MJTD

Thilawa Special Economic Zone (Zone A) Development

Environmental Monitoring Report (Operation Phase)

Myanmar Japan Thilawa Development Limited.

October 2024

CONTENTS

Appendix

1. Executive Summary

The environmental inspection and compliance monitoring program will be implemented under the direction of Ministry of Natural Resources and Environmental Conservation with oversight by Thilawa SEZ Management Committee.

The monitoring record from April 2024 to September 2024 according to the Environment Monitoring Plan is submitted in conformity with the provision of Chapter 9.1, Table 9.1-3 and 9.2, Table 9.2-3 Content of the EIA Report of Thilawa SEZ Development Project (Zone A).

2. Summary of Monitoring Activities

a) Progress made to date on the implementation of the EMP against the submitted implementation schedule;

We already submitted EMP for TSEZ Zone-A as following table.

Report No.	Description	Phase	Submission
1	Environmental Monitoring Report	Phase-1 Operation Phase	April, 2016
2	Environmental Monitoring Report	Phase-1 Operation Phase	October, 2016
3	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2017
4	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2017
5	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2018
6	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2018
7	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2019
8	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2019
9	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2020
10	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2020
11	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2021
12	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2021
13	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2022
14	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2022
15	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2023
16	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2023
17	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	April, 2024
18	Environmental Monitoring Report	Phase-1 & 2 Operation Phase	October, 2024

Report (No.18) is submitted this day attached with Operation Phase implementation schedule. Subsequent Operation Phase reports will be submitted on Bi-Annually.

b) Difficulties encountered in implementing of the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties;

Required clear guideline for the reference and target standard of water (such as surface water, wastewater, ground water etc.) in order to report TSEZ discharging impact.

c) **Number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation;**
None

d) **Accidents or incidents relating to the occupational and community health and safety, and the environment:**
Please refer to the attached Environmental Monitoring Form.

e) **Monitoring data on environmental parameters and conditions as committed in the EMP or otherwise required.**
Please refer to the attached Environmental Monitoring Form.

3. Monitoring Result

Environmental Monitoring plan report for Operation Phase implemented according to the following table, reference on Table 4.2-3, Chapter 4, EIA Report

Monitoring Plan (Operation Phase)

Category	Item	Location	Frequency	Remark
Air Quality	NO_2, SO_2, CO, TSP, PM_{10}	Representative point inside TSEZ Zone-A area	1 week each in dry and wet season (First 3 years after operation stage)	February 2024, Air quality monitoring report (Bi-Annually)
Water Quality	Water temperature, pH, SS, DO, BOD, COD, T-coliform T-N, T-P, Color and odor, HS, HCN, Oil and grease, Formaldehyde, Phenols, Cresols Free Chlorine, Zinc, Chromium, Arsenic, Copper, Mercury, Cadmium, Barium, Selenium, Lead and Nickel	Discharging points and reference points (6 points) which including outflow of retention pond to the river (1 point) Well in the Monastery (1 point)	Bi-monthly for water, temperature, pH, SS, DO, BOD, COD, T-Coliform, T-N, T-P, Color and odor Bi-annually for all parameters	February, April 2024, Water and waste water quality monitoring report (Bi-Monthly) June 2024, Water and wastewater quality monitoring report (Bi-Annually) National Surface Water Quality Standard (Myanmar) will be referred and included in December 2024
Waste	Status of non-hazardous waste management Status of hazardous waste management	Each tenant	Twice/ year (Submission of environmental reports by tenants	General waste disposal record (Waste generated from common area of TSEZ)
Soil Contamination	-Status of control of solid and liquid waste which causes soil contamination	Each tenant	Twice/year (Submission of environmental report by tenants)	June 2024, Soil quality monitoring report (Twice/year)
Noise and Vibration	Noise level at the monastery and residences to check effect of buffer zone for sound proofing to	Each tenant	One time in each dry and wet season (First 3 years after operation stage)	February 2024, Noise and vibration Monitoring Report (Bi-Annually)
Ground Subsidence	Ground elevation Consumption of ground water amount	Representative site (1 point)	Weekly	Refer to Environmental Monitoring form
Offensive Odor	Status offensive odor control by tenants	Each tenant	Twice/ year (Submission of environmental report by tenants)	Refer to Environmental Monitoring form
Bottom Sediment	Combined with water quality monitoring	Same as water quality monitoring	Same as water quality monitoring	Refer to Environmental Monitoring Form
Hydrological situation	Combined with ground subsidence monitoring	Same as ground subsidence monitoring	Same as ground subsidence monitoring	Refer to Environmental Monitoring Form
Risk for infectious disease such as AIDS/HIV	Status of measures of infectious disease	Each tenant	Twice/year (Submission of environmental report by tenants)	Refer to Environmental Monitoring form

Category	Item	Location	Frequency	Remark
Working conditions (including occupational safety)	Prehension of condition of occupational safety and health Prehension of infectious disease	Work site	Twice/year (Submission of environmental report by tenants)	
Accident	Existence of accident	Work site	As occasion arise	-

*Remark: Each locator will report their monitoring result directly to Environmental Section, One Stop Service Center, Thilawa SEZ Management Committee.

Myanmar Japan Thilawa Development Limited
MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Environment Monitoring Form

Environment Monitoring Form

The latest results of the below monitoring items shall be submitted to Authorities on once at Pre-construction phase and on quarterly basis at Construction Phase, and on bi-annually base at Operation Phase. The items, standards to be applied, measurement points, and frequency for each monitoring parameter are established based on the EIA Report for Thilawa Special Economic Zone Development Project (Zone A). Should there be any changes to the original plan, such change shall be reviewed and evaluated by environmental expert.

(1) General

1) Phase of the Project

- Please mark the current phase.

□ Pre-Construction Phase □ Construction Phase ☑ Operation Phase

2) Obtainment of Environmental Permits (Not Applicable)

Name of permits	Expected issuance date	Actual issuance date	Concerned authority	Remarks (Conditions, etc.)
Confirming report of Environmental Impact Assessment		3rd December 2013 စာအမှတ်၊သလဝ-၁/TSEZ/၂၀၁၃ (၅၀)	Thilawa SEZ Management Committee	
Notification of the comments of Ministry of Natural Resources and Environmental Conservation regarding with the Standard Change of Wastewater Quality of Industrial Zone, Internal Regulations of Thilawa SEZ Zone-A	5th January 2018	10th January 2018 Ref: Thilawa-2/TSEZ/2018(033)	Thilawa SEZ Management Committee	

3) Response/Actions to Comments and Guidance from Government Authorities and the Public (Not Applicable)

Monitoring Item	Monitoring Results during Report Period	Duration of Report Period	Frequency
Number and contents of formal comments made by the public		Same timing of submission of Monitoring Report	Upon receipt of comments/complaints
Number and contents of responses from Government agencies			

(2) Monitoring Results

1) Ambient/ Air Quality – 5 to 12 February 2024

NO_2, SO_2, CO, TSP, PM10

Location	Item	Unit	Measured Value (Mean)	Measured Value (Min~Max.)	Country's Standard	Target value to be applied	*Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
Centralized Sewage treatment plant area	NO_2	mg/m³	0.045	0.008 - 0.110	Refer to NEQG	0.11	Japan	1 week each in dry and wet season	HAZSCANNER, EPAS	
	SO_2	mg/m³	0.017	0.012 – 0.025		0.11	Japan		HAZSCANNER, EPAS	
	CO	mg/m³	0.174	0.010 - 0.740		11.45	Japan		HAZSCANNER, EPAS	
	TSP	mg/m³	0.227	0.031 – 0.484		< 0.33	Thailand		HAZSCANNER, EPAS	
	PM10	mg/m³	0.083	0.011 – 0.176		< 0.12	Thailand		HAZSCANNER, EPAS	

***Remark:** Referred to the Japan and Thailand Standard (EIA Report, Table 6.4-1) and Air Quality Monitoring Report (February 2024)

Complains from Residents

- Are there any complaints from residents regarding air quality in this monitoring period? □Yes, ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Complaints from Residents	Countermeasures

2)(a) Water Quality – February 2024

Measuring Point: Effluent of Wastewater (Thilawa SEZ discharging point which need to be monitored according to EIA are SW-1, SW-5 and SW-6. SW-2 and SW-4 natural creek water which are combine all the wastewater from the Local industrial water and domestic water from existing living environment are attach as reference points only. GW-1 is also as reference point for monitoring of existing tube well located in the Monastery compound.)

- Are there any effluents to water body in this monitoring period? □ Yes, ☑ No

If yes, please attach "Analysis Record" and fill in the items not to comply with Referred International Standard.

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-1 (Discharged Point) Sampling on 6 February 2024	pH*4	-	9.6	6-9	6-9	>=4	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	10.10	-	-			Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	22	50	50			APHA 2540D Method	
	BOD	mg/L	5.31	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	30.1	250	125			APHA 5220D Method	
	Total coliforms*3	MPN/100ml	>160000	400	400	7.5×10³		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	6.9	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.54	2	2			APHA 4500-PE	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-1 (Discharged Point) Sampling on 6 February 2024	Color	TCU	10.44	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	2	-	-			APHA 2150B	
	Total Dissolved solids (TDS) *7	mg/L	468	-	2000			APHA 2540C	
	Iron*7	mg/L	0.744	3.5	3.5			APHA 3120 B	
	Mercury*7	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
SW-5 **(Discharged Point)** Sampling on 6 February 2024	pH	-	9	6-9	6-9		Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	7.51	-	-	>=4		Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	12	50	50			APHA 2540D Method	
	BOD	mg/L	15.18	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	19.6	250	125			APHA 5220D Method	
	Total coliforms*3	MPN/100ml	540000	400	400	7.5×10^3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	1	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.10	2	2			APHA 4500-PE	
	Color	TCU	8.55	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	1	-	-			APHA 2150B	
	Total Dissolved solids (TDS) *7	mg/L	182	-	2000			APHA 2540C	
	Iron*7	mg/L	0.832	3.5	3.5			APHA 3120 B	
	Mercury*7	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-6 (STP outlet) Sampling on 6 February 2024	pH	-	6.1	6-9	6-9		Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	7.19	-	-	>=4		Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	2	50	50			APHA 2540D Method	
	BOD	mg/L	3.68	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	7.9	250	125			APHA 5220D Method	
	Total coliforms	MPN/100ml	< 1.8	400	400	7.5×10^3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	16.2	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.91	2	2			APHA 4500-PE	
	Color	TCU	4.71	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	1	-	-			APHA 2150B	
	Total Dissolved solids (TDS) *7	mg/L	546	-	2000			APHA 2540C	
	Iron*7	mg/L	0.018	3.5	3.5			APHA 3120 B	
	Mercury*7	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-2 (Reference Point) Sampling on 6 February 2024	pH	-	6.8	6-9	6-9		Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	3.88	-	-	>=4		Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	20	50	50			APHA 2540D Method	
	BOD	mg/L	11.63	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	36.8	250	125			APHA 5220D Method	
	Total coliforms*5	MPN/100ml	> 160000	400	400	7.5×10^3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	2.8	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.21	2	2			APHA 4500-PE	
	Color	TCU	18.43	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	1	-	-			APHA 2150B	
	Total Dissolved solids (TDS) *7	mg/L	1932	-	2000			APHA 2540C	
	Iron*7	mg/L	1.164	3.5	3.5			APHA 3120 B	
	Mercury*7	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
SW-4 (Reference Point) Sampling on 6 February 2024	pH	-	8	6-9	6-9		Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	5.22	-	-	>=4		Instrument Analysis Method	
	Suspended Solids (SS) *6	mg/L	528	50	50			APHA 2540D Method	
	BOD	mg/L	3.50	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	11.7	250	125			APHA 5220D Method	
	Total coliforms*5	MPN/100ml	> 160000	400	400	7.5×10^3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	7.1	-	80			HACH Method 10072	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-4 (Reference Point) Sampling on 6 February 2024	Total Phosphorous (T-P)	mg/L	1.05	2	2			APHA 4500-PE	
	Color	TCU	11.29	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	1	-	-			APHA 2150B	
	Total Dissolved solids*5 (TDS) *7	mg/L	604	-	2000			APHA 2540C	
	Iron*7, *8	mg/L	24	3.5	3.5			APHA 3120 B	
	Mercury*7	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
GW-1 (Reference Point) Sampling on 6 February 2024	pH	-	7.9	None (Available Guideline determined by MOREC)	6-9	5.5 – 8.5	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	6.11		-	-		Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	4		50	-		APHA 2540D Method	
	BOD	mg/L	0.11		30	-		APHA-5210B Method	
	COD(Cr)	mg/L	< 0.7		125	-		APHA 5220D Method	
	Total coliforms*9	MPN/100ml	140		400	3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	3.9		80	-		HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.13		2	-		APHA 4500-PE	
	Color	TCU	1.41		150 Co.Pt *	-		APHA 2120C	
	Odor	TON	1		-	-		APHA 2150B	
	Total Dissolved solids (TDS) *7	mg/L	1396		2000	1500		APHA 2540C	
	Iron*7	mg/L	0.498		3.5	5		APHA 3120 B	
	Mercury*7	mg/L	≤ 0.002		0.005	0.01		APHA 3120 B	

* Remark: TCU color unit is equivalent with Co.Pt as described in Target Value.

*[1]Remark: Referred to the Vietnam Standard (EIA Report), Reference to the Water Quality Monitoring Report, February 2024. February 2024 water quality report was received in this monitoring period of April 2024 to August 2024.

*[2]Remarks: There is no current country standard but Ministry of Natural Recourses and Environmental Conservation submitted the National Emission Quality Guidelines (NEQG) for environmental guidelines. The guidelines filled as the country standards in the environmental monitoring form.

*[3]Remark: At SW-1 and SW-5, total coliform was higher than the target value due to the expected reason i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, and ii) the heavy rainfall and stormwater runoff can wash contaminants from the surroundings into the retention pond and retention canal, and this runoff may contain fecal matter and other pollutants, leading to increased coliform levels. Total coliform do not affect human health directly, self-monitoring for E.Coli analysis was carried out to identify health impact by coliform bacteria. As for the result of E. Coli for SW-1 was < 1.8 and it was under the reference target value. It is considered that there is no significant impact to human health.

*[4] Remark: At SW-1 the result of pH was higher than the target value due to expected reason i) maybe due to no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of warmer temperature and abundant sunlight in winter season and their rapid carbon dioxide uptake may cause high pH level. Moreover, bicarbonate and carbonate are negatively charged ions (anions) common in most waters and the chemical interactions among carbon dioxide, hydrogen ions and anions that produce alkalinity buffer which can increase pH value. Currently, as the aquatic animals are still alive, the high pH level may not affect the aquatic ecosystem in the retention pond.

*[5] Remark: For reference monitoring points at SW-2 and SW-4, the result of total coliforms is higher than the standard due to expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) heavy rainfall and stormwater runoff can wash contaminants from the surroundings into Shwe Pyauk creek, and this runoff may contain fecal matter and other pollutants, leading to increased coliform levels, and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

*[6] Remark: At SW4, the results of SS was higher than standard due to expected reason of i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

*[7] Remark: Recommendation from JICA Environmental expert (TSMC), to be more emphasized on Environmental and analyzing only.

*8 Remark: At SW-4, the results of Iron was higher than the target value due to the expected reason i) maybe due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off or strong wind.

*9Remark: At GW-1 Total coliform exceeded due to expected reason i) may be possible due to the poor maintenance of well which can increase the risk of bacteria and other harmful organisms. However, the result of E. Coli of (GW-1) was under the reference value. Therefore, although the target value of total coliform exceeded at monitoring point of (GW-1), it is considered that there is no significant impact on human health.

Note: Ground water for GW-1, it was compared with Vietnam Groundwater Standard (No: QCVN 09-MT:2015/BTNMT) above table and at the Appendix Attachment of Water Quality Monitoring Report (February 2024). In February 2024 Report, GW-1 was compared with Vietnam Groundwater Standard. Target Value for GW is just a reference as there is no country standard yet.

2)(b) Water Quality – April 2024

Measuring Point: Effluent of Wastewater (Thilawa SEZ discharging point which need to be monitored according to EIA are SW-1, SW-5 and SW-6. SW-2 and SW-4 natural creek water which are combine all the wastewater from the Local industrial water and domestic water from existing living environment are attach as reference points only. GW-1 is also as reference point for monitoring of existing tube well located in the Monastery compound.)

- Are there any effluents to water body in this monitoring period? □ Yes, ☑ No

If yes, please attach "Analysis Record" and fill in the items not to comply with Referred International Standard.

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-1 (Discharge point)	pH*5	-	10.3	6-9	6-9	>=4	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	11.63	-	-			Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	18	50	50			APHA 2540D Method	
	BOD	mg/L	12.07	50	30			APHA-5210B Method	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-1 (Discharge point) Sampling on 24 April 2024)	COD(Cr)	mg/L	30.3	250	125			APHA 5220D Method	
	Total coliforms*3	MPN/100ml	1000	400	400	7.5×10^3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	1.3	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.26	2	2			APHA 4500-PE	
	Color	TCU	9.25	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	2	-	-			APHA 2150B	
	Total Dissolved solids (TDS) *6	mg/L	502	-	2000			APHA 2540C	
	Iron*6	mg/L	0.606	3.5	3.5			APHA 3120 B	
	Mercury*6	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
SW-5 (Discharge Point) Sampling on 24 April 2024	pH	-	9	6-9	6-9	>=4	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	6.27	-	-			Instrument Analysis Method	
	Suspended Solids (SS)*4	mg/L	136	50	50			APHA 2540D Method	
	BOD	mg/L	14.87	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	74.2	250	125	7.5×10^3		APHA 5220D Method	
	Total coliforms*3	MPN/100ml	> 160000	400	400			APHA 9221B	
	Total Nitrogen (T-N)	mg/L	2.2	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.37	2	2			APHA 4500-PE	
	Color	TCU	9.25	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	2	-	-			APHA 2150B	
	Total Dissolved solids	mg/L	310	-	2000			APHA 2540C	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
	(TDS)								
	Iron*6,*7	mg/L	9.6	3.5	3.5			APHA 3120 B	
	Mercury*6	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
SW-6 (STP outlet) Sampling on 24 April 2024	pH	-	6.8	6-9	6-9	>=4	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	5.82	-	-			Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	4	50	50			APHA 2540D Method	
	BOD	mg/L	16.54	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	33.4	250	125			APHA 5220D Method	
	Total coliforms	MPN/100ml	170	400	400			APHA 9221B	
	Total Nitrogen (T-N)	mg/L	10.9	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	< 0.05	2	2			APHA 4500-PE	
	Color	TCU	11.75	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	1.4	-	-	7.5×10^3		APHA 2150B	
	Total Dissolved solids (TDS) *6	mg/L	578	-	2000			APHA 2540C	
	Iron*6	mg/L	0.032	3.5	3.5			APHA 3120 B	
	Mercury*6	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
SW-2 (Reference Point)	pH	-	7.1	6-9	6-9	>=4	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	4.65	-	-			Instrument Analysis Method	
	Suspended Solids (SS)*9	mg/L	70	50	50			APHA 2540D Method	
	BOD	mg/L	11.67	50	30			APHA-5210B Method	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-2 (Reference Point) Sampling on 24 April 2024	COD(Cr)	mg/L	33.1	250	125	7.5×10^3		APHA 5220D Method	
	Total coliforms*8	MPN/100ml	24000	400	400			APHA 9221B	
	Total Nitrogen (T-N)	mg/L	0.9	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	< 0.05	2	2			APHA 4500-PE	
	Color	TCU	15.5	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	1.4	-	-			APHA 2150B	
	Total Dissolved solids (TDS) *6, *9	mg/L	3258	-	2000			APHA 2540C	
	Iron*6, *10	mg/L	4.020	3.5	3.5			APHA 3120 B	
	Mercury*6	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
SW-4 (Reference Point) Sampling on 24 April 2024	pH	-	7.5	6-9	6-9	>=4	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	4.99	-	-			Instrument Analysis Method	
	Suspended Solids (SS)*9	mg/L	198	50	50			APHA 2540D Method	
	BOD	mg/L	10.31	50	30			APHA-5210B Method	
	COD(Cr)	mg/L	21.6	250	125			APHA 5220D Method	
	Total coliforms*8	MPN/100ml	> 160000	400	400	7.5×10^3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	1.5	-	80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.14	2	2			APHA 4500-PE	
	Color	TCU	8	-	150 Co.Pt *			APHA 2120C	
	Odor	TON	1.4	-	-			APHA 2150B	
	Total Dissolved solids	mg/L	3700	-	2000			APHA 2540C	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequ-ency	Method	Note (Reason of excess of the standard)
SW-4 (Reference Point)	(TDS) *6, *9								
	Iron*6, *10	mg/L	22.080	3.5	3.5			APHA 3120 B	
	Mercury*6	mg/L	≤ 0.002	0.01	0.005			APHA 3120 B	
GW-1 (Reference Point) Sampling on 24 April 2024	pH	-	7.9	None (Available Guideline determined by MOREC)	6-9	5.5~9.0	Once in two months	Instrument Analysis Method	
	Dissolved Oxygen (DO)	mg/L	6.7		-	>=4		Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	10		50	50		APHA 2540D Method	
	BOD	mg/L	3.41		30	15		APHA-5210B Method	
	COD(Cr)	mg/L	5.1		125	30		APHA 5220D Meth od	
	Total coliforms *11	MPN/100ml	92,000		400	7.5×10^3		APHA 9221B	
	Total Nitrogen (T-N)	mg/L	1.1		80			HACH Method 10072	
	Total Phosphorous (T-P)	mg/L	0.11		2			APHA 4500-PE	
	Color	TCU	4.25		150 Co.Pt *			APHA 2120C	
	Odor	TON	1		-			APHA 2150B	
	Total Dissolved solids (TDS) *6	mg/L	1418		2000			APHA 2540C	
	Iron*6	mg/L	0.902		3.5			APHA 3120 B	
	Mercury*6	mg/L	≤ 0.002		0.005			APHA 3120 B	

* Remark: TCU color unit is equivalent with Co.Pt as described in Target Value.

*1Remark: Referred to the Environment Vietnam Standard (EIA Report), Reference to the Water Quality Monitoring Report, April 2024.

*2Remarks: There is no current country standard but Ministry of Natural Recourses and Environmental Conservation submitted the National Emission Quality Guidelines (NEQG) for environmental guidelines. The guidelines filled as the country standards in the environmental monitoring form.

*3 Remark: At SW-1 and SW-5, the results of T-Coli were higher than standard due to the expected reason i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, and ii) the heavy rainfall and stormwater runoff can wash contaminants from the surroundings into the retention pond and retention canal, and this runoff may contain fecal matter and other pollutants, leading to increased coliform levels. Total coliform do not affect human health directly, self-monitoring for E.Coli analysis was carried out to identify health impact by coliform bacteria. As for the result of E. Coli for SW-1 andSW-5 we < 1.8 and it were under the reference target value. It is considered that there is no significant impact to human health.

*4 Remark: At SW-5, the results of SS was higher than standard due to the expected reason i) due to the surface water run-off from bare land in Zone A.

*5 Remark: At SW-1 the result of pH higher than standard due to expected reason i) no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of hotter temperature and abundant sunlight in summer season and their rapid carbon dioxide uptake may cause high pH level. Moreover, bicarbonate and carbonate are negatively charged ions (anions) common in most waters and the chemical interactions among carbon dioxide, hydrogen ions and anions that produce alkalinity buffer which can increase pH value. Currently, as the aquatic animals are still alive, the high pH level may not affect the aquatic ecosystem in the retention pond.

*6 Remark: Recommendation from JICA Environmental expert (TSMC), to be more emphasized on Environmental and analyzing only.

*7 Remark: At SW-5 the result of iron was exceeded than target value due to expected reason may be due to the influence of natural origin (iron can reach out from soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off. Japan set effluent standards for two items as follows; i) health item and ii) living environment item. In the health item, there is no standard value for iron. On the other hand, for the living environment item, the standard value for soluble iron level is 10 mg/l as prescribed in Japan Effluent Standard, 21 October 2015. As the comparison with the living environment standard value in Japan, iron result in (SW-5) was within the limitation. Therefore, it can be considered that there is no significant impact on the living environment.

*8 Remark: At SW-2 and SW-4, the results of Total Coliform were higher than target value due to three expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) heavy rainfall and stormwater runoff can wash contaminants from the surroundings into Shwe Pyauk creek, and this runoff may contain fecal matter and other pollutants, leading to increased coliform levels, and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

*9 Remark: At SW-2 and SW-4, the results of SS and TDS exceeded than standard due to expected reason of i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

*10 Remark: At SW-2 and SW-4, the results of iron were higher than the target value due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off.

*11 Remark: At GW-1, the result of T-Coli exceeded than target value due to expected reason may be due to the poor maintenance of well which can increase the risk of bacteria and other harmful organisms.

Note: Ground water for GW-1, it was compared with Vietnam Groundwater Standard (No: QCVN 09-MT:2015/BTNMT) above table and at the Appendix Attachment of Water Quality Monitoring Report. Target Value for GW is just a reference as there is no standard yet.

2)(c) Water Quality – June 2024

Measuring Point: Effluent of Wastewater

- Are there any effluents to water body in this monitoring period? □Yes, ☑ No

If yes, please attach "Analysis Record" and fill in the items not to comply with Referred International Standard.

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
SW-1	Temperature	℃	29	< 3 (increase)	≤ 35		Once per	Instrument Analysis Method	
(Discharge	pH	-	7.4	6-9	6~9	5.9-9	6 months	Instrument Analysis Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
d Point)	Suspended Solids (SS)	mg/L	20	50	50	50		APHA 2540 D Method	
	Dissolved Oxygen (DO)	mg/L	4.95	-	-	>=4		Instrument Analysis Method	
	BOD (5)	mg/L	8.59	50	30	15		APHA 5210 B Method	
	COD (Cr)	mg/L	18	250	125	30		APHA 5220D Method	Refer to water
	Total Coliform*3	MPN/100ml	24000	400	400	7500		APHA 9221B Method	quality report
	Total Nitrogen (T-N)	mg/L	0.9	-	80			HACH Method 10072 Method	
	Total Phosphorous (T-P)	mg/L	0.10	2	2			APHA 4500-P E Method	
SW-1	Color	TCU	8.63	-	150 Co.Pt *			APHA 2120C Method	
(Discharge	Odor	TON	3	-	-			APHA 2150 B Method	
d Point)	Oil and Grease	mg/L	<3.1	10	10			APHA 5520B Method	
Sampling	Mercury	mg/L	≤ 0.002	0.01	0.005	0.001		APHA 3120 B Method	
on 6 June	Zinc	mg/L	≤ 0.002	2	2	1.5		APHA 3120 B Method	
2024	Arsenic	mg/L	≤ 0.010	0.1	0.1			APHA 3120 B Method	
	Chromium	mg/L	≤ 0.002	0.5	0.5			APHA 3120 B Method	
	Cadmium	mg/L	≤ 0.002	0.1	0.03	0.01		APHA 3120 B Method	
	Selenium	mg/L	≤ 0.002	0.1	0.02			APHA 3120 B Method	
	Lead	mg/L	≤ 0.002	0.1	0.1	0.05		APHA 3120 B Method	
	Copper	mg/L	≤ 0.002	0.5	0.5	0.5		APHA 3120 B Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	Barium	mg/L	0.022	-	1			APHA 3120 B Method	
	Nickel	mg/L	≤ 0.002	0.5	0.2	0.1		APHA 3120 B Method	
	Cyanide	mg/L	< 0.002	0.1	0.1	0.02		HACH 8027 Method	
SW-1	Total Cyanide	mg/L	0.002	1	1			APHA 4500-CN-C Method	
(Discharge	Free Chlorine	mg/L	<0.1	-	1			APHA 4500-CL G Method	
d Point)	Sulphide (S_2 -)	mg/L	0.032	1	1			HACH 8131 Method	
Sampling	Formaldehyde	mg/L	0.014	-	1			HACH 8110 Method	
on 6 June	Phenols	mg/L	0.009	0.5	0.5			USEPA Method 420.1	
2024	Iron	mg/L	0.690	3.5	3.5	1.5		APHA 3120 B Method	
	Total Dissolved Solids (TDS)	mg/L	92	-	2000			APHA 2540 C Method	
	Total Residual Chlorine	mg/L	0.1	0.2	0.2			APHA 4500-CL G Method	
	Chromium (Hexavalent)	mg/L mg/L	< 0.05	0.1	0.1	0.04		ISO 11083:1994 Method	
	Ammonia	mg/L	0.02	10	10			HACH Method 10205 Method	
	Fluoride	mg/L	0.275	20	20	1.5		APHA 4110 B Method	
	Silver		≤ 0.002	0.5	0.5			APHA 3120 B Method	
SW-5	Temperature	℃	29	< 3 (increase)	≤ 35		Once per	Instrument Analysis Method	Refer to water

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	pH	-	7.3	6-9	6~9	5.9-9	6 months	Instrument Analysis Method	quality report
	Suspended Solids (SS)	mg/L	6	50	50	50		APHA 2540 D Method	
	Dissolved Oxygen (DO)	mg/L	5.63	-	-	>=4		Instrument Analysis Method	
	BOD (5)	mg/L	7.43	50	30	15		APHA 5210 B Method	
	COD (Cr)	mg/L	14.9	250	125	30		APHA 5220D Method	
	Total Coliform*3	MPN/100ml	54000	400	400	7500		APHA 9221B Method	
SW-5	Total Nitrogen (T-N)	mg/L	< 0.5	-	80			HACH Method 10072 Method	
(Discharge	Total Phosphorous (T-P)	mg/L	0.06	2	2			APHA 4500-P E Method	
d Point)	Color	TCU	22.38	-	150 Co.Pt *			APHA 2120C Method	
Sampling	Odor	TON	1	-	-			APHA 2150 B Method	
on 6 June	Oil and Grease	mg/L	<3.1	10	10			APHA 5520B Method	
2024	Mercury	mg/L	≤ 0.002	0.01	0.005	0.001		APHA 3120 B Method	
	Zinc	mg/L	≤ 0.002	2	2	1.5		APHA 3120 B Method	
	Arsenic	mg/L	≤ 0.010	0.1	0.1			APHA 3120 B Method	
	Chromium	mg/L	≤ 0.002	0.5	0.5			APHA 3120 B Method	
	Cadmium	mg/L	≤ 0.002	0.1	0.03	0.01		APHA 3120 B Method	
	Selenium	mg/L	≤ 0.010	0.1	0.02			APHA 3120 B Method	
	Lead	mg/L	≤ 0.002	0.1	0.1	0.05		APHA 3120 B Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	Copper	mg/L	≤ 0.002	0.5	0.5	0.5		APHA 3120 B Method	
	Barium	mg/L	0.016	-	1			APHA 3120 B Method	
	Nickel	mg/L	≤ 0.002	0.5	0.2	0.1		APHA 3120 B Method	
	Cyanide	mg/L	< 0.002	0.1	0.1	0.02		HACH 8027 Method	
	Total Cyanide	mg/L	0.002	1	1			APHA 4500-CN-C Method	
SW-5	Free Chlorine	mg/L	< 0.1	-	1			APHA 4500-CL G Method	
(Discharge	Sulphide (S_2 -)	mg/L	0.038	1	1			HACH 8131 Method	
d Point)	Formaldehyde	mg/L	0.016	-	1			HACH 8110 Method	
Sampling	Phenols	mg/L	0.013	0.5	0.5			USEPA Method 420.1	
on 6 June	Iron	mg/L	0.588	3.5	3.5	1.5		APHA 3120 B Method	
2024	Total Dissolved Solids	mg/L	76	-	2000			APHA 2540 C Method	
	Total Residual Chlorine	mg/L	0.1	0.2	0.2			APHA 4500-CL G Method	
	Chromium	mg/L	< 0.05	0.1	0.1	0.04		ISO 11083:1994 Method	
	(Hexavalent)	mg/L							
	Ammonia	mg/L	< 0.02	10	10			HACH Method 10205 Method	
	Fluoride	mg/L	0.068	20	20	1.5		APHA 4110 B Method	
	Silver		≤ 0.002	0.5	0.5			APHA 3120 B Method	
SW-6	Temperature	˚C	31	< 3 (increase)	≤ 35		Once per	Instrument Analysis Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	pH	-	6.7	6-9	6~9	5.9-9	6 months	Instrument Analysis Method	
	SS	mg/L	6	50	50	50		APHA 2540 D Method	
	DO	mg/L	6.45	-	-	>=4		Instrument Analysis Method	
	BOD (5)	mg/L	13.55	50	30	15		APHA 5210 B Method	
	COD (Cr)	mg/L	24.5	250	125	30		APHA 5220D Method	Refer to water
SW-6	Total Coliform	MPN/100ml	< 1.8	400	400	7500		APHA 9221B Method	quality report
(Outlet	T-N	mg/L	6.1	-	80			HACH Method 10072 Method	
Point)	T-P	mg/L	0.68	2	2			APHA 4500-P E Method	
Sampling	Color	TCU	28.63	-	150 Co.Pt *			APHA 2120C Method	
on 6 June	Odor	TON	1	-	-			APHA 2150 B Method	
2024	Oil and Grease	mg/L	<3.1	10	10			APHA 5520B Method	
	Mercury	mg/L	≤ 0.002	0.01	0.005	0.001		APHA 3120 B Method	
	Zinc	mg/L	≤ 0.002	2	2	1.5		APHA 3120 B Method	
	Arsenic	mg/L	≤ 0.010	0.1	0.1			APHA 3120 B Method	
	Chromium	mg/L	≤ 0.002	0.5	0.5			APHA 3120 B Method	
	Cadmium	mg/L	≤ 0.002	0.1	0.03	0.01		APHA 3120 B Method	
	Selenium	mg/L	≤ 0.010	0.1	0.02			APHA 3120 B Method	
	Lead	mg/L	≤ 0.002	0.1	0.1	0.05		APHA 3120 B Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	Copper	mg/L	≤ 0.002	0.5	0.5	0.5		APHA 3120 B Method	
	Barium	mg/L	0.010	-	1			APHA 3120 B Method	
	Nickel	mg/L	≤ 0.002	0.5	0.2	0.1		APHA 3120 B Method	
	Cyanide	mg/L	0.002	0.1	0.1	0.02		HACH 8027 Method	
	Total Cyanide	mg/L	0.003	1	1			APHA 4500-CN-C Method	
SW-6	Free Chlorine	mg/L	0.2	-	1			APHA 4500-CL G Method	
(Outlet	Sulphide (S_2 -)	mg/L	0.008	1	1			HACH 8131 Method	
Point)	Formaldehyde	mg/L	0.039	-	1			HACH 8110 Method	
	Phenols	mg/L	< 0.002	0.5	0.5			USEPA Method 420.1	
	Iron	mg/L	0.030	3.5	3.5	1.5		APHA 3120 B Method	
	Total Dissolved Solids	mg/L	306	-	2000			APHA 2540 C Method	
	TotalResidual Chlorine*6	mg/L	0.4	0.2	0.2			APHA 4500-CL G Method	
	Chromium	mg/L	< 0.05	0.1	0.1	0.04		ISO 11083:1994 Method	
	(Hexavalent)	mg/L							
	Ammonia	mg/L	< 0.02	10	10			HACH Method 10205 Method	
	Fluoride	mg/L	2.324	20	20	1.5		APHA 4110 B Method	
	Silver		≤ 0.002	0.5	0.5			APHA 3120 B Method	
SW-2	Temperature	℃	29	< 3 (increase)	≤ 35			Instrument Analysis Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	pH	-	6	6-9	6~9	5.9-9		Instrument Analysis Method	
	SS	mg/L	30	50	50	50	Once per	APHA 2540 D Method	
	DO	mg/L	3.12	-	-	>=4	6 months	Instrument Analysis Method	
	BOD (5)	mg/L	15.67	50	30	15		APHA 5210 B Method	
SW-2	COD (Cr)	mg/L	31.3	250	125	30		APHA 5220D Method	
(Reference	Total Coliform*4	MPN/100ml	92000	400	400	7500		APHA 9221B Method	
point)	T-N	mg/L	< 0.5	-	80			HACH Method 10072 Method	Refer to water
Sampling	T-P	mg/L	0.22	2	2			APHA 4500-P E Method	quality report
on 6 June	Color	TCU	78.63	-	150 Co.Pt *			APHA 2120C Method	
2024	Odor	TON	3	-	-			APHA 2150 B Method	
	Oil and Grease	mg/L	<3.1	10	10			APHA 5520B Method	
	Mercury	mg/L	≤ 0.002	0.01	0.005	0.001		APHA 3120 B Method	
	Zinc	mg/L	≤ 0.002	2	2	1.5		APHA 3120 B Method	
	Arsenic	mg/L	≤ 0.010	0.1	0.1			APHA 3120 B Method	
	Chromium	mg/L	≤ 0.002	0.5	0.5			APHA 3120 B Method	
	Cadmium	mg/L	≤ 0.002	0.1	0.03	0.01		APHA 3120 B Method	
	Selenium	mg/L	≤ 0.010	0.1	0.02			APHA 3120 B Method	
	Lead	mg/L	≤ 0.002	0.1	0.1	0.05		APHA 3120 B Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	Copper	mg/L	≤ 0.002	0.5	0.5	0.5		APHA 3120 B Method	
	Barium	mg/L	0.02	-	1			APHA 3120 B Method	
	Nickel	mg/L	≤ 0.002	0.5	0.2	0.1		APHA 3120 B Method	
	Cyanide	mg/L	< 0.002	0.1	0.1	0.02		HACH 8027 Method	
	Total Cyanide	mg/L	0.002	1	1			APHA 4500-CN-C Method	
SW-2	Free Chlorine	mg/L	<0.1	-	1			APHA 4500-CL G Method	
(Reference	Sulphide (S2 -)	mg/L	0.059	1	1			HACH 8131 Method	
point)	Formaldehyde	mg/L	0.070	-	1			HACH 8110 Method	
Sampling	Phenols	mg/L	0.015	0.5	0.5			USEPA Method 420.1	
on 6 June	Iron*8	mg/L	2.980	3.5	3.5	1.5		APHA 3120 B Method	
2024	Total Dissolved Solids	mg/L	122	-	2000			APHA 2540 C Method	
	Total Residual Chlorine	mg/L	0.1	0.2	0.2			APHA 4500-CL G Method	
	Chromium	mg/L	< 0.05	0.1	0.1	0.04		ISO 11083:1994 Method	
	(Hexavalent)	mg/L							
	Ammonia	mg/L	0.03	10	10			HACH Method 10205 Method	
	Fluoride	mg/L	0.027	20	20	1.5		APHA 4110 B Method	
	Silver		≤ 0.002	0.5	0.5			APHA 3120 B Method	
SW-4	Temperature	˚C	29	< 3 (increase)	≤ 35			Instrument Analysis Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	pH	-	6.2	6-9	6~9	5.9-9		Instrument Analysis Method	
	Suspended Solids (SS)*5	mg/L	70	50	50	50		APHA 2540 D Method	
	Dissolved Oxygen (DO)	mg/L	3.33	-	-	>=4		Instrument Analysis Method	
	BOD (5)	mg/L	13.35	50	30	15	Once per	APHA 5210 B Method	
	COD (Cr)	mg/L	29.9	250	125	30	6 months	APHA 5220D Method	Refer to water
SW-4	Total Coliform*4	MPN/100ml	35000	400	400	7500		APHA 9221B Method	quality report
(Reference	Total Nitrogen (T-N)	mg/L	< 0.5	-	80			HACH Method 10072 Method	
point)	Total Phosphorous (T-P)	mg/L	0.22	2	2			APHA 4500-P E Method	
Sampling	Color	TCU	61.13	-	150 Co.Pt *			APHA 2120C Method	
on 6 June	Odor	TON	1	-	-			APHA 2150 B Method	
2024	Oil and Grease	mg/L	< 3.1	10	10			APHA 5520B Method	
	Mercury	mg/L	≤ 0.002	0.01	0.005	0.001		APHA 3120 B Method	
	Zinc	mg/L	≤ 0.002	2	2	1.5		APHA 3120 B Method	
	Arsenic	mg/L	≤ 0.010	0.1	0.1			APHA 3120 B Method	
	Chromium	mg/L	≤ 0.002	0.5	0.5			APHA 3120 B Method	
	Cadmium	mg/L	≤ 0.002	0.1	0.03	0.01		APHA 3120 B Method	
	Selenium	mg/L	≤ 0.010	0.1	0.02			APHA 3120 B Method	
	Lead	mg/L	≤ 0.002	0.1	0.1	0.05		APHA 3120 B Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	Copper	mg/L	≤ 0.002	0.5	0.5	0.5		APHA 3120 B Method	
	Barium	mg/L	0.022	-	1			APHA 3120 B Method	
	Nickel	mg/L	≤ 0.002	0.5	0.2	0.1		APHA 3120 B Method	
	Cyanide	mg/L	<0.002	0.1	0.1	0.02		HACH 8027 Method	
	Total Cyanide	mg/L	0.002	1	1			APHA 4500-CN-C Method	
	Free Chlorine	mg/L	< 0.1	-	1			APHA 4500-CL G Method	
	Sulphide (S2 -)	mg/L	0.077	1	1			HACH 8131 Method	
SW-4	Formaldehyde	mg/L	0.069	-	1			HACH 8110 Method	
(Reference	Phenols	mg/L	0.018	0.5	0.5			USEPA Method 420.1	
point)	Iron*7	mg/L	4.132	3.5	3.5	1.5		APHA 3120 B Method	
Sampling	Total Dissolved Solids	mg/L	124	-	2000			APHA 2540 C Method	
on 6 June	Total Residual Chlorine	mg/L	0.1	0.2	0.2			APHA 4500-CL G Method	
2024	Chromium	mg/L	< 0.05	0.1	0.1	0.04		ISO 11083:1994 Method	
	(Hexavalent)	mg/L							
	Ammonia	mg/L	0.05	10	10			HACH Method 10205 Method	
	Fluoride	mg/L	0.039	20	20	1.5		APHA 4110 B Method	
	Silver		≤ 0.002	0.5	0.5			APHA 3120 B Method	
GW-1	Temperature	˚C	30	None	≤ 35		Once per	Instrument Analysis Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	pH	-	7.9	(Available	6~9	5.5~8.5	6 months	Instrument Analysis Method	
	Suspended Solids (SS)	mg/L	4	Guideline	50			APHA 2540 D Method	
	Dissolved Oxygen (DO)	mg/L	6.35	value	-			Instrument Analysis Method	
	BOD (5)	mg/L	7.03	determined	30			APHA 5210 B Method	
	COD (Cr)	mg/L	16.1	by	125			APHA 5220D Method	
GW-1	Total Coliform	MPN/100ml	< 1.8	MONREC)	400	3		APHA 9221B Method	
(Reference	Total Nitrogen (T-N)	mg/L	< 0.5		80			HACH Method 10072 Method	
point)	Total Phosphorous (T-P)	mg/L	0.12		2			APHA 4500-P E Method	
Sampling	Color	TCU	1.13		150 Co.Pt *			APHA 2120C Method	
on 6 June	Odor	TON	1		-			APHA 2150 B Method	
2024	Oil and Grease	mg/L	< 3.1		10			APHA 5520B Method	
	Mercury	mg/L	≤ 0.002		0.005	0.001		APHA 3120 B Method	
	Zinc	mg/L	≤ 0.002		2	3		APHA 3120 B Method	
	Arsenic	mg/L	≤ 0.010		0.1	0.05		APHA 3120 B Method	
	Chromium	mg/L	≤ 0.002		0.5			APHA 3120 B Method	
	Cadmium	mg/L	≤ 0.002		0.03	0.005		APHA 3120 B Method	
	Selenium	mg/L	≤ 0.010		0.02	0.01		APHA 3120 B Method	
	Lead	mg/L	≤ 0.002		0.1	0.01		APHA 3120 B Method	

Location	Item	Unit	Measured Value (Max)	Country's Standard*2	Target value to be applied	Referred Internatio-nal Standard*1	Frequ-ency	Method	Note (Reason excess of the standard)
	Copper	mg/L	≤ 0.002		0.5			APHA 3120 B Method	
	Barium	mg/L	0.052		1			APHA 3120 B Method	
	Nickel	mg/L	≤ 0.002		0.2	0.02		APHA 3120 B Method	
	Cyanide	mg/L	< 0.002		0.1	0.01		HACH 8027 Method	
	Total Cyanide	mg/L	< 0.002		1			APHA 4500-CN-C Method	
GW-1	Free Chlorine	mg/L	< 0.1		1			APHA 4500-CL G Method	
(Reference	Sulphide (S_2 -)	mg/L	< 0.005		1			HACH 8131 Method	
point)	Formaldehyde	mg/L	< 0.003		1			HACH 8110 Method	
Sampling	Phenols	mg/L	< 0.002		0.5	0.001		USEPA Method 420.1	
on 6 June	Iron	mg/L	0.201		3.5	5		APHA 3120 B Method	
2024	Total Dissolved Solids	mg/L	1458		2000	1500		APHA 2540 C Method	
	Total Residual Chlorine	mg/L	< 0.1		0.2			APHA 4500-CL G Method	
	Chromium	mg/L	< 0.05		0.1	0.05		ISO 11083:1994 Method	
	(Hexavalent)	mg/L							
	Ammonia	mg/L	< 0.02		10			HACH Method 10205 Method	
	Fluoride	mg/L	0.036		20			APHA 4110 B Method	
	Silver		≤ 0.002		0.5			APHA 3120 B Method	

* Remark: TCU color unit is equivalent with Co.Pt as described in Target Value.

