MJTD

Thilawa Special Economic Zone (Zone A) Development

Environmental Monitoring Report (Operation Phase)

Myanmar Japan Thilawa Development Limited.

April 2020

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 October 2019 to March 2020 according to the Environment Monitoring Plan is submitted in conformity with the provision of Chapter 9.1, Table 9.1-2 and 9.2, Table 9.2-2 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

Report (No.9) 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:

There were Six cases of accidents happened during monitoring period at Thilawa SEZ common area. Each tenant's accidents will report directly to Environmental Section, One Stop Service Center, Thilawa SEZ Management Committee.

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 4.2-2, 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 2020, 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	October 2019 and February 2020, Water and waste water quality monitoring report (Bi-Monthly) December 2019, Water and wastewater quality monitoring report (Bi-Annually)
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 and Admin complex)
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 2020, 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
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.

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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	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 and Zone-B	5th January 2018	10th January 2018	Thilawa SEZ Management Committee	As Attachment

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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 – February 2020

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	ppm	0.031	0.003 - 0.168	Refer to NEQG	< 0.06	Japan	1 week each in dry and wet season	HAZSCANNER, EPAS	
	SO_2	ppm	0.031	0.013 – 0.779		< 0.04	Japan		HAZSCANNER, EPAS	
	CO	ppm	0.159	0.003- 0.465		< 10	Japan		HAZSCANNER, EPAS	
	TSP	mg/m^3	0.305	0.004 – 0.983		< 0.33	Thailand		HAZSCANNE1R, EPAS	
	PM10	mg/m^3	0.111	0.000 -0.346		< 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 2020)

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 – October 2019

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 Refereed International Standard.

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-1	pH	-	8.7	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS*3	ppm	96	50	Max.50			APHA 2540D Method	
	DO	ppm	8.94	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	25.3	250	Max.70			APHA 5220D Method	
	BOD	ppm	9.03	50	Max.20			APHA-5210B Method	
	T-N	ppm	5	-	Max.80			HACH Method 10072	
	T-P	ppm	0.087	2	Max 8			APHA 4500-PE	
	Color	Co.Pt	4.52	-	-			APHA 2120C	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	Odor	Co.Pt	1	-	-			APHA 2150B	
	Total coliforms*4	MPN/100ml	930	400	Max.400	7.5×10^3		APHA 9221B	
SW-5	pH	-	8.2	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS	ppm	46	50	Max.50			APHA 2540D Method	
	DO	ppm	6.55	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	37.2	250	Max.70			APHA 5220D Method	
	BOD	ppm	5.32	50	Max.20			APHA-5210B Method	
	T-N	ppm	1.8	-	Max.80			HACH Method 10072	
	T-P	ppm	0.197	2	-			APHA 4500-PE	
	Color	Co.Pt	4.59	-	-			APHA 2120C	
	Odor	Co.Pt	1	-	-			APHA 2150B	
	Total coliforms*4	MPN/100ml	820	400	Max.400	7.5×10^3		APHA 9221B	
SW-6	pH	-	6.9	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS	ppm	4	50	Max.50			APHA 2540D Method	
	DO	ppm	5.84	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	6	250	Max.70			APHA 5220D Method	
	BOD	ppm	2.33	50	Max.20			APHA-5210B Method	
	T-N	ppm	11.3	-	Max.80			HACH Method 10072	
	T-P	ppm	0.439	2	-			APHA 4500-PE	
	Color	Co.Pt	2.82	-	-			APHA 2120C	
	Odor	Co.Pt	1	-	-	7.5×10^3		APHA 2150B	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	Total coliforms	MPN/100ml	240	400	Max.400			APHA 9221B	
SW-2 (Reference Point)	pH	-	7.9	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS*5	ppm	70	50	Max.50			APHA 2540D Method	
	DO	ppm	4.75	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	29.3	250	Max.70			APHA 5220D Method	
	BOD	ppm	6.81	50	Max.20			APHA-5210B Method	
	T-N	ppm	2.4	-	Max.80			HACH Method 10072	
	T-P	ppm	0.091	2	-			APHA 4500-PE	
	Color	Co.Pt	12.2	-	-			APHA 2120C	
	Odor	Co.Pt	1	-	-			APHA 2150B	
	Total coliforms*6	MPN/100ml	>160000	400	Max.400			APHA 9221B	
SW-4 (Reference Point)	pH	-	7.6	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS*5	ppm	194	50	Max.50			APHA 2540D Method	
	DO	ppm	7.43	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	12.5	250	Max.70			APHA 5220D Method	
	BOD	ppm	8.52	50	Max.20			APHA-5210B Method	
	T-N	ppm	2.9	-	Max.80			HACH Method 10072	
	T-P	ppm	0.098	2	-			APHA 4500-PE	
	Color	Co.Pt	3.78	-	-			APHA 2120C	
	Odor	Co.Pt	1	-	-			APHA 2150B	
	Total coliforms*6	MPN/100ml	35000	400	Max.400			APHA 9221B	

Location	Item	Unit	Measured Value	Country's Standard*2	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
GW-1 (Reference Point)	pH	-	8.2	None (Available Guideline value determined by MONREC)	None (Available Guideline Value determined by MOI)	5.5~9.0	Once in two months	Instrument Analysis Method	
	SS	ppm	2			50		APHA 2540D Method	
	DO	ppm	5.61			>=4		Instrument Analysis Method	
	COD(Cr)	ppm	9.4			60		APHA 5220D Method	
	BOD	ppm	7.22			15		APHA-5210B Method	
	T-N	ppm	1.5			0.1		HACH Method 10072	
	T-P	ppm	0.09			0.04		APHA 4500-PE	
	Color	Co.Pt	1.16					APHA 2120C	
	Odor	Co.Pt	1					APHA 2150B	
	Total coliforms	MPN/100ml	49			7.5×10^3		APHA 9221B	

*1Remark: Referred to the Vietnam Standard (EIA Report), Reference to the Water Quality Monitoring Report, October 2019.

