of the entrance gate.



Photo 12 12/10/23 11:20hrs.

WAMCO landfill, waste kept very close to the quay wall and gets blown into the lagoon, precautions should be taken when working close to the fence towards the landfill.



Photo 13 12/10/23 11:22hrs.
Concrete testing lab under construction close to the batching plant setup within the site boundary.



Photo 14 12/10/23 11:23hrs.
Concrete testing lab under construction close to the batching plant setup within the site boundary.



Photo 15 12/10/23 11:25hrs.
Dewatering pipeline laying work ongoing.



Photo 16 12/10/23 11:26hrs.

Dewatering pipeline laying work ongoing, pipes run through re-purposed damaged spun piles, under the road area, and over the STELCO live cable.



Photo 17 12/10/23 11:28hrs.

Dewatering sedimentation tank, green coloration and a faint smell present.



Photo 18 12/10/23 11:29hrs.

Aggregate storage area close to the batching plant construction site.



Photo 19 12/10/23 11:31hrs.

Barbending and formwork fabrication area close to the batching plant construction site.



Photo 20 12/10/23 11:32hrs.

Foundation works for the batching plant equipment constructed.



Photo 21 12/10/23 11:33hrs.

Batching plant area under construction.



Photo 22 12/10/23 11:34hrs.
Batching plant parts and equipment on site.



Photo 23 12/10/23 11:36hrs.
Fuel storage area, needs to be completed urgently, the containment volume should be checked and ensure proper fire fighting equipment is kept within reach.



Photo 24 12/10/23 11:37hrs.
Waste oil storage area.



Photo 25 12/10/23 11:40hrs.

Waste sorting and storage, WAMCO landfill very close to the site boundary here, precaution should be taken when working in this area.



Photo 26 12/10/23 11:41hrs.

Area around the storage building should be kept clear for access, please remove these at the earliest.



Photo 27 12/10/23 11:42hrs.

Dedicated resting and smoking area setup within the site camp.



Photo 28 12/10/23 11:43hrs.
Water fountain with water filter made available for workers.



Photo 29 12/10/23 11:44hrs.
The main storage tank still leaks at several places, and this issue has not been rectified after several months.



Photo 30 12/10/23 11:45hrs.
The main toilet block has been completed and is in use, kept clean and cleaning log maintained.



Photo 31 12/10/23 11:47hrs.
Handwash area at the workers mess hall kept clean.



Photo 32 12/10/23 11:48hrs.
Waste water treatment plant is operational and in use. Periodic testing is done to ensure the water is safe enough to be pumped to the ocean.



Photo 33 12/10/23 11:49hrs.
Cooking gas storage kept locked and fire fighting equipment on hand.



Photo 34 12/10/23 11:50hrs.

The guard house at the site entrance has water leak damage from the windows and should be fixed as soon as possible.

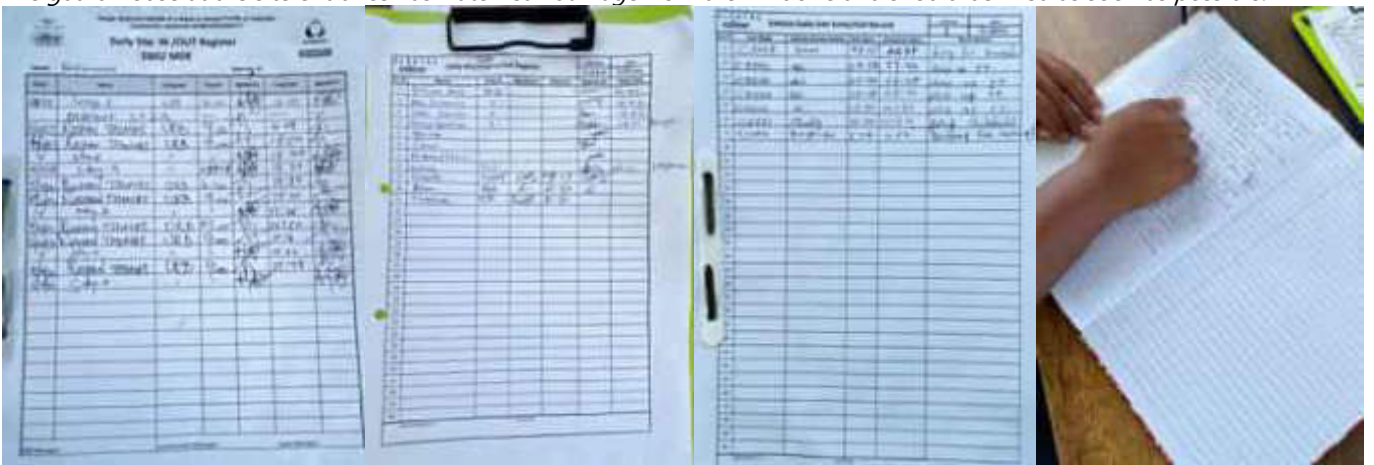


Photo 35 12/10/23 11:51hrs.

Staff and workers entry logs maintained on loose paper, and shift handover event log maintained by the security company on log book.



Photo 36 12/10/23 11:55hrs.

Material for new accommodation building on site.



Photo 37 12/10/23 11:56hrs.
Laundry in operation, laundry staff assigned.



Photo 38 12/10/23 11:57hrs.
Workers accommodation shared room for 6 persons, wardrobe and bunk bed provided. Generally kept clean.



Photo 39 12/10/23 11:58hrs.
The Emergency Assembly Point is not visible and 2 containers have been placed here, this should be moved as soon as possible.



Photo 40 12/10/23 11:59hrs.
Well point dewatering system installed in place around the bunker area and ready to be used.



Photo 41 12/10/23 11:59hrs.
Well point dewatering system installed in place around the bunker area and ready to be used.



Photo 42 12/10/23 12:00hrs.
PTW maintained in the work area, however water damage seen on the files, this should be water proofed as soon as possible.



Photo 43 12/10/23 12:05hrs.

Excavated area for the process building, spun piles have been cut to length and being made ready for lean concrete work.



Photo 44 12/10/23 12:06hrs.

Damaged pile within the process building area, yet to be cut to length.



Photo 45 12/10/23 12:07hrs.
Process building area, piling works ongoing.



Photo 46 12/10/23 12:08hrs.
Fabrication of the framing to be used for static load testing of the spun piles ongoing.



Photo 47 12/10/23 12:09hrs.
Rejected spunpiles clearly marked and put aside.



Photo 48 12/10/23 12:10hrs.
Security guard posted at the quay wall gate.



Photo 49 12/10/23 12:11hrs.
Waste dumped very close to the site boundary fence as well as the quay wall, waste is being blown into the lagoon.

DESIGN-BUILD AND OPERATE A WASTE TO ENERGY FACILITY IN K. THILAFUSHI	
HSE STATISTICS BOARD	
PROJECT COMMENCEMENT DATE:	0 2 0 3 2 2
TODAY DATE:	1 2 1 0 2 3
TOTAL MANPOWER AT SITE:	1 0 7
TOTAL SAFE MAN-HOURS COMPLETED WITHOUT LTI:	2 6 8 4 0 3
LTI FREE DAYS COMPLETED:	5 8 8

Photo 50 12/10/23 12:15hrs.
HSE statistics board placed near the site construction office, and regularly updated.

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	29	0	0	0	29	29	261	0	261
	EPC Contractor indirect staff	18	0	0	0	18	18	162	0	162
	EPC Contractor direct site workers	46	0	0	0	46	46	414	0	414
	Security (Gage)	7	0	0	0	7	0	63	0	63
	ELS (Spun pile contractor)	11	0	0	0	11	0	99	0	99
	Subcontractor (Electrician)	0	0	0	0	0	0	0	0	0
	Medical Leave	0	0	0	0	0	0	0	0	0
	Absent	0	0	0	0	0	0	0	0	0
	Vacation	7	0	0	0	7	0	0	0	0
	Grand Total Site POB	116	0	0	0	116	93	1044	0	1044

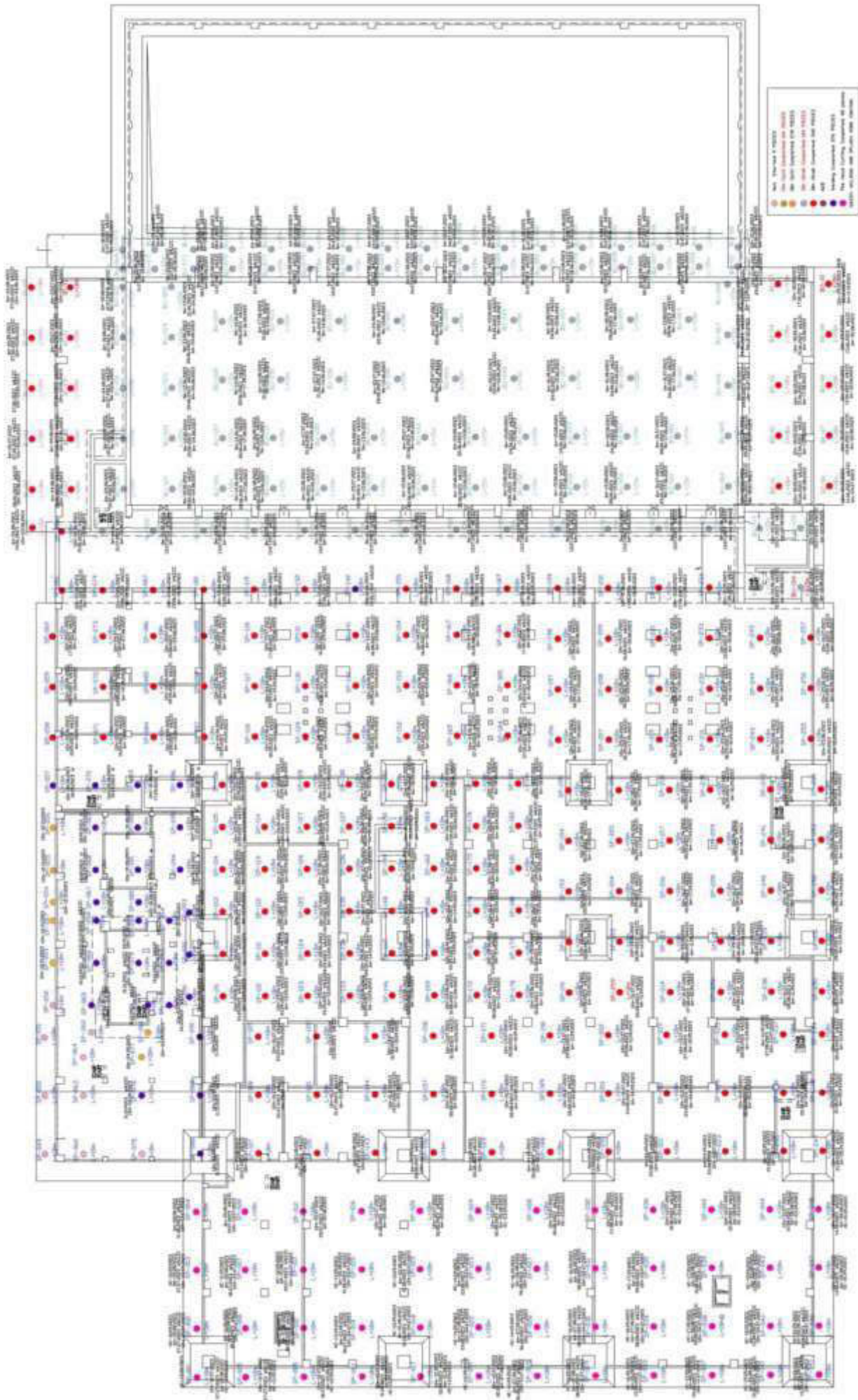
ALKE ALKATAS JV		HAZARDOUS MATERIAL RESOURCES								
		Concrete Admixture	Bitumen Material	Formwork Oil	Epoxy Material	Diesel	Fuel Oil	Paint	Antirust	Isolation Solution
Daily		0	0	0	0	500.0 lt	0	0	0	0
Monthly		0	0	0	0	6,200.0 lt	0	0	0	0
Project Total		0.0 lt	90.0 kg	0.0 lt	0.0 lt	75,697.0 lt	2509.0 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		0.002 tons	0.001 tons	0.010 tons	0	0.06 tons	6.70 tons	0	0	0
Monthly		0.028 tons	0.013 tons	0.120 tons	0	0.72 tons	80.40 tons	0	0	0.065 tons
Project Total		1.822 tons	0.532 tons	2.082 tons	0.0 tons	12.49 tons	708.30 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
93%	20 th October 2023	5 piece 12 m (SP-053, SP054, SP-055, SP-056, SP-267) spun pile installation of the VTE Building were completed.	No construction activities due to weekend.
100%	12 th October 2023	Installation of the dewatering pumps line and discharge line have been completed.	
55%	25 th October 2023	Construction of the concrete batching plant is ongoing.	
40%	31 st November 2023	Construction of the pre-fabricated accommodation building is ongoing.	
100%	12 th October 2023	Air Quality Monitoring at 7 locations (AQ1, AQ2, AQ3, AQ4, ASR2, ASR3, ASR5) for the construction stage monitoring were completed.	

PERMIT TO WORK							
PTW No.	Issue Date	Permit Holder	Area Authority	Location	Task Description	Expiry Date	Status
CW00129	7 th Oct 23	Bulent Duzenlioglu	Hikmet Buluttekin	General Mobilization	Cable laying,electric works,pumps and electric pumps generator maintenance ,material handing,pipe work, scaffolding works and working at height.	13 th Oct 23	Open
CW00130	8 th Oct 23	Ram Niwas	Hikmet Buluttekin	Warehouse Site	General maintenance for equipments.	14 th Oct 23	Open
CW00131	8 th Oct 23	M. Yunus Karaja	Hikmet Buluttekin	Laboratory Container	Lifting,scaffolding work(working at height) material handling, gypsum board work	14 th Oct 23	Open
HW00057	9 th Oct 23	Amos Chinnaiah	Hikmet Buluttekin	Waste Reception Hall	HDPE pipe installation.	16 th Oct 23	Open
CW00132	9 th Oct 23	Dinakaran	Hikmet Buluttekin	Camp Area	Fabrication,lifting ,material handling,scaffolding work, installation of prefabricated panels.	16 th Oct 23	Open
CW00133	9 th Oct 23	Amos Chinnaiah	Hikmet Buluttekin	Waste Reception Hall	Soil stripping for HDPE pipe installation.	13 th Oct 23	Open
CW00134	10 th Oct 23	Haji Quali	Hikmet Buluttekin	Batching Plant Area	Installation of the batching plant (formwork, rebar works, concrete works).	13 th Oct 23	Open
CW00135	10 th Oct 23	Burak Saglam	Hikmet Buluttekin	Bunker & Main Process	Spun pile driving, sheet pile driving, installation of sheet pile support elements (c channels concrete blocks tie rods), pile head repairing, lifting activity, excavation.	13 th Oct 23	Open
HW00058	10 th Oct 23	Burak Saglam	Hikmet Buluttekin	Bunker & Main Process	Spun pile welding, sheet pile and c channel cutting and welding.	13 th Oct 23	Open
HW00059	10 th Oct 23	Yunus Karaja	Hikmet Buluttekin	Laboratory Container	Welding cutting grinding.	13 th Oct 23	

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				
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	1	0	0	0	1	1	0				
180 kVA Genset	N.	0	0	1	0	0	0	0	0	0				
Trailer	N.	1	0	0	0	0	0	0	0	0				
JCB	N.	0	0	1	0	0	0	0	0	0				
Concrete Mixer	N.	0	0	0	1	0	0	0	0	0				
Mobile Crane	N.	0	0	1	0	0	0	1	0	0				
200 kVA Genset	N.	0	0	1	0	0	0	0	0	0				
Forklift	N.	1	0	0	0	0	0	0	0	0				
Backhoe Loader	N.	0	0	0	1	0	0	0	0	0				
Welding Generator	N.	0	0	0	0	0	0	3	3	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	0	0				
Cutting Machine	N.	0	0	0	0	0	0	0	1	0				
Mobile Tower Light	N.	0	0	0	1	0	0	0	0	0				
Vibratory Hammer	N.	0	0	0	0	0	0	1	0	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	1	0				



Pile Installation Plan



Site Inspection Report

by the Employer's Representative

No.: SI-23-27

Date / Time of the Visit	Conducted by [ER]	Signature
24 th October 2023 10:35 hrs – 13:00 Hrs	Nahee Nazim Deputy Team Leader Fichtner / REM	

General Observations

Sn	Particulars	Details / Remarks	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.	-
4	Total number of man power at project as per attendance register on date of visit a) ER Representative b) DBO Representative c) HO Management Team d) EPC Contractor Direct Staff e) EPC Contractor Indirect Staff f) EPC Contractor Direct Site Workers g) Security (Gage) h) ELS (Spun pile contractor)	Total of 110 workers deployed. 1 1 5 32 19 45 8 10	-
5	Others, if any	Presence of 350 KVA DG, and additional generators placed around the site, conditional approval from URA has been obtained via email.	-

Progress Observations

No.	Particulars	Details / Remarks	Reference
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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.	
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. Preparation for the lean concrete work for the spun pile caps has started.	-
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.	-

Environmental Observations

Sn	Particulars	Details / Remarks	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	However, for construction phase, various plans and SOPs as part of ESMS as mentioned in CEMP are yet to be finalized.	-
2	Status of adequacy of environment monitoring as envisaged in CEMP on the basis of assessment made on randomly basis.	Being conducted as scheduled.	-
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.	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.	
4	Status of adequacy of record keeping including data reported in monthly environment report on the basis of assessment made on randomly basis.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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	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 runs within the site boundary. 	-
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.	-
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.	-
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.	-
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.	-
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.	-
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.	Boxes placed for for internal grievance redress mechanism.	-
8	Status of adequacy of record keeping including data reported in monthly HSE report on the basis of randomly assessment made.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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

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.	-
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.	-
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.	-

Site Photos



Photo 01 24/10/23 10:36hrs.

Material and equipment related to the batching plant and concrete testing lab on site.



Photo 02 by 24/10/23 10:48hrs.

Concrete testing lab made ready and some of the equipment has been moved in.



Photo 03 24/10/23 10:49hrs.

Continous dewatering of the bunker area is ongoing, as excavation works continue.



Photo 04 24/10/23 10:50hrs.

Bunker area excavation works continue up to -2m level, and well point dewatering system is in place.



Photo 05 24/10/23 10:59hrs.

Bunker area excavation works continue up to -2m level, and well point dewatering system is in place.



Photo 06 24/10/23 11:00hrs.

Bunker area excavation works continue up to -2m level, and well point dewatering system is in place.



Photo 07 24/10/23 11:05hrs.
Concrete blocks moved to location to make ready for static load testing of the piles.



Photo 08 24/10/23 12:10hrs.
Main process building area, all piles terminated, and excavation completed, and making ready for lean concrete.



Photo 09 24/10/23 11:17hrs.
Main process building area, all piles terminated, and excavation completed, and making ready for lean concrete.



Photo 10 24/10/23 14:02hrs.
Laydown area close to the sea side entrance gate.



Photo 11 24/10/23 11:19hrs.
Loading/Unloading work ongoing from the sea side gate area.



Photo 12 24/10/23 11:19hrs.
Excavated soil from the site is stored in the laydown area within the site boundary.



Photo 13 24/10/23 11:19hrs.

Tower crane parts in laydown area within the site boundary.



Photo 14 24/10/23 11:19hrs.

Materials for temporary facilities stored in the laydown area within the site boundary.



Photo 15 24/10/23 11:19hrs.

WAMCO landfill seen in the left side is still being used and operation is very close to the boundary fence.



Photo 16 24/10/23 11:19hrs.

Fuel storage shed setup, however it should be checked for capacity..



Photo 17 24/10/23 11:19hrs.

Main store for the project is organized and store keeper is assigned.



Photo 18 24/10/23 11:19hrs.

Waste sorting and collection area is being utilized as planned.



Photo 19 24/10/23 11:19hrs.

Waste oil storage area. Logs are maintained.



Photo 20 24/10/23 11:19hrs.

Assembly of the new two storey workers accommodation block is almost completed.



Photo 21 24/10/23 11:19hrs.

Assembly of the new two storey workers accommodation block is almost completed.



Photo 22 24/10/23 11:19hrs.

Leaks not fixed on the water storage tank after several months.



Photo 23 24/10/23 11:19hrs.

Guard room at the main site entrance has leaks from the windows and needs to be fixed.



Photo 24 24/10/23 11:19hrs.
Materials for new workers accommodation on site.



Photo 25 24/10/23 11:19hrs.
Foundation works for the new workers accommodation building is in progress.



Photo 26 24/10/23 11:19hrs.
The CCTV system monitors in the construction camp managers office is not operational at the moment of inspection, issue with the system should be rectified at the earliest. It is recommended to provide monitor for the security guards in the guard.



Photo 27 24/10/23 11:19hrs.
Concrete works related to the batching plant is ongoing.



Photo 28 24/10/23 11:19hrs.
Batching plant assembly work is in progress.



Photo 29 24/10/23 11:19hrs.
Barbending work for the batching plant area is in progress.



Photo 30 24/10/23 11:19hrs.
 Workers from GLUT and VHPL on site. All subcontractors should be approved by ER.

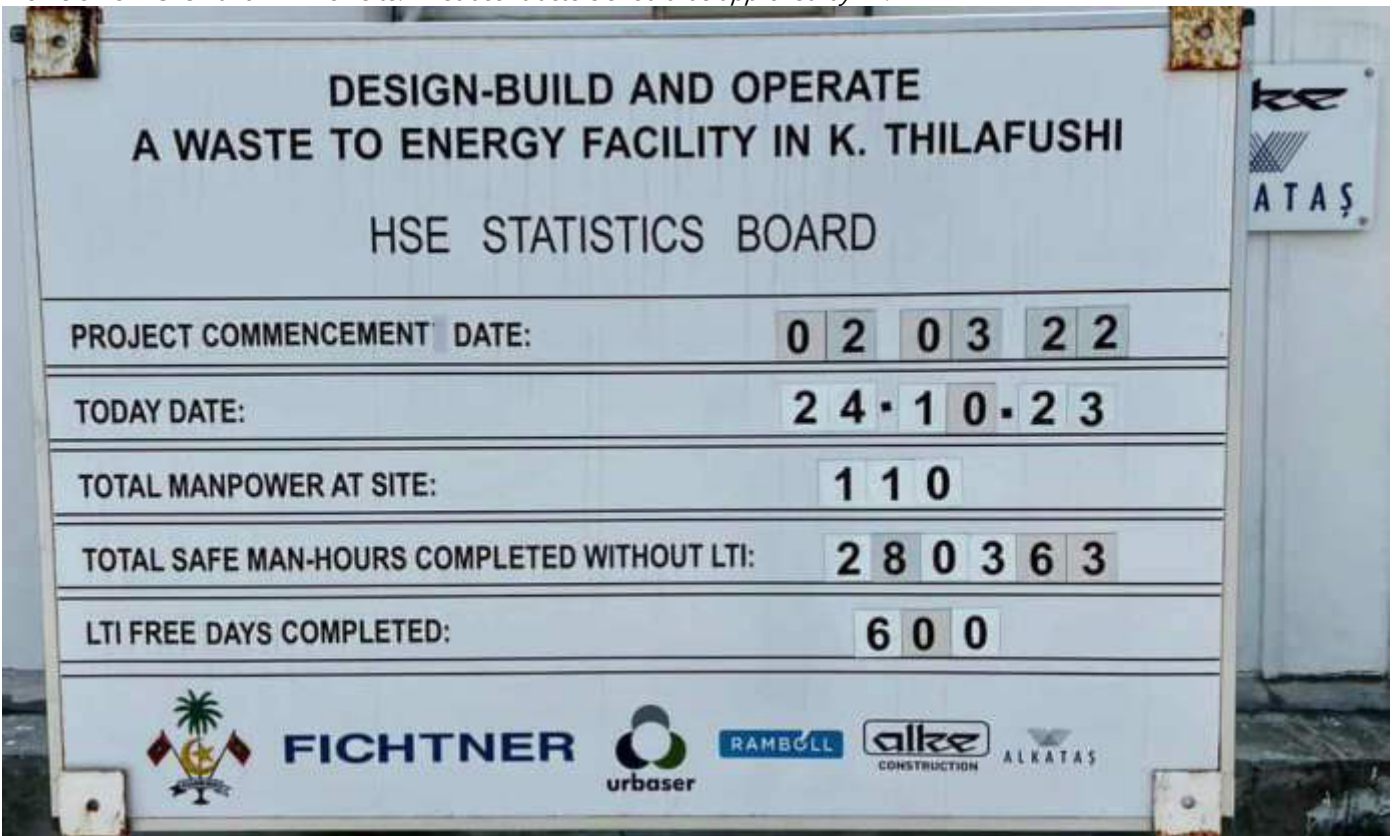


Photo 31 24/10/23 11:19hrs.
 HSE statistics board at the EPC site office kept updated.

Information Reported on the EPC Daily Progress Report

Company Name		Employee	Visitor	Rota. Off	Demob.	Total POB (Personal on Board)	Accommodation Site Camp	Normal (hrs)	Overtime (hrs)	Total (hrs)	
Office	DBO Representative	1	0	0	0	1	0	9	0	9	
	HO – Management Team	5	0	0	0	5	0	45	0	45	
	Subcontractor indirect	0	0	0	0	0	0	0	0	0	
Site	ER Representative	1	0	0	0	1	1	8	0	8	
	EPC Contractor direct staff	32	0	0	0	32	32	288	0	288	
	EPC Contractor indirect staff	19	0	0	0	19	19	171	0	171	
	EPC Contractor direct site workers	45	0	0	0	45	45	405	0	405	
	Security (Gage)	8	0	0	0	8	0	72	0	72	
	ELS (Spun pile contractor)	10	0	0	0	10	0	90	0	90	
	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	6	0	0	0	6	0	0	0	0	
	Grand Total Site POB		122	0	0	0	122	97	1088	0	1088

ALKE ALKATAS JV		HAZARDOUS MATERIAL RESOURCES								
		Concrete Admixture	Bitumen Material	Formwork Oil	Epoxy Material	Diesel	Fuel Oil	Paint	Antitrust	Isolation Solution
Daily		0	0	0	0	800.0 lt	0	0	0	0
Monthly		0	0	0	0	14250.0 lt	0	0	0	0
Project Total		0.0 lt	90.0 kg	0.0 lt	0.0 lt	83,747.0 lt	2509.0 lt	1363.0 lt	140.0 lt	0.0 lt

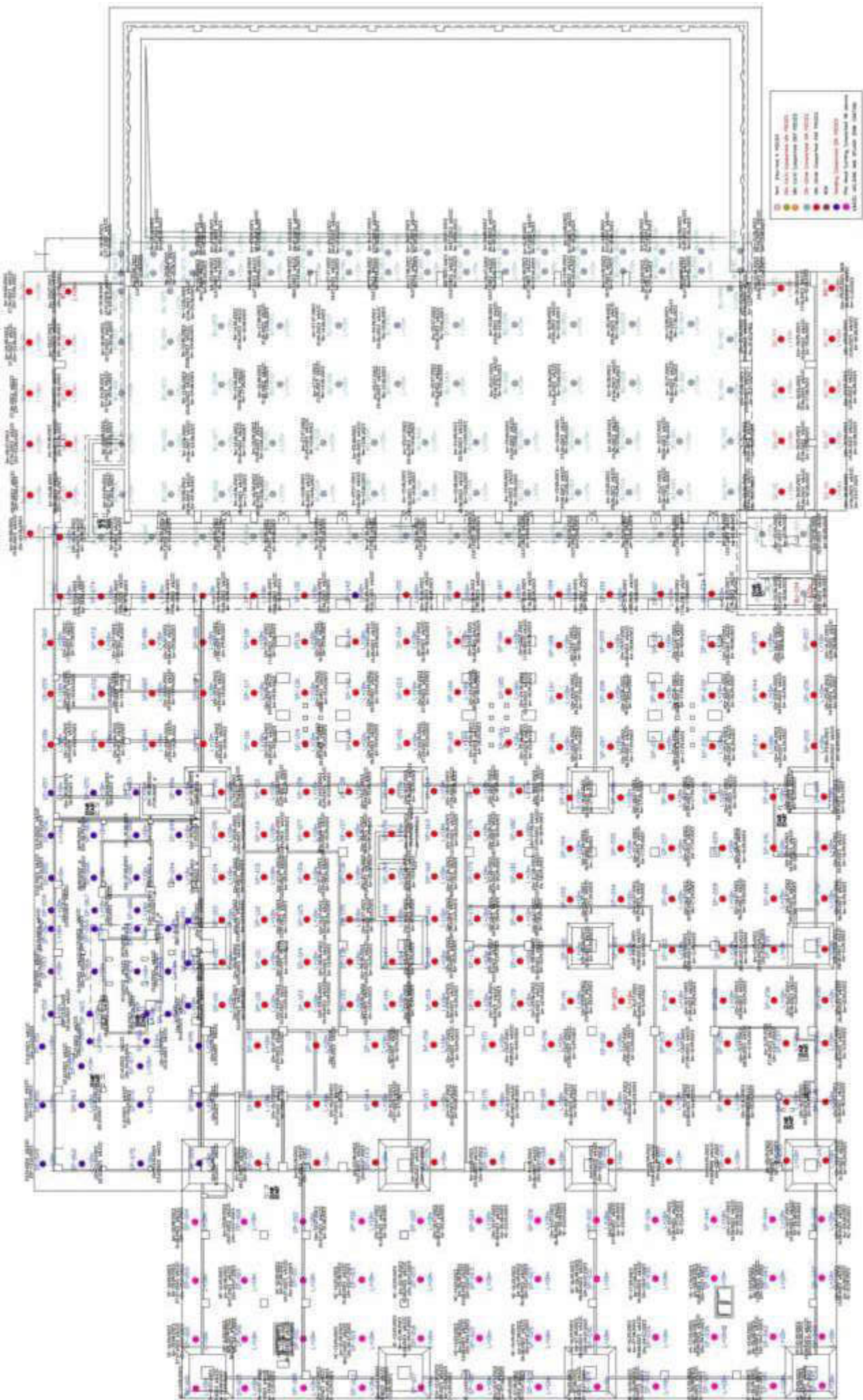
ALKE ALKATAS JV		WASTE GENERATION RESOURCES								
		Plastic Waste	Paper Waste	Kitchen Waste	Waste Oil	Sewage Sludge	Waste Water	Construction Waste	Metal Waste	Wood Waste
Daily		0.002 tons	0.001 tons	0.010 tons	0	0.06 tons	6.70 tons	0	0	0
Monthly		0.050 tons	0.025 tons	0.240 tons	0	1.44 tons	160.80 tons	0	0	0
Project Total		1.844 tons	0.544 tons	2.202 tons	0.0 tons	13.21 tons	788.70 tons	3.89 tons	0.82 tons	1.892 tons

CONSTRUCTION ACTIVITIES ON SITE			
12 th July 2023			Next Day Plan
Progress	Completion Date	Construction Activities	Construction Activities
75%	31 st October 2023	Construction of the concrete batching plant is ongoing.	Construction of the concrete batching plant will continue.
73%	3 rd November 2023	Construction of the pre-fabricated worker accommodation building will continue.	Construction of the pre-fabricated worker accommodation building will continue.
25%	30 th November 2023	Excavation of the Bunker Area is ongoing.	Excavation of the Bunker Area will continue.
75%	30 th October 2023	Construction of the reinforcement steel stockyard is ongoing.	Construction of the reinforcement steel stockyard will continue.
13%	15 th November 2023	Construction of the pre-fabricated staff accommodation building is ongoing.	Construction of the pre-fabricated staff accommodation building will continue.
100%	24 th October 2023	1 spun pile (SP-056) welding was completed. Spun pile welding works completed.	Field Density Test will be performed for the backfilling of 12 spun piles. (SP-025 to SP-036)
			Static Load Test will be performed on SP-184.

PERMIT TO WORK								
PTW No.	Issue Date	Permit Holder	Area Authority	Location	Task Description	Expiry Date	Status	
CW00144	21 st Oct 23	Habibullah M.	Sahin Keles	Batching Plant	Formwork, rebar work, concrete work, excavation work, manual handling.	27 th Oct 23	Open	
CW00145	21 st Oct 23	M. Yunus K.	Sahin Keles	Site Office	Scaffolding Lifting work at height manual handling.	27 th Oct 23	Open	
CW00146	21 st Oct 23	M. Mustafa	Sahin Keles	Bunker Area	Excavation.	27 th Oct 23	Open	
HW00062	21 st Oct 23	Haji Quali G.	Sahin Keles	Batching Plant	Welding, Cutting, Grinding.	27 th Oct 23	Open	
HW00063	21 st Oct 23	M. Yunus K.	Sahin Keles	Site Office	Welding, Cutting, Grinding.	27 th Oct 23	Open	
HW00064	21 st Oct 23	M. Mustafa	Sahin Keles	Bunker Area	C channel welding, cutting and grinding.	27 th Oct 23	Open	
HW00065	21 st Oct 23	Burak Saglam	Sahin Keles	Turbine Area	Spun pile joint welding, cutting and grinding.	27 th Oct 23	Open	
CW00147	22 nd Oct 23	Ram Niwas	Sahin Keles	Warehouse Site	General maintenance for equipments.	28 th Oct 23	Open	
CW00148	23 rd Oct 23	Sanjeeva J.	Sahin Keles	WTE Area	Concrete Blocks lifting and transport, steel beam lifting and transport	29 th Oct 23	Open	
CW00149	24 th Oct 23	Habibullah M.	Sahin Keles	Batching Plant	Concrete plant pre-assembly and lifting works (under 10 tons).	30 th Oct 23	Open	
CW00150	24 th Oct 23	Dinakaran	Sahin Keles	Accommodation Camp	Lifting, material handling, scaffolding works, installation of prefabricated building.	30 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	14	4	0	0	9	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	1	0	0	0	1	1	0				
180 kVA Genset	N.	0	0	1	0	0	0	0	0	0				
Trailer	N.	1	0	0	0	0	0	0	0	0				
JCB	N.	0	0	1	0	0	0	0	0	0				
Concrete Mixer	N.	0	0	0	1	0	0	0	0	0				
Mobile Crane	N.	0	0	1	0	0	0	1	0	0				
200 kVA Genset	N.	0	0	1	0	0	0	0	0	0				
Forklift	N.	1	0	0	0	0	0	0	0	0				
Backhoe Loader	N.	0	0	0	1	0	0	0	0	0				
Welding Generator	N.	0	0	0	0	0	0	3	3	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	1	0	0	0	0	0	0				
Cutting Machine	N.	0	0	0	0	0	0	0	1	0				
Mobile Tower Light	N.	0	0	0	1	0	0	0	0	0				
Vibratory Hammer	N.	0	0	0	0	0	0	1	0	0				
Compressor	N.	0	0	0	0	0	0	1	1	0				
Diesel Tanker	N.	0	0	1	0	0	0	0	0	0				
Dump Truck	N.	0	0	0	1	0	0	2	0	0				
Dewatering Pump	N.	0	0	4	0	0	0	0	0	0				



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
Antitrust	Liter	70	Chemical Store
Isolation Solution	Kg	0	-
Cement	Kg	1500	Warehouse
Sand	Kg	2000	Warehouse
Hempel Welding Paint (A 35569)	Liter	80	Chemical Store
Hempel Welding Paint (B 98560)	Liter	20	Chemical Store



Pile Installation Plan

Appendix: 4 Site HSE Observation Report

	Revision 1	Site Observation List		 4169A01-830-01
	Issue Date: 11 OCT. 2023	Greater Male Waste to Energy Project		
	Location	Dewatering detention pond		
	Date Identified	11.10.2023		
	Observation Ref.	F0001		
	Issue			
	Noticed active mosquito larvae breeding on the dewatering detention pond. Without mitigation might lead to dengue fever.			
	Contractor Work Status			
	As the Dewatering started and water is flowing there are no mosquito larvae is found. General awareness is planned for Saturday Toolbox meeting regarding stagnant water accumulation and necessary precautions to prevent water pooling which may cause mosquito larvae.			
STATUS	TARGET TO CLOSE Closed	DATE CLOSED: VERIFIED BY: SOFI ISMAIL		
	Location	Chemical Storage Area		
	Date identified	11.10.2023		
	Observation Ref.	F0002		
	Issue			
	Outdated MSDS record. To update and ensure all chemical stored have valid MSDS. MSDS shall be visible for all chemical storage areas.			
	Contractor Work Status			
	MSDS In the storage area is updated and store keeper is verbally instructed to keep MSDS log updated according its register.			
STATUS	TARGET TO CLOSE Closed	DATE CLOSED: VERIFIED BY: SOFI ISMAIL		

	Location	Staff Accommodation
	Date identified	11.10.2023
	Observation Ref.	F0003
	Issue	
	Escape door shall have emergency light. During emergency, the escape route is dark and not visible.	
	Contractor Work Status	
Emergency lights are ordered for all accommodation and offices and it is expected to arrive in 15.11.2023		
STATUS	TARGET TO CLOSE 16.11.2023	DATE CLOSED: VERIFIED BY: SOFI ISMAIL
	Location	Chemical Storage Area
	Date identified	11.10.2023
	Observation Ref.	F0004
	Issue	
	To ensure all chemical storage have their own eye wash station/device.	
	Contractor Work Status	
Eye wash are distributed for both sections of chemical storage.		
STATUS	TARGET TO CLOSE Closed	DATE CLOSED: VERIFIED BY: SOFI ISMAIL
	Location	Electrical DB at site
	Date identified	11.10.2023
	Observation Ref.	F0005
	Issue	
	Improper electrical DB setup. To be isolated and secured. Only accessible by authorized person.	
	Contractor Work Status	



Electrical main panel is to be enclosed with cabinet and lock to prevent unwanted access and responsible person to be posted.

STATUS

**TARGET TO
CLOSE**

26.20.2023

DATE CLOSED:

**VERIFIED BY:
SOFI ISMAIL**

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
01.10.2023	07.10.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering pipe installation for Bunker Area
- Spun pile PDA test
- Spun pile welding work

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.





5



OVERALL - POINT FIVE

6



ERECTION OF WORKER'S ACCOMMODATION

7



FABRICATION OF TEMPORARY LAB

8



CONSTRUCTION OF TEMPORARY BATCHING PLANT

9



INSTALLATION OF DEWATERING PIPE AT BUNKER AREA (Line 1 of 3)

Site Log



Date 10/1/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Sunday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Cloudy. Hevy rain from 15:00 to 19:00

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections 1) Bunker dewatering pipe installation

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Advice DBO form/document verification shall be signed and stamp. EPC to produce stamp for PIC whom verifying the work.

Meetings table with columns: When, Who, What

Comments N/A

FICHTNER

Site Log

Date: 10/2/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Monday

Time on site:

Time off site:

Completed by:

Weather:

	Total	Civil	Process
Workers on Site	46	46	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Spun pile welding work
2) Dewatering pipe at Bunker area installation

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/3/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Spun pile welding work
 2) Dewatering pipe at Bunker area installation

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
10:00AM	FIT, URB, AAJV	DEWATERING PIPE INSTALLATION METHOD
		Discussed on the option of laying the pipe above ground, protected by using the
		rejected pile. With this method, cable relocation will not affect the dewatering
		pipe. This will also eliminate the risk of disturbing the existing cable.

Comments

N/A

FICHTNER

Site Log

Date: 10/4/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Installation of dewatering pipe for Bunker area.
 2) Installation of deatering pipe protection.

Safety Audits/Safety Walkarounds

Checked on the rectified chemical storage, still not complying. Notify the EPC to comply it as per specification. MSDS, fire estinguisher, eye wash, ventilation & warning sign shall be in place.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
10:00am	FIT, URB, RAMB, AAJV	WEEKLY HSE MEETING
		Highlight to stop work if rain
		Request to share monitoring schedule for Oct. FIT request to witness
		Toolbox attendance shall be signed off during the toolbox not by end of business day

Comments

N/A

Site Log

FICHTNER

Date: 10/5/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Installation of dewatering pipe for Bunker area.
 2) Installation of deatering pipe protection.
 3) Spun pile PDA test on point SP130. Field result complying. EPC to submit the official report for review.

Safety Audits/Safety Walkarounds

Witness environmental monitoring (workers camp). Highlight few area for improvement:
 1) To install light on emergency escape door.
 2) Request for workers accomodation layout for checking.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Checked on the dewatering pipe & pond design. Design silt filtering from source at each collector's point. Not fully satisfied as the water that entering the pond still contain silt. Hence, additional wall (separation method) is required at the pond.

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/6/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Friday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Cloudy. Rain from 10:00-17:00

	Total	Civil	Process
Workers on Site			

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

OFF DAY (FRIDAY)

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/7/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Saturday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	<input type="text"/>	<input type="text"/>	<input type="text"/>

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Installation of dewatering pipe for Bunker area.
 2) Installation of deatering pipe protection.

Safety Audits/Safety Walkarounds

Weekly toolbox.
 1) Highlight on color code for safe tools

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
9:00am	FIT, AAJV	Progress for piling:
		1) 14 spun piles rejected (Material) due to cracking. AAJV have ordered new material and expected to arrived within 2 weeks
		2) Target to complete the overall spun pile installation work within 2 weeks (Mid Oct)

Comments

N/A

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
08.10.2023	14.10.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering pipe installation for Bunker Area. All three (3) lines completed.
- Spun pile driving work.
- Spun pile welding work

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.





5



OVERALL - POINT FIVE

6



INSTALLATION OF DEWATERING PIPE (DISCHARGE OVERFLOW)

7



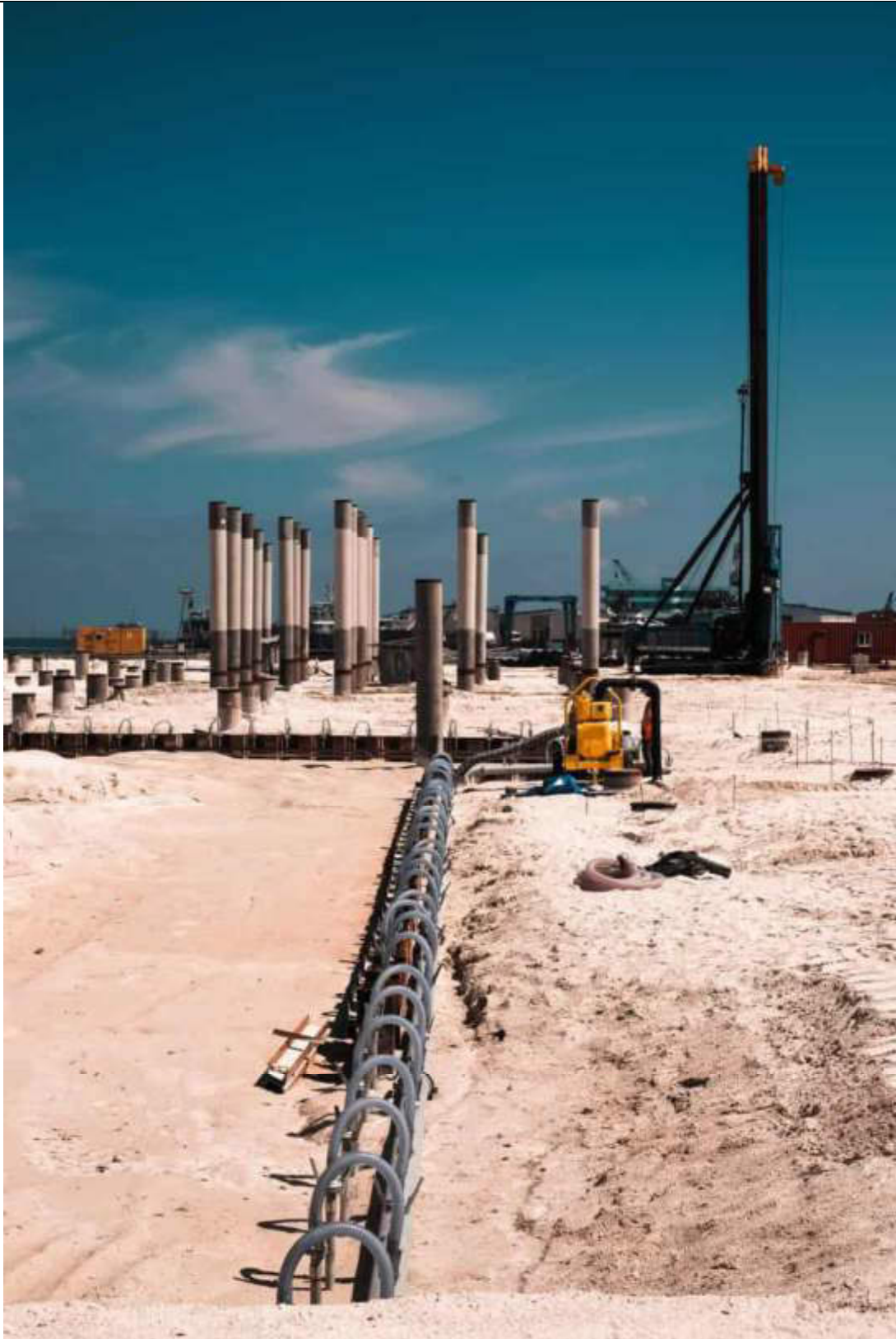
FABRICATION OF TEMPORARY LAB

8



CONSTRUCTION OF TEMPORARY BATCHING PLANT

9



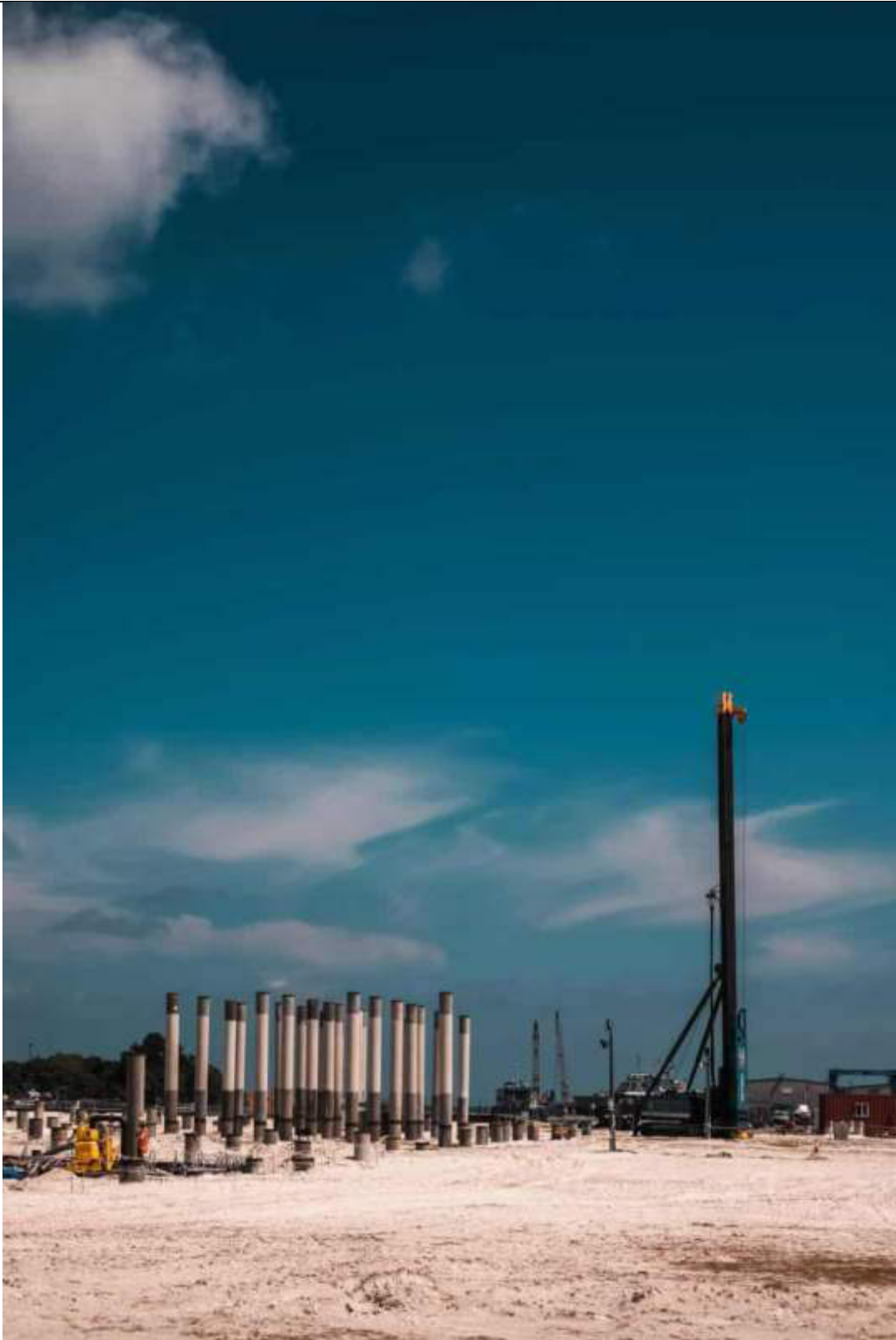
INSTALLATION OF DEWATERING PIPE AT BUNKER AREA (Line 2 of 3)

10



INSTALLATION OF DEWATERING PIPE AT BUNKER AREA (Line 3 of 3)

11



SPUN PILE DRIVING WORK

FICHTNER

Site Log

Date 10/8/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Sunday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Bunker dewatering pipe installation. Completed line 1 of 3.
2) Testing the dewatering line 1, still contain minor silt & mud. Require detention wall at the pond.

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

EPC to revise the dewatering pond design to include an additional detention wall.

Meetings

When	Who	What
N/A	N/A	N/A

Comments

N/A

FICHTNER

Site Log

Date: 10/9/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Monday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Spun pile welding work
 2) Dewatering pipe installation at Bunker area. Line 2 of 3.

Safety Audits/Safety Walkarounds

Witness installation of air quality monitoring station.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Reminded the EPC to submit As-built drawing for completed piles.
 Request for accommodation layout for review.

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/10/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process
<input type="text"/>	<input type="text"/>	<input type="text"/>

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Spun pile welding work
 2) Dewatering pipe at Bunker area installation. Line 2 of 3.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	10:00AM	FIT, URB, AAJV	QAQC Monitoring Meeting
			Discussed on current outstanding NCR. Two (2) nos. NCR to be closed.

Comments

FICHTNER

Site Log

Date: 10/11/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Installation of dewatering pipe for Bunker area. Completed line 2 of 3.
 2) Spun pile driving work at B2-10
 3) Spun pile material delivery and inspection. All piles arrived in acceptable condition.