*[1]Remark: Referred to the Vietnam Standard (Agricultural use and Groundwater), Reference to the Water Quality Monitoring Report, June 2024. Target Value for GW is just a reference as there is not set up country standard.

*[2]Remarks: There is no current country standard but Ministry of Natural Recourses and Environmental Conservation submitted the National Emission Quality Guidelines (NEQG) for environmental guidelines. The guidelines filled as the country standards in the environmental monitoring form.

*[3] Remark: At SW1 and SW-5, Total coliform are higher than the target value due to the expected i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, and ii) contaminants from the surroundings into the retention pond and retention canal may contain fecal matter and other pollutants, leading to increase coliform levels. Total coliform do not affect human health directly, self-monitoring for E.Coli analysis was carried out to identify health impact by coliform bacteria. As for the result of E.Coli for SW1 , SW-5 were 14 and it was under the reference under target value. It is considered that there is no significant impact to human health.

*[4]Remark: For reference monitoring points SW-2 and SW-4, the result of total coliforms is higher than the standard due to three expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) contaminants from the surroundings into the Shwe Pyauk creek may contain fecal matter and other pollutants, leading to increase coliform levels and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

*[5] Remark: At SW-4, the results of SS are higher than the target value due to the expected reason i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

*[6] Remark: at SW-6, Residual chlorine result was higher than the target value due to the expected reason i) more concentration of chlorine during the treatment process at STP. However, the results of total residual chlorine at SW-1 which is one of the final discharge points of Zone A (before discharging to natural creek) is under the target value (0.2 mg/l). Therefore, it can be considered that there is no significant impact on the human health and living environment.

*[7] Remark: At SW-4 the results of iron were higher than standard maybe due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off or strong wind.

Note: Ground water for GW-1, it was compared with Vietnam Groundwater Standard (No: QCVN 09-MT:2015/BTNMT) above table and at the Appendix Attachment of Water Quality Monitoring Report. Target Value for GW is just a reference as there is no country standard yet.

3) Soil Contamination (only operation phase)

Situations environmental report from tenants

- Are there any serious issues regarding soil contamination in this monitoring period? **□ Yes, ☑No**

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Issues on Soil Contamination	Countermeasures
Regular Soil Contamination Monitoring conducted and attached the Report in Appendix.	

4) Noise

Remarks: According to EIA report, Chapter 4- Table 4-2.2, monitoring plan is one time each in dry and wet season (First 3 years after operation stage). In the environmental monitoring report (Phase-1, operation phase) No.1, one time noise and vibration monitoring survey is finished as a record and there is no excess the standard in all of survey points.

Noise Level (Along the Thilawa Development Road)

Location	Item	Unit	Measured Value (Mean)	Measured Value (Min~Max)	Country's Standard	Target value to be applied	*Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
NV-1	Leq (day)	dB(A)	62	61 - 63	N/A	75		One time each in dry and wet season	Sound Level Meter	
	Leq(eve)	dB(A)	-			70				

***Remark: Referred to the Target Noise Standard (Thilawa SEZ Zone-A EIA Report) and Reference to Noise and Vibration Monitoring Report (February 2024)**

Noise Level (Living Environment)

Location	Item	Unit	Measured Value (Mean)	Measured Value (Min~Max)	Country's Standard	*Target value to be applied	Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
NV-2	Leq (day)	dB(A)	59	57 - 60	N/A	70		One time each in dry and wet season	Sound Level Meter	
	Leq(eve)	dB(A)	-			65				
	Leq(night)	dB(A)	-			60				
NV-3	Leq(day)	dB(A)	45	44 - 48	N/A	70			Sound level Meter	
	Leq(eve)	dB(A)	-			65				
	Leq(night)	dB(A)	-			60				

*Remark: Referred to the Target Noise Standard (Thilawa SEZ Zone-A EIA Report) and Reference to Noise and Vibration Monitoring Report (February 2024)

Remark: For safety and risk avoidance, we could monitor day time during this period.

Complaints from Residents

- Are there any complaints from residents regarding noise in this monitoring period? □ Yes, ☑ No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Complaints from Residents	Countermeasures

5) Solid Waste (Disposal from admin complex compound)

Measuring Point: ~~Construction Site (Construction Phase)~~, Storage for Sludge (Operation Phase)

- Are there any wastes of sludge in this monitoring period? ☑ Yes, □ No

If yes, please report the amount of sludge and fill in the results of solid waste management Activities.

Item	Date	Generated from	Unit	Value	Disposed to
General Waste	10 April 2024	Landscaping and Plantation	Kg	2900	Waste disposing to Thanlyin Development Committee, Yangon Division
	3 May 2024			2850	
	31 May 2024			2800	
	1 July 2024			2950	
	7 August 2024			2850	
Total			Kg	17,300	
Sludge	10 April 2024	Sewage Treatment Plant	Kg	5420	Golden DOWA Eco- System Myanmar Co., Ltd
	9 May 2024			5400	
	16 July 2024			6120	
	20 August 2024			6100	
Total			Kg	23040	

Remarks: Waste amount is not only in TSEZ-B but also combine with TSEZ-A General Waste. Generate wastes are dried waste and weight value are estimated base on type of Trash collector car. Green Waste (Grass cutting waste) are used in Bio-fertilizer and Sewage Treatment Plant generated sludge in appendix.

Myanmar Japan Thilawa Development Limited MJTD

6) (a) Ground Subsidence and Hydrology- April 2024

Duration (Month)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
20- April -2024	-		+7.133	m	Once per month	There is no tube well water consumption in Zone-A.

Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix. Location of Ground Subsidence Test : E=209545.508, N=1844669.443

(b) Ground Subsidence and Hydrology- May 2024

Duration (Month)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
24- May -2024	-	m3/week	+7.134	m	Once per month	There is no tube well water consumption in Zone-A.

Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix. Location of Ground Subsidence Test : E=209545.508, N=1844669.443

(c) Ground Subsidence and Hydrology- June 2024

Duration (Month)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
22- June -2024	-	m3/week	+7.134	m	Once per month	. There is no tube well water consumption in Zone-A.

Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix. Location of Ground Subsidence Test : E=209545.508, N=1844669.443

(d) Ground Subsidence and Hydrology- July 2024

Duration (Month)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
26-July-2024	-	m3/week	+7.135	m	Once per month	There is no tube well water consumption in Zone-A.

Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix. Location of Ground Subsidence Test : E=209545.508, N=1844669.443

(e) Ground Subsidence and Hydrology- August 2024

Duration (Month)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
23- August -2024	-	m3/week	+7.135	m	Once per month	There is no tube well water consumption in Zone-A.

Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix. Location of Ground Subsidence Test : E=209545.508, N=1844669.443

(f) Ground Subsidence and Hydrology- September 2024

Duration (Month)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
28- September-2024	-	m3/week	+7.138	m	Once per month	There is no tube well water consumption in Zone-A.

Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix. Location of Ground Subsidence Test : E=209545.508, N=1844669.443

7) Offensive Odor (only operation phase)

Complaints from Residents

- Are there any complaints from residents regarding offensive odor in this monitoring period? □ Yes, ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Complaints from Residents	Countermeasures

Situations environmental report from tenants

- Are there any serious issues regarding offensive odor in this monitoring period? □ Yes, ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Issues on Soil Contamination	Countermeasures

8) Infectious disease, Working Environment, Accident

Information from contractor (construction phase) or tenants (operation phase)

- Are there any incidents regarding Infectious disease, Working Environment, Accident in this monitoring period? □Yes, ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Incidents	Countermeasures

Note: If emergency incidents are occurred, the information shall be reported to the relevant organizations and authorities immediately.

End of Document

Myanmar Japan Thilawa Development Limited MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix -A

Water and Waste Water Monitoring Report

February, 2024

WATER QUALITY MONITORING REPORT

FOR DEVELOPMENT OF INDUSTRIAL AREA

IN THILAWA SEZ ZONE A

(OPERATION STAGE)

(Bi-Monthly Monitoring)

February 2024

Myanmar Koei International Ltd.

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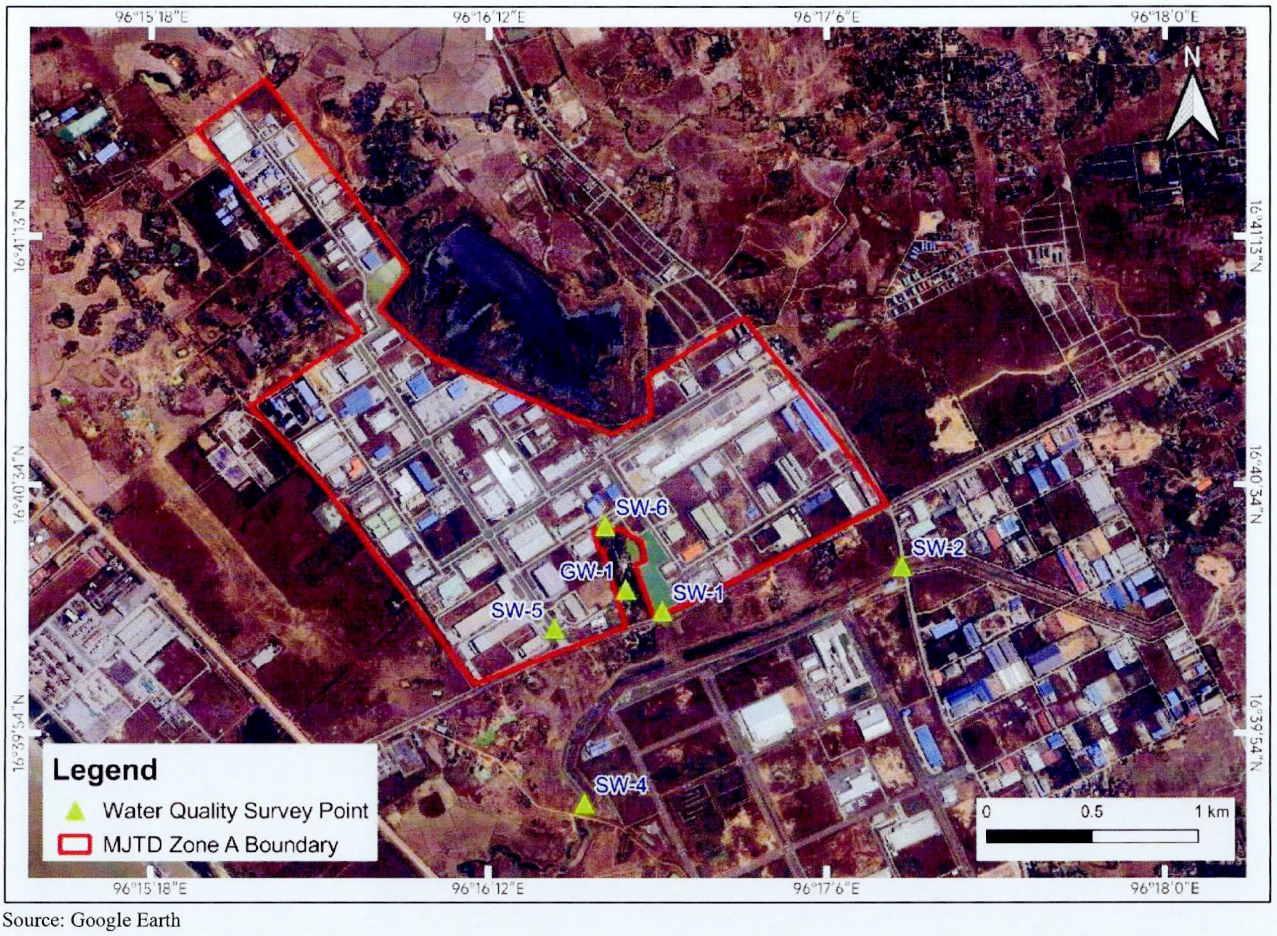
CHAPTER 1: INTRODUCTION

1.1 General

Thilawa Special Economic Zone (SEZ) is located in southern district of Yangon region and about 23 km southeast of Yangon city. As the developer of Thilawa SEZ, Myanmar Japan Thilawa Development Ltd. (MJTD) has a responsibility to carry out regular monitoring in the industrial area of Zone A in accordance with the approved Environmental Impact Assessment (EIA) report and Environmental Management Plan (EMP). MJTD has implemented monitoring of various environmental items with the specified time frame to know the environmental conditions in and around the area. As for the monitoring of the water quality, total six sampling points are set for water quality survey, named SW-1, SW-2, SW-4, SW-5, SW-6, and GW-1 have been monitored in Thilawa SEZ and its surrounding area in timely manner. Among the six locations, SW-1 and SW-5 are main discharged points of Thilawa SEZ Zone A, and SW-6 is discharged from centralized Sewage Treatment Plant (STP) which is required to monitor by Environmental Monitoring Plan (EMoP) in EIA report of Thilawa SEZ Zone A. The remaining points SW-2 and SW-4 are sampled as a reference monitoring for comparison with discharged points and baseline of discharged creek. Moreover, GW-1 is monitored as a reference of existing tube well located in the Moegyoe Swam monastery compound which is situated next to retention poind. Location of sampling points for water quality monitoring is shown in Figure 1.1-1.



Source: Google Earth

Figure 1.1-1 Location of Sampling Points of Water Quality Monitoring

CHAPTER 2: WATER QUALITY MONITORING

2.1 Monitoring Items

Sampling points and parameters for water quality monitoring are determined to cover the environmental monitoring plan of the EIA report.

Water quality sampling was carried out at six locations. Among the six locations, water flow measurement at three locations (SW-1, SW-4 and SW-6) can be carried out by current meter. However, water flow measurement cannot be conducted with current meter at two locations (SW-2 and SW-5) because no water flow was at SW-2 and water gate at SW-5 was closed during sampling. Monitoring items and sampling points are summarized in Table 2.1-1.

Table 2.1-1 Monitoring Items for Water Quality

No.	Parameters	SW-1	SW-2	SW-4	SW-5	SW-6	GW-1	Remarks
1	Water Temperature	○	○	○	○	○	○	On-site measurement
2	pH	○	○	○	○	○	○	On-site measurement
3	DO	○	○	○	○	○	○	On-site measurement
4	Suspended Solids	○	○	○	○	○	○	Laboratory analysis
5	$BOD_{(5)}$	○	○	○	○	○	○	Laboratory analysis
6	$COD_{(Cr)}$	○	○	○	○	○	○	Laboratory analysis
7	Total Nitrogen	○	○	○	○	○	○	Laboratory analysis
8	Total Phosphorous	○	○	○	○	○	○	Laboratory analysis
9	Color	○	○	○	○	○	○	Laboratory analysis
10	Odor	○	○	○	○	○	○	Laboratory analysis
11	Total Coliform	○	○	○	○	○	○	Laboratory analysis
12	Oil and Grease (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
13	Total Dissolved Solids (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
14	Iron (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
15	Mercury (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
16	Escherichia Coli (Self- monitoring)	○	-	-	○	-	○	Laboratory analysis
17	Flow Rate	○	-	○	-	○	-	On-site measurement

Source: Myanmar Koei International Ltd.

2.2 Description of Sampling Points

The outline of sampling points is mentioned in Table 2.2-1. The photos of conducting field survey at each sampling points are mentioned in Appendix-1.

Table 2.2-1 Outline of Sampling Points

No.	Station	Detailed Information
1	SW-1	**Coordinate** - N - 16° 40' 13.5", E - 96° 16' 39.8"
		Location - Outlet of Retention Pond
		Survey Item – Surface water sampling and water flow rate measurement
2	SW-2	**Coordinate** - N - 16° 40' 20.69", E - 96° 17' 18.04"
		Location - Upstream of Shwe Pyauk Creek
		Survey Item – Surface water sampling
3	SW-4	**Coordinate**- N - 16° 39' 42.84", E - 96° 16' 27.42"
		Location - Downstream of Shwe Pyauk Creek
		Survey Item – Surface water sampling and water flow rate measurement
4	SW-5	**Coordinate**- N - 16° 40' 10.7", E - 96° 16' 22.6"
		Location - Outlet of Retention Canal
		Survey Item – Surface water sampling
5	SW-6	**Coordinate**- N - 16° 40' 27.13", E - 96° 16' 30.68"
		Location - Outlet from STP to Retention Pond
		Survey Item – Surface water sampling and water flow rate measurement
6	GW-1	**Coordinate**- N - 16° 40' 16.96", E - 96° 16' 34.01"
		Location - In Moegyoe Swan Monastery
		Survey Item – Ground Water Sampling

Source: Myanmar Koei International Ltd.

SW-1

SW-1 was collected at the discharge point of retention pond which is located in the east of Moegyoe Swan monastery. The distance is about 530 m downstream of SW-6 which is the outlet of STP. This drainage is flowing from north to south and then connected to the Shwe Pyauk creek through earth drain. The water quality of this monitoring point has been influenced by the water from downstream of the Shwe Pyauk creek due to backflow by tidal fluctuation. In addition, it seems that a part of storm water from monastery has reached to the culvert in the SEZ area and discharging to the retention pond.

SW-2 (Reference Point)

SW-2 was collected at the upstream of Shwe Pyauk creek. This sampling point is located in the southeast of Zone A area and at the south of Dagon-Thilawa road. The surrounding areas are Zone B in the southwest and local industrial zone in the east respectively.

SW-4 (Reference Point)

SW-4 was collected at the downstream of Shwe Pyauk creek, after mixing of discharge water from local industrial zone, Thilawa SEZ Zone A and Zone B, which is flowing from east to west and then entering into the Yangon River. The distance is about 2.15 km downstream of SW-2. This sampling point is located in the southwest of Zone A area and in the south of Dagon-Thilawa road. The surrounding areas are Zone B and local industrial zone in the east respectively.

SW-5

SW-5 was collected at retention canal near main gate of Thilawa SEZ. Most of the water collected in this canal is rain water and plantation water from surrounding area. This canal is also connected to the Shwe Pyauk creek. The water quality of this monitoring point may have been influenced by the water from downstream due to backflow by tidal fluctuation.

SW-6

SW-6 was collected at the drain outlet of centralized STP which is located in the north of Moegyoe Swan monastery compound and retention pond (SW-1). Then the treated water is flowing to the retention pond. The distance is about 530 m upstream of (SW-1).

GW-1 (Reference of Existing Tube Well)

GW-1 was collected from tube well as ground water sample. It is located in the compound of Moegyoe Swan monastery. The surrounding areas are Zone A in the west, retention pond in the east and Dagon-Thilawa road in the south respectively.

2.3 Monitoring Method

All water samples were collected with cleaned sampling bottles and analyzed by the following standard method as shown in Table 2.3-1. All samples were kept in iced boxes keeping at 2-4° C and were transported to the laboratory. Among the parameters; water temperature, pH and DO were measured by the on-site instrument "Horiba, U-52" and water flow rate was also measured by using the on-site instrument "JFE Digital Current Meter".

Table 2.3-1 Analytic Method for Water Quality

No.	Parameter	Method
1	Water Temperature	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
2	pH	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
3	Dissolved Oxygen (DO)	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
4	Suspended Solids (SS)	APHA 2540 D (Dry at 103-105°C Method)
5	$BOD_{(5)}$	APHA 5210 B (5 Days BOD Test)
6	$COD_{(Cr)}$	APHA 5220D (Close Reflux Colorimetric Method)
7	Total Nitrogen (T-N)	HACH Method 10072 (TNT Persulfate Digestion Method)
8	Total Phosphorous (T-P)	APHA 4500-P E (Ascorbic Acid Method)
9	Color	APHA 2120C (Spectrophotometric Method)
10	Odor	APHA 2150 B (Threshold Odor Test)
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)
12	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)
13	Total Dissolved Solids	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)
14	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
15	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
16	Escherichia Coli	APHA 9221 F (Escherichia Coli Procedure Using Fluorogenic Substrate)
17	Flow Rate	Detection of Electromagnetic Elements (Real-time measurement by AEM 213-D Digital Current Meters)

Source: Myanmar Koei International Ltd.

2.4 Monitoring Period

Water quality and water flow rate monitoring were conducted on 6 February 2024, and sampling time is shown in Table 2.4-1 to avoid tidal effect. The tide record for Yangon River, Myanmar on 6 February 2024 is shown in Table 2.4-2.

Table 2.4-1 Sampling Time of Each Point

No.	Station	Sampling Time
1	SW-1	06/02/2024 10:58
2	SW-2	06/02/2024 09:12
3	SW-4	06/02/2024 13:09
4	SW-5	06/02/2024 11:31
5	SW-6	06/02/2024 10:29
6	GW-1	06/02/2024 12:50

Source: Myanmar Koei International Ltd.

Table 2.4-2 Tide Record for Yangon River, Myanmar

Date	Time	Height (m)	Tide Conditions
06/02/2024	00:53	4.31	High Tide
	08:39	0.92	Low Tide
	14:09	3.92	High Tide
	20:39	1.32	Low Tide

Source: Myanmar Port Authority, Tide Table for the Yangon River and Elephant Point, 2024.

2.5 Monitoring Results

Results of water quality monitoring are summarized in Table 2.5-1. Analytical results of the laboratory are described in Appendix-2. The results were compared with the target value of effluent water quality discharging to water body stipulated in the EIA report.

2.5.1 Results of Outlet of Sewage Treatment Plant (STP) and Discharged Points

As the comparison with the target value, the results of pH and total coliform exceeded than the target values.

As for the result of pH, the result at the outlet of the centralized STP (SW-6) complied with the target value. However, the result at the monitoring point of retention pond (SW-1) exceeded the target value due to the expected reason: maybe due to no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of warmer temperature and abundant sunlight in winter season and their rapid carbon dioxide uptake may cause high pH level. Moreover, bicarbonate and carbonate are negatively charged ions (anions) common in most waters and the chemical interactions among carbon dioxide, hydrogen ions and anions that produce alkalinity buffer which can increase pH value. Currently, as the aquatic animals are still alive, the high pH level may not affect the aquatic ecosystem in the retention pond.

As for the result of total coliform of surface water, the result at the outlet of the centralized STP (SW-6) complied with the target value. It may prove that effluents from each locator was treated well by the STP. On the other hand, results at the monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the target value due to the expected reason; i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals in and along of retention pond and retention canal, and ii) contaminants from the surroundings into the retention pond and retention canal may contain fecal matter and other pollutants, leading to increase coliform levels.

Since the composition of the total coliform include bacteria from natural origin, and total coliform do not affect human health directly, E. Coli analysis was carried out alternatively to identify the health impact by coliform bacteria. As for the result of E. Coli of surface water, all of results were under the reference value. Therefore, although the target value of total coliform exceeded at monitoring point of retention pond (SW-1), retention canal (SW-5) and the centralized STP (SW-6), but it is considered that there is no significant impact on human health.

Table 2.5-1 Results of Water Quality Monitoring on All Discharges and Gates

No.	Parameters	Unit	SW-1	SW-5	SW-6	Target Value (Reference Value for Self-Monitoring)
1	Water Temperature	°C	27	27	27	≤ 35
2	pH	-	9.6	9.0	6.1	6~9
3	Dissolved Oxygen (DO)	mg/l	10.10	7.51	7.19	-
4	Suspended Solid (SS)	mg/l	22	12	2	50
5	$BOD_{(5)}$	mg/l	5.31	15.18	3.68	30
6	$COD_{(Cr)}$	mg/l	30.1	19.6	7.9	125
7	Total Nitrogen (T-N)	mg/l	6.9	1.0	16.2	80
8	Total Phosphorous (T-P)	mg/l	0.54	0.10	0.91	2
9	Color	TCU (True Color Unit)	10.44	8.55	4.71	150
10	Odor	TON (Threshold Odor Number)	2	1	1	-
11	Total Coliform	MPN/100ml	> 160000	54000.0	< 1.8	400
12	Oil and Grease	mg/l	< 3.1	< 3.1	< 3.1	10
13	Total Dissolved Solids (TDS)	mg/l	468	182	546	2000
14	Iron	mg/l	0.744	0.832	0.018	3.5
15	Mercury	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.005
16	Escherichia Coli	MPN/100ml (SW)	< 1.8	6.8	-	(1000)* (CFU/100ml)
17	Flow Rate	m^3/s	11.07	-	0.02	-

Note: Red color means exceeded value than target value.
*Note: Based on the water utilization at discharged creek, the quality standard for water baths in Japan, (Ministry of Environment, 1997) is set as a reference value for self-monitoring of E. coli for surface water monitoring. However, due to limitation of capacity for analytical laboratory in

Myanmar, the method to analyze the "Colony Forming Unit (CFU)" is not available in Myanmar. Therefore, the results of "Most Probable Number (MPN)" are assumed similar to CFU values and compared with reference values. Once the method to analyze the CFU will be available in Myanmar, the analytical method will be changed.
According to the quality standard for water baths in Japan, (Ministry of Environment, 1997), in case of E. Coli result is exceeding 1,000 CFU/100 ml, since it is assumed unsafety, it is considered unsuitable for water baths.
Source: Myanmar Koei International Ltd.

2.5.2 Results of Reference Monitoring Points and Tube Well

Results of water quality monitoring at reference monitoring points and reference tube well are shown in Table 2.5-2 and Table 2.5-3. As the comparison with the target value, the results of suspended solid (SS), total coliform and iron at some monitoring points exceeded the target values.

Result of Reference Monitoring Points (Discharged Creek)

As for the result of SS, results at the surface water monitoring point (SW-4) exceeded the target values. The exceeded result for SS maybe due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

As for the result of total coliform, results at surface water monitoring points (SW-2) and (SW-4) exceeded the target value due to three expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) contaminants from the surroundings into the Shwe Pyauk creek may contain fecal matter and other pollutants, leading to increase coliform levels and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

As for the result of iron, the result at the monitoring point of surface water monitoring points (SW-4) exceeded the target value. The possible reason for exceeded value in surface water (SW-4) maybe due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off or strong wind.

Result of Reference Tube Well

For the ground water quality, National Technical Regulation on Ground Water Quality (No. QCVN 09-MT: 2015/BTNMT) in Vietnam are used as a reference because Myanmar does not have any ground water guidelines and standards, and most of the analyzed parameter are included in Vietnam standard rather the those stipulated by neighboring countries. For the result of Escherichia Coli, B1 (Irrigation water) of National Technical Regulation on Surface Water Quality (No. QCVN 08-MT: 2015/BTNMT) in Vietnam is referred, as no standard for E.coli is mentioned in Vietnam ground water regulation as a reference.

As for the result of total coliform in ground water, results at (GW-1) exceeded the target value. It may be possible due to the poor maintenance of well which can increase the risk of bacteria and other harmful organisms. According to the information by Moegyoe Swan monastery, the depth of tube well (GW-1) is about 60 m. By referring the report "Data Collection Survey on Water Resources Potential for Thilawa SEZ and Adjoining Areas" prepared by JICA in 2014, the groundwater extracted at GW-1 is from the second aquifer, there is the intrusion of saline water from Yangon River. Moreover, this aquifer is closed to ground surface and overlain by the unconsolidated soil layer. Consequently, the groundwater in this aquifer may be contaminated in terms of saline water intrusion as well as seepage of contaminated runoff through overlaying soil layer. However, the result of E. Coli of (GW-1) was under the reference value. Therefore, although the target value of total coliform exceeded at monitoring point of (GW-1), it is considered that there is no significant impact on human health.

Table 2.5-2 Result of Water Quality Survey for Reference Monitoring Points

No.	Parameters	Unit	SW-2	SW-4	Target Value (Reference Value for Self-Monitoring)
1	Water Temperature	˚C	22	26	≤ 35
2	pH	-	6.8	8.0	6~9
3	Dissolved Oxygen (DO)	mg/l	3.88	5.22	-
4	Suspended Solid (SS)	mg/l	20	528	50
5	$BOD_{(5)}$	mg/l	11.63	3.50	30
6	$COD_{(Cr)}$	mg/l	36.8	11.7	125
7	Total Nitrogen (T-N)	mg/l	2.8	7.1	80
8	Total Phosphorous (T-P)	mg/l	0.21	1.05	2
9	Color	TCU (True Color Unit)	18.43	11.29	150
10	Odor	TON (Threshold Odor Number)	1	1	-
11	Total Coliform	MPN/100ml	> 160000	> 160000	400
12	Oil and Grease	mg/l	< 3.1	< 3.1	10
13	Total Dissolved Solids (TDS)	mg/l	1932	604	2000
14	Iron	mg/l	1.164	24.000	3.5
15	Mercury	mg/l	≤ 0.002	≤ 0.002	0.005
16	Escherichia Coli	MPN/100ml	-	-	(1,000)* (CFU/100ml)
17	Flow Rate	m^3/s	-	0.49	-

Note: Red color means the exceeded results than target value.
*Note: Based on the water utilization at discharged creek, the quality standard for water baths in Japan, (Ministry of Environment, 1997) is set as a reference value of self-monitoring for surface water monitoring. However, due to limitation of capacity for analytical laboratory in Myanmar, the method to analyze the "Colony Forming Unit (CFU)" is not available in Myanmar. Therefore, the results of "Most Probable Number (MPN)" are assumed similar to CFU values and compared with reference values. Once the method to analyze the CFU will be available in Myanmar, the analytical method will be changed.
According to the quality standard for water baths in Japan, (Ministry of Environment, 1997), in case of E. Coli result is exceeding 1,000 CFU/100 ml, since it is assumed unsafety, it is considered unsuitable for water baths.
Source: Myanmar Koei International Ltd.

Table 2.5-3 Results of Water Quality Monitoring at Reference Tube Well

No.	Parameters	Unit	GW-1	Vietnam Ground Water Standard
1	Water Temperature	˚C	28	-
2	pH	-	7.9	5.5 - 8.5
3	Dissolved Oxygen (DO)	mg/l	6.11	-
4	Suspended Solid (SS)	mg/l	4	-
5	$BOD_{(5)}$	mg/l	0.11	-
6	$COD_{(Cr)}$	mg/l	< 0.7	-
7	Total Nitrogen (T-N)	mg/l	3.9	-
8	Total Phosphorous (T-P)	mg/l	0.13	-
9	Color	TCU (True Color Unit)	1.41	-
10	Odor	TON (Threshold Odor Number)	1	-
11	Total Coliform	MPN/100ml	140.0	3
12	Oil and Grease	mg/l	< 3.1	-
13	Total Dissolved Solids (TDS)	mg/l	1396	1500
14	Iron	mg/l	0.498	5
15	Mercury	mg/l	≤ 0.002	0.001
16	Escherichia Coli	MPN/100ml	< 1.8	(100)* (MPN/100ml)
17	Flow Rate	m^3/s	-	-

Note: Red color means the exceeded results than Vietnam Groundwater standards.
Vietnam Groundwater Standard (No: QCVN 09-MT:2015/BTNMT)
*Note: Based on the water utilization at monitoring point for ground water, B1(Irrigation water) of National Technical Regulation on Surface Water Quality in Vietnam (No: QCVN 08-MT: 2015/BTNMT) is set as a reference value of self-monitoring for ground water monitoring.
Source: Myanmar Koei International Ltd.

2.5.3 Comparison of Results of Water Quality Exceed the Target Value between Previous Monitoring and February 2024 Monitoring

In order to overview the exceed the target values of the concerned parameters during the present monitoring (February 2024), the results of the exceed parameters with respective sampling points are compared with the previous monitoring results since February 2023.

Regarding the result of pH at SW-1 is higher than the target value in three monitoring surveys as 10.1, 10.0 and 9.6 in April, December 2023 and February 2024. It is obvious that pH concentration at SW-1 is higher at the dry season and it might be no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of warmer temperature and abundant sunlight in dry season (winter and summer seasons) and their rapid carbon dioxide uptake may cause high pH level. As for the results of the parameters of discharge points (SW-1 and SW-5), the total coliform concentrations are higher than the target value in June, August, October, December 2023 and February 2024 at SW-1 as well as in February, June, August, October, December 2023 and February 2024 at SW-5. Noticeably, total coliform concentration of SW-1 and SW-5 are also higher throughout rainy season and winter seasons. The concentration of coliform at SW-1 and SW-5 are extending from 4900 MPN/100ml to the detection limit (>160000 MPN/100ml) and from 4900 MPN/100ml to the detection limit (>160000 MPN/100ml) respectively. Moreover, total coliform concentration at GW-1 is higher than the target value only in February, April 2023 and February 2024. It is clear that total coliform concentrations at GW-1 are higher dry season (February and April).

On the other hand, it is observed that the result of SS concentration, the results at the reference monitoring point (SW-4) are higher than the target value. As for the result of SS concentration, the result of SW-4 is higher than the target value during the surveys except April 2023, ranging from 78 to 528 mg/l. It is clear that SS concentrations at SW-4 are higher during rainy and winter seasons due to the run-off water from the surrounding. It is obvious that total coliform at SW-2 is higher in all monitoring surveys, ranging from 1700 to >160000 MPN/100ml and total coliform at SW-4 is higher in all monitoring surveys, ranging from 4600 to >160000 MPN/100ml. Especially the total coliform amount at SW-2 and SW-4 were reached to the detection limit (>160000 MPN/100ml) in June 2023 and February 2024. The result of iron at SW-4 are also higher than the target value in four to five monitoring surveys. It is revealed that high concentration of iron at SW-4 is higher in five monitoring surveys (June, August, October, December 2023 and February 2024) ranging from 6.88 to 24.000 mg/l. It is revealed that high concentration of iron at SW-4 occurred throughout rainy season till winter season. It is possible to say that the present condition of the water quality reflects the background condition of the surrounding environment of Thilawa SEZ.

The expected reasons for the results exceed the target value of concerned parameters are discussed in the upper section of this monitoring report.

CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

As described in Chapter 2 (Section 2.5), the results of pH at (SW-1), total coliform at (SW-1, SW-2, SW-4 and SW-5), suspended solid and iron at (SW-4) exceeded the target values in the surface water during this monitoring period for operation stage of Thilawa SEZ Zone A.

As comparison with the target value, the results of pH exceeded the target values at the retention pond (SW-1) exceeded the target values in this period for main discharged points of Thilawa SEZ Zone A. The expected reasons for exceeding the target value of pH at SW-1 is maybe due to no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of warmer temperature and abundant sunlight in winter time and their rapid carbon dioxide uptake may cause high pH level. Moreover, bicarbonate and carbonate are negatively charged ions (anions) common in most waters and the chemical interactions among carbon dioxide, hydrogen ions and anions that produce alkalinity buffer which can increase pH value. Currently, as the aquatic animals are still alive, the high pH level may not affect the aquatic ecosystem in the retention pond.

Total coliform results at monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the target value due to the expected reasons are the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals in and along of retention pond and retention canal,, and the contaminants from the surroundings into the retention pond and retention canal may contain fecal matter and other pollutants, leading to increase coliform levels. The. E. Coli analysis was carried out alternatively to identify the health impact by coliform bacteria and all of results were under the reference value. Therefore, although the target value of total coliform exceeded at monitoring point of retention pond (SW-1) and retention canal (SW-5), but it is considered that there is no significant impact on human health.

The result of total coliform at reference monitoring points (SW-2 and SW-4), SS and iron at reference monitoring point (SW-4) exceeded the target values. The exceeded results for total coliform at (SW-2 and SW-4) maybe due to three expected reasons; i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) contaminants from the surroundings into the Shwe Pyauk creek may contain fecal matter and other pollutants, leading to increase coliform levels and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

The exceeded results for SS at (SW-4) maybe due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

The expected reason for exceeding the target value of iron at reference monitoring point (SW-4) may be due to the influence of natural origin (iron can reach out from soil by run-off), the surrounding high land areas is comprised of lateritic soils and it can be transported to the low land area by run-off or strong wind.