*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.

*3Remark: In SW-1, SS higher than the target value due to expected reason i) surface water run-off from bare land in Zone A

*4Remark: In SW-1 and SW-5, Total coliform are higher than the target value due to the expected reason-i) the potential expected reason might natural bacteria existed in all area of Zone-A because there are various kind of vegetation and creature such as birds, and small animals in and along the retention canals and retention ponds. 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 was 21 & SW5 was 17 and they were under the reference under target value. It is considered that there is no significant impact to human health.

*5 Remark: In SW-2 and 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 outside of Thilawa SEZ ii) influence by water from the downstream of monitoring points due to flow back by tidal fluctuation.

*6Remark: For reference monitoring points (SW-2 and SW-4), the result of total coliforms is higher than the standard due to two expected reason: i) runoff of animal waste from

the undeveloped area and delivered from local industrial zone and illegal dumping site from outside of Thilawa SEZ in the upstream area ii) delivered from surrounding area by tidal effect.

2)(b) Water Quality – December 2019

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 Refereed International Standard.

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-1	Temperature	°C	27	< 3 (increase)	Max 40		Twice in one year	Instrument Analysis Method	
	pH	-	8.1	6-9	5.0-9.0			Instrument Analysis Method	
	SS	mg/l	28	50	Max 50			APHA 2540D Method	
	DO	mg/l	5.53	-	-	>=4		Instrument Analysis Method	
	BOD	mg/l	4.2	50	Max 20			APHA-5210B Method	
	COD(Cr)	mg/l	22.1	250	Max 70[4*]			APHA 5220D Method	
	Total Coliform*3	MPN/10	1600	400	Max 400	7.5×10³		APHA-9221B Method	
	T-N	0ml	5.7	-	Max 80			HACH Method 10072	
	T-P	mg/l	0.159	2	-			APHA 4500-P E Method	
	Color	mg/l	4.01	-	Max 150			APHA-2120C Method	
	Odor	Co.Pt	2	-	-			APHA-2150B Method	
	HS	Co Pt		1	Max 1			HACH 8131 Method	
	Oil and Grease	mg/l	< 3.1	10	Max 5			APHA-5520B Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	Formaldehyde	mg/l	0.071	-	Max 1			USEPA Method 420.1 Method	
	Phenols	mg/l	<0.002	0.5	Max 1			APHA 3120B	
	Free Chlorine	mg/l	< 0.1	0.2	Max 1			HACH 8131	
	Zinc	mg/l	0.02	2	Max 5			APHA-3120B Method	
	Chromium	mg/l	0.02	0.5	Max 0.5			APHA-3120B Method	
	Arsenic	mg/l	≤ 0.01	0.1	Max 0.25			APHA-3120B Method	
	Copper	mg/l	≤ 0.002	0.5	Max 1			APHA-3120B Method	
	Mercury	mg/l	≤ 0.002	0.01	Max 0.005			APHA-3120B Method	
	Cadmium	mg/l	≤ 0.002	0.1	Max 0.03		Twice in one	APHA-3120B Method	
SW-1	Barium	mg/l	0.016	-	Max 1		year	APHA-3120B Method	
	Selenium	mg/l	≤ 0.01	0.1	Max 0.02			APHA-3120B Method	
	Lead	mg/l	≤ 0.002	0.1	Max 0.2			APHA-3120B Method	
	Nickel	mg/l	0.018	0.5	Max 0.2			HACH 8027 Method	
	Cyanide	mg/l	< 0.002	1	Max 1			APHA 4500 CL G Method	
	Sulphide	mg/l	0.099	1	Max 1			HACH 8131 Method	
	Iron	mg/l	2.632	3.5	Max 3.5			APHA 3120 B ICP Method	
	Total Dissolved Solids	mg/l	226	-	Max 2000			APHA 2540C Method	
	Total Residual Chlorine	mg/l	< 0.1	-	Max 0.2			APHA 4500-CI G Method	
	Chromium (Hexavalent)	mg/l	<0.05	0.1	Max 0.1			Spectrometric Method	
	Ammonia	mg/l	0.205	10	Max 10			HACH 10205 Method	