Safety Audits/Safety Walkarounds

Site safety walkarounds together EPC, URB & FIT. 5 finding (Observation list) require immediate action from EPC.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

	When	Who	What
Meetings	10:00am	FIT, URB, RAMB, AAJV	WEEKLY HSE MEETING
			Highlight the purpose & function of Observation List by FIT.
			Respond shall be made within one month from the date of issuance.

Comments

N/A

Site Log



Date: 10/12/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Thursday Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Workers on Site table with columns: Total (47), Civil (47), Process (0). Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections: 1) Installation of dewatering pipe for Bunker area. Line 3 of 3. 2) Spun pile driving work at SP053, SP054, SP055, SP056 & SP267.

Safety Audits/Safety Walkarounds: N/A

Safety and Environmental Incidences: N/A

Compliance to Design and construction methods, approved materials: N/A

Major Quality Issues: N/A

Site Instructions Issued: N/A

Verbal communication: N/A

Meetings table with columns: When, Who, What. Contains one row with N/A and two empty rows.

Comments: N/A

FICHTNER

Site Log

Date: 10/13/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Friday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

	Total	Civil	Process
Workers on Site			

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

OFF DAY (FRIDAY)

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/14/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Saturday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

	Total	Civil	Process	
Workers on Site	45	45	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Installation of dewatering pipe for Bunker area. Line 3 of 3 completed.
 2) Spun pile driving work at SP049, SP050, SP051, SP052, SP062, SP063, SP064, SP075 & SP260

Safety Audits/Safety Walkarounds

Weekly toolbox.
 1) Highlight on work permit requirement & the right to stop work.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
15.10.2023	21.10.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Started dewatering work for Bunker area.
- Spun pile welding work
- Preparation for spun pile static load test (SLT)
- Excavation work for Bunker area

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.







7



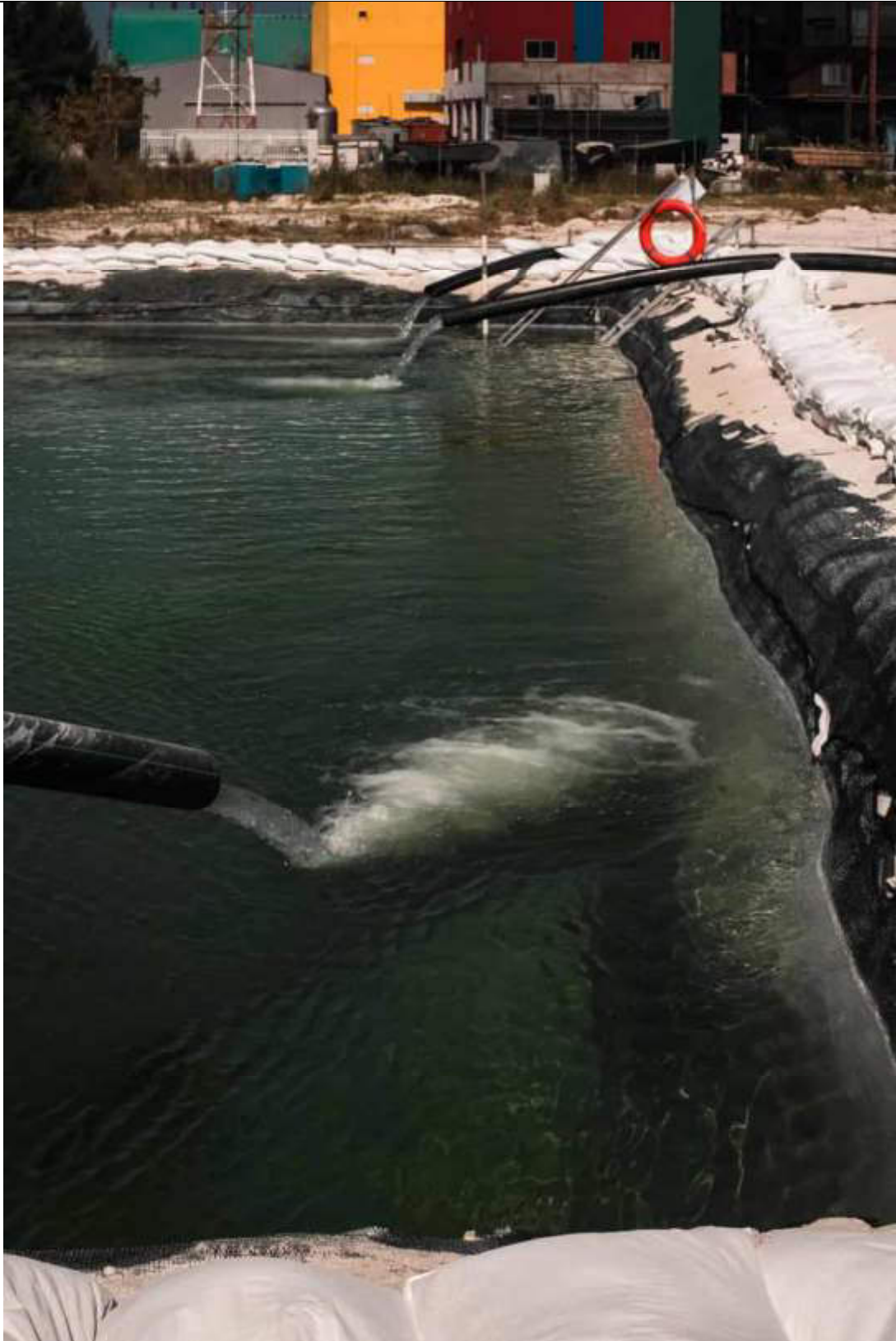
FABRICATION OF TEMPORARY LAB

8



PREPARATION FOR SLT SETUP

9



DEWATERING OF BUNKER AREA STARTED

10



STARTED DISCHARGE. WATER QUALITY MEET DEWATERING PARAMETER.

11



SETTING UP TEMPORARY BATCHING PLANT

FICHTNER

Site Log

Date: 10/15/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Sunday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

--	--	--

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Bunker dewatering pipe completed. Water sample taken for testing.
 2) Spun pile Pile Integrity Test (PIT) to determine the integrity of pile point number SP142. Field result indicated the pile is in working condition.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	N/A	N/A	N/A

Comments

FICHTNER

Site Log

Date: 10/16/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Monday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process

Workers on Site *Note : Enter this information when it is available, at least once per week as a minimum*

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Spun pile splash zone coating application.
 2) Dewatering bunker started. Water parameter complying to the requirement as stated in dewatering permit.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Reminded the EPC to:
 1) Submit as-built drawing for completed pile
 2) Submit method statement for dewatering

Meetings	When	Who	What
	1:00pm	MOE, FIT, URB, AAJV, RAM	Monthly progress meeting

Comments

FICHTNER

Site Log

Date: 10/17/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Spun pile welding work
 2) Dewatering of bunker area continue.

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Highlight that the design parameter for civil work need to finalized and submit to ER.

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/18/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny.

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Excavation of Bunker area started. Started around the sheetpile area.
 2) Spun pile welding work
 3) Preparation of Static Load Test (SLT) setup.
 4) Dewatering continue.

Safety Audits/Safety Walkarounds

Site safety walkarounds together EPC, URB & FIT. Taken water sample at discharge point for testing. Briefing on the dewatering test parameter and the limit.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

	When	Who	What
Meetings	10:00am	FIT, URB, RAMB, AAJV	WEEKLY HSE MEETING
			Briefing on Dewatering SOP.
			Excavation permit obtained. However, FIT limited the excavation only up to -2m.
			Revise excavation plan require for excavation of deeper than -2m.

Comments

N/A

Site Log

FICHTNER

Date: 10/19/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process
<input type="text"/>	<input type="text"/>	<input type="text"/>

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections

1) Excavation of Bunker area continue.
 2) Spun pile welding work
 3) Preparation of Static Load Test (SLT) setup.
 4) Dewatering continue.

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Mentioned that for material approval process (for CIVIL) , design parameter need to be finalized prior to material selection.

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/20/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday

Time on site:

7:00

Time off site:

18:00

Completed by:

Sofi Bin Ismail

Weather:

Sunny

Total Civil Process

Workers on Site

--	--	--

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

OFF DAY (FRIDAY)

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When Who What

N/A		

Comments

N/A

FICHTNER

Site Log

Date: 10/21/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Saturday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Excavation of Bunker area continue.
 2) Spun pile welding work
 3) Preparation of Static Load Test (SLT) setup.
 4) Dewatering continue.

Safety Audits/Safety Walkarounds

Weekly toolbox.
 1) Highlight on SOP for excavation

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
22.10.2023	28.10.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Spun pile welding work.
- Spun pile static load test (SLT) at SP184.
- Excavation work for Bunker area up to -2m depth.
- Lean concrete for pilecap at Main process building.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.



OVERALL - POINT ONE



OVERALL - POINT TWO



OVERALL - POINT THREE



OVERALL - POINT FOUR



5



OVERALL - POINT FIVE

6



EXCAVATION OF BUNKER AREA

7



STATIC LOAD TEST FOR SP184

8



LEAN CONCRETE AT MAIN PROCESS BUILDING

9



TEMPORARY REINFORCEMENT BAR BENDING YARD

10



TEMPORARY CONCRETE BATCHING PLANT SETUP

11



BUNKER AREA DEWATERING CONTINUE

Site Log



Date 10/22/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Sunday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Cloudy. Light rain from 15:00 to 16:40

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Excavation of Bunker area continue up to -2m.
2) Spun pile welding work.
3) Preparation of Static Load Test (SLT) setup.
4) Dewatering continue.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication N/A

Table with 3 columns: When, Who, What. Row 1: N/A, N/A, N/A. Subsequent rows are empty.

Comments N/A

FICHTNER

Site Log

Date 10/23/2023 **Site:** Greater Male WTE **Site Representative:** Sofi bin Ismail
Monday
Time on site: **Time off site:** **Completed by:**

Weather:

Total	Civil	Process

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Excavation of Bunker area continue up to -2m.
- 2) Spun pile welding work.
- 3) Preparation of Static Load Test (SLT) setup.
- 4) Dewatering continue.
- 5) Sand sampling for compaction test at Process Building.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Reminded the EPC to:

- 1) To conduct crosscheck on as-built information of piling work.
- 2) EPC to share design parameter for material selection.

	When	Who	What
Meetings	<input type="text" value="N/A"/>		

Comments

Site Log

FICHTNER

Date: 10/24/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Tuesday

Time on site:

Time off site:

Completed by:

Weather:

Sunny. Rain from 11:00-12:30

Total	Civil	Process
<input type="text"/>	<input type="text"/>	<input type="text"/>

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Spun pile welding work
- 2) Dewatering of bunker area continue.
- 3) Excavation of bunker area continue up to -2m.
- 4) Sand sampling for compaction test at main process building.
- 5) SLT setup preparation.

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Reminded the DBO to expedite respond on FIT Observation List.

Meetings

When	Who	What
N/A		

Comments

N/A

Site Log

FICHTNER

Date: 10/25/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny.

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Spun pile welding NDT test.
 2) Dewatering of bunker area continue.
 3) Excavation of bunker area continue up to -2m.
 4) Sand sampling for compaction test at main process building.
 5) Static Load Test (SLT) for spun pile SP184 started at 16:00 and will continue for 28 hours.

Safety Audits/Safety Walkarounds

Site safety walkarounds together EPC, URB & FIT. Observed that the cable connection point is not secured. Need safe method to ensure connection point is not exposed to water.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Conduct training on Static Load Test objective, requirement and procedure to URB, RAMB & AAJV. Identify the design load by designer (300T per pile) and maximum test load of 120% from design load for SLT. Identify parameter to monitor (settlement, calibration of equipment, visual inspection and sequence of inspection).

	When	Who	What
Meetings	10:00am	FIT, URB, RAMB, AAJV	Weekly safety meeting.
			Discuss on dewatering parameter and permit update
			Discuss on CCTV arrangement. Looping and fail-safe procedure.

Comments

N/A

Site Log



Date: 10/26/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Thursday Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Cloudy.

Table with 3 columns: Total, Civil, Process. Values: 47, 47, 0. Includes a note: Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site: 1) Spun pile welding coating work. 2) Dewatering of bunker area continue. 3) Excavation of bunker area continue up to -2m. 4) Lean concrete for pilecap at Main process building. 5) Static Load Test (SLT) for spun pile SP184 started at 16:00 (25/10) and completed on 20:20 (26/10). At maximum load of 120%, maximum settlement of 10.41mm which is lower than the limit. Official report to be submitted.

Safety Audits/Safety Walkarounds: N/A

Safety and Environmental Incidences: N/A

Compliance to Design and construction methods, approved materials: N/A

Major Quality Issues: N/A

Site Instructions Issued: N/A

Verbal communication: Request for record of sheetpile movement monitoring. To ensure movement is within the limit.

Table with 3 columns: When, Who, What. Row 1: N/A, empty, empty. Rows 2-4: empty, empty, empty.

Comments: N/A

FICHTNER

Site Log

Date 10/27/2023 **Site:** Greater Male WTE **Site Representative:** Sofi bin Ismail

Friday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

--	--	--

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

OFF DAY (FRIDAY)

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

Site Log

FICHTNER

Date 10/28/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site:

7:00

Time off site:

18:00

Completed by:

Sofi Bin Ismail

Weather:

Sunny

Total	Civil	Process
-------	-------	---------

47

47

0

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Excavation of bunker area continue up to -2m.
 3) Lean concrete for pilecap at Main process building.

Safety Audits/Safety Walkarounds

Weekly toolbox.
 1) Highlight on SOP for dewatering

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

Received sheetpile movement monitoring data. Movement at the limit of 20mm. No excavation beyond -2m is allowed. EPC to communicate with designer to check and advice moving forward. Additional anchoring and bracing might required, designer to confirm.

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
29.10.2023	04.11.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Spun pile driving work.
- Excavation work for Bunker area up to -2m depth.
- Lean concrete for pilecap at Main process building.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.



OVERALL - POINT ONE



OVERALL - POINT TWO

3



OVERALL - POINT THREE

4



OVERALL - POINT FOUR



5



OVERALL - POINT FIVE

6



EXCAVATION OF BUNKER AREA

7



STAFF ACCOMMODATION SETUP

8



TEMPORARY REINFORCEMENT BAR BENDING & CUTTING YARD

9



BUNKER AREA DEWATERING CONTINUE

10



TEMPORARY CONCRETE BATCHING PLANT SETUP

Site Log



Date 10/29/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Excavation of bunker area continue up to -2m.
3) Lean concrete for pilecap at Main process building.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication N/A

Table with 3 columns: When, Who, What. Row 1: N/A, N/A, N/A. Subsequent rows are empty.

Comments N/A

Site Log

FICHTNER

Date 10/30/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Monday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

<input type="text"/>	<input type="text"/>	<input type="text"/>
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Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
2) Excavation of bunker area continue up to -2m.
3) Spun pile driving work at SP-049, SP-050, SP-051, SP-052, SP-053, SP-054, SP-055, SP-056, SP-057, SP-062, SP-063, SP-075, SP-267
4) Spun pile welding thickness test.
5) Water sampling from dewatering detention pond for testing.
6) Witness material testing (reinforcement bar 16mm & 20mm) through video call for tensile test.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings

When	Who	What
<input type="text" value="N/A"/>		

Comments

Site Log



Date: 10/31/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	47	47	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Excavation of bunker area continue up to -2m.
 3) Spun pile driving work at SP-076, SP-088, SP-089, SP-064, SP-065, SP-066, SP-077, SP-078, SP-079, SP-260, SP-261
 4) Witness material testing (reinforcement bar 16mm & 20mm) through video call for bend test.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

Site Log

FICHTNER

Date 11/1/2023 **Site:** Greater Male WTE **Site Representative:** Sofi bin Ismail
Wednesday
Time on site: 7:00 **Time off site:** 18:00 **Completed by:** Sofi Bin Ismail

Weather: Sunny.

	Total	Civil	Process	
Workers on Site	47	47	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
 1) Dewatering of bunker area continue.
 2) Excavation of bunker area continue up to -2m.
 3) Spun pile driving work at SP-067, SP-068, SP-069, SP-070, SP-080, SP-081, SP-082, SP-083, SP-265, SP-266.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication N/A

	When	Who	What
Meetings	10:00am	FIT, URB, RAMB, AAJV	Weekly safety meeting.
			Discuss on dewatering parameter and permit update

Comments N/A

Site Log



Date: 11/2/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Cloudy

Total	Civil	Process
47	47	0

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities,
 Contractors
 Involved, Major
 Deliveries,
 Testing,
 Inspections

1) Dewatering of bunker area continue.
 2) Excavation of bunker area continue up to -2m.
 3) Spun pile driving work at SP-090, SP-091, SP-092, SP-093, SP-094, SP-095, SP-096, SP-262, SP-263, SP-264.
 4) Witness the concrete compressive strength for the lean concrete. Result is acceptable.

Safety
 Audits/Safety
 Walkarounds

N/A

Safety and
 Environmental
 Incidences

N/A

Compliance to
 Design and
 construction
 methods,
 approved
 materials

N/A

Major Quality
 Issues

N/A

Site Instructions
 Issued

N/A

Verbal
 communication

N/A

Meetings

When	Who	What
4:00PM	FIT, URB, AAJV	Discussion with the designer for sheetpile on mitigation measure required.
		Designer to resubmit the design calculation accordingly.

Comments

N/A

Site Log

FICHTNER

Date 11/3/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

<input type="text"/>	<input type="text"/>	<input type="text"/>
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Note : Enter this information when it is available, at least once per week as a minimum

Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections

OFF DAY (FRIDAY)

Safety
Audits/Safety
Walkarounds

N/A

Safety and
Environmental
Incidences

N/A

Compliance to
Design and
construction
methods,
approved
materials

N/A

Major Quality
Issues

N/A

Site Instructions
Issued

N/A

Verbal
communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

Site Log



Date 11/4/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	47	47	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
2) Witness (video call) the concrete compressive strength for the lean concrete. Result is acceptable.

Safety Audits/Safety Walkarounds

Weekly toolbox.
1) Highlight on SOP for excavation

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings	When	Who	What
	N/A		

Comments

N/A



Site Inspection Report

by the Employer's Representative

No.: SI-23-28

Date / Time of the Visit	Conducted by [ER]	Signature
06 th November 2023 10:35 hrs – 13:00 Hrs	Nahee Nazim Deputy Team Leader Fichtner / REM	

General Observations

Sn	Particulars	Details / Remarks	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.	-
4	Total number of man power at project as per attendance register on date of visit a) ER Representative b) DBO Representative c) HO Management Team d) EPC Contractor Direct Staff e) EPC Contractor Indirect Staff f) EPC Contractor Direct Site Workers g) Security (Gage) h) ELS (Spun pile contractor)	Total of 110 workers deployed. 1 1 5 35 20 42 8 10	-
5	Others, if any	Presence of 350 KVA DG, and additional generators placed around the site, conditional approval from URA has been obtained via email.	-

Progress Observations

No.	Particulars	Details / Remarks	Reference
1	Temporary facilities	Work on the temporary facilities on going. Accommodation buildings still under construction. Fencing, guard houses, CCTV systems, storage facilities, kitchen, laundry, toilets, gym as well as the waste water treatment plant are in operation.	
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 been completed, and daily monitoring of sheet piles for any movement is ongoing. Concrete batching plant installation work is ongoing. Preparation for the lean concrete work for the spun pile caps is continuing.	-
3	Excavation & Dewatering	Shallow excavation work for the foundations have begun, dewatering sedimentation pit has been constructed. Well point dewatering system around the bunker area has been setup and continuous dewatering works ongoing. Excavation works of the bunker area is in progress.	-

Environmental Observations

Sn	Particulars	Details / Remarks	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	However, for construction phase, various plans and SOPs as part of ESMS as mentioned in CEMP are yet to be finalized.	-
2	Status of adequacy of environment monitoring as envisaged in CEMP on the basis of assessment made on randomly basis.	Being conducted as scheduled.	-
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.	Work on designing a more effective training module including tool box talk as construction team is responsible for implementation of CEMP, H&S plan and other management plans is ongoing.	
4	Status of adequacy of record keeping including data reported in monthly environment report on the basis of assessment made on randomly basis.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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	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 runs within the site boundary. 	-
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.	-
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.	-
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.	-
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.	-
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, a proper register is to be 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.	-
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.	Boxes placed for for internal grievance redress mechanism.	-
8	Status of adequacy of record keeping including data reported in monthly HSE report on the basis of randomly assessment made.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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

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, several rounds of review and comments have been shared by the ER with the DBO contractor on the documents that are being prepared.	-
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.	-
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.	-

Site Photos



Photo 01 06/11/23 10:36hrs.
Installation work on the concrete batching plant is on going.



Photo 02 by 06/11/23 10:48hrs.
Barbending and preparation of reinforcement for the spun pile caps are ongoing.



Photo 03 06/11/23 10:49hrs.
Continous dewatering of the bunker area is ongoing, as excavation works continue.

Environmental Monitoring Report

PUBLIC

Project Number: 51077-003
Quarterly Report (October - December 2023)
February 2024

Maldives: Greater Male Waste-to-Energy Project

Part C: Appendices

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

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Photo 04 06/11/23 10:50hrs.

Bunker area excavation works continue up to -2m level, and well point dewatering system is in place, with additional sump well dug out to further assist in dewatering. Adequate barricading required, and area should be closed off at night.



Photo 05 06/11/23 10:59hrs.

S piles monitored by survey team, and additional reinforcement of the sheet piles put in place to minimize movement.



Photo 06 06/11/23 11:00hrs.

Main Process area spun piling works completed, and static load testing on select piles ongoing.



Photo 07 06/11/23 11:05hrs.

Lean concrete for the process building area completed and made ready for pile cap concrete works preparations to start.



Photo 08 06/11/23 12:10hrs.

Additional building installed to be used for bar bending and formworks preparation works.



Photo 09 06/11/23 11:17hrs.

Additional gate for heavy vehicles now operational with security guard post and project billboards in place.



Photo 10 06/11/23 14:02hrs.

Laydown area close to the buffer zone from the WAMCO landfill.



Photo 11 06/11/23 11:19hrs.

Overall view of the construction work site showing the dewatering sedimentation pit(left) and the bunker area and main process building area.



Photo 12 06/11/23 11:19hrs.

Bunker area excavation works continue as shown here.



Photo 13 06/11/23 11:19hrs.
Lean concrete works completed and ready for pile cap preparation works in part of the main process building.



Photo 14 06/11/23 11:19hrs.
Static load test being carried out on select piles in the main process building area.



Photo 15 06/11/23 11:19hrs.

Concrete batching plant installation works in progress. Concrete works for the material storage area has been completed.



Photo 16 06/11/23 11:19hrs.

Installation work of additional workers accommodation is in progress in the workers camp area.



Photo 17 06/11/23 11:19hrs.

Close proximity of the waste bales at the WAMCO landfill area poses a fire safety risk to the construction camp. C&D waste being dump in the corner close to the site fence.

Information Reported on the EPC Daily Progress Report

Company Name		Employee	Visitor	Rota. Off	Demob.	Total POB (Personal on Board)	Accommodation Site Camp	Normal (hrs)	Overtime (hrs)	Total (hrs)
Office	DBO Representative	1	0	0	0	1	0	9	0	9
	HO – Management Team	5	0	0	0	5	0	45	0	45
	Subcontractor indirect	0	0	0	0	0	0	0	0	0
Site	ER Representative	1	0	0	0	1	1	8	0	8
	EPC Contractor direct staff	35	0	0	0	35	35	315	0	315
	EPC Contractor indirect staff	20	0	0	0	20	20	180	0	180
	EPC Contractor direct site workers	42	0	0	0	42	42	378	0	378
	Security (Gage)	8	0	0	0	8	0	72	0	72
	ELS (Spun pile contractor)	10	0	0	0	10	0	90	0	90
	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	5	0	0	0	5	0	0	0	0
	Grand Total Site POB		122	0	0	0	122	98	1089	0

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	1200.0 lt	0	0	0	0
Monthly	0.011 tons	0.006 tons	0.060 tons	0	6400.0 lt	0	0	0	0
Project Total	0.0 lt	90.0 kg	0.0 lt	0.0 lt	96,847.0 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	0.002 tons	0.001 tons	0.010 tons	0	0.06 tons	6.70 tons	0	0	0
Monthly	0.011 tons	0.006 tons	0.060 tons	0	0.36 tons	40.20 tons	0	0	0
Project Total	1.868 tons	0.557 tons	2.332 tons	0.0 tons	13.99 tons	875.80 tons	3.89 tons	0.82 tons	1.892 tons

CONSTRUCTION ACTIVITIES ON SITE			
12 th July 2023			Next Day Plan
Progress	Completion Date	Construction Activities	Construction Activities
93%	10 th November 23	Construction of the concrete batching plant is ongoing.	Construction of the concrete batching plant will continue.
86%	15 th November 23	Construction of the pre-fabricated worker accommodation building is ongoing.	Construction of the pre-fabricated worker accommodation building will continue.
25%	30 th November 23	Construction of the pre-fabricated worker accommodation building is ongoing.	Construction of the pre-fabricated worker accommodation building will continue.

PERMIT TO WORK							
PTW No.	Issue Date	Permit Holder	Area Authority	Location	Task Description	Expiry Date	Status
CW00158	31 st Oct 23	Dinakaran	Sahin Keles	Accommodation Camp	Lifting, material handling, scaffolding works, installation of prefabricated building.	6 th Nov 23	Closed
CW00160	3 rd Nov 23	M. Ekber Qara	Sahin Keles	Site Office	Concrete work, painting, scaffolding work, manual handling, lifting work.	9 th Nov 23	Open
CW00161	3 rd Nov 23	Haji Quali G.	Sahin Keles	Batching Plant	Shuttering, rebar work, concreting, manual handling, lifting work (<10 tons).	9 th Nov 23	Open
CW00155	3 rd Nov 23	M. Mustafa	Sahin Keles	Bunker Area	Excavation inside and outside bunker area, installation of new well point system.	9 th Nov 23	Open
HW00069	3 rd Nov 23	Haji Quali G.	Sahin Keles	Batching Plant	Welding, cutting, grinding.	9 th Nov 23	Open
HW00070	3 rd Nov 23	M. Mustafa	Sahin Keles	Bunker Area	HDPE pipe welding, C channel welding, cutting and grinding.	9 th Nov 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	18	6	0	0	5	2	0	Concrete Admixture	Liter	0	-
Pickup	N.	0	0	1	0	0	0	0	0	0	Bitumen Material	Kg	126	Warehouse (C.S.A)
Car	N.	0	0	1	0	0	0	0	0	0	Formwork Oil	Liter	0	-
Excavator	N.	0	0	1	0	0	0	1	0	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	-
Concrete Mixer	N.	0	0	1	2	0	0	0	0	0	Paint	Liter	45	Warehouse (C.S.A)
Mobile Crane	N.	0	0	1	0	0	0	1	0	0	Antirust	Liter	70	Warehouse (C.S.A)
200 kVA Genset	N.	0	0	1	0	0	0	0	0	0	Isolation Solution	Kg	0	-
Forklift	N.	1	0	0	0	0	0	0	0	0	Cement	Kg	15,000	Stock Area
Backhoe Loader	N.	0	0	1	0	0	0	0	0	0	Sand	Kg	50,000	Stock Area
Welding Generator	N.	0	0	0	0	0	0	0	1	0	Aggregate	Kg	15,000	Stock Area
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 Generator	N.	0	0	1	0	0	0	0	0	0				
Cutting Machine	N.	0	0	0	0	0	0	0	1	0				
Mobile Tower Light	N.	0	0	2	0	0	0	0	0	0				
Compressor	N.	0	0	1	2	0	0	0	0	0				
Diesel Tanker	N.	0	0	1	0	0	0	0	0	0				
Roller Compactor	N.	0	0	0	2	0	0	0	0	0				
Dump Truck	N.	0	0	0	0	0	0	2	0	0				
Dewatering Pump	N.	0	0	4	0	0	0	0	0	0				



Site Inspection Report

No.: SI-23-29

by the Employer's Representative

Date / Time of the Visit	Conducted by [ER]	Signature
13 th November 2023 10:35 hrs – 13:00 Hrs	Nahee Nazim Deputy Team Leader Fichtner / REM	

General Observations

Sn	Particulars	Details / Remarks	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.	-
4	Total number of man power at project as per attendance register on date of visit a) ER Representative b) DBO Representative c) HO Management Team d) EPC Contractor Direct Staff e) EPC Contractor Indirect Staff f) EPC Contractor Direct Site Workers g) Security (Gage) h) ELS (Spun pile contractor)	Total of 110 workers deployed. 1 1 5 35 20 42 8 10	-
5	Others, if any	Presence of 350 KVA DG, and additional generators placed around the site, conditional approval from URA has been obtained via email.	-

Progress Observations

No.	Particulars	Details / Remarks	Reference
1	Temporary facilities	Work on the temporary facilities on going. Accommodation buildings still under construction. Fencing, guard houses, CCTV systems, storage facilities, kitchen, laundry, toilets, gym as well as the waste water treatment plant are in operation.	
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 been completed, and daily monitoring of sheet piles for any movement is ongoing. Concrete batching plant installation work is ongoing. Preparation for the lean concrete work for the spun pile caps is continuing.	-
3	Excavation & Dewatering	Shallow excavation work for the foundations have begun, dewatering sedimentation pit has been constructed. Well point dewatering system around the bunker area has been setup and continuous dewatering works ongoing. Excavation works of the bunker area is in progress.	-

Environmental Observations

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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	However, for construction phase, various plans and SOPs as part of ESMS as mentioned in CEMP are yet to be finalized.	-
2	Status of adequacy of environment monitoring as envisaged in CEMP on the basis of assessment made on randomly basis.	Being conducted as scheduled.	-
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.	Work on designing a more effective training module including tool box talk as construction team is responsible for implementation of CEMP, H&S plan and other management plans is ongoing.	
4	Status of adequacy of record keeping including data reported in monthly environment report on the basis of assessment made on randomly basis.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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	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 runs within the site boundary. 	-
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.	-
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.	-
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.	-
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.	-
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, a proper register is to be 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.	-
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.	Boxes placed for for internal grievance redress mechanism.	-
8	Status of adequacy of record keeping including data reported in monthly HSE report on the basis of randomly assessment made.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-

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

Community- health, safety and welfare

9	<p>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.)</p>	<p>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, several rounds of review and comments have been shared by the ER with the DBO contractor on the documents that are being prepared.</p>	-
10	<p>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.)</p>	<p>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.</p>	-
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Site Photos



Photo 01 06/11/23 10:36hrs.
Excavation work and continuous dewatering of the bunker area continues.



Photo 02 by 06/11/23 10:48hrs.
Excavation to a depth of -5m in the bunker area is ongoing.



Photo 03 06/11/23 10:49hrs.
Excavation to a depth of -5m in the bunker area is ongoing.



Photo 04 06/11/23 10:50hrs.
PDA test being conducted on select piles in the main process building area.



Photo 05 06/11/23 10:59hrs.
Reinforcement and formwork assembly work continues.

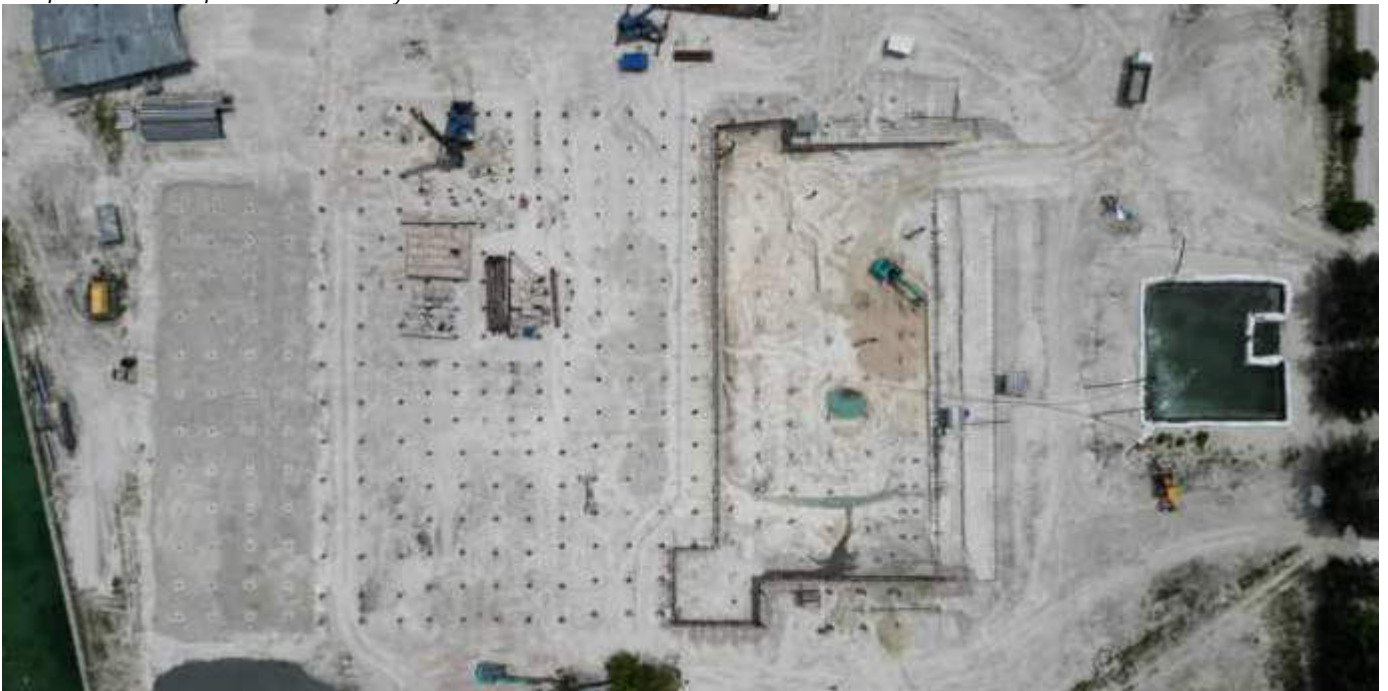


Photo 06 06/11/23 11:00hrs.
Overall view of the main construction area.



Photo 07 06/11/23 11:05hrs.

Lean concrete for the process building area completed and made ready for pile cap concrete works preparations to start.



Photo 08 06/11/23 12:10hrs.

Bunker area overview, sand has been removed outside the bunker area as to reduce the stress on the sheet piles.



Photo 09 06/11/23 11:17hrs.

Sand has been removed outside the bunker area as to reduce the stress on the sheet piles.



Photo 10 06/11/23 14:02hrs.

Dewatering sedimentation tank from above, algae bloom seen.



Photo 11 06/11/23 11:19hrs.
Concrete batching plant and support facilities installation work is in progress.



Photo 12 06/11/23 11:19hrs.
Concrete batching plant and support facilities installation work is in progress.



Photo 13 06/11/23 11:19hrs.
Dewatering outfall to sea, no visible change seen to the surrounding.



Photo 14 06/11/23 11:19hrs.

Overall view of construction camp area, installation work for the accommodation building is ongoing.



Photo 15 06/11/23 11:19hrs.

Installation work for the accommodation building is ongoing.

Information Reported on the EPC Daily Progress Report

Company Name		Employee	Visitor	Rota. Off	Demob.	Total POB (Personal on Board)	Accommodation Site Camp	Normal (hrs)	Overtime (hrs)	Total (hrs)
Office	DBO Representative	1	0	0	0	1	0	9	0	9
	HO – Management Team	5	0	0	0	5	0	45	0	45
	Subcontractor indirect	0	0	0	0	0	0	0	0	0
Site	ER Representative	1	0	0	0	1	1	9	0	9
	EPC Contractor direct staff	30	0	0	0	30	35	270	0	270
	EPC Contractor indirect staff	23	0	0	0	23	20	207	0	207
	EPC Contractor direct site workers	43	0	0	0	43	42	387	0	387
	Security (Gage)	8	0	0	0	8	0	72	0	72
	ELS (Spun pile contractor)	10	0	0	0	10	0	90	0	90
	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	7	0	0	0	7	0	0	0	0
	Grand Total Site POB		121	0	0	0	121	98	1089	0

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	1200.0 lt	0	0	0	0
Monthly	0.024 tons	0.013 tons	0.130 tons	0	14,400.0 lt	0	0	0	0
Project Total	0.0 lt	90.0 kg	0.0 lt	0.0 lt	104,847.0 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	0.002 tons	0.001 tons	0.010 tons	0	0.06 tons	6.70 tons	0	0	0
Monthly	0.024 tons	0.013 tons	0.130 tons	0	0.78 tons	87.10 tons	0	0	0
Project Total	1.881 tons	0.564 tons	2.402 tons	0.0 tons	14.41 tons	922.70 tons	3.89 tons	0.82 tons	1.892 tons

CONSTRUCTION ACTIVITIES ON SITE			
12 th July 2023			Next Day Plan
Progress	Completion Date	Construction Activities	Construction Activities
97%	15 th November 23	Construction of the concrete batching plant is ongoing.	Construction of the concrete batching plant will continue.
37%	30 th November 23	Construction of the pre-fabricated worker accommodation building is ongoing.	Construction of the pre-fabricated worker accommodation building will continue.
45%	30 th November 23	Excavation of the bunker area (down to -5.00m level) is ongoing.	Excavation of the bunker area (down to -5.00m level) will continue.
100%	13 th November 23	PDA test was conducted in the turbine area piles SP-260, SP-262, SP-265. Sheet pile supports installation works are ongoing.	- Sheet pile supports installation works will continue.

PERMIT TO WORK							
PTW No.	Issue Date	Permit Holder	Area Authority	Location	Task Description	Expiry Date	Status
CW00163	7 th Nov 23	Dinakaran	Omer Aldatmaz	Accommodation Camp	Lifting, material handling, scaffolding works, installation of prefabricated building.	13 th Nov 23	Closed
CW00165	10 th Nov 23	Haji Quali G.	Omer Aldatmaz	Batching Plant	Shuttering, rebar work, concreting, manual handling, lifting work (<10 tons).	16 th Nov 23	Open
CW00166	10 th Nov 23	M. Mustafa	Omer Aldatmaz	Bunker Area	Excavation inside and outside bunker area, installing new wellpoint system.	16 th Nov 23	Open
HW00071	10 th Nov 23	Haji Quali G.	Omer Aldatmaz	Batching Plant	Welding, cutting, grinding.	16 th Nov 23	Open
HW00072	10 th Nov 23	M. Mustafa	Omer Aldatmaz	Bunker Area	HDPE pipe welding, c channel welding, cutting and grinding.	16 th Nov 23	Open
CW00167	11 th Nov 23	Sanjeeva J.	Omer Aldatmaz	Bunker Area	Concrete blocks shifting and unloading for static load test.	13 th Nov 23	Open
CW00168	13 th Nov 23	Sanjeeva J.	Omer Aldatmaz	Turbine Area	PDA Testing.	19 th Nov 23	Open

LIST OF MAJOR EQUIPMENT										SITE RESOURCES				
Description	U. M.	AAJV								Rental	Material	Unit	Qty	Storage Location
		Laydown area		Site		Laydown area		Site						
		Working	Standby	Working	Standby	Working	Standby	Working	Standby					
TOTAL	N.	2	0	18	6	0	0	5	2	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	1	0	0	0	1	0	0				
180 kVA Genset	N.	0	0	1	0	0	0	0	0	0				
Trailer	N.	1	0	0	0	0	0	0	0	0				
Concrete Mixer	N.	0	0	1	2	0	0	0	0	0				
Mobile Crane	N.	0	0	1	0	0	0	1	0	0				
200 kVA Genset	N.	0	0	1	0	0	0	0	0	0				
Forklift	N.	1	0	0	0	0	0	0	0	0				
Backhoe Loader	N.	0	0	1	0	0	0	0	0	0				
Welding Generator	N.	0	0	0	0	0	0	1	0	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 Generator	N.	0	0	1	0	0	0	0	0	0				
Cutting Machine	N.	0	0	0	0	0	0	0	1	0				
Mobile Tower Light	N.	0	0	2	0	0	0	0	0	0				
Compressor	N.	0	0	1	2	0	0	0	0	0				
Diesel Tanker	N.	0	0	1	0	0	0	0	0	0				
Roller Compactor	N.	0	0	0	2	0	0	0	0	0				
Dump Truck	N.	0	0	0	0	0	0	2	0	0				
Dewatering Pump	N.	0	0	4	0	0	0	0	0	0				



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
05.11.2023	11.11.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Improvement work for sheetpile anchorage system

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

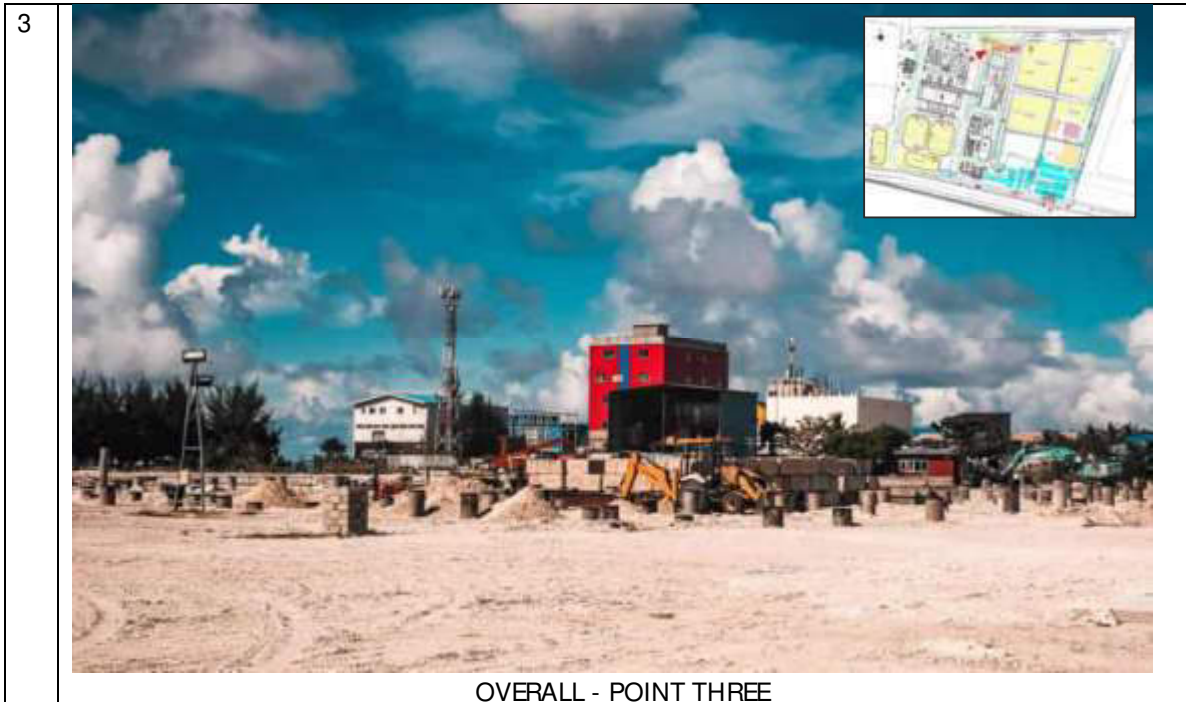
Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.



OVERALL - POINT ONE



OVERALL - POINT TWO



5



OVERALL - POINT FIVE

6



IMPROVEMENT OF SHEETPILE ANCHORAGE SYSTEM

7



BI-MONTHLY FOGGING FOR SITE AND ACCOMMODATION

8



IMPROVEMENT OF SHEETPILE ANCHORAGE SYSTEM



BUNKER AREA DEWATERING CONTINUE



TEMPORARY CONCRETE BATCHING PLANT SETUP

FICHTNER

Site Log

Date: 11/5/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Sunday
 Time on site: Time off site: Completed by:

Weather:

Total Civil Process

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Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Concrete compressive test on the lean concrete at main process building. (7 days). Result acceptable.

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A	N/A	N/A

Comments

N/A

FICHTNER

Site Log

Date 11/6/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Monday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	<input type="text"/>	<input type="text"/>	<input type="text"/>

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings

When	Who	What
<input type="text" value="N/A"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments

FICHTNER

Site Log

Date: 11/7/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	47	47	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date 11/8/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Wednesday

Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process	
Workers on Site	45	45	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

	When	Who	What
Meetings	10:00am	FIT, URB, RAMB, AAJV	Weekly safety meeting.
			Discuss on sheetpile monitoring parameter and safe working procedure.

Comments

FICHTNER

Site Log

Date: 11/9/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: Time off site: Completed by:

Weather:

Total Civil Process

47	47	0
----	----	---

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Preparation of sheetpile anchorage improvement and removal of excess soil (surcharge load) behind the sheetpile.

Safety Audits/Safety Walkarounds

Inspection of hazardous storage area. MSDS have been updated and recorded properly. Inspection of worker shed construction, working at height implemented with proper PPE and procedure.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 11/10/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

<input type="text"/>	<input type="text"/>	<input type="text"/>
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Note : Enter this information when it is available, at least once per week as a minimum

Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections

OFF DAY (FRIDAY)

Safety
Audits/Safety
Walkarounds

N/A

Safety and
Environmental
Incidences

N/A

Compliance to
Design and
construction
methods,
approved
materials

N/A

Major Quality
Issues

N/A

Site Instructions
Issued

N/A

Verbal
communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 11/11/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Saturday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process
47	47	0

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Preparation of sheetpile anchorage improvement and removal of excess soil (surcharge load) behind the sheetpile.

Safety Audits/Safety Walkarounds

Weekly toolbox.
 1) Highlight on SOP for reinforcement bar cutting and bending

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
12.11.2023	18.11.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Improvement work for sheetpile anchorage system completed.
- Continue bunker excavation.
- Preparation for spun pile Static Load Test (SLT) setup for turbine area.
- Spun pile PDA test.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.

1



OVERALL - POINT ONE

2



OVERALL - POINT TWO





OVERALL - POINT FIVE



BUNKER EXCAVATION CONTINUE FROM WEST SIDE

7



SLT SETUP PREPARATION FOR TURBINE AREA

8



FIRE DRILL EXERCISE

9



BUNKER AREA DEWATERING CONTINUE

10



TEMPORARY CONCRETE BATCHING PLANT SETUP

Site Log



Date: 11/12/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Sunday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

	Total	Civil	Process
Workers on Site	42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Spun pile high strain testing (PDA) on SP260, SP262, SP265 & B2-10 conducted. Field result pass. Contractor to submit full report officially.
 3) Preparation of sheetpile anchorage improvement and removal of excess soil (surcharge load) behind the sheetpile.

Safety Audits/Safety Walkarounds

Witness water sampling for tap water, drinking water, STP effluent, dewatering discharge, marine sea water and ground water.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Noticed that the reinforcement bar comes from Villa is all in 6m length instead of 12m length. Recommend the contractor to look into an option of buying directly from manufacturer. This will reduce reinforcement bar lapping requirement and minimize wastage.

Meetings	When	Who	What
	N/A	N/A	N/A

Comments

N/A

FICHTNER

Site Log

Date 11/13/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Monday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

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Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Preparation of sheetpile anchorage improvement and removal of excess soil (surcharge load) behind the sheetpile completed. Inspection done. In accordance to the revise drawing. Allow to proceed with excavation.
 3) Site visit by MoE minister.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

	When	Who	What
Meetings	<input type="text" value="N/A"/>		

Comments

Site Log



Date 11/14/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Tuesday

Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	43	43	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Excavation on bunker area continue from west side.
 3) Preparation of Static Load Test (SLT) setup at turbine area.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

Site Log



Date 11/15/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny.

	Total	Civil	Process
Workers on Site			

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Excavation on bunker area continue from west side.
 3) Preparation of Static Load Test (SLT) setup at turbine area.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Discussion on turbine spun pile drawing second phase. Noted on the pile arrangement. Request the contractor to update construction drawing accordingly.

Meetings	When	Who	What
	10:00am	FIT, URB, RAMB, AAJV	Weekly safety meeting.
			Discuss on plan mock up drill for fire break on 18/11/2023

Comments N/A

Site Log



Date 11/16/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Thursday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Excavation on bunker area continue from west side.
3) Preparation of Static Load Test (SLT) setup at turbine area.
4) Inspection of spun pile material to be used for turbine second phase. Material is acceptable.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication N/A

Table with 3 columns: When, Who, What. Row 1: N/A, empty, empty. Rows 2-4: empty.

Comments N/A

Site Log



Date: 11/17/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Workers on Site table with columns: Total, Civil, Process. Includes a note: Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections OFF DAY (FRIDAY) - Material delivery gravel for batching plant.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication N/A

Meetings table with columns: When, Who, What

Comments N/A

Site Log



Date 11/18/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Excavation on bunker area continue from west side.
3) Preparation of Static Load Test (SLT) setup at turbine area.

Safety Audits/Safety Walkarounds Weekly toolbox.
1) Conducted fire drill. Start siren at 10:00am. Full assembly and start head counting by 10:04am. Created scenario in cases where fire outbreak occur at WAMCO area, assembly point opposite wind direction.

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Received sheet pile monitoring data, maximum deflection data (15mm) within design tolerance (33mm). Checked daily.

Meetings table with columns: When, Who, What

Comments N/A



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
19.11.2023	25.11.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Bunker excavation to -3.7m.
- Spun pile driving, splash coating and welding at Turbine (second phase) area.
- Preparation for spun pile Static Load Test (SLT) setup for turbine area.
- Spun pile cutting at Bunker area.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.