As for the result of total coliform in ground water, results at (GW-1) exceeded the target value. It may be possible due to the poor maintenance of well which can increase the risk of bacteria and other harmful organisms. According to the information by Moegyoe Swan monastery, the depth of tube well (GW-1) is about 50 m. By referring the report "Data Collection Survey on Water Resources Potential for Thilawa SEZ and Adjoining Areas" prepared by JICA in 2014, the groundwater extracted at GW-1 is from the second aquifer, there is the intrusion of saline water from Yangon River. Moreover, this aquifer is closed to ground surface and overlain by the unconsolidated soil layer. Consequently, the groundwater in this aquifer may be contaminated in terms of saline water intrusion as well as seepage of contaminated runoff through overlaying soil layer. However, the result of E. Coli of (GW-1) was under the reference value. Therefore, although the target value of total coliform exceeded at monitoring point of (GW-1), it is considered that there is no significant impact on human health.

As for future subject for main discharged points of Thilawa SEZ Zone A, the following action may be taken to achieve the target level of pH, total coliform, and appropriate water quality monitoring:

- To perform regular removal of algae and other vegetation present in the retention pond in order to preserve its cleanliness; and
- To continue monitoring Escherichia coli (E. coli) level to identify health impact by coliform bacteria.

End of the Document

APPENDIX-1 FIELD SURVEY PHOTOS

FOR DISCHARGED POINTS OF THILAWA SEZ ZONE A

Surface water sampling and onsite measurement at SW-1

Surface water sampling and onsite measurement at SW-5

Surface water sampling and onsite measurement at SW-6

FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGED POINTS AND BASELINE OF DISCHARGED CREEK

Surface water sampling and onsite measurement at SW-2

Surface water sampling and onsite measurement at SW-4

Ground water sampling and onsite measurement at GW-1

APPENDIX-2 LABORATORY RESULTS

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

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Report No. : GEM-LAB-202402035
Revision No. : 1
Report Date : 21 February, 2024
Application No. : 0001-C001

Analysis Report

Client Name : Myanmar Koei International LTD (MKI)

Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.

Project Name : Environment Monitoring report for Zone A & B

Sample Description

Sample Name : MKI-SW-1-0206

Sample No. : W-2402019

Waste Profile No. : -

Sampling Date : 6 February, 2024

Sampling By : Customer

Sample Received Date : 6 February, 2024

Analytical Date : 6-21/2/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	22	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	5.31	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	30.1	0.7
4	Oil and Grease	APHA 5520B (Partition Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	10.44	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	6.9	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.54	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	468	-
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.744	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	>160000	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	0
13	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	<1.8	1.8

Remark : LOQ - Limit of Quantitation

APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

Analysed By :

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Analysis Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-5-0206
Sample No. : W-2402020
Waste Profile No. : -

Sampling Date : 6 February, 2024
Sampling By : Customer
Sample Received Date : 6 February, 2024
Analytical Date : 6-21/2/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	12	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	15.18	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	19.6	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	8.55	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.0	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.10	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	182	-
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.832	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	54000.0	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0
13	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	6.8	1.8

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-6-0206
Sample No. : W-2402021
Waste Profile No. : -

Sampling Date : 6 February, 2024
Sampling By : Customer
Sample Received Date : 6 February, 2024
Analytical Date : 6-21/2/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	2	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	3.68	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	7.9	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.71	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	16.2	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.91	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	546	-
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.018	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	<1.8	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGED POINTS AND BASELINE OF DISCHARGED CREEK

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Report No. : GEM-LAB-202402038
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Analysis Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description

Sample Name : MKI-SW-2-0206
Sample No. : W-2402022
Waste Profile No. : -

Sampling Date : 6 February, 2024
Sampling By : Customer
Sample Received Date : 6 February, 2024
Analytical Date : 6-21/02/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	20	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	11.63	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	36.8	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	18.43	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	2.8	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.21	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	1932	-
9	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
11	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	1.164	0.002
12	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	>160000	1.8
13	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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LAB 21/2/24 GEM

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Ni Ni Aye Lwin Feb 23, 2024
Manager

Myanmar Japan Thilawa Development Limited MJTD

DOWA

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Report No. : GEM-LAB-202402039
Revision No. : 1
Report Date : 21 February, 2024
Application No. : 0001-C001

Analysis Report

Client Name : Myanmar Koei International LTD (MKI)

Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.

Project Name : Environment Monitoring report for Zone A & B

Sample Description

Sample Name : MKI-SW-4-0206 — Sampling Date : 6 February, 2024

Sample No. : W-2402023 — Sampling By : Customer

Waste Profile No. : - — Sample Received Date : 6 February, 2024

Analytical Date : 6-21/02/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	528	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	3.50	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	11.7	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	11.29	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	7.1	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	1.05	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	604	-
9	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
11	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	24.000	0.002
12	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	>160000	1.8
13	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0

Remark : LOQ - Limit of Quantitation

APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

LAB 21/2/24 GEM

Analysed By :

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Report No. : GEM-LAB-202402040
Revision No. : 1
Report Date : 21 February, 2024
Application No. : 0001-C001

Analysis Report

Client Name : Myanmar Koei International LTD (MKI)

Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.

Project Name : Environment Monitoring report for Zone A & B

Sample Description

Sample Name : MKI-GW-1-0206
Sample No. : W-2402024
Waste Profile No. : -

Sampling Date : 6 February, 2024
Sampling By : Customer
Sample Received Date : 6 February, 2024
Analytical Date : 6-21/02/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	4	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	0.11	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	<0.7	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	1.41	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	3.9	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.13	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	1396	-
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.498	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	140.0	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0
13	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	<1.8	1.8

Remark : LOQ - Limit of Quantitation

APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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Myanmar Japan Thilawa ... Limited

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix -B

Water and Waste Water Monitoring Report

April, 2024

WATER QUALITY MONITORING REPORT

FOR DEVELOPMENT OF INDUSTRIAL AREA

IN THILAWA SEZ ZONE A

(OPERATION STAGE)

(Bi-Monthly Monitoring)

April 2024

Myanmar Koei International Ltd.

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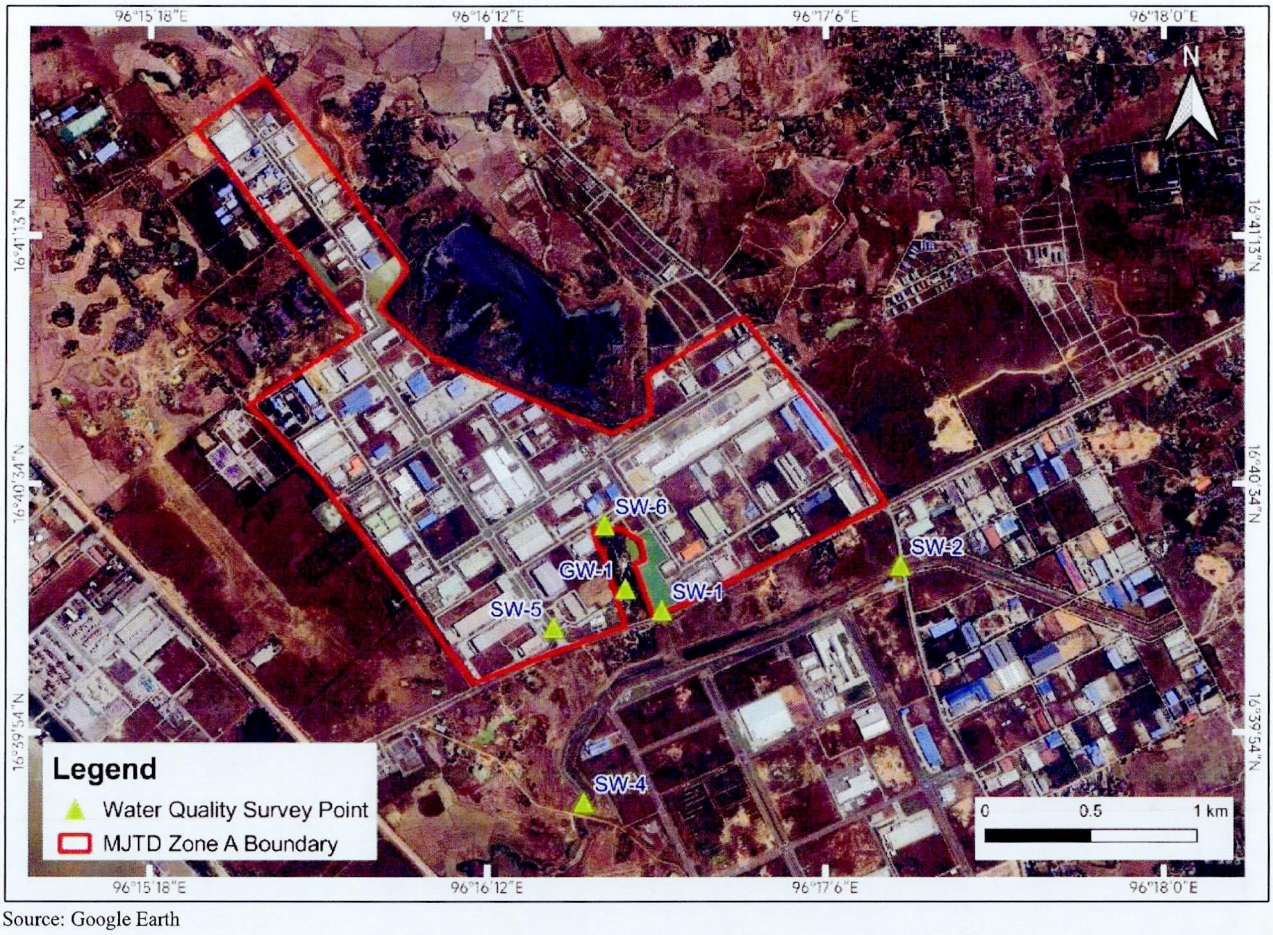
CHAPTER 1: INTRODUCTION

1.1 General

Thilawa Special Economic Zone (SEZ) is located in southern district of Yangon region and about 23 km southeast of Yangon city. As the developer of Thilawa SEZ, Myanmar Japan Thilawa Development Ltd. (MJTD) has a responsibility to carry out regular monitoring in the industrial area of Zone A in accordance with the approved Environmental Impact Assessment (EIA) report and Environmental Management Plan (EMP). MJTD has implemented monitoring of various environmental items with the specified time frame to know the environmental conditions in and around the area. As for the monitoring of the water quality, total six sampling points are set for water quality survey, named SW-1, SW-2, SW-4, SW-5, SW-6, and GW-1 have been monitored in Thilawa SEZ and its surrounding area in timely manner. Among the six locations, SW-1 and SW-5 are main discharged points of Thilawa SEZ Zone A, and SW-6 is discharged from centralized Sewage Treatment Plant (STP) which is required to monitor by Environmental Monitoring Plan (EMoP) in EIA report of Thilawa SEZ Zone A. The remaining points SW-2 and SW-4 are sampled as a reference monitoring for comparison with discharged points and baseline of discharged creek. Moreover, GW-1 is monitored as a reference of existing tube well located in the Moegyoe Swam monastery compound which is situated next to retention pond. Location of sampling points for water quality monitoring is shown in Figure 1.1-1.



Source: Google Earth

Figure 1.1-1 Location of Sampling Points of Water Quality Monitoring

CHAPTER 2: WATER QUALITY MONITORING

2.1 Monitoring Items

Sampling points and parameters for water quality monitoring are determined to cover the environmental monitoring plan of the EIA report.

Water quality sampling was carried out at six locations. Among the six locations, water flow measurement at two locations (SW-4 and SW-6) can be carried out by current meter. However, water flow measurement cannot be conducted with current meter at three locations (SW-1, SW-2 and SW-5) because no water flow was at SW-2 and water gate at SW-1 and SW-5 were closed during sampling. Monitoring items and sampling points are summarized in Table 2.1-1.

Table 2.1-1 Monitoring Items for Water Quality

No.	Parameters	SW-1	SW-2	SW-4	SW-5	SW-6	GW-1	Remarks
1	Water Temperature	○	○	○	○	○	○	On-site measurement
2	pH	○	○	○	○	○	○	On-site measurement
3	DO	○	○	○	○	○	○	On-site measurement
4	Suspended Solids	○	○	○	○	○	○	Laboratory analysis
5	$BOD_{(5)}$	○	○	○	○	○	○	Laboratory analysis
6	$COD_{(Cr)}$	○	○	○	○	○	○	Laboratory analysis
7	Total Nitrogen	○	○	○	○	○	○	Laboratory analysis
8	Total Phosphorous	○	○	○	○	○	○	Laboratory analysis
9	Color	○	○	○	○	○	○	Laboratory analysis
10	Odor	○	○	○	○	○	○	Laboratory analysis
11	Total Coliform	○	○	○	○	○	○	Laboratory analysis
12	Oil and Grease (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
13	Total Dissolved Solids (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
14	Iron (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
15	Mercury (Self-monitoring)	○	○	○	○	○	○	Laboratory analysis
16	Escherichia Coli (Self- monitoring)	○	-	-	○	-	○	Laboratory analysis
17	Flow Rate	-	-	○	-	○	-	On-site measurement

Source: Myanmar Koei International Ltd.

2.2 Description of Sampling Points

The outline of sampling points is mentioned in Table 2.2-1. The photos of conducting field survey at each sampling points are mentioned in Appendix-1.

Table 2.2-1 Outline of Sampling Points

No.	Station	Detailed Information
1	SW-1	**Coordinate** - N - 16° 40' 13.5", E - 96° 16' 39.8" **Location** - Outlet of Retention Pond **Survey Item** – Surface water sampling
2	SW-2	**Coordinate** - N - 16° 40' 20.69", E - 96° 17' 18.04" **Location** - Upstream of Shwe Pyauk Creek **Survey Item** – Surface water sampling
3	SW-4	**Coordinate**- N - 16° 39' 42.84", E - 96° 16' 27.42" **Location** - Downstream of Shwe Pyauk Creek **Survey Item** – Surface water sampling and water flow rate measurement
4	SW-5	**Coordinate**- N - 16° 40' 10.7", E - 96° 16' 22.6" **Location** - Outlet of Retention Canal **Survey Item** – Surface water sampling
5	SW-6	**Coordinate**- N - 16° 40' 27.13", E - 96° 16' 30.68" **Location** - Outlet from STP to Retention Pond **Survey Item** – Surface water sampling and water flow rate measurement
6	GW-1	**Coordinate**- N - 16° 40' 16.96", E - 96° 16' 34.01" **Location** - In Moegyoe Swan Monastery **Survey Item** – Ground Water Sampling

Source: Myanmar Koei International Ltd.

SW-1

SW-1 was collected at the discharge point of retention pond which is located in the east of Moegyoe Swan monastery. The distance is about 530 m downstream of SW-6 which is the outlet of STP. This drainage is flowing from north to south and then connected to the Shwe Pyauk creek through earth drain. The water quality of this monitoring point has been influenced by the water from downstream of the Shwe Pyauk creek due to backflow by tidal fluctuation. In addition, it seems that a part of storm water from monastery has reached to the culvert in the SEZ area and discharging to the retention pond.

SW-2 (Reference Point)

SW-2 was collected at the upstream of Shwe Pyauk creek. This sampling point is located in the southeast of Zone A area and at the south of Dagon-Thilawa road. The surrounding areas are Zone B in the southwest and local industrial zone in the east respectively.

SW-4 (Reference Point)

SW-4 was collected at the downstream of Shwe Pyauk creek, after mixing of discharge water from local industrial zone, Thilawa SEZ Zone A and Zone B, which is flowing from east to west and then entering into the Yangon River. The distance is about 2.15 km downstream of SW-2. This sampling point is located in the southwest of Zone A area and in the south of Dagon-Thilawa road. The surrounding areas are Zone B and local industrial zone in the east respectively.

SW-5

SW-5 was collected at retention canal near main gate of Thilawa SEZ. Most of the water collected in this canal is rain water and plantation water from surrounding area. This canal is also connected to the Shwe Pyauk creek. The water quality of this monitoring point may have been influenced by the water from downstream due to backflow by tidal fluctuation.

SW-6

SW-6 was collected at the drain outlet of centralized STP which is located in the north of Moegyoe Swan monastery compound and retention pond (SW-1). Then the treated water is flowing to the retention pond. The distance is about 530 m upstream of (SW-1).

GW-1 (Reference of Existing Tube Well)

GW-1 was collected from tube well as ground water sample. It is located in the compound of Moegyoe Swan monastery. The surrounding areas are Zone A in the west, retention pond in the east and Dagon-Thilawa road in the south respectively.

2.3 Monitoring Method

All water samples were collected with cleaned sampling bottles and analyzed by the following standard method as shown in Table 2.3-1. All samples were kept in iced boxes keeping at 2-4° C and were transported to the laboratory. Among the parameters; water temperature, pH and DO were measured by the on-site instrument "Horiba, U-52" and water flow rate was also measured by using the on-site instrument "JFE Digital Current Meter".

Table 2.3-1 Analytic Method for Water Quality

No.	Parameter	Method
1	Water Temperature	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
2	pH	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
3	Dissolved Oxygen (DO)	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
4	Suspended Solids (SS)	APHA 2540 D (Dry at 103-105°C Method)
5	$BOD_{(5)}$	APHA 5210 B (5 Days BOD Test)
6	$COD_{(Cr)}$	APHA 5220D (Close Reflux Colorimetric Method)
7	Total Nitrogen (T-N)	HACH Method 10072 (TNT Persulfate Digestion Method)
8	Total Phosphorous (T-P)	APHA 4500-P E (Ascorbic Acid Method)
9	Color	APHA 2120C (Spectrophotometric Method)
10	Odor	APHA 2150 B (Threshold Odor Test)
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)
12	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)
13	Total Dissolved Solids	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)
14	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
15	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
16	Escherichia Coli	APHA 9221 F (Escherichia Coli Procedure Using Fluorogenic Substrate)
17	Flow Rate	Detection of Electromagnetic Elements (Real-time measurement by AEM 213-D Digital Current Meters)

Source: Myanmar Koei International Ltd.

2.4 Monitoring Period

Water quality and water flow rate monitoring were conducted on 24 April 2024, and sampling time is shown in Table 2.4-1 to avoid tidal effect. The tide record for Yangon River, Myanmar on 24 April 2024 is shown in Table 2.4-2.

Table 2.4-1 Sampling Time of Each Point

No.	Station	Sampling Time
1	SW-1	24/04/2024 11:05
2	SW-2	24/04/2024 08:57
3	SW-4	24/04/2024 09:21
4	SW-5	24/04/2024 11:27
5	SW-6	24/04/2024 10:36
6	GW-1	24/04/2024 11:49

Source: Myanmar Koei International Ltd.

Table 2.4-2 Tide Record for Yangon River, Myanmar

Date	Time	Height (m)	Tide Conditions
24/04/2024	00:10	0.71	Low Tide
	04:49	5.42	High Tide
	12:09	0.58	Low Tide
	16:55	5.80	High Tide

Source: Myanmar Port Authority, Tide Table for the Yangon River and Elephant Point, 2024.

2.5 Monitoring Results

Results of water quality monitoring are summarized in Table 2.5-1. Analytical results of the laboratory are described in Appendix-2. The results were compared with the target value of effluent water quality discharging to water body stipulated in the EIA report.

2.5.1 Results of Outlet of Sewage Treatment Plant (STP) and Discharged Points

As the comparison with the target value, the results of pH, suspended solid, total coliform and iron exceeded the limitations.

As for the result of pH, the result at the outlet of the centralized STP (SW-6) was within limitation. However, the result at the monitoring point of retention pond (SW-1) exceeded the limitation due to the expected reason, i.e., no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of hotter temperature and abundant sunlight in summer season and their rapid carbon dioxide uptake may cause high pH level. Moreover, bicarbonate and carbonate are negatively charged ions (anions) common in most waters and the chemical interactions among carbon dioxide, hydrogen ions and anions that produce alkalinity buffer which can increase pH value. Currently, as the aquatic animals are still alive, the high pH level may not affect the aquatic ecosystem in the retention pond.

As comparison with the limitation, the result of suspended solid (SS) exceeded the limitation at the monitoring point of retention canal (SW-5) before discharging to creek due to the surface water run-off from bare land in Zone A. The result at the outlet of the centralized STP (SW-6) was within limitation, therefore, it implied that effluents from each locator was treated well by the STP.

As for the result of total coliform of surface water, the result at the outlet of the centralized STP (SW-6) was within limitation. It may prove that effluents from each locator was treated well by the STP. On the other hand, results at the monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the limitation due to the expected reason; i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals in and along of retention pond and retention canal, and ii) contaminants from the surroundings into the retention pond and retention canal may contain fecal matter and other pollutants, leading to increase coliform levels.

Since the composition of the total coliform include bacteria from natural origin, and total coliform do not affect human health directly, E. Coli analysis was carried out alternatively to identify the health impact by coliform bacteria. As for the result of E. Coli of surface water, all of results were within limitation. Therefore, although the limitation of total coliform exceeded at monitoring point of retention pond (SW-1) and retention canal (SW-5), but it is considered that there is no significant impact on human health.

As for the result of the iron, the result at the outlet of the centralized STP (SW-6) was within limitation. It implied that effluents from each locator was treated well by the STP. On the other hand, the result at the monitoring point of retention canal (SW-5) exceeded the limitation. The possible reason may be due to the influence of natural origin (iron can reach out from soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off. Japan set effluent standards for two items as follows; i) health item and ii) living environment item. In the health item, there is no standard value for iron. On the other hand, for the living environment item, the standard value for soluble iron level is 10 mg/l as prescribed in Japan Effluent Standard, 21 October 2015*. As the comparison with the living environment standard value in Japan, iron result in (SW-5) was within the limitation. Therefore, it can be considered that there is no significant impact on the living environment.

Table 2.5-1 Results of Water Quality Monitoring on All Discharges and Gates

No.	Parameters	Unit	SW-1	SW-5	SW-6	Target Value
1	Water Temperature	˚C	32	33	31	≤ 35
2	pH	-	10.3	9.0	6.8	6~9
3	Dissolved Oxygen (DO)	mg/l	11.63	6.27	5.82	-
4	Suspended Solid (SS)	mg/l	18	136	4	50
5	$BOD_{(5)}$	mg/l	12.07	14.87	16.54	30
6	$COD_{(Cr)}$	mg/l	30.3	74.2	33.4	125
7	Total Nitrogen (T-N)	mg/l	1.3	2.2	10.9	80
8	Total Phosphorous (T-P)	mg/l	0.26	0.37	< 0.05	2
9	Color	TCU (True Color Unit)	9.25	9.25	11.75	150
10	Odor	TON (Threshold Odor Number)	2	2	1.4	-
11	Total Coliform	MPN/100ml	1000.0	> 160000	170.0	400
12	Oil and Grease	mg/l	< 3.1	< 3.1	< 3.1	10
13	Total Dissolved Solids (TDS)	mg/l	502	310	578	2000
14	Iron	mg/l	0.606	9.600	0.032	3.5
15	Mercury	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.005
16	Escherichia Coli	MPN/100ml (SW)	< 1.8	< 1.8	-	(1000)** (CFU/100ml)
17	Flow Rate	m^3/s	-	-	0.01	-

Note: Red color means exceeded value than target value.
*Note: National Effluent Standards | Water / Soil / Ground Environment | Ministry of the Environment, Government of Japan
**Note: Based on the water utilization at discharged creek, the quality standard for water baths in Japan, (Ministry of Environment, 1997) is set as a reference value for self-monitoring of E. coli for surface water monitoring. However, due to limitation of capacity for analytical laboratory in Myanmar, the method to analyze the "Colony Forming Unit (CFU)" is not available in Myanmar. Therefore, the results of "Most Probable Number (MPN)" are assumed similar to CFU values and compared with reference values. Once the method to analyze the CFU will be available in Myanmar, the analytical method will be changed.
According to the quality standard for water baths in Japan, (Ministry of Environment, 1997), in case of E. Coli result is exceeding 1,000 CFU/100 ml, since it is assumed unsafety, it is considered unsuitable for water baths.
Source: Myanmar Koei International Ltd.

2.5.2 Results of Reference Monitoring Points (Discharged Points and Tube Well)

Result of water quality monitoring at reference tube well monitoring point is shown in Table 2.5-2 and Table 2.5-3. As the comparison with the target value, the results of suspended solid (SS), total coliform, total dissolved solids (TDS) and iron at some monitoring points exceeded the limitations.

Result of Reference Monitoring Points (Discharged Creek)

As for the result of SS and TDS, results at the surface water monitoring points (SW-2) and (SW-4) exceeded the limitations. The exceeded results for SS and TDS maybe due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

As for the result of total coliform, results at surface water monitoring points (SW-2) and (SW-4) exceeded the limitation due to three expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) contaminants from the surroundings into the Shwe Pyauk creek may contain fecal matter and other pollutants, leading to increase coliform levels and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

As for the result of iron, the results at the monitoring points of surface water (SW-2) and (SW-4) exceeded the limitation. The possible reason for exceeded value in surface water (SW-2) and (SW-4) may be due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off or strong wind.

Result of Reference Tube Well

For the ground water quality, National Technical Regulation on Ground Water Quality (No. QCVN 09-MT: 2015/BTNMT) in Vietnam is used as a reference because Myanmar does not have any ground water guidelines and standards, and most of the analyzed parameter are included in Vietnam standard rather the those stipulated by neighboring countries. For the result of Escherichia Coli, B1 (Irrigation water) of National Technical Regulation on Surface Water Quality (No. QCVN 08-MT: 2015/BTNMT) in Vietnam is referred, as no standard for E.coli is mentioned in Vietnam ground water regulation as a reference. In addition, the target values of effluent water quality discharging to water body stipulated in the EIA report are also considered for comparison with ground water quality.

As for the result of total coliform in ground water, results at (GW-1) exceeded the limitation. It may be due to the poor maintenance of well which can increase the risk of bacteria and other harmful organisms. According to the information by Moegyoe Swan monastery, the depth of tube well (GW-1) is about 60 m. By referring the report "Data Collection Survey on Water Resources Potential for Thilawa SEZ and Adjoining Areas" prepared by JICA in 2014, the groundwater extracted at GW-1 is from the second aquifer, there is the intrusion of saline water from Yangon River. Moreover, this aquifer is closed to ground surface and overlain by the unconsolidated soil layer. Consequently, the groundwater in this aquifer may be contaminated in terms of saline water intrusion as well as seepage of contaminated runoff through overlaying soil layer. However, the result of E. Coli of (GW-1) was within the limitation. Therefore, although the limitation of total coliform exceeded the limitation at monitoring point of (GW-1), it is considered that there is no significant impact on human health.

Table 2.5-2 Result of Water Quality Survey for Reference Monitoring Points

No.	Parameters	Unit	SW-2	SW-4	Target Value
1	Water Temperature	°C	30	30	≤ 35
2	pH	-	7.1	7.5	6~9
3	Dissolved Oxygen (DO)	mg/l	4.65	4.99	-
4	Suspended Solid (SS)	mg/l	70	198	50
5	$BOD_{(5)}$	mg/l	11.67	10.31	30
6	$COD_{(Cr)}$	mg/l	33.1	21.6	125
7	Total Nitrogen (T-N)	mg/l	0.9	1.5	80
8	Total Phosphorous (T-P)	mg/l	< 0.05	0.14	2
9	Color	TCU (True Color Unit)	15.50	8.00	150
10	Odor	TON (Threshold Odor Number)	1.4	1.4	-
11	Total Coliform	MPN/100ml	24000.0	> 160000	400
12	Oil and Grease	mg/l	< 3.1	< 3.1	10
13	Total Dissolved Solids (TDS)	mg/l	3258	3700	2000
14	Iron	mg/l	4.020	22.080	3.5
15	Mercury	mg/l	≤ 0.002	≤ 0.002	0.005
16	Escherichia Coli	MPN/100ml	-	-	(1,000)* (CFU/100ml)
17	Flow Rate	m^3/s	-	0.50	-

Note: Red color means the exceeded results than target value.
*Note: Based on the water utilization at discharged creek, the quality standard for water baths in Japan, (Ministry of Environment, 1997) is set as a reference value of self-monitoring for surface water monitoring. However, due to limitation of capacity for analytical laboratory in Myanmar, the method to analyze the "Colony Forming Unit (CFU)" is not available in Myanmar. Therefore, the results of "Most Probable Number (MPN)" are assumed similar to CFU values and compared with reference values. Once the method to analyze the CFU will be available in Myanmar, the analytical method will be changed.
According to the quality standard for water baths in Japan, (Ministry of Environment, 1997), in case of E. Coli result is exceeding 1,000 CFU/100 ml, since it is assumed unsafety, it is considered unsuitable for water baths.
Source: Myanmar Koei International Ltd.

Table 2.5-3 Results of Water Quality Monitoring at Reference Tube Well

No.	Parameters	Unit	GW-1	Vietnam Ground Water Standard	Target Value
1	Water Temperature	˚C	30	-	≤ 35
2	pH	-	7.9	5.5 - 8.5	6~9
3	Dissolved Oxygen (DO)	mg/l	6.70	-	-
4	Suspended Solid (SS)	mg/l	10	-	50
5	$BOD_{(5)}$	mg/l	3.41	-	30
6	$COD_{(Cr)}$	mg/l	5.1	-	125
7	Total Nitrogen (T-N)	mg/l	1.1	-	80
8	Total Phosphorous (T-P)	mg/l	0.11	-	2
9	Color	TCU (True Color Unit)	4.25	-	150
10	Odor	TON (Threshold Odor Number)	1	-	-
11	Total Coliform	MPN/100ml	92000.0	3	400
12	Oil and Grease	mg/l	< 3.1	-	10
13	Total Dissolved Solids (TDS)	mg/l	1418	1500	2000
14	Iron	mg/l	0.902	5	3.5
15	Mercury	mg/l	≤ 0.002	0.001	0.005
16	Escherichia Coli	MPN/100ml	8.2	(100)* (MPN/100ml)	(100)* (MPN/100ml)
17	Flow Rate	m^3/s	-	-	-

Note: Red color means the exceeded results than Vietnam Groundwater standards and target value.
Vietnam Groundwater Standard (No: QCVN 09-MT:2015/BTNMT)
*Note: Based on the water utilization at monitoring point for ground water, B1(Irrigation water) of National Technical Regulation on Surface Water Quality in Vietnam (No: QCVN 08-MT: 2015/BTNMT) is set as a reference value of self-monitoring for ground water monitoring.
Source: Myanmar Koei International Ltd.

2.5.3 Comparison of Results of Water Quality Exceed the Target Value between Previous Monitoring and April 2024 Monitoring

In order to overview the exceed the limitations of the concerned parameters during the present monitoring (April 2024), the results of the exceed parameters with respective sampling points are compared with the previous monitoring results since April 2023.

Regarding the result of pH at SW-1 is higher than the limitation in four monitoring surveys as 10.1, 10.0, 9.6 and 10.3 in April, December 2023 and February, April 2024. It is obvious that pH concentration at SW-1 is higher at the dry season and it might be due to no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of warmer and hotter temperature and abundant sunlight in dry season (winter and summer seasons) and their rapid carbon dioxide uptake may cause high pH level. SS result at SW-5 is higher than the limitation only in one monitoring survey (April 2024) as 136 mg/l. It is obvious that SS concentration at SW-5 is higher at the summer season and it might be the effect of surface water run-off from bare land. Moreover, the result of iron concentration at SW-5 is also higher than the limitation only in one monitoring survey (April 2024) as 9.6 mg/l.. It is observed that iron concentration at SW-5 is higher at the summer season and it might be the effect of surroundings of the Thilawa SEZ, especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off. As for the results of the parameters of discharge points (SW-1 and SW-5), the total coliform concentrations are higher than the limitation in June, August, October, December 2023 and February, April 2024 at SW-1 as well as in June, August, October, December 2023 and February, April 2024 at SW-5. Noticeably, total coliform concentration of SW-1 and SW-5 are also higher throughout all three seasons. The concentration of coliform at SW-1 are extending from 4900 MPN/100ml to the detection limit (>160000 MPN/100ml) and SW-5 are extending from 4900 MPN/100ml to the detection limit (>160000 MPN/100ml) respectively. Moreover, total coliform concentration at GW-1 is higher than the limitation only in April 2023 and February, April 2024. It is clear that total coliform concentrations at GW-1 are higher in dry season (February and April).

On the other hand, it is observed that the results of SS concentration, the results at the reference monitoring point (SW-2 and SW-4) are higher than the limitation. As for the results of SS concentration, the result of SW-2 is higher than the limitation during the surveys except June, December 2023 and April 2024, ranging from 70 to 90 mg/l for SW-2 and the result of SW-4 is higher than the limitation during the surveys except April 2023, ranging from 102 to 528 mg/l for SW-4 respectively. It is assumed that SS concentrations at (SW-2 and SW-4) are higher during all three seasons due to the run-off water from the surrounding during the rainy season and surrounding temperature is very high during the summer season. It is obvious that total coliform at both SW-2 and SW-4 is higher in all monitoring surveys, ranging from 1700 to >160000 MPN/100ml for SW-2 and from 4600 to >160000 MPN/100ml for SW-4, respectively. Especially the total coliform amount at SW-2 and SW-4 were reached to the detection limit (>160000 MPN/100ml) in June 2023 and February, April 2024. The result of TDS at (SW-2 and SW-4) are higher than the limitation only in two monitoring survey (April 2023 and April 2024). It is obvious that TDS concentration at (SW-2 and SW-4) are higher at the summer season and it may be attributable to greater solubility of ions at high temperature. The results of iron at (SW-2 and SW-4) are also higher than the limitation in four to six monitoring surveys. It is revealed that high concentration of iron at SW-2 is higher in four monitoring surveys (June, August, December 2023 and April 2024) ranging from 4.06 to 8.346 mg/l and high concentration of iron at SW-4 is higher in six monitoring surveys (June, August, October, December 2023 and February, April 2024) ranging from 6.88 to 24.000 mg/l. It is revealed that high concentration of iron at (SW-2 and SW-4) occurred throughout all three seasons. It is possible to say that the present condition of the water quality reflects the background condition of the surrounding environment of Thilawa SEZ.

The expected reasons for the results exceed the limitation of concerned parameters are discussed in the upper section of this monitoring report

CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

As described in Chapter 2 (Section 2.5), the results of pH at (SW-1), suspended solid at (SW-2, SW-4 and SW-5), total coliform at (SW-1, SW-2, SW-4 and SW-5), total dissolved solid at (SW-2 and SW-4) and iron at (SW-2, SW-4 and SW-5) exceeded the limitations in the surface water, as well as the results of total coliform at (GW-1) exceeded in the ground water during this monitoring period for operation stage of Thilawa SEZ Zone A.

As comparison with the target value, the results of pH at the retention pond (SW-1) exceeded the limitation in this period for main discharged points of Thilawa SEZ Zone A. The expected reasons for exceeding the limitation of pH at SW-1 may bedue to no circulation of water for a long period of time in retention pond as well as more algae accumulation or blooming by the consequence of hotter temperature and abundant sunlight in summer time and their rapid carbon dioxide uptake may cause high pH level. Moreover, bicarbonate and carbonate are negatively charged ions (anions) common in most waters and the chemical interactions among carbon dioxide, hydrogen ions and anions that produce alkalinity buffer which can increase pH value. Currently, as the aquatic animals are still alive, the high pH level may not affect the aquatic ecosystem in the retention pond.

As comparison with the target value, the result of suspended solid (SS) exceeded the limitation at the monitoring point of retention canal (SW-5) before discharging to creek due to the surface water run-off from bare land in Zone A. The result at the outlet of the centralized STP (SW-6) was within limitation, therefore, it implied that effluents from each locator was treated well by the STP.

Total coliform results at monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the limitation due to the expected reasons are the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals in and along of retention pond and retention canal, and the contaminants from the surroundings into the retention pond and retention canal may contain fecal matter and other pollutants, leading to increase coliform levels. The. E. Coli analysis was carried out alternatively to identify the health impact by coliform bacteria and all of results were within the limitation. Therefore, although the limitation of total coliform exceeded at monitoring point of retention pond (SW-1) and retention canal (SW-5), but it is considered that there is no significant impact on human health.

As for the result of the iron, the result at the monitoring point of retention canal (SW-5) exceeded the limitation. The possible reason may be due to the influence of natural origin (iron can reach out from soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off. Japan set effluent standards for two items as follows; i) health item and ii) living environment item. In the health item, there is no standard value for iron. On the other hand, for the living environment item, the standard value for soluble iron level is 10 mg/l as prescribed in Japan Effluent Standard, 21 October 2015. As the comparison with the living environment standard value in Japan, iron result in (SW-5) was within the limitation. Therefore, it can be considered that there is no significant impact on the living environment.

As for parameters of SS, total dissolved solids, total coliform and iron in surface water exceeded the limitation at reference monitoring points. The exceeded result of SS and TDS at (SW-2) and (SW-4) maybe due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

The exceeded results for total coliform at (SW-2) and (SW-4) may be due tothree expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) contaminants from the surroundings into the Shwe Pyauk creek may contain fecal matter and other pollutants, leading to increase coliform levels and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

The expected reason for exceeding the limitation of iron at reference monitoring points (SW-2) and (SW-4) may be due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off or strong wind.

As for the result of total coliform in ground water, results at (GW-1) exceeded the limitation. It may be due to the poor maintenance of well which can increase the risk of bacteria and other harmful organisms. According to the information by Moegyoe Swan monastery, the depth of tube well (GW-1) is about 60 m. By referring the report "Data Collection Survey on Water Resources Potential for Thilawa SEZ and Adjoining Areas" prepared by JICA in 2014, the groundwater extracted at GW-1 is from the second aquifer, there is the intrusion of saline water from Yangon River. Moreover, this aquifer is closed to ground surface and overlain by the unconsolidated soil layer. Consequently, the groundwater in this aquifer may be contaminated in terms of saline water intrusion as well as seepage of contaminated runoff through overlaying soil layer. However, the result of E. Coli of (GW-1) was within the limitation. Therefore, although the limitation of total coliform exceeded at monitoring point of (GW-1), it is considered that there is no significant impact on human health.

As for future subject for main discharged points of Thilawa SEZ Zone A, the following action may be taken to achieve the target level of pH, total coliform, iron and appropriate water quality monitoring:

- To perform regular removal of algae and other vegetation present in the retention pond in order to preserve its cleanliness; and
- To continue monitoring Escherichia coli (E. coli) level to identify health impact by coliform bacteria.

End of the Document

APPENDIX-1 FIELD SURVEY PHOTOS

FOR DISCHARGED POINTS OF THILAWA SEZ ZONE A

Surface water sampling and onsite measurement at SW-1

Surface water sampling and onsite measurement at SW-5

Surface water sampling and onsite measurement at SW-6

FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGED POINTS AND BASELINE OF DISCHARGED CREEK

Surface water sampling and onsite measurement at SW-2

Surface water sampling and onsite measurement at SW-4

Ground water sampling and onsite measurement at GW-1

APPENDIX-2 LABORATORY RESULTS

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

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Report No. : GEM-LAB-202405006
Revision No. : 1
Report Date : 9 May, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-1-0424
Sample No. : W-2404098
Waste Profile No. : -

Sampling Date : 24 April, 2024
Sampling By : Withdraw GEM
Sample Received Date : 24 April, 2024
Analytical Date : 24/04-09/05/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	18	_
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	12.07	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	30.3	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	9.25	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.3	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.26	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	502	_
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.606	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	1000.0	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	0
13	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	<1.8	1.8

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

Analysed By :
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Approved By :
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Revision No. : 1
Report Date : 9 May, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-5-0424
Sample No. : W-2404099
Waste Profile No. : -

Sampling Date : 24 April, 2024
Sampling By : Withdraw GEM
Sample Received Date : 24 April, 2024
Analytical Date : 24/04-09/05/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	136	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	14.87	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	74.2	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	9.25	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	2.2	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.37	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	310	-
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	9.600	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	>160000	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	0
13	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	<1.8	1.8

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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Revision No. : 1
Report Date : 9 May, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-6-0424
Sample No. : W-2404100
Waste Profile No. : -

Sampling Date : 24 April, 2024
Sampling By : Withdraw GEM
Sample Received Date : 24 April, 2024
Analytical Date : 24/4-09/5/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	4	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	16.54	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	33.4	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	11.75	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	10.9	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	<0.05	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	578	-
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.032	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	170.0	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	1.4	0

Remark : LOQ - Limit of Quantitation

APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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Myanmar Japan Thilawa Development Limited MJTD

FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGED POINTS AND BASELINE OF DISCHARGED CREEK

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Report No. : GEM-LAB-202405009
Revision No. : 1
Report Date : 9 May, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)

Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.

Project Name : Environment Monitoring report for Zone A & B

Sample Description

Sample Name : MKI-SW-2-0424 — Sampling Date : 24 April, 2024

Sample No. : W-2404101 — Sampling By : Withdraw GEM

Waste Profile No. : - — Sample Received Date : 24 April, 2024

Analytical Date : 24/4-09/5/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	70	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	11.67	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	33.1	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	15.50	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	0.9	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	<0.05	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	3258	-
9	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
11	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	4.020	0.002
12	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	24000.0	1.8
13	Odor	APHA 2150 B (Threshold Odor Test)	TON	1.4	0

Remark : LOQ - Limit of Quantitation

APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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Page1of1

Report No. : GEM-LAB-202405010
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Report Date : 9 May, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)

Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.