	Fluoride	mg/l	1.262	20	Max 20			APHA 4110 B Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	Silver		≤ 0.002	0.5	Max 0.5			APHA 3120 B ICP Method	
SW-5	Temperature	°C	28	< 3 (increase)	Max 40		Twice in one year	Instrument Analysis Method	
	pH	-	8.8	6-9	5.0-9.0			Instrument Analysis Method	
	SS*2	mg/l	116	50	Mas 50			APHA 2540D Method	
	DO	mg/l	6.05	-	-			Instrument Analysis Method	
	BOD	mg/l	6.27	50	Max 20			APHA-5210B Method	
	COD(Cr)	mg/l	30.2	250	Max 70#*	>=4		APHA 5220D Method	
	Total Coliform*3	MPN/10	540	400	Max 400			APHA-9221B Method	
	T-N	0ml	1.6	-	Max 80			HACH Method 10072	
	T-P	mg/l	0.123	2	-	7.5×10^3		APHA 4500-P E Method	
	Color	mg/l	4.55	-	Max 150			APHA-2120C Method	
	Odor	Co.Pt	2	-	-			APHA-2150B Method	
	HS	Co Pt		1	Max 1			HACH 8131 Method	
	Oil and Grease	mg/l	<3.1	10	Max 5			APHA-5520B Method	
	Formaldehyde	mg/l	0.090	-	Max 1			USEPA Method 420.1 Method	
	Phenols	mg/l	0.004	0.5	Max 1			APHA 3120B	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-5	Free Chlorine	mg/l	<0.1	0.2	Max 1		Twice in one year	HACH 8131	
	Zinc	mg/l	0.038	2	Max 5			APHA-3120B Method	
	Chromium	mg/l	≤0.002	0.5	Max 0.5			APHA-3120B Method	
	Arsenic	mg/l	≤0.01	0.1	Max 0.25			APHA-3120B Method	
	Copper	mg/l	≤0.002	0.5	Max 1			APHA-3120B Method	
	Mercury	mg/l	≤0.002	0.01	Max 0.005			APHA-3120B Method	
	Cadmium	mg/l	≤0.002	0.1	Max 0.03			APHA-3120B Method	
	Barium	mg/l	0.05	-	Max 1			APHA-3120B Method	
	Selenium	mg/l	≤0.01	0.1	Max 0.02			APHA-3120B Method	
	Lead	mg/l	≤0.002	0.1	Max 0.2			APHA-3120B Method	
	Nickel	mg/l	0.016	0.5	Max 0.2			HACH 8027 Method	
	Cyanide	mg/l	<0.002	1	Max 1			APHA 4500 CL G Method	
	Sulphide	mg/l	0.112	1	Max 1			HACH 8131 Method	
	Iron*6	mg/l	5.27	3.5	Max 3.5			APHA 3120B ICP Method	
	Total Dissolved Solids	mg/l	246	-	Max 2000			APHA 2540C Method	
	Total Residual Chlorine	mg/l	< 0.1	-	Max 0.2			APHA 4500-CI G Method	
	Chromium (Hexavalent)	mg/l	< 0.05	0.1	Max 0.1			Spectrometric Method	
	Ammonia	mg/l	0.526	10	Max 10			HACH 10205 Method	
	Fluoride	mg/l	0.267	20	Max 20			APHA 4110 B Method	
	Silver	mg/l	≤0.002	0.5	Max 0.5			APHA 3120B ICP Method	
	Temperature	°C	30	< 3 (increase)	Max 40			Instrument Analysis Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	pH	-	6.5	6-9	5.0-9.0			Instrument Analysis Method	
	SS	mg/l	2	50	Mas 30		Twice in one	APHA 2540D Method	
	DO	mg/l	5.57	-	-	>=4	year	Instrument Analysis Method	
	BOD	mg/l	4.42	50	Max 20			APHA-5210B Method	
	COD(Cr)	mg/l	26.5	250	Max 70[4*]			APHA 5220D Method	
	Total Coliform	MPN/10	170	400	Max 400	7.5×10^3		APHA-9221B Method	
	T-N	0ml	16.1	-	Max 80			HACH Method 10072	
	T-P	mg/l	0.888	2	-			APHA 4500-P E Method	
	Color	mg/l	4.46	-	Max 150			APHA-2120C Method	
	Odor	Co.Pt	1.4	-	-			APHA-2150B Method	
	HS	-	-	1	Max 1			HACH 8131 Method	
	Oil and Grease	mg/l	< 3.1	10	Max 5			APHA-5520B Method	
SW-6	Formaldehyde	mg/l	0.052	-	Max 1			USEPA Method 420.1 Method	
	Phenols	mg/l	<0.002	0.5	Max 1		Twice in one	APHA 3120B	
	Free Chlorine	mg/l	< 0.1	0.2	Max 1		year	HACH 8131	
	Zinc	mg/l	0.318	2	Max 5			APHA-3120B Method	
	Chromium	mg/l	≤ 0.002	0.5	Max 0.5			APHA-3120B Method	
	Arsenic	mg/l	≤ 0.01	0.1	Max 0.25			APHA-3120B Method	
	Copper	mg/l	≤ 0.002	0.5	Max 1			APHA-3120B Method	
	Mercury	mg/l	≤ 0.002	0.01	Max 0.005			APHA-3120B Method	
	Cadmium	mg/l	≤ 0.002	0.1	Max 0.03			APHA-3120B Method	