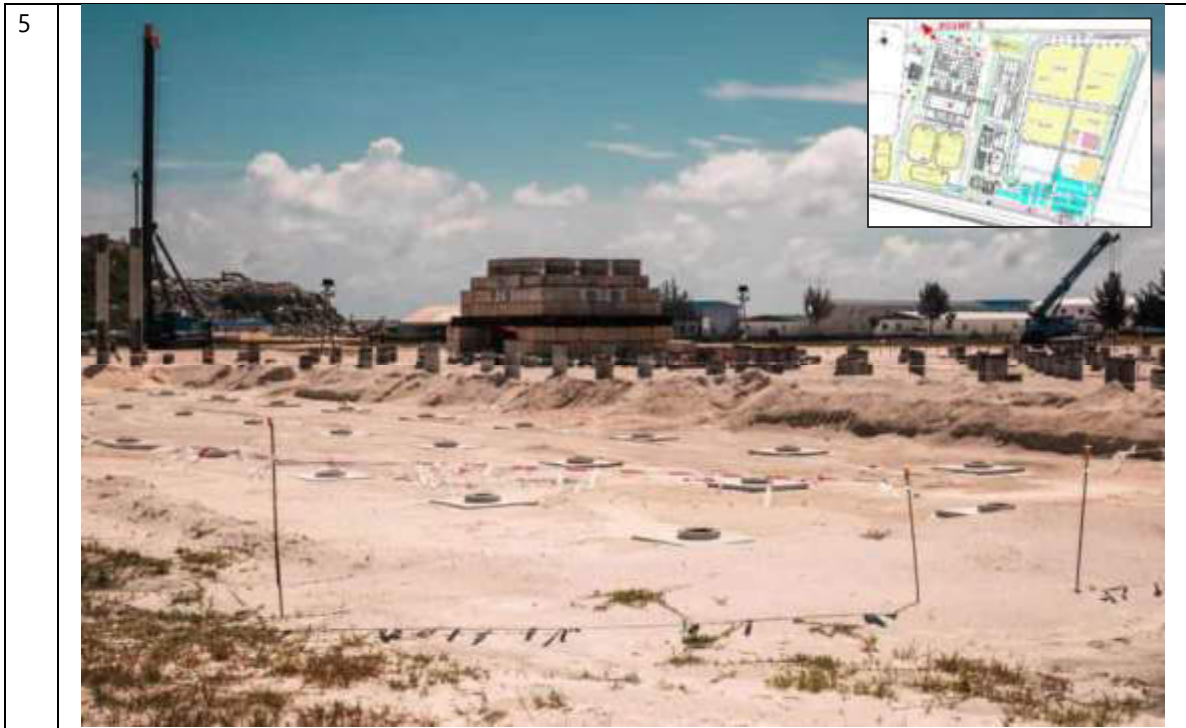




OVERALL - POINT THREE



OVERALL - POINT FOUR



OVERALL - POINT FIVE



BUNKER EXCAVATION CONTINUE FROM WEST SIDE

7



SLT SETUP PREPARATION FOR TURBINE AREA

8



TEMPORARY CONCRETE BATCHING PLANT SETUP

Site Log



Date: 11/19/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

	Total	Civil	Process
Workers on Site	42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Spun pile driving for turbine area (second phase) points FR05, FR07, FR10, FR11, FR12, FR13, FR14, FR15, FR16, FR17 & FR18
 3) Bunker excavation to -3.7m depth.
 4) SLT setup preparation.

Safety Audits/Safety Walkarounds

Noise level monitoring outside project boundaries.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Suggest EPC to monitor water table during low tide & high tide. Information is helpful for decommissioning of dewatering schedule and foundation backfilling in future.

Meetings	When	Who	What
	N/A	N/A	N/A

Comments

N/A

Site Log



Date 11/20/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Monday Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections 1) Dewatering of bunker area continue. 2) Spun pile cutting at BU004, BU005, BU006, BU021, BU026, BU030 & BU034. 3) Spun pile splash zone coating for turbine (second phase) area. 4) Bunker excavation to -3.7m depth. 5) SLT setup preparation.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication N/A

Table with 3 columns: When, Who, What. Row 1: Meetings, N/A, empty, empty.

Comments N/A

Site Log



Date: 11/21/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	43	43	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Spun pile cutting at BU007, BU017, BU022, BU027, BU031, BU035 & BU039.
 3) Spun pile welding work for turbine (second phase) area.
 4) Bunker excavation to -3.7m depth.
 5) SLT setup preparation.

Safety Audits/Safety Walkarounds

Air quality monitoring conducted on three location AQ1, AQ2 & ASR2.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Received sheet pile monitoring data, deflection data (16mm) within design tolerance (33mm)

Meetings	When	Who	What
	10:00am	MOE, ER, DBO, EPC	Monthly Progress Meeting

Comments

N/A

Site Log



Date 11/22/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny.

	Total	Civil	Process
Workers on Site	43	43	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Spun pile cutting at BU-043, BU-047, BU-051, BU-053, BU-54, BU-55, BU-57, BU-058, BU-059, BU-89, BU-91 & BU-92.
 3) Spun pile welding work for turbine (second phase) area.
 4) Bunker excavation to -3.7m depth.
 5) SLT setup preparation.

Safety Audits/Safety Walkarounds

Air quality monitoring at AQ4, ASR3 & ASR5.

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

EPC informed foundation type for stack is by piling. EPC still finalizing the foundation design for stack.
 Received sheet pile monitoring data, deflection data (19mm) within design tolerance (33mm)

Meetings	When	Who	What
	N/A		

Comments

N/A

Site Log



Date: 11/23/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total	Civil	Process

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Spun pile cutting at BU-081, BU-082, BU-083, BU-084, BU-085, BU-086, BU-087, BU-088, BU-089 & BU-090.
- 3) Spun pile welding inspection at turbine (second phase) area.
- 4) Bunker excavation to -3.7m depth.
- 5) SLT setup preparation.
- 6) Concrete compressive strength test (28 days) for lean concrete main process building conducted. Result acceptable.

Safety Audits/Safety Walkarounds
 Observation and inspection of waste disposable area, camp site and office.

Safety and Environmental Incidences
 N/A

Compliance to Design and construction methods, approved materials
 N/A

Major Quality Issues
 N/A

Site Instructions Issued
 N/A

Verbal communication
 Received sheet pile monitoring data, deflection data (17mm) within design tolerance (33mm).
 Discuss on batching plant readiness. Material (aggregate, SRC) and equipment (generator set, chiller) still not ready.

When	Who	What
N/A		

Comments
 N/A

Site Log

FICHTNER

Date 11/24/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

<input type="text"/>	<input type="text"/>	<input type="text"/>
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Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments

Site Log



Date: 11/25/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Spun pile cutting at BU-077 & BU-078.
3) Spun pile welding inspection at turbine (second phase) area.
4) Bunker excavation to -3.7m depth.
5) SLT setup preparation.
6) Concrete compressive strength test (28 days) for lean concrete main process building conducted. Result acceptable.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Received sheet pile monitoring data, maximum deflection data (17mm) within design tolerance (33mm). Remind EPC/DBO to update status of outstanding work (observation list) raise by ER.

Table with 3 columns: When, Who, What. Row 1: N/A, empty, empty. Rows 2-4: empty.

Comments N/A



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
26.11.2023	2.12.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Bunker excavation to -3.7m.
- Spun pile welding at Turbine (second phase) area.
- Spun pile Static Load Test on SP-263
- Spun pile cutting at Bunker area.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.



3



OVERALL - POINT THREE

4



OVERALL - POINT FOUR

5



OVERALL - POINT FIVE

6



BUNKER EXCAVATION CONTINUE FROM WEST SIDE

7



DEWATERING BUNKER AREA

8



TEMPORARY CONCRETE BATCHING PLANT SETUP



WAMCO PRESENTATION ON S.O.P. FOR FIRE OUTBREAK TOGETHER WITH MNDF

Site Log



Date: 11/26/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Sunday
 Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

	Total	Civil	Process
Workers on Site	42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Spun pile cutting at BU-048, BU-049, BU-079, BU-080, BU-081, BU-082, BU-083, BU-084, BU-085, BU-086, BU-097 & BU-098.
- 3) Spun pile welding inspection at turbine (second phase) area.
- 4) Bunker excavation to -3.7m depth.
- 5) Static Load Test on pile point SP-263 begin. Target maximum load of 120%. Expected maximum displacement of 12mm.
- 6) Concrete compressive strength test (28 days) for lean concrete main process building conducted. Result acceptable.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication
 Received sheet pile monitoring data, maximum deflection data (22mm) within design tolerance (33mm).

Meetings	When	Who	What
	N/A	N/A	N/A

Comments N/A

Site Log



Date 11/27/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Monday

Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	<input type="text"/>	<input type="text"/>	<input type="text"/>

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Spun pile cutting at BU-099, BU-100, BU-101, BU-102, BU-068, BU-040 & BU-041.
 3) Bunker excavation to -3.7m depth.
 4) Static Load Test on pile point SP-263. Maximum load tested at 120%, maximum displacement of 10.53mm. Below the expected allowance of 12mm.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments

Site Log



Date: 11/28/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	44	44	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Bunker excavation to -3.7m depth.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

Site Log



Date: 11/29/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Wednesday

Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	43	43	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Spun pile cutting at BU-008, BU-042, BU-103 & BU-104.
 3) Bunker excavation to -3.7m depth.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

When	Who	What
10:00	FIT, URB, RAM, AAJV	Weekly safety committee meeting.
		Highlight the schedule presentation by Wamco on 30/11/23
		Remind to update the FIT observation list.

Comments

Site Log



Date 11/30/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Thursday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Bunker excavation to -3.7m depth.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Received sheet pile monitoring data, deflection data (20mm) within design tolerance (33mm). Highlight to URB & AAJV that the dewatering water might have spike on Total Suspended Solid (TSS) as the water is very cloudy and high amount of silt. To test the water and verify action moving forward.

Table with 3 columns: When, Who, What. Meeting at 15:00 with WAMCO, FIT, URB, AAJV, MNDF regarding fire SOP and ERP.

Comments N/A

Site Log

FICHTNER

Date: 12/1/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday
Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

	Total	Civil	Process
Workers on Site			

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

OFF DAY (FRIDAY)

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

N/A

Meetings	When	Who	What
	N/A		

Comments

N/A

Site Log



Date 12/2/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Bunker excavation to -3.7m depth.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Received sheet pile monitoring data, maximum deflection data (20mm) within design tolerance (33mm).

Table with 3 columns: When, Who, What. Row 1: Meetings, N/A, empty, empty.

Comments N/A



Site Inspection Report

No.: SI-23-30

by the Employer's Representative

Dates / Time of the Visit	Conducted by [ER]	Signature
13 th , 16 th , 17 th December 2023 09:00 hrs – 17:00 Hrs	Nahee Nazim Deputy Team Leader Fichtner / REM	

General Observations

Sn	Particulars	Details / Remarks	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.	-
4	Total number of man power at project as per attendance register on date of visit a) ER Representative b) DBO Representative c) HO Management Team d) EPC Contractor Direct Staff e) EPC Contractor Indirect Staff f) EPC Contractor Direct Site Workers g) Security (Gage) h) ELS (Spun pile contractor)	Total of 107 workers deployed. 1 1 5 33 20 42 7 5	-
5	Others, if any	Presence of 350 KVA DG, and additional generators placed around the site, conditional approval from URA has been obtained via email.	-

Progress Observations

No.	Particulars	Details / Remarks	Reference
1	Temporary facilities	Work on the temporary facilities on going. Staff accommodation buildings still under construction. Fencing, guard houses, CCTV systems, storage facilities, kitchen, laundry, toilets, gym as well as the waste water treatment plant are in operation, new entrance gate installed and guard house under construction.	
2	Site Preparation	Spun piles for ground improvement has been. Sheetpiling work around the bunker area has been completed, and daily monitoring of sheet piles for any movement is ongoing. Concrete batching plant is operational. Lean concrete work and pile caps concrete work for the spun pile caps is continuing.	-
3	Excavation & Dewatering	Excavation work for the bunker and the main process building has been completed. Well point dewatering system around the bunker area has been setup and continuous dewatering works is ongoing.	-

Environmental Observations

Sn	Particulars	Details / Remarks	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	However, for construction phase, various plans and SOPs as part of ESMS as mentioned in CEMP are yet to be finalized. Implementation of the said plans is an ongoing process and efforts are in place to implement the CEMP.	-
2	Status of adequacy of environment monitoring as envisaged in CEMP on the basis of assessment made on randomly basis.	Being conducted as scheduled.	-
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.	Toolbox talks are being conducted on a daily basis. Training is conducted monthly as per requirement for the month. Implementation of CEMP, H&S plan and other management plans is ongoing.	
4	Status of adequacy of record keeping including data reported in monthly environment report on the basis of assessment made on randomly basis.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record on the ACONEX project management system and shared with all stakeholders.	-

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	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, SOPs are in place for specific work activities and is an ongoing process. 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 No risk management and monitoring plan was in place to deal with air pollutants emitting from dumping site, however the need for air quality monitoring within the site area has been suggested by ADB HSE expert and it was agreed to work on implementing this by EPC. 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. 	-
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, HSE monitoring and audits are conducted by the EPC as well as DBO. Implementation of the CEMP and HSE plans is ongoing. SOP's are in place for all ongoing construction work and is an ongoing process as work progress on site.	-
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.)	SOPs on subject is in place and drills have been conducted on site. However regular drills and training is required on a regularly basis as work force increases. 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 as the workforce increases.	-
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 are operational, 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.	-
5	Status of adequacy of housekeeping within project site on the basis of randomly assessment made.	Site is kept generally clean and organized. Designated persons assigned for cleaning and logs kept for toilets. Designated waste collection area is established, waste bins are installed through out site camp area.	-
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, a proper register is to be maintained. Security guards in place at both entry points to the site. CCTV system is installed. Adequate lighting is provided around the site. CCTV monitor should be provided for the security guard room.	-
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.	Boxes placed for for internal grievance redress mechanism at several places within the site area. Notices and forms are in several languages.	-

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

8	Status of adequacy of record keeping including data reported in monthly HSE report on the basis of randomly assessment made.	Site activities are captured on the Daily Progress Reports prepared by the EPC and digital copies of the report are kept on record.	-
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.)	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, several rounds of review and comments have been shared by the ER with the DBO contractor on the documents that are being prepared. Even though the process of developing the documents, measures are taken to implement these as an ongoing process.	-
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. However, plan and SOPs on subject are under process of finalization for getting approval of ER/PMU for construction phase. Regular training and drills are being conducted on site and records are kept.	-
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. The site being in the industrial area no complaints were received this month.	-

Site Photos



Photo 01 13/12/23 09:56hrs.

Mr. Sandeep, HSE Expert (ADB) along with Dr. Ibrahim (MOE) and Nahee (ER) meeting with site team.



Photo 02 by 13/13/23 10:49hrs.

Site walk around with ADB expert around.



Photo 03 13/12/23 10:50hrs.

Excavation to a depth of -3.7m in the bunker area is ongoing. Dewatering system is operational. Sheet pile movement monitoring is carried out by suvey team on a daily basis.



Photo 04 13/12/23 10:50hrs.

HSE site team explaining the measures in place and site activities to the ADB HSE expert .



Photo 05 13/12/23 10:52hrs.
Reinforcement and formwork assembly work continues.



Photo 06 13/12/23 11:25hrs.
Sedimentation pond for the dewatering activities. Kept clean and any floating debris is removed regularly. Life buoys placed and a guard is always posted. Dewatering will continue until foundation works have been completed. Regularly dewatering water quality monitoring, and EPA permits are being updated on a monthly basis.



Photo 07 13/12/23 11:30hrs.
Diesel genset in use, placed in an enclosure and signage in place. Operational permits have been obtained from URA.



Photo 08 13/11/23 11:47hrs.
Concrete batching plant is operational and trial mix test cubes cast and being tested on site by the ELS concrete testing lab.



Photo 09 13/12/23 11:47hrs.
ELS concrete testing lab operational on site.



Photo 10 13/12/23 11:49hrs.

Trial mix test cubes cast and being tested on site by the ELS concrete testing lab.

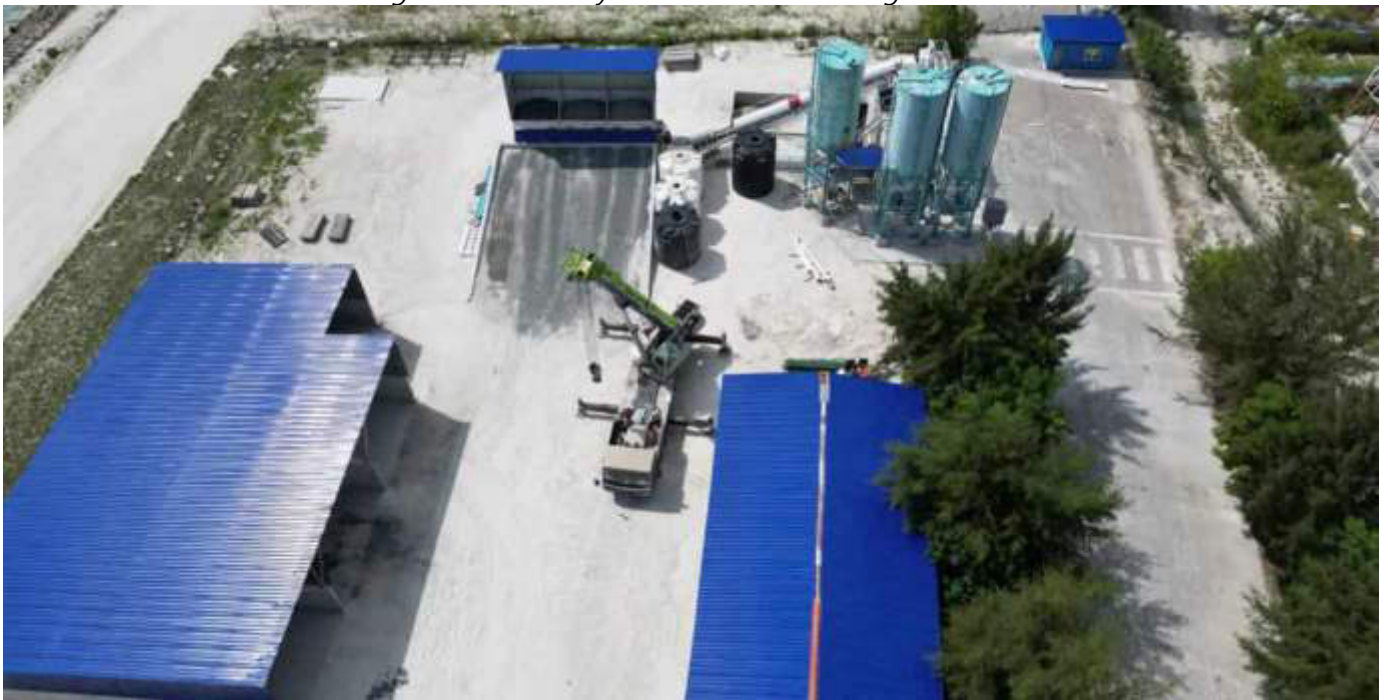


Photo 11 13/12/23 11:59hrs.

Concrete batching plant is operational and support facilities installation work is in progress.



Photo 12 13/12/23 13:05hrs.
Concrete batching plant is operational and support facilities installation work is in progress.



Photo 13 13/12/23 13:09hrs.
Workers camp on site (Right) a new workers accommodation block and a staff accommodation block is almost complete.



Photo 14 16/12/23 13:19hrs.
WAMCO waste bale storage in close proximity to site, 25m distance from the Gate 1. Breaking of the bale covers and vegetation growth seen on the bales.



Photo 15 13/12/23 13:19hrs.
Breaking of the bale covers and vegetation growth seen on the bales.



Photo 16 13/12/23 13:25hrs.
Excavation work in the bunker area is ongoing.



Photo 17 06/11/23 13:26hrs.
Dewatering works is ongoing and the sedimentation tank kept with guard rails, silt traps, and guard in place and all surface debris is removed before the outfall.



Photo 18 13/12/23 13:28hrs.

Excavation works and pile cutting and lean concrete for the pile caps works is ongoing for the main process building. Turbine area piling work is in progress.



Photo 19 13/12/23 13:35hrs.

WAMCO landfill adjacent to site is being used for daily waste disposal by WAMCO.



Photo 20 13/12/23 13:36hrs.

WAMCO landfill adjacent to site is being used for daily waste disposal by WAMCO. Waste disposed very close to the quay wall and danger of spilling into lagoon is there. Floating waste visible within the lagoon.



Photo 21 13/12/23 13:39hrs.

Shipwrecks in the lagoon is yet to be removed by URBANCO. No activity regarding this has been observed this month, Lots of floating debris is gathered around the shipwrecks and on the ramp area in the site corner.



Photo 22 13/12/23 13:45hrs.

Shipwrecks in the lagoon is yet to be removed by URBANCO. The excavated soil is managed within the site away from the working area and relatively dust free given the rainy days.

Information Reported on the EPC Daily Progress Report

Company Name		Employee	Visitor	Rota. Off	Demob.	Total POB (Personal on Board)	Accommodation Site Camp	Normal (hrs)	Overtime (hrs)	Total (hrs)
Office	DBO Representative	1	0	0	0	1	0	0	0	0
	HO – Management Team	5	0	0	0	5	0	0	0	0
	Subcontractor indirect	0	0	0	0	0	0	0	0	0
Site	ER Representative	1	0	0	0	1	1	0	0	0
	EPC Contractor direct staff	33	0	0	0	33	33	297	0	297
	EPC Contractor indirect staff	20	0	0	0	20	20	180	0	180
	EPC Contractor direct site workers	42	0	0	0	42	42	378	0	378
	Security (Gage)	7	0	0	0	7	0	63	0	63
	ELS (Spun pile contractor)	5	0	0	0	5	0	45	0	45
	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	4	0	0	0	4	0	0	0	0
	Direct workers total	47	0	0	0	47		423		423
Grand Total Site POB	107	0	0	0	107	93	963	0	963	

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	1300.0 lt	0	0	0	0
Monthly	0	0	0	0	14,900.0 lt	0	0	0	0
Project Total	0.0 lt	90.0 kg	0.0 lt	0.0 lt	140,347.0 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	0.002 tons	0.001 tons	0.010 tons	0	0.06 tons	6.70 tons	0	0	0
Monthly	0.025 tons	0.013 tons	0.130 tons	0	0.78 tons	87.10 tons	0	0	0
Project Total	1.938 tons	0.594 tons	2.702 tons	0.0 tons	16.21 tons	1123.00 tons	3.89 tons	0.82 tons	1.892 tons

CONSTRUCTION ACTIVITIES ON SITE			
12 th July 2023			Next Day Plan
Progress	Completion Date	Construction Activities	Construction Activities
92%	25 th December 23	Construction of the pre-fabricated staff accommodation building is ongoing.	Construction of the pre-fabricated staff accommodation building will continue.
93%	17 th December 23	Excavation of the Bunker Area is ongoing.	Construction of the pre-fabricated worker accommodation building will continue.
20%	30 th December 23	Installation of the additional wastehouse for the project is ongoing.	Excavation of the Bunker Area will continue.
40%	15 th December 23	Air Quality Monitoring at 2 locations (AQ2, AQ1) has been started for the construction stage monitoring.	Spun pile cutting works between the MD-MH and T1-M10 axes of the Main Process Area will continue.
100%	13 th December 23	DFT test for Future Turbine Area piles has been conducted.	Installation of the additional warehouse for the project materials will continue.
		8 nos spun pile's (SP-188, SP-189, SP-190, SP-191, SP-192, SP-193, SP-200, SP-201) cutting works were completed in Main Process Area.	Air Quality Monitoring for the construction stage monitoring will continue.
		Daily toolbox talk meeting was conducted before start to construction activities.	

PERMIT TO WORK							
PTW No.	Issue Date	Permit Holder	Area Authority	Location	Task Description	Expiry Date	Status
HW00083	07 th Dec 23	Dinakaran	Sahin Keles	Accommodation Camp	Foam panel board and profile cutting work.	13 th Dec 23	Closed
CW00187	09 th Dec 23	Mustafa M.	Sahin Keles	Bunker Area	Excavation at Bunker Area water discharging spun pile cold cutting and installation support for sheet pile	15 th Dec 23	Open
CW00188	09 th Dec 23	Haji Quali G.	Sahin Keles	Batching Plant	Excavation at Main Process Area until +0.40 level.	15 th Dec 23	Open
CW00189	09 th Dec 23	Amos C.	Sahin Keles	WtE Building	Welding, cutting, grinding.	15 th Dec 23	Open
HW00084	09 th Dec 23	M. Mustafa	Sahin Keles	Bunker Area	Welding, cutting, grinding.	15 th Dec 23	Open
HW00085	09 th Dec 23	Haji Quali G.	Sahin Keles	Batching Plant	Scaffolding work, working at high, manual handling, installation of the new warehouse	15 th Dec 23	Open
CW00190	10 th Dec 23	M. Yunos K.	Sahin Keles	Warehouse	Concrete blocks shifting and unloading for static load test.	16 th Dec 23	Open
CW00191	11 th Dec 23	Dinakaran	Sahin Keles	Accommodation Camp	Lifting, material handling, scaffolding works, installation of prefabricated building.	17 th Dec 23	Open
HW00086	11 th Dec 23	M. Yunos K.	Sahin Keles	Warehouse	Welding, cutting, grinding.	17 th Dec 23	Open
CW00192	13 th Dec 23	Amos C.	Sahin Keles	Turbine Area	Spun pile driving.	19 th Dec 23	Open

LIST OF MAJOR EQUIPMENT										
Description	U. M.	AA/JV				Subcontractors				Rental
		Laydown area		Site		Laydown area		Site		
		Working	Standby	Working	Standby	Working	Standby	Working	Standby	
TOTAL	N.	2	0	18	6	0	0	3	2	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	1	0	0	0	1	0	0
180 kVA Genset	N.	0	0	1	0	0	0	0	0	0
Trailer	N.	1	0	0	0	0	0	0	0	0
Concrete Mixer	N.	0	0	1	2	0	0	0	0	0
Mobile Crane	N.	0	0	1	0	0	0	1	0	0
200 kVA Genset	N.	0	0	1	0	0	0	0	0	0
Forklift	N.	1	0	0	0	0	0	0	0	0
Backhoe Loader	N.	0	0	1	0	0	0	0	0	0
Welding Generator	N.	0	0	0	0	0	0	1	0	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 Generator	N.	0	0	1	0	0	0	0	0	0
Cutting Machine	N.	0	0	0	0	0	0	0	1	0
Mobile Tower Light	N.	0	0	2	0	0	0	0	0	0
Compressor	N.	0	0	1	2	0	0	0	0	0
Diesel Tanker	N.	0	0	1	0	0	0	0	0	0
Roller Compactor	N.	0	0	0	2	0	0	0	0	0
Dump Truck	N.	0	0	0	0	0	0	0	0	0
Dewatering Pump	N.	0	0	4	0	0	0	0	0	0

SITE RESOURCES			
Material	Unit	Qty	Storage Location
Concrete Admixture	Liter	0	-
Bitumen Material	Kg	126	Warehouse (C.S.A)
Formwork Oil	Liter	0	-
Epoxy Material	Liter	0	-
Diesel	Liter	0	-
Fuel Oil	Liter	0	-
Paint	Liter	45	Warehouse (C.S.A)
Antirust	Liter	70	Warehouse (C.S.A)
Isolation Solution	Kg	0	-
Cement	Kg	13,000	Stock Area
Sand	Kg	322,000	Stock Area
Aggregate	Kg	216,000	Stock Area



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
3.12.2023	9.12.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Bunker excavation to -3.7m. Installation of drainage layer in progress.
- Spun pile welding visual and NDT at Turbine (second phase) area.
- Spun pile cutting at Bunker area.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.



OVERALL - POINT ONE



OVERALL - POINT TWO

3



OVERALL - POINT THREE

4



OVERALL - POINT FOUR

5



OVERALL - POINT FIVE

6



BUNKER EXCAVATION CONTINUE FROM WEST SIDE

7



DRAINAGE LAYER BUNKER AREA

8



SPUN PILE WELDING COATING



SPUN PILE CUTTING

Site Log



Date: 12/3/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total	Civil	Process
43	43	0

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.

Safety Audits/Safety Walkarounds

N/A

Safety and Environmental Incidences

N/A

Compliance to Design and construction methods, approved materials

N/A

Major Quality Issues

N/A

Site Instructions Issued

N/A

Verbal communication

Received sheet pile monitoring data, maximum deflection data (24mm) within design tolerance (33mm).

Meetings

When	Who	What
N/A	N/A	N/A

Comments

N/A

Site Log



Date 12/4/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Monday Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny.

Workers on Site table with columns: Total (43), Civil (43), Process. Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Received sheet pile monitoring data, maximum deflection data (22mm) within design tolerance (33mm).

Meetings table with columns: When, Who, What

Comments N/A

Site Log



Date: 12/5/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	44	44	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
 3) Surface cleaning of welded spun pile at Turbine (second phase) area.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication
 Received sheet pile monitoring data, deflection data (17mm) within design tolerance (33mm). Highlight that site laboratory shall be inspected prior to conducting any testing.

Meetings	When	Who	What
	N/A		

Comments

Site Log



Date: 12/6/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Wednesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	43	43	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
 3) Visual inspection and NDT (MT & PT) of spun pile welding work at Turbine (second phase) area.
 4) Spun pile welding coating at Turbine (second phase) area.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

Site Log



Date 12/7/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Thursday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Received sheet pile monitoring data, deflection data (17mm) within design tolerance (33mm).

Meetings table with columns: When, Who, What

Comments N/A

Site Log



Date: 12/8/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Workers on Site table with columns: Total, Civil, Process. Includes a note: Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections OFF DAY (FRIDAY)

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication N/A

Meetings table with columns: When, Who, What

Comments N/A

Site Log



Date 12/9/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site: 7:00 Time off site: 18:00 Completed by: Sofi Bin Ismail

Weather: Sunny

Total Civil Process

Workers on Site Note: Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections
1) Dewatering of bunker area continue.
2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.

Safety Audits/Safety Walkarounds N/A

Safety and Environmental Incidences N/A

Compliance to Design and construction methods, approved materials N/A

Major Quality Issues N/A

Site Instructions Issued N/A

Verbal communication Received sheet pile monitoring data, maximum deflection data (22mm) within design tolerance (33mm).

Table with 3 columns: When, Who, What. Row 1: Meetings, N/A, empty, empty.

Comments N/A



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
10.12.2023	16.12.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Bunker excavation to -3.7m. Installation of drainage layer in progress.
- Main process building excavation in progress.
- Spun pile cutting at Main process area.
- Spun pile cutting at Bunker area.
- Spun pile driving at Turbine (Second phase) area.
- Trial Mix at Site Batching Plant for C16/20 & C35/45.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.





5



OVERALL - POINT FIVE

6



BUNKER EXCAVATION CONTINUE FROM WEST SIDE

7

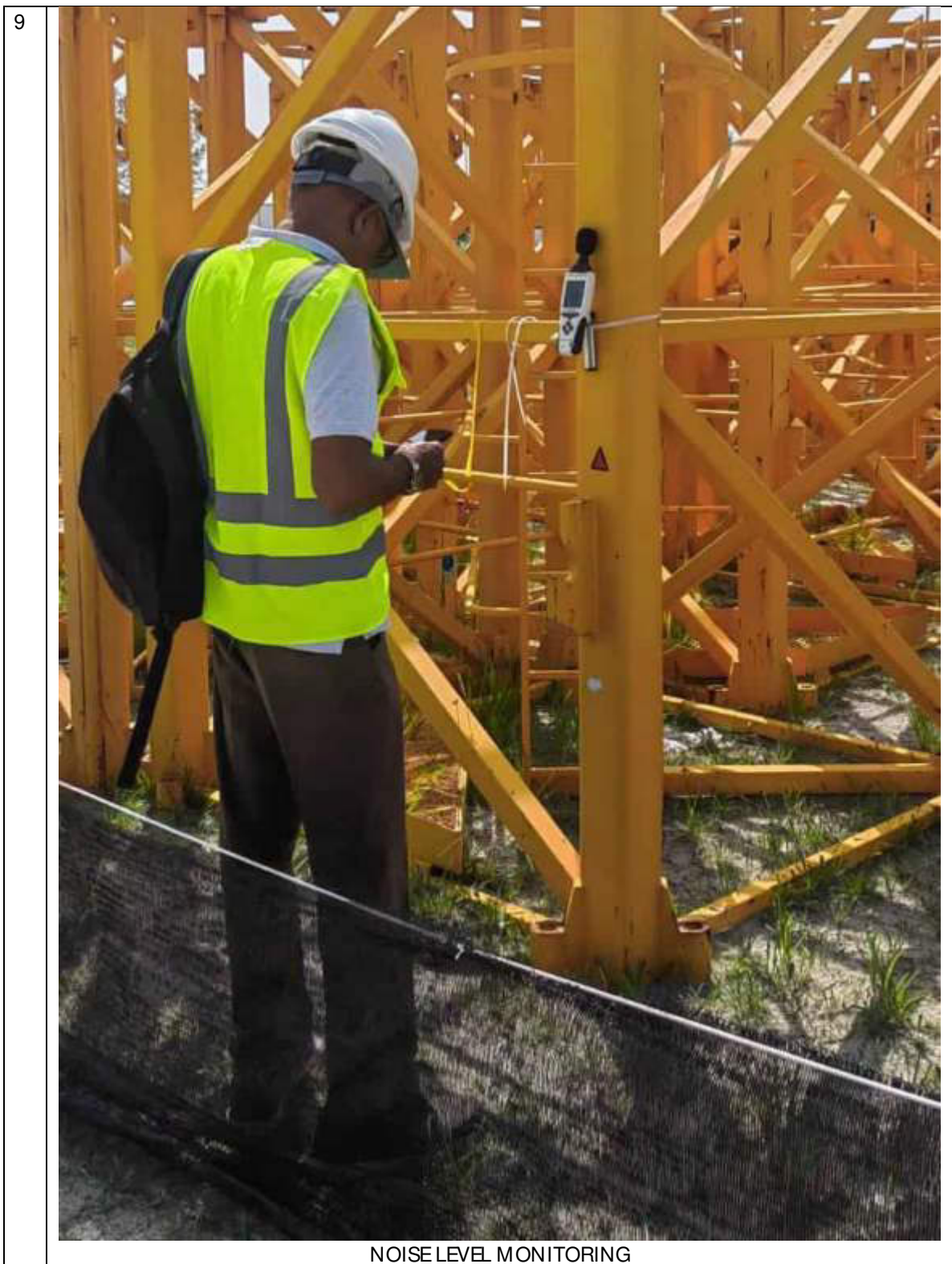


DRAINAGE LAYER BUNKER AREA

8



MAIN PROCESS BUILDING EXCAVATION



FICHTNER

Site Log

Date: 12/10/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Sunday

Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process
42	42	0

Total	Civil	Process
42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

**Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections**

1) Dewatering of bunker area continue.
2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
3) Excavation for main process building started.

**Safety
Audits/Safety
Walkarounds**

N/A

**Safety and
Environmental
Incidences**

N/A

**Compliance to
Design and
construction
methods,
approved
materials**

N/A

**Major Quality
Issues**

N/A

**Site Instructions
Issued**

N/A

**Verbal
communication**

Received sheet pile monitoring data, maximum deflection data (19mm) within design tolerance (33mm). Inspection of site laboratory. Few recommendation for improvement:
1) To ensure lab equipment have been sign off by Rambol.
2) Concrete waste from cube testing to be properly manage and stored.
3) To improve the labelling method for more systematic recording.

Meetings

When	Who	What
N/A	N/A	N/A

Comments

N/A

FICHTNER

Site Log

Date: 12/11/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Monday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process	
Workers on Site	44	44		<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Spun pile cutting for SP-236, SP-237, SP-238, SP-239, SP-240, SP-247, SP-248, SP-249, SP-250, SP-251 & SP-252.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

	When	Who	What
Meetings	N/A		

Comments

FICHTNER

Site Log

Date: 12/12/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	44	44	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Spun pile cutting for SP-202, SP-203, SP-204, SP-211, SP-212, SP-213, SP-216 & SP-259.
- 5) Trial mix for concrete grade C16/20 & C35/45 produced from site batching plant.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date 12/13/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process	
Workers on Site	44	44	0	<i>Note : Enter this information when it is available, at least once per week as a minimum</i>

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Spun pile cutting for SP-188, SP-189, SP-190, SP-191, SP-192, SP-193, SP-200 & SP-201.
- 5) Dry film thickness test on completed spun pile welding coating at Turbine (second phase) area.
- 6) Material testing - Geogrid

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings

When	Who	What
N/A		

Comments

FICHTNER

Site Log

Date: 12/14/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

**Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections**

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Spun pile cutting for SP-178, SP-179, SP-180 & SP-181.
- 5) Material testing for geotextile material.

**Safety
Audits/Safety
Walkarounds**

Air quality monitoring at 2 locations at AQ2 & AQ1

**Safety and
Environmental
Incidences**

N/A

**Compliance to
Design and
construction
methods,
approved
materials**

N/A

**Major Quality
Issues**

N/A

**Site Instructions
Issued**

N/A

**Verbal
communication**

Received sheet pile monitoring data, deflection data (18mm) within design tolerance (33mm).

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date 12/15/2023 **Site:** Greater Male WTE **Site Representative:** Sofi bin Ismail
 Friday
Time on site: **Time off site:** **Completed by:**

Weather:

Total	Civil	Process

Workers on Site *Note : Enter this information when it is available, at least once per week as a minimum*

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

OFF DAY (FRIDAY)

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

	When	Who	What
Meetings	<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date: 12/16/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Saturday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process

Workers on Site

Note : Enter this information when it is available, at least once per week as a minimum

**Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections**

1) Dewatering of bunker area continue.
 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
 3) Excavation for main process building continue.
 4) Spun pile cutting for SP-178, SP-179, SP-180 & SP-181.
 5) Continue spun pile driving at Turbine (second phase) area at FR-01, FR-02, FR-03, FR-04, FR-05, FR-06, FR-07, FR-08, FR-09, FR-10, FR-11, FR-12, FR-13, FR-14, FR-15, FR-16, FR-17 & FR-18.

**Safety
Audits/Safety
Walkarounds**

N/A

**Safety and
Environmental
Incidences**

N/A

**Compliance to
Design and
construction
methods,
approved
materials**

N/A

**Major Quality
Issues**

N/A

**Site Instructions
Issued**

N/A

**Verbal
communication**

Received sheet pile monitoring data, maximum deflection data (17mm) within design tolerance (33mm).

Meetings

When	Who	What
N/A		

Comments

N/A



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
17.12.2023	23.12.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Bunker excavation to -3.7m. Installation of drainage layer in progress.
- Main process building excavation in progress.
- Turbine (second phase) excavation started.
- Spun pile cutting at Main process area.
- Spun pile cutting at Bunker area.
- Material delivery of aggregate and sand.
- Calibration & accreditation for site laboratory & site batching plant.
- Trial mix conducted on site batching plant.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.



OVERALL - POINT ONE



OVERALL - POINT TWO

3



OVERALL - POINT THREE

4



OVERALL - POINT FOUR



OVERALL - POINT FIVE



BUNKER DRAINAGE LAYER INSTALLATION IN PROGRESS. LEAN CONCRETE PREPARATION IN PROGRESS.

7	 <p>DRAINAGE LAYER BUNKER AREA</p>
8	 <p>MAIN PROCESS BUILDING 7 TURBINE (SECOND PHASE) EXCAVATION</p>
9	



SITE LABORATORY & BATCHING PLANT CALIBRATION & ACCREDITATION BY THIRD PARTY

FICHTNER

Site Log

Date: 12/17/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Sunday

Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process
45	45	0

45	45	0
----	----	---

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

**Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections**

1) Dewatering of bunker area continue.
 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
 3) Excavation for main process building continue.
 4) Spun pile cutting for SP-160, SP-161, SP-162, SP-169, SP-170, SP-171, SP-172, SP-173, SP-174, SP-175 & SP-185.
 5) Aggregate for batching plant arrived. Contain high dust amount, aggregate to be wash-off prior to be used for concreting work.

**Safety
Audits/Safety
Walkarounds**

1) Air quality monitoring at 2 locations (ASR2 & SAR3) completed. Started at AQ3.
 2) Noise level monitoring at 5 locations (NQ1, NQ2, NQ3, NQ4 & NQ5) completed.

**Safety and
Environmental
Incidences**

N/A

**Compliance to
Design and
construction
methods,
approved
materials**

N/A

**Major Quality
Issues**

N/A

**Site Instructions
Issued**

N/A

**Verbal
communication**

Received sheet pile monitoring data, maximum deflection data (17mm) within design tolerance (33mm).

Meetings

When	Who	What
N/A	N/A	N/A

Comments

N/A

FICHTNER

Site Log

Date 12/18/2023 **Site:** Greater Male WTE **Site Representative:** Sofi bin Ismail
Monday
Time on site: **Time off site:** **Completed by:**

Weather:

	Total	Civil	Process
Workers on Site			

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
 3) Excavation for main process building continue.
 4) Spun pile cutting for BU-018, BU-023, BU-028, BU-032, BU-033, BU-036 & BU-037.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Received sheet pile monitoring data, maximum deflection data (17mm) within design tolerance (33mm).

Meetings

When	Who	What
<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date: 12/19/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	44	44	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Spun pile cutting for BU-019, BU-020, BU-024, BU-025, BU-029, BU-071, BU-072 & BU-079.
- 5) Calibration of site laboratory equipment by third party.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date 12/20/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Spun pile cutting for BU-069, BU-070, BU-073, BU-074 & BU-076.
- 5) Calibration & accreditation of site laboratory equipment by third party.
- 6) Batching plant calibration & accreditation by third party.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date: 12/21/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: Time off site: Completed by:

Weather:

Total Civil Process

42	42	0
----	----	---

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

**Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections**

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Spun pile cutting for SP-146, SP-147, SP-148 & SP-149.
- 5) 5-10mm aggregate has been delivered to site.
- 6) Trial mix for concrete grade 35 at site batching plant.

**Safety
Audits/Safety
Walkarounds**

N/A

**Safety and
Environmental
Incidences**

N/A

**Compliance to
Design and
construction
methods,
approved
materials**

N/A

**Major Quality
Issues**

N/A

**Site Instructions
Issued**

N/A

**Verbal
communication**

Received sheet pile monitoring data, deflection data (19mm) within design tolerance (33mm).

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 12/22/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections

OFF DAY (FRIDAY)

Safety
Audits/Safety
Walkarounds

N/A

Safety and
Environmental
Incidences

N/A

Compliance to
Design and
construction
methods,
approved
materials

N/A

Major Quality
Issues

N/A

Site Instructions
Issued

N/A

Verbal
communication

N/A

Meetings

When	Who	What
N/A		

Comments

N/A

FICHTNER

Site Log

Date: 12/23/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

Workers on Site

--	--	--

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Excavation for main process building continue.
- 4) Excavation for turbine (second phase) started.
- 5) Spun pile cutting for SP-133, SP-134, SP-135, SP-136, SP-144, SP-145, SP-156 & SP-157.
- 6) 5-10mm aggregate delivered to site.
- 7) Sand delivered to site.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings

When	Who	What
N/A		

Comments



Greater Male' Waste-to-Energy Project

Greater Male Waste to Energy Project

Site Weekly Report

by the Employer's Representative

Week from	Week to	Prepared by	Signature	Checked by	Signature
24.12.2023	30.12.2023	Sofi bin Ismail		Naahee Nazim	

Progress Review

The works performed during the Reporting Week are as follows:

- Dewatering work for Bunker area continues.
- Bunker excavation to -3.7m. Installation of drainage layer completed.
- Bunker leancon for 24 pilecaps completed.
- Bunker pilecaps reinforcement bar in progress.
- Main process building excavation in progress.
- Turbine (second phase) excavation completed.
- Spun pile cutting at Main process area in progress.
- Spun pile cutting at Bunker area completed.
- Material delivery of aggregate and sand.

Attachment:

Site Daily Logs

Site Photos

The below figure provides an overview of fixed photo locations and angles where photos are taken from in each Reporting Week.

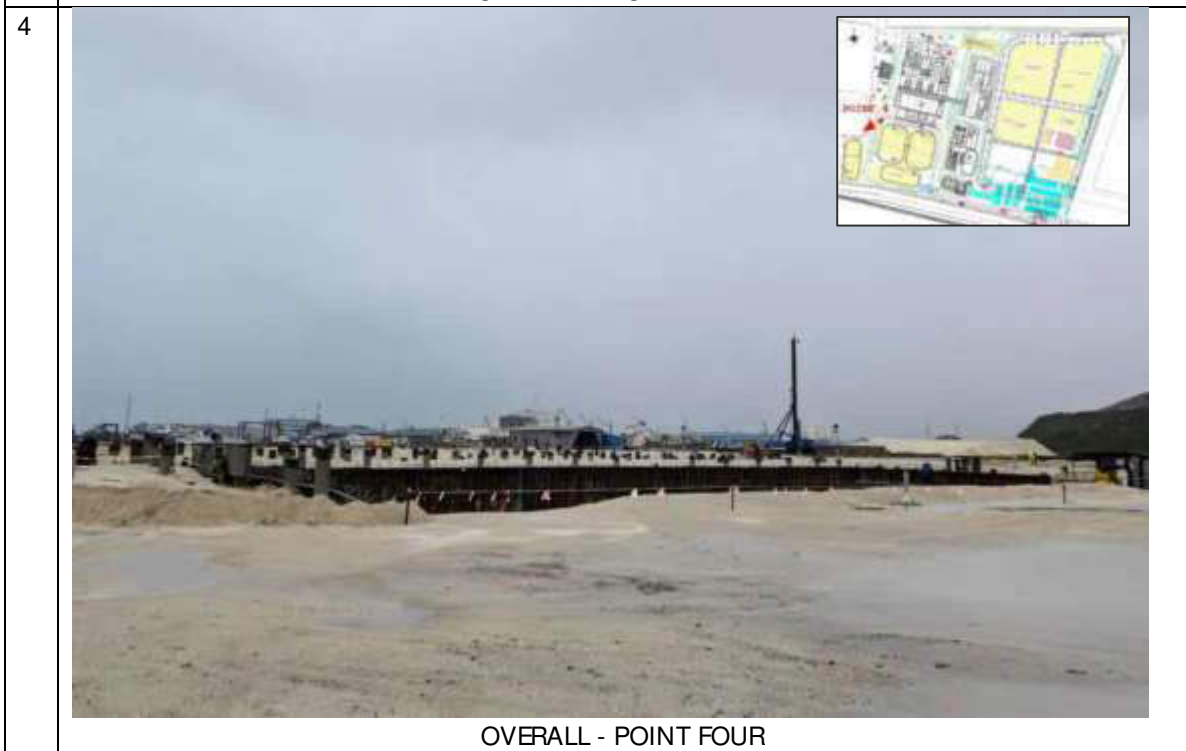
Photos 1 to 5 will include photos according to the map, the remaining photos are taken from elsewhere and are not exactly from the same location and angle in every Weekly Report.



OVERALL - POINT ONE



OVERALL - POINT TWO



5



OVERALL - POINT FIVE

6



BUNKER DRAINAGE LAYER COMPLETED. 24 NOS LEAN CONCRETE COMPLETED.

7



MAIN PROCESS BUILDING & TURBINE (SECOND PHASE) EXCAVATION.

FICHTNER

Site Log

Date: 12/24/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Sunday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process
0	0	0

Workers on Site *Note : Enter this information when it is available, at least once per week as a minimum*

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

- 1) Dewatering of bunker area continue.
- 2) Bunker excavation to -3.7m depth. Installing the drainage layer in progress.
- 3) Bunker compaction to receive leanconcrete for pilecap.
- 4) Excavation for turbine (second phase) completed.
- 5) Spun pile cutting for SP-107, SP-108, SP-109, SP-120, SP-121, SP-122, SP-124, SP-125, SP-126 & SP-143.
- 6) 90 tons of sand delivered to site.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

	When	Who	What
Meetings	N/A	N/A	N/A

Comments

FICHTNER

Site Log

Date: 12/25/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Monday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Bunker excavation to -3.7m depth. Installing the drainage layer completed.
 3) Bunker compaction to receive leanconcrete for pilecap.
 4) Spun pile cutting for SP-094, SP-101, SP-102, SP-103, SP-104, SP-110, SP-111, SP-112, SP-113 & SP-123.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date: 12/26/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Tuesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Bunker field density test for compacted area of BU-001, BU-002, BU-003, BU-004, BU-016, BU-017, BU-022, BU-026, BU-027, BU-030 & BU-031.
 3) Spun pile cutting for SP-079, SP-080, SP-081, SP-091, SP-092, SP-093, SP-261, SP-262, SP-263 & SP-265.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Received sheet pile monitoring data, deflection data (18mm) within design tolerance (33mm).

When	Who	What
14:00	FIT, URB, AAJV	Discussion on document, material and design readiness for bunker pilecaps concreting work.
		a) Trial mix result to be presented and recorded.
		b) Checklist as per ITP to be in place.
		c) Rust on reinforcement bar cage for pilecaps to be remove and recheck on the dia.

Comments

FICHTNER

Site Log

Date 12/27/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Wednesday
 Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

1) Dewatering of bunker area continue.
 2) Bunker - leancon formwork completed for BU-001, BU-002, BU-003, BU-004, BU-016, BU-017, BU-022, BU-026, BU-027, BU-030 & BU-031.
 3) Spun pile cutting at main process building for SP-052, SP-053, SP-054, SP-055, SP-066, SP-067, SP-068, SP-078, SP-266, SP-267.

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Received sheet pile monitoring data, deflection data (18mm) within design tolerance (33mm).
 Advise the contractor to standby additional pump at leancon area in case of rain to ensure the compacted ground is not affected by rain.

Meetings	When	Who	What
	<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date: 12/28/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail
 Thursday
 Time on site: Time off site: Completed by:

Weather:

Total	Civil	Process
42	42	0

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

**Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections**

- 1) Dewatering of bunker area continue.
- 2) Bunker - leancon completed for BU-001, BU-002, BU-003, BU-004, BU-016, BU-017, BU-022, BU-026, BU-027, BU-030 & BU-031.
- 3) Bunker - field density test conducted for compacted ground at BU-005, BU-006, BU-007, BU-008, BU-034, BU-035, BU-038, BU-039, BU-042, BU-043, BU-046, BU-047
- 4) Main process building - spun pile cutting at for SP-065, SP-075, SP-076, SP-077, SP-088, SP-089, SP-090 & SP-261.

**Safety
Audits/Safety
Walkarounds**

**Safety and
Environmental
Incidences**

**Compliance to
Design and
construction
methods,
approved
materials**

**Major Quality
Issues**

**Site Instructions
Issued**

**Verbal
communication**

Received sheet pile monitoring data, deflection data (19mm) within design tolerance (33mm).

Meetings

When	Who	What
<input type="text" value="N/A"/>		

Comments

FICHTNER

Site Log

Date: 12/29/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Friday

Time on site: Time off site: Completed by:

Weather:

	Total	Civil	Process
Workers on Site	<input type="text"/>	<input type="text"/>	<input type="text"/>

Note : Enter this information when it is available, at least once per week as a minimum

Site Activities, Contractors Involved, Major Deliveries, Testing, Inspections

Safety Audits/Safety Walkarounds

Safety and Environmental Incidences

Compliance to Design and construction methods, approved materials

Major Quality Issues

Site Instructions Issued

Verbal communication

Meetings	When	Who	What
	<input type="text" value="N/A"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments

FICHTNER

Site Log

Date: 12/30/2023 Site: Greater Male WTE Site Representative: Sofi bin Ismail

Saturday

Time on site: Time off site: Completed by:

Weather:

Total Civil Process

--	--	--

Note : Enter this information when it is available, at least once per week as a minimum

Workers on Site

**Site Activities,
Contractors
Involved, Major
Deliveries,
Testing,
Inspections**

- 1) Dewatering of bunker area continue.
- 2) Bunker - leancon curing completed for BU-001, BU-002, BU-003, BU-004, BU-016, BU-017, BU-022, BU-026, BU-027, BU-030 & BU-031.
- 3) Bunker - leancon at BU-005, BU-006, BU-007, BU-008, BU-034, BU-035, BU-038, BU-039, BU-042, BU-043, BU-046, BU-047
- 4) Main process building - spun pile cutting at for SP-049, SP-050, SP-051, SP-062, SP-063 & SP-064.