Project Name : Environment Monitoring report for Zone A & B

Sample Description

Sample Name : MKI-SW-4-0424 — Sampling Date : 24 April, 2024

Sample No. : W-2404102 — Sampling By : Withdraw GEM

Waste Profile No. : - — Sample Received Date : 24 April, 2024

Analytical Date : 24/4-09/5/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	198	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	10.31	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	21.6	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	8.00	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.5	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.14	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	3700	-
9	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
11	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	22.080	0.002
12	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	>160000	1.8
13	Odor	APHA 2150 B (Threshold Odor Test)	TON	1.4	0

Remark : LOQ - Limit of Quantitation

APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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Report No. : GEM-LAB-202405011
Revision No. : 1
Report Date : 9 May, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-GW-1-0424
Sample No. : W-2404103
Waste Profile No. : -

Sampling Date : 24 April, 2024
Sampling By : Withdraw GEM
Sample Received Date : 24 April, 2024
Analytical Date : 24/4-09/5/2024

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	10	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	3.41	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	5.1	0.7
4	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	3.1
5	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.25	0.00
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.1	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.11	0.05
8	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	1418	-
9	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.002
10	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.902	0.002
11	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	92000.0	1.8
12	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0
13	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	8.2	1.8

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

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Manager

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Myanmar Japan Thilawa Development Limited MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix – C

Water and Waste Water Monitoring Report

June, 2024

WATER QUALITY MONITORING REPORT

FOR DEVELOPMENT OF INDUSTRIAL AREA

IN THILAWA SEZ ZONE A

(OPERATION STAGE)

(Bi-Annually Monitoring)

June 2024

Myanmar Koei International Ltd.

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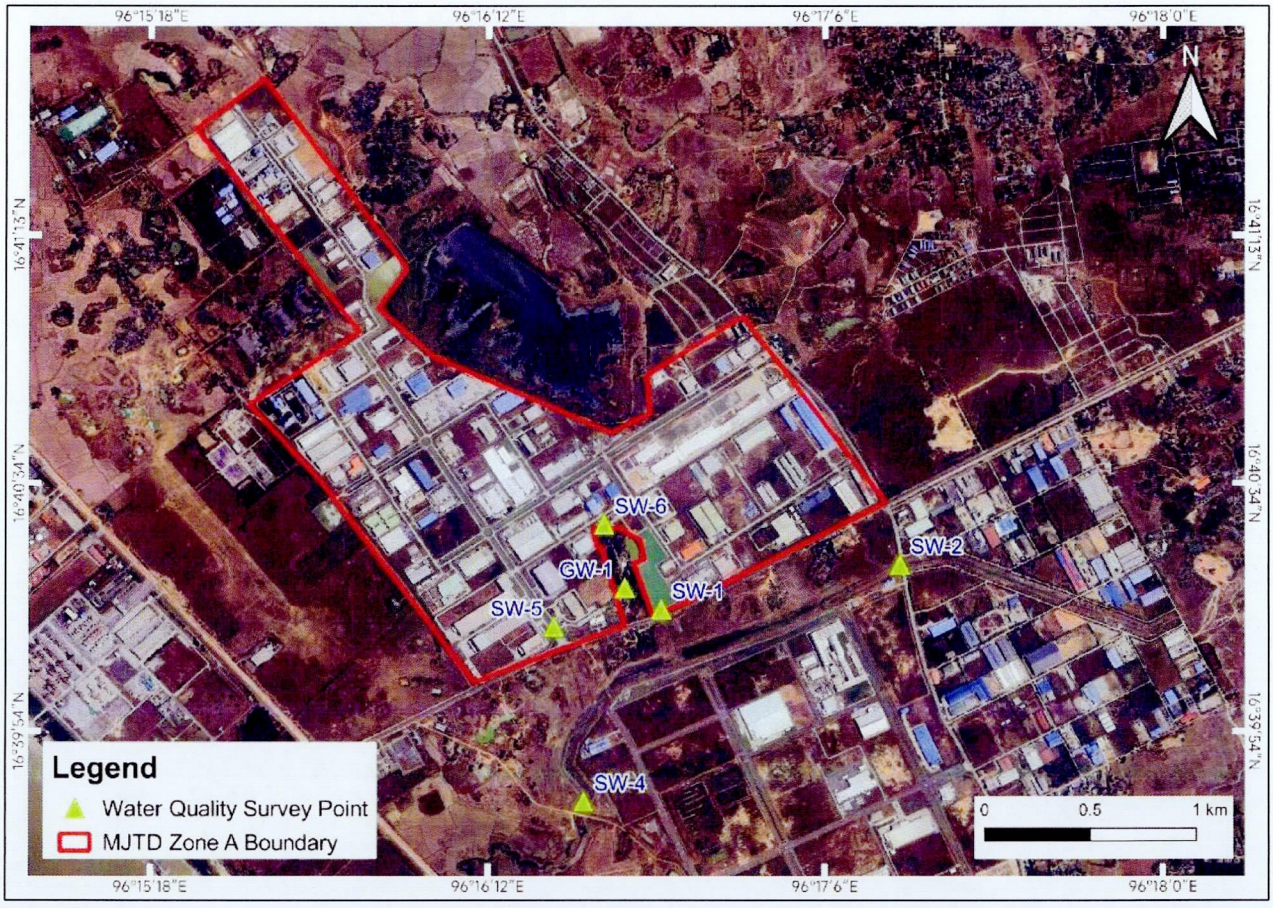
CHAPTER 1: INTRODUCTION

1.1 General

Thilawa Special Economic Zone (SEZ) is located in southern district of Yangon region and about 23 km southeast of Yangon city. As the developer of Thilawa SEZ, Myanmar Japan Thilawa Development Ltd. (MJTD) has a responsibility to carry out regular monitoring in the industrial area of Zone A in accordance with the approved Environmental Impact Assessment (EIA) report and Environmental Management Plan (EMP). MJTD has implemented monitoring of various environmental items with the specified time frame to know the environmental conditions in and around the area. As for the monitoring of the water quality, total six sampling points are set for water quality survey, named SW-1, SW-2, SW-4, SW-5, SW-6, and GW-1 have been monitored in Thilawa SEZ and its surrounding area in timely manner. Among the six locations, SW-1 and SW-5 are main discharged points of Thilawa SEZ Zone A, and SW-6 is discharged from centralized Sewage Treatment Plant (STP) which is required to monitor by Environmental Monitoring Plan (EMoP) in EIA report of Thilawa SEZ Zone A. The remaining points SW-2 and SW-4 are sampled as a reference monitoring for comparison with discharged points and baseline of discharged creek. Moreover, GW-1 is monitored as a reference of existing tube well located in the Moegyoe Swam monastery compound which is situated next to retention pond. Location of sampling points for water quality monitoring is shown in Figure 1.1-1.



Source: Google Earth

Figure 1.1-1 Location of Sampling Points of Water Quality Monitoring

CHAPTER 2: WATER QUALITY MONITORING

2.1 Monitoring Items

Sampling points and parameters for water quality monitoring are determined to cover the environmental monitoring plan of the EIA report.

Water quality sampling was carried out at six locations. Among the six locations, water flow measurement at three locations (SW-2, SW-4 and SW-6) can be carried out by current meter. However, water flow measurement cannot be conducted with current meter at two locations (SW-1 and SW-5) because water gate at SW-1 and SW-5 were closed during sampling. Monitoring items and sampling points are summarized in Table 2.1-1.

Table 2.1-1 Monitoring Items for Water Quality

No.	Parameters	SW-1	SW-2	SW-4	SW-5	SW-6	GW-1	Remarks
1	Water Temperature	○	○	○	○	○	○	On-site measurement
2	pH	○	○	○	○	○	○	On-site measurement
3	DO	○	○	○	○	○	○	On-site measurement
4	Suspended Solids	○	○	○	○	○	○	Laboratory analysis
5	$BOD_{(5)}$	○	○	○	○	○	○	Laboratory analysis
6	$COD_{(Cr)}$	○	○	○	○	○	○	Laboratory analysis
7	Total Coliform	○	○	○	○	○	○	Laboratory analysis
8	Oil and Grease	○	○	○	○	○	○	Laboratory analysis
9	Total Nitrogen (T-N)	○	○	○	○	○	○	Laboratory analysis
10	Total Phosphorous (T-P)	○	○	○	○	○	○	Laboratory analysis
11	Color	○	○	○	○	○	○	Laboratory analysis
12	Odor	○	○	○	○	○	○	Laboratory analysis
13	Ammonia	○	○	○	○	○	○	Laboratory analysis
14	Total Dissolved Solids	○	○	○	○	○	○	Laboratory analysis
15	Mercury	○	○	○	○	○	○	Laboratory analysis
16	Zinc	○	○	○	○	○	○	Laboratory analysis
17	Arsenic	○	○	○	○	○	○	Laboratory analysis
18	Chromium	○	○	○	○	○	○	Laboratory analysis
19	Cadmium	○	○	○	○	○	○	Laboratory analysis
20	Selenium	○	○	○	○	○	○	Laboratory analysis
21	Lead	○	○	○	○	○	○	Laboratory analysis
22	Copper	○	○	○	○	○	○	Laboratory analysis
23	Barium	○	○	○	○	○	○	Laboratory analysis
24	Nickel	○	○	○	○	○	○	Laboratory analysis
25	Silver	○	○	○	○	○	○	Laboratory analysis
26	Iron	○	○	○	○	○	○	Laboratory analysis
27	Cyanide	○	○	○	○	○	○	Laboratory analysis
28	Total Cyanide	○	○	○	○	○	○	Laboratory analysis
29	Chromium (Hexavalent)	○	○	○	○	○	○	Laboratory analysis
30	Fluoride	○	○	○	○	○	○	Laboratory analysis
31	Free Chlorine	○	○	○	○	○	○	Laboratory analysis
32	Total Residual Chlorine	○	○	○	○	○	○	Laboratory analysis
33	Sulphide	○	○	○	○	○	○	Laboratory analysis
34	Formaldehyde	○	○	○	○	○	○	Laboratory analysis
35	Phenols	○	○	○	○	○	○	Laboratory analysis
36	Escherichia Coli (Self- monitoring)	○	-	-	○	-	○	Laboratory analysis
37	Flow Rate	-	○	○	-	○	-	On-site measurement

Source: Myanmar Koei International Ltd.

2.2 Description of Sampling Points

The outline of sampling points is mentioned in Table 2.2-1. The photos of conducting field survey at each sampling points are mentioned in Appendix-1.

Table 2.2-1 Outline of Sampling Points

No.	Station	Detailed Information
1	SW-1	**Coordinate** - N - 16° 40' 13.5", E - 96° 16' 39.8" **Location** - Outlet of Retention Pond **Survey Item** – Surface water sampling
2	SW-2	**Coordinate** - N - 16° 40' 20.69", E - 96° 17' 18.04" **Location** - Upstream of Shwe Pyauk Creek **Survey Item** – Surface water sampling and water flow rate measurement
3	SW-4	**Coordinate**- N - 16° 39' 42.84", E - 96° 16' 27.42" **Location** - Downstream of Shwe Pyauk Creek **Survey Item** – Surface water sampling and water flow rate measurement
4	SW-5	**Coordinate**- N - 16° 40' 10.7", E - 96° 16' 22.6" **Location** - Outlet of Retention Canal **Survey Item** – Surface water sampling
5	SW-6	**Coordinate**- N - 16° 40' 27.13", E - 96° 16' 30.68" **Location** - Outlet from STP to Retention Pond **Survey Item** – Surface water sampling and water flow rate measurement
6	GW-1	**Coordinate**- N - 16° 40' 16.96", E - 96° 16' 34.01" **Location** - In Moegyoe Swan Monastery **Survey Item** – Ground Water Sampling

Source: Myanmar Koei International Ltd.

SW-1

SW-1 was collected at the discharge point of retention pond which is located in the east of Moegyoe Swan monastery. The distance is about 530 m downstream of SW-6 which is the outlet of STP. This drainage is flowing from north to south and then connected to the Shwe Pyauk creek through earth drain. The water quality of this monitoring point has been influenced by the water from downstream of the Shwe Pyauk creek due to backflow by tidal fluctuation. In addition, it seems that a part of storm water from monastery has reached to the culvert in the SEZ area and discharging to the retention pond.

SW-2 (Reference Point)

SW-2 was collected at the upstream of Shwe Pyauk creek. This sampling point is located in the southeast of Zone A area and at the south of Dagon-Thilawa road. The surrounding areas are Zone B in the southwest and local industrial zone in the east respectively.

SW-4 (Reference Point)

SW-4 was collected at the downstream of Shwe Pyauk creek, after mixing of discharge water from local industrial zone, Thilawa SEZ Zone A and Zone B, which is flowing from east to west and then entering into the Yangon River. The distance is about 2.15 km downstream of SW-2. This sampling point is located in the southwest of Zone A area and in the south of Dagon-Thilawa road. The surrounding areas are Zone B and local industrial zone in the east respectively.

SW-5

SW-5 was collected at retention canal near main gate of Thilawa SEZ. Most of the water collected in this canal is rain water and plantation water from surrounding area. This canal is also connected to the Shwe Pyauk creek. The water quality of this monitoring point may have been influenced by the water from downstream due to backflow by tidal fluctuation.

SW-6

SW-6 was collected at the drain outlet of centralized STP which is located in the north of Moegyoe Swan monastery compound and retention pond (SW-1). Then the treated water is flowing to the retention pond. The distance is about 530 m upstream of (SW-1).

GW-1 (Reference of Existing Tube Well)

GW-1 was collected from tube well as ground water sample. It is located in the compound of Moegyoe Swan monastery. The surrounding areas are Zone A in the west, retention pond in the east and Dagon-Thilawa road in the south respectively.

2.3 Monitoring Method

All water samples were collected with cleaned sampling bottles and analyzed by the following standard method as shown in Table 2.3-1. All samples were kept in iced boxes keeping at 2-4° C and were transported to the laboratory. Among the parameters; water temperature, pH and DO were measured by the on-site instrument "Horiba, U-52" and water flow rate was also measured by using the on-site instrument "JFE Digital Current Meter".

Table 2.3-1 Analytic Method for Water Quality

No.	Parameter	Method
1	Water Temperature	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
2	pH	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
3	Dissolved Oxygen (DO)	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
4	Suspended Solids (SS)	APHA 2540 D (Dry at 103-105°C Method)
5	$BOD_{(5)}$	APHA 5210 B (5 Days BOD Test)
6	$COD_{(Cr)}$	APHA 5220D (Close Reflux Colorimetric Method)
7	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)
8	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)
9	Total Nitrogen (T-N)	HACH Method 10072 (TNT Persulfate Digestion Method)
10	Total Phosphorous (T-P)	APHA 4500-P E (Ascorbic Acid Method)
11	Color	APHA 2120C (Spectrophotometric Method)
12	Odor	APHA 2150 B (Threshold Odor Test)
13	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)
14	Total Dissolved Solids	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)
15	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
16	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
17	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
18	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
19	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
20	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
21	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
22	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
23	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
24	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
25	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
26	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
27	Cyanide	HACH 8027 (Pyridine-Pyrazalone Method)
28	Total Cyanide	Distillation process: APHA 4500-CN-C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine – Pyrazalone Method)
29	Chromium (Hexavalent)	ISO 11083:1994 (Determination of chromium (VI) Spectrometric method using 1,5-diphenylcarbazide)
30	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)
31	Free Chlorine	APHA 4500-CL G (DPD Colorimetric Method)
32	Total Residual Chlorine	APHA 4500-CL G (DPD Colorimetric Method)
33	Sulphide	HACH 8131 (USEPA Methylene Blue Method)
34	Formaldehyde	HACH 8110 (MBTH Method)
35	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4 AAP With Distillation))
36	Escherichia Coli	APHA 9221 F (Escherichia Coli Procedure Using Fluorogenic Substrate)
37	Flow Rate	Detection of Electromagnetic Elements (Real-time measurement by AEM 213-D Digital Current Meters)

Source: Myanmar Koei International Ltd.

2.4 Monitoring Period

Water quality and water flow rate monitoring were conducted on 5 June 2024, and sampling time is shown in Table 2.4-1 to avoid tidal effect. The tide record for Yangon River, Myanmar on 5 June 2024 is shown in Table 2.4-2.

Table 2.4-1 Sampling Time of Each Point

No.	Station	Sampling Time
1	SW-1	05/06/2024 11:01
2	SW-2	05/06/2024 08:29
3	SW-4	05/06/2024 09:02
4	SW-5	05/06/2024 11:17
5	SW-6	05/06/2024 10:31
6	GW-1	05/06/2024 11:39

Source: Myanmar Koei International Ltd.

Table 2.4-2 Tide Record for Yangon River, Myanmar

Date	Time	Height (m)	Tide Conditions
05/06/2024	03:19	5.46	High Tide
	10:32	0.99	Low Tide
	15:25	6.00	High Tide
	23:29	0.92	Low Tide

Source: Myanmar Port Authority, Tide Table for the Yangon River and Elephant Point, 2024.

2.5 Monitoring Results

Results of water quality monitoring are summarized in Table 2.5-1. Analytical results of the laboratory are described in Appendix-2. The results were compared with the target value of effluent water quality discharging to water body stipulated in the EIA report.

2.5.1 Results of Outlet of Sewage Treatment Plant (STP) and Discharged Points

As the comparison with the target value, the results of total coliform and total residual chlorine exceeded the limitations.

As comparison with the limitation, the result of total coliform of surface water at the outlet of the centralized STP (SW-6) was within limitation. It may prove that effluents from each locator was treated well by the STP. On the other hand, results at the monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the limitation due to the expected reason; i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals in and along of retention pond and retention canal, and ii) contaminants from the surroundings into the retention pond and retention canal may contain fecal matter and other pollutants, leading to increase coliform levels.

Since the composition of the total coliform include bacteria from natural origin, and total coliform do not affect human health directly, E. Coli analysis was carried out alternatively to identify the health impact by coliform bacteria. As for the result of E. Coli of surface water, all of results were within limitation. Therefore, although the limitation of total coliform exceeded at monitoring point of retention pond (SW-1) and retention canal (SW-5), but it is considered that there is no significant impact on human health.

As for the result of total residual chlorine, the results at the outlet of the centralized STP (SW-6) is 0.4 mg/l and slightly higher than the limitation. A possible reason for exceeding the limitation is because of more concentration of chlorine during the treatment process at STP. However, the results of total residual chlorine at SW-1 which is one of the final discharge points of Zone A (before discharging to natural creek) is under the limitation (0.2 mg/l). Therefore, it can be considered that there is no significant impact on the human health and living environment.

Table 2.5-1 Results of Water Quality Monitoring on All Discharges and Gates

No.	Parameters	Unit	SW-1	SW-5	SW-6	Target Value
1	Water Temperature	˚C	29	29	31	≤ 35
2	pH	-	7.4	7.3	6.7	6~9
3	Dissolved Oxygen (DO)	mg/l	4.95	5.63	6.45	-
4	Suspended Solid (SS)	mg/l	20	6	6	50
5	$BOD_{(5)}$	mg/l	8.59	7.43	13.55	30
6	$COD_{(Cr)}$	mg/l	18.0	14.9	24.5	125
7	Total Coliform	MPN/100ml	24000.0	54000.0	< 1.8	400
8	Oil and Grease	mg/l	< 3.1	< 3.1	< 3.1	10
9	Total Nitrogen (T-N)	mg/l	0.9	< 0.5	6.1	80
10	Total Phosphorous (T-P)	mg/l	0.10	0.06	0.68	2
11	Color	TCU (True Color Unit)	8.63	22.38	28.63	150
12	Odor	TON (Threshold Odor Number)	1	1	1	-
13	Ammonia	mg/l	0.02	< 0.02	< 0.02	10
14	Total Dissolved Solids	mg/l	92	76	306	2000
15	Mercury	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.005
16	Zinc	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	2
17	Arsenic	mg/l	≤ 0.010	≤ 0.010	≤ 0.010	0.1
18	Chromium	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.5
19	Cadmium	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.03
20	Selenium	mg/l	≤ 0.002	≤ 0.010	≤ 0.010	0.02
21	Lead	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.1
22	Copper	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.5
23	Barium	mg/l	0.022	0.016	0.010	1
24	Nickel	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.2
25	Silver	mg/l	≤ 0.002	≤ 0.002	≤ 0.002	0.5
26	Iron	mg/l	0.690	0.588	0.030	3.5
27	Cyanide	mg/l	< 0.002	< 0.002	0.002	0.1
28	Total Cyanide	mg/l	0.002	0.002	0.003	1
29	Chromium (Hexavalent)	mg/l	< 0.05	< 0.05	< 0.05	0.1
30	Fluoride	mg/l	0.275	0.068	2.324	20
31	Free Chlorine	mg/l	< 0.1	< 0.1	0.2	1
32	Total Residual Chlorine	mg/l	0.1	0.1	0.4	0.2
33	Sulphide	mg/l	0.032	0.038	0.008	1
34	Formaldehyde	mg/l	0.014	0.016	0.039	1
35	Phenols	mg/l	0.009	0.013	< 0.002	0.5
36	Escherichia Coli	MPN/100ml (SW)	14.0	14.0	-	(1000)* (CFU/100ml)
37	Flow Rate	m^3/s	-	-	0.002	-

Note: Red color means exceeded value than target value.
*Note: Based on the water utilization at discharged creek, the quality standard for water baths in Japan, (Ministry of Environment, 1997) is set as a reference value for self-monitoring of E. coli for surface water monitoring. However, due to limitation of capacity for analytical laboratory in Myanmar, the method to analyze the "Colony Forming Unit (CFU)" is not available in Myanmar. Therefore, the results of "Most Probable Number (MPN)" are assumed similar to CFU values and compared with reference values. Once the method to analyze the CFU will be available in Myanmar, the analytical method will be changed.
According to the quality standard for water baths in Japan, (Ministry of Environment, 1997), in case of E. Coli result is exceeding 1,000 CFU/100 ml, since it is assumed unsafety, it is considered unsuitable for water baths.
Source: Myanmar Koei International Ltd.

2.5.2 Results of Reference Monitoring Points (Discharged Points and Tube Well)

Result of water quality monitoring at reference tube well monitoring point is shown in Table 2.5-2 and Table 2.5-3. As the comparison with the target value, the results of suspended solid (SS), total coliform and iron at some monitoring points exceeded the limitations.

Result of Reference Monitoring Points (Discharged Creek)

As for the result of SS, result at the surface water monitoring point (SW-4) exceeded the limitations. The exceeded result for SS maybe due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

As for the result of total coliform, results at surface water monitoring points (SW-2) and (SW-4) exceeded the limitation due to three expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) contaminants from the surroundings into the Shwe Pyauk creek may contain fecal matter and other pollutants, leading to increase coliform levels and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

As for the result of iron, the result at the monitoring point of surface water (SW-4) exceeded the limitation. The possible reason for exceeded value in surface water (SW-4) may be due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off or strong wind.

Result of Reference Tube Well

For the ground water quality, National Technical Regulation on Ground Water Quality (No. QCVN 09-MT: 2015/BTNMT) in Vietnam is used as a reference because Myanmar does not have any ground water guidelines and standards, and most of the analyzed parameter are included in Vietnam standard rather the those stipulated by neighboring countries. For the result of Escherichia Coli, B1 (Irrigation water) of National Technical Regulation on Surface Water Quality (No. QCVN 08-MT: 2015/BTNMT) in Vietnam is referred, as no standard for E.coli is mentioned in Vietnam ground water regulation as a reference. In addition, the target values of effluent water quality discharging to water body stipulated in the EIA report are also considered for comparison with ground water quality.

Table 2.5-2 Result of Water Quality Survey for Reference Monitoring Points

No.	Parameters	Unit	SW-2	SW-4	Target Value
1	Water Temperature	˚C	29	29	≤ 35
2	pH	-	6.0	6.2	6~9
3	Dissolved Oxygen (DO)	mg/l	3.12	3.33	-
4	Suspended Solid (SS)	mg/l	30	70	50
5	$BOD_{(5)}$	mg/l	15.67	13.35	30
6	$COD_{(Cr)}$	mg/l	31.3	29.9	125
7	Total Coliform	MPN/100ml	92000.0	35000.0	400
8	Oil and Grease	mg/l	< 3.1	< 3.1	10
9	Total Nitrogen (T-N)	mg/l	< 0.5	< 0.5	80
10	Total Phosphorous (T-P)	mg/l	0.22	0.22	2
11	Color	TCU (True Color Unit)	78.63	61.13	150
12	Odor	TON (Threshold Odor Number)	3	1	-
13	Ammonia	mg/l	0.03	0.05	10
14	Total Dissolved Solids	mg/l	122	124	2000
15	Mercury	mg/l	≤ 0.002	≤ 0.002	0.005
16	Zinc	mg/l	≤ 0.002	≤ 0.002	2
17	Arsenic	mg/l	≤ 0.010	≤ 0.010	0.1
18	Chromium	mg/l	≤ 0.002	≤ 0.002	0.5
19	Cadmium	mg/l	≤ 0.002	≤ 0.002	0.03
20	Selenium	mg/l	≤ 0.010	≤ 0.010	0.02
21	Lead	mg/l	≤ 0.002	≤ 0.002	0.1
22	Copper	mg/l	≤ 0.002	≤ 0.002	0.5
23	Barium	mg/l	0.020	0.022	1
24	Nickel	mg/l	≤ 0.002	≤ 0.002	0.2
25	Silver	mg/l	≤ 0.002	≤ 0.002	0.5
26	Iron	mg/l	2.980	4.132	3.5
27	Cyanide	mg/l	< 0.002	< 0.002	0.1
28	Total Cyanide	mg/l	0.002	0.002	1
29	Chromium (Hexavalent)	mg/l	< 0.05	< 0.05	0.1
30	Fluoride	mg/l	0.027	0.039	20
31	Free Chlorine	mg/l	< 0.1	< 0.1	1
32	Total Residual Chlorine	mg/l	0.1	0.1	0.2
33	Sulphide	mg/l	0.059	0.077	1
34	Formaldehyde	mg/l	0.070	0.069	1
35	Phenols	mg/l	0.015	0.018	0.5
36	Escherichia Coli	MPN/100ml	-	-	(1,000)* (CFU/100ml)
37	Flow Rate	m^3/s	0.11	0.43	-

Note: Red color means the exceeded results than target value.
*Note: Based on the water utilization at discharged creek, the quality standard for water baths in Japan, (Ministry of Environment, 1997) is set as a reference value of self-monitoring for surface water monitoring. However, due to limitation of capacity for analytical laboratory in Myanmar, the method to analyze the "Colony Forming Unit (CFU)" is not available in Myanmar. Therefore, the results of "Most Probable Number (MPN)" are assumed similar to CFU values and compared with reference values. Once the method to analyze the CFU will be available in Myanmar, the analytical method will be changed.
According to the quality standard for water baths in Japan, (Ministry of Environment, 1997), in case of E. Coli result is exceeding 1,000 CFU/100 ml, since it is assumed unsafety, it is considered unsuitable for water baths.
Source: Myanmar Koei International Ltd.

Table 2.5-3 Results of Water Quality Monitoring at Reference Tube Well

No.	Parameters	Unit	GW-1	Vietnam Ground Water Standard	Target Value
1	Water Temperature	˚C	30	-	≤ 35
2	pH	-	7.9	5.5-8.5	6~9
3	Dissolved Oxygen (DO)	mg/l	6.35	-	-
4	Suspended Solid (SS)	mg/l	4	-	50
5	$BOD_{(5)}$	mg/l	7.03	-	30
6	$COD_{(Cr)}$	mg/l	16.1	-	125
7	Total Coliform	MPN/100ml	< 1.8	3	400
8	Oil and Grease	mg/l	< 3.1	-	10
9	Total Nitrogen (T-N)	mg/l	< 0.5	-	80
10	Total Phosphorous (T-P)	mg/l	0.12	-	2
11	Color	TCU (True Color Unit)	1.13	-	150
12	Odor	TON (Threshold Odor Number)	1	-	-
13	Ammonia	mg/l	< 0.02	-	10
14	Total Dissolved Solids	mg/l	1458	1500	2000
15	Mercury	mg/l	≤ 0.002	0.001	0.005
16	Zinc	mg/l	≤ 0.002	3	2
17	Arsenic	mg/l	≤ 0.010	0.05	0.1
18	Chromium	mg/l	≤ 0.002	-	0.5
19	Cadmium	mg/l	≤ 0.002	0.005	0.03
20	Selenium	mg/l	≤ 0.010	0.01	0.02
21	Lead	mg/l	≤ 0.002	0.01	0.1
22	Copper	mg/l	≤ 0.002	-	0.5
23	Barium	mg/l	0.052	-	1
24	Nickel	mg/l	≤ 0.002	0.02	0.2
25	Silver	mg/l	≤ 0.002	-	0.5
26	Iron	mg/l	0.201	5	3.5
27	Cyanide	mg/l	< 0.002	0.01	0.1
28	Total Cyanide	mg/l	< 0.002	-	1
29	Chromium (Hexavalent)	mg/l	< 0.05	0.05	0.1
30	Fluoride	mg/l	0.036	-	20
31	Free Chlorine	mg/l	< 0.1	-	1
32	Total Residual Chlorine	mg/l	< 0.1	-	0.2
33	Sulphide	mg/l	< 0.005	-	1
34	Formaldehyde	mg/l	< 0.003	-	1
35	Phenols	mg/l	< 0.002	0.001	0.5
36	Escherichia Coli	MPN/100ml	< 1.8	(100)* (MPN/100ml)	(100)* (MPN/100ml)
37	Flow Rate	m^3/s	-		-

Note: Vietnam Groundwater Standard (No: QCVN 09-MT:2015/BTNMT)
*Note: Based on the water utilization at monitoring point for ground water, B1(Irrigation water) of National Technical Regulation on Surface Water Quality in Vietnam (No: QCVN 08-MT: 2015/BTNMT) is set as a reference value of self-monitoring for ground water monitoring.
Source: Myanmar Koei International Ltd.

2.5.3 Comparison of Results of Water Quality Exceed the Target Value between Previous Monitoring and June 2024 Monitoring

In order to overview the exceed the limitations of the concerned parameters during the present monitoring (June 2024), the results of the exceed parameters with respective sampling points are compared with the previous monitoring results since June 2023.

Regarding the result of the parameters of discharge points (SW-1 and SW-5), the total coliform concentrations at both monitoring points are higher than the limitation in all monitoring survey (June, August, October, December 2023 and February, April, June 2024). Noticeably, total coliform concentration of SW-1 and SW-5 are also higher throughout all three seasons. The concentration of coliform at SW-1 are extending from 1000 MPN/100ml to the detection limit (>160000 MPN/100ml) and SW-5 are extending from 4900 MPN/100ml to the detection limit (>160000 MPN/100ml) respectively. The result of total residual chlorine at SW-6 is slightly higher than the limitation in this time (June 2024) as well as in June and December 2023.

On the other hand, it is observed that the results of SS concentration, at the reference monitoring point (SW-4) is higher than the limitation. As for the results of SS concentration, the result of SW-4 is higher throughout all three seasons, ranging from 70 to 528 mg/l. It is assumed that SS concentrations at (SW-4) are higher during all three seasons due to the agricultural and domestic run-off from the surrounding as well as the tidal effect resulting the cloudiness (turbidity) of water along Shwe Pyauk creek during both seasons. It is obvious that total coliform at both SW-2 and SW-4 is higher in all monitoring surveys, ranging from 24000 to >160000 MPN/100ml for SW-2 and from 14000 to >160000 MPN/100ml for SW-4, respectively. Especially the total coliform amounts at SW-2 and SW-4 were reached to the detection limit (>160000 MPN/100ml) in June 2023 and February, April 2024. The results of iron at (SW-4) are also higher than the limitation in all monitoring surveys (June, August, October, December 2023 and February, April, June 2024) ranging from 4.132 to 24.000 mg/l. It is revealed that high concentration of iron at (SW-4) occurred throughout all three seasons. It is possible to say that the present condition of the water quality reflects the background condition of the surrounding environment of Thilawa SEZ.

The expected reasons for the results exceed the limitation of concerned parameters are discussed in the upper section of this monitoring report.

CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

As described in Chapter 2 (Section 2.5), the results of suspended solid at (SW-4), total coliform at (SW-1, SW-2, SW-4 and SW-5), iron at (SW-4) and total residual chlorine at (SW-6) exceeded the limitations in the surface water during this monitoring period for operation stage of Thilawa SEZ Zone A.

As comparison with the limitation, total coliform results at monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the limitation due to the expected reasons are the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals in and along of retention pond and retention canal, and the contaminants from the surroundings into the retention pond and retention canal may contain fecal matter and other pollutants, leading to increase coliform levels. The. E. Coli analysis was carried out alternatively to identify the health impact by coliform bacteria and all of results were within the limitation. Therefore, although the limitation of total coliform exceeded at monitoring point of retention pond (SW-1) and retention canal (SW-5), but it is considered that there is no significant impact on human health.

As for the result of total residual chlorine, the results at the outlet of the centralized STP (SW-6) is 0.4 mg/l and slightly higher than the limitation. A possible reason for exceeding the limitation is because of more concentration of chlorine during the treatment process at STP. However, the results of total residual chlorine at SW-1 which is one of the final discharge points of Zone A (before discharging to natural creek) is under the limitation (0.2 mg/l). Therefore, it can be considered that there is no significant impact on the human health and living environment.

As for parameters of SS, total coliform and iron in surface water exceeded the limitation at reference monitoring points. The exceeded result of SS at (SW-4) maybe due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which is located outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to backflow by tidal fluctuation along Shwe Pyauk creek.

The exceeded results for total coliform at (SW-2) and (SW-4) may be due to three expected reasons: i) the existing of various kinds of vegetation and aquatic animals, especially fecal contamination from the animals, ii) contaminants from the surroundings into the Shwe Pyauk creek may contain fecal matter and other pollutants, leading to increase coliform levels and iii) incoming tidal water can contain the fecal matter and delivered along Shwe Pyauk creek during flood tide.

The expected reason for exceeding the limitation of iron at reference monitoring point (SW-4) may be due to the influence of natural origin (iron can reach out from the soil by run-off). Surroundings of the Thilawa SEZ especially small hilly areas are mainly composed of iron rich soil (lateritic soil), and it can be transported to the low land area by run-off or strong wind.

As for future subject for main discharged points of Thilawa SEZ Zone A, the following action may be taken to achieve the target level of total coliform, total residual chlorine and appropriate water quality monitoring:

- To perform regular removal of algae and other vegetation present in the retention pond in order to preserve its cleanliness;
- To ensure the specified amount of chemicals during treatment of STP; and
- To continue monitoring Escherichia coli (E. coli) level to identify health impact by coliform bacteria.

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APPENDIX-1 FIELD SURVEY PHOTOS

FOR DISCHARGED POINTS OF THILAWA SEZ ZONE A

Surface water sampling and onsite measurement at SW-1

Surface water sampling and onsite measurement at SW-5

Surface water sampling and onsite measurement at SW-6

FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGED POINTS AND BASELINE OF DISCHARGED CREEK

Surface water sampling and onsite measurement at SW-2

Surface water sampling and onsite measurement at SW-4

Ground water sampling and onsite measurement at GW-1

APPENDIX-2 LABORATORY RESULTS

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

DOWA

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Report No. : GEM-LAB-202406072
Revision No. : 1
Report Date : 20 June, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-1-0605
Sample No. : W-2406051
Waste Profile No. : -

Sampling Date : 5 June, 2024
Sampling By : Withdraw GEM
Sample Received Date : 5 June, 2024
Analytical Date : 5-20/06/2024

No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	20	50	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	8.59	30	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	18.0	125	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	24000.0	400	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	10	3.1
6	Color	APHA 2120C (Spectrophotometric Method)	TCU	8.63	150	0.00
7	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	0.9	80	0.5
8	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.10	2	0.05
9	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)	mg/l	0.02	10	0.02
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	92	2000	-
11	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	-	0
12	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.005	0.002
13	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	2	0.002
14	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.1	0.010
15	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
16	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.03	0.002
17	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.02	0.010
18	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.1	0.002
19	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
20	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.022	1	0.002

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No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
21	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.2	0.002
22	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
23	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.690	3.5	0.002
24	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	<0.002	0.1	0.002
25	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	0.002	1	0.002
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	<0.05	0.1	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.275	20	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	<0.1	1	0.1
29	Total Residual Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	0.1	0.2	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.032	1	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.014	1	0.003
32	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	14.0	_	1.8
33	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	0.009	0.5	0.002

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

APHA 2120B.6(b); Color Unit - TCU(True Color Unit).
One TCU is equivalent to one Hazen unit and to one Pt-Co unit.

Analysed By :
Cherry Myint Thein
Assistant Manager

LAB GEM
June 20, 2024

Approved By :
Ni Ni Aye Lwin June 20, 2024
Manager

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Report No. : GEM-LAB-202406073
Revision No. : 1
Report Date : 20 June, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-5-0605
Sample No. : W 2406052
Waste Profile No. : -

Sampling Date : 5 June, 2024
Sampling By : Withdraw GEM
Sample Received Date : 5 June, 2024
Analytical Date : 5-20/06/2024

No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	6	50	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	7.43	30	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	14.9	125	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	54000.0	400	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	10	3.1
6	Color	APHA 2120C (Spectrophotometric Method)	TCU	22.38	150	0.00
7	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	<0.5	80	0.5
8	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.06	2	0.05
9	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)	mg/l	<0.02	10	0.02
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	76	2000	-
11	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	-	0
12	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.005	0.002
13	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	2	0.002
14	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.1	0.010
15	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
16	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.03	0.002
17	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.02	0.010
18	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.1	0.002
19	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
20	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.016	1	0.002

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THIS ANALYSIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY OF
GOLDEN DOWA ECO SYSTEM MYANMAR CO.,LTD

Myanmar Japan Thilawa Development Limited
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Doc No: GEM LB RO(a)/01/A0
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No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
21	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.2	0.002
22	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
23	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.588	3.500	0.002
24	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	<0.002	0.1	0.002
25	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	0.002	1	0.002
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	<0.05	0.1	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.068	20	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	<0.1	1	0.1
29	Total Residual Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	0.1	0.2	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.038	1	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.016	1	0.003
32	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	14.0	_	1.8
33	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	0.013	0.5	0.002

Remark : LOQ - Limit of Quantitation

APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

APHA 2120B.6(b); Color Unit - TCU(True Color Unit).
One TCU is equivalent to one Hazen unit and to one Pt-Co unit.

Analysed By :

Cherry Myint Thein
Assistant Manager

LAB GEM
Jun 20, 2024

Approved By :

Ni Ni Aye Lwin Jun 20, 2024
Manager

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Doc No: GEM-LB-R008/01/AD
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Report No. : GEM-LAB-202406074
Revision No. : 1
Report Date : 20 June, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-6-0605
Sample No. : W-2406053
Waste Profile No. : -

Sampling Date : 5 June, 2024
Sampling By : Withdraw GEM
Sample Received Date : 5 June, 2024
Analytical Date : 5-20/06/2024

No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	6	50	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	13.55	30	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	24.5	125	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	<1.8	400	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	10	3.1
6	Color	APHA 2120C (Spectrophotometric Method)	TCU	28.63	150	0.00
7	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	6.1	80	0.5
8	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.68	2	0.05
9	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)	mg/l	<0.02	10	0.02
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	306	2000	-
11	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	-	0
12	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.005	0.002
13	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	2	0.002
14	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.1	0.010
15	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
16	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.03	0.002
17	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.02	0.010
18	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.1	0.002
19	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
20	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.010	1.000	0.002

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Doc No. GDM-LB-R006F/01/AD
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No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
21	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.2	0.002
22	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
23	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.030	3.500	0.002
24	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	0.002	0.1	0.002
25	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine - Pyrazalone Method)	mg/l	0.003	1	0.002
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	<0.05	0.1	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	2.324	20	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	0.2	1	0.1
29	Total Residual Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	0.4	0.2	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.008	1	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.039	1	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	<0.002	0.5	0.002

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

APHA 2120B.6(b); Color Unit - TCU(True Color Unit).
One TCU is equivalent to one Hazen unit and to one Pt-Co unit.