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Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-6	Barium	mg/l	≤ 0.002	-	Max 1			APHA-3120B Method	
	Selenium	mg/l	≤ 0.01	0.1	Max 0.02			APHA-3120B Method	
	Lead	mg/l	≤ 0.002	0.1	Max 0.2			APHA-3120B Method	
	Nickel	mg/l	0.016	0.5	Max 0.2			HACH 8027 Method	
	Cyanide	mg/l	< 0.002	1	Max 1			APHA 4500 CL G Method	
	Sulphide	mg/l	0.007	1	Max 1			HACH 8131 Method	
	Iron	mg/l	0.138	3.5	Max 3.5			APHA 3120B ICP Method	
	Total Dissolved Solids	mg/l	476	-	Max 2000			APHA 2540C Method	
	Total Residual Chlorine	mg/l	< 0.1	-	Max 0.2			APHA 4500-CI G Method	
	Chromium (Hexavalent)	mg/l	< 0.05	0.1	Max 0.5			Spectrometric Method	
	Ammonia	mg/l	0.094	10	Max 10			HACH 10205 Method	
	Fluoride	mg/l	1.529	20	Max 20			APHA 4110 B Method	
	Silver		≤ 0.002	0.5	Max 0.5			APHA 3120B ICP Method	
SW-2 (Reference Point)	Temperature	°C	27	< 3 (increase)	Max 40			Instrument Analysis Method	
	pH	-	7.7	6-9	5.0-9.0			Instrument Analysis Method	
	SS	mg/l	20	50	Mas 30			APHA 2540D Method	
	DO	mg/l	3.4	-	-	>=4		Instrument Analysis Method	
	BOD	mg/l	9.42	50	Max 20			APHA-5210B Method	
	COD(Cr)	mg/l	31.2	250	Max 70[4*]			APHA 5220D Method	
	Total Coliform*5	MPN/10	35,000	400	Max 400	7.5×10^3		APHA-9221B Method	
	T-N	0ml	2.3	-	Max 80			HACH Method 10072	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	T-P	mg/l	0.173	2	-			APHA 4500-P E Method	
	Color	mg/l	13.85	-	Max 150		Twice in one	APHA-2120C Method	
	Odor	Co.Pt	1.4	-	-		year	APHA-2150B Method	
	HS	-	-	1	Max 1			HACH 8131 Method	
	Oil and Grease	mg/l	< 3.1	10	Max 5			APHA-5520B Method	
	Formaldehyde	mg/l	0.061	-	Max 1			USEPA Method 420.1 Method	
	Phenols	mg/l	0.008	0.5	Max 1			APHA 3120B	
	Free Chlorine	mg/l	< 0.1	0.2	Max 1			HACH 8131	
	Zinc	mg/l	≤ 0.002	2	Max 5			APHA-3120B Method	
	Chromium	mg/l	≤ 0.002	0.5	Max 0.5			APHA-3120B Method	
SW-2	Arsenic	mg/l	≤ 0.01	0.1	Max 0.25			APHA-3120B Method	
(Reference	Copper	mg/l	≤ 0.002	0.5	Max 1			APHA-3120B Method	
Point)	Mercury	mg/l	≤ 0.002	0.01	Max 0.005			APHA-3120B Method	
	Cadmium	mg/l	≤ 0.002	0.1	Max 0.03			APHA-3120B Method	
	Barium	mg/l	0.018	-	Max 1		Twice in one	APHA-3120B Method	
	Selenium	mg/l	≤ 0.01	0.1	Max 0.02		year	APHA-3120B Method	
	Lead	mg/l	≤ 0.002	0.1	Max 0.2			APHA-3120B Method	
	Nickel	mg/l	0.006	0.5	Max 0.2			HACH 8027 Method	
	Cyanide	mg/l	<0.002	1	Max 1			APHA 4500 CL G Method	
	Sulphide	mg/l	0.039	1	Max 1			HACH 8131 Method	
	Iron	mg/l	1.688	3.5	Max 3.5			APHA 3120B ICP Method	