**Safety
Audits/Safety
Walkarounds**

**Safety and
Environmental
Incidences**

**Compliance to
Design and
construction
methods,
approved
materials**

**Major Quality
Issues**

**Site Instructions
Issued**

**Verbal
communication**

Meetings

When	Who	What
<input type="text" value="N/A"/>		

Comments

**Appendix 3: Results of Monitoring (Air Quality, Noise,
Water and Wastewater Quality)**

Ambient Air Quality



GOVERNMENT of MALDIVES

WtE Energy Facility Project

CONSGTRUCTION PHASE

AIR QUALITY MEASUREMENT REPORT



Thilafushi Island/MALDIVES

MALDIVES 2023



AIRS Air Quality Management Services Ltd
Mustafa Kemal Mah. Via Green Is Mrk. B-36
Cankaya Ankara TURKEY
Tel: +90 312 221 02 45 Fax: +90 312 221 02 45
www.airsaqms.com

Test Report

Customer Name/Address	Alke Alkatas Joint Venture Pvt Ltd H.H.Moomiyaage 5A Asaree Hingun K.Male 20265 MALDIVES
Order No.	EN-M/2207/417_01
Name and identity of test item	Immission (Air Quality)
Remarks	-
Date of Test	09.10.2023-12.10.2023
Number of Pages of the Report	28 Pages
Test Method	Air Quality Sensors
Test results	The test results are given in the measurement result tables.
Environmental conditions	Environmental conditions during the measurement are given in the measurement result tables.
Comments	-

The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Reporter and Approval
Ismail Ulusoy Environmental Engineer



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Environmental Monitoring Report

PUBLIC

Project Number: 51077-003
Quarterly Report (October - December 2023)
February 2024

Maldives: Greater Male Waste-to-Energy Project

Part D: Appendices

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

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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 (±63%)	s	<60
Humidity	Typ. relative humidity accuracy	%RH	4.5
	Operating relative humidity range	%RH	0 to 100
	Response time (±63%)	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.



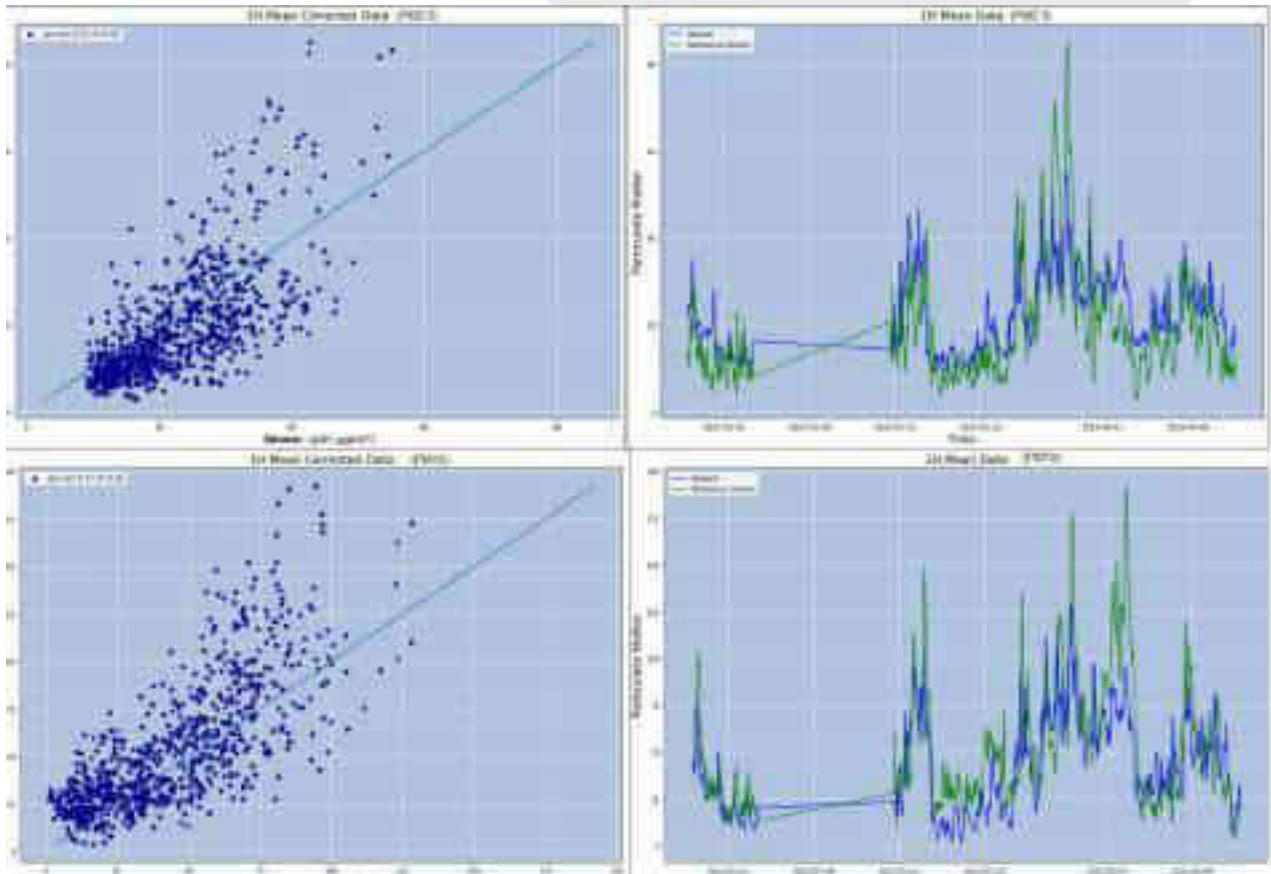
Sensor Units were calibrated using reference stations for a period before the deployment. The calibration process for particle matter and gas pollutants measurement is explained below.

Table 1 Calibration Process for Pollutants

Description	Methodology	
	NO ₂ -SO ₂ -O ₃	PM ₁₀ -PM _{2.5} -TSP
Installation	Near Reference Station (3/4 meters)	Near Reference Station (3/4 meters)
Pre-Test	Quality Check in zero air conditions	Quality Check in zero air conditions
Co-Located Period	4-5 weeks	8 weeks
Sampling Period	30 seconds. Hourly mean is used because the reference station measurements are hourly.	60 seconds. Hourly mean is used because the reference station measurements are hourly.
Validation	Cross-validation is used. Also, some ranges of measurement are eliminated, where the reference station is not available.	Cross-validation is used. Also, some ranges of measurement are eliminated, where the reference station is not available.
Calibration Procedure	is obtained via R ² and spearman correlation	is obtained via R ² and spearman correlation

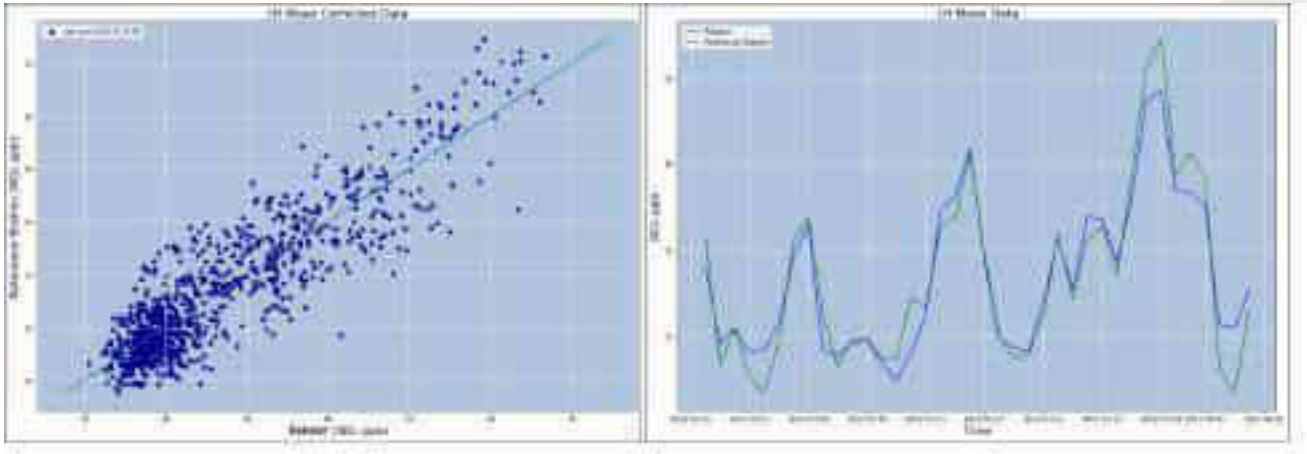
Calibration Result for PM

The corrected measurement results after the Smart Calibration Process are shown in the figures below. The correlation between Sensor Unit’s PM_{2.5} measurements between Reference Station’s PM_{2.5} measurements for hourly and daily mean of data is 0.73, and the correlation between Sensor Unit’s PM₁₀ measurements between Reference Station’s PM₁₀ measurements for hourly and daily mean of data is 0.77.



Calibration Result for Gases

The corrected measurement results after the Smart Calibration Process are shown in the figures below. The correlation between Sensor Unit's NO₂ measurements between Reference Station's NO₂ measurements for hourly and daily mean of data is respectively 0.823, 0.898



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 three sets of devices.

ASR5 and AQ4 measurements were conducted on the first day,

ASR2 and ASR3 measurements were conducted on the second day

AQ1, AQ2 and AQ3 measurement were conducted on the third 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
Particular 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
Particular 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	Temp (°C)	Atm Pressure (mmHg)	Wind speed (km/h)	Wind direction	Air Humid (%)	Precipitation rain volume (mm)	Condition
9.Oct.2023	2-5 AM	28	758	12	West	79	0	Cloudy
	8-11 AM	29	759	21	Northwest	84	0.2	Partly Sunny
	14-17PM	30	760	11	West	84	0.7	Light Rain
	20-23PM	28	758	11	Northwest	83	0	Overcast
10.Oct.2023	2-5 AM	29	757	10	West	80	0	Cloudy
	8-11 AM	28	757	12	Northwest	78	0.3	Sunny
	14-17PM	31	756	11	West	81	0.4	Broken Clouds
	20-23PM	29	758	10	Northwest	85	0	Light Rain
11.Oct.2023	2-5 AM	29	755	12	Easth	77	0.8	Passing Clouds
	8-11 AM	31	759	17	Northwest	83	0.12	Passing Clouds
	14-17PM	28	759	12	Northwest	86	0.3	Partly Sunny
	20-23PM	28	759	11	West	86	0.1	Partly Clouds
12.Oct.2023	2-5 AM	28	759	10	West	82	0.3	Partly Clouds
	8-11 AM	31	759	09	West	82	0.4	Light Rain
	14-17PM	29	759	08	West	80	0	Cloudy
	20-23PM	28	759	09	West	83	0	Cloudy

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	2023-10-11 17:00:00	11.37	9.43	ND	ND	18.13	75.93	27.66
	2023-10-11 18:00:00	11.03	8.95	ND	ND	17.59	78.11	27.07
	2023-10-11 19:00:00	10.97	8.75	ND	ND	17.5	79.36	26.58
	2023-10-11 20:00:00	12.52	10	ND	ND	19.98	81.47	26.61
	2023-10-11 21:00:00	13.41	10.76	ND	ND	21.39	81.06	26.76
	2023-10-11 22:00:00	13.58	10.9	ND	ND	21.66	81.84	26.75
	2023-10-11 23:00:00	16.66	13.26	6.46	ND	26.59	82.21	26.52
	2023-10-12 00:00:00	13.5	10.74	5.47	ND	21.53	81.57	26.52
	2023-10-12 01:00:00	11.52	9.06	9.87	ND	18.37	83	26.23
	2023-10-12 02:00:00	12.74	9.62	12.01	ND	20.31	87.31	25.18
	2023-10-12 03:00:00	9.22	6.87	5.47	ND	14.63	87.39	24.83
	2023-10-12 04:00:00	8.09	6.06	ND	ND	12.9	87.63	24.99
	2023-10-12 05:00:00	8.56	6.42	ND	ND	13.65	86.41	25.02
	2023-10-12 06:00:00	6.84	5.16	ND	ND	10.91	85.12	25.16
	2023-10-12 07:00:00	9.31	7.28	ND	ND	14.85	82.78	26.07
	2023-10-12 08:00:00	10.68	9.04	ND	ND	17.03	74.29	28.2
	2023-10-12 09:00:00	9.57	8.51	ND	ND	15.26	68.62	29.66
	2023-10-12 10:00:00	13.65	13.11	ND	ND	21.48	61.42	30.02
	2023-10-12 11:00:00	11.78	11.16	ND	ND	18.8	62.66	30.57
	2023-10-12 12:00:00	11.7	11.51	ND	ND	18.66	60.05	31.79
	2023-10-12 13:00:00	14.04	13.56	ND	ND	22.36	60.83	31.19
	2023-10-12 14:00:00	14.24	12.89	ND	ND	22.71	62	30.16
	2023-10-12 15:00:00	15.14	12.39	ND	ND	24.1	59.84	27.28
	2023-10-12 16:00:00	16.82	12.37	ND	ND	26.83	70.23	24.51
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
24 h Average		11.96	9.91	1.64	ND	19.05	75.88	27.31
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

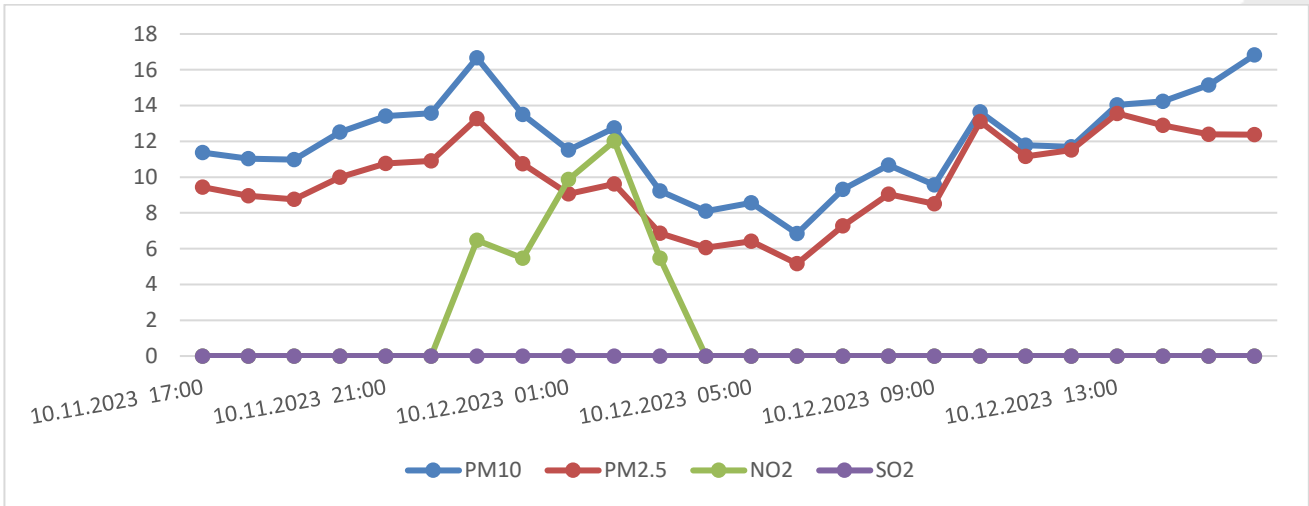


Figure 2 Measurement Graphs for Location AQ1

Table 6 Measurement Results for Location 2

Device Code: 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	2023-10-11 17:00:00	6.88	6.12	ND	ND	6.79	82.35	28
	2023-10-11 18:00:00	5.58	4.97	ND	ND	5.88	77.17	27.13
	2023-10-11 19:00:00	5.81	5.17	ND	ND	5.92	83.41	26.99
	2023-10-11 20:00:00	7.27	6.47	ND	ND	7.85	84.98	27.67
	2023-10-11 21:00:00	7.38	6.57	ND	ND	8.33	84.33	27.94
	2023-10-11 22:00:00	7.79	6.93	ND	ND	8.29	84.66	28.14
	2023-10-11 23:00:00	7.87	7.00	ND	ND	8.76	84.2	28.23
	2023-10-12 00:00:00	8.08	7.19	ND	ND	9.25	84.24	28.45
	2023-10-12 01:00:00	8.29	7.38	ND	ND	9.75	82.81	28.9
	2023-10-12 02:00:00	8.88	7.90	ND	ND	9.77	76.02	28.58
	2023-10-12 03:00:00	8.32	7.40	ND	ND	9.56	74.27	28.69
	2023-10-12 04:00:00	9.22	8.21	ND	ND	10.49	71.2	29.6
	2023-10-12 05:00:00	10.02	8.92	ND	ND	11.95	72.06	31.07
	2023-10-12 06:00:00	10.01	8.91	ND	ND	10.43	58.56	32.12
	2023-10-12 07:00:00	11.34	10.09	ND	ND	11.65	62.57	31.82
	2023-10-12 08:00:00	10.79	9.60	ND	ND	12.23	66.99	31.26
	2023-10-12 09:00:00	10.77	9.59	ND	ND	12.43	66.01	30.61
	2023-10-12 10:00:00	12.78	11.37	ND	ND	12.21	75.06	29.38
	2023-10-12 11:00:00	11.62	10.34	ND	ND	12.44	74.1	26.63
	2023-10-12 12:00:00	8.41	7.48	ND	ND	11.92	78.89	26.51
	2023-10-12 13:00:00	10.14	9.02	ND	ND	13.73	82.26	26.91
	2023-10-12 14:00:00	12.16	10.82	ND	ND	16	83.05	27.4
2023-10-12 15:00:00	11.66	10.38	ND	ND	16.82	82.99	27.81	
2023-10-12 16:00:00	12.16	10.82	ND	ND	17.06	83.67	27.95	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		9.30	7.70	ND	ND	10.81	77.33	28.66
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

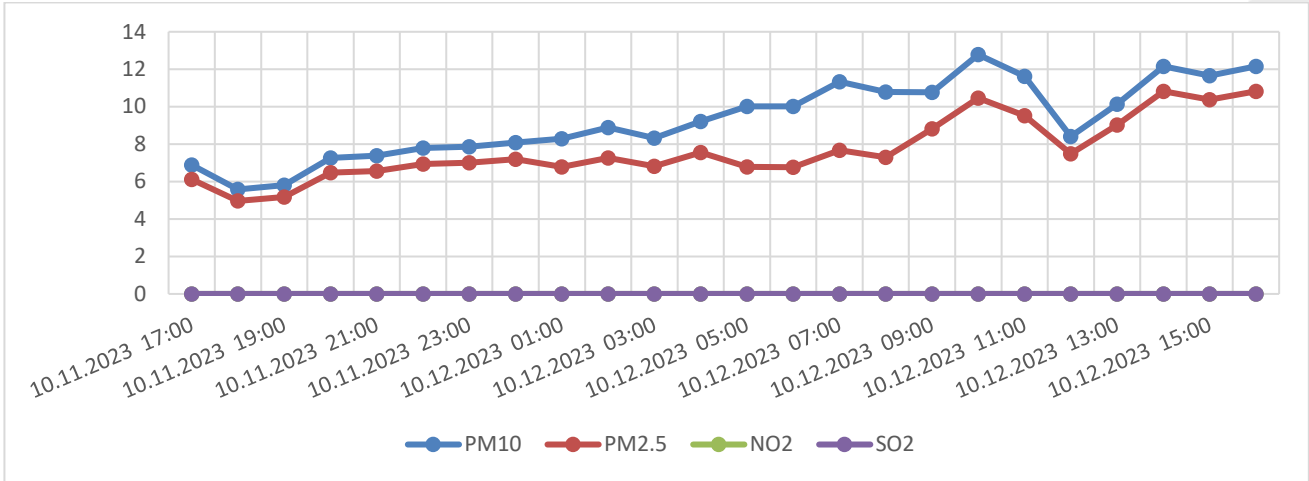


Figure 3 Measurement Graphs for Location AQ2

Table 7 Measurement Results for Location 3

Device Code: 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	2023-10-11 17:00:00	7.84	6.01	ND	ND	7.36	84.4	27.44
	2023-10-11 18:00:00	6.32	4.91	ND	ND	6.37	80.48	26.92
	2023-10-11 19:00:00	6.6	5.12	ND	ND	6.42	85.53	26.63
	2023-10-11 20:00:00	8.22	6.38	ND	ND	8.51	90.04	26.22
	2023-10-11 21:00:00	8.32	7.10	ND	ND	9.03	89.82	26.13
	2023-10-11 22:00:00	8.82	7.54	ND	ND	8.98	90.04	26.35
	2023-10-11 23:00:00	8.88	7.63	ND	ND	9.49	89.13	26.43
	2023-10-12 00:00:00	9.09	7.81	ND	ND	10.02	88.08	26.59
	2023-10-12 01:00:00	9.3	7.25	ND	ND	10.56	86.16	27.33
	2023-10-12 02:00:00	10.03	7.82	ND	ND	10.58	76.27	28.5
	2023-10-12 03:00:00	9.36	7.28	ND	ND	10.36	72.49	29.29
	2023-10-12 04:00:00	10.37	7.96	ND	ND	11.37	67.76	30.98
	2023-10-12 05:00:00	11.23	10.32	ND	ND	12.94	72.27	30.71
	2023-10-12 06:00:00	11.36	10.28	ND	ND	11.3	64.8	31.15
	2023-10-12 07:00:00	12.88	11.34	ND	ND	12.62	67.06	31.02
	2023-10-12 08:00:00	12.15	11.14	ND	ND	13.25	67.55	30.36
	2023-10-12 09:00:00	12.1	11.11	ND	ND	13.46	64.4	27.89
	2023-10-12 10:00:00	14.62	11.40	ND	ND	13.25	72.46	26.44
	2023-10-12 11:00:00	13.15	10.25	ND	ND	13.47	77.03	26.91
	2023-10-12 12:00:00	9.24	7.89	ND	ND	12.91	80.69	26.71
2023-10-12 13:00:00	11.22	9.44	ND	ND	14.88	82.84	26.95	
2023-10-12 14:00:00	13.48	11.11	ND	ND	17.34	83.86	27.25	
2023-10-12 15:00:00	12.79	10.89	ND	ND	18.22	83.77	27.48	
2023-10-12 16:00:00	13.39	11.40	ND	ND	18.49	84.63	27.58	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		10.45	8.72	ND	ND	11.72	79.23	27.89
Daily Limit Values	TA Luft	50	-	-	-	-	-	-
	EU	50	-	-	-	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

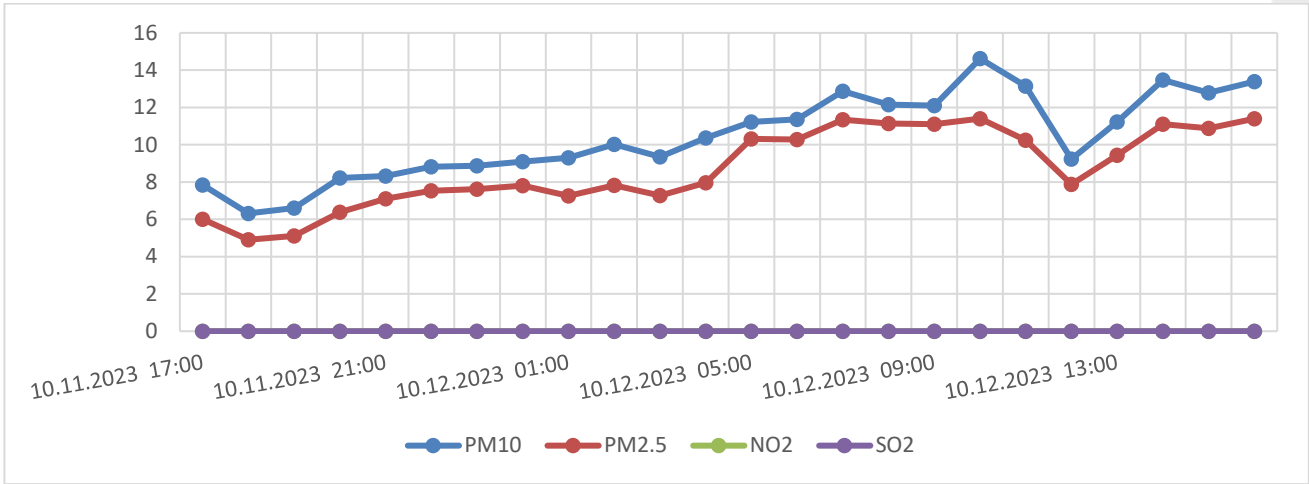


Figure 4 Measurement Graphs for Location AQ3

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	2023-10-10 11:00:00	18.65	15.67	21.99	ND	29.75	82.06	28.26
	2023-10-10 12:00:00	19.12	16.06	15.38	ND	30.5	83.48	27.92
	2023-10-10 13:00:00	18.91	15.88	11.55	ND	30.17	83.17	27.93
	2023-10-10 14:00:00	20.03	16.83	9.02	ND	31.96	84.58	27.89
	2023-10-10 15:00:00	21.55	18.10	5.89	ND	34.38	84.46	27.8
	2023-10-10 16:00:00	22.04	18.51	8.26	ND	35.15	85.68	27.83
	2023-10-10 17:00:00	29.08	24.43	8.41	ND	46.39	87.63	27.31
	2023-10-10 18:00:00	20.45	17.18	5.82	ND	32.62	86.12	27.42
	2023-10-10 19:00:00	14.78	12.12	15.28	32.55	23.57	88.91	26.79
	2023-10-10 20:00:00	17.82	14.61	21.7	41.45	28.4	99.31	24.28
	2023-10-10 21:00:00	9.31	7.63	7.33	18.43	14.66	99.94	23.49
	2023-10-10 22:00:00	5.15	4.22	7.28	48.34	8.2	99.96	23.78
	2023-10-10 23:00:00	4.24	3.48	3.5	ND	6.75	98.16	23.85
	2023-10-11 00:00:00	2.12	1.74	2.62	6.55	3.38	94.93	23.89
	2023-10-11 01:00:00	6.55	5.37	12.45	0.05	10.44	92.06	25.22
	2023-10-11 02:00:00	9.13	7.49	4	ND	14.55	75.94	29.28
	2023-10-11 03:00:00	6.07	5.46	0.61	ND	9.68	68.21	31.37
	2023-10-11 04:00:00	16.75	15.08	1.4	ND	25.97	60.31	34.61
	2023-10-11 05:00:00	11.59	10.43	5.91	ND	18.49	72.34	30.9
	2023-10-11 06:00:00	12.13	10.92	8.46	ND	19.34	76.88	30.06
	2023-10-11 07:00:00	15.36	13.82	3.69	ND	24.42	75.65	30.31
	2023-10-11 08:00:00	12.62	11.36	3.27	ND	20.11	68.16	29.58
2023-10-11 09:00:00	13.61	12.25	3.31	ND	21.71	60.6	23.45	
2023-10-11 10:00:00	17.53	15.78	8.61	ND	27.96	66.42	21.64	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		14.36	12.27	8.16	6.14	22.86	82.29	27.29
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

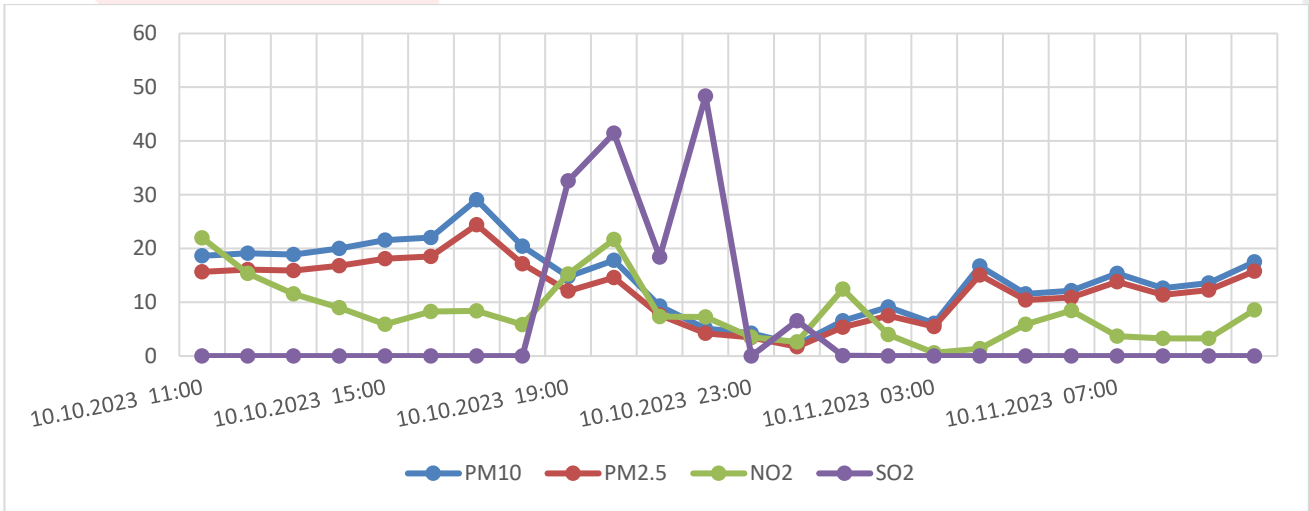


Figure 5 Measurement Graphs for Location ASR2



Table 9 Measurement Results for Location 5

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)
ASR3	2023-10-10 11:00:00	7.1	5.40	45.43	ND	11.32	78.38	29.73
	2023-10-10 12:00:00	6.14	4.67	14.02	ND	9.8	81.31	28.92
	2023-10-10 13:00:00	6.19	4.70	12.18	ND	9.87	83.8	28.01
	2023-10-10 14:00:00	8.2	6.23	12.29	ND	13.09	86.62	28.1
	2023-10-10 15:00:00	8.71	6.62	8.39	ND	13.89	85.96	28.43
	2023-10-10 16:00:00	8.66	6.58	7.92	ND	13.82	86.48	28.4
	2023-10-10 17:00:00	9.15	6.95	5.62	ND	14.6	85.75	28.35
	2023-10-10 18:00:00	9.67	7.35	5.72	ND	15.42	85.68	28.28
	2023-10-10 19:00:00	10.19	7.74	6.84	ND	16.25	86.24	28.2
	2023-10-10 20:00:00	10.2	7.75	6.05	ND	16.28	86.52	28.13
	2023-10-10 21:00:00	9.99	7.59	4.61	ND	15.94	86.21	28.07
	2023-10-10 22:00:00	10.96	8.33	5.3	ND	17.49	86.63	28.14
	2023-10-10 23:00:00	12.48	9.48	3.75	ND	19.91	85.72	28.14
	2023-10-11 00:00:00	10.89	8.28	2.43	ND	17.38	85.72	28.37
	2023-10-11 01:00:00	12.17	9.25	1.41	ND	19.41	83.56	29.05
	2023-10-11 02:00:00	12.78	9.71	ND	ND	20.39	79.84	29.98
	2023-10-11 03:00:00	12.98	9.86	ND	ND	20.71	75.15	31.12
	2023-10-11 04:00:00	12.64	9.61	ND	ND	20.16	67.81	33.05
	2023-10-11 05:00:00	12.99	9.87	ND	ND	20.73	61.32	34.93
	2023-10-11 06:00:00	12.45	9.46	ND	ND	19.86	53.26	37.75
	2023-10-11 07:00:00	14.35	10.91	10.1	ND	22.89	55.58	36.49
	2023-10-11 08:00:00	16.72	12.71	25.62	ND	26.67	63.16	33.32
2023-10-11 09:00:00	17.63	13.40	23.71	ND	28.03	64.72	32.54	
2023-10-11 10:00:00	17.83	13.55	31.11	ND	28.44	79.39	28.83	
Hourly Limit Values	TA Luft	-	-	200	200	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		11.29	8.58	9.69	ND	18.01	78.12	30.18
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

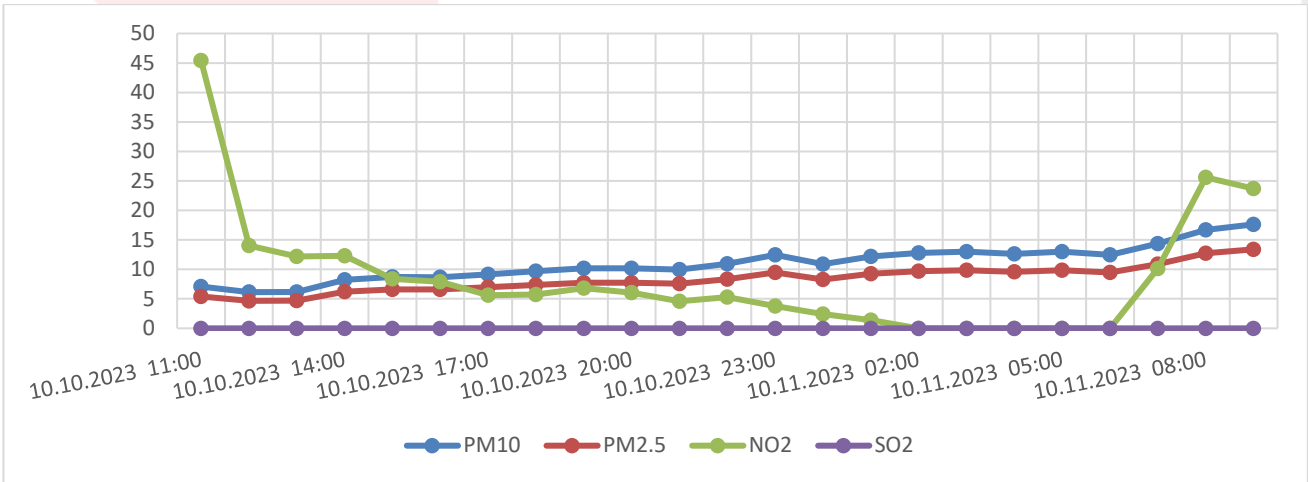


Figure 6 Measurement Graphs for Location ASR3

Table 10 Measurement Results for Location 6

Device Code: 222								
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	2023-10-9 11:00:00	16.52	11.06	13.36	ND	26.34	74.37	21.66
	2023-10-9 12:00:00	16.55	11.09	15.13	ND	26.4	81.34	22.17
	2023-10-9 13:00:00	14.53	9.74	13.22	ND	23.18	85.83	23.72
	2023-10-9 14:00:00	13.11	8.78	9.39	ND	20.92	84.6	24.53
	2023-10-9 15:00:00	10.9	7.30	7.88	ND	17.39	85.14	24.97
	2023-10-9 16:00:00	10.1	6.77	6.31	ND	16.12	86.04	25.26
	2023-10-9 17:00:00	17.06	12.10	4.35	ND	138.03	84.03	25.4
	2023-10-9 18:00:00	9.94	6.10	0.2	3.14	464.51	73.31	23.87
	2023-10-9 19:00:00	21.91	20.98	8.71	ND	120.83	85.73	23.7
	2023-10-9 20:00:00	18.32	12.27	7.66	ND	29.22	88.72	25
	2023-10-9 21:00:00	11.68	7.83	5.41	ND	18.63	87.68	25.54
	2023-10-9 22:00:00	10.99	7.36	4.73	ND	17.53	87.93	25.83
	2023-10-9 23:00:00	10.64	7.13	4.33	ND	16.97	87.91	26.01
	2023-10-10 00:00:00	10.69	7.16	3.52	ND	17.06	88	26.19
	2023-10-10 01:00:00	12.81	8.58	3.14	ND	20.43	87.21	26.4
	2023-10-10 02:00:00	16.26	10.57	0.06	ND	25.71	76.87	24.99
	2023-10-10 03:00:00	18.42	12.27	0.2	ND	29.33	78.02	24.16
	2023-10-10 04:00:00	17.66	11.83	2.42	ND	28.17	79.12	24.08
	2023-10-10 05:00:00	14.59	9.78	8.69	ND	23.27	87.52	25.06
	2023-10-10 06:00:00	6.76	4.50	2.59	ND	10.76	67.63	24.42
	2023-10-10 07:00:00	13.87	7.39	10.63	5.77	20.79	73.62	25.02
	2023-10-10 08:00:00	10.01	6.70	3.64	ND	15.96	75.09	26.84
	2023-10-10 09:00:00	9.75	6.53	3.57	ND	15.56	71.45	26.36
	2023-10-10 10:00:00	6.02	4.03	13.24	ND	9.6	75.34	27.48
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		13.30	9.08	6.35	ND	48.03	81.35	24.94
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

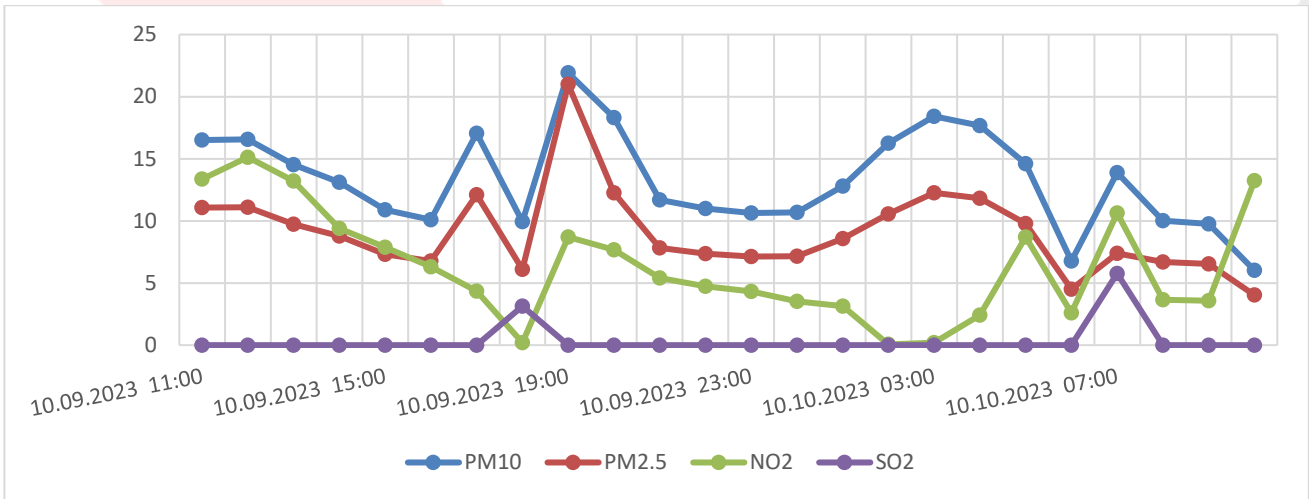


Figure 7 Measurement Graphs for Location ASR5

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	2023-10-9 11:00:00	4.03	3.86	ND	ND	6.35	74.6	30.91
	2023-10-9 12:00:00	2.91	2.87	ND	ND	4.63	79.1	29.71
	2023-10-9 13:00:00	3.22	3.17	ND	ND	5.11	81.26	29.27
	2023-10-9 14:00:00	3.61	3.56	ND	ND	5.74	83.77	28.82
	2023-10-9 15:00:00	3.32	3.26	ND	ND	5.26	82.22	29.08
	2023-10-9 16:00:00	3.99	3.93	ND	ND	6.34	83.46	28.91
	2023-10-9 17:00:00	3.66	3.65	ND	ND	5.83	83.72	28.75
	2023-10-9 18:00:00	3.5	3.49	ND	ND	5.57	83.34	28.69
	2023-10-9 19:00:00	3.35	3.35	ND	ND	5.35	84.57	28.4
	2023-10-9 20:00:00	4.25	4.25	ND	ND	6.78	87.76	27.92
	2023-10-9 21:00:00	3.58	3.54	ND	ND	5.69	89.89	27.02
	2023-10-9 22:00:00	4.06	3.85	ND	ND	6.37	93.44	26.31
	2023-10-9 23:00:00	3.9	3.89	ND	ND	6.21	94.79	26.15
	2023-10-10 00:00:00	5.35	5.12	ND	ND	8.43	96.04	26.38
	2023-10-10 01:00:00	6.21	5.53	ND	ND	9.59	97.33	25.44
	2023-10-10 02:00:00	4.8	4.75	ND	ND	7.63	95.59	24.09
	2023-10-10 03:00:00	4.58	4.55	ND	ND	7.29	83.62	23.03
	2023-10-10 04:00:00	8	8	ND	ND	12.76	71.15	23.89
	2023-10-10 05:00:00	5.88	5.87	ND	ND	9.38	64.54	22.58
	2023-10-10 06:00:00	1.44	1.35	ND	ND	2.26	57.67	23.01
	2023-10-10 07:00:00	2.36	2.06	ND	ND	3.62	52.02	24.48
	2023-10-10 08:00:00	3.27	2.57	ND	ND	4.88	64.78	24.42
	2023-10-10 09:00:00	1.66	1.65	ND	ND	2.64	58.27	25.4
	2023-10-10 10:00:00	2.25	2.08	ND	ND	3.42	66.41	25.81
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.88	3.76	ND	ND	6.13	79.56	26.60
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

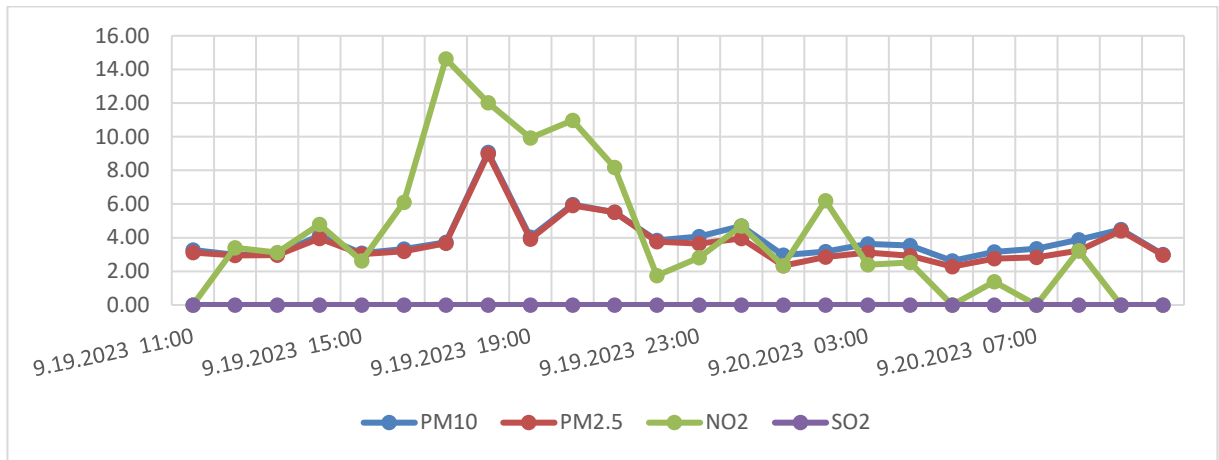


Figure 8 Measurement Graphs for Location AQ4

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.



GOVERNMENT of MALDIVES

WtE Energy Facility Project

CONSGTRUCTION PHASE

AIR QUALITY MEASUREMENT REPORT



Thilafushi Island/MALDIVES

MALDIVES 2023



AIRS Air Quality Management Services Ltd
Mustafa Kemal Mah. Via Green Is Mrk. B-36
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Tel: +90 312 221 02 45 Fax: +90 312 221 02 45
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Test Report

Customer Name/Address	Alke Alkatas Joint Venture Pvt Ltd H.H.Moomiyaage 5A Asaree Hingun K.Male 20265 MALDIVES
Order No.	EN-M/2207/417_01
Name and identity of test item	Immission (Air Quality)
Remarks	-
Date of Test	21.11.2023-24.11.2023
Number of Pages of the Report	28 Pages
Test Method	Air Quality Sensors
Test results	The test results are given in the measurement result tables.
Environmental conditions	Environmental conditions during the measurement are given in the measurement result tables.
Comments	-

The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Reporter and Approval
Ismail Ulusoy Environmental Engineer



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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 (±63%)	s	<60
Humidity	Typ. relative humidity accuracy	%RH	4.5
	Operating relative humidity range	%RH	0 to 100
	Response time (±63%)	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.



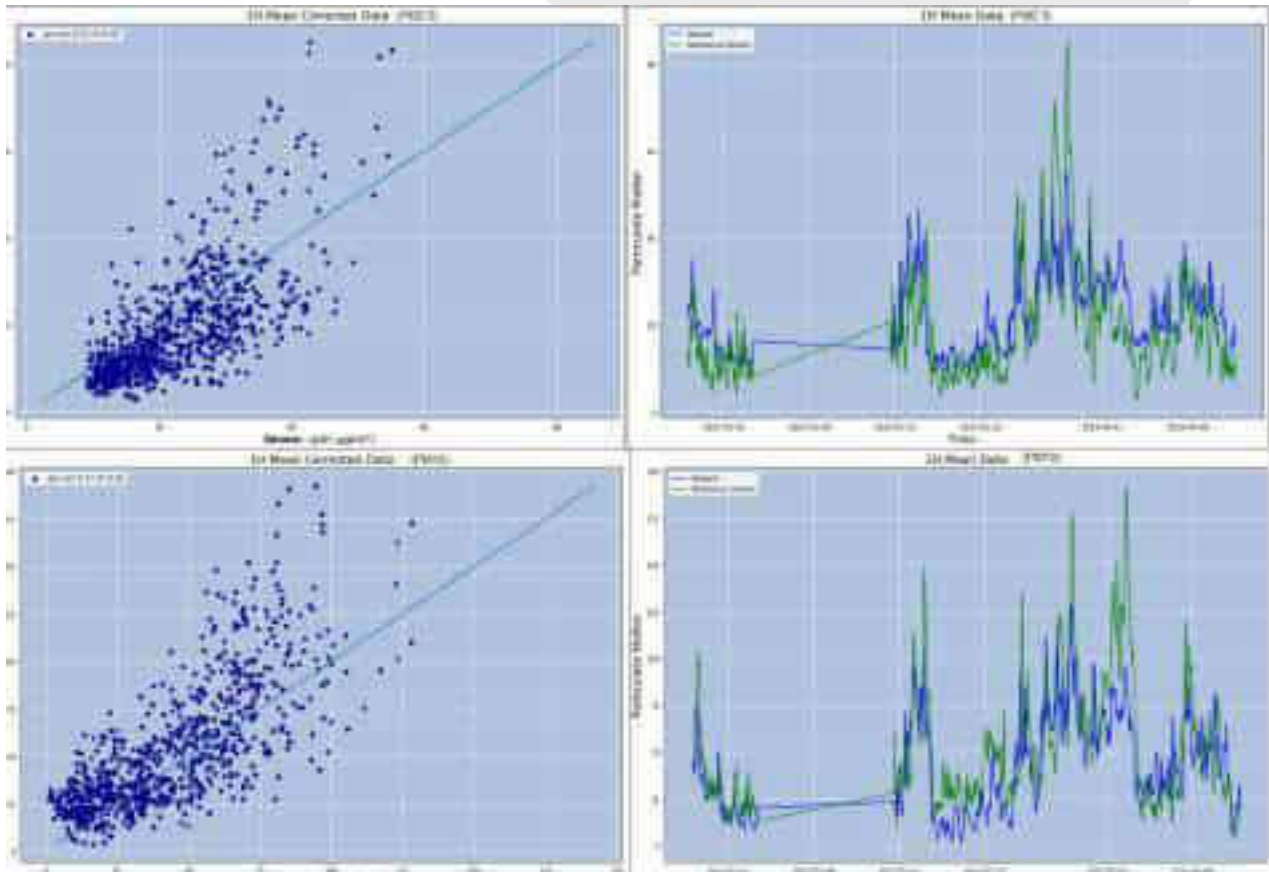
Sensor Units were calibrated using reference stations for a period before the deployment. The calibration process for particle matter and gas pollutants measurement is explained below.

Table 1 Calibration Process for Pollutants

Description	Methodology	
	NO ₂ -SO ₂ -O ₃	PM ₁₀ -PM _{2.5} -TSP
Installation	Near Reference Station (3/4 meters)	Near Reference Station (3/4 meters)
Pre-Test	Quality Check in zero air conditions	Quality Check in zero air conditions
Co-Located Period	4-5 weeks	8 weeks
Sampling Period	30 seconds. Hourly mean is used because the reference station measurements are hourly.	60 seconds. Hourly mean is used because the reference station measurements are hourly.
Validation	Cross-validation is used. Also, some ranges of measurement are eliminated, where the reference station is not available.	Cross-validation is used. Also, some ranges of measurement are eliminated, where the reference station is not available.
Calibration Procedure	is obtained via R ² and spearman correlation	is obtained via R ² and spearman correlation

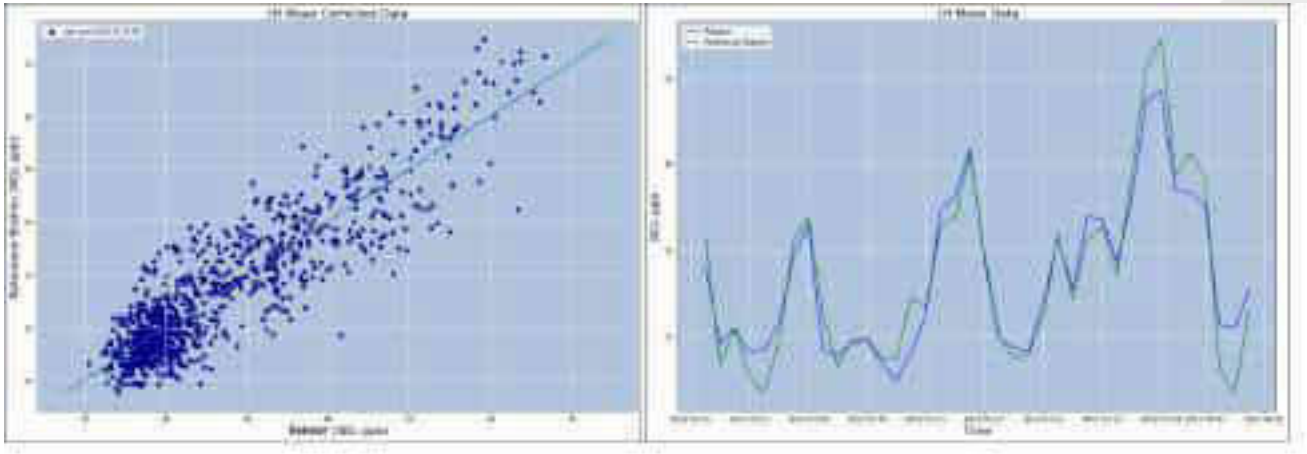
Calibration Result for PM

The corrected measurement results after the Smart Calibration Process are shown in the figures below. The correlation between Sensor Unit's PM_{2.5} measurements between Reference Station's PM_{2.5} measurements for hourly and daily mean of data is 0.73, and the correlation between Sensor Unit's PM₁₀ measurements between Reference Station's PM₁₀ measurements for hourly and daily mean of data is 0.77.