Analysed By :

Cherry Myint Thein
Assistant Manager

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June 20, 2024
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Approved by

Ni Ni Aye Lwin June 20, 2024
Manager

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Myanmar Japan Thilawa Development Limited MJTD

FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGED POINTS AND BASELINE OF DISCHARGED CREEK

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Report No. GEM-LAB-202406075
Revision No. 1
Report Date 20 June, 2024
Application No. 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-2-0605
Sample No. : W-2406054
Waste Profile No. : -
Sampling Date : 5 June, 2023
Sampling By : Withdraw GEM
Sample Received Date : 5 June, 2023
Analytical Date : 5-20/06/2023

No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	30	50	_
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	15.67	30	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	31.3	125	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	92000.0	400	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	10	3.1
6	Color	APHA 2120C (Spectrophotometric Method)	TCU	78.63	150	0.00
7	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	<0.5	80	0.5
8	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.22	2	0.05
9	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)	mg/l	0.03	10	0.02
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	122	2000	_
11	Odor	APHA 2150 B (Threshold Odor Test)	TON	3	_	0
12	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.005	0.002
13	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	2	0.002
14	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.1	0.010
15	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
16	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.03	0.002
17	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.02	0.01
18	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.1	0.002
19	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
20	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.020	1	0.002

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Myanmar Japan Thilawa Development Limited MJTD

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No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
21	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.2	0.002
22	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
23	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	2.980	3.5	0.002
24	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	<0.002	0.1	0.002
25	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	0.002	1	0.002
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	<0.05	0.1	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.027	20	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	<0.1	1	0.1
29	Total Residual Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	0.1	0.2	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.059	1	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.070	1	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	0.015	0.5	0.002

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

APHA 2120B.6(b); Color Unit - TCU(True Color Unit).
One TCU is equivalent to one Hazen unit and to one Pt-Co unit.

Analysed By :

LAB
June 20, 2024
GEM

Cherry Myint Thein
Assistant Manager

Approved by

Ni Ni Aye Lwin June 20, 2024
Manager

*** End of Document ***

Myanmar Japan Thilawa Development Limited
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Phone No. Fax No. (+95) 1 2305051

Report No. : GEM-LAB-202406076
Revision No. : 1
Report Date : 20 June, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-4-0605
Sample No. : W-2406055
Waste Profile N : -

Sampling Date : 5 June, 2024
Sampling By : Withdraw GEM
Sample Received Date : 5 June, 2024
Analytical Date : 5-20/06/2024

No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	70	50	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	13.35	30	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	29.9	125	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	35000.0	400	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	10	3.1
6	Color	APHA 2120C (Spectrophotometric Method)	TCU	61.13	150	0.00
7	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	<0.5	80	0.5
8	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.22	2	0.05
9	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)	mg/l	0.05	10	0.02
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	124	2000	-
11	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	-	0
12	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.005	0.002
13	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	2	0.002
14	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	<0.010	0.1	0.010
15	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
16	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.03	0.002
17	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.02	0.01
18	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.1	0.002
19	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
20	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.022	1	0.002

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Myanmar Japan Thilawa Development Limited MJTD

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Phone No. Fax No: (+951) 2309051

No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
21	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.2	0.002
22	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
23	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	4.132	3.5	0.002
24	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	<0.002	0.1	0.002
25	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	0.002	1	0.002
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	<0.05	0.1	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.039	20	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	<0.1	1	0.1
29	Total Residual Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	0.1	0.2	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.077	1	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.069	1	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	0.018	0.5	0.002

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

APHA 2120B.6(b); Color Unit - TCU(True Color Unit).
One TCU is equivalent to one Hazen unit and to one Pt-Co unit.

Analysed By :

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June 20,2024
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Cherry Myint Thein
Assistant Manager

Approved by

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Manager

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Report No. : GEM-LAB-202406077
Revision No. : 1
Report Date : 20 June, 2024
Application No. : 0001-C001

Test Report

Client Name : Myanmar Koei International LTD (MKI)
Address : No, 36/A, 1st Floor, Grand Pho Sein Condominium, Pho Sein Road, Tamwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-GW-1-0605
Sample No. : W-2406056
Waste Profile No : -
Sampling Date : 5 June, 2024
Sampling By : Withdraw GEM
Sample Received Date : 5 June, 2024
Analytical Date : 5-20/06/2024

No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	4	50	_
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	7.03	30	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	16.1	125	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	<1.8	400	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	<3.1	10	3.1
6	Color	APHA 2120C (Spectrophotometric Method)	TCU	1.13	150	0.00
7	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	<0.5	80	0.5
8	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.12	2	0.05
9	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)	mg/l	<0.02	10	0.02
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	1458	2000	_
11	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	_	0
12	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.005	0.002
13	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	2	0.002
14	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.1	0.010
15	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
16	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.03	0.002
17	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.010	0.02	0.010
18	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.1	0.002
19	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
20	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.052	1	0.002

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GEM

REMARKS: 1 COPY OF THIS SAMPLE SUBMITTED FOR ANALYSIS

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No.	Parameter	Method	Unit	Result	TSEZ's WQ Standard	LOQ
21	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.2	0.002
22	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤0.002	0.5	0.002
23	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.201	3.5	0.002
24	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	<0.002	0.1	0.002
25	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	<0.002	1	0.002
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	<0.05	0.1	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.036	20	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	<0.1	1	0.1
29	Total Residual Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	<0.1	0.2	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	<0.005	1	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	<0.003	1	0.003
32	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	<1.8	_	1.8
33	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	<0.002	0.5	0.002

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 22nd edition

APHA 2120B.6(b); Color Unit - TCU(True Color Unit).
One TCU is equivalent to one Hazen unit and to one Pt-Co unit.

Analysed By :

Cherry Myint Thein
Assistant Manager

LAB
June 20, 2024
GEM

Approved By :

Ni Ni Aye Lwin June 20, 2024
Manager

*** End of Document ***

Myanmar Japan Thilawa Development Limited MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix -D

Air Quality Monitoring Report

February, 2024

AIR QUALITY MONITORING REPORT
FOR DEVELOPMENT OF INDUSTRIAL AREA
THILAWA SEZ ZONE A
(OPERATION STAGE)

(BI-ANNUALLY MONITORING)

February 2024

Myanmar Koei International Ltd.

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CHAPTER 1: OUTLINES AND SUMMARY OF MONITORING PLAN

1.1 General

Thilawa Special Economic Zone (TSEZ) is located in the southern district of Yangon region and about 23 km southeast of Yangon city. As the developer of Thilawa SEZ, Myanmar Japan Thilawa Development Ltd. (MJTD) has a responsibility to carry out regular environmental monitoring in the industrial area of Zone A in accordance with the approved Environmental Impact Assessment (EIA) report with Environmental Management Plan (EMP). MJTD has implemented monitoring of various environmental items with the specified time frame to know about the environmental conditions in and around the area.

1.2 Outlines of Monitoring Plan

To assess the environmental condition under the operation of industrial area in and around Thilawa SEZ Zone A, air quality had been monitored from 5 February 2024 – 12 February 2024 as follows;

Table 1.2-1 Outlines of Air Quality Monitoring Plan

Monitoring Date	Monitoring Item	Parameters	Number of Point	Duration	Monitoring Methodology
From 5 February – 12 February, 2024	Air Quality	CO, NO_2, TSP, PM_{10} and SO_2	1	7 Days	On site measurement by Haz-Scanner Environmental Perimeter Air Station (EPAS)

Source: Myanmar Koei International Ltd.

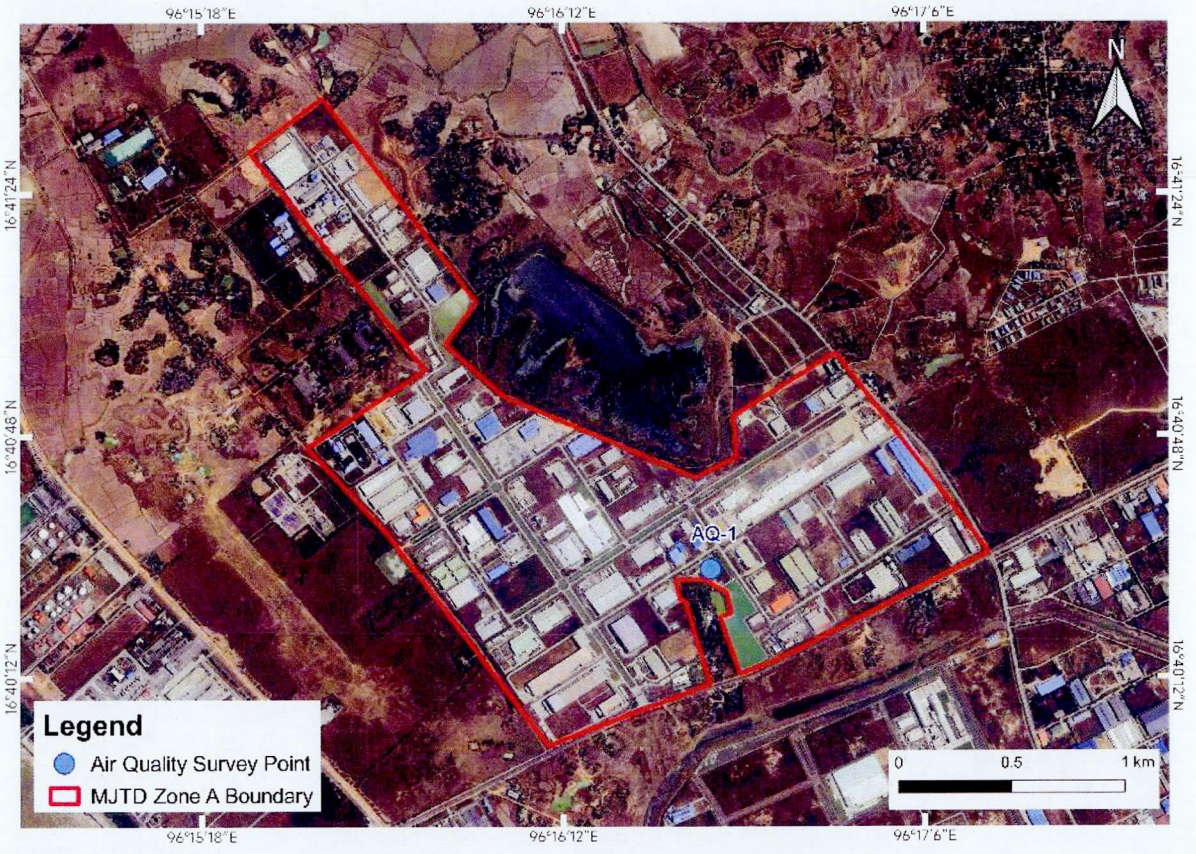
CHAPTER 2: AIR QUALITY MONITORING

2.1 Monitoring Item

The parameters for air quality monitoring were CO, NO_2, TSP, PM_{10} and SO_2.

2.2 Monitoring Location

The air quality measurement equipment, "Haz-Scanner Environmental Perimeter Air Station (EPAS) was set up inside the centralized Sewage Treatment Plant (STP) compound which is southeast of the Thilawa SEZ Zone A, N: 16°40'28.07", E: 96°16'34.06". It is surrounded by the factories of Thilawa SEZ Zone A, north of Dagon-Thilawa road and northeast of Moegyoe Swan monastery respectively. Possible emission sources are dust emissions from construction activities of surrounding Zone A's locators and exhaust gas emissions from surrounded factories. The location of air quality monitoring is shown in the Figure 2.2-1.



Source: Google Earth

Figure 2.2-1 Location of Air Quality Monitoring Point

2.3 Monitoring Period

Air quality monitoring was conducted seven consecutive days from 5 February – 12 February, 2024.

2.4 Monitoring Method

Monitoring of CO, NO_2, TSP, PM_{10} and SO_2 were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner EPAS was used to collect ambient air pollutants. The EPAS measures automatically every one minute and directly reads and records onsite for CO, NO_2, PM_{10} and SO_2. Air quality monitoring equipment is maintained for the proper conditions for the measurement. Due to the limitation of the analytical equipment in Myanmar, TSP results were calculated as predicted value which is based on the results of PM_{10}. Therefore, the result of TSP was evaluated using the estimated TSP concentration values. The state of air quality monitoring is shown in Figure 2.4-1.

Source: Myanmar Koei International Ltd.

Figure 2.4-1 Status of Air Quality Monitoring Point

2.5 Monitoring Results

The daily average value of air quality monitoring results of CO, NO_2, TSP, PM_{10} and SO_2 are described in Table 2.5-1. Comparing with the target value of CO, NO_2, TSP, PM_{10} and SO_2 prescribed in EIA report for Thilawa SEZ development project Zone A, concentration of CO, NO_2, TSP, PM_{10} and SO_2 were lower than the target value.

Regarding the calculation of predicted TSP concentration, the correlation value between PM_{10} and TSP of ambient air quality guideline value in Thailand as below;

330 µg/m³ (TSP standard value in Thailand) / 120 µg/m³ (PM_{10} standard value in Thailand) = 2.75 (Correlation value)

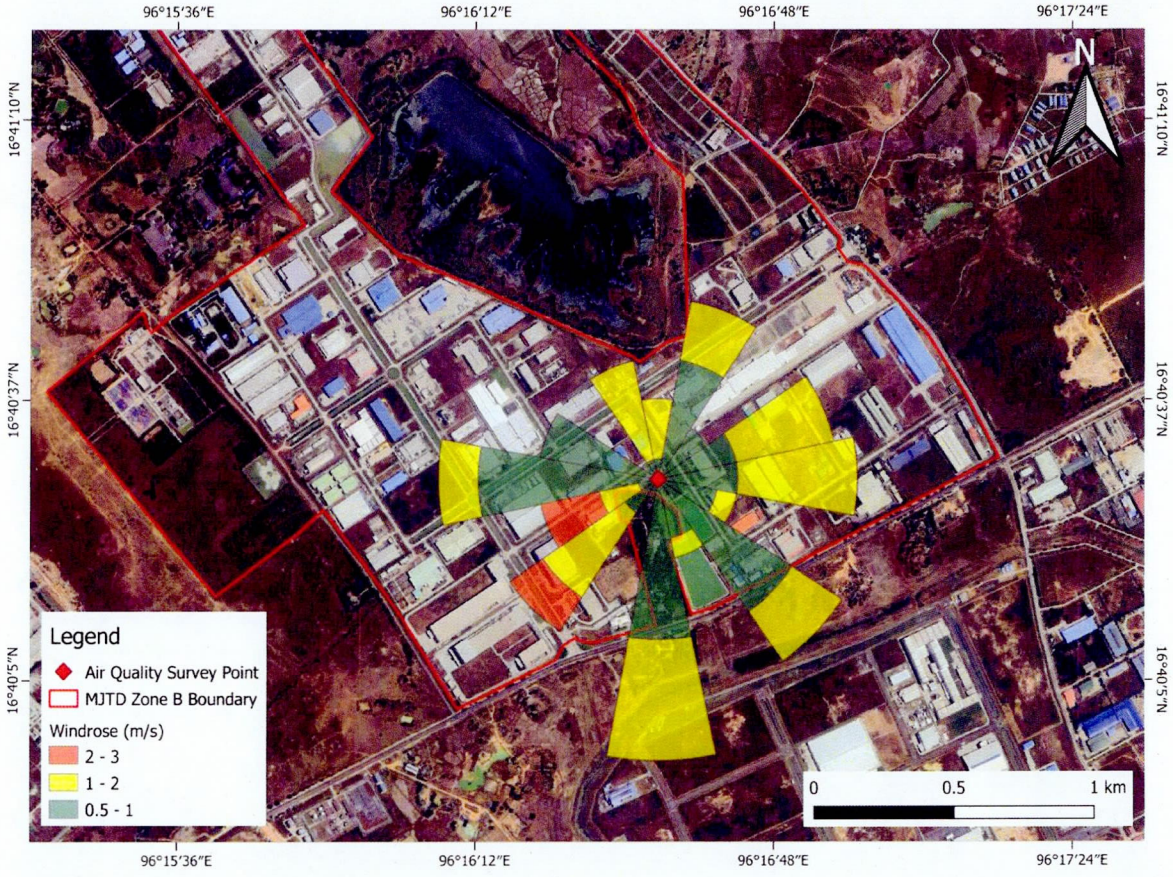
Table 2.5-1 Air Quality Monitoring Result (Daily Average)

Date	CO	NO_2	TSP	PM_{10}	SO_2
	mg/m³	mg/m³	mg/m³	mg/m³	mg/m³
05-06 Feb, 2024	0.152	0.036	0.219	0.079	0.017
06-07 Feb, 2024	0.156	0.047	0.216	0.078	0.018
07-08 Feb, 2024	0.167	0.040	0.213	0.077	0.020
08-09 Feb, 2024	0.196	0.043	0.241	0.088	0.015
09-10 Feb, 2024	0.178	0.046	0.174	0.063	0.019
10-11 Feb, 2024	0.194	0.055	0.272	0.099	0.016
11-12 Feb, 2024	0.176	0.045	0.255	0.093	0.018
7 Days Average Value	0.174	0.045	0.227	0.083	0.017
Target Value	11.45	0.11	<0.33	<0.12	0.11

Note: The target value of CO, NO_2 and SO_2 were converted from ppm unit to mg/m³. The conversion equation are as follows;
1. (CO, mg/m³) = (CO, ppm) * (Molecular Weight of CO (28)) / 24.45 at 25°C and 1 atm condition
2. (NO_2, mg/m³) = (NO_2, ppm) * (Molecular Weight of NO_2 (46)) / 24.45 at 25°C and 1 atm condition
3. (SO_2, mg/m³) = (SO_2, ppm) * (Molecular Weight of SO_2 (64)) / 24.45 at 25°C and 1 atm condition

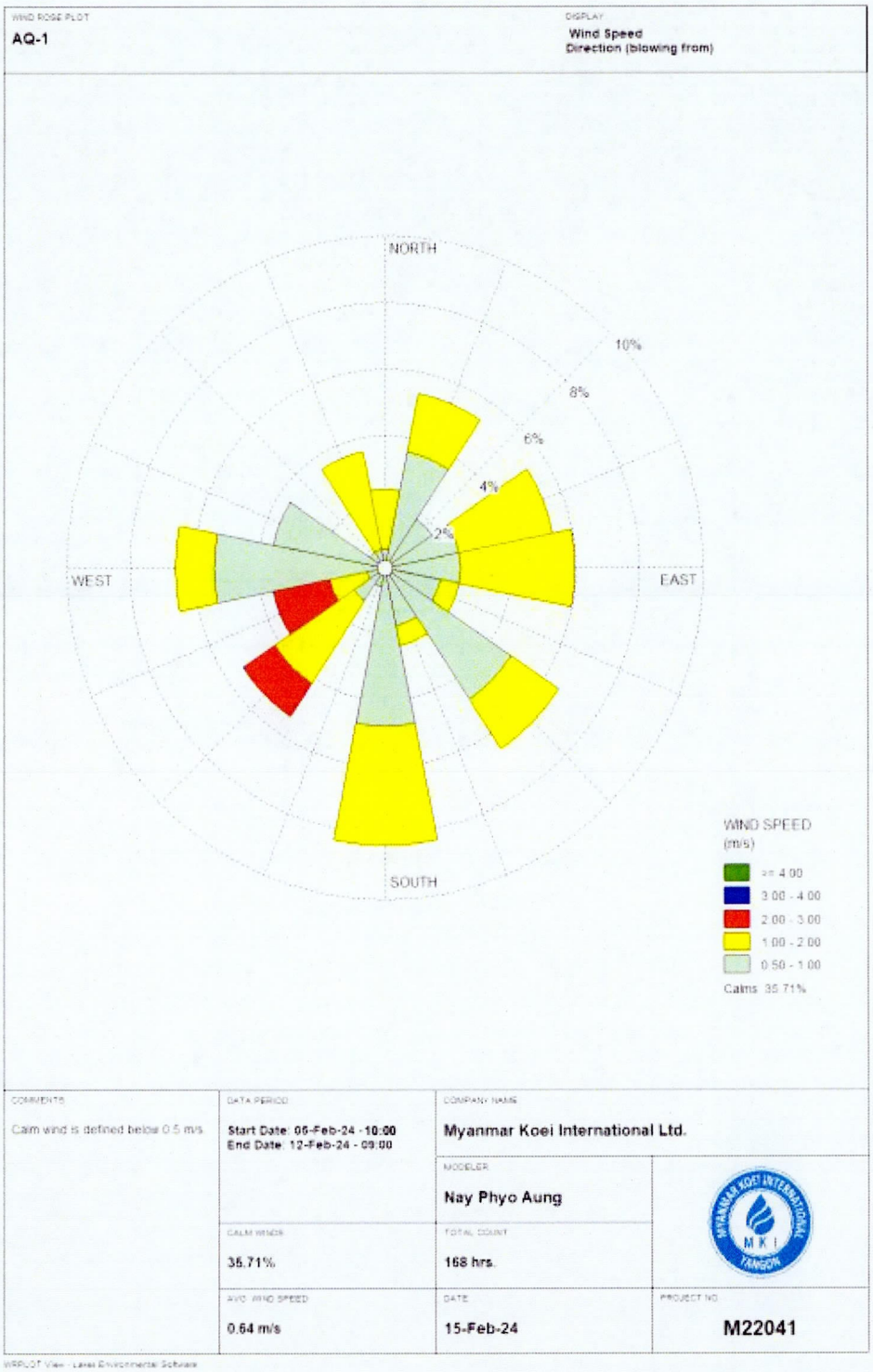
Source: Myanmar Koei International Ltd.

Wind direction and wind speed were measured at AQ-1. Hourly average values of measured wind direction and wind speed data are described in Appendix-1. Frequency of wind direction at AQ-1 and its wind rose diagram are described in Figure 2.5-1 and Figure 2.5-2. According to the wind rose analysis, the prevailing wind direction during monitoring was South (S) and the least frequency wind direction was Northeast (NE). During the monitoring period, while the maximum wind speed was 2.93 m/s, the average speed is 0.64 m/s. The calm wind is 35.71%, whereas the calm wind is defined below 0.5 m/s. As the average wind speed is higher than the defined calm wind, it is assumed that the wind was "Light Air" during the monitoring period.



Source: Myanmar Koei International Ltd.

Figure 2.5-1 Wind Status at AQ-1



Source: Myanmar Koei International Ltd.

Figure 2.5-2 Wind Rose Diagram of AQ-1

CHAPTER 3: CONCLUSION AND RECOMMENDATION

The result of air quality at AQ-1, concentration of CO, NO_2, TSP, PM_{10} and SO_2 during seven days monitoring was not exceeded the target value, thus there is no impacts from the operation activities of Zone A.

In conclusion of this environmental survey periodical monitoring will be necessary to grasp the environmental conditions in Thilawa SEZ Zone A and to show the compliance status in the operation stage of Thilawa SEZ Zone A. The mitigation measures for environmental management will be considered in collected periodical environmental data and has to be reviewed in future.

APPENDIX 1: HOURLY AIR RESULT

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
05 Feb, 2024	10:00 ~ 10:59	0.218	0.011	0.244	0.089	0.016	0.62	266	W
05 Feb, 2024	11:00 ~ 11:59	0.062	0.012	0.136	0.050	0.018	0.75	301	WNW
05 Feb, 2024	12:00 ~ 12:59	0.072	0.010	0.112	0.041	0.015	0.83	295	WNW
05 Feb, 2024	13:00 ~ 13:59	0.042	0.010	0.039	0.014	0.016	0.72	289	WNW
05 Feb, 2024	14:00 ~ 14:59	0.016	0.010	0.045	0.016	0.017	0.68	170	S
05 Feb, 2024	15:00 ~ 15:59	0.018	0.010	0.132	0.048	0.015	0.72	287	WNW
05 Feb, 2024	16:00 ~ 16:59	0.371	0.012	0.206	0.075	0.019	1.07	187	S
05 Feb, 2024	17:00 ~ 17:59	0.391	0.038	0.228	0.083	0.019	1.75	111	ESE
05 Feb, 2024	18:00 ~ 18:59	0.391	0.080	0.214	0.078	0.015	0.62	132	SE
05 Feb, 2024	19:00 ~ 19:59	0.526	0.104	0.297	0.108	0.016	0.43	139	SE
05 Feb, 2024	20:00 ~ 20:59	0.089	0.080	0.224	0.081	0.020	0.68	139	SE
05 Feb, 2024	21:00 ~ 21:59	0.017	0.063	0.296	0.108	0.021	0.48	139	SE
05 Feb, 2024	22:00 ~ 22:59	0.275	0.050	0.284	0.103	0.018	0.23	139	SE
05 Feb, 2024	23:00 ~ 23:59	0.235	0.049	0.251	0.091	0.015	0.65	178	S
06 Feb, 2024	0:00 ~ 0:59	0.170	0.008	0.248	0.090	0.017	0.87	234	SW
06 Feb, 2024	1:00 ~ 1:59	0.290	0.008	0.210	0.076	0.014	0.87	266	W
06 Feb, 2024	2:00 ~ 2:59	0.347	0.009	0.213	0.077	0.017	0.38	265	W
06 Feb, 2024	3:00 ~ 3:59	0.013	0.011	0.214	0.078	0.018	0.47	270	W
06 Feb, 2024	4:00 ~ 4:59	0.011	0.019	0.275	0.100	0.016	0.57	270	W
06 Feb, 2024	5:00 ~ 5:59	0.010	0.032	0.339	0.123	0.015	0.13	269	W
06 Feb, 2024	6:00 ~ 6:59	0.040	0.055	0.342	0.124	0.016	0.33	247	WSW
06 Feb, 2024	7:00 ~ 7:59	0.011	0.091	0.298	0.108	0.019	0.57	19	NNE
06 Feb, 2024	8:00 ~ 8:59	0.011	0.080	0.287	0.105	0.017	0.65	12	NNE
06 Feb, 2024	9:00 ~ 9:59	0.011	0.017	0.111	0.040	0.016	0.68	261	W

Max	0.526	0.104	0.342	0.124	0.021
Avg	0.152	0.036	0.219	0.079	0.017
Min	0.010	0.008	0.039	0.014	0.014

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
06 Feb, 2024	10:00 ~ 10:59	0.123	0.010	0.031	0.011	0.015	0.58	177	S
06 Feb, 2024	11:00 ~ 11:59	0.146	0.010	0.115	0.042	0.018	0.78	284	WNW
06 Feb, 2024	12:00 ~ 12:59	0.045	0.011	0.178	0.065	0.016	0.92	279	W
06 Feb, 2024	13:00 ~ 13:59	0.149	0.010	0.089	0.032	0.017	0.90	299	WNW
06 Feb, 2024	14:00 ~ 14:59	0.212	0.010	0.071	0.026	0.016	0.82	266	W
06 Feb, 2024	15:00 ~ 15:59	0.162	0.010	0.210	0.076	0.019	0.62	267	W
06 Feb, 2024	16:00 ~ 16:59	0.142	0.010	0.284	0.103	0.016	1.53	142	SE
06 Feb, 2024	17:00 ~ 17:59	0.035	0.027	0.245	0.089	0.015	1.85	133	SE
06 Feb, 2024	18:00 ~ 18:59	0.040	0.091	0.226	0.082	0.020	0.83	161	SSE
06 Feb, 2024	19:00 ~ 19:59	0.063	0.102	0.248	0.090	0.016	0.25	170	S
06 Feb, 2024	20:00 ~ 20:59	0.046	0.087	0.289	0.105	0.017	0.08	168	SSE
06 Feb, 2024	21:00 ~ 21:59	0.033	0.107	0.332	0.121	0.016	0.17	168	SSE
06 Feb, 2024	22:00 ~ 22:59	0.036	0.083	0.330	0.120	0.019	0.12	150	SSE
06 Feb, 2024	23:00 ~ 23:59	0.052	0.084	0.248	0.090	0.017	0.30	186	S
07 Feb, 2024	0:00 ~ 0:59	0.046	0.008	0.205	0.075	0.018	0.32	212	SSW
07 Feb, 2024	1:00 ~ 1:59	0.181	0.034	0.243	0.089	0.017	0.12	212	SSW
07 Feb, 2024	2:00 ~ 2:59	0.190	0.016	0.242	0.088	0.018	0.35	212	SSW
07 Feb, 2024	3:00 ~ 3:59	0.175	0.012	0.240	0.087	0.021	0.18	225	SW
07 Feb, 2024	4:00 ~ 4:59	0.112	0.016	0.323	0.117	0.018	0.07	226	SW
07 Feb, 2024	5:00 ~ 5:59	0.083	0.026	0.370	0.134	0.017	0.00	226	SW
07 Feb, 2024	6:00 ~ 6:59	0.170	0.094	0.378	0.137	0.019	0.05	249	WSW
07 Feb, 2024	7:00 ~ 7:59	0.157	0.110	0.157	0.057	0.021	0.18	287	WNW
07 Feb, 2024	8:00 ~ 8:59	0.740	0.105	0.040	0.015	0.022	0.40	333	NNW
07 Feb, 2024	9:00 ~ 9:59	0.600	0.059	0.084	0.031	0.021	0.50	84	E

Max	0.740	0.110	0.378	0.137	0.022
Avg	0.156	0.047	0.216	0.078	0.018
Min	0.033	0.008	0.031	0.011	0.005

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
07 Feb, 2024	10:00 ~ 10:59	0.085	0.008	0.054	0.020	0.020	0.52	133	SE
07 Feb, 2024	11:00 ~ 11:59	0.038	0.008	0.114	0.041	0.019	0.75	54	NE
07 Feb, 2024	12:00 ~ 12:59	0.075	0.008	0.292	0.106	0.021	1.02	98	E
07 Feb, 2024	13:00 ~ 13:59	0.097	0.008	0.052	0.019	0.023	0.98	59	ENE
07 Feb, 2024	14:00 ~ 14:59	0.073	0.008	0.093	0.034	0.021	0.92	93	E
07 Feb, 2024	15:00 ~ 15:59	0.096	0.008	0.165	0.060	0.018	0.70	70	ENE
07 Feb, 2024	16:00 ~ 16:59	0.130	0.011	0.271	0.099	0.025	1.30	182	S
07 Feb, 2024	17:00 ~ 17:59	0.250	0.038	0.273	0.099	0.019	1.52	241	WSW
07 Feb, 2024	18:00 ~ 18:59	0.331	0.085	0.239	0.087	0.023	0.65	266	W
07 Feb, 2024	19:00 ~ 19:59	0.077	0.110	0.261	0.095	0.020	0.37	276	W
07 Feb, 2024	20:00 ~ 20:59	0.048	0.101	0.234	0.085	0.018	0.62	312	NW
07 Feb, 2024	21:00 ~ 21:59	0.076	0.029	0.182	0.066	0.020	1.15	337	NNW
07 Feb, 2024	22:00 ~ 22:59	0.025	0.019	0.157	0.057	0.023	1.45	337	NNW
07 Feb, 2024	23:00 ~ 23:59	0.098	0.024	0.153	0.056	0.022	0.93	333	NNW
08 Feb, 2024	0:00 ~ 0:59	0.301	0.029	0.161	0.059	0.021	0.97	340	NNW
08 Feb, 2024	1:00 ~ 1:59	0.561	0.025	0.192	0.070	0.022	1.20	353	N
08 Feb, 2024	2:00 ~ 2:59	0.424	0.031	0.228	0.083	0.020	1.02	180	S
08 Feb, 2024	3:00 ~ 3:59	0.331	0.036	0.259	0.094	0.018	1.00	66	ENE
08 Feb, 2024	4:00 ~ 4:59	0.367	0.027	0.270	0.098	0.020	0.75	15	NNE
08 Feb, 2024	5:00 ~ 5:59	0.093	0.032	0.283	0.103	0.021	0.50	31	NNE
08 Feb, 2024	6:00 ~ 6:59	0.095	0.075	0.354	0.129	0.019	0.28	84	E
08 Feb, 2024	7:00 ~ 7:59	0.112	0.080	0.301	0.109	0.020	0.18	138	SE
08 Feb, 2024	8:00 ~ 8:59	0.134	0.085	0.290	0.105	0.021	0.43	77	ENE
08 Feb, 2024	9:00 ~ 9:59	0.101	0.074	0.226	0.082	0.018	0.55	78	ENE

Max	0.561	0.110	0.354	0.129	0.025
Avg	0.167	0.040	0.213	0.077	0.020
Min	0.025	0.008	0.052	0.019	0.018

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
08 Feb, 2024	10:00 ~ 10:59	0.145	0.008	0.145	0.053	0.014	0.70	84	E
08 Feb, 2024	11:00 ~ 11:59	0.258	0.008	0.090	0.033	0.016	1.07	91	E
08 Feb, 2024	12:00 ~ 12:59	0.449	0.008	0.147	0.053	0.018	1.03	97	E
08 Feb, 2024	13:00 ~ 13:59	0.194	0.008	0.037	0.014	0.015	1.30	95	E
08 Feb, 2024	14:00 ~ 14:59	0.112	0.008	0.090	0.033	0.012	1.30	13	NNE
08 Feb, 2024	15:00 ~ 15:59	0.065	0.008	0.195	0.071	0.013	1.40	128	SE
08 Feb, 2024	16:00 ~ 16:59	0.054	0.009	0.207	0.075	0.014	1.50	7	N
08 Feb, 2024	17:00 ~ 17:59	0.068	0.032	0.244	0.089	0.015	1.10	10	N
08 Feb, 2024	18:00 ~ 18:59	0.104	0.052	0.160	0.058	0.018	0.93	178	S
08 Feb, 2024	19:00 ~ 19:59	0.083	0.077	0.199	0.072	0.014	0.80	178	S
08 Feb, 2024	20:00 ~ 20:59	0.218	0.063	0.206	0.075	0.012	1.45	64	ENE
08 Feb, 2024	21:00 ~ 21:59	0.303	0.047	0.223	0.081	0.017	1.32	181	S
08 Feb, 2024	22:00 ~ 22:59	0.385	0.046	0.251	0.091	0.013	1.03	71	ENE
08 Feb, 2024	23:00 ~ 23:59	0.441	0.047	0.292	0.106	0.015	0.57	20	NNE
09 Feb, 2024	0:00 ~ 0:59	0.179	0.043	0.314	0.114	0.016	0.77	172	S
09 Feb, 2024	1:00 ~ 1:59	0.265	0.045	0.320	0.116	0.015	0.37	79	E
09 Feb, 2024	2:00 ~ 2:59	0.280	0.045	0.381	0.139	0.014	0.10	145	SE
09 Feb, 2024	3:00 ~ 3:59	0.279	0.066	0.484	0.176	0.016	0.08	95	E
09 Feb, 2024	4:00 ~ 4:59	0.156	0.101	0.388	0.141	0.014	0.05	85	E
09 Feb, 2024	5:00 ~ 5:59	0.140	0.052	0.349	0.127	0.015	0.02	62	ENE
09 Feb, 2024	6:00 ~ 6:59	0.111	0.100	0.322	0.117	0.012	0.10	236	SW
09 Feb, 2024	7:00 ~ 7:59	0.122	0.100	0.318	0.116	0.018	0.05	260	W
09 Feb, 2024	8:00 ~ 8:59	0.112	0.055	0.283	0.103	0.015	0.72	181	S
09 Feb, 2024	9:00 ~ 9:59	0.175	0.008	0.149	0.054	0.013	0.60	50	NE

Max	0.449	0.101	0.484	0.176	0.018
Avg	0.196	0.043	0.241	0.088	0.015
Min	0.054	0.008	0.037	0.014	0.012

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
09 Feb, 2024	10:00 ~ 10:59	0.384	0.008	0.129	0.047	0.022	0.77	57	ENE
09 Feb, 2024	11:00 ~ 11:59	0.363	0.008	0.159	0.058	0.020	0.97	80	E
09 Feb, 2024	12:00 ~ 12:59	0.276	0.008	0.144	0.052	0.018	0.93	135	SE
09 Feb, 2024	13:00 ~ 13:59	0.153	0.017	0.103	0.037	0.020	0.93	48	NE
09 Feb, 2024	14:00 ~ 14:59	0.078	0.008	0.094	0.034	0.018	1.10	90	E
09 Feb, 2024	15:00 ~ 15:59	0.086	0.008	0.167	0.061	0.016	0.97	33	NNE
09 Feb, 2024	16:00 ~ 16:59	0.100	0.012	0.251	0.091	0.018	1.20	76	ENE
09 Feb, 2024	17:00 ~ 17:59	0.108	0.016	0.244	0.089	0.021	1.05	13	NNE
09 Feb, 2024	18:00 ~ 18:59	0.133	0.098	0.198	0.072	0.017	1.00	344	NNW
09 Feb, 2024	19:00 ~ 19:59	0.117	0.091	0.196	0.071	0.016	0.42	318	NW
09 Feb, 2024	20:00 ~ 20:59	0.226	0.086	0.211	0.077	0.019	0.30	281	W
09 Feb, 2024	21:00 ~ 21:59	0.157	0.040	0.152	0.055	0.017	0.98	339	NNW
09 Feb, 2024	22:00 ~ 22:59	0.207	0.033	0.127	0.046	0.016	1.22	179	S
09 Feb, 2024	23:00 ~ 23:59	0.176	0.037	0.115	0.042	0.017	0.95	7	N
10 Feb, 2024	0:00 ~ 0:59	0.137	0.043	0.127	0.046	0.019	0.67	15	NNE
10 Feb, 2024	1:00 ~ 1:59	0.146	0.040	0.133	0.048	0.017	0.62	67	ENE
10 Feb, 2024	2:00 ~ 2:59	0.151	0.046	0.135	0.049	0.019	0.47	182	S
10 Feb, 2024	3:00 ~ 3:59	0.145	0.069	0.140	0.051	0.021	0.27	124	SE
10 Feb, 2024	4:00 ~ 4:59	0.144	0.065	0.178	0.065	0.020	0.00	341	NNW
10 Feb, 2024	5:00 ~ 5:59	0.141	0.093	0.174	0.063	0.019	0.13	121	ESE
10 Feb, 2024	6:00 ~ 6:59	0.142	0.074	0.229	0.083	0.018	0.22	75	ENE
10 Feb, 2024	7:00 ~ 7:59	0.159	0.105	0.304	0.111	0.020	0.28	108	ESE
10 Feb, 2024	8:00 ~ 8:59	0.268	0.090	0.304	0.111	0.019	0.63	103	ESE
10 Feb, 2024	9:00 ~ 9:59	0.283	0.020	0.171	0.062	0.017	0.78	110	ESE

Max	0.384	0.105	0.304	0.111	0.022
Avg	0.178	0.046	0.174	0.063	0.019
Min	0.078	0.008	0.094	0.034	0.016

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
10 Feb, 2024	10:00 ~ 10:59	0.169	0.008	0.121	0.044	0.018	0.77	100	E
10 Feb, 2024	11:00 ~ 11:59	0.164	0.008	0.068	0.025	0.016	0.92	126	SE
10 Feb, 2024	12:00 ~ 12:59	0.157	0.008	0.170	0.062	0.017	1.45	221	SW
10 Feb, 2024	13:00 ~ 13:59	0.119	0.008	0.053	0.019	0.015	1.25	214	SW
10 Feb, 2024	14:00 ~ 14:59	0.106	0.008	0.133	0.048	0.013	1.65	236	WSW
10 Feb, 2024	15:00 ~ 15:59	0.115	0.008	0.222	0.081	0.014	1.53	243	WSW
10 Feb, 2024	16:00 ~ 16:59	0.119	0.009	0.285	0.104	0.012	1.98	241	WSW
10 Feb, 2024	17:00 ~ 17:59	0.165	0.046	0.277	0.101	0.012	2.00	238	WSW
10 Feb, 2024	18:00 ~ 18:59	0.157	0.095	0.252	0.092	0.016	0.90	247	WSW
10 Feb, 2024	19:00 ~ 19:59	0.120	0.107	0.225	0.082	0.014	0.32	295	WNW
10 Feb, 2024	20:00 ~ 20:59	0.221	0.107	0.265	0.096	0.013	0.18	289	WNW
10 Feb, 2024	21:00 ~ 21:59	0.249	0.059	0.279	0.102	0.015	0.10	305	NW
10 Feb, 2024	22:00 ~ 22:59	0.247	0.065	0.312	0.114	0.018	0.12	306	NW
10 Feb, 2024	23:00 ~ 23:59	0.202	0.042	0.261	0.095	0.018	0.15	236	SW
11 Feb, 2024	0:00 ~ 0:59	0.171	0.063	0.279	0.101	0.017	0.17	157	SSE
11 Feb, 2024	1:00 ~ 1:59	0.261	0.106	0.311	0.113	0.019	0.17	255	WSW
11 Feb, 2024	2:00 ~ 2:59	0.241	0.090	0.391	0.142	0.015	0.20	254	WSW
11 Feb, 2024	3:00 ~ 3:59	0.230	0.086	0.420	0.153	0.016	0.38	244	WSW
11 Feb, 2024	4:00 ~ 4:59	0.263	0.043	0.409	0.149	0.018	0.18	162	SSE
11 Feb, 2024	5:00 ~ 5:59	0.214	0.093	0.408	0.148	0.017	0.13	144	SE
11 Feb, 2024	6:00 ~ 6:59	0.243	0.088	0.447	0.163	0.019	0.30	109	ESE
11 Feb, 2024	7:00 ~ 7:59	0.263	0.098	0.447	0.163	0.017	0.32	115	ESE
11 Feb, 2024	8:00 ~ 8:59	0.227	0.057	0.356	0.130	0.016	0.70	131	SE
11 Feb, 2024	9:00 ~ 9:59	0.240	0.008	0.131	0.048	0.018	1.00	161	SSE

Max	0.263	0.107	0.447	0.163	0.019
Avg	0.194	0.055	0.272	0.099	0.016
Min	0.106	0.008	0.053	0.019	0.012

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
11 Feb, 2024	10:00 ~ 10:59	0.099	0.008	0.108	0.039	0.020	1.22	174	S
11 Feb, 2024	11:00 ~ 11:59	0.081	0.008	0.057	0.021	0.018	1.82	214	SSW
11 Feb, 2024	12:00 ~ 12:59	0.077	0.008	0.156	0.057	0.019	1.18	265	W
11 Feb, 2024	13:00 ~ 13:59	0.017	0.008	0.060	0.022	0.015	1.37	275	W
11 Feb, 2024	14:00 ~ 14:59	0.018	0.008	0.119	0.043	0.017	2.23	251	WSW
11 Feb, 2024	15:00 ~ 15:59	0.013	0.008	0.208	0.076	0.017	2.93	214	SW
11 Feb, 2024	16:00 ~ 16:59	0.018	0.008	0.271	0.099	0.018	2.17	226	SW
11 Feb, 2024	17:00 ~ 17:59	0.035	0.025	0.263	0.096	0.019	1.63	231	SW
11 Feb, 2024	18:00 ~ 18:59	0.083	0.083	0.239	0.087	0.018	0.50	196	SSW
11 Feb, 2024	19:00 ~ 19:59	0.224	0.099	0.211	0.077	0.020	0.37	221	SW
11 Feb, 2024	20:00 ~ 20:59	0.190	0.095	0.251	0.091	0.016	0.23	240	WSW
11 Feb, 2024	21:00 ~ 21:59	0.292	0.100	0.266	0.097	0.019	0.33	304	NW
11 Feb, 2024	22:00 ~ 22:59	0.242	0.085	0.298	0.109	0.018	0.22	261	W
11 Feb, 2024	23:00 ~ 23:59	0.277	0.043	0.247	0.090	0.020	0.27	236	SW
12 Feb, 2024	0:00 ~ 0:59	0.134	0.038	0.265	0.096	0.019	0.28	268	W
12 Feb, 2024	1:00 ~ 1:59	0.172	0.049	0.297	0.108	0.018	0.60	235	SW
12 Feb, 2024	2:00 ~ 2:59	0.201	0.014	0.366	0.133	0.019	0.30	25	NNE
12 Feb, 2024	3:00 ~ 3:59	0.161	0.009	0.378	0.138	0.017	0.40	9	N
12 Feb, 2024	4:00 ~ 4:59	0.190	0.048	0.375	0.136	0.016	0.22	198	SSW
12 Feb, 2024	5:00 ~ 5:59	0.262	0.103	0.372	0.135	0.015	0.23	150	SSE
12 Feb, 2024	6:00 ~ 6:59	0.202	0.080	0.392	0.142	0.017	0.63	147	SSE
12 Feb, 2024	7:00 ~ 7:59	0.266	0.102	0.446	0.162	0.013	0.80	154	SSE
12 Feb, 2024	8:00 ~ 8:59	0.551	0.047	0.343	0.125	0.018	0.82	144	SE
12 Feb, 2024	9:00 ~ 9:59	0.421	0.008	0.118	0.043	0.016	0.67	102	ESE

Max	0.551	0.103	0.446	0.162	0.020
Avg	0.176	0.045	0.255	0.093	0.018
Min	0.013	0.008	0.057	0.021	0.013

APPENDIX 2: CERTIFICATE OF CALIBRATION

NANOVA Co., Ltd.
Medical Scientific Industrial

SYSTEM HEALTH CHECK REPORT

Imformation

Instrument	Haz-scanner
Model	EPAS
Serial number	918189
Unit Sensor	CO,NO2,O3,NO,SO2,PM10 PM2.5,T & RH,WS/WD,SLRR
Customer	Myanmar Koei International LTD.
Date	Sep-23

Check List

Physical Check	OK
Supply Voltage Check	OK
PM 10,PM2.5 Air Flow Check	OK
SLRR,T & RH,WS/WD sensor Check	OK
NO Sensor Health Check	Moderate
CO,NO2,O3,SO2 Sensor Health Check	Still Good
Lithium Battery Voltage Check	OK
Data Logging Check	OK
Data Downloading Check	OK

Recommend

Need to replace new acid gas scrubber (schedule is 6 months)
Need to replace internal filters (schedule is 6 months)
Need to perform factory calibration or in-field calibration.(schedule is 12 months)

Performed by
Phoe Saw Htoo
Technical Service Engineer
NANOVA CO.,LTD

Approved by
Myo Oo
Technical Service Manager
NANOVA CO.,LTD

Yangon : 22-A, Shan Yeikthar Street, Sanchaung Township, Tel: +95 (1) 230 4901, 230 4902
Nay Pyi Taw : Za / 30, Ziwaka Say Sine Tan, Tha Phay Khone, Pyimanar. Tel:067 810 8083
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Helpline: 09 421 360000, 09 451 360000

Myanmar Japan Thilawa Development Limited MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix - E

Noise and Vibration Monitoring Report

February, 2024

NOISE AND VIBRATION MONITORING REPORT
FOR DEVELOPMENT OF INDUSTRIAL AREA THILAWA SEZ ZONE A
(OPERATION STAGE)

(BI-ANNUALLY MONITORING)

February 2024

Myanmar Koei International Ltd.