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Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	Total Dissolved Solids	mg/l	202	-	Max 2000			APHA 2540C Method	
	Total Residual Chlorine	mg/l	< 0.1	-	Max 0.2			APHA 4500-CI G Method	
	Chromium (Hexavalent)	mg/l	< 0.05	0.1	Max 0.5			Spectrometric Method	
	Ammonia	mg/l	1.110	10	Max 10			HACH 10205 Method	
	Fluoride	mg/l	0.207	20	Max 20			APHA 4110 B Method	
	Silver		≤ 0.002	0.5	Max 0.5			APHA 3120B ICP Method	
	Temperature	°C	27	< 3 (increase)	Max 40			Instrument Analysis Method	
	pH	-	7.7	6-9	5.0-9.0			Instrument Analysis Method	
	SS*4	mg/l	382	50	Mas 30		Twice in one	APHA 2540D Method	
SW-4	DO	mg/l	5.85	-	-		year	Instrument Analysis Method	
(Reference	BOD	mg/l	4.86	50	Max 20			APHA-5210B Method	
Point)	COD(Cr)	mg/l	5.4	250	Max 70*4*	>=4		APHA 5220D Method	
	Total Coliform*5	MPN/10	24,000	400	Max 400			APHA-9221B Method	
	T-N	0ml	2.5	-	Max 80			HACH Method 10072	
	T-P	mg/l	< 0.05	2	-	7.5×10^3		APHA 4500-P E Method	
	Color	mg/l	1.49	-	Max 150			APHA-2120C Method	
	Odor	Co.Pt	1	-	-			APHA-2150B Method	
	HS	-	-	1	Max 1			HACH 8131 Method	
	Oil and Grease	mg/l	< 3.1	10	Max 5			APHA-5520B Method	
	Formaldehyde	mg/l	0.051	-	Max 1			USEPA Method 420.1 Method	
	Phenols	mg/l	0.007	0.5	Max 1			APHA 3120B	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-4 (Reference Point)	Free Chlorine	mg/l	<0.1	0.2	Max 1		Twice in one year	HACH 8131	
	Zinc	mg/l	0.05	2	Max 5			APHA-3120B Method	
	Chromium	mg/l	0.044	0.5	Max 0.5			APHA-3120B Method	
	Arsenic	mg/l	≤ 0.01	0.1	Max 0.25			APHA-3120B Method	
	Copper	mg/l	≤ 0.002	0.5	Max 1			APHA-3120B Method	
	Mercury	mg/l	≤ 0.002	0.01	Max 0.005			APHA-3120B Method	
	Cadmium	mg/l	≤ 0.002	0.1	Max 0.03			APHA-3120B Method	
	Barium	mg/l	0.04	-	Max 1			APHA-3120B Method	
	Selenium	mg/l	≤ 0.01	0.1	Max 0.02			APHA-3120B Method	
	Lead	mg/l	≤ 0.002	0.1	Max 0.2			APHA-3120B Method	
	Nickel	mg/l	0.078	0.5	Max 0.2			HACH 8027 Method	
	Cyanide	mg/l	< 0.002	1	Max 1			APHA 4500 CL G Method	
	Sulphide	mg/l	0.072	1	Max 1			HACH 8131 Method	
	Iron*6	mg/l	25.84	3.5	Max 3.5			APHA 3120B ICP Method	
	Total Dissolved Solids*4	mg/l	2036	-	Max 2000			APHA 2540C Method	
	Total Residual Chlorine	mg/l	< 0.1	-	Max 0.2			APHA 4500-CI G Method	
	Chromium (Hexavalent)	mg/l	< 0.05	0.1	Max 0.5			Spectrometric Method	
	Ammonia	mg/l	0.038	10	Max 10			HACH 10205 Method	
	Fluoride	mg/l	0.155	20	Max 20			APHA 4110 B Method	
	Silver		≤ 0.002	0.5	Max 0.5			APHA 3120B ICP Method	
	Temperature	℃	32	None	Max 40			Instrument Analysis Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
GW-1 (Reference Point)	pH	-	8.1	(Available Guideline value determined by MONREC)	5.0-9.0		Twice in one year	Instrument Analysis Method	
	SS	mg/l	2		Max 30			APHA 2540D Method	
	DO	mg/l	5.36		-	>=4		Instrument Analysis Method	
	BOD	mg/l	2.75		Max 20			APHA-5210B Method	
	COD(Cr)	mg/l	5.4		Max 70[4*]			APHA 5220D Method	
	Total Coliform	MPN/10 0ml	5		Max 400	7.5×10^3		APHA-9221B Method	
	T-N	mg/l	0.7		Max 80			HACH Method 10072	
	T-P	mg/l	< 0.05		-			APHA 4500-P E Method	
	Color	mg/l	1.36		Max 150			APHA-2120C Method	
	Odor	Co.Pt	1		-			APHA-2150B Method	
	HS	-	-		Max 1			HACH 8131 Method	
	Oil and Grease	mg/l	< 3.1		Max 5			APHA-5520B Method	
	Formaldehyde	mg/l	0.008		Max 1			USEPA Method 420.1 Method	
	Phenols	mg/l	< 0.002		Max 1			APHA 3120B	
	Free Chlorine	mg/l	< 0.1		Max 1			HACH 8131	
	Zinc	mg/l	≤ 0.002		Max 5			APHA-3120B Method	
	Chromium	mg/l	≤ 0.002		Max 0.5			APHA-3120B Method	
	Arsenic	mg/l	≤ 0.01		Max 0.25			APHA-3120B Method	
	Copper	mg/l	≤ 0.002		Max 1			APHA-3120B Method	
	Mercury	mg/l	≤ 0.002		Max 0.005			APHA-3120B Method	
	Cadmium	mg/l	≤ 0.002		Max 0.03		Twice in one	APHA-3120B Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
GW-1 (Reference Point)	Barium	mg/l	0.056		Max 1		year	APHA-3120B Method	
	Selenium	mg/l	≤ 0.01		Max 0.02			APHA-3120B Method	
	Lead	mg/l	≤ 0.002		Max 0.2			APHA-3120B Method	
	Nickel	mg/l	≤ 0.002		Max 0.2			HACH 8027 Method	
	Cyanide	mg/l	< 0.002		Max 1			APHA 4500 CL G Method	
	Sulphide	mg/l	< 0.005		Max 1			HACH 8131 Method	
	Iron	mg/l	0.730		Max 3.5			APHA 3120B ICP Method	
	Total Dissolved Solids	mg/l	1,426		Max 2000			APHA 2540C Method	
	Total Residual Chlorine	mg/l	< 0.1		Max 0.2			APHA 4500-CI G Method	
	Chromium (Hexavalent)	mg/l	< 0.05		Max 0.5			Spectrometric Method	
	Ammonia	mg/l	0.154		Max 10			HACH 10205 Method	
	Fluoride	mg/l	0.146		Max 20			APHA 4110 B Method	
	Silver	mg/l	≤ 0.002		Max 0.5			APHA 3120B ICP Method	

*1Remark: Referred to the Vietnam Standard (EIA Report), Reference to the Water Quality Monitoring Report, December 2019.