Calibration Result for Gases

The corrected measurement results after the Smart Calibration Process are shown in the figures below. The correlation between Sensor Unit's NO₂ measurements between Reference Station's NO₂ measurements for hourly and daily mean of data is respectively 0.823, 0.898



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 three sets of devices.

AQ1, AQ2 and ASR2 measurements were conducted on the first day,

ASR3, ASR5 and AQ4 measurements were conducted on the second day

AQ3 measurement were conducted on the third 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
Particular 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
Particular 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	Temp (°C)	Atm Pressure (mmHg)	Wind speed (km/h)	Wind direction	Air Humid (%)	Precipitation rain volume (mm)	Condition
21.Nov.2023	2-5 AM		758					Cloudy
	8-11 AM		759					Partly Sunny
	14-17PM		760					Light Rain
	20-23PM		758					Overcast
22.Nov.2023	2-5 AM		757					Cloudy
	8-11 AM		757					Sunny
	14-17PM		756					Broken Clouds
	20-23PM		758					Light Rain
23.Nov.2023	2-5 AM		755					Passing Clouds
	8-11 AM		759					Passing Clouds
	14-17PM		759					Partly Sunny
	20-23PM		759					Partly Clouds
24.Nov.2023	2-5 AM		759					Partly Clouds
	8-11 AM		759					Light Rain
	14-17PM		759					Cloudy
	20-23PM		759					Cloudy

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	11.21.2023 5:00:00	2.18	2.18	14.43	0	3.48	72.19	30.43
	11.21.2023 6:00:00	14.44	14.44	27.47	0	23.03	79.61	28.64
	11.21.2023 7:00:00	2.65	2.65	23.75	0	4.22	83.58	28.12
	11.21.2023 8:00:00	3.2	3.2	16.4	0	5.11	83.72	27.97
	11.21.2023 9:00:00	3.65	3.65	13.94	0	5.82	84.16	27.9
	11.21.2023 10:00:00	4.03	4.03	11.73	0	6.43	83.7	27.88
	11.21.2023 11:00:00	3.94	3.94	7.93	0	6.29	83.41	27.69
	11.22.2023 12:00:00	4.38	4.38	11.95	0	6.99	84.77	27.47
	11.22.2023 1:00:00	4.69	4.69	13.47	0	7.48	85.94	27.28
	11.22.2023 2:00:00	4.62	4.62	10.46	0	7.37	85.96	27.32
	11.22.2023 3:00:00	4.85	4.85	8.85	0	7.74	86.57	27.2
	11.22.2023 4:00:00	4.83	4.83	10.37	0	7.71	89.09	27
	11.22.2023 5:00:00	5.02	5.02	8.91	0	8.01	89.23	27.06
	11.22.2023 6:00:00	5.61	5.61	7.5	0	8.95	86.7	27.24
	11.22.2023 7:00:00	7.1	7.1	0.48	0	11.33	73.56	30.93
	11.22.2023 8:00:00	3.6	3.6	0	0	5.75	62.31	34.49
	11.22.2023 9:00:00	3.25	3.25	0.36	0	5.18	58.44	36.22
	11.22.2023 10:00:00	3.44	3.25	0.15	0	5.4	53	38.57
	11.22.2023 11:00:00	4.64	3.93	4.02	0	7.07	51.76	39.17
	11.22.2023 12:00:00	8.74	6.35	3.6	0	12.82	52.26	38.67
	11.22.2023 1:00:00	4.52	4.29	32.38	0	7.1	65.21	33.32
	11.22.2023 2:00:00	5.61	4.58	13.63	0	8.47	53.93	38.43
11.22.2023 3:00:00	3.98	3.52	9.78	0	6.13	53.24	38.04	
11.22.2023 4:00:00	5.34	5.16	55.6	0	8.43	83.48	28.84	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
24 h Average		4.31	4.71	12.8	0.00	7.76	74.41	31.08
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

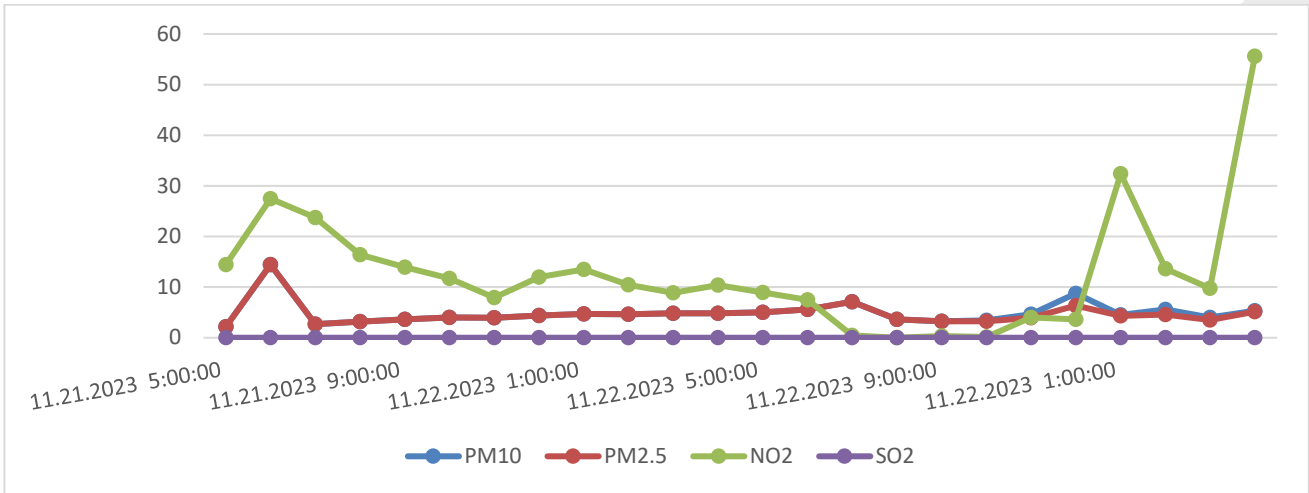


Figure 2 Measurement Graphs for Location AQ1

Table 6 Measurement Results for Location 2

Device Code: 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)
AQ2	11.21.2023 5:00:00	2.52	1.93	0	0	3.09	79.93	29.24
	11.21.2023 6:00:00	12.11	11.14	0	0	16.22	85.62	27.98
	11.21.2023 7:00:00	2.75	2.23	0	0	3.46	87.82	27.67
	11.21.2023 8:00:00	3.29	2.69	0	0	4.15	87.82	27.61
	11.21.2023 9:00:00	4.48	3.33	0	0	5.41	87.86	27.67
	11.21.2023 10:00:00	3.82	3.27	0	0	4.93	86.89	27.86
	11.21.2023 11:00:00	3.73	3.2	0	0	4.82	86.6	27.67
	11.22.2023 12:00:00	3.89	3.45	0	0	5.12	89.78	26.87
	11.22.2023 1:00:00	4.51	3.8	0	0	5.78	90.99	26.34
	11.22.2023 2:00:00	4.42	3.75	0	0	5.68	91.01	26.33
	11.22.2023 3:00:00	4.48	3.88	0	0	5.82	91.4	26.28
	11.22.2023 4:00:00	4.55	3.91	0	0	5.88	93.02	26.2
	11.22.2023 5:00:00	5.08	4.19	0	0	6.45	93.11	26.3
	11.22.2023 6:00:00	5.36	4.57	0	0	6.91	91.49	26.62
	11.22.2023 7:00:00	6.25	5.58	0	0	8.25	83.08	29.01
	11.22.2023 8:00:00	3.44	2.93	0	0	4.43	75.88	31.25
	11.22.2023 9:00:00	3.14	2.65	0	0	4.03	73.4	32.34
	11.22.2023 10:00:00	3.18	2.62	0	0	4.03	69.92	33.81
	11.22.2023 11:00:00	4.21	3.15	0	0	5.1	69.13	34.18
	11.22.2023 12:00:00	7.37	4.95	0	0	8.5	69.45	33.9
	11.22.2023 1:00:00	3.99	3.38	0	0	5.13	77.73	30.53
	11.22.2023 2:00:00	4.99	3.65	0	0	5.98	70.52	33.86
	11.22.2023 3:00:00	3.76	2.87	0	0	4.59	70.07	33.68
11.22.2023 4:00:00	4.79	4.09	0	0	6.18	89.01	27.89	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		4.59	3.80	0.00	0.00	5.83	82.98	29.21
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

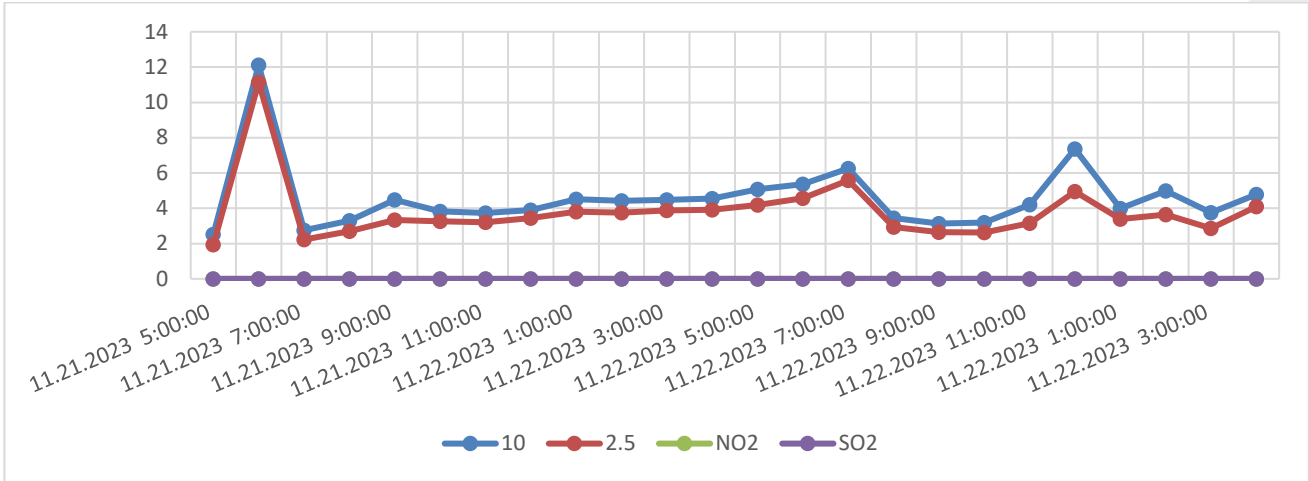


Figure 3 Measurement Graphs for Location AQ2

Table 7 Measurement Results for Location 3

Device Code: 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)
AQ3	11.23.2023 5:00:00	3.37	3.36	0	0	5.38	63.07	33.85
	11.23.2023 6:00:00	3.49	3.48	0.02	0	5.56	62.75	34.06
	11.23.2023 7:00:00	2.99	2.99	0.26	0	4.77	62.16	33.98
	11.23.2023 8:00:00	2.75	2.75	7.14	0	4.38	62.9	34.02
	11.23.2023 9:00:00	1.83	1.83	10	0	2.92	63.93	33.41
	11.23.2023 10:00:00	1.19	1.19	14.52	0	1.9	66.22	32.95
	11.23.2023 11:00:00	1.09	1.04	15.54	0	1.71	69.26	32.44
	11.24.2023 12:00:00	1.3	1.18	11.36	0	2.01	67.57	32.24
	11.24.2023 1:00:00	1.14	1.06	11.58	0	1.78	66.64	32.44
	11.24.2023 2:00:00	3.07	2.76	0	0	7.27	67.94	32.3
	11.24.2023 3:00:00	2.55	2.29	0	0	6.04	71.52	31.23
	11.24.2023 4:00:00	1.91	1.72	0	0	4.53	73.42	30.82
	11.24.2023 5:00:00	1.35	1.2	0	0	3.18	73.83	30.74
	11.24.2023 6:00:00	1.18	1.01	0	0	2.73	73.11	31.04
	11.24.2023 7:00:00	1.19	0.99	0	0	2.72	72.72	31.35
	11.24.2023 8:00:00	1.84	1.5	0	0	4.16	71.98	31.44
	11.24.2023 9:00:00	2.58	2.1	0	0	5.83	71.08	31.58
	11.24.2023 10:00:00	2.98	2.41	0	0	6.71	70.73	31.37
	11.24.2023 11:00:00	2.51	2.03	0	0	5.65	73.03	31.15
	11.24.2023 12:00:00	1.94	1.56	0	0	4.36	73.41	31.14
11.24.2023 1:00:00	1.47	1.17	0	0	3.29	72.22	31.27	
11.24.2023 2:00:00	1.24	0.96	0	0	2.74	71.78	31.2	
11.24.2023 3:00:00	1.38	1.04	0	0	3.01	70.7	31.37	
11.24.2023 4:00:00	3.07	2.76	0	0	7.27	70.14	30.22	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		2.06	1.85	0.0	0.0	4.16	69.25	31.98
Daily Limit Values	TA Luft	50	-	-	-	-	-	-
	EU	50	-	-	-	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

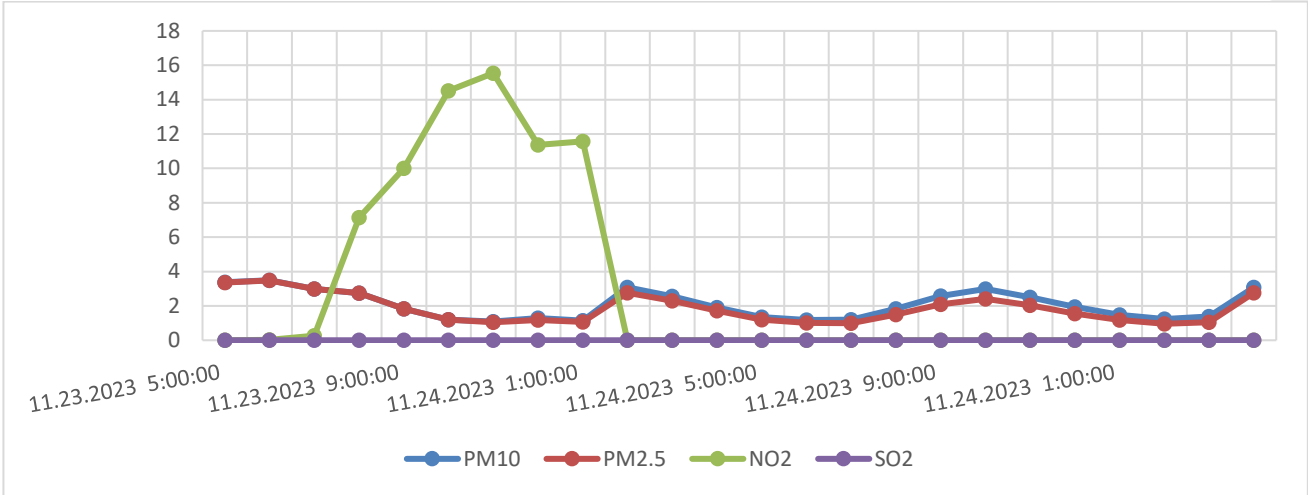


Figure 4 Measurement Graphs for Location AQ3

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	11.21.2023 5:00:00	1.24	1.24	0	0	1.74	93.68	27.13
	11.21.2023 6:00:00	1.28	1.28	0	0	1.79	96.3	26.81
	11.21.2023 7:00:00	1.03	1.03	0	0	1.44	95.37	26.88
	11.21.2023 8:00:00	1.2	1.2	0	0	1.68	95.1	26.96
	11.21.2023 9:00:00	2.48	2.47	0	0	3.46	94.44	27.26
	11.21.2023 10:00:00	1.02	1.02	0	0	1.43	92.57	27.82
	11.21.2023 11:00:00	1.00	1.00	0	0	1.4	92.26	27.64
	11.22.2023 12:00:00	0.72	0.7	0	0	0.99	98.69	25.8
	11.22.2023 1:00:00	1.29	1.16	0	0	1.71	99.96	24.67
	11.22.2023 2:00:00	1.24	1.17	0	0	1.68	100	24.57
	11.22.2023 3:00:00	1.05	1.02	0	0	1.45	100	24.65
	11.22.2023 4:00:00	1.18	1.18	0	0	1.65	100	24.77
	11.22.2023 5:00:00	1.77	1.77	0	0	2.48	100	24.95
	11.22.2023 6:00:00	1.49	1.49	0	0	2.09	100	25.53
	11.22.2023 7:00:00	1.08	1.08	0	0	1.51	100	25.59
	11.22.2023 8:00:00	0.95	0.95	0	0	1.33	100	25.49
	11.22.2023 9:00:00	0.91	0.9	0	0	1.27	100	25.43
	11.22.2023 10:00:00	0.76	0.75	0	0	1.06	100	25.34
	11.22.2023 11:00:00	0.9	0.86	0	0	1.23	100	25.32
	11.22.2023 12:00:00	0.83	0.8	0	0	1.14	100	25.41
	11.22.2023 1:00:00	0.71	0.69	0	0	0.98	100	25.57
	11.22.2023 2:00:00	0.93	0.9	0	0	1.28	100	25.73
	11.22.2023 3:00:00	0.99	0.95	0	0	1.36	99.99	25.93
11.22.2023 4:00:00	0.95	0.92	0	0	1.31	98.84	26.19	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		1.13	1.11	0.00	0.00	1.56	98.22	25.89
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

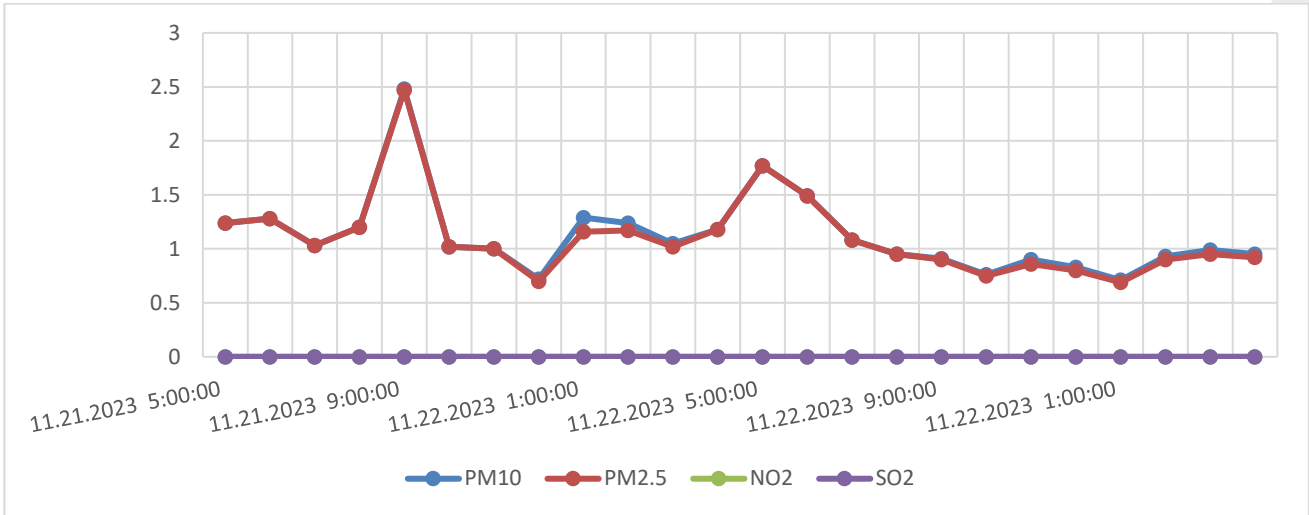


Figure 5 Measurement Graphs for Location ASR2

Table 9 Measurement Results for Location 5

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)
ASR3	11.22.2023 5:00:00	3.49	3.15	9.05	0	5.41	98.65	25.41
	11.22.2023 6:00:00	2.59	2.59	10.04	0	4.12	97.14	26.14
	11.22.2023 7:00:00	3.23	3.23	10.48	0	5.15	95.13	26.54
	11.22.2023 8:00:00	3	2.82	11.81	0	4.7	95.22	26.29
	11.22.2023 9:00:00	3.23	3.18	10.15	13.02	5.13	89.69	27.72
	11.22.2023 10:00:00	3.43	3.09	18.75	0	5.31	98.74	25.25
	11.22.2023 11:00:00	2.32	2.18	6.08	0	3.64	89.13	27.53
	11.23.2023 12:00:00	1.79	1.75	3.15	0	2.83	84.36	28.55
	11.23.2023 1:00:00	1.72	1.71	5.66	0	2.74	82.49	28.75
	11.23.2023 2:00:00	2.43	2.37	10	0	3.85	84.92	28.09
	11.23.2023 3:00:00	4.56	4.52	21.13	0	7.26	89.4	27.16
	11.23.2023 4:00:00	28.8	28.77	24.4	0	45.94	91.78	26.8
	11.23.2023 5:00:00	1.98	1.94	14.89	0	3.14	92.29	26.73
	11.23.2023 6:00:00	1.18	1.15	7.84	0	1.87	91.39	26.99
	11.23.2023 7:00:00	1.5	1.48	7.3	0	2.38	90.9	27.26
	11.23.2023 8:00:00	1.46	1.44	4.39	0	2.32	89.98	27.34
	11.23.2023 9:00:00	4.5	4.47	2.89	0	7.16	88.85	27.46
	11.23.2023 10:00:00	0.73	0.67	3.22	0	1.13	88.41	27.28
	11.23.2023 11:00:00	1.44	1.24	9.08	0	2.21	91.29	27.09
	11.23.2023 12:00:00	1.98	1.66	11.5	0	3.01	91.76	27.08
	11.23.2023 1:00:00	2.01	1.65	6.91	0	3.04	90.27	27.19
	11.23.2023 2:00:00	2.56	2.14	7.25	0	3.89	89.72	27.13
	11.23.2023 3:00:00	2.12	1.78	5.16	0	3.22	88.37	27.28
	11.23.2023 4:00:00	3.41	3.12	2.29	0	5.3	77.48	30.08
Hourly Limit Values	TA Luft	-	-	200	200	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.56	3.42	9.31	0.54	5.61	90.31	27.21
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

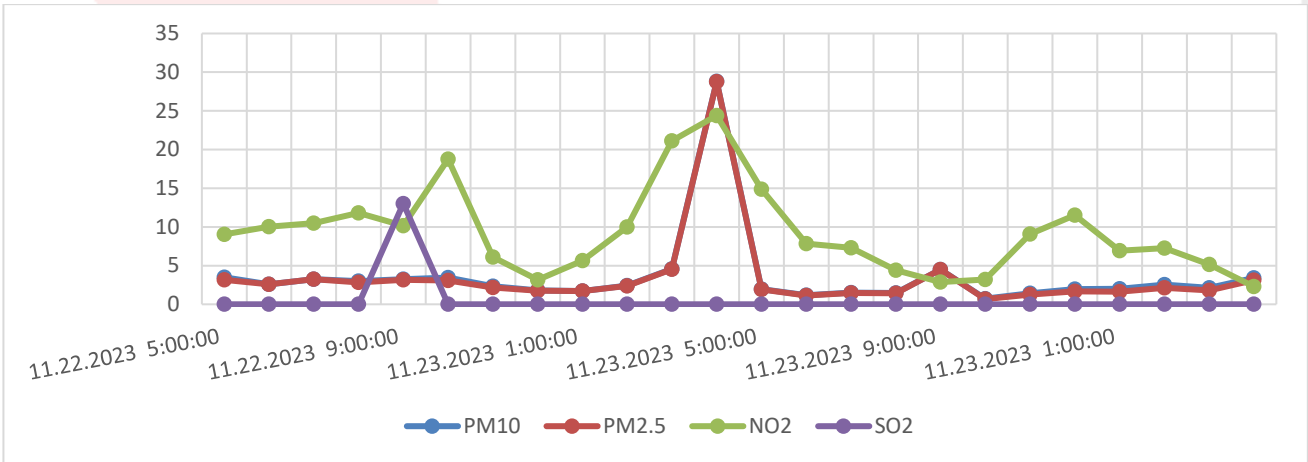


Figure 6 Measurement Graphs for Location ASR3

Table 10 Measurement Results for Location 6

Device Code: 222								
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	11.22.2023 5:00:00	2.63	2.53	0	0	4.12	80.79	29.11
	11.22.2023 6:00:00	8.51	8.51	0	0	13.61	86.29	28.91
	11.22.2023 7:00:00	2.71	2.71	0	0	4.33	88.3	28.62
	11.22.2023 8:00:00	2.98	2.93	0	0	4.72	88.27	27.57
	11.22.2023 9:00:00	3.79	3.77	0	0	6.04	88.27	27.64
	11.22.2023 10:00:00	3.45	3.35	0	0	5.43	87.25	27.86
	11.22.2023 11:00:00	3.07	3.02	0	0	4.87	86.95	27.67
	11.23.2023 12:00:00	3.02	3	0	0	4.81	90.34	26.8
	11.23.2023 1:00:00	3.38	3.32	0	0	5.35	91.55	26.24
	11.23.2023 2:00:00	3.54	3.49	0	0	5.61	91.58	26.22
	11.23.2023 3:00:00	4.21	4.19	0	0	6.72	91.94	26.18
	11.23.2023 4:00:00	3.53	3.52	0	0	18.44	93.45	26.11
	11.23.2023 5:00:00	3.81	3.8	0	0	6.09	93.54	26.22
	11.23.2023 6:00:00	3.76	3.75	0	0	6	92.02	26.56
	11.23.2023 7:00:00	4.43	4.43	0	0	7.09	84.14	27.79
	11.23.2023 8:00:00	2.62	2.61	0	0	4.18	77.39	28.89
	11.23.2023 9:00:00	3.34	3.33	0	0	5.33	75.06	29.9
	11.23.2023 10:00:00	2.24	2.13	0	0	3.48	71.8	30.28
	11.23.2023 11:00:00	3.11	2.68	0	0	4.59	71.06	30.63
	11.23.2023 12:00:00	5.3	3.99	0	0	7.3	71.36	31.37
	11.23.2023 1:00:00	3.15	2.92	0	0	4.83	79.13	31.22
	11.23.2023 2:00:00	3.95	3.29	0	0	5.72	72.36	31.35
11.23.2023 3:00:00	3.02	2.67	0	0	4.52	71.94	30.2	
11.23.2023 4:00:00	4.07	3.88	0	0	6.35	71.62	29.78	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.65	3.49	0.00	0.00	6.23	83.18	28.46
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

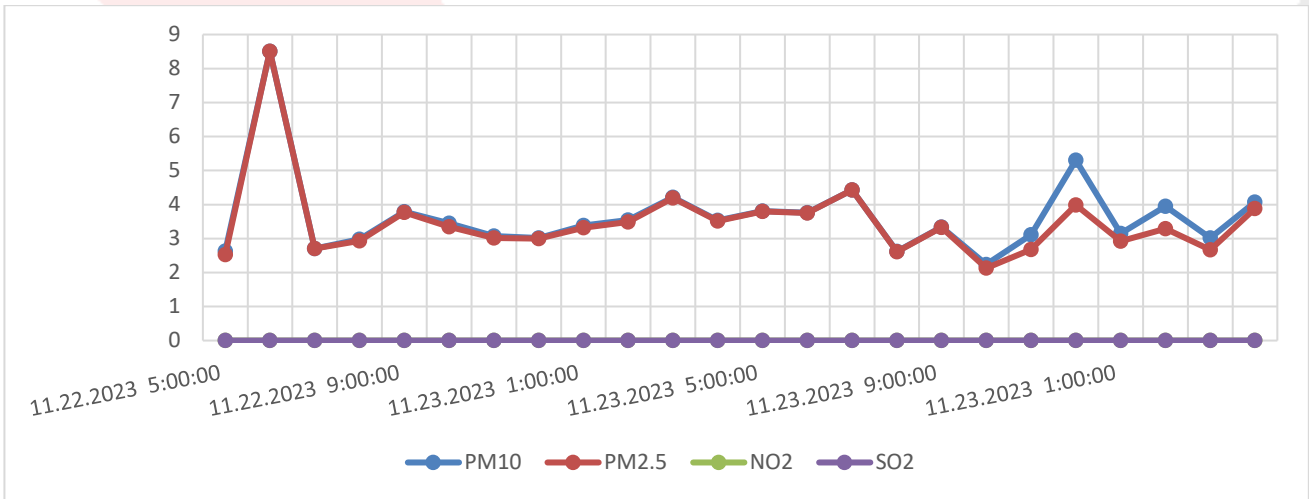


Figure 7 Measurement Graphs for Location ASR5

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	11.22.2023 5:00:00	2.68	2.48	0	0	4.11	82.77	28.42
	11.22.2023 6:00:00	3.38	3.38	0	0	5.41	86.62	27.64
	11.22.2023 7:00:00	2.51	2.51	0	0	4.02	88.2	27.49
	11.22.2023 8:00:00	2.48	2.37	0	0	3.87	88.32	27.3
	11.22.2023 9:00:00	3.05	3.01	0	0	4.85	86.37	27.83
	11.22.2023 10:00:00	2.77	2.56	0	0	4.24	89.72	26.83
	11.22.2023 11:00:00	2.09	2	0	0	3.26	85.7	27.63
	11.23.2023 12:00:00	1.73	1.7	0	0	2.74	84.61	27.9
	11.23.2023 1:00:00	1.89	1.84	0	0	2.98	84.56	27.87
	11.23.2023 2:00:00	2.29	2.24	0	0	3.62	85.54	27.63
	11.23.2023 3:00:00	3.54	3.5	0	0	5.63	87.7	27.18
	11.23.2023 4:00:00	18.12	18.1	0	0	28.97	90.17	26.92
	11.23.2023 5:00:00	2.22	2.2	0	0	3.53	90.45	26.93
	11.23.2023 6:00:00	1.72	1.7	0	0	2.73	88.58	27.14
	11.23.2023 7:00:00	1.93	1.92	0	0	3.08	80.5	28.46
	11.23.2023 8:00:00	1.52	1.51	0	0	2.42	73.38	29.63
	11.23.2023 9:00:00	3.3	3.28	0	0	5.26	70.6	30.72
	11.23.2023 10:00:00	1.01	0.95	0	0	1.56	67.16	30.05
	11.23.2023 11:00:00	1.6	1.4	0	0	2.37	67.57	30.34
	11.23.2023 12:00:00	2.31	1.87	0	0	3.3	68.06	31.03
	11.23.2023 1:00:00	1.87	1.63	0	0	2.77	75.23	30.87
	11.23.2023 2:00:00	2.38	2.01	0	0	3.47	68.25	30.91
	11.23.2023 3:00:00	1.97	1.71	0	0	2.91	67.29	29.74
11.23.2023 4:00:00	2.87	2.66	0	0	4.4	81.08	29.34	
Hourly Limit Values	TA Luft	-	-	200	350		-	-
	EU	-	-	200	350		-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-		-	-
Average		2.97	2.86	0.00	0.00	4.65	80.77	28.58
Daily Limit Values	TA Luft	50	-	-	125		-	-
	EU	50	-	-	125		-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40		-	-

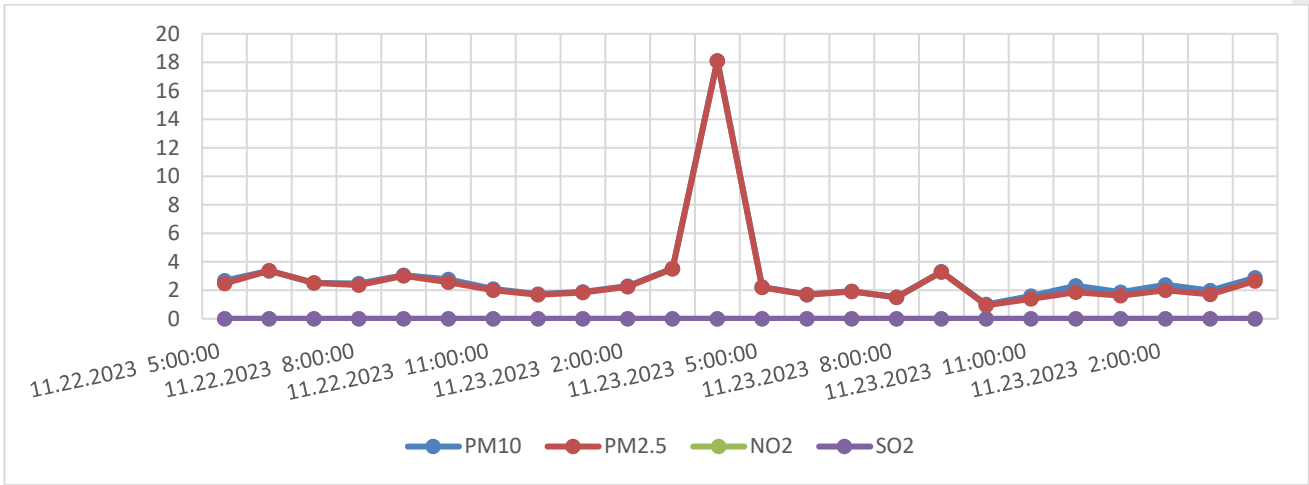


Figure 8 Measurement Graphs for Location AQ4

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.

GOVERNMENT of MALDIVES

WtE Energy Facility Project

CONSGTRUCTION PHASE

AIR QUALITY MEASUREMENT REPORT



Thilafushi Island/MALDIVES



AIRS Air Quality Management Services Ltd
Mustafa Kemal Mah. Via Green Is Mrk. B-36
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Tel: +90 312 221 02 45 Fax: +90 312 221 02 45
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Test Report

Customer Name/Address	Alke Alkatas Joint Venture Pvt Ltd H.H.Moomiyaage 5A Asaree Hingun K.Male 20265 MALDIVES
Order No.	EN-M/2207/417_01
Name and identity of test item	Immission (Air Quality)
Remarks	-
Date of Test	11.12.2023-17.12.2023
Number of Pages of the Report	28 Pages
Test Method	Air Quality Sensors
Test results	The test results are given in the measurement result tables.
Environmental conditions	Environmental conditions during the measurement are given in the measurement result tables.
Comments	-

The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.


Reporter and Approval
Ismail Ulusoy Environmental Engineer


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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 (±63%)	s	<60
Humidity	Typ. relative humidity accuracy	%RH	4,5
	Operating relative humidity range	%RH	0 to 100
	Response time (±63%)	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.



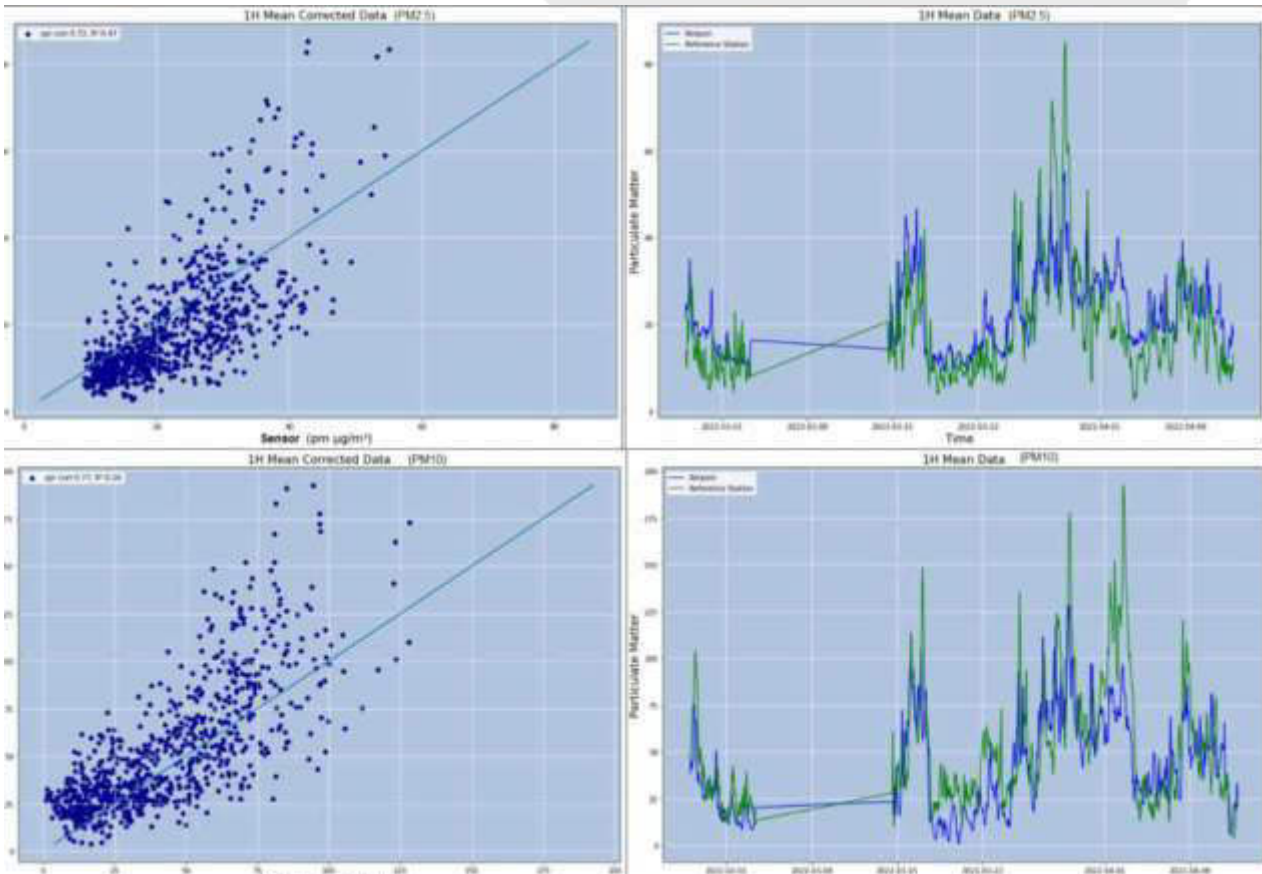
Sensor Units were calibrated using reference stations for a period before the deployment. The calibration process for particle matter and gas pollutants measurement is explained below.

Table 1 Calibration Process for Pollutants

Description	Methodology	
	NO ₂ -SO ₂ -O ₃	PM ₁₀ -PM _{2.5} -TSP
Installation	Near Reference Station (3/4 meters)	Near Reference Station (3/4 meters)
Pre-Test	Quality Check in zero air conditions	Quality Check in zero air conditions
Co-Located Period	4-5 weeks	8 weeks
Sampling Period	30 seconds. Hourly mean is used because the reference station measurements are hourly.	60 seconds. Hourly mean is used because the reference station measurements are hourly.
Validation	Cross-validation is used. Also, some ranges of measurement are eliminated, where the reference station is not available.	Cross-validation is used. Also, some ranges of measurement are eliminated, where the reference station is not available.
Calibration Procedure	is obtained via R ² and spearman correlation	is obtained via R ² and spearman correlation

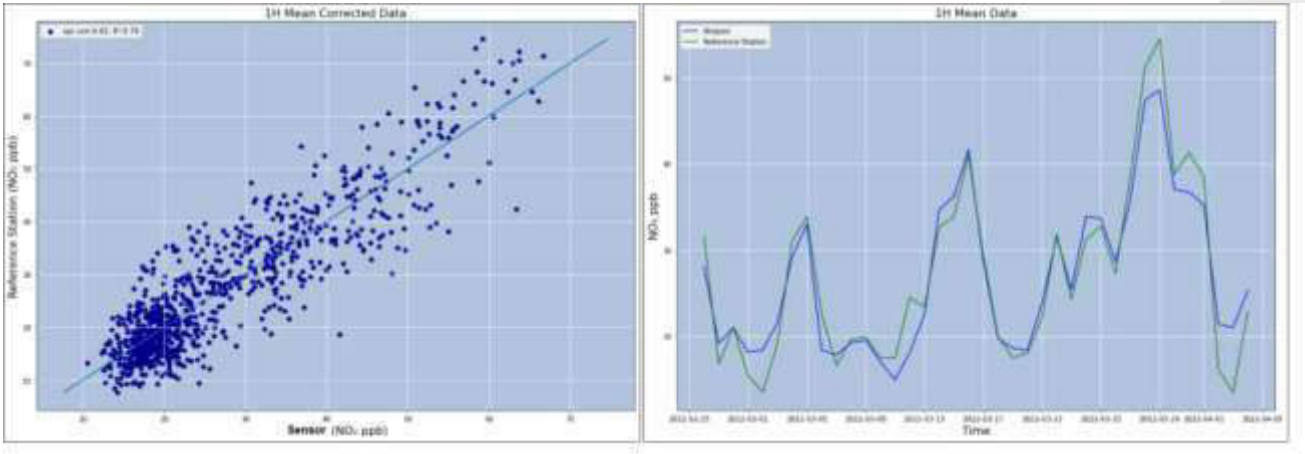
Calibration Result for PM

The corrected measurement results after the Smart Calibration Process are shown in the figures below. The correlation between Sensor Unit's PM_{2.5} measurements between Reference Station's PM_{2.5} measurements for hourly and daily mean of data is 0.73, and the correlation between Sensor Unit's PM₁₀ measurements between Reference Station's PM₁₀ measurements for hourly and daily mean of data is 0.77.



Calibration Result for Gases

The corrected measurement results after the Smart Calibration Process are shown in the figures below. The correlation between Sensor Unit's NO₂ measurements between Reference Station's NO₂ measurements for hourly and daily mean of data is respectively 0.823, 0.898



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 three sets of devices.

ASR5 and AQ4 measurements were conducted on the first day,

AQ1 and AQ2 measurements were conducted on the second day

AQ3, ASR2 and ASR3 measurement were conducted on the third 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
Particular 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
Particular 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	Temp (°C)	Atm Pressure (mmHg)	Wind speed (km/h)	Wind direction	Air Humid (%)	Precipitation rain volume (mm)	Condition
11.Dec.2023	2-5 AM	30	758	8	E	81	2	Light Rains
	8-11 AM	30	755	12	N	76	NIL	Cloudy
	14-17PM	28	759	8	N-WN	82	NIL	Partly Cloudy
	20-23PM	28	759	19	ENE	88	NIL	Mostly Cloudy
12.Dec.2023	2-5 AM	31	760	23	ENE	77	NIL	Partly Cloudy
	8-11 AM	31	758	24	E	78	NIL	Partly Cloudy
	14-17PM	29	757	30	E	85	NIL	Overcast
	20-23PM	26	757	23	SE	96	45	Heavy Rain
13.Dec.2023	2-5 AM	27	756	16	E	91	16.4	Heavy rains
	8-11 AM	27	759	14	SE	90	3	Light Rains
	14-17PM	27	760	15	SE	90	NIL	Partly Cloudy
	20-23PM	27	758	13	SE-ESE	90	NIL	Partly Cloudy
14.Dec.2023	2-5 AM	30	759	7	NNE	78	NIL	Cloudy
	8-11 AM	29	759	10	E	78	NIL	Cloudy
	14-17PM	28	759	5	NNE	84	NIL	Clear
	20-23PM	26	759	0	CALM	93	NIL	Partly Cloudy
15.Dec.2023	2-5 AM	30	755	7	SSW	76	NIL	Cloudy
	8-11 AM	30	759	6	WSW	75	NIL	Partly Cloudy
	14-17PM	29	759	8	SW-WSW	79	NIL	Cloudy
	20-23PM	28	759	5	SW	86	1	Light Rain

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	2023-12-13 14:00:00	15.47	14.09	0.07	0.00	25.91	77.40	29.32
	2023-12-13 15:00:00	13.45	12.14	0.11	0.00	22.43	74.31	29.51
	2023-12-13 16:00:00	12.71	11.35	0.00	0.00	21.04	75.59	27.08
	2023-12-13 17:00:00	14.21	12.56	0.04	0.00	22.97	75.89	28.23
	2023-12-13 18:00:00	12.98	11.18	0.07	0.00	20.68	80.88	27.68
	2023-12-13 19:00:00	7.40	5.74	0.40	0.00	18.83	82.90	27.22
	2023-12-13 20:00:00	11.95	10.41	2.34	0.00	19.60	82.42	27.37
	2023-12-13 21:00:00	10.46	9.13	1.90	0.00	17.05	81.94	27.44
	2023-12-13 22:00:00	6.55	8.78	3.33	0.00	16.37	82.01	27.41
	2023-12-13 23:00:00	9.91	9.08	4.00	0.00	17.27	82.69	27.30
	2023-12-14 00:00:00	9.58	8.30	2.05	0.00	15.72	83.00	27.19
	2023-12-14 01:00:00	10.71	8.96	3.13	0.00	17.27	84.51	26.64
	2023-12-14 02:00:00	9.70	9.68	0.24	0.00	17.90	86.94	26.23
	2023-12-14 03:00:00	9.52	8.52	0.55	0.00	15.85	86.64	26.35
	2023-12-14 04:00:00	9.70	8.53	0.01	0.00	15.84	86.63	26.35
	2023-12-14 05:00:00	5.92	4.99	0.00	0.00	12.89	85.30	26.70
	2023-12-14 06:00:00	6.95	6.41	0.00	0.00	11.58	85.11	26.76
	2023-12-14 07:00:00	8.73	8.35	0.00	0.00	14.41	89.38	25.76
	2023-12-14 08:00:00	8.21	7.79	0.00	0.00	13.69	88.37	26.78
	2023-12-14 09:00:00	10.26	9.91	0.07	0.00	17.30	83.99	27.32
	2023-12-14 10:00:00	10.92	10.41	0.45	0.00	18.17	78.05	28.67
	2023-12-14 11:00:00	10.07	9.22	4.36	0.17	16.48	70.77	30.71
	2023-12-14 12:00:00	6.69	9.51	4.23	0.00	17.83	65.88	32.25
2023-12-14 13:00:00	12.72	10.85	6.65	0.00	21.15	61.84	33.29	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
24 h Average		10.20	9.41	1.42	0.01	17.84	80.52	27.90
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: 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)
AQ2	2023-12-13 14:00:00	3.88	3.79	0.00	0.00	4.94	51.99	23.75
	2023-12-13 15:00:00	3.55	3.48	0.00	0.00	4.53	57.68	21.78
	2023-12-13 16:00:00	5.83	5.64	0.00	0.00	7.35	62.48	21.65
	2023-12-13 17:00:00	13.16	12.70	0.00	0.00	16.56	72.13	22.89
	2023-12-13 18:00:00	39.79	38.31	0.00	0.00	49.95	77.30	23.54
	2023-12-13 19:00:00	42.85	41.25	0.00	0.00	53.79	80.96	23.86
	2023-12-13 20:00:00	31.98	30.79	0.00	0.00	40.15	81.49	24.05
	2023-12-13 21:00:00	16.72	16.14	0.00	0.00	21.04	84.06	24.22
	2023-12-13 22:00:00	9.79	9.49	0.00	0.00	12.37	86.73	24.37
	2023-12-13 23:00:00	5.67	5.52	0.00	0.00	7.19	88.72	24.50
	2023-12-14 00:00:00	3.64	3.55	0.00	0.00	4.62	91.38	24.76
	2023-12-14 01:00:00	2.54	2.49	0.00	0.00	3.24	91.83	24.86
	2023-12-14 02:00:00	2.26	2.22	0.00	0.00	2.89	91.99	24.93
	2023-12-14 03:00:00	2.75	2.70	0.00	0.00	3.52	77.21	23.86
	2023-12-14 04:00:00	3.52	3.43	0.00	0.00	4.47	69.73	22.70
	2023-12-14 05:00:00	4.51	4.44	0.00	0.00	5.78	76.82	27.89
	2023-12-14 06:00:00	9.02	8.95	0.00	0.00	11.64	75.78	30.90
	2023-12-14 07:00:00	8.86	8.79	0.00	0.00	11.43	75.54	31.28
	2023-12-14 08:00:00	5.65	5.60	0.00	0.00	7.29	74.14	31.44
	2023-12-14 09:00:00	8.08	8.01	0.00	0.00	10.42	75.94	31.34
	2023-12-14 10:00:00	12.52	12.43	0.00	0.00	16.17	77.57	30.98
	2023-12-14 11:00:00	13.23	13.09	0.00	0.00	17.03	77.01	30.82
	2023-12-14 12:00:00	15.65	15.46	0.00	0.00	20.12	80.71	30.00
	2023-12-14 13:00:00	15.76	15.54	0.00	0.00	20.22	85.20	29.09
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		11.72	11.41	0.00	0.00	14.86	77.68	26.23
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