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CHAPTER 1: OUTLINES AND SUMMARY OF MONITORING PLAN

1.1 General

Thilawa Special Economic Zone (TSEZ) is located in southern district of Yangon region and about 23 km southeast of Yangon city. As the developer of Thilawa SEZ, Myanmar Japan Thilawa Development Ltd. (MJTD) has a responsibility to carry out regular environmental monitoring in the industrial area of Zone A in accordance with the approved Environmental Impact Assessment (EIA) report with Environmental Management Plan (EMP). MJTD has implemented monitoring various environmental items with the specified time frame to know the environmental conditions in and around the area.

1.2 Outlines of Monitoring Plan

To assess the environmental conditions under the operation of industrial area in and around Thilawa SEZ Zone A, noise and vibration levels had been monitored from 7 February 2024 – 9 February 2024 as follows;

Table 1.2-1 Outlines of Noise and Vibration Level Monitoring

Monitoring Date	Monitoring Item	Parameters	Number of Points	Duration	Monitoring Methodology
7 February, 2024	Noise Level	L_{Aeq} (dB)	1 (NV-1)	8 hours	On-site measurement by "Rion NL-42 sound level meter"
9 February, 2024	Noise Level	L_{Aeq} (dB)	1 (NV-2)	8 hours	On-site measurement by "Rion NL-42 sound level meter"
8 February, 2024	Noise Level	L_{Aeq} (dB)	1 (NV-3)	8 hours	On-site measurement by "Rion NL-42 sound level meter"
7 February, 2024	Vibration Level	Lv10 (dB)	1 (NV-1)	8 hours	On-site measurement by "Vibration Level Meter- VM-53A"
9 February, 2024	Vibration Level	Lv10 (dB)	1 (NV-2)	8 hours	On-site measurement by "Vibration Level Meter- VM-53A"
8 February, 2024	Vibration Level	Lv10 (dB)	1 (NV-3)	8 hours	On-site measurement by "Vibration Level Meter- VM-53A"

Source: Myanmar Koei International Ltd.

CHAPTER 2: NOISE AND VIBRATION LEVEL MONITORING

2.1 Monitoring Item

The noise and vibration level monitoring items are shown in Table 2.1-1.

Table 2.1-1 Monitoring Parameters for Noise and Vibration Level

No.	Item	Parameter
1	Noise	A-weighted loudness equivalent (L_{Aeq})
2	Vibration	Vibration level, vertical, percentile (Lv10)

Source: Myanmar Koei International Ltd.

2.2 Monitoring Location

The exact coordinates and locations of noise and vibration level points are shown in Table 2.2-1. The detail of each sampling point is described below. The location of the noise and vibration monitoring points are shown in Figure 2.2-1.

Table 2.2-1 Location of Noise and Vibration Monitoring Station

Sampling Point	Coordinates	Description of Sampling Point
NV-1	N: 16°40'11.50", E: 96°16'32.00"	In front of administrative building, Thilawa SEZ Zone A
NV-2	N: 16°40'52.50", E: 96°16'55.50"	In the east of the Thilawa SEZ Zone A
NV-3	N: 16°40'46.20", E: 96°15'30.10"	In the west of the Thilawa SEZ Zone A, where is the nearest to the residential houses of Alwan sok village.

Source: Myanmar Koei International Ltd.

Source: Google Earth

Figure 2.2-1 Location of Noise and Vibration Level Monitoring Points

NV-1

NV-1 is located in front of administrative building, Thilawa SEZ and next to Dagon-Thilawa road which is paved with moderate to highly traffic volume during the day and night by passing of loader vehicles and dump trucks. Possible sources of noise and vibration is generated from vehicle traffic during the day and night time.

NV-2

NV-2 is located in the east of the Thilawa SEZ Zone A, Thilawa dam in west and constructed factories in Thilawa SEZ Zone A in northwest. Possible sources of noise and vibration is generated from operation activities of Zone A's locators and road traffic. There is an access road situated east of NV-2.

NV-3

NV-3 is located in the west of the Thilawa SEZ Zone A, surrounded by the residential houses of Alwan sok village in north and northwest and garment factory in northeast, constructed factories in Thilawa SEZ Zone A in east respectively. Possible sources of noise and vibration is generated from operation and construction activities of surrounding Zone A's locators. In addition, daily human activities nearby Alwan sok village and road traffic might be noise and vibration sources. There is an access road situated in the northeast of NV-3.

2.3 Monitoring Method

Noise level was measured by "Rion NL-42 sound level meter" and automatically recorded every 10 minutes on a memory card. The vibration level meter was, VM-53A (Rion Co. Ltd., Japan), accompanied by a 3-axis accelerometer PV-83C (Rion Co., Ltd.) was placed on solid soil ground. Vertical vibration (Z axis), L_V, was measured every 10 minutes within the adaptable range of (10-70) dB at NV-1, (10-70) dB at NV-2, and (10-70) dB at NV-3 and recorded on a memory card.

The measurement period of noise and vibration was 8 hours for each monitoring point. The status of the noise and vibration level monitoring on NV-1, NV-2 and NV-3 are shown in Figure 2.3-1.

Source: Myanmar Koei International Ltd.

Figure 2.3-1 Status of Noise and Vibration Level Monitoring at NV-1, NV-2 and NV-3

2.4 Monitoring Results

Noise Monitoring Results

Noise monitoring results are separated daytime (6:00 AM to 10:00 PM), night time (10:00 PM to 6:00 AM) time frames for NV-1, daytime (7:00 AM to 7:00 PM), evening time (7:00 PM to 10:00 PM) and night time (10:00 PM to 7:00 AM) time frames respectively for NV-2 and NV-3. Noise measurement was carried out on an 8-hour as working time (8:00 AM to 4:00 PM) at the designated one location instead of 24-hours due to the safety reason and risk avoidance. The monitoring results are summarized in Table 2.4-1, Table 2.4-2 and Table 2.4-3 respectively. Hourly noise level monitoring results for NV-1, NV-2 and NV-3 are shown in Table 2.4-4, Table 2.4-5 and Table 2.4-6. Comparing with the target value of noise level in operation stage prescribed in EIA report for Thilawa SEZ development project Zone A, all results were under the target values at NV-1, NV-2 and NV-3.

Table 2.4-1 Results of Noise Level (LA_{eq}) Monitoring at NV-1

Date	(Traffic Noise Level) Equivalent Noise Level (LA_{eq}, dB)	
	Day Time (6:00 AM – 10:00 PM)	Night Time (10:00 PM – 6:00 AM)
7 February, 2024	62	-
Target Value	75	70

Note: Target value is applied to the noise standard along main road stipulated in the Noise Regulation Law (Japan) (Law No. 98 of 1968, Latest Amendment by Law No.91 of 2000).
Source: Myanmar Koei International Ltd.

Table 2.4-2 Results of Noise Level (LA_{eq}) Monitoring at NV-2

Date	(Commercial and Industrial Areas) Equivalent Noise Level (LA_{eq}, dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
9 February, 2024	59	-	-
Target Value	70	65	60

Note: Target value is applied to the noise level during the operation stage in the EIA Report for Thilawa SEZ Development Project (Industrial Area of Zone A).
Source: Myanmar Koei International Ltd.

Table 2.4-3 Results of Noise Level (LA_{eq}) Monitoring at NV-3

Date	(Commercial and Industrial Areas) Equivalent Noise Level (LA_{eq}, dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
8 February, 2024	45	-	-
Target Value	70	65	60

Note: Target value is applied to the noise level during the operation stage in the EIA Report for Thilawa SEZ Development Project (Industrial Area of Zone A).
Source: Myanmar Koei International Ltd.

Table 2.4-4 Hourly Noise Level (LA_{eq}) Monitoring Results at NV-1

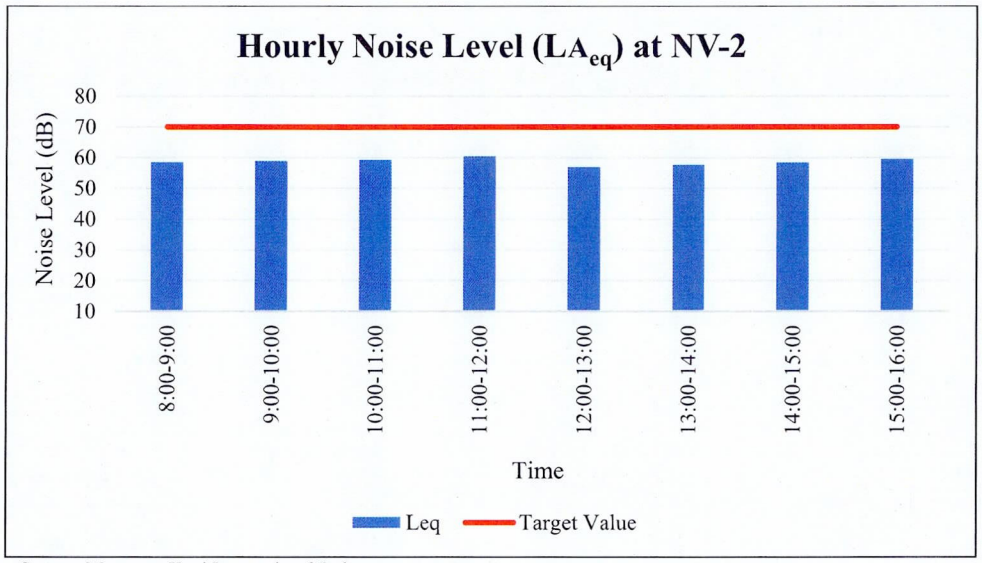
Date	Time	Hourly Result (LA_{eq}, dB)	Interval Result (LA_{eq}, dB)	Target Value (LA_{eq}, dB)
7 February, 2024	6:00-7:00	-	62	75
	7:00-8:00	-		
	8:00-9:00	61		
	9:00-10:00	63		
	10:00-11:00	62		
	11:00-12:00	63		
	12:00-13:00	61		
	13:00-14:00	62		
	14:00-15:00	63		
	15:00-16:00	61		
	16:00-17:00	-		
	17:00-18:00	-		
	18:00-19:00	-		
	19:00-20:00	-		
	20:00-21:00	-		
	21:00-22:00	-		
	22:00-23:00	-	-	70
	23:00-24:00	-		
	24:00-1:00	-		
	1:00-2:00	-		
	2:00-3:00	-		
	3:00-4:00	-		
	4:00-5:00	-		
	5:00-6:00	-		

Source: Myanmar Koei International Ltd.

Table 2.4-5 Hourly Noise Level (LA_{eq}) Monitoring Results at NV-2

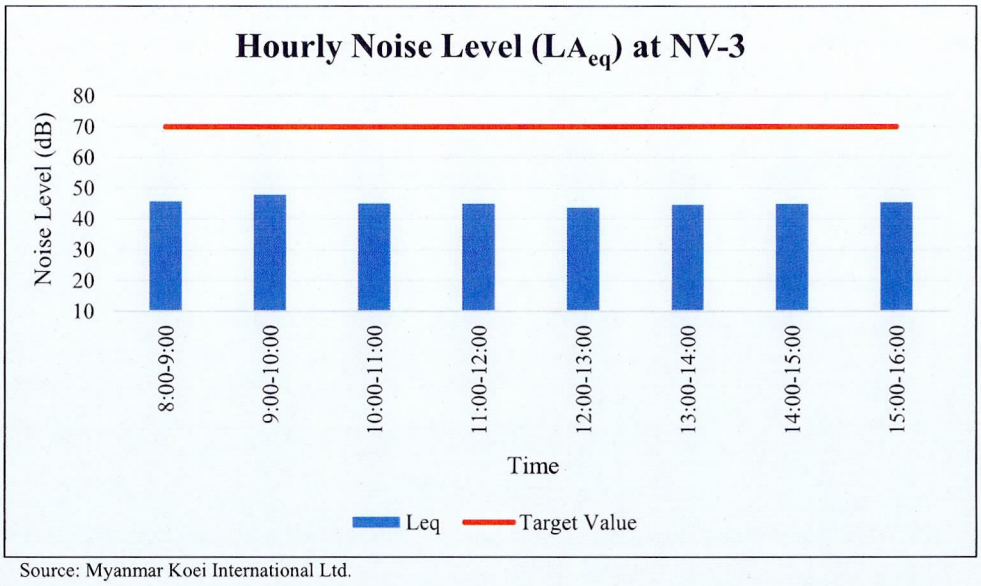
Date	Time	Hourly Result (LA_{eq}, dB)	Interval Result (LA_{eq}, dB)	Target Value (LA_{eq}, dB)
9 February, 2024	7:00-8:00	-	59	70
	8:00-9:00	59		
	9:00-10:00	59		
	10:00-11:00	59		
	11:00-12:00	60		
	12:00-13:00	57		
	13:00-14:00	58		
	14:00-15:00	58		
	15:00-16:00	60		
	16:00-17:00	-		
	17:00-18:00	-		
	18:00-19:00	-		
	19:00-20:00	-	-	65
	20:00-21:00	-		
	21:00-22:00	-		
	22:00-23:00	-	-	60
	23:00-24:00	-		
	24:00-1:00	-		
	1:00-2:00	-		
	2:00-3:00	-		
	3:00-4:00	-		
	4:00-5:00	-		
	5:00-6:00	-		
	6:00-7:00	-		

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.4-2 Results of Noise Level (LA_{eq}) Monitoring at NV-2



Source: Myanmar Koei International Ltd.

Figure 2.4-3 Results of Noise Level (LA_{eq}) Monitoring at NV-3

Vibration Monitoring Results

Vibration monitoring results are separated daytime (7:00 AM to 7:00 PM), evening time (7:00 PM to 10:00 PM) and night time (10:00 PM to 7:00 AM) time frames respectively for NV-1, NV-2 and NV-3. Vibration measurement was carried out on an 8-hour as working time (8:00 AM to 4:00 PM) at the designated one location instead of 24-hours due to the safety reason and risk avoidance. The results of vibration level are shown in Table 2.4-7, Table 2.4-8 and Table 2.4-9 respectively. Results of hourly vibration level monitoring for NV-1, NV-2 and NV-3 are summarized in Table 2.4-10, Table 2.4-11 and Table 2.4-12. By comparing with the target vibration level in operation stage in EIA report for Thilawa SEZ development project Zone A, all of results were under the target values.

Table 2.4-7 Results of Vibration Level (Lv10) Monitoring at NV-1

Date	(Office, commercial facilities, and factories) Equivalent Vibration Level (Lv10, dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
7 February, 2024	49	-	-
Target Value	70	65	65

Note: Target value is applied to the vibration level during the operation stage in the EIA Report for Thilawa SEZ Development Project (Industrial Area of Zone A).
Source: Myanmar Koei International Ltd.

Table 2.4-8 Results of Vibration Level (Lv10) Monitoring at NV-2

Date	(Office, commercial facilities, and factories) Equivalent Vibration Level (Lv10, dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
9 February, 2024	33	-	-
Target Value	70	65	65

Note: Target value is applied to the vibration level during the operation stage in the EIA Report for Thilawa SEZ Development Project (Industrial Area of Zone A).
Source: Myanmar Koei International Ltd.

Table 2.4-9 Results of Vibration Level (Lv10) Monitoring at NV-3

Date	(Office, commercial facilities, and factories) Equivalent Vibration Level (Lv10, dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
8 February, 2024	28	-	-
Target Value	70	65	65

Note: Target value is applied to the vibration level during the operation stage in the EIA Report for Thilawa SEZ Development Project (Industrial Area of Zone A).
Source: Myanmar Koei International Ltd.

Table 2.4-10 Results of Hourly Vibration Level (Lv10) Monitoring at NV-1

Date	Time	Hourly Result (Lv10, dB)	Interval Result (Lv10, dB)	Target Value (Lv10, dB)
7 February, 2024	7:00-8:00	-	49	70
	8:00-9:00	48		
	9:00-10:00	49		
	10:00-11:00	48		
	11:00-12:00	49		
	12:00-13:00	48		
	13:00-14:00	49		
	14:00-15:00	49		
	15:00-16:00	49		
	16:00-17:00	-		
	17:00-18:00	-		
	18:00-19:00	-		
	19:00-20:00	-	-	65
	20:00-21:00	-		
	21:00-22:00	-		
	22:00-23:00	-	-	65
	23:00-24:00	-		
	24:00-1:00	-		
	1:00-2:00	-		
	2:00-3:00	-		
	3:00-4:00	-		
	4:00-5:00	-		
	5:00-6:00	-		
	6:00-7:00	-		

Source: Myanmar Koei International Ltd.

Table 2.4-11 Results of Hourly Vibration Level (Lv10) Monitoring at NV-2

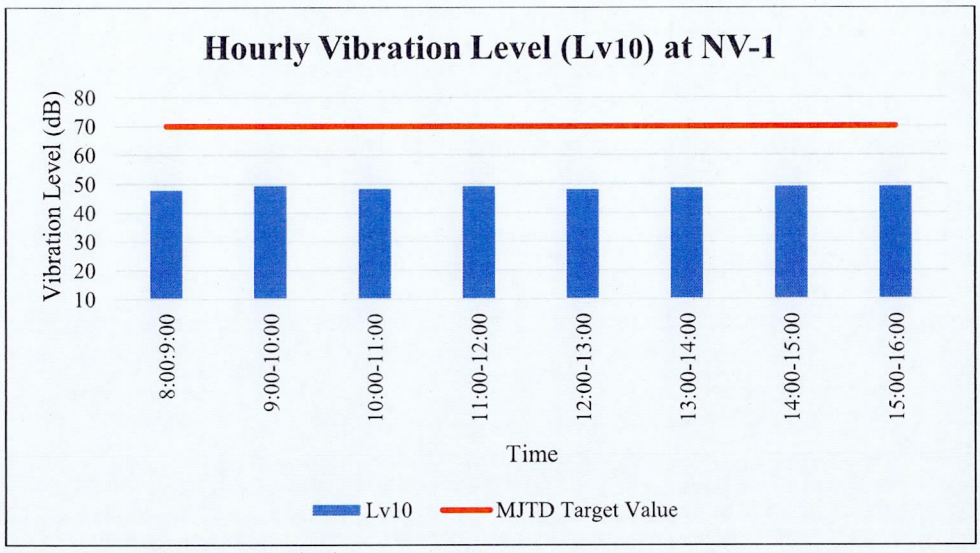
Date	Time	Hourly Result (Lv10, dB)	Interval Result (Lv10, dB)	Target Value (Lv10, dB)
9 February, 2024	7:00-8:00	-	33	70
	8:00-9:00	35		
	9:00-10:00	34		
	10:00-11:00	34		
	11:00-12:00	34		
	12:00-13:00	31		
	13:00-14:00	30		
	14:00-15:00	32		
	15:00-16:00	33		
	16:00-17:00	-		
	17:00-18:00	-		
	18:00-19:00	-		
	19:00-20:00	-	-	65
	20:00-21:00	-		
	21:00-22:00	-		
	22:00-23:00	-	-	65
	23:00-24:00	-		
	24:00-1:00	-		
	1:00-2:00	-		
	2:00-3:00	-		
	3:00-4:00	-		
	4:00-5:00	-		
	5:00-6:00	-		
	6:00-7:00	-		

Source: Myanmar Koei International Ltd.

Table 2.4-12 Results of Hourly Vibration Level (Lv10) Monitoring at NV-3

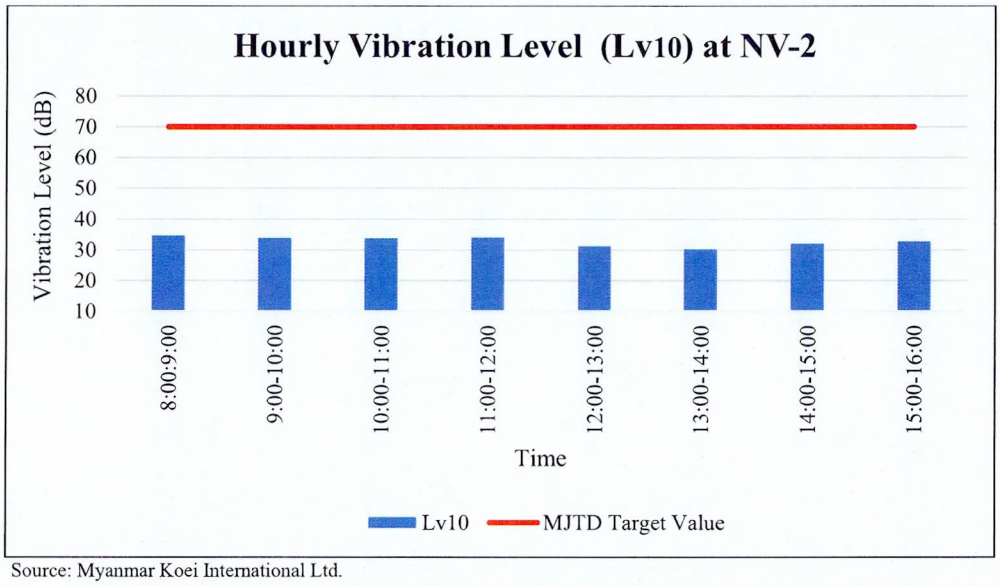
Date	Time	Hourly Result (Lv10, dB)	Interval Result (Lv10, dB)	Target Value (Lv10, dB)
8 February, 2024	7:00-8:00	-	28	70
	8:00-9:00	31		
	9:00-10:00	30		
	10:00-11:00	31		
	11:00-12:00	28		
	12:00-13:00	25		
	13:00-14:00	25		
	14:00-15:00	26		
	15:00-16:00	27		
	16:00-17:00	-		
	17:00-18:00	-		
	18:00-19:00	-		
	19:00-20:00	-	-	65
	20:00-21:00	-		
	21:00-22:00	-		
	22:00-23:00	-	-	65
	23:00-24:00	-		
	24:00-1:00	-		
	1:00-2:00	-		
	2:00-3:00	-		
	3:00-4:00	-		
	4:00-5:00	-		
	5:00-6:00	-		
	6:00-7:00	-		

Source: Myanmar Koei International Ltd.



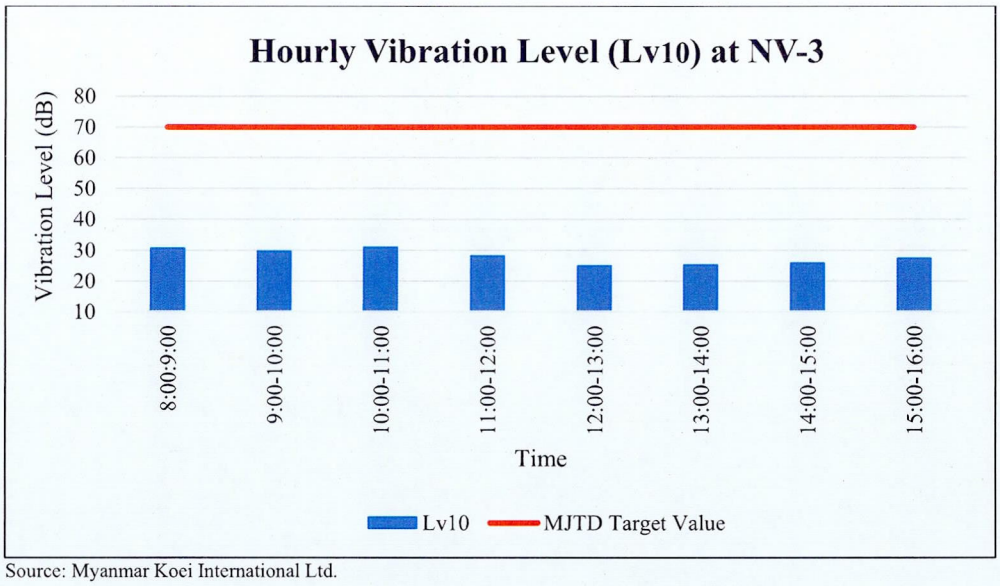
Source: Myanmar Koei International Ltd.

Figure 2.4-4 Results of Vibration Level (Lv10) Monitoring at NV-1



Source: Myanmar Koei International Ltd.

Figure 2.4-5 Results of Vibration Level (Lv10) Monitoring at NV-2



Source: Myanmar Koei International Ltd.

Figure 2.4-6 Results of Vibration Level (Lv10) Monitoring at NV-3

CHAPTER 3: CONCLUSION AND RECOMMENDATION

By comparing with the target noise and vibration level in operation stage in EIA report for Thilawa SEZ development project Zone A, all results were under the target values at NV-1, NV-2, and NV-3. (Referred to section 2.4).

In conclusion of this environmental monitoring, there are no specific noise and vibration impacts on the surrounding area of industrial area of Thilawa SEZ Zone A during this monitoring period.

Thilawa Special Economic Zone- A

Development Project (Operation Phase)

Appendix -F

Soil contamination survey in Thilawa SEZ

June, 2024

MJTD MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED

SOIL CONTAMINATION SURVEY IN THILAWA SEZ (ZONE A)

June 2024

Resource & Environment Myanmar

Resource & Environment Myanmar Ltd. B-702 Delta Plaza Building, Shwegondaing Rd., Bahan, Yangon. MYANMAR

Tel: (959) 7301 3448; Fax: (951) 552901

www.enviromyanmar.net

Soil Contamination Survey in Thilawa SEZ (Zone-A)

Purpose of Survey

Soil contamination survey in Thilawa SEZ (Zone-A) is required to be conducted twice a year as described in Environmental Monitoring Plan (EMoP) of Environmental Impact Assessment (EIA) report of Thilawa SEZ Zone A. Soil contamination or soil pollution as part of land degradation is caused by the presence of xenobiotics (human-made) chemicals or other alteration in the natural soil environment. It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste.

The purpose of this survey is to monitor the concentration level of chemical in the soil and to perform the mitigation measure if the concentration level is higher than standard value.

Survey Item

Parameter for soil contamination survey are determined by referring to the parameter of soil content observation of Japan and other countries as shown in Table 1.

Table 1 Survey parameter for soil quality

No.	Parameter	Unit	Standard		
			Japan	Thailand	Vietnam
1	pH	-	-	-	-
2	Mercury	ppm	15	610	-
3	Arsenic	ppm	150	27	12
4	Lead	ppm	150	750	300
5	Cadmium	ppm	150	810	10
6	Copper	ppm	125	-	100
7	Zinc	ppm	150	-	300
8	Chromium	ppm	250	640	-
9	Fluoride	ppm	4000	-	-
10	Boron	ppm	4000	-	-
11	Selenium	ppm	150	10,000	-

Source: Japan: Ministry of Environment, Government of Japan (2002), "Regulation for Implementing the Law on Soil Contamination Countermeasures"
Thailand: Notification of National Environmental Board No.25, B.E. Thailand (2004), "other purpose" class"
Vietnam: QCVN 03:2008/BTNMT, Applied "industrial land', Vietnam.

Summary of survey points

The survey location is situated in Thilawa Special Economic Zone (Zone-A) areas, Thanlyin Township, Yangon. There are five samples collected for soil quality survey.

Figure 1 Location map of the soil sampling points

The locations of survey points are shown in following table. The detail of each survey point is described below.

Table 2 Summary of survey points

Sampling Point	Coordinates	Description of Sampling Point
S-1	16° 40' 13.49" N 96° 16' 29.89" E	About 40 m northeast of administration building.
S-2	16° 40' 10.74" N 96° 16' 22.01" E	At the embankment area of the drain, near main gate of Thilawa SEZ.
S-3	16° 40' 30.25" N 96° 16' 34.86" E	At the drain from sewage treatment plant.
S-4	16° 40' 24.29" N 96° 15' 49.55" E	At damping area near retention pond.
S-5	16° 40' 32.36" N 96° 15' 49.81" E	At the drain from the retention pond.

S-1

S-1 is situated in the southern part of the Thilawa SEZ Zone (A) area, and distanced about 40 m from administration building. It was collected beside of the Trash Storage Building. Sometimes,

wastewater after cleaning that domestic waste leaked and may sink into the ground. The soil condition is fine to medium grained, reddish brown colored silty clay.

Figure 2 Soil quality sampling at S-1

S-2

S-2 was collected at the slope area of the retention canal, which is situated near the main gate of Thilawa SEZ (Zone-A). It is beside the Thilawa SEZ car road and intended for the trees along the slop. The soil condition is fine to medium grained, reddish brown colored silty clay.

Figure 3 Soil quality sampling at S-2

S-3

S-3 is collected in the retention canal where wastewater from the centralized sewage treatment plant is flowing into the retention canal. It is distanced about 5 m away from the junction of wastewater discharge drainage and main rain water drainage. The soil condition is fine to medium grained, yellowish brown colored silty clay.

Figure 4 Soil quality sampling at S-3

S-4

S-4 is collected from the soil disposing site which is located near Plot No.E-1 of TSEZ Zone-A retention pond, about 40 m in distance. This dumping site is about 16,500 square meters where soil from Thilawa SEZ Zone-A was dumped. The soil condition is fine to medium grained, reddish brown colored silty clay.

Figure 5 Soil quality sampling at S-4

S-5

It is collected at the retention canal where wastewater is discharged from the retention pond of Plot No.E-1 of Thilawa SEZ Zone-A. S-5 is distanced about 100 m from this retention pond. The soil condition is fine grained, yellowish brown colored silty clay.

Figure 6 Soil quality monitoring at S-5

Myanmar Japan Thilawa Development Limited MJTD

Survey Period

Soil sampling was conducted on 6th June 2024.

Survey Method

For soil sampling, the standard environmental sampler (soil auger) was applied. The sampler is a stainless-steel tube that is sharpened on one end and fitted with a long, T-shaped handle. This tube is approximately three inches inside diameter. In order to refrain from contamination, about 20 cm of topsoil was removed by the sampler before sampling. Then sample was taken and collected in cleaned plastic bag. Chemical preservation of soil is not generally recommended. Samples were cooled in an ice box which temperature was under 4°C. Samples were protected from sunlight to minimize any potential reaction.

Field equipment used on site are also shown in the table.

Table 3 Field Equipment for Sediment and Soil Quality Survey

No.	Equipment	Originate Country	Model
1	Soil Auger (for soil sampling)	U.S.A	AMS

The analysis method for each parameter is also shown in the following table.

Table 4 Analysis methods of soil quality

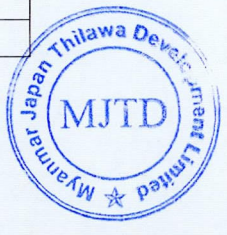
No.	Parameter	Analysis Method
1	pH	Atomic Absorption Spectrophotometer, Aqua-regia
2	Mercury (Hg)	Atomic Absorption Spectrophotometer, Aqua-regia
3	Arsenic (As)	Atomic Absorption Spectrophotometer, Aqua-regia
4	Lead (Pb)	Atomic Absorption Spectrophotometer, Aqua-regia
5	Cadmium (Cd)	Atomic Absorption Spectrophotometer, Aqua-regia
6	Copper (Cu)	Atomic Absorption Spectrophotometer, Aqua-regia
7	Zinc (Zn)	Atomic Absorption Spectrophotometer, Aqua-regia
8	Chromium (VI)	Atomic Absorption Spectrophotometer, Aqua-regia
9	Fluoride (F)	Atomic Absorption Spectrophotometer, Aqua-regia
10	Boron (B)	Atomic Absorption Spectrophotometer, Aqua-regia
11	Selenium (Se)	Atomic Absorption Spectrophotometer, Aqua-regia

Survey Result

Chemical properties for soil were analyzed in the laboratory of United Analyst and Engineering Consultant Co., Ltd. (UAE) in Thailand. The result of soil quality analysis is presented as follow. Most of the results complied with the proposed standard value.

Table 4 Soil quality result

No.	Parameter	Unit	S-1	S-2	S-3	S-4	S-5	Japan	Thailand	Vietnam
1	pH	-	5.0	4.8	7.3	4.8	6.3	-	-	-
2	Fluoride	Mg/kg	ND	ND	1.33	ND	1.05	15	610	-
3	Arsenic	Mg/kg	6.71	11.6	5.87	6.74	7.87	150	27	12
4	Cadmium	Mg/kg	ND	ND	ND	ND	ND	150	750	300
5	Mercury	Mg/kg	ND	ND	ND	ND	ND	150	810	10
6	Selenium	Mg/kg	ND	ND	ND	0.266	0.172	125	-	100
7	Chromium	Mg/kg	32.1	26.0	30.3	23.7	24.5	150	-	300
8	Copper	Mg/kg	19.6	23.7	25.1	16	25.2	250	640	-



9	Boron	Mg/kg	20.7	19.8	15.7	15	21.3	4000	-	-
10	Lead	Mg/kg	133	14.1	16.6	12.5	22.7	4000	-	-
11	Zinc	Mg/kg	30.8	30.0	59.9	32.0	60.7	250	10,000	-

Conclusion

To ensure proper control on soil contamination of TSEZ-A, soil quality monitoring activities were conducted in twice per Year in June, and December. Soil samples were taken at designated five locations. Among five locations, all analysis parameters results are within the guideline. For overall reviewing on soil analysis results and compare with other country standard for Environment point of view, it is still safe for soil Environment.