*2Remark: In SW-5, SS are higher than the target value due to the expected reason- i) surface water run-off from bare land in Zone A.

*3Remark: In SW-1 and SW-5, Total coliform are higher than the target value due to the expected reason- i) the potential expected reason might natural bacteria existed in all area of Zone A because there are various kinds of vegetation and creature such as birds and small animals in and along the retention canals and retention pond. 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 was 12 & SW5 was 3.6 and they were under the reference under target value. It is considered that there is no significant impact to human health.

*4Remark: For reference monitoring points SW-4, the result of suspended solids and total dissolved solids are higher than the target value due to two expected reason: i) delivered from upstream area such as natural origin and wastewater from the other industrial area outside of Thilawa SEZ and ii) influence by water from downstream of monitoring

points due to flow back by tidal fluctuation.

*5Remark: For reference monitoring points (SW2 and SW-4), the result of total coliform is higher than the target value due to two expected reason: i) runoff of animal waste from the undeveloped area and delivered from local industrial zone and illegal dumping site from outside of Thilawa SEZ in the upstream area ii) delivered from surrounding area by tidal effect.

*6Remark: For reference monitoring points SW5 and SW-4, the result of iron is higher than the target value due to the expected reason is due to the influence of natural origin (iron can reach out from the soil by run-off). For the living environment item, the standard value for soluble iron level is 10mb/L. As the comparison with the living environment standard value in Japan, iron results are lower than the standard value. Therefore, it can be considered that there is no significant impact on the living environment.

2)(c) Water Quality – February 2020

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 Refereed International Standard.

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-1	pH*3	-	10.2	6-9	5.0-9.0		Once in two months	Instrument Analysis Method	
	SS	ppm	30	50	Max.30			APHA 2540D Method	
	DO	ppm	9.13	-	-	>=4		Instrument Analysis Method	
	COD(Cr)	ppm	42	250	Max.70			APHA 5220D Method	
	BOD	ppm	5.52	50	Max.20			APHA-5210B Method	
	T-N	ppm	3.7	-	Max.80			HACH Method 10072	
	T-P	ppm	0.12	2	-			APHA 4500-P E Method	
	Color	Co.Pt	6.42	-	-	7.5×10^3		APHA 2120C Method	
	Odor	Co.Pt	2	-	-			APHA 2150B Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
	Total coliforms	MPN/100ml	23	400	Max.400			APHA 9221B Method	
SW-5	pH*3	-	9.7	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS*2	ppm	92	50	Max.30			APHA 2540D Method	
	DO	ppm	8.96	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	46	250	Max.70			APHA 5220D Method	
	BOD	ppm	5.37	50	Max.20			APHA-5210B Method	
	T-N	ppm	7.8	-	Max.80			HACH Method 10072	
	T-P	ppm	0.30	2	-			APHA 4500-P E Method	
	Color	Co.Pt	5.71	-	-			APHA 2120C Method	
	Odor	Co.Pt	2	-	-			APHA 2150B Method	
	Total coliforms	MPN/100ml	49	400	Max.400	7.5×10^3		APHA 9221B Method	
SW-6	pH	-	6.9	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS	ppm	2	50	Max.30			APHA 2540D Method	
	DO	ppm	5.69	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	29.9	250	Max.70			APHA 5220D Method	
	BOD	ppm	1.62	50	Max.20			APHA-5210B Method	
	T-N	ppm	13.8	-	Max.80			HACH Method 10072	
	T-P	ppm	0.78	2	-			APHA 4500-P E Method	
	Color	Co.Pt	4.13	-	-			APHA 2120C Method	
	Odor	Co.Pt	1.4	-	-			APHA 2150B Method	
	Total coliforms	MPN/100ml	4.5	400	Max.400	7.5×10^3		APHA 9221B Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-2 (Reference Point)	pH	-	7.9	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS	ppm	44	50	Max.30			APHA 2540D Method	
	DO	ppm	2.03	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	48	250	Max.70			APHA 5220D Method	
	BOD	ppm	3.01	50	Max.20			APHA-5210B Method	
	T-N	ppm	1.9	-	Max.80			HACH Method 10072	
	T-P	ppm	0.11	2	-			APHA 4500-P E Method	
	Color	Co.Pt	22.19	-	-			APHA 2120C Method	
	Odor	Co.Pt	2	-	-			APHA 2150B Method	
	Total coliforms*5	MPN/100ml	24,000	400	Max.400			APHA 9221B Method	
SW-4 (Reference Point)	pH*6	-	9.6	6-9	5.0-9.0	>=4	Once in two months	Instrument Analysis Method	
	SS*4	ppm	64	50	Max.30			APHA 2540D Method	
	DO	ppm	8.79	-	-			Instrument Analysis Method	
	COD(Cr)	ppm	35.3	250	Max.70			APHA 5220D Method	
	BOD	ppm	6.27	50	Max.20			APHA-5210B Method	
	T-N	ppm	4	-	Max.80			HACH Method 10072	
	T-P	ppm	< 0.05	2	-			APHA 4500-P E Method	
	Color	Co.Pt	7.85	-	-			APHA 2120C Method	
	Odor	Co.Pt	1	-	-			APHA 2150B Method	
	Total coliforms	MPN/100ml	140	400	Max.400			APHA 9221B Method	
	pH	-	8.2	None	None	5.5~9.0	Once in two	Instrument Analysis Method	