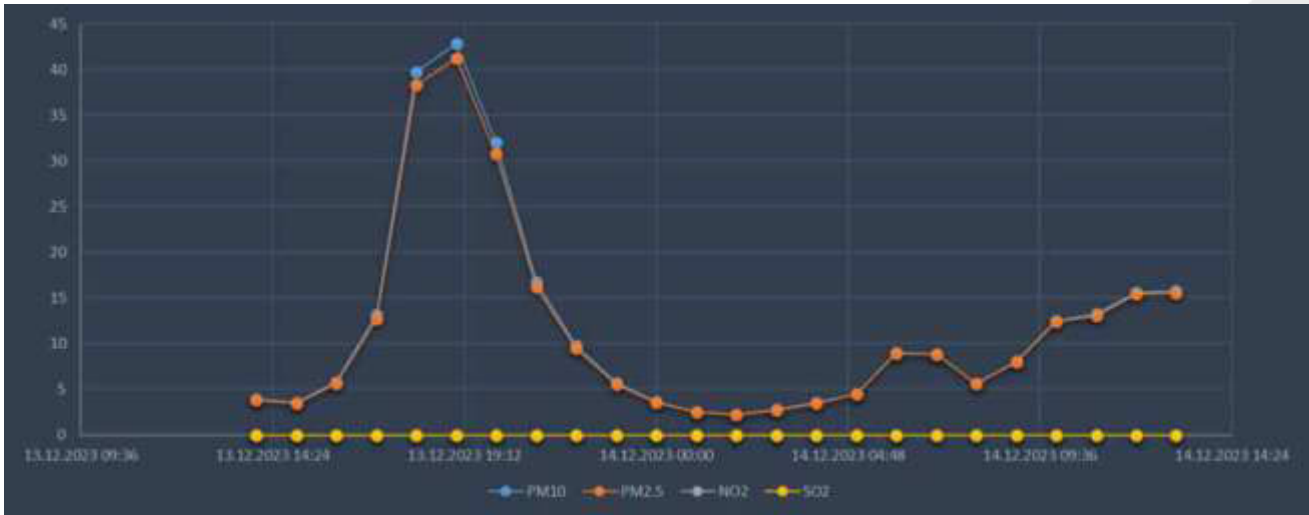


Figure 3 Measurement Graphs for Location AQ2

Table 7 Measurement Results for Location 3

Device Code: 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	2023-12-14 14:00:00	18.18	17.88	4.11	0.00	23.27	88.95	28.11
	2023-12-14 15:00:00	18.76	18.48	7.12	0.81	24.05	93.17	27.80
	2023-12-14 16:00:00	20.58	20.22	6.33	1.18	26.32	90.74	27.74
	2023-12-14 17:00:00	19.64	19.31	2.06	0.00	25.14	90.63	27.64
	2023-12-14 18:00:00	18.53	18.24	0.00	0.00	23.74	94.52	27.38
	2023-12-14 19:00:00	11.55	11.39	0.00	0.00	14.82	95.22	26.50
	2023-12-14 20:00:00	14.87	14.64	0.00	0.00	19.06	96.62	26.55
	2023-12-14 21:00:00	4.92	4.55	0.00	0.00	5.95	99.05	24.39
	2023-12-14 22:00:00	5.99	5.50	0.00	0.00	7.20	100.00	24.15
	2023-12-14 23:00:00	3.96	3.53	0.00	0.00	4.63	100.00	23.86
	2023-12-15 00:00:00	4.01	3.93	0.00	0.00	5.12	100.00	24.00
	2023-12-15 01:00:00	9.46	9.34	0.00	0.00	12.15	99.78	24.82
	2023-12-15 02:00:00	8.78	8.67	0.00	0.00	11.28	99.87	25.38
	2023-12-15 03:00:00	10.96	10.80	0.00	0.00	14.06	99.17	25.69
	2023-12-15 04:00:00	9.62	9.34	0.00	0.00	12.17	99.89	24.98
	2023-12-15 05:00:00	6.34	6.25	0.00	0.00	8.13	100.00	24.22
	2023-12-15 06:00:00	4.87	4.80	0.00	0.00	6.25	98.85	24.92
	2023-12-15 07:00:00	4.95	4.90	0.00	0.00	6.38	94.03	26.37
	2023-12-15 08:00:00	4.39	4.36	0.00	0.00	5.67	80.15	30.13
	2023-12-15 09:00:00	4.74	4.71	0.00	0.00	6.13	83.65	29.00
	2023-12-15 10:00:00	5.18	5.12	0.00	0.00	6.66	89.60	27.72
	2023-12-15 11:00:00	4.29	4.23	0.00	0.00	5.51	95.80	26.08
	2023-12-15 12:00:00	5.23	5.13	0.00	0.00	6.68	81.27	23.67
	2023-12-15 13:00:00	4.77	4.67	0.00	0.00	6.08	83.07	23.14
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		9.36	9.17	0.82	0.08	11.94	93.92	26.01
Daily Limit Values	TA Luft	50	-	-	-	-	-	-
	EU	50	-	-	-	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

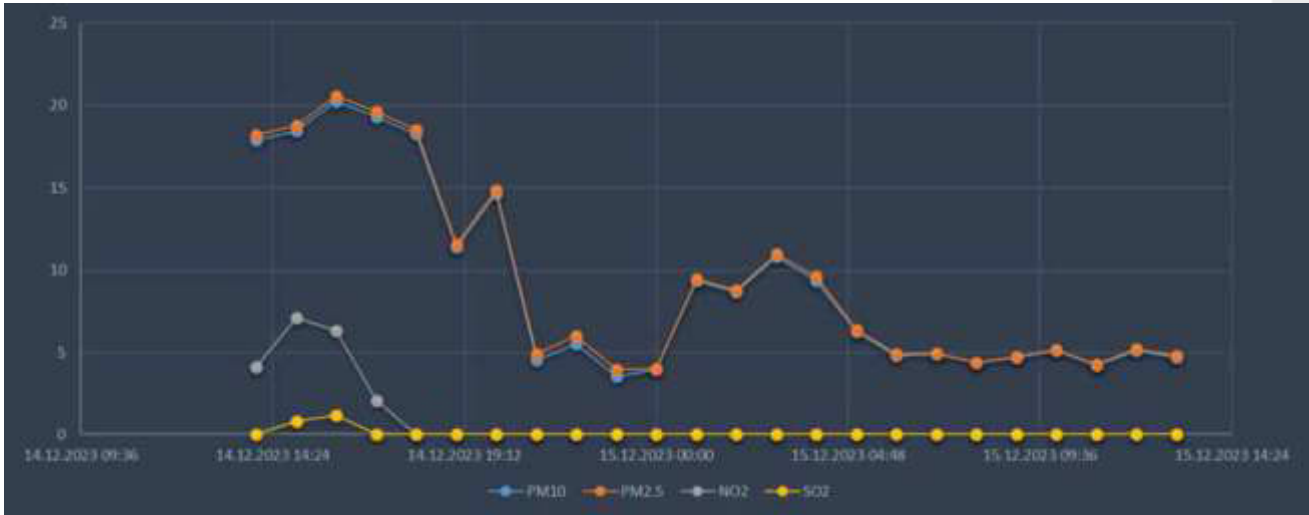


Figure 4 Measurement Graphs for Location AQ3

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	2023-12-14 14:00:00	10.67	10.34	0.00	0.00	13.89	72.78	29.32
	2023-12-14 15:00:00	10.17	9.86	0.00	0.00	13.24	75.05	29.51
	2023-12-14 16:00:00	11.11	10.77	0.00	0.00	14.47	76.27	27.08
	2023-12-14 17:00:00	13.38	12.87	0.00	0.00	17.30	79.55	28.23
	2023-12-14 18:00:00	20.36	19.50	0.00	0.00	26.22	84.23	27.68
	2023-12-14 19:00:00	18.82	16.78	0.00	0.00	22.71	86.36	27.22
	2023-12-14 20:00:00	16.79	16.07	0.00	0.00	21.62	86.84	27.37
	2023-12-14 21:00:00	9.10	8.65	0.00	0.00	11.65	88.35	27.44
	2023-12-14 22:00:00	6.26	6.95	0.00	0.00	9.24	89.58	27.41
	2023-12-14 23:00:00	5.48	5.32	0.00	0.00	7.15	90.47	27.30
	2023-12-15 00:00:00	4.92	4.55	0.00	0.00	6.13	91.46	27.19
	2023-12-15 01:00:00	6.48	5.99	0.00	0.00	8.09	92.04	26.64
	2023-12-15 02:00:00	5.91	5.93	0.00	0.00	7.94	92.93	26.23
	2023-12-15 03:00:00	6.61	6.36	0.00	0.00	8.55	87.67	26.35
	2023-12-15 04:00:00	6.47	6.19	0.00	0.00	8.32	85.42	26.35
	2023-12-15 05:00:00	4.78	4.52	0.00	0.00	6.09	87.37	26.70
	2023-12-15 06:00:00	5.95	5.80	0.00	0.00	7.79	86.58	26.76
	2023-12-15 07:00:00	6.45	6.33	0.00	0.00	8.50	86.32	25.76
	2023-12-15 08:00:00	5.22	5.10	0.00	0.00	6.84	80.89	26.78
	2023-12-15 09:00:00	6.61	6.50	0.10	0.10	8.72	81.19	27.32
	2023-12-15 10:00:00	8.19	8.03	0.00	0.00	10.78	81.74	28.67
	2023-12-15 11:00:00	7.89	7.63	0.00	0.00	10.25	81.19	30.71
	2023-12-15 12:00:00	7.87	8.66	0.00	0.00	11.51	75.95	32.25
2023-12-15 13:00:00	9.50	8.93	0.00	0.00	12.03	76.70	33.29	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		8.96	8.65	0.00	0.00	11.63	84.04	27.90
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-



Figure 5 Measurement Graphs for Location ASR2

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	2023-12-14 14:00:00	35.05	34.40	0.00	0.00	44.85	78.64	29.17
	2023-12-14 15:00:00	9.32	9.16	0.00	0.00	11.94	84.45	27.85
	2023-12-14 16:00:00	9.15	8.99	0.00	0.00	11.72	86.48	27.49
	2023-12-14 17:00:00	10.73	10.55	0.00	0.00	13.75	88.51	27.42
	2023-12-14 18:00:00	10.22	10.02	0.00	0.00	13.07	89.88	27.11
	2023-12-14 19:00:00	11.89	11.68	0.00	0.00	15.23	91.61	26.80
	2023-12-14 20:00:00	9.79	9.58	0.00	0.00	12.50	92.60	26.65
	2023-12-14 21:00:00	8.49	8.31	0.00	0.00	10.84	94.08	26.40
	2023-12-14 22:00:00	8.31	8.15	0.00	0.00	10.63	93.91	26.19
	2023-12-14 23:00:00	8.44	8.27	0.00	0.00	10.79	95.13	25.88
	2023-12-15 00:00:00	8.68	8.55	0.00	0.00	11.14	93.38	26.21
	2023-12-15 01:00:00	7.61	7.49	0.00	0.00	9.76	91.71	26.17
	2023-12-15 02:00:00	7.71	7.58	0.00	0.00	9.88	93.06	26.10
	2023-12-15 03:00:00	9.54	9.39	0.00	0.00	12.24	84.43	28.66
	2023-12-15 04:00:00	5.03	4.97	0.00	0.00	6.47	67.92	33.30
	2023-12-15 05:00:00	4.69	4.68	0.00	0.00	6.09	60.01	35.85
	2023-12-15 06:00:00	5.45	5.41	0.00	0.00	7.04	65.60	33.68
	2023-12-15 07:00:00	5.24	5.22	0.00	0.00	6.79	61.53	35.25
	2023-12-15 08:00:00	6.37	6.37	0.00	0.00	8.28	53.41	38.42
	2023-12-15 09:00:00	6.27	6.27	0.00	0.00	8.15	54.55	38.03
	2023-12-15 10:00:00	4.35	4.34	0.00	0.00	5.64	58.69	35.93
	2023-12-15 11:00:00	6	5.89	0.00	0.00	7.68	61.68	31.17
	2023-12-15 12:00:00	6.02	5.95	0.00	0.00	7.75	68.31	32.72
	2023-12-15 13:00:00	5.97	5.89	0.00	0.00	7.67	71.82	31.48
Hourly Limit Values	TA Luft	-	-	200	200	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		8.76	8.63	0.00	0.00	11.25	78.39	30.16
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-

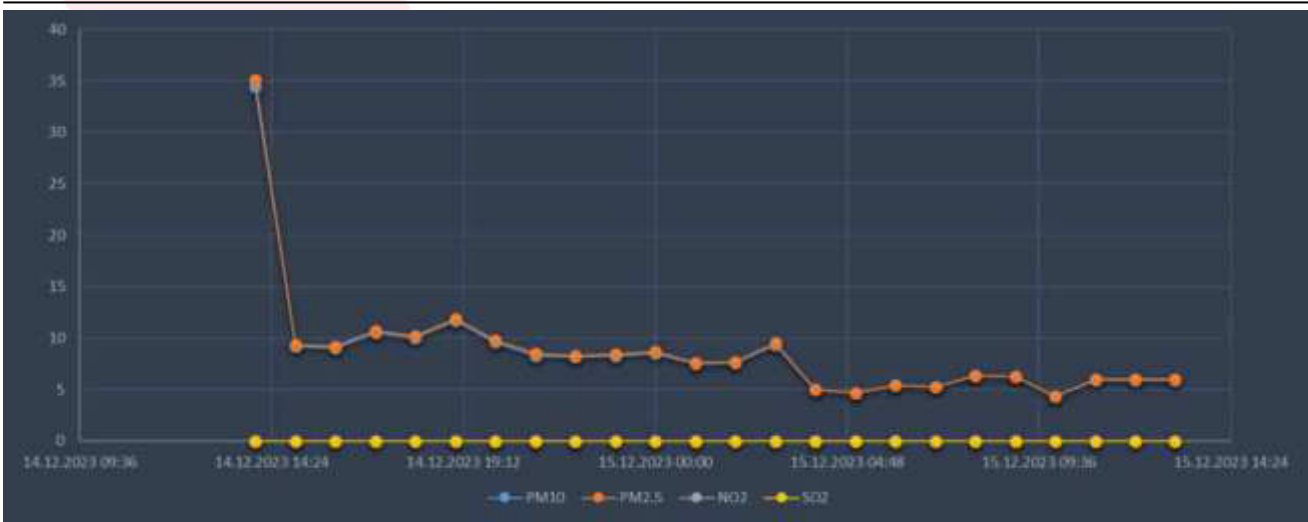


Figure 6 Measurement Graphs for Location ASR3

Device Code: 222								
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	2023-12-11 14:00:00	2.39	2.36	0.00	0.00	3.34	81.24	29.40
	2023-12-11 15:00:00	3.77	3.74	0.00	0.00	5.27	88.04	28.05
	2023-12-11 16:00:00	3.73	3.68	0.00	0.00	5.21	89.66	27.78
	2023-12-11 17:00:00	3.93	3.90	0.00	0.00	5.49	87.26	27.84
	2023-12-11 18:00:00	4.65	4.63	0.00	0.00	6.51	89.04	27.49
	2023-12-11 19:00:00	4.54	4.50	0.00	0.00	6.35	90.91	27.28
	2023-12-11 20:00:00	4.50	4.45	0.00	0.00	6.29	92.02	27.45
	2023-12-11 21:00:00	4.01	3.98	0.00	0.00	5.61	89.74	27.46
	2023-12-11 22:00:00	3.28	3.26	0.00	0.00	4.59	91.18	27.30
	2023-12-11 23:00:00	3.35	3.33	0.00	0.00	4.69	90.98	27.24
	2023-12-12 00:00:00	3.65	3.62	0.00	0.00	5.10	91.35	27.15
	2023-12-12 01:00:00	3.50	3.46	0.00	0.00	4.89	91.11	27.26
	2023-12-12 02:00:00	3.29	3.26	0.00	0.00	4.60	92.15	27.35
	2023-12-12 03:00:00	2.77	2.75	0.00	0.00	3.87	93.69	27.62
	2023-12-12 04:00:00	4.14	4.07	0.00	0.00	5.78	87.58	29.12
	2023-12-12 05:00:00	2.52	2.51	0.00	0.00	3.53	76.74	31.72
	2023-12-12 06:00:00	2.09	2.09	0.00	0.00	2.93	69.00	33.77
	2023-12-12 07:00:00	2.00	1.99	0.00	0.00	2.80	65.39	34.93
	2023-12-12 08:00:00	2.05	2.04	0.00	0.00	2.87	65.55	34.94
	2023-12-12 09:00:00	1.84	1.84	0.10	0.10	2.58	59.95	36.75
	2023-12-12 10:00:00	1.75	1.73	0.00	0.00	2.45	65.78	34.62
	2023-12-12 11:00:00	1.05	1.04	0.00	0.00	1.47	66.17	34.73
	2023-12-12 12:00:00	1.42	1.41	0.00	0.00	1.99	75.55	31.12
2023-12-12 13:00:00	1.79	1.77	0.00	0.00	2.50	89.22	26.72	
Hourly Limit Values	TA Luft	-	-	200	350	-	-	-
	EU	-	-	200	350	-	-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-	-	-	-
Average		3.00	2.98	0.00	0.00	4.20	82.47	29.80
Daily Limit Values	TA Luft	50	-	-	125	-	-	-
	EU	50	-	-	125	-	-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40	-	-	-



Figure 7 Measurement Graphs for Location ASR5

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	2023-12-11 14:00:00	3.35	3.21	16.60	0.00	5.28	72.56	31.19
	2023-12-11 15:00:00	3.87	3.87	18.79	0.00	6.17	76.00	30.41
	2023-12-11 16:00:00	4.31	4.31	19.31	0.00	6.88	80.19	29.31
	2023-12-11 17:00:00	6.53	6.53	21.36	0.00	10.41	83.85	28.52
	2023-12-11 18:00:00	8.52	8.52	17.79	0.00	13.59	86.34	28.33
	2023-12-11 19:00:00	7.94	7.93	15.94	0.00	12.66	86.06	28.32
	2023-12-11 20:00:00	8.63	8.63	12.60	0.00	13.76	83.59	28.55
	2023-12-11 21:00:00	9.5	9.50	11.19	0.00	15.15	84.87	28.25
	2023-12-11 22:00:00	7.07	7.07	6.85	0.00	11.28	85.31	28.25
	2023-12-11 23:00:00	7.34	7.34	7.26	0.00	11.71	86.00	28.21
	2023-12-12 00:00:00	6.84	6.84	9.13	0.00	10.91	85.29	28.18
	2023-12-12 01:00:00	7.2	7.19	12.92	0.00	11.48	85.97	28.21
	2023-12-12 02:00:00	6.96	6.96	7.48	0.00	11.10	84.52	28.40
	2023-12-12 03:00:00	5.89	5.89	18.00	0.00	9.39	92.42	27.63
	2023-12-12 04:00:00	6.32	6.32	17.52	0.00	10.08	91.75	27.72
	2023-12-12 05:00:00	6.03	6.03	8.26	0.00	9.62	85.99	29.18
	2023-12-12 06:00:00	6.46	6.45	1.41	0.00	10.30	79.60	30.71
	2023-12-12 07:00:00	5.25	5.25	0.12	0.00	8.38	75.07	31.90
	2023-12-12 08:00:00	4.5	4.50	0.07	0.00	7.18	65.91	34.79
	2023-12-12 09:00:00	3.57	3.57	0.56	0.10	5.70	56.34	37.28
	2023-12-12 10:00:00	3.61	3.61	14.15	0.00	5.76	68.55	32.71
	2023-12-12 11:00:00	2.81	2.81	15.57	0.00	4.49	73.44	31.34
	2023-12-12 12:00:00	7.07	7.07	6.85	0.00	11.28	85.31	28.25
	2023-12-12 13:00:00	7.34	7.34	7.26	0.00	11.71	86.00	28.21
Hourly Limit Values	TA Luft	-	-	200	350		-	-
	EU	-	-	200	350		-	-
	WHO Ambient Air Quality Guideline Value	-	-	-	-		-	-
Average		6.12	6.11	11.12	0.00	9.76	80.87	29.74
Daily Limit Values	TA Luft	50	-	-	125		-	-
	EU	50	-	-	125		-	-
	WHO Ambient Air Quality Guideline Value	45	15	25	40		-	-

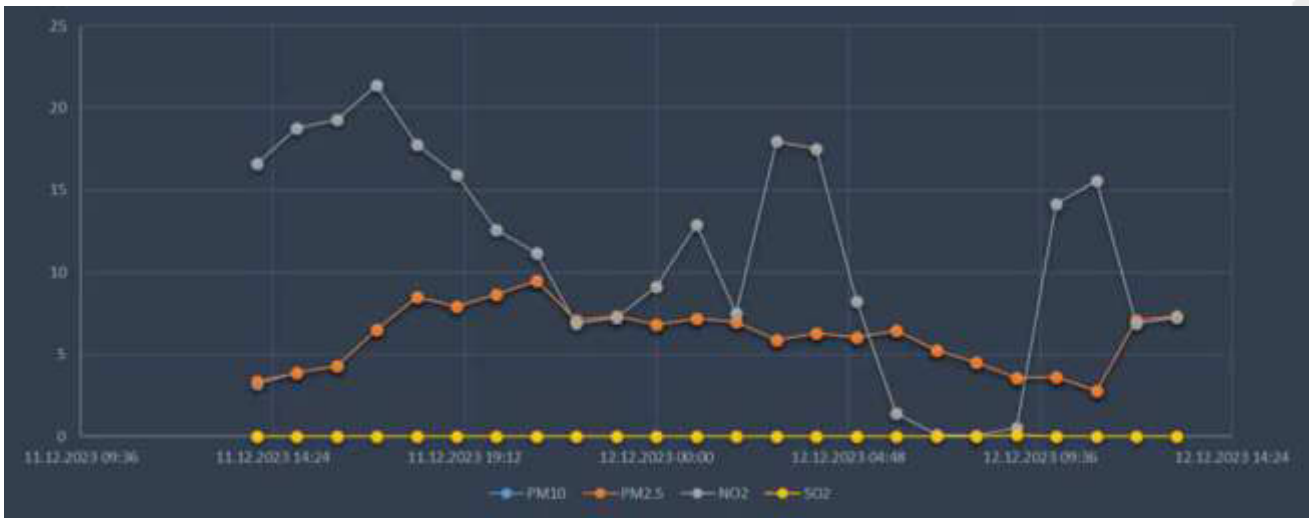


Figure 8 Measurement Graphs for Location AQ4

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

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

Noise Level Measurements (October 2023)

Prepared by: Mahmood Riyaz



30th October 2023

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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 16th October 2023 13: 00 to 17th October 2023 13:00 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

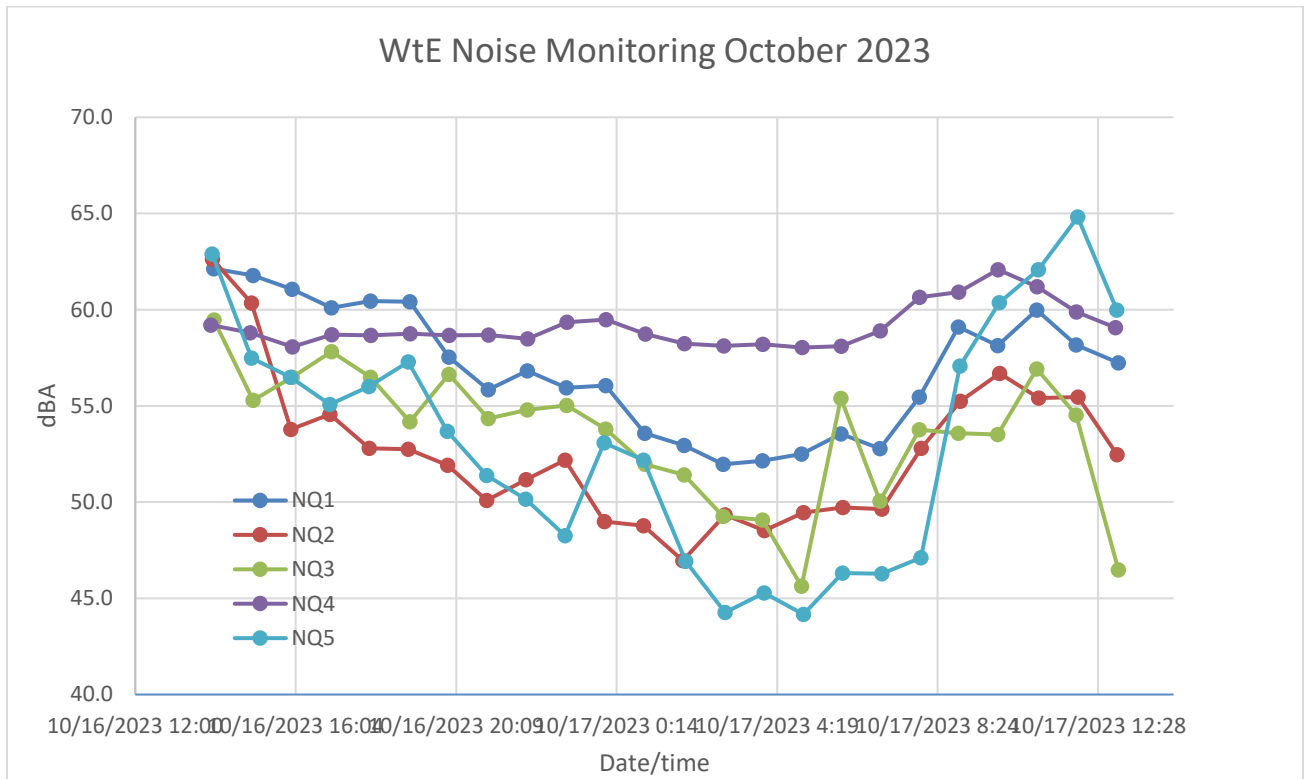


2.1 Results

Table 2: Noise measurement records in (dBA), 16-17 October 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
10/16/2023 13:55	59.2	10/16/2023 13:57	62.6	10/16/2023 13:59	59.5	10/16/2023 13:55	59.2	10/16/2023 13:57	62.9
10/16/2023 14:55	58.8	10/16/2023 14:57	60.3	10/16/2023 14:59	55.3	10/16/2023 14:55	58.8	10/16/2023 14:57	57.5
10/16/2023 15:59	58.1	10/16/2023 15:57	53.8	10/16/2023 15:59	56.5	10/16/2023 15:59	58.1	10/16/2023 15:56	56.5
10/16/2023 16:59	58.7	10/16/2023 16:57	54.6	10/16/2023 16:59	57.8	10/16/2023 16:59	58.7	10/16/2023 16:56	55.1
10/16/2023 17:59	58.7	10/16/2023 17:56	52.8	10/16/2023 17:58	56.5	10/16/2023 17:59	58.7	10/16/2023 17:56	56.0
10/16/2023 18:59	58.8	10/16/2023 18:56	52.8	10/16/2023 18:58	54.2	10/16/2023 18:59	58.8	10/16/2023 18:56	57.3
10/16/2023 19:59	58.7	10/16/2023 19:56	51.9	10/16/2023 19:58	56.6	10/16/2023 19:59	58.7	10/16/2023 19:56	53.7
10/16/2023 20:58	58.7	10/16/2023 20:56	50.1	10/16/2023 20:58	54.3	10/16/2023 20:58	58.7	10/16/2023 20:55	51.4
10/16/2023 21:58	58.5	10/16/2023 21:55	51.2	10/16/2023 21:58	54.8	10/16/2023 21:58	58.5	10/16/2023 21:55	50.2
10/16/2023 22:58	59.4	10/16/2023 22:55	52.2	10/16/2023 22:57	55.0	10/16/2023 22:58	59.4	10/16/2023 22:55	48.3
10/16/2023 23:58	59.5	10/16/2023 23:55	49.0	10/16/2023 23:57	53.8	10/16/2023 23:58	59.5	10/16/2023 23:55	53.1
10/17/2023 0:58	58.7	10/17/2023 0:55	48.8	10/17/2023 0:57	52.0	10/17/2023 0:58	58.7	10/17/2023 0:55	52.2
10/17/2023 1:57	58.2	10/17/2023 1:55	47.0	10/17/2023 1:57	51.4	10/17/2023 1:57	58.2	10/17/2023 1:59	46.9
10/17/2023 2:57	58.1	10/17/2023 2:59	49.3	10/17/2023 2:57	49.3	10/17/2023 2:57	58.1	10/17/2023 2:59	44.3
10/17/2023 3:57	58.2	10/17/2023 3:59	48.5	10/17/2023 3:56	49.1	10/17/2023 3:57	58.2	10/17/2023 3:59	45.3
10/17/2023 4:57	58.0	10/17/2023 4:59	49.5	10/17/2023 4:56	45.6	10/17/2023 4:57	58.0	10/17/2023 4:59	44.2
10/17/2023 5:56	58.1	10/17/2023 5:59	49.7	10/17/2023 5:56	55.4	10/17/2023 5:56	58.1	10/17/2023 5:58	46.3
10/17/2023 6:56	58.9	10/17/2023 6:59	49.6	10/17/2023 6:56	50.1	10/17/2023 6:56	58.9	10/17/2023 6:58	46.3
10/17/2023 7:56	60.7	10/17/2023 7:58	52.8	10/17/2023 7:55	53.8	10/17/2023 7:56	60.7	10/17/2023 7:58	47.1
10/17/2023 8:56	60.9	10/17/2023 8:58	55.2	10/17/2023 8:55	53.6	10/17/2023 8:56	60.9	10/17/2023 8:58	57.1
10/17/2023 9:56	62.1	10/17/2023 9:58	56.7	10/17/2023 9:55	53.5	10/17/2023 9:56	62.1	10/17/2023 9:58	60.4
10/17/2023 10:55	61.2	10/17/2023 10:58	55.4	10/17/2023 10:55	56.9	10/17/2023 10:55	61.2	10/17/2023 10:57	62.1
10/17/2023 11:55	59.9	10/17/2023 11:58	55.5	10/17/2023 11:55	54.5	10/17/2023 11:55	59.9	10/17/2023 11:57	64.8
10/17/2023 12:55	59.1	10/17/2023 12:57	52.5	10/17/2023 12:59	46.5	10/17/2023 12:55	59.1	10/17/2023 12:57	60.0
Average dB(A)	56.9		52.6		53.6		59.1		53.3
Daytime	58.9		54.7		54.7		59.5		56.9
Night time	54.1		49.5		52.1		58.5		48.2
WHO guideline for ambient noise level	70								

Figure 2. Graph showing the Ambient noise level recorded



There are no designated national standards for ambient noise level in outdoor industrial area in the Maldives. Compared to WHO and ADB specified noise level standards for outdoors industrial and commercial area the noise level in Thilafushi island and the subproject area is below the noise level standards. The results show that in all the stations ambient noise level are below threshold levels specified by the WHO standards.

Annex 1. Noise level Hourly recorded



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 : few showers Strong wind of 19-24mph with rough seas	Temperature:32.4°C
Start time	10/16/2023 13:59		Wind 13-23 SW/S
End time	10/17/2023 12:59		

Date/time	dBA	Remarks noise level
10/16/2023 13:59	62.1	Conversation
10/16/2023 14:59	61.8	Conversation
10/16/2023 15:59	61.1	Conversation
10/16/2023 16:59	60.1	Conversation
10/16/2023 17:58	60.5	Conversation
10/16/2023 18:58	60.4	Conversation
10/16/2023 19:58	57.5	Quiet Office
10/16/2023 20:58	55.8	Quiet Office
10/16/2023 21:58	56.8	Quiet Office
10/16/2023 22:57	56.0	Quiet Office
10/16/2023 23:57	56.1	Quiet Office
10/17/2023 0:57	53.6	Quiet Office
10/17/2023 1:57	52.9	Quiet Office
10/17/2023 2:57	52.0	Quiet Office
10/17/2023 3:56	52.2	Quiet Office
10/17/2023 4:56	52.5	Quiet Office
10/17/2023 5:56	53.6	Quiet Office
10/17/2023 6:56	52.8	Quiet Office
10/17/2023 7:55	55.5	Quiet Office
10/17/2023 8:55	59.1	Quiet Office
10/17/2023 9:55	58.1	Quiet Office
10/17/2023 10:55	60.0	Quiet Office
10/17/2023 11:55	58.2	Quiet Office
10/17/2023 12:59	57.2	Quiet Office

Average	56.9
Day time avr	58.9
Night time average	54.1



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 : few showers Strong wind of 19-24mph with rough seas	Temperature:32.4°C
Start time	10/16/2023 13:57		Wind 13-23 SW/S
End time	10/17/2023 12:57		

Date/time	dBA	Remarks noise level
10/16/2023 13:57	62.6	Conversation
10/16/2023 14:57	60.3	Conversation
10/16/2023 15:57	53.8	Quiet Office
10/16/2023 16:57	54.6	Quiet Office
10/16/2023 17:56	52.8	Quiet Office
10/16/2023 18:56	52.8	Quiet Office
10/16/2023 19:56	51.9	Quiet Office
10/16/2023 20:56	50.1	Quiet Office
10/16/2023 21:55	51.2	Quiet Office
10/16/2023 22:55	52.2	Quiet Office
10/16/2023 23:55	49.0	Quiet Library
10/17/2023 0:55	48.8	Quiet Library
10/17/2023 1:55	47.0	Quiet Library
10/17/2023 2:59	49.3	Quiet Library
10/17/2023 3:59	48.5	Quiet Library
10/17/2023 4:59	49.5	Quiet Library
10/17/2023 5:59	49.7	Quiet Library
10/17/2023 6:59	49.6	Quiet Library
10/17/2023 7:58	52.8	Quiet Office
10/17/2023 8:58	55.2	Quiet Office
10/17/2023 9:58	56.7	Quiet Office
10/17/2023 10:58	55.4	Quiet Office
10/17/2023 11:58	55.5	Quiet Office
10/17/2023 12:57	52.5	Quiet Office
Average	52.6	
Day time avr	54.7	
Night time average	49.5	



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 : few showers Strong wind of 19-24mph with rough seas	Temperature:32.4°C
Start time	10/16/2023 13:59		Wind 13-23 SW/S
End time	10/17/2023 12:59		
Date/time	dBA	Remarks Noise level	
10/16/2023 13:59	59.5	Quiet Office	
10/16/2023 14:59	55.3	Quiet Office	
10/16/2023 15:59	56.5	Quiet Office	
10/16/2023 16:59	57.8	Quiet Office	
10/16/2023 17:58	56.5	Quiet Office	
10/16/2023 18:58	54.2	Quiet Office	
10/16/2023 19:58	56.6	Quiet Office	
10/16/2023 20:58	54.3	Quiet Office	
10/16/2023 21:58	54.8	Quiet Office	
10/16/2023 22:57	55.0	Quiet Office	
10/16/2023 23:57	53.8	Quiet Office	
10/17/2023 0:57	52.0	Quiet Office	
10/17/2023 1:57	51.4	Quiet Office	
10/17/2023 2:57	49.3	Quiet Library	
10/17/2023 3:56	49.1	Quiet Library	
10/17/2023 4:56	45.6	Quiet Library	
10/17/2023 5:56	55.4	Quiet Office	
10/17/2023 6:56	50.1	Quiet Office	
10/17/2023 7:55	53.8	Quiet Office	
10/17/2023 8:55	53.6	Quiet Office	
10/17/2023 9:55	53.5	Quiet Office	
10/17/2023 10:55	56.9	Quiet Office	
10/17/2023 11:55	54.5	Quiet Office	
10/17/2023 12:59	46.5	Quiet Library	
Average	53.6		
Day time avr	54.7		
Night time average	52.1		

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 : few showers Strong wind of 19-24mph with rough seas	Temperature:32.4°C
Start time	10/16/2023 13:55		Wind 13-23 SW/S
End time	10/17/2023 12:55		

Date/time	dBA	Remarks Noise level
10/16/2023 13:55	59.2	Quiet Office
10/16/2023 14:55	58.8	Quiet Office
10/16/2023 15:59	58.1	Quiet Office
10/16/2023 16:59	58.7	Quiet Office
10/16/2023 17:59	58.7	Quiet Office
10/16/2023 18:59	58.8	Quiet Office
10/16/2023 19:59	58.7	Quiet Office
10/16/2023 20:58	58.7	Quiet Office
10/16/2023 21:58	58.5	Quiet Office
10/16/2023 22:58	59.4	Quiet Office
10/16/2023 23:58	59.5	Quiet Office
10/17/2023 0:58	58.7	Quiet Office
10/17/2023 1:57	58.2	Quiet Office
10/17/2023 2:57	58.1	Quiet Office
10/17/2023 3:57	58.2	Quiet Office
10/17/2023 4:57	58.0	Quiet Office
10/17/2023 5:56	58.1	Quiet Office
10/17/2023 6:56	58.9	Quiet Office
10/17/2023 7:56	60.7	Conversation
10/17/2023 8:56	60.9	Conversation
10/17/2023 9:56	62.1	Conversation
10/17/2023 10:55	61.2	Conversation
10/17/2023 11:55	59.9	Quiet Office
10/17/2023 12:55	59.1	Quiet Office
Average	59.1	
Day time avr	59.5	
Night time average	58.5	



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 : few showers Strong wind of 19-24mph with rough seas	Temperature:32.4°C
Start time	10/16/2023 13:57		Wind 13-23 SW/S
End time	10/17/2023 12:57		

Date/time	dBA	Remarks Noise level
10/16/2023 13:57	62.9	Conversation
10/16/2023 14:57	57.5	Quiet Office
10/16/2023 15:56	56.5	Quiet Office
10/16/2023 16:56	55.1	Quiet Office
10/16/2023 17:56	56.0	Quiet Office
10/16/2023 18:56	57.3	Quiet Office
10/16/2023 19:56	53.7	Quiet Office
10/16/2023 20:55	51.4	Quiet Office
10/16/2023 21:55	50.2	Quiet Office
10/16/2023 22:55	48.3	Quiet Library
10/16/2023 23:55	53.1	Quiet Office
10/17/2023 0:55	52.2	Quiet Office
10/17/2023 1:59	46.9	Quiet Library
10/17/2023 2:59	44.3	Quiet Library
10/17/2023 3:59	45.3	Quiet Library
10/17/2023 4:59	44.2	Quiet Library
10/17/2023 5:58	46.3	Quiet Library
10/17/2023 6:58	46.3	Quiet Library
10/17/2023 7:58	47.1	Quiet Library
10/17/2023 8:58	57.1	Quiet Office
10/17/2023 9:58	60.4	Conversation
10/17/2023 10:57	62.1	Conversation
10/17/2023 11:57	64.8	Conversation
10/17/2023 12:57	60.0	Quiet Office
Average	53.3	
Day time avr	56.9	
Night time average	48.2	

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

Noise Level Measurements (November 2023)

Prepared by: Mahmood Riyaz



30th November 2023

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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 18th November 2023 13: 00 to 19th November 2023 13:00 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

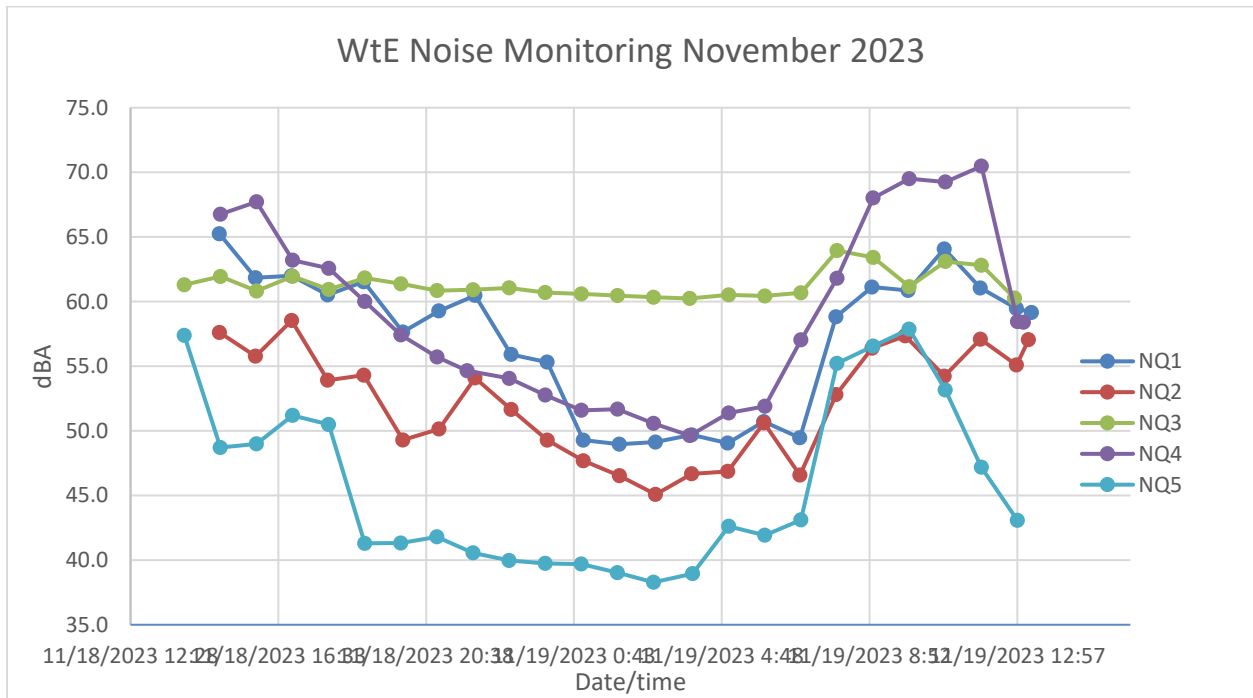


2.1 Results

Table 2: Noise measurement records in (dBA), 18-19 November 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)
11/18/2023 14:55	65.2	11/18/2023 14:56	57.6	11/18/2023 13:58	61.3	11/18/2023 14:57	66.8	11/18/2023 13:57	57.4
11/18/2023 15:55	61.8	11/18/2023 15:55	55.8	11/18/2023 14:57	61.9	11/18/2023 15:57	67.7	11/18/2023 14:57	48.7
11/18/2023 16:55	62.0	11/18/2023 16:55	58.5	11/18/2023 15:57	60.8	11/18/2023 16:57	63.2	11/18/2023 15:57	49.0
11/18/2023 17:55	60.5	11/18/2023 17:55	53.9	11/18/2023 16:57	62.0	11/18/2023 17:57	62.6	11/18/2023 16:57	51.2
11/18/2023 18:55	61.5	11/18/2023 18:55	54.3	11/18/2023 17:57	60.9	11/18/2023 18:56	60.0	11/18/2023 17:56	50.5
11/18/2023 19:59	57.7	11/18/2023 19:59	49.3	11/18/2023 18:56	61.8	11/18/2023 19:56	57.4	11/18/2023 18:56	41.3
11/18/2023 20:59	59.3	11/18/2023 20:59	50.1	11/18/2023 19:56	61.4	11/18/2023 20:56	55.7	11/18/2023 19:56	41.3
11/18/2023 21:59	60.5	11/18/2023 21:59	54.1	11/18/2023 20:56	60.9	11/18/2023 21:46	54.7	11/18/2023 20:56	41.8
11/18/2023 22:59	55.9	11/18/2023 22:59	51.7	11/18/2023 21:56	60.9	11/18/2023 22:56	54.1	11/18/2023 21:56	40.6
11/18/2023 23:59	55.3	11/18/2023 23:59	49.3	11/18/2023 22:56	61.1	11/18/2023 23:55	52.8	11/18/2023 22:55	40.0
11/19/2023 0:58	49.3	11/19/2023 0:58	47.7	11/18/2023 23:55	60.7	11/19/2023 0:55	51.6	11/18/2023 23:55	39.7
11/19/2023 1:58	49.0	11/19/2023 1:58	46.5	11/19/2023 0:55	60.6	11/19/2023 1:55	51.7	11/19/2023 0:55	39.7
11/19/2023 2:58	49.1	11/19/2023 2:58	45.1	11/19/2023 1:55	60.5	11/19/2023 2:55	50.6	11/19/2023 1:55	39.0
11/19/2023 3:58	49.7	11/19/2023 3:58	46.7	11/19/2023 2:55	60.3	11/19/2023 3:55	49.6	11/19/2023 2:55	38.3
11/19/2023 4:57	49.1	11/19/2023 4:58	46.9	11/19/2023 3:55	60.2	11/19/2023 4:59	51.4	11/19/2023 3:59	39.0
11/19/2023 5:57	50.7	11/19/2023 5:57	50.6	11/19/2023 4:59	60.5	11/19/2023 5:59	51.9	11/19/2023 4:59	42.6
11/19/2023 6:57	49.5	11/19/2023 6:57	46.6	11/19/2023 5:59	60.4	11/19/2023 6:59	57.0	11/19/2023 5:59	41.9
11/19/2023 7:57	58.8	11/19/2023 7:57	52.8	11/19/2023 6:59	60.7	11/19/2023 7:59	61.8	11/19/2023 6:59	43.1
11/19/2023 8:57	61.1	11/19/2023 8:57	56.4	11/19/2023 7:59	63.9	11/19/2023 8:58	68.0	11/19/2023 7:58	55.2
11/19/2023 9:56	60.9	11/19/2023 9:51	57.3	11/19/2023 8:58	63.4	11/19/2023 9:58	69.5	11/19/2023 8:58	56.6
11/19/2023 10:56	64.1	11/19/2023 10:56	54.2	11/19/2023 9:58	61.2	11/19/2023 10:58	69.3	11/19/2023 9:58	57.9
11/19/2023 11:56	61.1	11/19/2023 11:56	57.1	11/19/2023 10:58	63.1	11/19/2023 11:58	70.5	11/19/2023 10:58	53.2
11/19/2023 12:56	59.5	11/19/2023 12:56	55.1	11/19/2023 11:58	62.8	11/19/2023 12:58	58.5	11/19/2023 11:58	47.2
11/19/2023 13:21	59.2	11/19/2023 13:16	57.1	11/19/2023 12:53	60.3	11/19/2023 13:08	58.4	11/19/2023 12:57	43.1
Average dB(A)	57.1		52.3		61.3		58.9		45.8
Daytime	60.9		55.0		61.8		63.5		49.7
Night time	51.8		48.5		60.6		52.5		40.3
WHO guideline for ambient noise level	70								

Figure 2. Graph showing the Ambient noise level recorded



There are no designated national standards for ambient noise level in outdoor industrial area in the Maldives. Compared to WHO and ADB specified noise level standards for outdoors industrial and commercial area the noise level in Thilafushi island and the subproject area is below the noise level standards. The results show that in all the stations ambient noise level are below threshold levels specified by the WHO standards.