Appendix

Lab Results

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TESTING
No.0063

ANALYSIS REPORT

PROJECT NAME : SOIL CONTAMINATION SURVEY IN INDUSTRIAL ZONE OF THILAWA SPECIAL ECONOMIC ZONE (ZONE-A)
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : contact@rem-uaeconsultant.com
SAMPLING SOURCE : -
SAMPLE TYPE : SOIL
SAMPLING DATE : JUNE 6, 2024
SAMPLING TIME : 1/
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS JINTASUPA PLIANSRI

RECEIVED DATE : JUNE 11, 2024
ANALYTICAL DATE : JUNE 11-27, 2024
ISSUE DATE : JUNE 29, 2024
REPORT NO. : 2024-U058975
WORK NO. : 2024-005770
ANALYSIS NO. : T24AM675-0001 - T24AM675-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 09:35 HOUR 1/ T24AM675-0001	2 09:45 HOUR 1/ T24AM675-0002	
pH (1:1) [b]	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	5.0 (25°C)	4.8 (25°C)	-
FLUORIDE [c]	mg/kg	ION SELECTIVE ELECTRODE METHOD (US EPA 1996: 9214)	ND	ND	0.80
METALS					
ARSENIC (As) [c]	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	6.71	11.6	0.100
BORON (B) [c]	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	20.7	19.8	0.250
CADMIUM (Cd) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	ND	0.300
CHROMIUM (Cr) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	32.1	26.0	0.500
COPPER (Cu) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	19.6	23.7	0.300
LEAD (Pb) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	133	14.1	1.55
MERCURY (Hg) [c]	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (US EPA 2007: 7471B)	ND	ND	0.100
SELENIUM (Se) [c]	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1994: 7742)	ND	ND	0.100

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TESTING
No.0063

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 09:35 HOUR 1/ T24AM675-0001	2 09:45 HOUR 1/ T24AM675-0002	
ZINC (Zn) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	30.8	30.0	0.350
SAMPLE CONDITION			BROWN SOIL	BROWN SOIL	

[a] : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
[b] : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
[c] : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

RESULT 1 : S-1
RESULT 2 : S-2

SAMPLE (S) ANALYSED ON AS RECEIVED BASIS. RESULT (S) REPORTED ON A DRY WEIGHT BASIS.
ND : NOT DETECTED.
*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

(MR BHUCHONK PANICHLERTUMPI)
LABORATORY SUPERVISOR

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2024-U058975

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

TESTING
No.0063

ANALYSIS REPORT

PROJECT NAME : SOIL CONTAMINATION SURVEY IN INDUSTRIAL ZONE OF THILAWA SPECIAL ECONOMIC ZONE (ZONE-A)
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : contact@rem-uaeconsultant.com
SAMPLING SOURCE : -
SAMPLE TYPE : SOIL
SAMPLING DATE : JUNE 6, 2024
SAMPLING TIME : 1/
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS JINTASUPA PLIANSRI
RECEIVED DATE : JUNE 11, 2024
ANALYTICAL DATE : JUNE 11-27, 2024
ISSUE DATE : JUNE 29, 2024
REPORT NO. : 2024-U058976
WORK NO. : 2024-005770
ANALYSIS NO. : T24AM675-0003 - T24AM675-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 10:15 HOUR 1/ T24AM675-0003	2 11:00 HOUR 1/ T24AM675-0004	
pH (1:1) [b]	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	7.3 (25°C)	4.8 (25°C)	-
FLUORIDE [c]	mg/kg	ION SELECTIVE ELECTRODE METHOD (US EPA 1996: 9214)	1.33	ND	0.80
METALS					
ARSENIC (As) [c]	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	5.87	6.74	0.100
BORON (B) [c]	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	15.7	15.0	0.250
CADMIUM (Cd) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	ND	0.300
CHROMIUM (Cr) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	30.3	23.7	0.500
COPPER (Cu) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	25.1	16.0	0.300
LEAD (Pb) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	16.6	12.5	1.55
MERCURY (Hg) [c]	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (US EPA 2007: 7471B)	ND	ND	0.100
SELENIUM (Se) [c]	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1994: 7742)	ND	0.266	0.100

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TESTING
No.0063

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 10:15 HOUR 1/ T24AM675-0003	2 11:00 HOUR 1/ T24AM675-0004	
ZINC (Zn) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	59.9	32.0	0.350
SAMPLE CONDITION			BROWN SOIL	BROWN SOIL	

[a] : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
[b] : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
[c] : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

RESULT 1 : S-3
RESULT 2 : S-4

SAMPLE (S) ANALYSED ON AS RECEIVED BASIS. RESULT (S) REPORTED ON A DRY WEIGHT BASIS.
ND : NOT DETECTED.
*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

Myanmar Japan Thilawa Development Limited MJTD

(MR BHUCHONK PANICHLERTUMPI)
LABORATORY SUPERVISOR

2024-U058976

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TESTING
No.0063

ANALYSIS REPORT

PROJECT NAME : SOIL CONTAMINATION SURVEY IN INDUSTRIAL ZONE OF THILAWA SPECIAL ECONOMIC ZONE (ZONE-A)
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : contact@rem-uaeconsultant.com
SAMPLING SOURCE : -

SAMPLE TYPE	: SOIL	**RECEIVED DATE**	: JUNE 11, 2024
SAMPLING DATE	: JUNE 6, 2024	**ANALYTICAL DATE**	: JUNE 11-27, 2024
SAMPLING TIME	: 10:35 HOUR	**ISSUE DATE**	: JUNE 29, 2024
SAMPLING METHOD	: -	**REPORT NO.**	: 2024-U058977
SAMPLING BY	: CUSTOMER	**WORK NO.**	: 2024-005770
ANALYZED BY	: MISS JINTASUPA PLIANSRI	**ANALYSIS NO.**	: T24AM675-0005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			S-5 T24AM675-0005	
pH (1:1) [b]	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	6.3 (25°C)	-
FLUORIDE [c]	mg/kg	ION SELECTIVE ELECTRODE METHOD (US EPA 1996: 9214)	1.05	0.80
METALS				
ARSENIC (As) [c]	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	7.87	0.100
BORON (B) [c]	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	21.3	0.250
CADMIUM (Cd) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	0.300
CHROMIUM (Cr) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	24.5	0.500
COPPER (Cu) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	25.2	0.300
LEAD (Pb) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	22.7	1.55
MERCURY (Hg) [c]	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (US EPA 2007: 7471B)	ND	0.100
SELENIUM (Se) [c]	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1994: 7742)	0.172	0.100
ZINC (Zn) [c]	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	60.7	0.350
SAMPLE CONDITION			BROWN SOIL	

[a] : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
[b] : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
[c] : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SAMPLE (S) ANALYSED ON AS RECEIVED BASIS. RESULT (S) REPORTED ON A DRY WEIGHT BASIS.
ND : NOT DETECTED.
*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

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Myanmar Japan Thilawa Development Limited MJTD

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Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix -G

Ground Subsidence Monitoring Status

(Location- Admin Complex Compound)

(April 2024 to September 2024)

Ground Subsidence Monitoring Status (Operation Phase)

Location Admin Complex Compound
Coordinate Points E=209545.508 N=1844669.443

Month	Date	Predefined Level (m)-ASL	Weekly Reading Level (m)-ASL	Subsidence (m)	Remark
Jul	15-Jul-16	+7.137	+7.137	0.000	
	22-Jul-16	+7.137	+7.136	-0.001	
	29-Jul-16	+7.137	+7.136	-0.001	
Aug	5-Aug-16	+7.137	+7.136	-0.001	
	12-Aug-16	+7.137	+7.136	-0.001	
	19-Aug-16	+7.137	+7.136	-0.001	
	26-Aug-16	+7.137	+7.136	-0.001	
Sept	2-Sep-16	+7.137	+7.136	-0.001	
	9-Sep-16	+7.137	+7.136	-0.001	
	16-Sep-16	+7.137	+7.136	-0.001	
	23-Sep-16	+7.137	+7.136	-0.001	
	30-Sep-16	+7.137	+7.136	-0.001	
Oct	7-Oct-16	+7.137	+7.136	-0.001	
	14-Oct-16	+7.137	+7.136	-0.001	
	21-Oct-16	+7.137	+7.136	-0.001	
	28-Oct-16	+7.137	+7.136	-0.001	
Nov	4-Nov-16	+7.137	+7.136	-0.001	
	11-Nov-16	+7.137	+7.136	-0.001	
	18-Nov-16	+7.137	+7.136	-0.001	
	25-Nov-16	+7.137	+7.138	+0.001	
Dec	2-Dec-16	+7.137	+7.136	-0.001	
	9-Dec-16	+7.137	+7.136	-0.001	
	16-Dec-16	+7.137	+7.135	-0.002	
	23-Dec-16	+7.137	+7.133	-0.004	
	30-Dec-16	+7.137	+7.133	-0.004	
Jan	6-Jan-17	+7.137	+7.134	-0.003	
	13-Jan-17	+7.137	+7.134	-0.003	
	20-Jan-17	+7.137	+7.134	-0.003	
	27-Jan-17	+7.137	+7.134	-0.003	
Feb	3-Feb-17	+7.137	+7.134	-0.003	
	10-Feb-17	+7.137	+7.134	-0.003	
	17-Feb-17	+7.137	+7.134	-0.003	
	24-Feb-17	+7.137	+7.134	-0.003	
Mar	3-Mar-17	+7.137	+7.134	-0.003	
	10-Mar-17	+7.137	+7.134	-0.003	
	17-Mar-17	+7.137	+7.128	-0.009	After earthquake
	24-Mar-17	+7.137	+7.128	-0.009	
	31-Mar-17	+7.137	+7.128	-0.009	
Apr	7-Apr-17	+7.137	+7.128	-0.009	
	21-Apr-17	+7.137	+7.126	-0.011	
	28-Apr-17	+7.137	+7.126	-0.011	
May	5-May-17	+7.137	+7.126	-0.011	
	12-May-17	+7.137	+7.129	-0.008	
	19-May-17	+7.137	+7.131	-0.006	
	26-May-17	+7.137	+7.135	-0.002	
Jun	9-Jun-17	+7.137	+7.135	-0.002	
	16-Jun-17	+7.137	+7.134	-0.003	
	23-Jun-17	+7.137	+7.134	-0.003	
	30-Jun-17	+7.137	+7.136	-0.001	
July	7-Jul-17	+7.137	+7.136	-0.001	
	14-Jul-17	+7.137	+7.136	-0.001	
	21-Jul-17	+7.137	+7.138	+0.001	
	28-Jul-17	+7.137	+7.136	-0.001	
Aug	3-Aug-17	+7.137	+7.136	-0.001	
	10-Aug-17	+7.137	+7.137	+0.000	
	17-Aug-17	+7.137	+7.136	-0.001	
	24-Aug-17	+7.137	+7.137	+0.000	

Month	Date	Predefined Level (m)-ASL	Weekly Reading Level (m)-ASL	Subsidence (m)	Remark
Sept	1-Sep-17	+7.137	+7.136	-0.001	
	8-Sep-17	+7.137	+7.136	-0.001	
	15-Sep-17	+7.137	+7.136	-0.001	
	22-Sep-17	+7.137	+7.136	-0.001	
	29-Sep-17	+7.137	+7.136	-0.001	
Oct	2-Oct-17	+7.137	+7.136	-0.001	
	9-Oct-17	+7.137	+7.136	-0.001	
	16-Oct-17	+7.137	+7.136	-0.001	
	23-Oct-17	+7.137	+7.136	-0.001	
	30-Oct-17	+7.137	+7.136	-0.001	
Nov	6-Nov-17	+7.137	+7.136	-0.001	
	13-Nov-17	+7.137	+7.136	-0.001	
	20-Nov-17	+7.137	+7.135	-0.002	
	27-Nov-17	+7.137	+7.135	-0.002	
Dec	4-Dec-17	+7.137	+7.135	-0.002	
	11-Dec-17	+7.137	+7.135	-0.002	
	18-Dec-17	+7.137	+7.134	-0.003	
	26-Dec-17	+7.137	+7.134	-0.003	
Jan	2-Jan-18	+7.137	+7.134	-0.003	
	8-Jan-18	+7.137	+7.133	-0.004	
	15-Jan-18	+7.137	+7.133	-0.004	
	22-Jan-18	+7.137	+7.132	-0.005	
	29-Jan-18	+7.137	+7.132	-0.005	
Feb	5-Feb-18	+7.137	+7.132	-0.005	
	13-Feb-18	+7.137	+7.132	-0.005	
	19-Feb-18	+7.137	+7.132	-0.005	
	26-Feb-18	+7.137	+7.132	-0.005	
Mar	5-Mar-18	+7.137	+7.132	-0.005	
	12-Mar-18	+7.137	+7.132	-0.005	
	19-Mar-18	+7.137	+7.132	-0.005	
	26-Mar-18	+7.137	+7.130	-0.007	
Apr	2-Apr-18	+7.137	+7.130	-0.007	
	9-Apr-18	+7.137	+7.130	-0.007	
	23-Apr-18	+7.137	+7.129	-0.008	
	30-Apr-18	+7.137	+7.129	-0.008	
May	7-May-18	+7.137	+7.129	-0.008	
	14-May-18	+7.137	+7.129	-0.008	
	21-May-18	+7.137	+7.13	-0.007	
	28-May-18	+7.137	+7.13	-0.007	
June	4-Jun-18	+7.137	+7.13	-0.007	
	11-Jun-18	+7.137	+7.131	-0.006	
	18-Jun-18	+7.137	+7.131	-0.006	
	25-Jun-18	+7.137	+7.132	-0.005	
July	2-Jul-18	+7.137	+7.134	-0.003	
	9-Jul-18	+7.137	+7.134	-0.003	
	16-Jul-18	+7.137	+7.134	-0.003	
	24-Jul-18	+7.137	+7.135	-0.002	
August	3-Aug-18	+7.137	+7.135	-0.002	
	13-Aug-18	+7.137	+7.135	-0.002	
	20-Aug-18	+7.137	+7.134	-0.003	
	27-Aug-18	+7.137	+7.135	-0.002	
September	3-Sep-18	+7.137	+7.135	-0.002	
	10-Sep-18	+7.137	+7.136	-0.001	
	17-Sep-18	+7.137	+7.136	-0.001	
	28-Sep-18	+7.137	+7.136	-0.001	
October	8-Oct-18	+7.137	+7.136	-0.001	
	15-Oct-18	+7.137	+7.136	-0.001	
	20-Oct-18	+7.137	+7.136	-0.001	
	31-Oct-18	+7.137	+7.136	-0.001	
November	9-Nov-18	+7.137	+7.136	-0.001	
	16-Nov-18	+7.137	+7.136	-0.001	
	23-Nov-18	+7.137	+7.135	-0.002	

Month	Date	Predefined Level (m)-ASL	Weekly Reading Level (m)-ASL	Subsidence (m)	Remark
December	3-Dec-18	+7.137	+7.135	-0.002	
	13-Dec-18	+7.137	+7.135	-0.002	
	20-Dec-18	+7.137	+7.135	-0.002	
	27-Dec-18	+7.137	+7.135	-0.002	
January	8-Jan-19	+7.137	+7.135	-0.002	
	19-Jan-19	+7.137	+7.135	-0.002	
	26-Jan-19	+7.137	+7.135	-0.002	
February	1-Feb-19	+7.137	+7.135	-0.002	
	8-Feb-19	+7.137	+7.134	-0.003	
	15-Feb-19	+7.137	+7.134	-0.003	
	23-Feb-19	+7.137	+7.135	-0.002	
March	4-Mar-19	+7.137	+7.135	-0.002	
	16-Mar-19	+7.137	+7.136	-0.001	
	23-Mar-19	+7.137	+7.136	-0.001	
	30-Mar-19	+7.137	+7.136	-0.001	
April	8-Apr-19	+7.137	+7.134	-0.003	
	22-Apr-19	+7.137	+7.133	-0.004	
	30-Apr-19	+7.137	+7.131	-0.006	
May	3-May-19	+7.137	+7.132	-0.005	
	10-May-19	+7.137	+7.132	-0.005	
	22-May-19	+7.137	+7.131	-0.006	
	31-May-19	+7.137	+7.131	-0.006	
June	7-Jun-19	+7.137	+7.130	-0.007	
	14-Jun-19	+7.137	+7.131	-0.006	
	21-Jun-19	+7.137	+7.132	-0.005	
	28-Jun-19	+7.137	+7.132	-0.005	
July	5-Jul-19	+7.137	+7.132	-0.005	
	12-Jul-19	+7.137	+7.133	-0.004	
	24-Jul-19	+7.137	+7.133	-0.004	
	31-Jul-19	+7.137	+7.133	-0.004	
August	5-Aug-19	+7.137	+7.133	-0.004	
	12-Aug-19	+7.137	+7.134	-0.003	
	20-Aug-19	+7.137	+7.133	-0.004	
	30-Aug-19	+7.137	+7.134	-0.003	
September	6-Sep-19	+7.137	+7.135	-0.002	
	13-Sep-19	+7.137	+7.135	-0.002	
	20-Sep-19	+7.137	+7.136	-0.001	
	30-Sep-19	+7.137	+7.136	-0.001	
October	8-Oct-19	+7.137	+7.136	-0.001	
	20-Oct-19	+7.137	+7.135	-0.002	
	30-Oct-19	+7.137	+7.135	-0.002	
November	8-Nov-19	+7.137	+7.135	-0.002	
	28-Nov-19	+7.137	+7.135	-0.002	
December	13-Dec-19	+7.137	+7.135	-0.002	
	20-Dec-20	+7.137	+7.135	-0.002	
	30-Dec-20	+7.137	+7.135	-0.002	
January	10-Jan-20	+7.137	+7.135	-0.002	
	20-Jan-20	+7.137	+7.136	-0.001	
	31-Jan-20	+7.137	+7.135	-0.002	
February	7-Feb-20	+7.137	+7.134	-0.003	
	28-Feb-20	+7.137	+7.135	-0.002	
March	9-Mar-20	+7.137	+7.136	-0.001	
	18-Mar-20	+7.137	+7.136	-0.001	
April	28-Apr-20	+7.137	+7.133	-0.003	
May	28-May-20	+7.137	+7.131	-0.006	
June	30-Jun-20	+7.137	+7.130	-0.007	
July	29-Junly-20	+7.137	+7.130	-0.007	
August	18-Aug-20	+7.137	+7.131	-0.006	
September	25-Sep-20	+7.137	+7.132	-0.005	
October	9-Oct-20	+7.137	+7.133	-0.004	
November	19-Nov-20	+7.137	+7.134	-0.003	
December	29-Dec-20	+7.137	+7.134	-0.003	
January	10-Jan-21	+7.137	+7.135	-0.002	
February	28-Feb-21	+7.137	+7.135	-0.002	
March	18-Mar-21	+7.137	+7.136	-0.001	
April	27-Apr-21	+7.137	+7.135	-0.002	

Month	Date	Predefined Level (m)-ASL	Weekly Reading Level (m)-ASL	Subsidence (m)	Remark
May	28-May-21	+7.137	+7.133	-0.004	
June	29-Jun-21	+7.137	+7.130	-0.007	
July	27-Jul-21	+7.137	+7.131	-0.006	
August	12-Aug-21	+7.137	+7.131	-0.006	
September	23-Sep-21	+7.137	+7.132	-0.005	
October	14-Oct-21	+7.137	+7.132	-0.005	
November	15-Nov-21	+7.137	+7.132	-0.005	
December	14-Dec-21	+7.137	+7.132	-0.005	
January	18-Jan-22	+7.137	+7.134	-0.003	
February	17-Feb-22	+7.137	+7.134	-0.003	
March	8-Mar-22	+7.137	+7.135	-0.002	
April	12-Apr-22	+7.137	+7.135	-0.002	
May	30-May-22	+7.137	+7.134	-0.003	
June	8-Jun-22	+7.137	+7.134	-0.003	
July	13-Jul-22	+7.137	+7.133	-0.004	
August	17-Aug-22	+7.137	+7.133	-0.004	
September	8-Sep-22	+7.137	+7.134	-0.003	
October	27-Oct-22	+7.137	+7.131	0.006	
November	14-Nov-22	+7.137	+7.132	0.005	
December	15-Dec-22	+7.137	+7.132	0.005	
January	9-Jan-23	+7.137	+7.138	-0.001	
February	24-Feb-23	+7.137	+7.140	-0.003	
March	9-Mar-23	+7.137	+7.142	-0.005	
April	21-Apr-23	+7.137	+7.143	-0.006	
May	12-May-23	+7.137	+7.142	-0.005	
June	21-Jun-23	+7.137	+7.136	0.001	
July	28-Jul-23	+7.137	+7.135	0.002	
August	25-Aug-23	+7.137	+7.135	0.002	
September	22-Sep-23	+7.137	+7.135	0.002	
October	20-Oct-23	+7.137	+7.133	-0.004	
November	24-Nov-23	+7.137	+7.134	-0.003	
December	22-Dec-23	+7.137	+7.134	-0.003	
January	26-Jan-24	+7.137	+7.135	-0.002	
February	23-Feb-24	+7.137	+7.135	-0.002	
March	28-Mar-24	+7.137	+7.138	-0.001	
April	20-Apr-24	+7.137	+7.133	-0.004	
May	24-May-24	+7.137	+7.134	-0.003	
June	22-Jun-24	+7.137	+7.134	-0.003	
July	26-Jul-24	+7.137	+7.135	-0.002	
August	23-Aug-24	+7.137	+7.135	-0.002	
September	30-Sep-24	+7.137	+7.215	-0.078	

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix -H

Waste Disposal Record

(April 2024 to September 2024)

Solid Waste Disposed Record

Item	Date	Generated from	Unit	Value	Disposed to
General Waste	10 April 2024	Landscaping and Plantation	Kg	2900	Waste disposing to Than Lynn Development Committee, Yangon Division
	3 May 2024			2850	
	31 May 2024			2800	
	1 July 2024			2950	
	7 August 2024			2850	
Total			Kg	17,300	
Sludge	10 April 2024	Sewage Treatment Plant	Kg	5420	Golden DOWA Eco-System Myanmar Co., Ltd
	9 May 2024			5400	
	16 July 2024			6120	
Total			Kg	16940	

Remark: General wastes are generated from Landscaping and Plantation. Sludge are generated from Sewage Treatment Plant.

ငွေလွှဲပြောင်း/လက်ခံပြေစာ

၁။ အကြောင်းအရာ ။ ..... Paying for Dumping Service Charges .....

၂။ ငွေပေါင်း(ဂဏန်း) ။ .70000/- .....

.....

၃။ ငွေပေါင်း(စာဖြင့်) ။ .. Seventy Thousand Kyats .....

.....

10.4.2024

(လွှဲပြောင်းပေးသူ)

အမည် ..... Kyaw Kyine Phyo .....

ရာထူး ..... Civil Assistant Engineer .....

နေရာ ..... TDTC .....

ရက်စွဲ ..... 10.4.2024 .....

(လက်ခံသူ)

အမည် .....

ရာထူး ..... ဒု-ဦးစီးမှူး(သန့်)

နေရာ ..... မြို့နယ်စွန့်ပစ်သုတ်ရာဒေးအတွက်

သန်လျင်မြို့.

ရက်စွဲ .....

D/Eng/PageMaker/Form-3

Myanmar Japan Thilawa Development Limited ★ MJTD

ငွေလွှဲပြောင်း/လက်ခံပြေစာ

၁။ အကြောင်းအရာ ။ ..... Paying for Dumping Service Charges .....

၂။ ငွေပေါင်း(ဂဏန်း) ။ 70000/- .....

၃။ ငွေပေါင်း(စာဖြင့်) ။ Seventy Thousand Kyats .....

3.5.2024

(လွှဲပြောင်းပေးသူ)

အမည် Kyaw Khine Phyo

ရာထူး Director

နေရာ TSEZ

ရက်စွဲ 3.05.2024

(လက်ခံသူ)

အမည် .....

ရာထူး ဒု-ဦးစီးမှူး(သန့်)

နေရာ မြို့နယ်စည်ပင်သာယာရေးအဖွဲ့
သန်လျင်မြို့

ရက်စွဲ .....

Japan Thilawa Development Limited
Myanmar
MJTD

ငွေလွှဲပြောင်း/လက်ခံပြေစာ

၁။ အကြောင်းအရာ ။ ..... Paying For Dumping Service Charges .....

၂။ ငွေပေါင်း(ဂဏန်း) ။ 70000/- .....

.....

၃။ ငွေပေါင်း(စာဖြင့်) ။ Seventy Thousand Kyats .....

.....

31.5.2024

(လွှဲပြောင်းပေးသူ)

အမည် ..... Kyaw Khine Phyo .....

ရာထူး ..... Dr. Physician .....

နေရာ ..... TGZ .....

ရက်စွဲ ..... 31 May 2024 .....

(လက်ခံသူ)

အမည် .....

ရာထူး ..... ဒု-ဦးစီးမှူး(သန့်)

နေရာ ..... မြို့နယ်စွန့်ပစ်သယ်ယာဂရေးအဖွဲ့

ရက်စွဲ ..... သန့်ရှင်းမြို့

Myanmar Japan Thilawa Development Limited ★ MJTD

ငွေလွှဲပြောင်း/လက်ခံပြေစာ

၁။ အကြောင်းအရာ ။ ..... Paying For Dumping Service Charges .....

၂။ ငွေပေါင်း(ဂဏန်း) ။ 70000/-

၃။ ငွေပေါင်း(စာဖြင့်) ။ Seventy Thousand Kyats

1.7.2024

(လွှဲပြောင်းပေးသူ)

အမည် Kyaw Khine Phyo

ရာထူး Sr. Accounting Engr.

နေရာ ၂၄၂

ရက်စွဲ 01 July 2024

(လက်ခံသူ)

အမည် .....

ရာထူး ..... ဒု-ဦးစီးမှူး(သန်)

နေရာ .... မြို့နယ်စုည်းပုဂ္ဂလိကသာယာရေးအဖွဲ့

သန်လျင်မြို့

ရက်စွဲ .....

Japan Thilawa Development Limited
MJTD
Myanmar

ငွေလွှဲပြောင်း/လက်ခံပြေစာ

၁။ အကြောင်းအရာ ။ ..... Paying For Dumping Service Charges .....

.....

၂။ ငွေပေါင်း(ဂဏန်း) ။ 70000/- .....

.....

၃။ ငွေပေါင်း(စာဖြင့်) ။ Seventy Thousand Kyats .....

.....

7.8.2024.

(လွှဲပြောင်းပေးသူ)

အမည် ..... Kyaw Khine Phyo .....

ရာထူး ..... Sr. Engineering Engineer .....

နေရာ ..... TBEZ .....

ရက်စွဲ ..... 07 Aug 2024 .....

(လက်ခံသူ)

အမည် .....

ရာထူး ..... ဒု-ဦးစီးမှူး(သန့်) .....

နေရာ ..... မြို့နယ်စည်ပင်သာယာရေးအဖွဲ့ .....

သန့်ရှင်းမြို့ .....

ရက်စွဲ .....

Myanmar Japan Thilawa Development Limited ★ MJTD

Manifest

C- Slip

* Transportation company to Waste Generator

Date of issuance	(Day Month,Year) 10 Apr 2024	Issuer	(Name&Sign) Hon Ni Tun Aung
Number of issuance	0001 2404 0001		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	~~GEM~~ MJTD	GEM	GEM
Tel			

	Kind	Name	Style of packing
Waste	☑Non-Hazardous	SIP Dehydrated Sludge	
	☐Hazardous	Quantity (Unit)	Remark
	☐Others	5,420kg	GNHT-01

Customer code	001	Waste Profile code	NIIN-1006

Trace	PIC (Name & Sign)	Date of Completion
Transportation company	(Name&Sign) Ag Ko Lin AD 2nd 6757	(Day Month,Year)
Waste service company	(Name&Sign) Ei Thanda Htun	(Day Month,Year)

Designed by GOLDEN DOWA ECO - SYSTEM MYANMAR CO., LTD. GEM-SL-R 010E/00

Myanmar Japan Thilawa Development Limited MJTD

Manifest

C- Slip

* Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 9 May 2024	Issuer	(Name&Sign) Ibn Ni Lin Aung Star
Number of issuance	0001 2405 0001		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	MJTD	GEM	GEM
Tel			

Waste	Kind	Name	Style of packing
	☑Non-Hazardous	SIP: Dehydrated sludge	
	☐Hazardous	Quantity (Unit)	Remark
	☐Others	5,400kg	

Customer code	001	Waste Profile code	NHN - 1006

Trace	PIC (Name & Sign)	Date of Completion
Transportation company	(Name&Sign)	(Day Month, Year)
Waste service company	(Name&Sign) Ein Yoon Lei	(Day Month, Year)

Designed by GOLDEN DOWA ECO - SYSTEM MYANMAR CO., LTD. GEM-SL-R 010E/00

Myanmar Japan Thilawa Development Limited MJTD

Manifest

C- Slip

* Transportation company to Waste Generator

Date of issuance	(Day Month,Year) 16 July 2024	Issuer	(Name&Sign) Hon Ni Tun Aung
Number of issuance	0001 2407 0001		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	MJTD	GEM	GEM
Tel			

Waste	Kind	Name	Style of packing
	☑Non-Hazardous	STP Dehydroted Sludge	
	☐Hazardous	Quantity (Unit)	Remark
	☐Others	6,120kg	

Customer code	001	Waste Profile code	NHN-1006

Trace	PIC (Name & Sign)	Date of Completion
Transportation company	(Name&Sign) ZN-6957 Z Z Win	(Day Month,Year) ZN-6957 Z Z Win
Waste service company	(Name&Sign) Yoon Yoon Lei	(Day Month,Year)

Designed by GOLDEN DOWA ECO - SYSTEM MYANMAR CO., LTD. GEM-SL-R 010E/00

Myanmar Japan Thilawa Development Limited MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix - I

Sewage Treatment Plant Monitoring Record

(April 2024 to September 2024)

Daily Self Monitoring of STP Inlet, Outlet and Aeration

Monthly	Date	Inlet (Zone B)				Inlet -1				Inlet -2				Outlet - 1				Outlet - 2			
		pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD
Standard		6 - 9	2000	≤35	400	6 - 9	2000	≤35	400	6 - 9	2000	≤35	400	6 - 9	2000	≤35	125	6 - 9	2000	≤35	125
Unit		-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L
Apr	01-04-24	7.01	229.3	30.6	-	6.94	370	32	99	6.92	359.6	33.2	-	7.02	485.7	32.6	11	7.09	542.5	32.3	15
Apr	02-04-24	6.89	513.2	27.4	344	6.99	603.9	28.2	-	7.01	605	28.4	208	7.08	513.1	28	13	7.07	514.3	28.2	24
Apr	03-04-24	7.07	348.2	29.8	-	6.58	429.7	28.3	289	6.95	551.3	28.2	-	6.84	455.9	27.4	43	7.01	550.5	28.4	30
Apr	04-04-24	7.1	345.7	28.3	377	6.88	440.9	28	-	6.89	441.8	28.3	79	6.92	499.2	28.2	36	7.12	540.1	28.9	32
Apr	05-04-24	6.98	310.7	28.6	599	7.34	533.3	29.3	471	7.1	520.5	29.2	-	7.27	345.6	29.3	45	6.99	606	29.2	19
Apr	06-04-24	6.51	346.6	24.3	-	7.06	394.5	24.3	-	7.02	391.2	24.3	-	7.19	461	24.1	-	7.26	510.9	24.1	-
Apr	07-04-24	7	243.2	25.8	-	7.28	437.3	24.6	-	7.18	453.6	24.3	-	7.07	448.9	24.3	-	7.17	513.1	24.8	-
Apr	08-04-24	6.97	325.2	29.2	-	6.92	379.1	32.4	159	7.02	366.8	31.9	-	7.05	451.4	32.2	41	7.19	520.3	32.2	24
Apr	09-04-24	6.96	279.6	28.7	688	7.33	531	29.8	-	6.98	421.1	29.2	222	7.21	417.8	29.9	49	7.19	498.3	29.8	32
Apr	10-04-24	7.16	305.2	25.7	-	7.22	358.1	25.7	103	7.01	566.7	25.8	-	7.09	455.8	26.8	33	7.33	563.3	26.5	20
Apr	11-04-24	6.7	552.5	28.7	617	6.88	373.8	28.5	-	7.04	423.2	28.4	470	7.09	512.5	28.7	41	7.1	418.3	28.9	30
Apr	12-04-24	7.17	411.2	28.3	597	7.11	723.5	29.6	-	7.24	725.1	29.9	537	6.99	451.2	28.9	45	7	543	28.8	38
Apr	13-04-24	6.8	2879	23.7	-	6.87	430.7	23.6	-	6.88	474.1	23.6	-	6.68	447.2	23.6	-	7.25	553.2	23.7	-
Apr	14-04-24	6.87	2790	23.7	-	6.98	601.3	24.4	-	6.9	668.1	24.2	-	7.05	439.8	24.1	-	7.28	538.2	24.1	-
Apr	15-04-24	7.11	4405	28	-	7.05	336.2	28.8	-	7.06	358.3	28.9	-	7.18	479	28.6	-	7.21	477.6	28.5	-
Apr	16-04-24	7.11	2955	20.1	-	6.99	224.1	20.3	-	6.93	415.2	20.7	-	-	-	-	-	7.29	436.3	20.9	-
Apr	17-04-24	7.09	3677	20.1	-	7.24	215.2	20.3	-	7.06	201.1	20.8	-	-	-	-	-	7.33	402.8	21	-
Apr	18-04-24	7.06	3578	20	-	7.15	260.2	20.6	-	7.23	260.4	21.3	-	-	-	-	-	-	-	-	-
Apr	19-04-24	7.85	1238	29.4	-	7.24	1568	25.6	-	7.24	1568	24.1	-	7.34	443.8	24	-	7.26	459	23.3	-
Apr	20-04-24	7.08	1772	22.5	-	7.24	236.4	21.9	-	6.95	1277	22.5	-	-	-	-	-	-	-	-	-
Apr	21-04-24	6.97	2656	22.6	-	7.34	386.9	22.4	-	7.35	386.3	22.4	-	7.05	418.6	22.3	-	-	-	-	-
Apr	22-04-24	7.04	1227	23.4	-	6.9	939.5	24.9	162	-	-	-	-	6.91	413.3	27.9	18	-	-	-	-
Apr	23-04-24	7.4	451.8	27.6	187	7.3	667.1	28.1	-	7.31	737.6	27.9	97	6.85	521.8	27.5	21	-	-	-	-
Apr	24-04-24	6.99	345.2	22.9	-	6.84	332	22.9	112	6.85	566.7	25	-	6.71	521.9	22.4	36	-	-	-	-
Apr	25-04-24	7.18	393.1	23.7	119	7.27	445.9	24.8	-	6.99	446.8	24.5	32	7.04	528.2	23.3	25	-	-	-	-
Apr	26-04-24	7.37	380.1	25.9	78	7.53	445.7	30.8	-	7.67	459.2	29.4	167	7.12	460.7	29.6	47	-	-	-	-
Apr	27-04-24	7.18	376.5	23.7	-	6.8	512.8	23.6	-	6.8	513.4	23.6	-	7.46	523.7	23.6	-	-	-	-	-
Apr	28-04-24	7.32	416.7	24.3	-	7.04	509.9	23.8	-	7.03	506	23.7	-	7.25	466.3	24	-	-	-	-	-
Apr	29-04-24	7.31	386.7	29.7	-	7.01	493.7	28.1	73	7.11	402	27.4	-	7.04	472.7	29.7	16	7.16	458.2	29.2	7
Apr	30-04-24	7.36	315.7	27.7	111	7.33	656.7	28.4	-	7.3	424.3	27.3	91	7.09	472.4	29.1	35	7.22	451.5	29	24
May	01-05-24	7.13	289.6	22	-	7.04	493.5	22.1	-	7.03	485	21.9	-	6.8	461.2	21.7	-	6.86	462.5	22.8	-
May	02-05-24	7.15	258.8	30	87	6.96	375.9	27.8	-	7.09	374.4	27.9	91	6.79	442.3	28.6	37	-	-	-	-
May	03-05-24	7.39	353	22.2	130	7.31	333.1	22	-	7.3	508.7	22.1	104	7.38	317.6	22.2	24	7.17	483.6	22.5	32
May	04-05-24	7.29	301.3	23.5	-	7.18	308.6	23.6	-	7.17	533.6	23.4	-	7.07	469.7	23.8	-	7.17	490.2	23.3	-
May	05-05-24	7.37	325.2	22.8	-	7.4	417.8	23.1	-	7.41	452.6	23.1	-	6.97	483.1	23.8	-	7.41	492.5	23.4	-
May	06-05-24	7.48	384.3	25.9	-	7.4	366.4	25.2	58	7.11	364.5	25.3	-	7.36	485.2	25.5	21	7.05	483.2	24.9	41
May	07-05-24	7.41	290.6	27.7	139	7.22	396.6	24	-	7.41	389.7	25.2	130	7.22	405.7	25	24	7.16	451.2	23.8	33
May	08-05-24	7.15	346.6	25.9	-	7.21	485.5	25.6	161	7.1	442.9	26	-	7.24	446.3	25.8	21	7.21	467.6	25.7	30
May	09-05-24	7.47	274.9	24.9	152	7.18	421.1	25.7	-	7.16	418.9	25.8	1356	7.09	409.7	25.5	6	7.2	452.4	25	9
May	10-05-24	7.09	234.2	30	176	7.02	324.3	32.8	-	7.04	324.8	32.5	50	7.17	519.3	31.8	7	7.18	520.6	31.1	13
May	11-05-24	6.84	254.2	23.3	-	6.66	373.3	23.3	-	6.66	374.2	23.2	-	7	420.4	23.1	-	7.22	520.6	23.4	-
May	12-05-24	7.46	253	24.1	-	7.14	422.3	23.7	-	7.07	456.9	23.8	-	7.12	394.2	23.8	-	7.13	513.2	23.8	-
May	13-05-24	7.51	210.6	24	-	6.38	382	24.4	248	6.32	354.9	24.5	-	6.68	390.3	24.7	24	7.18	529.1	24.8	9
May	14-05-24	7.24	319.8	22.9	198	7.01	384.8	23.5	-	6.99	368.4	22.8	164	6.99	368.4	23.1	10	7.21	484.7	22.6	5
May	15-05-24	7.09	369.1	26.4	-	7.08	492.4	25.7	182	7.03	552	28.8	-	6.81	370	26.3	15	7.22	494.4	27.4	12
May	16-05-24	7.03	297.7	28	208	7.05	479.4	28	-	7.04	481.9	28.3	241	7	378.8	28	23	7.09	483.3	28.8	24
May	17-05-24	7.03	266.4	26.8	248	7.17	459.1	28.8	-	7.15	460.1	28.7	171	7.09	380.8	28.9	18	7.25	529.6	28.8	28
May	18-05-24	7.01	242.2	24.9	-	7.29	473.5	25.1	-	7.25	478.5	25.4	-	6.98	371.1	25	-	7.19	523.3	25.2	-
May	19-05-24	7.52	242	26.2	-	7.28	378.3	26.3	-	7.06	375.8	24.6	-	6.9	364.3	25.2	-	7.12	510.6	30.1	-
May	20-05-24	7.35	343.7	28.9	-	7.3	437.7	28.1	205	7.12	443.8	28.5	-	6.99	361.2	28.2	27	6.96	509.7	28.1	16
May	21-05-24	7.11	277.2	29.4	238	6.84	409.9	27.8	-	6.92	618.1	27.9	255	6.93	376.4	27.7	51	7.19	534.4	27.8	16
May	22-05-24	7.22	263.8	25.2	-	7.19	456.3	25.9	-	7.08	571.6	25	-	6.96	422.5	24.9	-	6.94	442	25.6	-
May	23-05-24	7.15	302.3	28.3	305	7.25	344	30.6	-	7.21	354	30.4	94	6.83	359.2	30.5	5	6.91	447.9	30.5	20
May	24-05-24	6.97	208.5	26.4	44	6.82	201.3	27.6	-	7.11	304.1	27.6	149	6.87	361	27.1	16	6.84	413.5	27.1	32
May	25-05-24	6.77	553.2	23.7	-	6.9	249	23.7	-	6.94	249.4	23.7	-	6.9	295.8	23.6	-	6.87	354.3	23.7	-
May	26-05-24	6.99	200.9	23.7	-	6.74	147.4	23.5	-	6.95	145.9	23.6	-	6.76	264.6	23.5	-	7.05	327.5	23.6	-
May	27-05-24	7.14	173.9	25.9	-	7.07	168	25.4	39	6.96	165.7	25.4	-	7.09	271.4	25.1	24	6.93	316.3	25.3	28
May	28-05-24	7.03	219.9	26.3	42	6.81	237.3	27.2	-	6.76	219.2	27.7	204	6.84	258.9	27.7	9	6.87	256.2	27.2	16
May	29-05-24	7.27	399.3	27.4	-	6.68	328.2	27.7	260	6.66	449.2	27.3	-	6.81	299	27.3	17	6.76	306.5	27.3	16
May	30-05-24	7.04	433.3	26.9	146	6.96	316.3	27.3	-	6.94	274	26.4	192	6.87	262.9	26.8	37	7.24	352.1	26.6	46
May	31-05-24	7.38	410.7	25.9	217	7.21	508.9	28.4	-	7.12	499.1	26.4	129	6.87	319.8	27	42	7.02	345.4	26.7	43