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*1Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
GW-1 (Reference Point)	SS	ppm	6	(Available Guideline value determined by MONREC)	(Available Guideline Value determined by MOI)	50	months	APHA 2540D Method	
	DO	ppm	8.10			>=4		Instrument Analysis Method	
	COD(Cr)	ppm	5.7			60		APHA 5220D Method	
	BOD	ppm	0.86			15		APHA-5210B Method	
	T-N	ppm	1.8			-		HACH Method 10072	
	T-P	ppm	0.09			-		APHA 4500-P E Method	
	Color	Co.Pt	1.35			-		APHA 2120C Method	
	Odor	Co.Pt	1			-		APHA 2150B Method	
	Total coliforms	MPN/100ml	23			7.5×10^3		APHA 9221B Method	

[1]*Remark: Referred to the Vietnam Standard (EIA Report), Reference to the Water Quality Monitoring Report, February 2020.

*[2]Remark: In SW-5, suspended solids are higher than the standard due to the expected reason- i) surface water run-off from bare land in Zone A.

*[3]Remark: In SW1, SW5 pH value is higher than the standard due to the expected reason i) might be due to the water polluted with concrete washout water discharge from construction sites of Zone A, (ii) might be due to water storage for a long period of time and presence of algae in the stored water.

*[4]Remark: For reference monitoring points SW-4, the result of suspended solids is higher than the standard due to two expected reason: i) delivered from upstream area such as natural origin and wastewater from the local industrial zone which outside of Thilawa SEZ and ii) influence by water from downstream of monitoring points due to flow back by tidal fluctuation.

*[5]Remark: For reference monitoring points SW-2, the result of total coliforms is higher than the standard due to two expected reason: i) runoff of animal waste from the undeveloped area and delivered from local industrial zone and illegal dumping site from outside of Thilawa SEZ in the upstream area and ii) delivered from surrounding area by tidal effect.

*[6]Remark: For reference monitoring points SW4, the results of pH value is higher than the standard due to i) might be wastewater discharged from of local industrial zone, and ii) might be domestic wastewater discharge that contains detergents and soap-based products.

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. There is not much operation stage industry in current and monitoring will start after consult with environmental expert.

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)	59	57-62	N/A	75		One time each in dry and wet season	Sound Level Meter	
	Leq(eve)	dB(A)	56	53-58		70				

*Remark: Referred to the Target Noise Standard (Thilawa SEZ Zone-A EIA Report) and Reference to Noise and Vibration Monitoring Report (February 2020)

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)	63	58-67	N/A	70		One time each in dry and wet season	Sound Level Meter	
	Leq(eve)	dB(A)	55	52-57		65				
	Leq(night)	dB(A)	52	46-59		60				
NV-3	Leq(day)	dB(A)	51	42-57	N/A	70			Sound level Meter	
	Leq(eve)	dB(A)	51	45-55		65				
	Leq(night)	dB(A)	52	46-58		60				

*Remark: Referred to the Target Noise Standard (Thilawa SEZ Zone-A EIA Report) and Reference to Noise and Vibration Monitoring Report (February 2020)

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.

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No.	Date	Description	No. of Kgs/L	Remarks
1	October 2019	General Waste Disposal	2440 kg	Golden Dowa Eco-system Myanmar Co.,Ltd
2	November 2019	General Waste Disposal	2080 kg	Golden Dowa Eco-system Myanmar Co.,Ltd
3	December 2019	General Waste Disposal	800 kg	Golden Dowa Eco-system Myanmar Co.,Ltd
4	January 2020	General Waste Disposal	3120 kg	Golden Dowa Eco-system Myanmar Co.,Ltd
5	February 2020	General Waste Disposal	1580 kg	Golden Dowa Eco-system Myanmar Co.,Ltd
6	March 2020	General Waste Disposal	1 L	YCDC (Kyawt Than)

Remark: Attached general waste disposal record (Admin Complex Compound) in appendix.

Remark: Admin complex compound waste disposal reported in the Operation phase, Environmental Monitoring Report because the waste from common area of Thilawa SEZ is storing in the admin complex trash storage. Each locator will submit according to ECPP approval for the waste disposal record directly to the Environmental Section, One Stop Service Center, Thilawa SEZ Management Committee.