Annex 1. Noise level Hourly recorded

			
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 showerwith few heavyby showerin central atolls	Temperature:31.8°C
Start time	11/18/2023 13:58		Wind 03-10 SE/S
End time	11/19/2023 12:53		
Date/time	dBA	Remarks	noise level
11/18/2023 14:55	65.2	Conversation	
11/18/2023 15:55	61.8	Conversation	
11/18/2023 16:55	62.0	Conversation	
11/18/2023 17:55	60.5	Conversation	
11/18/2023 18:55	61.5	Conversation	
11/18/2023 19:59	57.7	Quiet Office	
11/18/2023 20:59	59.3	Quiet Office	
11/18/2023 21:59	60.5	Conversation	
11/18/2023 22:59	55.9	Quiet Office	
11/18/2023 23:59	55.3	Quiet Office	
11/19/2023 0:58	49.3	Quiet Library	
11/19/2023 1:58	49.0	Quiet Library	
11/19/2023 2:58	49.1	Quiet Library	
11/19/2023 3:58	49.7	Quiet Library	
11/19/2023 4:57	49.1	Quiet Library	
11/19/2023 5:57	50.7	Quiet Office	
11/19/2023 6:57	49.5	Quiet Library	
11/19/2023 7:57	58.8	Quiet Office	
11/19/2023 8:57	61.1	Conversation	
11/19/2023 9:56	60.9	Conversation	
11/19/2023 10:56	64.1	Conversation	
11/19/2023 11:56	61.1	Conversation	
11/19/2023 12:56	59.5	Quiet Office	
11/19/2023 13:21	59.2	Quiet Office	
Average	57.1		
Day time avr	60.9		
Night time average	51.8		



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	Temperature:31,8°C
Start time	11/18/2023 14:56	showerwith few heavyby	Wind 3-10 SE/S
End time	11/19/2023 13:16	showerin central atolls	

Date/time	dBA	Remarks noise level
11/18/2023 14:56	57.6	Quiet Office
11/18/2023 15:55	55.8	Quiet Office
11/18/2023 16:55	58.5	Quiet Office
11/18/2023 17:55	53.9	Quiet Office
11/18/2023 18:55	54.3	Quiet Office
11/18/2023 19:59	49.3	Quiet Library
11/18/2023 20:59	50.1	Quiet Office
11/18/2023 21:59	54.1	Quiet Office
11/18/2023 22:59	51.7	Quiet Office
11/18/2023 23:59	49.3	Quiet Library
11/19/2023 0:58	47.7	Quiet Library
11/19/2023 1:58	46.5	Quiet Library
11/19/2023 2:58	45.1	Quiet Library
11/19/2023 3:58	46.7	Quiet Library
11/19/2023 4:58	46.9	Quiet Library
11/19/2023 5:57	50.6	Quiet Office
11/19/2023 6:57	46.6	Quiet Library
11/19/2023 7:57	52.8	Quiet Office
11/19/2023 8:57	56.4	Quiet Office
11/19/2023 9:51	57.3	Quiet Office
11/19/2023 10:56	54.2	Quiet Office
11/19/2023 11:56	57.1	Quiet Office
11/19/2023 12:56	55.1	Quiet Office
11/19/2023 13:16	57.1	Quiet Office
Average	52.3	
Day time avr	55.0	
Night time average	48.5	

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 showerwith few heavby showerin central atolls	Temperature:31.8°C
Start time	11/18/2023 13:58		Wind 3-10 SE/S
End time	11/19/2023 12:53		

Date/time	dB(A)	Remarks	Noise level
11/18/2023 13:58	61.3	Conversation	
11/18/2023 14:57	61.9	Conversation	
11/18/2023 15:57	60.8	Conversation	
11/18/2023 16:57	62.0	Conversation	
11/18/2023 17:57	60.9	Conversation	
11/18/2023 18:56	61.8	Conversation	
11/18/2023 19:56	61.4	Conversation	
11/18/2023 20:56	60.9	Conversation	
11/18/2023 21:56	60.9	Conversation	
11/18/2023 22:56	61.1	Conversation	
11/18/2023 23:55	60.7	Conversation	
11/19/2023 0:55	60.6	Conversation	
11/19/2023 1:55	60.5	Conversation	
11/19/2023 2:55	60.3	Conversation	
11/19/2023 3:55	60.2	Conversation	
11/19/2023 4:59	60.5	Conversation	
11/19/2023 5:59	60.4	Conversation	
11/19/2023 6:59	60.7	Conversation	
11/19/2023 7:59	63.9	Conversation	
11/19/2023 8:58	63.4	Conversation	
11/19/2023 9:58	61.2	Conversation	
11/19/2023 10:58	63.1	Conversation	
11/19/2023 11:58	62.8	Conversation	
11/19/2023 12:53	60.3	Conversation	
Average	61.3		
Day time avr	61.8		
Night time average	60.6		

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 showerwith few heavby showerin central atolls	Temperature:31.8°C
Start time	11/18/2023 14:57		Wind 3-10 SE/S
End time	11/19/2023 13:08		

Date/time	dba	Remarks Noise level
11/18/2023 14:57	66.8	Conversation
11/18/2023 15:57	67.7	Conversation
11/18/2023 16:57	63.2	Conversation
11/18/2023 17:57	62.6	Conversation
11/18/2023 18:56	60.0	Conversation
11/18/2023 19:56	57.4	Quiet Office
11/18/2023 20:56	55.7	Quiet Office
11/18/2023 21:46	54.7	Quiet Office
11/18/2023 22:56	54.1	Quiet Office
11/18/2023 23:55	52.8	Quiet Office
11/19/2023 0:55	51.6	Quiet Office
11/19/2023 1:55	51.7	Quiet Office
11/19/2023 2:55	50.6	Quiet Office
11/19/2023 3:55	49.6	Quiet Library
11/19/2023 4:59	51.4	Quiet Office
11/19/2023 5:59	51.9	Quiet Office
11/19/2023 6:59	57.0	Quiet Office
11/19/2023 7:59	61.8	Conversation
11/19/2023 8:58	68.0	Conversation
11/19/2023 9:58	69.5	Conversation
11/19/2023 10:58	69.3	Conversation
11/19/2023 11:58	70.5	Restaurent
11/19/2023 12:58	58.5	Quiet Office
11/19/2023 13:08	58.4	Quiet Office
Average	58.9	
Day time avr	63.5	
Night time average	52.5	

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 showerwith few heavby showerin central atolls	Temperature:31.8°C
Start time	11/18/2023 13:57		Wind 3-10 SE/S
End time	11/19/2023 12:57		
Date/time	dBa	Remarks	Noise level
11/18/2023 13:57	57.4	Quiet Office	
11/18/2023 14:57	48.7	Quiet Library	
11/18/2023 15:57	49.0	Quiet Library	
11/18/2023 16:57	51.2	Quiet Office	
11/18/2023 17:56	50.5	Quiet Office	
11/18/2023 18:56	41.3	Quiet Library	
11/18/2023 19:56	41.3	Quiet Library	
11/18/2023 20:56	41.8	Quiet Library	
11/18/2023 21:56	40.6	Quiet Library	
11/18/2023 22:55	40.0	Whisper	
11/18/2023 23:55	39.7	Whisper	
11/19/2023 0:55	39.7	Whisper	
11/19/2023 1:55	39.0	Whisper	
11/19/2023 2:55	38.3	Whisper	
11/19/2023 3:59	39.0	Whisper	
11/19/2023 4:59	42.6	Quiet Library	
11/19/2023 5:59	41.9	Quiet Library	
11/19/2023 6:59	43.1	Quiet Library	
11/19/2023 7:58	55.2	Quiet Office	
11/19/2023 8:58	56.6	Quiet Office	
11/19/2023 9:58	57.9	Quiet Office	
11/19/2023 10:58	53.2	Quiet Office	
11/19/2023 11:58	47.2	Quiet Library	
11/19/2023 12:57	43.1	Quiet Library	
Average	45.8		
Day time avr	49.7		
Night time average	40.3		

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

Noise Level Measurements (December 2023)

Prepared by: Mahmood Riyaz



30th December 2023

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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

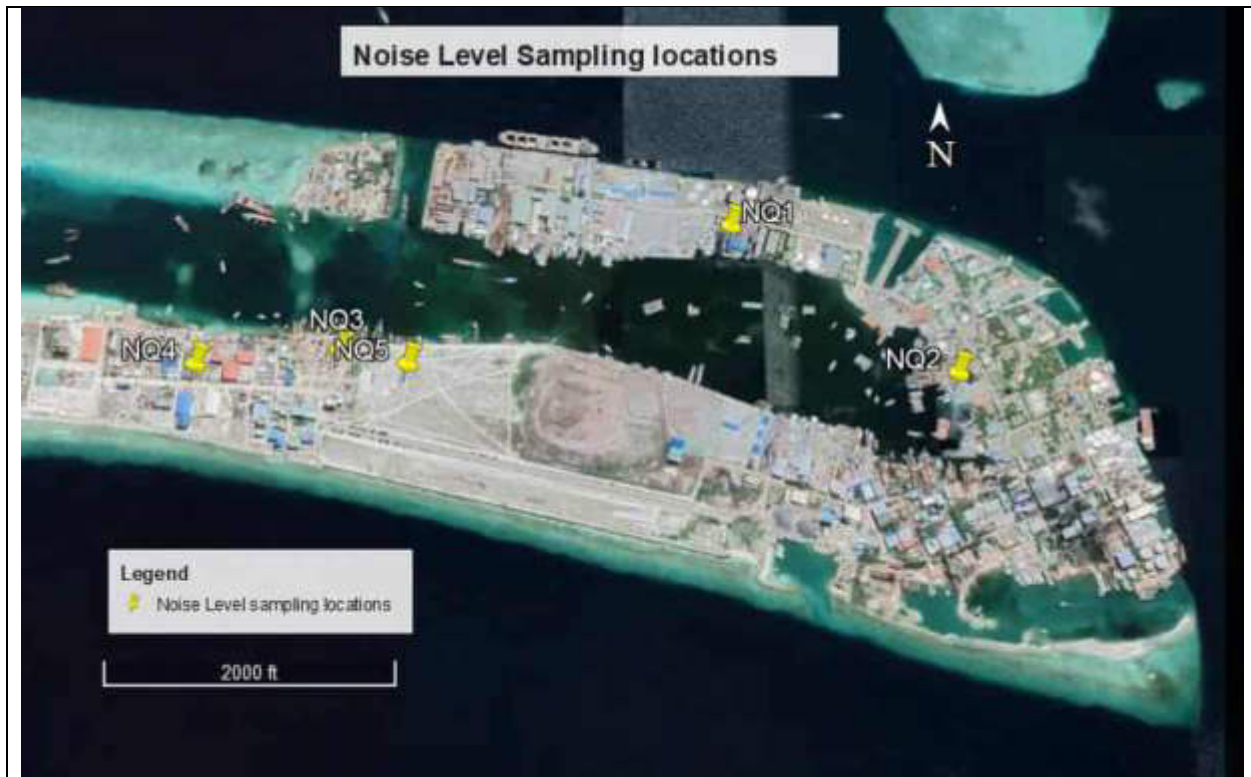
As part of the pre-construction monitoring of Thilafushi Waste to Energy facility, ambient noise levels measurements were repeated at the same five locations used in the EIA report. Ambient noise level measurement was done using a handheld sound level meter (ET-958 Professional Sound Level Meter) Measurements are recorded in NQ1, and NQ2 NQ3, NQ4 and NQ5 from 16th December 2023 13: 00 to 17th December 2023 13:00 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

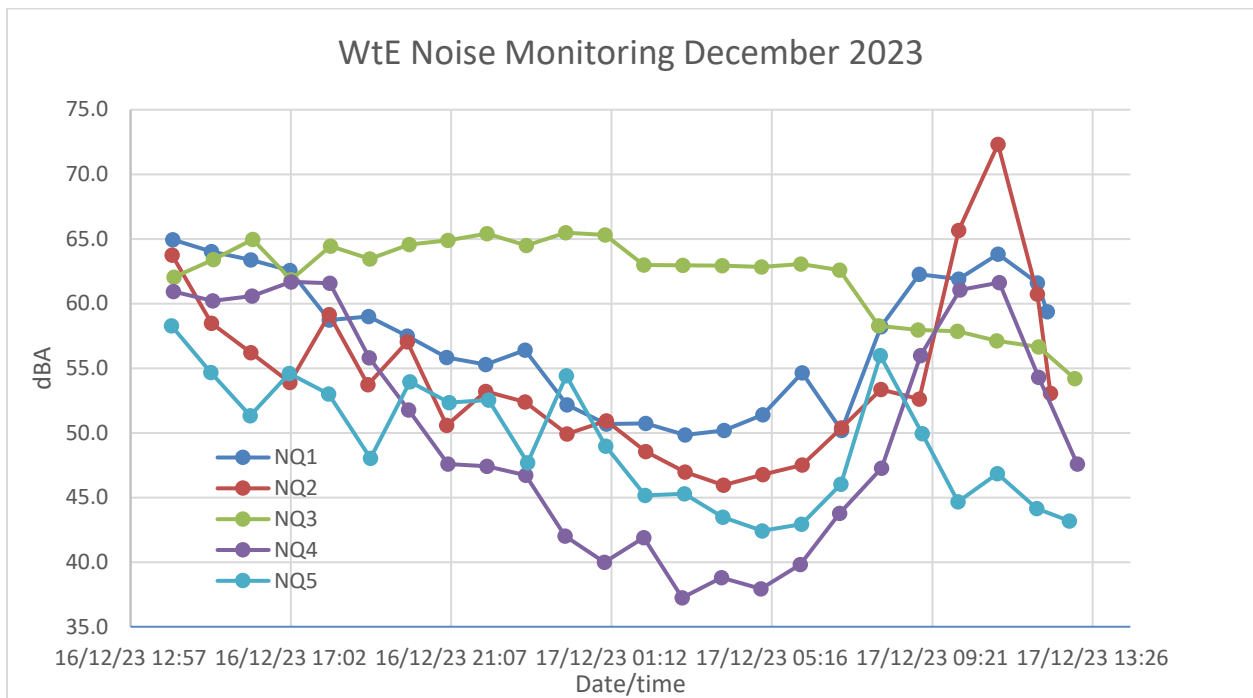


2.1 Results

Table 2: Noise measurement records in (dBA), 16-17 December 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)
16/12/23 14:02	65.0	16/12/23 14:01	63.8	16/12/23 14:04	62.0	16/12/23 14:03	60.9	16/12/23 14:00	58.3
16/12/23 15:01	64.0	16/12/23 15:01	58.5	16/12/23 15:04	63.4	16/12/23 15:03	60.2	16/12/23 15:00	54.7
16/12/23 16:01	63.4	16/12/23 16:01	56.2	16/12/23 16:04	65.0	16/12/23 16:03	60.6	16/12/23 16:00	51.3
16/12/23 17:01	62.6	16/12/23 17:01	53.9	16/12/23 17:03	61.9	16/12/23 17:03	61.7	16/12/23 17:00	54.6
16/12/23 18:01	58.7	16/12/23 18:01	59.2	16/12/23 18:03	64.5	16/12/23 18:02	61.6	16/12/23 18:00	53.0
16/12/23 19:01	59.0	16/12/23 19:00	53.7	16/12/23 19:03	63.5	16/12/23 19:02	55.8	16/12/23 19:04	48.0
16/12/23 20:00	57.5	16/12/23 20:00	57.1	16/12/23 20:03	64.6	16/12/23 20:02	51.8	16/12/23 20:04	54.0
16/12/23 21:00	55.8	16/12/23 21:00	50.6	16/12/23 21:02	64.9	16/12/23 21:02	47.6	16/12/23 21:04	52.3
16/12/23 22:00	55.3	16/12/23 22:00	53.2	16/12/23 22:02	65.4	16/12/23 22:02	47.4	16/12/23 22:04	52.5
16/12/23 23:00	56.4	16/12/23 23:00	52.4	16/12/23 23:02	64.5	16/12/23 23:01	46.7	16/12/23 23:04	47.7
17/12/23 00:04	52.2	17/12/23 00:04	49.9	17/12/23 00:02	65.5	17/12/23 00:01	42.0	17/12/23 00:03	54.4
17/12/23 01:04	50.7	17/12/23 01:04	50.9	17/12/23 01:02	65.3	17/12/23 01:01	40.0	17/12/23 01:03	49.0
17/12/23 02:04	50.7	17/12/23 02:04	48.6	17/12/23 02:01	63.0	17/12/23 02:01	41.9	17/12/23 02:03	45.2
17/12/23 03:04	49.8	17/12/23 03:04	47.0	17/12/23 03:01	63.0	17/12/23 03:00	37.2	17/12/23 03:03	45.3
17/12/23 04:04	50.2	17/12/23 04:03	46.0	17/12/23 04:01	62.9	17/12/23 04:00	38.8	17/12/23 04:02	43.5
17/12/23 05:03	51.4	17/12/23 05:03	46.8	17/12/23 05:01	62.8	17/12/23 05:00	37.9	17/12/23 05:02	42.4
17/12/23 06:03	54.6	17/12/23 06:03	47.5	17/12/23 06:01	63.1	17/12/23 06:00	39.8	17/12/23 06:02	42.9
17/12/23 07:03	50.2	17/12/23 07:03	50.4	17/12/23 07:00	62.6	17/12/23 07:00	43.8	17/12/23 07:02	46.0
17/12/23 08:03	58.2	17/12/23 08:03	53.4	17/12/23 08:00	58.3	17/12/23 08:04	47.3	17/12/23 08:02	56.0
17/12/23 09:02	62.3	17/12/23 09:02	52.6	17/12/23 09:00	58.0	17/12/23 09:04	56.0	17/12/23 09:06	49.9
17/12/23 10:02	61.9	17/12/23 10:02	65.7	17/12/23 10:00	57.9	17/12/23 10:04	61.1	17/12/23 10:01	44.7
17/12/23 11:02	63.8	17/12/23 11:02	72.3	17/12/23 11:00	57.1	17/12/23 11:04	61.6	17/12/23 11:01	46.9
17/12/23 12:02	61.6	17/12/23 12:02	60.7	17/12/23 12:04	56.7	17/12/23 12:04	54.3	17/12/23 12:01	44.1
17/12/23 12:17	59.4	17/12/23 12:22	53.1	17/12/23 12:59	54.2	17/12/23 13:03	47.6	17/12/23 12:51	43.2
Average dB(A)	57.3		54.3		62.1		50.1		49.2
Daytime	60.5		57.9		60.7		56.0		50.3
Night time	52.7		49.3		64.0		41.9		47.5
WHO guideline for ambient noise level	70								

Figure 2. Graph showing the Ambient noise level recorded



There are no designated national standards for ambient noise level in outdoor industrial area in the Maldives. Compared to WHO and ADB specified noise level standards for outdoors industrial and commercial area the noise level in Thilafushi island and the subproject area is below the noise level standards. The results show that in all the stations ambient noise level are below threshold levels specified by the WHO standards. However, noise level in station 2 exceeded the threshold level up to 72dB at around 11:20 Am on 17th December 2023.

Annex 1. Noise level Hourly recorded

			
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 :Scattered showers few thunderstorms in central atolls	Temperature:30.6°C
Start time	16/12/23 14:02		Wind 5-15 mph NE/E
End time	17/12/23 12:17		
Date/time	dBA	Remarks	noise level
16/12/23 14:02	65.0	Conversation	
16/12/23 15:01	64.0	Conversation	
16/12/23 16:01	63.4	Conversation	
16/12/23 17:01	62.6	Conversation	
16/12/23 18:01	58.7	Quiet Office	
16/12/23 19:01	59.0	Quiet Office	
16/12/23 20:00	57.5	Quiet Office	
16/12/23 21:00	55.8	Quiet Office	
16/12/23 22:00	55.3	Quiet Office	
16/12/23 23:00	56.4	Quiet Office	
17/12/23 00:04	52.2	Quiet Office	
17/12/23 01:04	50.7	Quiet Office	
17/12/23 02:04	50.7	Quiet Office	
17/12/23 03:04	49.8	Quiet Library	
17/12/23 04:04	50.2	Quiet Office	
17/12/23 05:03	51.4	Quiet Office	
17/12/23 06:03	54.6	Quiet Office	
17/12/23 07:03	50.2	Quiet Office	
17/12/23 08:03	58.2	Quiet Office	
17/12/23 09:02	62.3	Conversation	
17/12/23 10:02	61.9	Conversation	
17/12/23 11:02	63.8	Conversation	
17/12/23 12:02	61.6	Conversation	
17/12/23 12:17	59.4	Quiet Office	
Average	57.3		
Day time avr	60.5		
Night time average	52.7		

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 :Scattered showers few thunderstorms in central atolls	Temperature:30.6°C
Start time	16/12/23 14:01		Wind 5-15 mph NE/E
End time	17/12/23 12:22		

Date/time	dBA	Remarks noise level
16/12/23 14:01	63.8	Conversation
16/12/23 15:01	58.5	Quiet Office
16/12/23 16:01	56.2	Quiet Office
16/12/23 17:01	53.9	Quiet Office
16/12/23 18:01	59.2	Quiet Office
16/12/23 19:00	53.7	Quiet Office
16/12/23 20:00	57.1	Quiet Office
16/12/23 21:00	50.6	Quiet Office
16/12/23 22:00	53.2	Quiet Office
16/12/23 23:00	52.4	Quiet Office
17/12/23 00:04	49.9	Quiet Library
17/12/23 01:04	50.9	Quiet Office
17/12/23 02:04	48.6	Quiet Library
17/12/23 03:04	47.0	Quiet Library
17/12/23 04:03	46.0	Quiet Library
17/12/23 05:03	46.8	Quiet Library
17/12/23 06:03	47.5	Quiet Library
17/12/23 07:03	50.4	Quiet Office
17/12/23 08:03	53.4	Quiet Office
17/12/23 09:02	52.6	Quiet Office
17/12/23 10:02	65.7	Conversation
17/12/23 11:02	72.3	Restaurent
17/12/23 12:02	60.7	Conversation
17/12/23 12:22	53.1	Quiet Office
Average	54.3	
Day time avr	57.9	
Night time average	49.3	

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 :Scattered showers few thunderstorms in central atolls	Temperature:30.6°C
Start time	16/12/23 14:04		Wind 5-15 mph NE/E
End time	17/12/23 12:59		

Date/time	dB(A)	Remarks	Noise level
16/12/23 14:04	62.0	Conversation	
16/12/23 15:04	63.4	Conversation	
16/12/23 16:04	65.0	Conversation	
16/12/23 17:03	61.9	Conversation	
16/12/23 18:03	64.5	Conversation	
16/12/23 19:03	63.5	Conversation	
16/12/23 20:03	64.6	Conversation	
16/12/23 21:02	64.9	Conversation	
16/12/23 22:02	65.4	Conversation	
16/12/23 23:02	64.5	Conversation	
17/12/23 00:02	65.5	Conversation	
17/12/23 01:02	65.3	Conversation	
17/12/23 02:01	63.0	Conversation	
17/12/23 03:01	63.0	Conversation	
17/12/23 04:01	62.9	Conversation	
17/12/23 05:01	62.8	Conversation	
17/12/23 06:01	63.1	Conversation	
17/12/23 07:00	62.6	Conversation	
17/12/23 08:00	58.3	Quiet Office	
17/12/23 09:00	58.0	Quiet Office	
17/12/23 10:00	57.9	Quiet Office	
17/12/23 11:00	57.1	Quiet Office	
17/12/23 12:04	56.7	Quiet Office	
17/12/23 12:59	54.2	Quiet Office	
Average	62.1		
Day time avr	60.7		
Night time average	64.0		

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 :Scattered showers few thunderstorms in central atolls	Temperature:30.6°C
Start time	16/12/23 14:03		Wind 5-15 mph NE/E
End time	17/12/23 13:03		

Date/time	dBA	Remarks	Noise level
16/12/23 14:03	60.9	Conversation	
16/12/23 15:03	60.2	Conversation	
16/12/23 16:03	60.6	Conversation	
16/12/23 17:03	61.7	Conversation	
16/12/23 18:02	61.6	Conversation	
16/12/23 19:02	55.8	Quiet Office	
16/12/23 20:02	51.8	Quiet Office	
16/12/23 21:02	47.6	Quiet Library	
16/12/23 22:02	47.4	Quiet Library	
16/12/23 23:01	46.7	Quiet Library	
17/12/23 00:01	42.0	Quiet Library	
17/12/23 01:01	40.0	Whisper	
17/12/23 02:01	41.9	Quiet Library	
17/12/23 03:00	37.2	Whisper	
17/12/23 04:00	38.8	Whisper	
17/12/23 05:00	37.9	Whisper	
17/12/23 06:00	39.8	Whisper	
17/12/23 07:00	43.8	Quiet Library	
17/12/23 08:04	47.3	Quiet Library	
17/12/23 09:04	56.0	Quiet Office	
17/12/23 10:04	61.1	Conversation	
17/12/23 11:04	61.6	Conversation	
17/12/23 12:04	54.3	Quiet Office	
17/12/23 13:03	47.6	Quiet Library	
Average	50.1		
Day time avr	56.0		
Night time average	41.9		

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 :Scattered showers few thunderstorms in central atolls	Temperature:30.6°C
Start time	16/12/23 14:00		Wind 5-15 mph NE/E
End time	17/12/23 12:51		

Date/time	dBA	Remarks	Noise level
16/12/23 14:00	58.3	Quiet Office	
16/12/23 15:00	54.7	Quiet Office	
16/12/23 16:00	51.3	Quiet Office	
16/12/23 17:00	54.6	Quiet Office	
16/12/23 18:00	53.0	Quiet Office	
16/12/23 19:04	48.0	Quiet Library	
16/12/23 20:04	54.0	Quiet Office	
16/12/23 21:04	52.3	Quiet Office	
16/12/23 22:04	52.5	Quiet Office	
16/12/23 23:04	47.7	Quiet Library	
17/12/23 00:03	54.4	Quiet Office	
17/12/23 01:03	49.0	Quiet Library	
17/12/23 02:03	45.2	Quiet Library	
17/12/23 03:03	45.3	Quiet Library	
17/12/23 04:02	43.5	Quiet Library	
17/12/23 05:02	42.4	Quiet Library	
17/12/23 06:02	42.9	Quiet Library	
17/12/23 07:02	46.0	Quiet Library	
17/12/23 08:02	56.0	Quiet Office	
17/12/23 09:06	49.9	Quiet Library	
17/12/23 10:01	44.7	Quiet Library	
17/12/23 11:01	46.9	Quiet Library	
17/12/23 12:01	44.1	Quiet Library	
17/12/23 12:51	43.2	Quiet Library	
Average	49.2		
Day time avr	50.3		
Night time average	47.5		

Ground Water Quality

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 03 of 14
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Nov13, 2023	
Reference Number: 74230483152	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
STP Cont.	Sulphide as HS ²⁻	0.1	1.0	Satisfactory	
	Surfactants	0.6	10	Satisfactory	
	Fluoride as F ⁻	0.12	1.0	Satisfactory	
	Cadmium as Cd	0.002	0.05	Satisfactory	
	Phenolic Compounds as	0.008	1.0	Satisfactory	
	Sulphate as SO ₄ ⁻	34	250	Satisfactory	
GW - 01	Turbidity	2.2	Max. 1	Unsatisfactory	
	Nitrate (as NO ₃ ⁻)*	04	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	
	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	125.7	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	
	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				Nov 20, 2023	
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 04 of 14	
Subcontracted By: Nsure (Pvt) Ltd					
Code Name: AAJV					
Date of Sample Received: Nov13, 2023					
Reference Number: 74230483152					
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW - 02	Turbidity	2.3	Max. 1	Unsatisfactory	
	Nitrate (as NO ₃ ⁻)*	29	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)	142	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	48,060	Max. 1000	--	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	207.8	Max. 200	Unsatisfactory	
	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 - 04	Turbidity	0.9	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	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 05 of 14
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Nov13, 2023	
Reference Number: 74230483152	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW – 04 Cont	Lead (as Pb)	ND	Max. 0.01	Satisfactory	
	Mercury (as Hg)	ND	Max. 0.001	Satisfactory	
	Total Suspended Solids (TSS)	08	5 - 750	--	
	Feecal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.7	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	296.3	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	39.2	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				Nov 20, 2023	
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 06 of 14	
Subcontracted By: Nsure (Pvt) Ltd					
Code Name: AAJV					
Date of Sample Received: Nov13, 2023					
Reference Number: 74230483152					
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW – 05	Turbidity	9.6	Max. 1	Unsatisfactory	
	Nitrate (as NO ₃ ⁻)*	1.1	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)	46	5 - 750	Satisfactory	
	Feecal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	Ph at 25°C	7.4	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	3978	Max. 1000	--	
	Total Phosphates (as PO ₄ ³⁻)	0.18	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		
GW – 06	Turbidity	2.9	Max. 1	Unsatisfactory	
	Nitrate (as NO ₃ ⁻)*	2.5	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				Nov 20, 2023	
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 07 of 14	
Subcontracted By: Nsure (Pvt) Ltd					
Code Name: AAJV					
Date of Sample Received: Nov13, 2023					
Reference Number: 74230483152					
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	
	Feacal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	7.9	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	525.9	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	56.8	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	3.3	Max. 1	Unsatisfactory	
	Nitrate (as NO ₃ ⁻)*	1.6	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	
	Feacal Coliform	<1.8	0	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 08 of 14
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Nov13, 2023	
Reference Number: 74230483152	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
GW – 07 Cont.	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	8.0	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	451.7	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	ND	Max. 5.0	Satisfactory	
	Chloride (as Cl ⁻)	49	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	3.6	Max. 1	Unsatisfactory	
	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	--	
	Feacal Coliform	<1.8	0	Satisfactory	
	Oil & Grease	ND	-	Satisfactory	
	pH at 25°C	8.2	6.5 – 8.5	Satisfactory	
	Electrical Conductivity at 25°C	302.4	Max. 1000	Satisfactory	
	Total Phosphates (as PO ₄ ³⁻)	0.05	Max. 5.0	Satisfactory	
Chloride (as Cl ⁻)	45.8	Max. 200	Satisfactory		

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 09 of 14
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Nov13, 2023	
Reference Number: 74230483152	

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)	24	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.4	05	Satisfactory
	pH	7.1	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	17	20	Satisfactory
	Biological Oxygen Demand	04	2	Unsatisfactory
	Turbidity	3.0	3-5	Satisfactory
	Electrical Conductivity	50,220	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	5.6	70	Satisfactory
	Total Phosphates (as PO ₄ ₃)	0.8	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.2	2 - 3	Satisfactory
	Temperature	27.8	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
Lead as Pb	< 0.025	0.5	Satisfactory	
Chromium VI	0.005	0.1	Satisfactory	
Total Chromium (as Cr)	0.034	0.5	Satisfactory	

Surface Water Quality

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 09 of 14
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Nov13, 2023	
Reference Number: 74230483152	

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)	24	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.4	05	Satisfactory
	pH	7.1	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	17	20	Satisfactory
	Biological Oxygen Demand	04	2	Unsatisfactory
	Turbidity	3.0	3-5	Satisfactory
	Electrical Conductivity	50,220	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	5.6	70	Satisfactory
	Total Phosphates (as PO ₄ ₃)	0.8	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.2	2 - 3	Satisfactory
	Temperature	27.8	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
	Lead as Pb	< 0.025	0.5	Satisfactory
Chromium VI	0.005	0.1	Satisfactory	
Total Chromium (as Cr)	0.034	0.5	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 10 of 14
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Nov13, 2023				
Reference Number: 74230483152				
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	0.045	2	Satisfactory
	Copper as Cu	0.013	0.5	Satisfactory
SW - 02	Salinity	3.4%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	26	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.46	5	Satisfactory
	pH	7.5	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	18	20	Satisfactory
	Biological Oxygen Demand	04	2	Unsatisfactory
	Turbidity	3.0	3-5	Satisfactory
	Electrical Conductivity	50,526	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	5.7	70	Satisfactory
	Total Phosphates (as PO ₄) ₃	0.9	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.2	2 - 3	Satisfactory
	Temperature	28.1	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
	Lead as Pb	< 0.025	0.5	Satisfactory
	Chromium VI	0.005	0.1	Satisfactory
	Total Chromium (as Cr)	0.039	0.5	Satisfactory
Mercury as Hg	< 0.001	0.02	Satisfactory	
Nickel as Ni	< 0.001	1	Satisfactory	
Zinc as Zn	0.043	2	Satisfactory	
Copper as Cu	0.013	0.5	Satisfactory	
SW - 03	Salinity	3.5%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	28	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.5	05	Satisfactory
	pH	7.5	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	22	20	Unsatisfactory
	Biological Oxygen Demand	05	2	Unsatisfactory

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 11 of 14
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Nov13, 2023				
Reference Number: 74230483152				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW - 03 Cont.	Turbidity	2.8	3-5	--
	Electrical Conductivity	52,020	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	6.1	70	Satisfactory
	Total Phosphates (as PO ₄)	1.1	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.4	2 - 3	Satisfactory
	Temperature	29.6	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
	Lead as Pb	0.022	0.5	Satisfactory
	Chromium VI	0.005	0.1	Satisfactory
	Total Chromium (as Cr)	0.033	0.5	Satisfactory
	Mercury as Hg	< 0.001	0.02	Satisfactory
	Nickel as Ni	< 0.001	1	Satisfactory
	Zinc as Zn	0.047	2	Satisfactory
Copper as Cu	0.014	0.5	Satisfactory	
SW - 04	Salinity	3.8%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	32	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.9	05	Satisfactory
	pH	7.3	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	25	20	Unsatisfactory
	Biological Oxygen Demand	03	2	Unsatisfactory
	Turbidity	2.7	3-5	--
	Electrical Conductivity	53,740	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	5.2	70	Satisfactory
	Total Phosphates (as PO ₄)	0.9	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.2	2 - 3	Satisfactory
	Temperature	27.4	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
	Lead as Pb	0.028	0.5	Satisfactory
Chromium VI	0.006	0.1	Satisfactory	
Total Chromium (as Cr)	0.039	0.5	Satisfactory	
Mercury as Hg	< 0.001	0.02	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 12 of 14
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Nov13, 2023				
Reference Number: 74230483152				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW - 04 Cont.	Nickel as Ni	< 0.001	1	Satisfactory
	Zinc as Zn	0.041	2	Satisfactory
	Copper as Cu	0.012	0.5	Satisfactory
SW - 05	Salinity	3.4%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	26	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.6	05	Satisfactory
	pH	7.2	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	19	20	Satisfactory
	Biological Oxygen Demand	04	2	Unsatisfactory
	Turbidity	3.0	3-5	Satisfactory
	Electrical Conductivity	51,500	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	5.7	70	Satisfactory
	Total Phosphates (as PO ₄)	0.8	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.3	2 - 3	Satisfactory
	Temperature	27.8	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
	Lead as Pb	0.017	0.5	Satisfactory
	Chromium VI	<0.005	0.1	Satisfactory
	Total Chromium (as Cr)	0.031	0.5	Satisfactory
Mercury as Hg	< 0.001	0.02	Satisfactory	
Nickel as Ni	< 0.001	1	Satisfactory	
Zinc as Zn	0.035	2	Satisfactory	
Copper as Cu	0.012	0.5	Satisfactory	
SW - 06	Salinity	3.3%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	25	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.4	05	Satisfactory
	pH	7.3	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	21	20	Unsatisfactory
	Biological Oxygen Demand	04	2	Unsatisfactory
	Turbidity	2.6	3-5	--

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 13 of 14
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Nov13, 2023	
Reference Number: 74230483152	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW – 06 Cont.	Electrical Conductivity	51,490	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	5.3	70	Satisfactory
	Total Phosphates (as PO ₄)	0.7	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.3	2 - 3	Satisfactory
	Temperature	27.6	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
	Lead as Pb	0.017	0.5	Satisfactory
	Chromium VI	<0.005	0.1	Satisfactory
	Total Chromium (as Cr)	0.031	0.5	Satisfactory
	Mercury as Hg	< 0.001	0.02	Satisfactory
	Nickel as Ni	< 0.001	1	Satisfactory
	Zinc as Zn	0.039	2	Satisfactory
Copper as Cu	0.012	0.5	Satisfactory	
SW - 07	Salinity	3.4%	3.2-4.2%	Satisfactory
	Total Suspended Solids (TSS)	27	150	Satisfactory
	Oil & Grease	ND	-	--
	Feacal Coliform	<1.8	400	Satisfactory
	Nitrates	1.46	5	Satisfactory
	pH	7.3	8.0-8.3	Unsatisfactory
	Chemical Oxygen Demand	18	20	Satisfactory
	Biological Oxygen Demand	02	2	Satisfactory
	Turbidity	3.5	3-5	Satisfactory
	Electrical Conductivity	50,680	35000 - 60000	Satisfactory
	Total Inorganic Nitrogen	3.7	70	Satisfactory
	Total Phosphates (as PO ₄)	0.6	3	Satisfactory
	Sulfide	<0.1	1	Satisfactory
	Ammonia - N	2.3	2 - 3	Satisfactory
	Temperature	27.9	18-32 °C	Satisfactory
	Arsenic as As	< 0.005	0.1	Satisfactory
	Cadmium as Cd	< 0.005	0.05	Satisfactory
	Lead as Pb	0.022	0.5	Satisfactory
Chromium VI	0.005	0.1	Satisfactory	
Total Chromium (as Cr)	0.033	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				Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 14 of 14
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Nov13, 2023				
Reference Number: 74230483152				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
SW – 07 Cont.	Zinc as Zn	0.034	2	Satisfactory
	Copper as Cu	0.012	0.5	Satisfactory

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

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

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FEED BACK:		
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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

Quality of Drinking water, Water used for camp and construction, waste water discharge from STP and dewatering



TEST REPORT



Report No: (7423)051-6134

Code Name: AAJV

Oct 25, 2023

Page 1 of 10

Customer: Alke Alkatas Joint Venture (Pvt) Ltd
Address : H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives
Date of Sample Received: Oct 19, 2023
Date of Testing Started: Oct 19, 2023
Date of Testing Completed: Oct 25, 2023

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

Sample Identified by the Client as:
Supply Water Camp And Construction

Date of Sample Collection: 10.18.2023

Sample Drawn By BVCPS NO

Photo of the Submitted Samples



Bureau Veritas Consumer Products Services Lanka (Pvt) Ltd.

No. 570, Galle Road, Katubedda, Moratuwa, Sri Lanka
Tel: (9411) 2350111-115 (dedicated lines), Fax: (9411) 112622198 & 199
Email: bvcp.lanka@lk.bureauveritas.com

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TEST REPORT



Report No: (7423)051-6134

Code Name: AAJV

Oct 25, 2023

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TEST RESULTS

No.	Parameters	Results	ReferenceRange **	Unit	Test Method
1	Fecal Coliforms	< 2.0	0/100ml	MPN/100ml	IS1622:1981
2	E.Coli	< 2.0	0/100ml	MPN/100ml	IS1622:1981
3	Total Coliforms	< 2.0	0/100ml	MPN/100ml	IS1622:1981
4	pH	6.3	6.5-8.5	pH	APHA-4500-H ⁺
5	Physical Appearance	Clear	Clear/Colorless	Clear/Colorless	Visual Examination
6	Free Residual Chlorine	< 0.1	0.04-0.2	mg/l	APHA4-500-CL
7	Total Dissolved Solids	259	<500	mg/l	APHA-2540-C
8	Turbidity	< 0.1	< 1.0	NTU	APHA-2130-B
9	Chloride as Cl ⁻	25.4	<200	mg/l	APHA-4500-CL
10	Nitrites as NO ₃ ⁻	1.5	<50	mg/l	APHA-4500-NO ₂ ⁻
11	Ammonia (Ammonical Nitrogen -N)	< 0.1	<0.5	mg/l	APHA-4500-NH ₃ ⁻
12	Iron as Fe	0.05	<0.3	mg/l	APHA-3125-B
13	Sulphide as HS ²⁻	< 0.1	<0.05	mg/l	APHA-4500-D
14	Total Hardness as CaCo ₃	23	<75	mg/l	APHA-2340 C
15	Total Suspended Solids	5.0	5-750	mg/l	APHA-2540-C
16	Electrical Conductivity	386	<1000	μs/CM	APHA-2510

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,

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

TEST REPORT



Report No: (7423)051-6134

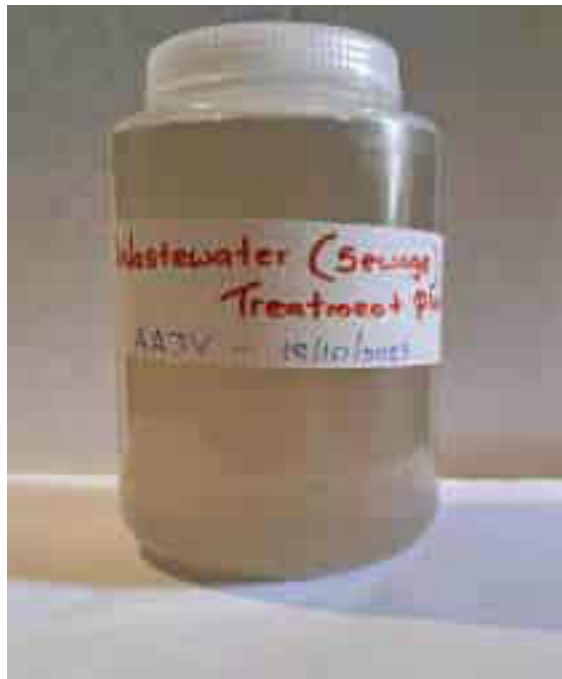
Code Name: AAJV

Oct 25, 2023

Page 3 of 10

Customer: Alke Alkatas Joint Venture (Pvt) Ltd
Address : H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives
Date of Sample Received: Oct 19, 2023
Date of Testing Started: Oct 19, 2023
Date of Testing Completed: Oct 25, 2023
Sample Description: **Sample Received as:**
A water sample contained in sealed plastic bottle
Sample Identified by the Client as:
Wastewater (Sewage) Treatment Plant
Date of Sample Collection: 10.18.2023
Sample Drawn By BVCPS NO

Photo of the Submitted Samples



TEST REPORT



Report No: (7423)051-6134
Code Name: AAJV

Oct 25, 2023
Page 4 of 10

TEST RESULTS

No.	Parameters	Results	ReferenceRange **	Unit	Test Method
1	Fecal Coliforms	< 2.0	100/100	MPN/100ml	IS1622:1981
2	Total Coliforms	280	400	org/ml	IS1622:1981
3	E.Coli	< 2.0	0.01	org/ml	IS1622:1981
4	pH	7.3	5.0-9.5	pH	APHA-4500-H ⁺
5	Temperature	4.5	44	°C	APHA-2550 B
6	Total Suspended Solids	43	50	mg/l	APHA-2540-D
7	Ortho Phosphate as P	1.5	10	mg/l	APHA-2540-C
8	Oil & Grease	3.0	5	mg/l	APHA-5520-B
9	Dissolved Oxygen	6.2	75	mg/l	APHA-4500-O
10	Free Residual Chlorine	< 0.01	0.2-0.8	mg/l	APHA4-500-CL
11	Zinc as Zn	0.22	20	mg/l	APHA-3125-B
12	Sodium as Na	35	200	mg/l	APHA-3125-B
13	Electrical Conductivity	1059	--	µs/CM	APHA-2510
14	Chemical Oxygen Demand	70	50	mg/l	APHA-5220-D
15	Biological Oxygen Demand	15	30	mg/l	APHA-5210-B
16	Nitrites as NO ₃ ⁻	4.2	15	mg/l	APHA-4500-NO ₂ ⁻
17	Ammonia (Ammonia Free -N)	3.2	10	mg/l	APHA-4500-NH ₃ ⁻
18	Arsenic as As	0.001	2.0	mg/l	APHA-3125-B
19	Calcium as Ca	56	80	mg/l	APHA-3125-B
20	Cyanide as CN	0.1	10	mg/l	APHA-4500-CN ⁻
21	Chloride as Cl ⁻	42	200	mg/l	APHA-4500-CL
22	Sulphide as HS ²⁻	0.1	1.0	mg/l	APHA-4500-D
23	Surfactants	1.2	10	mg/l	APHA-5540-C
24	Fluoride as F ⁻	0.72	1.0	mg/l	APHA-4500-F ⁻
25	Cadmium as Cd	0.002	0.05	mg/l	APHA-3125-B
26	Phenolic Compounds	0.008	1.0	mg/l	APHA-5530-D
27	Sulphate as SO ₄	34	250	mg/l	APHA-2320-B

TEST REPORT



Report No: (7423)051-6134

Code Name: AAJV

Oct 25, 2023

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*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, SNE

Shall not exceed at 5°C while receiving.

COMMENT :The Testing Results revealed that Food hygiene of Tested Water Sample is Not satisfactory as per the Reference range **specified as per Supply Water Quality Standard, Environment Protection Agency EPA, Maldives.

TEST REPORT



Report No: (7423)051-6134

Code Name: AAJV

Oct 25, 2023

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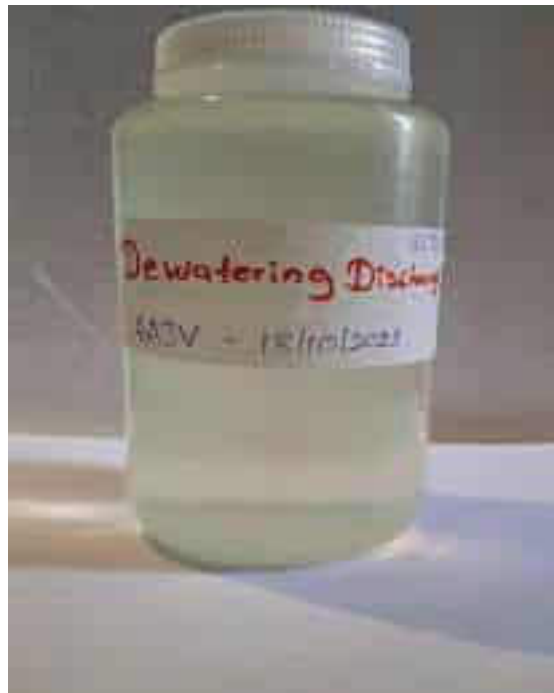
Customer: Alke Alkatas Joint Venture (Pvt) Ltd
Address : H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives
Date of Sample Received: Oct 19, 2023
Date of Testing Started: Oct 19, 2023
Date of Testing Completed: Oct 25, 2023
Sample Description: **Sample Received as:**
A water sample contained in sealed plastic bottle

Sample Identified by the Client as:
Dewatering Discharge

Date of Sample Collection: 10.18.2023

Sample Drawn By BVCPS NO

Photo of the Submitted Samples



TEST REPORT



Report No: (7423)051-6134

Code Name: AAJV

Oct 25, 2023

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TEST RESULTS

No.	Parameters	Results	ReferenceRange **	Unit	Test Method
1	Fecal Coliforms	< 2.0	100	MPN/100ml	IS1622:1981
2	pH	7.7	8.0-8.3	pH	APHA-4500-H ⁺
3	Temperature	25.3	18-32	°C	APHA-2550 B
4	Total Dissolved Solids	15150	--	mg/l	APHA-2540-C
5	Dissolved Oxygen	6.2	6.5-8.0	mg/l	APHA-4500-O
6	Turbidity	2.5	< 5	NTU	APHA-2130-B
7	Total Hydrocarbon	< 0.1	10	ppm	Inhouse –Laboratory Method
8	Electrical Conductivity	22611	<Sea Water	µs/CM	APHA-2510
9	Salinity	3.8	3.2-4.2%	ppm	APHA-2520-B
10	Sulphide as HS ²⁻	0.25	0.5	mg/l	APHA-4500-D
11	Phosphate as P	0.09	2	mg/l	APHA-2540-C
12	Oil & Grease	2.6	5	mg/l	APHA-5520-B
13	Ammonia (Ammoniacal Nitrogen -N)	2.7	2-3	mg/l	APHA-4500-NH ₃ ⁻
14	Nitrites as NO ₂ ⁻	6.52	15	mg/l	APHA-4500-NO ₂ ⁻

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,

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

TEST REPORT



Report No: (7423)051-6134

Code Name: AAJV

Oct 25, 2023

Page 8 of 10

Customer: Alke Alkatas Joint Venture (Pvt) Ltd
Address : H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives
Date of Sample Received: Oct 19, 2023
Date of Testing Started: Oct 19, 2023
Date of Testing Completed: Oct 25, 2023
Sample Description: **Sample Received as:**
A water sample contained in sealed plastic bottle

Sample Identified by the Client as:
DrinkingWater

Date of Sample Collection: 10.18.2023

Sample Drawn By BVCPS NO

Photo of the Submitted Samples



TEST REPORT



Report No: (7423)051-6134

Code Name: AAJV

Oct 25, 2023

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TEST RESULTS

No.	Parameters	Results	ReferenceRange **	Unit	Test Method
1	Fecal Coliforms	< 2.0	0/100ml	MPN/100ml	IS1622:1981
2	E.Coli	< 2.0	0/100ml	MPN/100ml	IS1622:1981
3	Total Coliforms	< 2.0	0/100ml	MPN/100ml	IS1622:1981
4	pH	6.7	6.5-8.5	pH	APHA-4500-H ⁺
5	Physical Appearance	Clear	Clear/Colorless	Clear/Colorless	Visual Examination
6	Free Residual Chlorine	< 0.1	0.5	mg/l	APHA4-500-CL
7	Temperature	25.3	--	°C	APHA-2550 B
8	Total Dissolved Solids	4.0	<300	mg/l	APHA-2540-C
9	Turbidity	< 0.1	< 1	NTU	APHA-2130-B
10	Chloride as Cl ⁻	42	<250	mg/l	APHA-4500-CL
11	Electrical Conductivity	131	<1500	µs/CM	APHA-2510
12	Iron as Fe	0.75	<0.3	mg/l	APHA-3125-B
13	Ammonia (Ammoniacal Nitrogen -N)	< 0.1	<1.5	mg/l	APHA-4500-NH ₃ ⁻
14	Nitrates as NO ₃ ⁻	< 0.1	<50	mg/l	APHA-4500-NO ₂ ⁻

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.

Free Residual Chlorine Limit is applicable only when water is chlorinated.

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

TEST REPORT



Report No: (7423)051-6134

Oct 25, 2023

Code Name: AAJV

Page 10 of 10

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

GENERAL INQUIRIES:		
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TECHNICAL INQUIRIES:		
RUWANI AMARASINGHE	TEL: +94 768 229 457	E-MAIL: ruwani.amarasinghe@bureauveritas.com
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



SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 01 of 14
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Nov13, 2023				
Reference Number: 74230483152				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
Drinking Water	pH	7.4	6.5-8.5	Satisfactory
	Turbidity	ND	< 1.0	Satisfactory
	Residual free chlorine*	<0.01	0.04-0.2	--
	Electrical Conductivity	12.9	<1000	Satisfactory
	Total Hardness	<01	<75	Satisfactory
	Total Suspended Solids (TSS)	<01	5-750	Satisfactory
	Total Dissolved solids	08	<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 ⁻)*	ND	<50	Satisfactory
	Chloride (as Cl ⁻)	10.6	<200	Satisfactory
Physical Appearance	Clear	Clear/Colorless	--	
Water for Construction	pH	6.7	6.5-8.5	Satisfactory
	Turbidity	0.4	< 1.0	Satisfactory
	Residual free chlorine*	<0.01	0.04-0.2	--
	Electrical Conductivity	478.9	<1000	Satisfactory
	Total Hardness	09	<75	Satisfactory
	Total Suspended Solids (TSS)	02	5-750	--
	Total Dissolved solids	267	<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	

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

No. 570, Galle Road, Katubedda, Moratuwa, Sri Lanka
Tel: (9411) 2350111-115 (dedicated lines), Fax: (9411)
112622198 & 199
Email: bvcp.lanka@lk.bureauveritas.com

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 02 of 14
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Nov13, 2023				
Reference Number: 74230483152				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
Water for Construction Cont.	Nitrate (as NO ₃ ⁻)*	01	<50	Satisfactory
	Chloride (as Cl ⁻)	38.1	<200	Satisfactory
	Physical Appearance	Clear	Clear/Colorless	--
Dewatering	Fecal Coliforms	<1.8	100	Satisfactory
	pH	7.1	6.5-8.5	Satisfactory
	Temperature °C	27.3	18-32	Satisfactory
	Total Dissolved Solids	24,000	--	--
	Dissolved Oxygen	6.6	6.5-8.0	Satisfactory
	Electrical Conductivity	39,200	--	--
	Turbidity	2.0	< 5	Satisfactory
	Salinity	3.1	3.2-4.2%	Unsatisfactory
	Ammonia	0.7	2-3	--
	Hydrogen Sulphide (H ₂ S)	0.05	0.5	Satisfactory
	Nitrate as NO ₃ ⁻	4.52	15	Satisfactory
	Phosphate as P	0.03	2.0	Satisfactory
	Total Hydrocarbon	< 0.1	10	Satisfactory
	Oil & Grease	01	5	Satisfactory
STP	Fecal Coliforms	< 2.0	100/100	Satisfactory
	Total Coliforms	27	400	Satisfactory
	E.Coli	< 2.0	0.01	Satisfactory
	pH at 25°C	7.2	5.0-9.5	Satisfactory
	Temperature °C	28.0	18-32	Satisfactory
	Total Suspended Solids	13	50	Satisfactory
	Ortho Phosphate as P	0.5	10	Satisfactory
	Oil & Grease	ND	5	Satisfactory
	Dissolved Oxygen	6.2	6-8	Unsatisfactory
	Free Residual Chlorine	< 0.01	0.2-0.8	-
	Zinc as Zn	0.22	20	Satisfactory
	Sodium as Na	39	200	Satisfactory
	Electrical Conductivity at 25°C	1340.5	--	--
	Chemical Oxygen Demand	45	50	Unsatisfactory
	Biological Oxygen Demand	16	30	Satisfactory
	Nitrites as NO ₃ ⁻	3.2	15	Satisfactory
	Ammonia (Ammonia Free-N)	2.8	10	Satisfactory
	Arsenic as As	0.001	2.0	Satisfactory
	Calcium as Ca	46	80	Satisfactory
	Cyanide as CN	0.1	10	Satisfactory
Chloride as Cl ⁻	44	200	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd	Nov 20, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives	Page 03 of 14
Subcontracted By: Nsure (Pvt) Ltd	
Code Name: AAJV	
Date of Sample Received: Nov13, 2023	
Reference Number: 74230483152	

Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment	
STP Cont.	Sulphide as HS ²⁻	0.1	1.0	Satisfactory	
	Surfactants	0.6	10	Satisfactory	
	Fluoride as F ⁻	0.12	1.0	Satisfactory	
	Cadmium as Cd	0.002	0.05	Satisfactory	
	Phenolic Compounds as	0.008	1.0	Satisfactory	
	Sulphate as SO ₄ ⁻	34	250	Satisfactory	
GW - 01	Turbidity	2.2	Max. 1	Unsatisfactory	
	Nitrate (as NO ₃ ⁻)*	04	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	
	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	125.7	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	
	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				Dec 13, 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: Dec04, 2023				
Reference Number: 74230486572				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
Drinking Water	pH	7.5	6.5-8.5	Satisfactory
	Turbidity	ND	< 1.0	Satisfactory
	Residual free chlorine*	<0.01	0.04-0.2	--
	Electrical Conductivity	534.7	<1000	Satisfactory
	Total Dissolved solids	298	<500	Satisfactory
	Feacal Coliform	ND	0/100ml	Satisfactory
	Total Coliform	ND	0/100ml	Satisfactory
	Escherichia coli	ND	0/100ml	Satisfactory
	Iron (as Fe)	ND	<0.3	Satisfactory
	Ammonia - N	<0.1	<0.5	Satisfactory
	Nitrate (as NO ₃ ⁻)*	ND	<50	Satisfactory
	Chloride (as Cl ⁻)	28.4	<200	Satisfactory
Physical Appearance	Clear	Clear/Colorless	--	
Water for Camp and Construction	pH	7.6	6.5-8.5	Satisfactory
	Turbidity	0.5	< 1.0	Satisfactory
	Residual free chlorine*	<0.01	0.04-0.2	--
	Electrical Conductivity	497.3	<1000	Satisfactory
	Total Hardness	10	<75	Satisfactory
	Total Suspended Solids (TSS)	02	5-750	--
	Total Dissolved solids	272	<500	Satisfactory
	Feacal Coliform	ND	0/100ml	Satisfactory
	Total Coliform	ND	0/100ml	Satisfactory
	Escherichia coli	ND	0/100ml	Satisfactory
	Iron (as Fe)	ND	<0.3	Satisfactory
	Hydrogen Sulphide	<0.01	<0.05	Satisfactory
Ammonia - N	<0.1	<0.5	Satisfactory	

Bureau Veritas Consumer Products Services Lanka (Pvt) Ltd.