Monthly	Date	Inlet (Zone B)				Inlet -1				Inlet -2				Outlet - 1				Outlet - 2			
		pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD
Standard		6 - 9	2000	≤35	400	6 - 9	2000	≤35	400	6 - 9	2000	≤35	400	6 - 9	2000	≤35	125	6 - 9	2000	≤35	125
Unit		-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L
Apr	01-04-24	7.01	229.3	30.6	-	6.94	370	32	99	6.92	359.6	33.2	-	7.02	485.7	32.6	11	7.09	542.5	32.3	15
Jun	01-06-24	7.02	292.6	25	-	6.76	395.3	25.3	-	6.94	406	25.2	-	7.76	101.8	25.1	-	7.98	101.5	25.4	-
Jun	02-06-24	7.22	191.8	24.4	-	7.04	282.5	24	-	6.9	281.4	24	-	6.85	292.6	24	-	7.16	298.5	24.2	-
Jun	03-06-24	7.33	231	26.9	-	7.1	294.1	28.8	93	7.24	291.1	28.1	-	6.09	295.7	28.4	18	7.28	336.8	27.9	20
Jun	04-06-24	7.02	215.5	27.8	153	6.96	343.7	26.3	-	7.01	259	26.4	77	6.91	256.8	27.3	33	7.06	262.1	27	29
Jun	05-06-24	6.82	184.9	27.1	-	6.61	304.1	28.1	163	6.65	299	27.6	-	6.89	232.6	27.4	16	6.87	280.8	27.6	21
Jun	06-06-24	7.01	265.1	26.2	84	6.82	346.1	26.2	-	6.82	346.1	25.9	166	6.74	268	26	28	6.82	287.1	25.8	19
Jun	07-06-24	7.1	210.2	26.6	48	7.07	359.4	27.3	-	7.01	364.2	27.2	68	6.98	296	27	40	7.07	315.5	26.7	34
Jun	08-06-24	6.98	211.6	23.9	-	7.11	263.1	24	-	7.16	257	23.7	-	6.89	222.8	23.6	-	7.2	293.4	23.8	-
Jun	09-06-24	7.13	226.2	23.8	-	6.75	218.4	23.6	-	6.77	466.2	23.6	-	7.11	280.7	23.4	-	7.15	309.9	23.3	-
Jun	10-06-24	7.33	364.2	24.7	-	7.21	345.3	25	79	7.16	347.4	25.1	-	7.35	269.8	24.4	5	7.32	319.8	24.5	6
Jun	11-06-24	7.07	231.4	27.7	140	7.09	360.4	28.2	-	7.13	358.7	28.2	223	6.83	297.7	28.1	9	6.82	352.6	28.1	7
Jun	12-06-24	7.54	454.9	27	-	6.92	622.2	26	-	6.95	631.6	25.2	-	6.88	351.2	25.1	17	7.04	350.9	25.4	17
Jun	13-06-24	7.54	490	25.4	64	6.88	355.9	25.2	94	6.88	409	25.7	140	6.68	374.7	26.4	43	7.73	397.9	25.7	20
Jun	14-06-24	7.58	436.1	25.7	43	7.21	396.5	26.6	-	7.39	405.6	25.3	105	7.18	351.1	25.7	29	7.19	394.8	25.2	28
Jun	15-06-24	7.27	377.4	23.6	-	7.08	406.3	23.6	-	7.16	423.9	23.5	-	6.99	340.5	23.6	-	6.95	342.3	23.7	-
Jun	16-06-24	7.2	345.8	23.9	-	7.2	216.5	23.8	-	7.17	366.8	23.7	-	6.95	302.1	24	-	6.95	354.1	24.4	-
Jun	17-06-24	7.81	437.7	27	-	6.92	268.6	26.4	29	6.86	287.2	26.3	-	6.93	275.7	25.9	13	6.95	357.7	25.3	22
Jun	18-06-24	6.99	232.9	23.8	-	4.88	565	23.9	-	6.81	107.8	24.4	-	6.87	272.8	23.8	-	7.07	322.1	23.7	-
Jun	19-06-24	7.19	387.3	24.6	-	4.58	432.2	24.8	41	7.08	164.8	24.8	-	6.83	211.7	24.7	14	6.96	256.1	24.6	11
Jun	20-06-24	7.18	342.4	27.3	97	7.08	463.2	27.8	-	7.23	233.8	28.1	68	7.23	233.8	28.1	15	7.69	116	28	16
Jun	21-06-24	7.05	216.8	25.8	148	6.92	300.4	27.1	-	6.95	269.4	26.4	110	7.41	111.6	26.9	10	7.49	112.2	26.8	15
Jun	22-06-24	7.04	437	24.5	-	7	328	24.5	-	6.97	325.2	24.4	-	6.82	243.2	24.4	-	6.73	243.8	24.4	-
Jun	23-06-24	6.99	221.4	24.6	-	6.95	259.3	24.5	-	6.94	259.2	24.4	-	6.9	241.5	24.4	-	6.85	316	24.5	-
Jun	24-06-24	6.9	179.3	24.8	-	6.91	243.9	25.7	25	6.92	264.2	25.9	-	7	261.1	25.9	11	7.04	331.5	25.7	4
Jun	25-06-24	6.89	230.6	26.8	40	6.21	420.5	26.6	-	7.13	173.26	26.7	34	6.91	278.7	26.5	13	7.05	300.1	26.7	14
Jun	26-06-24	7.55	414.8	25.2	-	6.71	205	25.1	23	6.77	204.2	27.5	-	6.57	204.2	27.5	13	6.61	280.4	27.5	16
Jun	27-06-24	7.25	367.7	27.2	76	6.86	278.2	26.9	-	6.7	323.9	24.5	140	6.71	182.9	24.5	19	6.76	271.7	24.7	33
Jun	28-06-24	6.79	231.8	25.3	51	6.82	324.6	26.8	-	6.86	321.6	26.4	63	6.63	213.4	26.4	39	6.79	271	26.5	34
Jun	29-06-24	6.78	273.4	25	-	6.76	328.6	24	-	6.8	1102	24.1	-	6.69	316.6	24.2	-	6.9	256	24.2	-
Jun	30-06-24	6.81	195.5	24.2	-	6.78	260.6	24.3	-	6.75	313.1	24.5	-	6.81	264.7	24.4	-	6.86	343.4	24.3	-
Jul	01-07-24	7.65	464.9	25	-	6.7	202.3	26.5	177	6.69	199.7	26.6	-	6.83	367.2	26.3	10	6.8	252.6	26.6	18
Jul	02-07-24	6.72	229.5	26.4	74	6.69	216.4	28.4	-	6.78	209	27.8	114	6.83	209.7	28.3	14	6.73	277.4	28.8	16
Jul	03-07-24	6.77	683.9	21.5	-	6.93	186.6	21.5	34	6.9	187.9	21.9	-	7.49	291	21.9	28	7.03	230.6	21.9	25
Jul	04-07-24	6.84	458	24.8	148	7.04	156.6	24.5	-	6.94	154.1	24.7	51	6.99	208.8	25	16	7.01	205.3	25.1	14
Jul	05-07-24	6.54	470.4	25.7	191	6.85	237.3	26	-	7.16	269.7	25.9	26	7.32	167.3	26.2	12	7	212	26.1	18
Jul	06-07-24	6.49	489.9	23	-	6.62	181.7	23.1	-	6.71	323.8	23.2	-	6.93	455.3	23	-	6.62	182.7	23.1	-
Jul	07-07-24	6.38	497.1	26.2	-	6.42	256.1	26.4	-	6.47	206.7	26.5	-	6.44	218.1	25.8	-	6.54	257.8	26.1	-
Jul	08-07-24	6.42	431.9	26.6	-	6.72	265.4	27.4	19	6.79	310.9	27	-	6.55	240.9	27.6	16	6.76	255.4	26.8	3
Jul	09-07-24	6.64	536.5	24.5	347	6.06	265.1	25.4	-	6.83	347.3	24.9	354	6.77	250.5	24.8	33	7.13	310.5	25.8	9
Jul	10-07-24	6.78	289.3	24.4	-	6.57	304.1	25.1	44	6.68	435.6	25.4	-	6.75	265.5	25.5	7	6.76	317.9	25.3	27
Jul	11-07-24	7.02	260.5	25.3	75	6.64	263	25.6	-	6.72	280.6	25.6	222	6.72	270	25.4	23	6.9	351.1	25.3	21
Jul	12-07-24	7.1	265.5	24.4	101	6.73	246.6	24.6	-	6.71	244.9	24.4	237	6.83	270.4	24.5	30	6.76	340.1	24.3	18
Jul	13-07-24	6.84	232.2	23	-	6.81	189.9	23	-	6.82	195.1	23	-	6.88	230	23	-	6.7	230.9	22.9	-
Jul	14-07-24	7.01	182.7	23.2	-	6.98	343.2	23.4	-	6.96	346.5	23.4	-	6.93	232.9	23.3	-	7.07	369.2	23.2	-
Jul	15-07-24	7.35	323.7	27.4	-	6.92	163	28.8	56	6.9	208.5	28.1	-	6.98	248.2	28.2	19	6.92	294.6	28.7	14
Jul	16-07-24	7.26	295.8	28.3	46	6.94	187	28	-	6.97	182.5	28.1	82	7.06	235.1	27.7	14	6.98	280.2	27.8	13
Jul	17-07-24	7.01	367.6	27.7	-	7.19	415.5	28.3	41	7.21	415.6	28.5	-	6.92	202.2	28.5	23	6.95	238.7	28.4	17
Jul	18-07-24	7.21	346	27.4	80	6.94	265.7	26.6	-	7.19	384.1	26.9	103	7.22	261.1	26.7	41	7.26	305.7	26.3	15
Jul	19-07-24	7.21	163.5	23.3	-	6.85	159.6	23.3	-	6.82	168.6	23.2	-	6.93	187.9	23.3	-	6.83	283.2	23.3	-
Jul	20-07-24	6.83	322.7	23.3	-	6.84	223.8	23.3	-	6.8	222.7	23.4	-	7.04	239.1	23.8	-	7.03	239.6	23.6	-
Jul	21-07-24	6.94	141.2	23.9	-	6.94	211.6	24	-	6.83	198.7	24	-	7.03	175.1	23.2	-	7.07	201.2	23.2	-
Jul	22-07-24	7.3	279.2	24.4	-	6.87	177	24.9	41	6.84	176.8	24.9	-	7.06	184.5	24.5	34	7.09	178.5	24.5	22
Jul	23-07-24	7.58	295.8	25.6	40	7.02	197.8	25.3	-	7.03	175	25.2	55	7.27	142.8	25	24	7.25	221.7	25	33
Jul	24-07-24	6.98	336.3	25.4	-	6.48	210.7	26	250	6.49	215.8	26.8	-	6.99	178.2	26.2	29	7.05	243.7	26.6	15
Jul	25-07-24	7.79	274	25.5	54	7.43	193.9	26.2	-	7.49	326.1	26.8	62	7.29	175.9	27.4	19	7.04	183.6	28.4	21
Jul	26-07-24	7.83	189.3	24.8	107	6.84	134.8	24.2	-	6.83	266.5	24.8	78	7.82	289.5	24.5	10	7.59	265.6	24.8	28
Jul	27-07-24	6.9	112.1	23.6	-	6.81	135.3	23.3	-	6.79	136.4	23.6	-	6.92	210.1	23.6	-	6.86	146.3	23.8	-
Jul	28-07-24	6.98	133.3	22.9	-	6.83	132	22.8	-	6.81	135.2	22.9	-	6.87	118.3	23.2	-	7.16	219.4	23.8	-
Jul	29-07-24	6.82	214.2	24.1	-	6.85	132.8	24.1	30	6.81	136.6	24	-	6.93	154.4	25.6	13	7.12	147.7	24.4	6
Jul	30-07-24	7.4	138.8	24.8	47	6.75	184.6	24.6	-	7.17	185.3	24.2	209	7.24	157.1	24.8	4	7.21	227.8	24.6	2
Jul	31-07-24	7.01	390.3	25.8	-	6.98	163.2	25.8	15	6.71	162.2	25.1	-	6.8	179	25.1	10	6.78	220.4	25.2	24

Monthly	Date	Inlet (Zone B)				Inlet -1				Inlet -2				Outlet - 1				Outlet - 2			
		pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD	pH	TDS	Tem	COD
Standard		6 - 9	2000	≤35	400	6 - 9	2000	≤35	400	6 - 9	2000	≤35	400	6 - 9	2000	≤35	125	6 - 9	2000	≤35	125
Unit		-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L	-	mg/L	`C	mg/L
Apr	01-04-24	7.01	229.3	30.6	-	6.94	370	32	99	6.92	359.6	33.2	-	7.02	485.7	32.6	11	7.09	542.5	32.3	15
Aug	01-08-24	7.22	153.5	25.3	32	6.92	199	25.2	-	7.23	200.6	24.6	39	7.16	261.3	24.2	20	7.11	218.7	24.1	30
Aug	02-08-24	6.94	217.4	23.8	93	7.02	314.8	23.8	-	7	315.1	23.9	83	6.71	172.7	23.3	17	7.04	206.7	23.9	11
Aug	03-08-24	7.77	434.9	22.9	-	6.86	239.6	22.9	-	6.87	238.6	22.8	-	7.02	222	23.4	-	6.98	387.8	23.3	-
Aug	04-08-24	7.2	144.3	23.8	-	7.15	203.9	23.7	-	7.06	196.8	23.7	-	6.98	235.7	23.6	-	6.9	391.7	23.5	-
Aug	05-08-24	7.42	621.1	25	-	7.35	293.9	25.4	27	7.32	272	25.3	-	7.37	160.6	25.2	13	7.27	240.6	25	6
Aug	06-08-24	7.4	249.1	23.9	55	6.77	294.8	26.1	-	6.88	302.4	26.1	47	6.99	209.2	25.8	12	6.87	247.6	25.4	22
Aug	07-08-24	6.86	235.4	24.5	-	6.78	211.9	24.9	23	6.88	533.9	25.2	-	6.88	226.4	25.1	14	6.74	293.3	25.2	24
Aug	08-08-24	6.86	218.9	28.7	70	6.25	192.1	28.5	-	6.8	296.8	28.7	77	6.69	224.2	28.4	8	6.81	300.9	28.1	10
Aug	09-08-24	6.72	247.9	26.9	118	6.45	250.4	26.2	-	6.61	247.7	26.5	134	6.8	241.5	26.3	9	6.7	241	26.2	11
Aug	10-08-24	6.93	210.4	23.9	-	7.05	161.79	23.4	-	7.04	163.14	23.4	-	6.77	254.8	23.4	-	No outlet water			-
Aug	11-08-24	7.09	254.8	23.4	-	6.99	274.7	23.2	-	6.99	267.5	23.3	-	7.09	274.1	23.2	-	6.79	273	23.3	-
Aug	12-08-24	6.96	188.2	25.8	-	6.88	376.3	26.5	55	6.9	339	26.9	-	6.75	239.9	27.2	30	6.78	308.6	27.1	14
Aug	13-08-24	6.99	259.6	23.7	195	6.96	324.7	27	-	6.96	321.5	27.2	308	6.89	288.7	27.1	31	6.94	324.2	27.5	20
Aug	14-08-24	7	422.8	23.9	-	7.03	441.6	27.3	96	6.95	347.2	28.2	-	6.68	270.2	26.7	12	6.68	315.4	26.8	10
Aug	15-08-24	7.07	287.2	29.9	155	6.72	270.9	30.5	-	6.71	407.2	29.6	192	6.41	296.2	29.5	16	6.58	316.1	29.8	10
Aug	16-08-24	6.07	279.1	25.5	157	6.67	327.7	25.1	-	6.71	327.5	24.9	606	6.73	310.2	25.4	36	6.73	338	25.3	16
Aug	17-08-24	6.89	244.3	23	-	6.9	481.4	23	-	6.9	478.5	23	-	6.73	232.7	23	-	6.7	339.4	23	-
Aug	18-08-24	6.75	187.7	23.2	-	6.89	483.9	23.1	-	6.86	481.4	23	-	6.67	208.4	23	-	6.73	328.1	23	-
Aug	19-08-24	7.04	206	26.8	-	6.73	266.2	29.7	31	6.71	297.4	29.8	-	6.81	215.3	29.5	12	6.73	303.7	29.4	18
Aug	20-08-24	7.07	302.2	25.6	100	6.92	261.6	25.7	-	6.94	259.1	25.8	112	7.51	387.8	25.8	13	7.61	271.3	26.3	14
Aug	21-08-24	7.03	266.9	24.7	-	6.6	381.1	24.7	55	6.93	235.5	24.7	-	6.65	253.6	24.6	14	6.71	311	24.5	10
Aug	22-08-24	6.89	280.6	23.9	59	6.75	234.4	24.2	-	6.8	257.6	24.5	285	6.88	262.7	24.4	42	6.89	301	24.3	11
Aug	23-08-24	6.81	671.9	26.2	245	7.13	240.9	25.9	-	7.07	242.6	25.9	43	6.87	253.7	25.8	14	6.89	311.2	25.8	13
Aug	24-08-24	6.89	229.1	23.4	-	6.8	281.2	23.4	-	6.8	280.7	23.4	-	6.84	257.5	23.3	-	6.88	348.9	23.3	-
Aug	25-08-24	6.89	210.6	23.5	-	6.95	314.7	23.8	-	6.85	262.1	23.7	-	6.94	233.2	23.7	-	6.87	339.5	23.7	-
Aug	26-08-24	7.09	279.5	25	-	6.98	293.5	25	49	7.04	303.1	25.2	-	6.84	232.6	25.2	14	7.57	343.2	24.6	12
Aug	27-08-24	7.19	290.1	28.8	82	7.03	353.1	26.2	-	7.04	352.4	26.5	79	6.69	287.2	26	16	6.63	288.5	26.3	5
Aug	28-08-24	7.03	280.6	25.5	-	7.05	363.6	25.1	71	7.01	358.1	25.3	-	6.78	257.6	25.4	29	7.1	312.7	25.2	7
Aug	29-08-24	6.95	337.6	25	204	6.82	349	26.9	-	6.71	346.9	26.8	73	6.81	275.3	25.9	33	6.9	326.7	26	11
Aug	30-08-24	6.85	322.9	23.7	74	6.83	294.1	24.1	-	7.01	415.4	24.2	108	6.91	261.6	24.3	28	7.01	324.4	24.4	31
Aug	31-08-24	6.83	311.8	23.9	-	7.2	134.81	24.4	-	7.18	140.64	24.4	-	6.77	237.1	24.5	-	7.09	385.8	24.5	-
Sep	01-09-24	6.8	154.3	24.5	-	6.73	264	24.7	-	6.72	263.6	24.9	-	6.56	201.4	25.1	-	6.57	200.4	25.2	-
Sep	02-09-24	6.92	180.1	26.5	-	6.81	205.1	25.4	30	6.86	394.9	26	-	6.95	201.3	26	9	6.9	202.1	26.2	16
Sep	03-09-24	7.34	282	25	120	7.05	261.6	26.6	-	7.23	474.3	26.7	106	6.86	277.6	26.9	17	6.83	263.4	26.6	17
Sep	04-09-24	7.03	246.3	24.1	-	6.89	229	24.7	30	6.84	226.2	24.1	-	6.8	248.4	24.2	14	6.84	364.6	24.3	10
Sep	05-09-24	6.93	211.9	26	152	6.62	298.6	26.9	-	6.69	298.7	27.9	43	6.8	259.3	26.8	33	6.62	373.7	26.6	10
Sep	06-09-24	6.73	227.7	25.2	253	6.83	278	26	-	6.91	264.4	26.5	42	6.82	219.6	26.7	22	6.74	324.6	26.7	11
Sep	07-09-24	6.61	208.5	22.8	-	6.45	302.8	22.9	-	6.58	301.5	22.9	-	6.66	219.5	22.8	-	6.62	306.9	23	-
Sep	08-09-24	6.9	135.2	23.1	-	6.84	393.2	23.2	-	6.85	324.8	23.3	-	6.75	241.2	23.3	-	6.62	337.5	23.3	-
Sep	09-09-24	7	208.9	23.6	-	6.93	346.2	23.7	41	6.95	287.4	24.5	-	6.9	221.8	24.6	13	6.83	254	24.6	19
Sep	10-09-24	7.54	172	25.5	60	7.38	338.2	26	-	7.02	337.4	26.2	39	6.96	235.3	25.9	6	7.01	247.7	25.4	4
Sep	11-09-24	7.17	189.1	25.5	-	6.9	220.9	24.2	33	6.94	224	24.2	-	6.8	208.5	24.2	10	7.3	251.5	24.2	14
Sep	12-09-24	7.06	193.5	25.8	34	6.81	207	25.5	-	6.82	226.1	25.5	25	6.95	197.5	25.8	10	6.91	252.8	25.9	5
Sep	13-09-24	7.1	222.8	23.8	75	7.05	214.6	23.2	-	7.02	239.6	24	19	7.11	258.6	24.2	16	7.08	257.6	24.3	7
Sep	14-09-24	6.89	157.8	23.6	-	6.68	230.9	23.6	-	6.72	213.8	23.5	-	6.87	208.7	23.6	-	6.81	289.5	23.4	-
Sep	15-09-24	7.03	155.3	23.6	-	6.61	179.9	23.6	-	6.61	179.9	23.5	-	6.74	223.8	23.5	-	6.84	274.7	23.4	-
Sep	16-09-24	7.15	161.5	27.3	-	6.8	173.9	26.9	50	6.77	175.4	27.1	-	6.84	220.4	26.8	14	6.82	267.3	27.2	9
Sep	17-09-24	7.17	257.6	25.6	60	6.82	219.8	26.1	-	6.8	272.9	26.7	40	7.01	249.3	26.8	18	6.99	258.9	27	11
Sep	18-09-24	6.97	244.5	25.5	-	6.91	354	24.8	86	6.89	459.6	24.9	-	6.91	283.7	26.4	18	6.94	290.3	26.2	16
Sep	19-09-24	6.96	249.1	25.5	182	6.8	392.1	26.4	-	6.79	475	26.2	84	6.93	308.6	26.1	14	6.91	312.5	25.9	20
Sep	20-09-24	7.48	455.6	25.9	131	7.03	344.1	25.9	-	7.04	342.3	25.8	65	7.23	359.4	25	10	7.08	358.9	25.2	9
Sep	21-09-24	6.73	192.2	24.5	-	6.92	283	24.6	-	6.95	501	24.4	-	6.97	333.8	24.5	-	6.94	388	24.7	-
Sep	22-09-24	6.98	159.8	24.4	-	6.96	334.2	24.4	-	6.98	332.3	24.5	-	6.74	330	24.6	-	6.83	388.7	24.3	-
Sep	23-09-24	6.99	100.9	25.1	-	6.78	133.2	24.8	37	6.83	177	24.9	-	7.11	245.5	25	4	7.33	354.2	25.1	18
Sep	24-09-24	7.45	272.1	28.1	46	6.83	167	27.6	-	7.53	329.6	27.5	73	6.85	183.8	28.5	35	6.96	258.3	28	14
Sep	25-09-24	7.42	355.4	25	-	6.82	237.1	25.1	40	6.8	235.6	24.8	-	7.45	195.5	24.9	15	7.24	239.8	25.1	20
Sep	26-09-24	7.06	219.7	26.1	79	7.07	307.3	26.5	-	7.14	306.3	26.3	50	7.2	257.8	26.4	40	7.26	252.7	26.2	25
Sep	27-09-24	6.99	225.8	23.5	92	7.05	425.1	23.4	-	7.12	430.3	23.6	115	7.09	220.4	23.8	10	7.24	234.6	23.9	17
Sep	28-09-24	7.19	200.1	22	-	7.18	311.3	22.5	-	7.05	219.2	22.5	-	7.16	248.3	22.5	-	7.13	246.4	22.5	-
Sep	29-09-24	7.32	162.3	22.6	-	7.23	229.1	22.9	-	7.09	226.8	22.9	-	6.97	246.4	22.8	-	7.09	273.3	22.8	-
Sep	30-09-24	7.08	213.1	27.5	-	6.81	233	27.4	22	6.8	235.6	27.4	-	6.79	278.7	27.8	3	7.27	303.9	28	4

Weekly STP Water Analysis Results

Month	Date	Zone A (Inlet) -1			Zone A (Inlet) -2			Outlet - 1								Outlet - 2							
		SS	BOD	T-P	SS	BOD	T-P	SS	BOD	T-N	T-P	O&G	T-Coli	E-Coli	Free Chlorine	SS	BOD	T-N	T-P	O&G	T-Coli	E-Coli	Free Chlorine
Standard		Max 200	Max 200	Max8	Max 200	Max 200	Max8	Max 50	Max 30	Max 80	Max 2	Max 10	Max 400	Max 1000	Max 1	Max 50	Max 30	Max 80	Max 2	Max 10	Max 400	Max 1000	Max 1
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	MNP/100ml	MNP/100ml	mg/L	ppm	ppm	ppm	ppm	ppm	MNP/100ml	MNP/100ml	mg/L
Apr	04-04-24	20	138	1.36	-	-	-	5	9.1	13.3	0.977	0	< 1	< 1	0.43	20	8.7	8.4	1.84	0.1	< 1	< 1	0.52
Apr	09-04-24	-	-	-	20	147	1.74	10	8.8	5.5	0.836	0.2	< 1	< 1	0.13	5	8.2	7.4	1.49	0	< 1	< 1	0.3
Apr	24-04-24	93	192	1.86	-	-	-	10	8.2	14.2	0.793	0	< 1	< 1	0.51	-	-	-	-	-	-	-	-
May	02-05-24	50	96	1.49	-	-	-	40	14	9.5	1.9	0.3	1	< 1	0.08	-	-	-	-	-	-	-	-
May	08-05-24	-	-	-	75	129	2.04	16	7.3	17.1	1.17	0.1	3	2	0.01	7	7.1	7.6	1.31	0	1	< 1	0.04
May	15-05-24	20	96	2.79	-	-	-	12	7.2	13.4	1.26	0.1	< 1	< 1	0.16	10	6.1	4	1.39	0	< 1	< 1	0.03
May	21-05-24	-	-	-	13	98	2.58	2	10	9	1.38	0.1	< 1	< 1	0.03	16	7.7	4	1.42	0	< 1	< 1	0.12
May	29-05-24	20	123	1.05	-	-	-	4	7.8	1.3	0.689	0	< 1	< 1	0.47	16	8.3	5.6	1.08	0	< 1	< 1	0.64
Jun	05-06-24	-	-	-	40	177	2.5	15	8.7	7.2	0.652	0	< 1	< 1	2.83	5	7.6	10.8	1.13	0	< 1	< 1	0.09
Jun	10-06-24	30	165	1.57	-	-	-	20	9.8	11.6	0.778	0.1	1	< 1	0.03	10	8.6	9.7	1.19	0	< 1	< 1	0.98
Jun	20-6-24	-	-	-	30	114	1.12	25	9.2	6.6	1.01	0	1	1	0.01	15	8.5	1.6	1.76	0	< 1	< 1	0.19
Jun	26-6-24	20	112	0.807	-	-	-	10	6.7	0.2	0.707	0	< 1	< 1	0.25	10	7	1.02	1.02	0.1	< 1	< 1	0.38
Jul	05-07-24	20	112	1.08	-	-	-	44	9.8	11.2	1.64	0	1	< 1	0.18	46	8.9	9.7	1.29	0	329	329	0.18
Jul	10-07-24	-	-	-	130	297	2.51	5	7.3	7.3	0.963	0	< 1	< 1	0.38	10	7.2	3.3	0.551	0	< 1	< 1	0.22
Jul	17-07-24	20	111	1.12	-	-	-	15	8.6	5.5	0.659	0.2	< 1	< 1	0.19	15	7.9	5.1	1.4	0.1	1	< 1	0.16
Jul	23-07-24	-	-	-	40	111	0.796	20	7.4	5.4	1.05	0.1	< 1	< 1	0.06	10	6.9	5.6	1.03	0	< 1	< 1	0.2
Jul	30-07-24	15	129	0.921	-	-	-	30	8.3	2.8	0.795	0.3	< 1	< 1	0.03	5	7.9	2.7	0.705	0.1	< 1	< 1	0.05
Aug	06-08-24	-	-	-	20	99	1.07	7	7.9	0.5	0.473	0.2	< 1	< 1	0.25	3	7.3	1	0.645	0	1	< 1	0.01
Aug	13-08-24	-	-	-	50	111	1.75	10	8.3	13	0.468	0.1	< 1	< 1	0.29	15	7.9	22	1.1	0	< 1	< 1	0.92
Aug	22-08-24	30	150	0.869	-	-	-	10	9	12.8	0.645	0.2	1	1	0.01	5	7.9	8.8	1.04	0.1	1	1	0.17
Aug	28-08-24	40	108	1.48	-	-	-	20	10	12	0.996	0.1	< 1	< 1	0.02	5	9.3	24	1.07	0.2	< 1	< 1	0.98
Sep	03-09-24	-	-	-	15	117	1.09	10	7.1	10.5	0.672	0.1	< 1	< 1	0.05	5	6.4	10	1.12	0.1	8	8	0.02
Sep	11-09-24	20	68	0.479	-	-	-	10	3.8	12	0.888	0.3	< 1	< 1	0.04	40	3.2	14	0.907	0.2	1	< 1	0.05
Sep	19-09-24	-	-	-	20	141	1.14	5	9.3	11	0.439	0.1	< 1	< 1	0.34	5	8.6	9	0.424	0	< 1	< 1	0.01
Sep	26-09-24	50	141	1.08	-	-	-	20	13	4.6	0.815	0.3	1	< 1	0.01	10	7.7	5.9	0.93	0.2	< 1	< 1	0.02

Monitoring Parameters Result for STP

Month	Date	Zone B - Inlet											Zone A - Inlet -1								Zone A - Inlet -2								Outlet -1						Outlet -2					
		SS	BOD	TP	TN	O & G	Cyanide	Formal-dehyde	Free Chlorine	Color	Iron	Ammonia	TN	O & G	Cyanide	Formal-dehyde	Free Chlorine	Color	Iron	Ammonia	TN	O & G	Cyanide	Formal-dehyde	Free Chlorine	Color	Iron	Ammonia	Cyanide	Formal-dehyde	Total Chlorine	Color	Iron	Ammonia	Cyanide	Formal-dehyde	Total Chlorine	Color	Iron	Ammonia
Standard		Max 200	Max 200	Max 8	Max 80	Max 40	Max 0.1	Max 1	Max 1	150	Max3.5	Max80	Max 80	Max 40	Max 0.1	Max 1	Max 1	150	Max3.5	Max80	Max 80	Max 40	Max 0.1	Max 1	Max 1	150	Max3.5	Max80	Max 0.1	Max 1	Max 0.2	Max 150	Max3.5	Max10	Max 0.1	Max 1	Max 0.2	Max 150	Max3.5	Max10
Unit		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	TCU	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	TCU	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	TCU	mg/l	mg/l	mg/l	mg/l	mg/l	TCU	mg/l	mg/l	mg/l	mg/l	mg/l	TCU	mg/l	mg/l
Apr	24-04-24	-	-	-	-	-	-	-	-	-	-	-	14.9	0.8	0.021	0.161	0.01	23.05	0.195	3.93	-	-	-	-	-	-	-	-	0.002	0.037	2.06	12.24	0.419	4.73	-	-	-	-	-	-
May	08-05-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.8	0.4	0.014	0.124	0.08	18.93	0.122	0.959	0.001	0.045	0.15	13.13	0.085	4.74	0.003	0.078	0.35	7.49	0.26	0.042
Jun	05-06-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.7	0.1	0.02	0.523	0	20.13	1.559	8.1	0.001	0.031	3.5	5.95	0.434	0.146	0.001	0.042	0.45	5.73	0.126	0.001
Jul	03-07-24	-	-	-	-	-	-	-	-	-	-	-	11	0.1	0.001	0.049	0.01	14.6	0.963	9.97	-	-	-	-	-	-	-	-	0.011	0.026	0.18	6.4	2.772	0.063	0.007	0.025	0.21	5.98	0.801	0.034
Aug	06-08-24	30	108	0.606	35	0.5	0.035	0.247	0	13.6	0.646	1.16	-	-	-	-	-	-	-	-	2	0.4	0.007	0.09	0.12	12.7	0.661	4.71	0.002	0.028	0.76	3.91	0.245	0.069	0.004	0.015	0.42	3.6	0.073	0.155
Sep	03-09-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.1	0.6	0.001	0.15	0	15.3	1.277	0.065	0.003	0.034	0.29	5.53	0.694	0.736	0.005	0.005	0.15	4.74	0.433	0.23
Oct	08-10-24	-	-	-	-	-	-	-	-	-	-	-	17	0.3	0.005	0.205	0	12.57	2.127	0.034	-	-	-	-	-	-	-	-	0.002	0.028	0.18	5.02	0.154	0.155	0.004	0.011	0.29	4.62	0.183	0.265

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Monthly analysis results

Month	Date	Inlet - 1																Outlet-1															
		Odor	Mercury	Zinc	Arsenic	Chromium	Cadmium	Selenium	Lead	Copper	Barium	Nickel	Silver	Sulphide	Total Cyanide	Hexavalent Chromium (Cr6+)	Fluoride	Phenols	Odor	Mercury	Zinc	Arsenic	Chromium	Cadmium	Selenium	Lead	Copper	Barium	Nickel	Silver	Sulphide	Total Cyanide	Hexavalent Chromium(Cr6+)	Fluoride	Phenols
Standard		-	Max 0.005	Max 2	Max 0.1	Max 0.5	Max 0.03	Max 0.02	Max 0.1	Max 0.5	Max 1	Max 0.2	Max0.5	Max 1	Max1	Max0.1	Max20	Max 0.5	-	Max 0.005	Max 2	Max 0.1	Max 0.5	Max 0.03	Max 0.02	Max 0.1	Max 0.5	Max 1	Max 0.2	Max0.5	Max 1	Max 1	Max0.1	Max20	Max 0.5
Unit		TON	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	TON	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Apr	24-04-24	8	≤ 0.002	0.04	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.002	≤ 0.002	≤ 0.002	0.084	0.003	< 0.05	0.378	< 0.002	1.4	≤ 0.002	≤ 0.002	≤ 0.010	≤ 0.002	≤ 0.002	≤ 0.010	≤ 0.002	≤ 0.002	≤ 0.002	≤ 0.002	≤ 0.002	≤ 0.002	0.072	0.002	< 0.05	3.205	< 0.002
May	05-08-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	≤ 0.002	0.082	≤ 0.010	≤ 0.002	≤ 0.002	≤ 0.010	≤ 0.002	≤ 0.002	0.018	≤ 0.002	≤ 0.002	0.011	0.003	< 0.05	4.876	< 0.002
Jun	05-06-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	≤ 0.002	≤ 0.002	≤ 0.010	≤ 0.002	≤ 0.002	≤ 0.010	≤ 0.002	≤ 0.002	0.016	≤ 0.002	≤ 0.002	0.007	0.002	< 0.05	2.165	0.009
Jul	03-07-24	3	≤ 0.002	0.048	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.02	≤ 0.002	≤ 0.002	0.036	< 0.002	< 0.05	0.851	0.012	2	≤ 0.002	0.124	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.036	≤ 0.002	≤ 0.002	0.016	< 0.002	< 0.05	1.739	< 0.002
Aug	06-08-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	≤ 0.002	0.012	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.01	≤ 0.002	≤ 0.002	< 0.005	< 0.002	< 0.05	1.53	0.023
Sep	03-09-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	≤ 0.002	0.044	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.018	≤ 0.002	≤ 0.002	0.007	< 0.002	< 0.05	2.246	0.003
Oct	08-10-24	4	≤ 0.002	0.036	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.024	≤ 0.002	≤ 0.002	0.026	0.003	< 0.05	2.503	0.029	1	≤ 0.002	0.052	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.014	≤ 0.002	≤ 0.002	< 0.005	0.004	< 0.05	2.429	0.005

Myanmar Japan Thilawa Development Limited
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Monthly analysis results

Month	Date	Inlet-2																Outlet-2																
		Odor	Mercury	Zinc	Arsenic	Chromium	Cadmium	Selenium	Lead	Copper	Barium	Nickel	Silver	Sulphide	Total Cyanide	Hexavalent Chromium (Cr6+)	Fluoride	Phenols	Odor	Mercury	Zinc	Arsenic	Chromium	Cadmium	Selenium	Lead	Copper	Barium	Nickel	Silver	Sulphide	Total Cyanide	Hexavalent Chromium(Cr 6+)	Fluoride	Phenols
Standard		-	Max 0.005	Max 2	Max 0.1	Max 0.5	Max 0.03	Max 0.02	Max 0.1	Max 0.5	Max 1	Max 0.2	Max0.5	Max 1	Max1	Max0.1	Max20	Max 0.5	-	Max 0.005	Max 2	Max 0.1	Max 0.5	Max 0.03	Max 0.02	Max 0.1	Max 0.5	Max 1	Max 0.2	Max0.5	Max 1	Max 1	Max0.1	Max20	Max 0.5
Unit		TON	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	TON	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Apr	24-04-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	05-08-24	35	≤ 0.002	0.022	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.034	≤ 0.002	≤ 0.002	0.042	0.002	< 0.05	≤ 0.014	< 0.02	1	≤ 0.002	0.018	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.016	≤ 0.002	≤ 0.002	<0.005	0.004	< 0.05	2.773	< 0.002
Jun	05-06-24	8	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.028	≤ 0.002	≤ 0.002	0.173	0.002	< 0.05	0.488	0.014	1	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.064	≤ 0.002	≤ 0.002	<0.005	0.004	< 0.05	1.641	0.006
Jul	03-07-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	≤ 0.002	0.094	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.024	≤ 0.002	≤ 0.002	0.013	0.003	< 0.05	1.617	0.005
Aug	06-08-24	17	≤ 0.002	0.016	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.014	≤ 0.002	≤ 0.002	0.024	< 0.002	< 0.05	0.619	0.006	1	≤ 0.002	0.016	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.008	≤ 0.002	≤ 0.002	0.006	< 0.002	< 0.05	0.798	0.003
Sep	03-09-24	6	≤ 0.002	0.062	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.022	≤ 0.002	≤ 0.002	0.042	0.002	< 0.05	0.599	0.007	1	≤ 0.002	0.028	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.012	≤ 0.002	≤ 0.002	0.008	< 0.002	< 0.05	1.337	< 0.002
Oct	08-10-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	≤ 0.002	0.024	≤ 0.01	≤ 0.002	≤ 0.002	≤ 0.01	≤ 0.002	≤ 0.002	0.008	≤ 0.002	≤ 0.002	< 0.005	0.004	< 0.05	1.959	0.009

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Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix - J

Chemical Consumption of Water Purification Plant and Sewage Treatment Plant at Zone-A,

Sewage Treatment Plant Sludge Disposal Amount,

Treated Water Volume at Water Purification Plant at TSEZ-A

(April 2024 to September 2024)

Chemical cosnumption of WPP

Month & Year	PAC (25 kg/bag)	PAC (bag/12 months)	NaOH (25 kg/bag)	NaOH(bag/12 months)	NaClO (Liter)	NaClO (Liter/12 months)
Apr,2024	29	113	0.6	2	5300	24105
May,2024	18		0.1		3337	
Jun,2024	18		0.4		3914	
Jul,2024	18		0.6		4256	
Aug,2024	18		0.2		4139	
Sep,2024	11		0.1		3158	
Oct,2024						
Nov,2024						
Dec,2024						
Jan,2025						
Feb,2025						
Mar,2025						

Chemical cosnumption of STP

Month & Year	NaClO (Liter)	NaClO (Liter/12 months)
Apr,2024	977	8285
May,2024	1241	
Jun,2024	1562	
Jul,2024	1510	
Aug,2024	1363	
Sep,2024	1632	
Oct,2024		
Nov,2024		
Dec,2024		
Jan,2025		
Feb,2025		
Mar,2025		

Month & Year	Polymer (25 kg/bag)	Polymer(bag/12 months)
Apr,2024	0	1
May,2024	0	
Jun,2024	0	
Jul,2024	0	
Aug,2024	1	
Sep,2024	0	
Oct,2024		
Nov,2024		
Dec,2024		
Jan,2025		
Feb,2025		
Mar,2025		

STP Sludge Disposal Amount

Month & Year	Weight (Ton)	Weight (Ton/12months)
Apr,2024	5.42	23.04
May,2024	5.4	
Jun,2024	0	
Jul,2024	6.12	
Aug,2024	6.1	
Sep,2024	0	
Oct,2024		
Nov,2024		
Dec,2024		
Jan,2025		
Feb,2025		
Mar,2025		

Locator Treated Water Volume (Cu.m)

Month & Year	Cu.m
Apr,2024	55,043
May,2024	19,411
Jun,2024	17,136
Jul,2024	18,183
Aug,2024	18,822
Sep,2024	15,974
Oct,204	
Nov-24	
Dec-24	
Jan-25	
Feb-25	
Mar-25	
Total	**144,569**

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STP Sludge Disposal Amount

Month & Year	Weight (Ton)	Weight (Ton/12months)
Apr,2024	5.42	23.04
May,2024	5.4	
Jun,2024	0	
Jul,2024	6.12	
Aug,2024	6.1	
Sep,2024	0	
Oct,2024		
Nov,2024		
Dec,2024		
Jan,2025		
Feb,2025		
Mar,2025		

Locator Treated Water Volume (Cu.m)

Month & Year	Cu.m
Apr,2024	55,043
May,2024	19,411
Jun,2024	17,136
Jul,2024	18,183
Aug,2024	18,822
Sep,2024	15,974
Oct,204	
Nov-24	
Dec-24	
Jan-25	
Feb-25	
Mar-25	
Total	**144,569**

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