No. 570, Galle Road, Katubedda, Moratuwa, Sri Lanka
 Tel: (9411) 2350111-115 (dedicated lines), Fax: (9411) 112622198 & 199
 Email: bvcp.lanka@lk.bureauveritas.com

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

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SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Dec 13, 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: Dec04, 2023				
Reference Number: 74230486572				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
Water for Camp and Construction Cont.	Nitrate (as NO ₃ ⁻)*	ND	<50	Satisfactory
	Chloride (as Cl ⁻)	44.6	<200	Satisfactory
	Physical Appearance	Clear	Clear/Colorless	--
Dewatering	Fecal Coliforms	<1.8	100	Satisfactory
	pH	7.3	6.5-8.5	Satisfactory
	Temperature °C	27.8	18-32	Satisfactory
	Total Dissolved Solids	25,900	--	--
	Dissolved Oxygen	6.5	6.5-8.0	Satisfactory
	Electrical Conductivity	47,170	--	--
	Turbidity	2.6	< 5	Satisfactory
	Salinity	3.8	3.2-4.2%	Satisfactory
	Ammonia	1.2	2-3	--
	Hydrogen Sulphide (H ₂ S)	<0.01	0.5	Satisfactory
	Nitrate (as NO ₃ ⁻)	5.54	15	Satisfactory
	Phosphate as P	0.09	2.0	Satisfactory
	Total Hydrocarbon	< 0.1	10	Satisfactory
	Oil & Grease	02	5	Satisfactory
STP	Fecal Coliforms	ND	100/100	Satisfactory
	Total Coliforms	34	400	Satisfactory
	E.Coli	ND	0.01	Satisfactory
	pH at 25°C	7.1	5.0-9.5	Satisfactory
	Temperature °C	28.1	18-32	Satisfactory
	Total Suspended Solids	26	50	Satisfactory
	Ortho Phosphate as P	0.8	10	Satisfactory
	Oil & Grease	01	5	Satisfactory
	Dissolved Oxygen	6.0	6-8	Satisfactory
	Free Residual Chlorine	< 0.01	0.2-0.8	-
	Zinc as Zn	0.29	20	Satisfactory
	Sodium as Na	45	200	Satisfactory
	Electrical Conductivity at 25°C	1301.7	--	--
	Chemical Oxygen Demand	48	50	Satisfactory
	Biological Oxygen Demand	19	30	Satisfactory
	Nitrate (as NO ₃ ⁻)	4.5	15	Satisfactory
	Ammonia (Ammonia Free-N)	2.6	10	Satisfactory
	Arsenic as As	0.001	2.0	Satisfactory
	Calcium as Ca	43	80	Satisfactory
	Cyanide as CN	0.1	10	Satisfactory
Chloride as Cl ⁻	48	200	Satisfactory	

SUMMARY REPORT



Customer: Alke Alkatas Joint Venture (Pvt) Ltd				Dec 13, 2023
Address: H.H. Moomiyaage, 5A, Asaree Hingun. 20265 Male, Republic of Maldives				Page 03 of 03
Subcontracted By: Nsure (Pvt) Ltd				
Code Name: AAJV				
Date of Sample Received: Dec04, 2023				
Reference Number: 74230486572				
Sample Description (As per TRF)	Test Parameters	Results	Limits	Comment
STP Cont.	Sulphide as HS ²⁻	0.1	1.0	Satisfactory
	Surfactants	0.6	10	Satisfactory
	Fluoride as F ⁻	0.14	1.0	Satisfactory
	Cadmium as Cd	0.002	0.05	Satisfactory
	Phenolic Compounds as Phenol	0.01	1.0	Satisfactory
	Sulphate as SO ₄ ⁻	36	250	Satisfactory
	Total Nitrogen (as N)*	8.8	10	Satisfactory

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

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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

**Appendix 4: Marine ecology survey report conducted
in October 2023**

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

Marine Ecology (October 2023)

Prepared by: Mahmood Riyaz



30th October 2023

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1. INTRODUCTION

This is the environmental monitoring report of marine ecology result conducted in October 2023 prepared as part of the construction stage monitoring of the waste to energy (WtE) facility at Thilafushi, Maldives. Environmental monitoring is a contractual requirement of the DBO in the Environmental Impact Assessment report prepared for the project. This report presents results of the marine ecology assessments and environmental monitoring conducted on 17th October 2023 as part the requirements of the EIA monitoring 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.

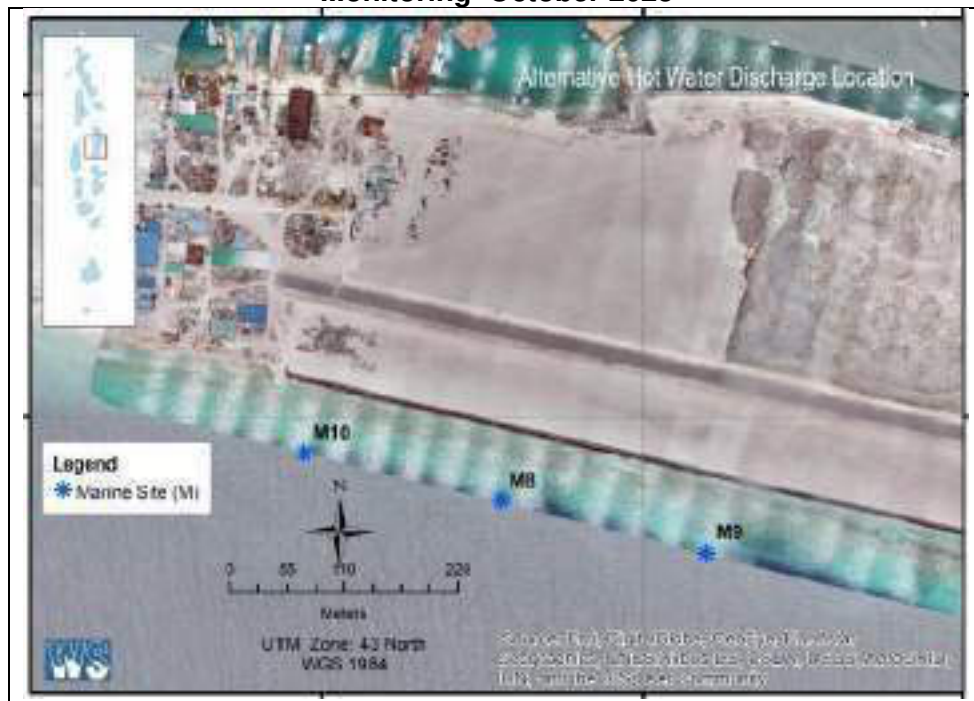
2. MARINE ECOLOGICAL SURVEY

For the construction site environmental monitoring reef benthic 3rd survey was conducted 17th October 2023 in locations M10, M9 and M8 **Figure 1**. The purpose of the marine survey was to continue monitoring changes to the conditions established in the Environmental Impact Assessment (EIA) during August and September 2018. A re-evaluation of the baseline was established in June 2022, and the first monitoring survey was conducted on 24th December 2022 and the following report is based on the 4th survey conducted on 17th October 2023.

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 quadrat of size 0.5 x 0.5 m was laid sequentially on the transect, and photo images were taken with the quadrat in the center. This way, every transect would have at least 10 images, resulting in around 60 images from each depth.

Figure 1: Underwater Marine Survey Locations M8,M9 and M10 for construction stage Monitoring October 2023



2.1 Data analysis

The data collected in October 2023 was analyzed using CoralNet (an online resource for benthic images analysis - <https://coralnet.ucsd.edu/>), which utilizes artificial intelligence for automatic classification. Analysis was conducted using CPCe (Coral Point Count of Excel Extension)¹. CPCe involves randomly placing points over the quadrat space on the image, but in this case, the points are identified by humans. Twenty-five points were randomly placed on the entire photo image. The points were then classified under the following categories, as listed in Table 1

Table 1: Substrate categories and the codes.

<u>Category</u>	<u>Code</u>
CORALLINACEAE (CO)	CO
ROCK (R)	R
CORAL RUBBLE (CR)	CR
MACRO ALAGE (MA)	MA
TURF ALAGE (TUR)	TUR
SPONGE (SP)	SP
SAND AND SILT (S)	S
TUNICATE (TU)	TU
BLEACHED CORAL (BLC)	BLC
UNKOWN (UN)	UN
ZOANTHARIAN (ZO)	ZO
SOFT CORAL (SC)	SC
CORAL (C)	C
SEAGRASS (SG)	SG
INVERTEBRATES (INV)	INV

2.2 Results

The following presents findings and observations from under marine ecological surveys conducted at the monitoring location at Thilafushi reef.

Status of Site M8: The site is the location that will be used for discharge of waste water from the brine outfall as described in the EIA. Waste water discharge pipe for the temporary plant is already installed and discharging treated waste water into the water (see photos of discharge pipe **Figure 2**). The survey conducted in April 2023 reported coral cover around 28-25%. The recent survey shows slight increase in shallow water (at 5m depth) coral cover from 33% to 33% while the coral cover at 10m varied between 32% and 22%. This may be due to extensive sedimentation that was produced from the ongoing Thilafushi Phase II reclamation project. Thilafushi reclamation project started in September 2023 and it is going to continue for over two years during which Thilafushi Phase II and Phase three will be reclaimed. Sedimentation was particularly high at 10m depth compared to shallow water this can be attributed to stronger current at shallow reef areas. The dominant benthic cover is rock about 63-59% in the 5 and 10 m transect respectively. As mentioned earlier sand and silt cover is about 4% at 5m depth and from 12% to 15 % at 10m

¹ Kohler, K.E., Gill, S.M., 2006. Coral Point Count with Excel Extension (CPCe): A Visual Basic program for the determination of coral and substrate coverage using random point count methodology. *Computers and Geosciences* 32, 1259–1269.

depth. This can be directly attributed to the ongoing reclamation at Thilafushi Phase II. Coraline algae cover was around 3-4% at 5m and 10m depth respectively. Most of the live coral was massive and sub-massive corals.

Fish diversity was highest for one species of Balistidae, *Odonus niger*. Pomacentridae *Chromis dimidiata* and Serranidae *Pseudanthias evansi* are abundant, while Acanthuridae *Ctenochaetus striatus* are common at 8m depth in three transects. Balistidae, *Odonus niger*, Chaetodontidae *Hemitaenichthys zoster* Labridae *Thalassoma amblycephalum* and Pomacentridae *Chromis dimidiata* are abundant at 10m depth, which means >40 individual on average at each 20 m transect.. Photographs of the transect quadrats are shown in

Figure 3 and Figure 4. Benthic composition of M8 at both 5 and 10m depth is in Figure 5 please note the level of sedimentation in each photo.

Figure 2. Waste water outfall pipe installed at M8 discharging from temporary waste water plant (April 2023).

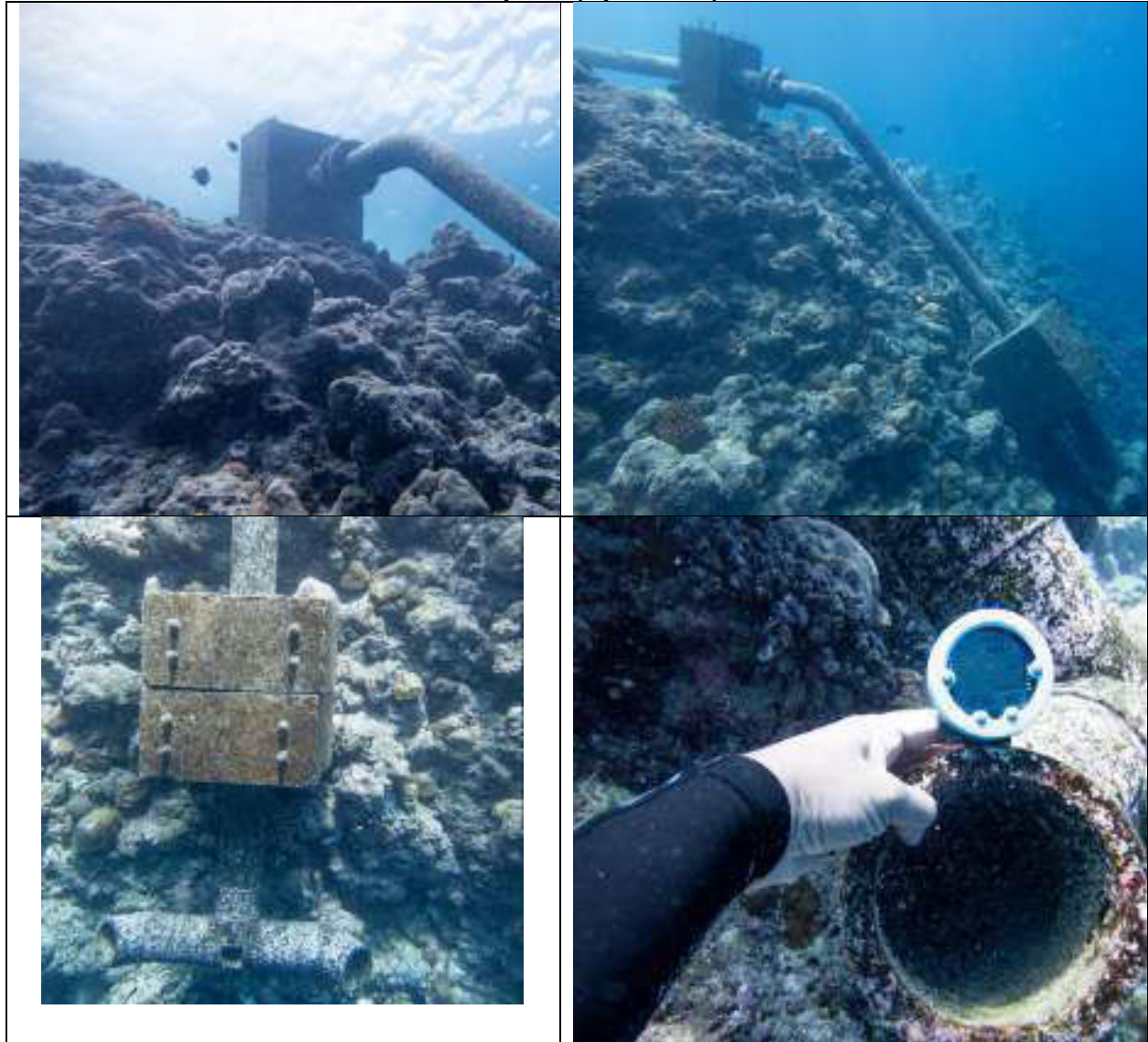


Figure 3: Photos Taken from Site 8 (M8) (17th October 2023) at 5m depth



Figure 4: Photos Taken from Site 8 (M8) (17nd October 2023) at 10m depth

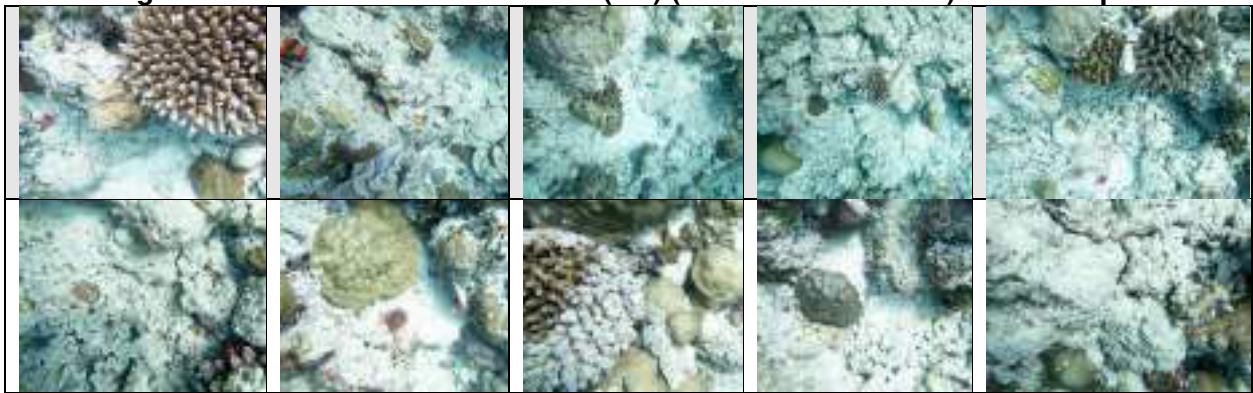
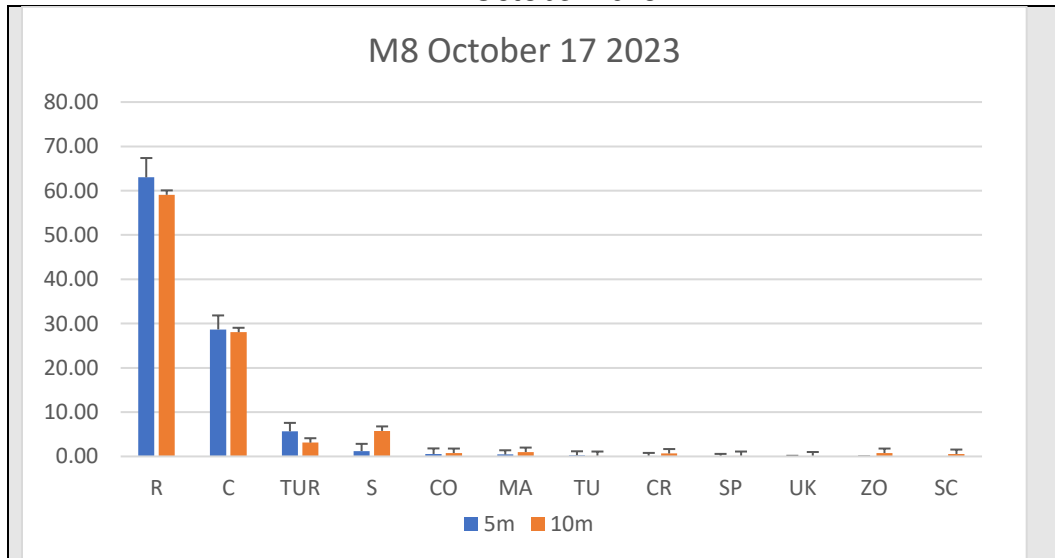


Figure 5: Average benthic cover and their standard error for M8 at both 5 and 10m depth 17th October 2023



Status of Site M9: This location was identified as an alternative for brine discharge and wastewater outfall. This is close to the WtE site at the southern reef of Thilafushi Island. Substrate cover was qualitatively similar to the results obtained in the past surveys. Like Site 8, the highest

substrate cover was rock, some 59-37% at 5m and 10m depth respectively, followed by live coral. Live coral cover was 36-20%. Sand and silt cover was around 1-3%, higher than the last survey.

Like M8 M9 was also extensively impacted from the sedimentation generated from the ongoing reclamation project on Thilafushi Phase II. The sediment plume that is generated from the reclamation carried Eastwards towards the WtE site by the prevailing ocean currents. The sedimentation seems higher at 10m than the 5m due to decrease in turbulation with depth.

With regards to fish Pomacentridae *Chromis dimidiata* was Pomacentridae *Chromis weberi* and Serranidae *Pseudanthias evansi* are the most abundant fish at 5m depth and similar to site M8 *Chormis dimidiata* and Serranidae *Pseudanthias evansi* were abundant, at both 5m and 10 m depth occurring > 40 individuals along 20 meters transect. In Addition to the above Balistidae *Odonus niger* Chaetodontidae *Hemitaurichthys zoster* and Labridae *Thalassoma amblycephalum* were only abundant at 10m depth. Centropyge multispinis , Pomacentrus philippinus and Pseudanthias squamipinnis were th e common species found at 5m depth while Ctenochaetus striatus from Family Acanthuridae was the only common species found at 10m depth at this site. Photographs of the transect quadrats are shown in Figure 6 and Figure 7. Benthic composition of M8 at both 5 and 10m depth is in Figure 8.

Figure 6: Photos Taken from Site 9 (M9) (17th October 2023) at 5m depth



Figure 7: Overall view of the site at 5m depth



Figure 8: Photos Taken from Site 9 (M9) (17th October 2023) at 10m depth

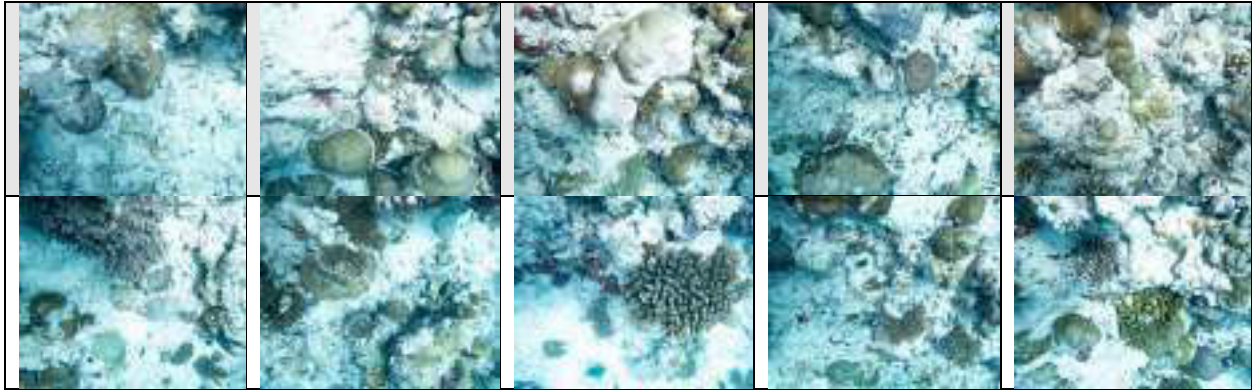
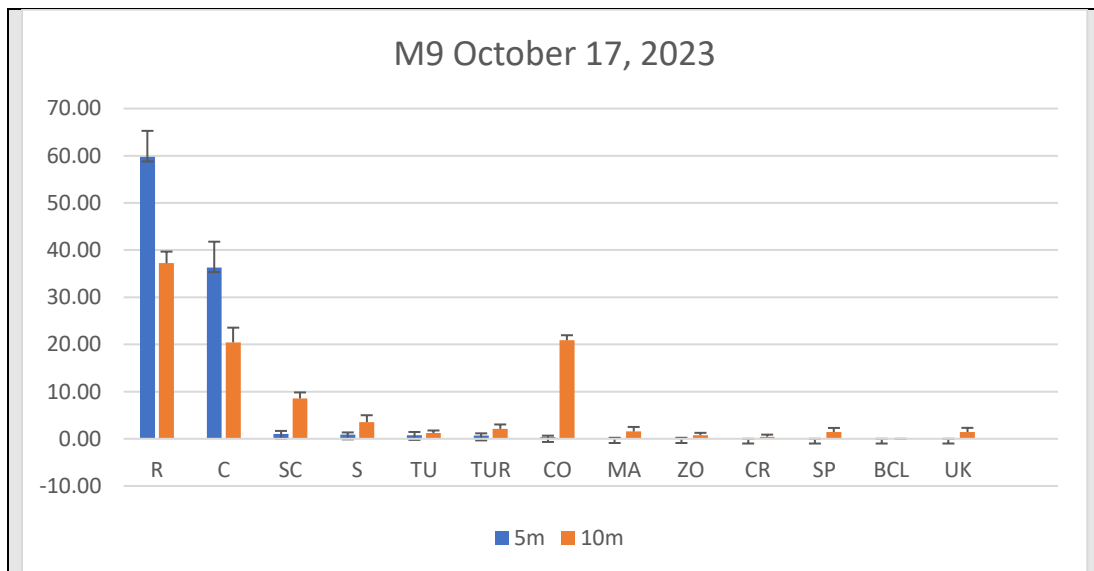


Figure 9: Average benthic cover and their standard error for M9 at both 5 and 10m depth 17th October 2023



Status of Site M10: This location has been identified in the EIA report as a potential alternative for the discharge of brine water and waste water. The location is very close to the WtE facility and it is on the southern reef of Thilafushi Island. Coral cover in Site M10 is 69.52% at 5m and 26% at 10m depth respectively and coral rock cover at 5m depth is higher than 10m depth between 28 and 26% respectively, while sand and silt cover at this site is very high reaching almost 15% at 10m depth. This is the closest site to the on going Thilafushi phase II reclamation project. Silt content is extremely high at 10m while at 5m it is relatively lower, this may be due the inability of silt to settle at shallow water due to strong current. Micro Algae and rubble cover on the substrates are higher at 5m than 10m at 5 depth micro algae cover does not exceeds 0.11% of substrate.

Disposed PVC pipes

A large number of cut pieces of PVC pipes dumped into the site was observed during the survey

On 17th October. It seems that someone has intentionally disposed off PVC pipes into the sea. However the sources of these pipes are not known. PVC pieces are found on three sites at all depths but a large amount was found on Site M10. It s recommended to remove the pipes and clean the area.

Figure 10. Large number of cut pieces of PVC pipes were found in the monitoring sites.



With regard to fish three species *Odonus niger* and *Chormis dimidiata* were abundant at both 5m and 10 m depth while , *Pseudanthias evansi* was abundant at 5m depth only. *Thalassoma amblycephalum* from Labridae Family was the only common species found at 5m depth on this site. *Chromis dimidiata* species was abundant at 5m depth and common at 10m depth. Photographs of the transect quadrats are shown in Figure 11 and Figure 412 .Benthic composition of M8 at both 5 and 10m depth is in the graph in Figure 13 .

Figure 11: Photos Taken from Site 10 (M10) (17th October 2023) at 5m depth

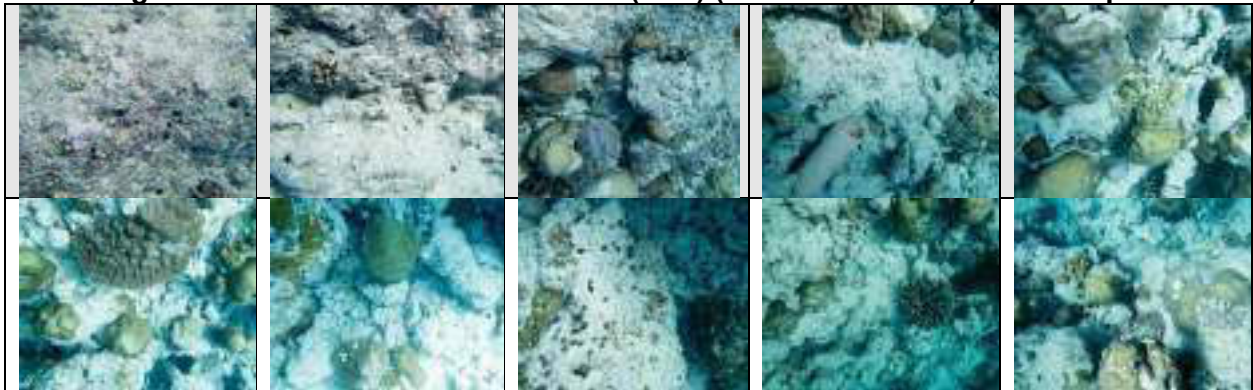


Figure 12: Photos Taken from Site 10 (M10) (17th October 2023) at 10m depth

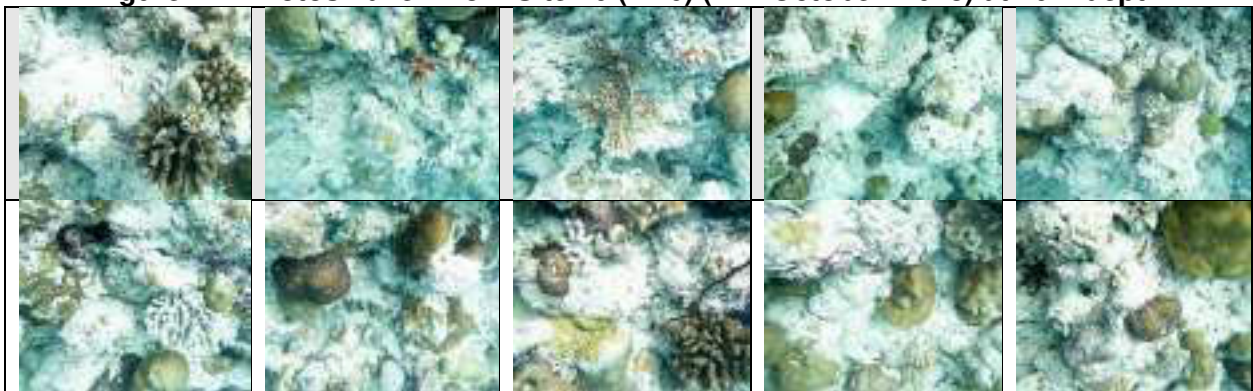
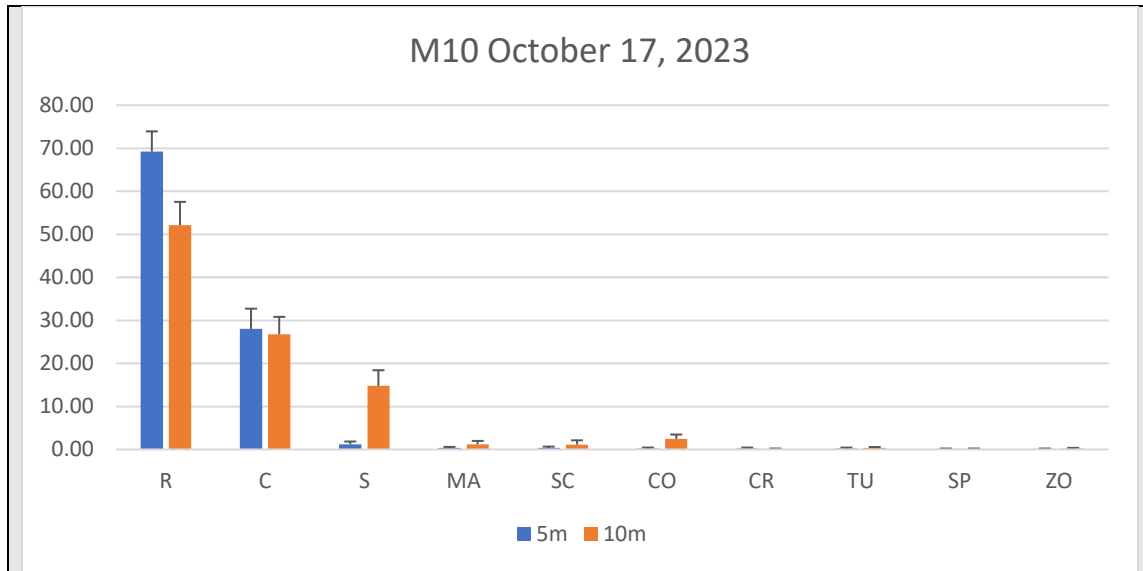


Figure 13: Average benthic cover and their standard error for M9 at both 5 and 10m depth, October 2023



2.3 Fish surveys

To ensure that the fish were not disturbed while data on substrate was being collected, a visual assessment of the fish was performed after the transect was laid. As previously mentioned, at each transect and at each depth (5m and 10m), three transects of 20m length were observed. The counts were estimated in the field and the average count of each depth was taken as the mean abundance. The mean abundance was then categorized into three arbitrary scales: "Rare" (no fish to 20 fish), "Common" (20-40 fish), and "Abundant" (counts over 40 fish).

Summaries of the data collected at each site (combining both depths) are provided in **Table 2**. The majority of the fish observed were considered rare. However, there were instances where Balistidae, and Pomacentridae are abundant. When examining the data at the species *Odonus niger* and *Chromis dimidiata* by depth are most common species at 5m depth. Figure 14 the list is provided in the Appendix.

Table 2: Summary of fish census for three site ordered as Rare, Common and Abundant for three site.

Site M8	Site M9	Site M10
---------	---------	----------

Annex 1. Marine ecology survey ; Fish census data

Fish Census data M8

Family	Species	5m Depth Abundance	10m Depth Abundance
Acanthuridae	<i>Ctenochaetus striatus</i>	Common	Rare
Acanthuridae	<i>Acanthurus leucosternon</i>	Rare	Rare
Acanthuridae	<i>Zebrasoma scopas</i>	Rare	Rare
Balistidae	<i>Odonus niger</i>	Abundant	Abundant
Balistidae	<i>Melichthys indicus</i>	Rare	Rare
Balistidae	<i>Rhinecanthus rectangulus</i>	Rare	Rare
Balistidae	<i>Sufflamen bursa</i>	Rare	Rare
Balistidae	<i>Balistapus undulatus</i>	Rare	Rare
Chaetodontidae	<i>Forcipiger flavissimus</i>	Rare	Rare
Chaetodontidae	<i>Chaetodon meyeri</i>	Rare	Rare
Chaetodontidae	<i>Hemitaurichthys zoster</i>	Rare	Abundant
Chaetodontidae	<i>Chaetodon kleinii</i>	Rare	Rare
Cirrhitidae	<i>Cirrhitichthys oxycephalus</i>	Rare	Rare
Gobiidae	<i>Eviota sebreei</i>	Rare	Rare
Gobiidae	<i>Eviota sigillata</i>	Rare	Rare
Holocentridae	<i>Myripristis pralinia</i>	Rare	Rare
Labridae	<i>Thalassoma hardwicke</i>	Rare	Rare
Labridae	<i>Thalassoma amblycephalum</i>	Rare	Abundant
Labridae	<i>Hemitautoga scapularis</i>	Rare	Rare
Labridae	<i>Pseudocheilinus hexataenia</i>	Rare	Rare
Labridae	<i>Labroides dimidiatus</i>	Rare	Rare
Nemipteridae	<i>Scolopsis bilineata</i>	Rare	Rare
Pomacanthidae	<i>Centropyge multispinis</i>	Rare	Rare
Pomacentridae	<i>Chromis dimidiata</i>	Abundant	Abundant
Pomacentridae	<i>Pomacentrus inidcus</i>	Rare	Rare
Pomacentridae	<i>Pomacentrus philippinus</i>	Rare	Rare
Scaridae	<i>Chlorurus sordidus</i>	Rare	Rare
Serranidae	<i>Cephalopholis argus</i>	Rare	Rare
Serranidae	<i>Pseudanthias evansi</i>	Abundant	Rare
Zanclidae	<i>Zanclus cornutus</i>	Rare	Rare

Fish Census data M9

Family	Species	5m Depth Abundance	10m Depth Abundance
Acanthuridae	<i>Ctenochaetus striatus</i>	Rare	Common
Acanthuridae	<i>Acanthurus leucosternon</i>	Rare	Rare

Acanthuridae	<i>Zebrosoma scopas</i>	Rare	Rare
Acanthuridae	<i>Naso brevirostris</i>	Rare	Rare
Balistidae	<i>Odonus niger</i>	Rare	Abundant
Balistidae	<i>Melichthys indicus</i>	Rare	Rare
Balistidae	<i>Rhinecanthus rectangulus</i>	Rare	Rare
Balistidae	<i>Sufflamen bursa</i>	Rare	Rare
Carangidae	<i>Caranx melampygus</i>	Rare	Rare
Chaetodontidae	<i>Forcipiger flavissimus</i>	Rare	Rare
Chaetodontidae	<i>Chaetodon melannotus</i>	Rare	Rare
Chaetodontidae	<i>Chaetodon kleinii</i>	Rare	Rare
Chaetodontidae	<i>Hemitaurichthys zoster</i>	Rare	Abundant
Cirrhitidae	<i>Cirrhitichthys oxycephalus</i>	Rare	Rare
Gobiidae	<i>Eviota sebreei</i>	Rare	Rare
Gobiidae	<i>Eviota sigillata</i>	Rare	Rare
Labridae	<i>Thalassoma hardwicke</i>	Rare	Rare
Labridae	<i>Thalassoma amblycephalum</i>	Rare	Abundant
Labridae	<i>Labroides dimidiatus</i>	Rare	Rare
Pomacanthidae	<i>Centropyge multispinis</i>	Common	Rare
Pomacentridae	<i>Chromis dimidiata</i>	Abundant	Abundant
Pomacentridae	<i>Pomacentrus philippinus</i>	Common	Rare
Scaridae	<i>Chlorurus strongylocephalus</i>	Rare	Rare
Pomacentridae	<i>Chromis weberi</i>	Abundant	Rare
Serranidae	<i>Cephalopholis argus</i>	Rare	Rare
Serranidae	<i>Aethaloperca roga</i>	Rare	Rare
Serranidae	<i>Pseudanthias evansi</i>	Abundant	Rare
Serranidae	<i>Pseudanthias squamipinnis</i>	Common	Rare
Zanclidae	<i>Zanclus cornutus</i>	Rare	Rare

Fish Census data M10

Family	Species	5m Depth Abundance	10m Depth Abundance
Acanthuridae	<i>Ctenochaetus striatus</i>	Rare	Rare
Acanthuridae	<i>Acanthurus leucosternon</i>	Rare	Rare
Acanthuridae	<i>Zebrosoma scopas</i>	Rare	Rare
Balistidae	<i>Odonus niger</i>	Abundant	Abundant
Balistidae	<i>Sufflamen bursa</i>	Rare	Rare
Balistidae	<i>Balistapus undulatus</i>	Rare	Rare
Chaetodontidae	<i>Forcipiger flavissimus</i>	Rare	Rare
Chaetodontidae	<i>Chaetodon kleinii</i>	Rare	Rare
Chaetodontidae	<i>Hemitaurichthys zoster</i>	Rare	Rare
Cirrhitidae	<i>Cirrhitichthys oxycephalus</i>	Rare	Rare

Gobiidae	<i>Eviota sebreei</i>	Rare	Rare
Gobiidae	<i>Eviota sigillata</i>	Rare	Rare
Haemulidae	<i>Plectorhincus vittatus</i>	Rare	Rare
Holocentridae	<i>Myripristis pralinia</i>	Rare	Rare
Labridae	<i>Thalassoma hardwicke</i>	Rare	Rare
	<i>Thalassoma</i>		
Labridae	<i>amblycephalum</i>	Common	Rare
Labridae	<i>Labroides dimidiatus</i>	Rare	Common
Nemipteridae	<i>Scolopsis bilineata</i>	Rare	Rare
Pomacanthidae	<i>Centropyge multispinis</i>	Rare	Rare
Pomacentridae	<i>Chromis dimidiata</i>	Abundant	Abundant
Pomacentridae	<i>Pomacentrus philippinus</i>	Rare	Rare
Pomacentridae	<i>Chromis viridis</i>	Rare	Rare
Scaridae	<i>Chlorurus frenatus</i>	Rare	Rare
Serranidae	<i>Cephalopholis argus</i>	Rare	Rare
Serranidae	<i>Pseudanthias evansi</i>	Abundant	Rare
	<i>Pseudanthias</i>		
Serranidae	<i>squamipinnis</i>	Rare	Rare

Appendix 5: Other Site Photos (from Contractor)



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

2. HSE INDUCTION

6 AAJV Personals, 16 subcontractor Personals and 11 visitors were provided HSE Induction



3. TRAINING

- On 4th October Working at Height Training Conducted
- On 8th October PTW Workshop Conducted
- On 9th October Fire Watcher Training conducted
- On 12th October Power and Hand tools safety Training conducted
- On 15th October GRM Awareness training was conducted
- On 21st October Lifting and Rigging Safety Training conducted
- On 24th October Emergency Response Training conducted



4. TOOLBOX TALK

This month 77nos Toolbox was conducted including subcontractor
The topic was covered below as

- Manual Handling
- Health and Hygiene
- Slip, Trip & Fall Hazards
- Working at height
- Adverse weather condition
- Emergency Response
- Safe use of a ladder
- Electrical Hazards
- Power Tools and Hand Tools Safety
- Hot Work
- Chemical Handling
- Housekeeping
- PPE
- Lifting Hazards
- Welding, Cutting and Grinding Safety
- Formworks, & Concrete works
- Noise
- Open Hole and Barricade and warning signage
- Safe Driving of plant and equipment
- Dewatering Safety requirements



5. DBO HSE MANAGEMENT MEETING

- On the 4th, 11th, 18th and 25th, of October, 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
 - HSE Training
 - HSE Inspection Tracker and NCR Status
 - Environmental Monitoring during the construction stage
 - Batching Plant Operation (Plant and Equipment)



6. INTERNAL HSE MEETING

On the 7th and 15th of October AAJV, Internal weekly HSE was conducted and the following topics were discussed

- HSE Observation
- Improvement of PTW Systems
- Comply with Plant and equipment
- Comply with PPE



7. AAJV MANAGEMENT SITE VISIT

- From the 17th and 18th of October, AAJV senior Management visited the site



8. DBO / MOE WEEKLY HSE INSPECTION

On the 11th On 31st of October Weekly HSE Inspection was carried out by DBO and ER Representative, The Inspection report will be prepared and submitted to the EPC contractor for closeout action



9. INTERNAL HSE 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
- Permit Audit
- Lifting Equipment Inspection
- Overall Site Inspection
- Camp Inspection



Fire Extinguisher Inspection



Power tools Inspection



Hand tools Inspection



Ladder Inspection



Harness Inspection



Plant and Equipment Inspection



Plant and Equipment Inspection



PPE Inspection



PPE Inspection



Lifting slings Inspection



Lifting slings Inspection



PTW Audit

10. INTERNAL HSE AUDIT

- On the 24th and 25th of October Internal HSE Audit was carried out on the HR Procedure, HSE Plan and Chemical Management Plan



11. HOUSEKEEPING

- There were 5 mass housekeeping carried out
- Daily housekeeping is carried out on a daily basis



12. IMPROVEMENTS / GOOD PRACTICE



Safety Award presented to Safe Operator of the Month



Safety Award presented to Safe Employee of the Month



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

2. HSE INDUCTION

4 AAJV Personals, 8 subcontractor Personals and 12 visitors were provided HSE Induction



3. TRAINING

- On 5th November Emergency Response Training Conducted
- On 8th November Manual Handling Training Conducted
- On 11th November Scaffolding Safety Training conducted
- On 13th November Incident Reporting Procedure Training conducted
- On 20th November Lifting and Rigging Training conducted



4.TOOLBOX TALK

This month 95nos Toolbox was conducted including subcontractor

The topic was covered below as

- Manual Handling
- Excavation Safety
- Health and Hygiene
- Slip, Trip & Fall Hazards
- Working at height
- Adverse weather condition
- Emergency Response
- Safe use of a ladder
- Electrical Hazards
- Power Tools and Hand Tools Safety
- Hot Work
- Chemical Handling
- Housekeeping
- PPE
- Lifting Hazards
- Welding, Cutting and Grinding Safety
- Formworks, & Concrete works
- Noise
- Open Hole and Barrication and warning signage
- Safe Driving of plant and equipment
- Dewatering Safety requirements



5. DBO HSE MANAGEMENT MEETING

- On the 1st, 8th, 15th and 29th of November, 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
 - HSE Training
 - HSE Inspection Tracker and NCR Status
 - Environmental Monitoring during the construction stage
 - Batching Plant Operation (Plant and Equipment)



6. INTERNAL HSE MEETING

On the 25th of November AAJV, Internal weekly HSE was conducted and the following topics were discussed

- HSE Observation
- Improvement of PTW Systems
- Comply with Plant and equipment
- Comply with PPE
- Inspect Excavation at Buker Area



7. ADB / MOE / FITCHNER VISIT

- On the 6th of November from ADB Independent Auditor Mr. Nick visited the site
- On the 12th MoE Representative visited the site
- On the 21st MoE/ Fitchner / DBO visited the site



8. MEETING WITH STAKEHOLDERS OF WAMCO

On November 30th, a meeting was held with WAMCO stakeholders to discuss the control measures implemented by WAMCO regarding the landfill dumping yard operations and their potential impact on the WTE Project site.



9. DBO WEEKLY HSE INSPECTION

On the 27th of November, the Weekly HSE Inspection was carried out by the DBO, The Inspection report will be prepared and submitted to the EPC contractor for closeout action



10. INTERNAL HSE 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
- Permit Audit
- Lifting Equipment Inspection
- Overall Site Inspection
- Camp Inspection
- Smoke Detector Inspection



Fire Extinguisher Inspection



Power tools Inspection



Hand tools Inspection



Ladder Inspection



Harness Inspection



Plant and Equipment Inspection



Plant and Equipment Inspection



PPE Inspection



PPE Inspection



Lifting slings Inspection



Lifting slings Inspection



Smoke Detector Inspection



Camp, Clinic and Security Inspection



Camp, Clinic and Security Inspection



PTW Audit

11. INTERNAL HSE AUDIT

- On the 26th and 28th of November Internal HSE Audit was carried out on the Emergency Response Plan, Construction Camp and Management Plan and Public Health, Safety and Security Plan



12. HOUSEKEEPING

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



13. EVACUATION DRILL



Evacuation drill was conducted on 18th of November, to test the awareness and effectiveness of the workforce in case of emergency situation arises at the site, how does the evacuation procedure effectively function as per the Emergency Response Plan at Waste to Energy Facility while carrying out construction activities

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7 PICTURES OF SAPMLING FOR ENVIRONMENTAL MONITORING

7.1 AMBIENT AIR MONITORING IN NOVEMBER 2023



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7.2 NOISE MONITORING IN NOVEMBER 2023



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7.3 WATER SAMPLING



Dewatering Discharge



STP



Drinking Water



Water for Construction and Camp

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GROUND WATER



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MARINE WATER



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7.4 CONDITION CAMP CONSTRUCTION AND DISPOSAL AREA CONSTRUCTIONS

The construction for new accommodations for staff and workers has been continued.



The wastes send it to WAMCO in weekly basis from temporary waste storage.





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

2. HSE INDUCTION

8 AAJV Personals, 7 subcontractor Personals, 2 DBO/ ADB personals 11 visitors were provided HSE Induction



3. TRAINING

- On 10th December Flagman Training conducted
- On 12th December Security Management Training conducted
- On 14th December Risk Assessment Training Procedure training conducted
- On 14th December Incident Reporting Procedure Training conducted
- On 23rd December Driving Safety Awareness Training conducted
- On 23rd December HSE Re Induction provided
- On 24th December Vectors based on diseases Awareness training provided
- On 28th December Onsite Power tools training provided



4.TOOLBOX TALK

This month 54nos Toolbox was conducted including subcontractor

The topic was covered below as

- Manual Handling
- Excavation Safety
- Health and Hygiene
- Slip, Trip & Fall Hazards
- Working at height
- Adverse weather condition
- Emergency Response
- Safe use of a ladder
- Electrical Hazards
- Power Tools and Hand Tools Safety
- Hot Work
- Chemical Handling
- Housekeeping
- PPE
- Lifting Hazards
- Welding, Cutting and Grinding Safety
- Formworks, & Concrete works
- Noise
- Open Hole and Barrication and warning signage
- Safe Driving of plant and equipment
- Dewatering Safety requirements
- Batching Plant Operation



5. DBO HSE MANAGEMENT MEETING

- On the 6th, 20th and 27th of December, the DDO HSE Management Meeting was Conducted and the following topics were discussed
 - Toolbox Talk
 - Manpower and Site Activity
 - Security Arrangements at the site
 - Permit to Work System
 - Pending HSE Documents Approval
 - HSE Training
 - HSE Inspection Tracker and NCR Status
 - Environmental Monitoring during the construction stage
 - Batching Plant Operation (Plant and Equipment)



6. INTERNAL HSE MEETING

On the 16th of December AAJV, Internal weekly HSE was conducted and the following topics were discussed

- HSE Observation
- Improvement of PTW Systems
- Comply with Plant and equipment
- Comply with PPE
- Inspect Excavation at Buker Area
- Batching Plant Operation
- Risk Assessment and SOP



7. ADB / MOE / VISIT

- On 13th and 14th December, ADB Safeguard specialist Mr. Sandeep Uttarwar visited the site along with MoE
- On 16th December Occupational Health and Safety Assessment Conducted on EPC Contractor





8. INTERNAL HSE 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
- Permit Audit
- Lifting Equipment Inspection
- Overall Site Inspection
- Camp Inspection
- Smoke Detector Inspection
- Chemical Storage Inspection
- Warehouse Inspection



Fire Extinguisher Inspection



Power tools Inspection



Hand tools Inspection



Ladder Inspection



Harness Inspection



Plant and Equipment Inspection



Plant and Equipment Inspection



PPE Inspection



PPE Inspection



Chemical Storage Inspection



Chemical Storage Inspection



Warehouse Inspection



Lifting slings Inspection



Lifting slings Inspection



Smoke Detector Inspection



Camp, Clinic and Security Inspection



Camp, Clinic and Security Inspection



PTW Audit

9. INTERNAL HSE AUDIT

- On the 23rd and 24th of December, an Internal HSE Audit was carried out on the Risk Assessment Procedure, Security Management Plan and CEMP



10. HOUSEKEEPING

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



11. GOOD PRACTICE / IMPROVEMENT



Safety Award Presented for Safe Employee of the Month



Well-traffic management controlled at the outside boundary



Appropriate mandatory signage placed at the worksite



Safety Award Presented for Safe Employee of the Month



Excavation at the bunker area provided the necessary warning flickering lights and control of entry



workers are all PPE (dust mask, hearing protection etc.) Compliance while cutting of spun pile

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6 PICTURES OF SAPMLING FOR ENVIRONMENTAL MONITORING

7.1 AMBIENT AIR MONITORING IN DECEMBER 2023



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7.2 NOISE MONITORING IN DECEMBER 2023

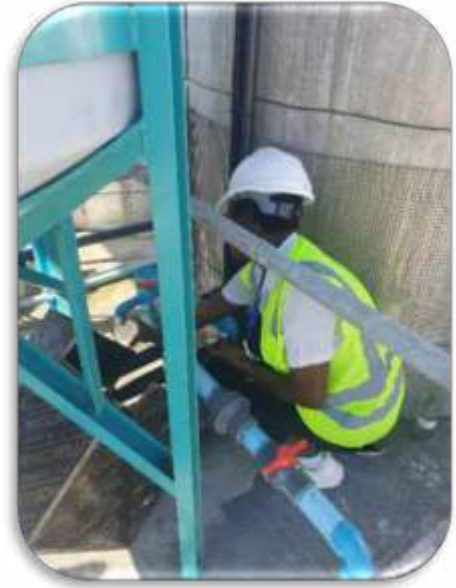


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7.3 WATER SAMPLING



Dewatering Discharge



STP



Drinking Water



Water for Construction and Camp

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7.4 CONDITION CAMP CONSTRUCTION AND DISPOSAL AREA CONSTRUCTIONS

The construction for new accommodations for staff and workers has been continued.



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The wastes send it to WAMCO in weekly basis from temporary waste storage.