6) (a) Ground Subsidence and Hydrology- October 2019

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
8-October -2019	-	m3/week	+7.136	m	Three times per month	
10- October -2019	-	m3/week	+7.135	m		
30- October 2019	-	m3/week	+7.135	m		

*** Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix. There is no ground water consumption in Zone-A industrial area and will monitor and descript the water consumption quantity if using the tube well.**

(b) Ground Subsidence and Hydrology- November 2019

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
8-November-2019	-	m3/week	+7.135	m	Twice a month	
28-November-2019	-	m3/week	+7.135	m		

*** Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix.**

(c) Ground Subsidence and Hydrology- December 2019

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
13-December-2019	-	m3/week	+7.135	m	Three times per month	
20- December-2019	-	m3/week	+7.135	m		
30- December-2019	-	m3/week	+7.135	m		

*** Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix.**

(d) Ground Subsidence and Hydrology- January 2020

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
10-January-2020	-	m3/week	+7.135	m	Three times per month	
20-January-2020	-	m3/week	+7.136	m		
31-January 2020	-	m3/week	+7.135	m		

*** Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix.**

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(e) Ground Subsidence and Hydrology- February 2020

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
7-February-2020	-	m3/week	+7.134	m	Twice a month	
28- February-2020	-	m3/week	+7.135	m		

* Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix.

(f) Ground Subsidence and Hydrology- March 2020

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
9-March-2020	-	m3/week	+7.136	m	Twice a month	
18- March-2020	-	m3/week	+7.136	m		

* Remarks: Attached ground subsidence monitoring status (Operation Phase) in appendix.

7) Offensive Odor (only operation phase) Not Applicable at Construction Phase Report

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 Not Applicable at Construction Phase Report

- 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
An accident case was happened in front of B-11 site on 6th November 2019. Long Vehicle reduced speed to approach slow bump. Behind this long vehicle was followed by sand truck. Sand Truck cannot control speed and crashed badly.	MJTD took action as follow: - Put barrier gate not to happen traffic jam on main road
An accident case was happened in front of Gate-2 on 18th November 2019. Two workers riding motorbike and one of company ferry car driving with high speed. Motorbike turn right without showing signal and crashed with high speed driving company ferry car.	Responsible person sent injured person to hospital.
An accident case was happened in front of A-20 site on 24th November 2019. Two dump trucks came the same way from Gate-2 and one dump trucks approach right side then couldn't control acceleration and crashed with right side dump truck.	MJTD took action as follow: - Remind to drive carefully in future and explained the traffic rule.
An accident case was happened in front of Main Gate on 11 January 2020. Long vehicle carried steel reels with steel reel string. At that time steel reel string are broken and steel reel were fell down and accidently hit platform and road surface.	MJTD took action as follow: - Issue the remind letter and ask them to submit the accident report, preventive action and repair the damaged road.

Contents of Incidents	Countermeasures
An accident case was happened in front of Ball Asia on 5 February 2020. Car from Ball Asia was hit with motorbike. Two motorbike men got a little injury.	MJTD took action as follow: - Contact to responsible person and remind them to be more careful drive and explain traffic rule. - Sent injured person to clinic
An accident was happened near Koyorad Factory on 21 March 2020 due to one tyre was broken. There is no injury person in this case.	MJTD took action as follow: - Ask driver to drive carefully and do the regular maintenance including tyre.

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

End of Document

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix

Water and Waste Water Monitoring Report

October, 2019

WATER QUALITY MONITORING REPORT

FOR DEVELOPMENT OF INDUSTRIAL AREA

IN THILAWA SEZ ZONE A

(OPERATION STAGE)

(Bi-Monthly Monitoring)

October 2019

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 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 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 which is located in the monastery compound. Location of sampling points for water quality monitoring is shown in Figure 1.1-1.

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 so as 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 carried out at three locations (SW-1, SW-4 and SW-6) where can be measured by Current Meter. 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	BOD $_{(5)}$	○	○	○	○	○	○	Laboratory analysis
5	COD $_{(Cr)}$	○	○	○	○	○	○	Laboratory analysis
6	Total Nitrogen	○	○	○	○	○	○	Laboratory analysis
7	Suspended Solids	○	○	○	○	○	○	Laboratory analysis
8	Total Coliform	○	○	○	○	○	○	Laboratory analysis
9	Total Phosphorous	○	○	○	○	○	○	Laboratory analysis
10	Color	○	○	○	○	○	○	Laboratory analysis
11	Odor	○	○	○	○	○	○	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. 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 due to flow back by tidal fluctuation. In addition, it seems that a part of wastewater 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, construction site of Zone B and Zone A, 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 domestic wastewater from surrounding. 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 flow back 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 depth of the tube well is about 62 m below ground level. 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 conducted by using the on-site instrument "Tamaya 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	Suspended Solids (SS)	APHA 2540 D (Dry at 103-105°C Method)
4	Dissolved Oxygen (DO)	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
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	Total Nitrogen (T-N)	HACH Method 10072(TNT Persulfate Digestion Method)
9	Total Phosphorous (T-P)	APHA 4500-P E (Ascorbic Acid Method)
10	Color	APHA 2120C (Spectrophotometric Method)
11	Odor	APHA 2150 B (Threshold Odor Test)
12	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)
13	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
14	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
15	Total Dissolved Solids	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)
16	Escherichia Coli	APHA 9221 F (Escherichia Coli Procedure Using Fluorogenic Substrate)
17	Flow Rate	Detection of Electromagnetic Elements (Real-time measurement by UC-200V Digital Current Meters)

Source: Myanmar Koei International Ltd.

2.4 Monitoring Period

Water quality and water flow rate monitoring conducted on 21 October 2019 and sampling time is shown in Table 2.4-1 to avoid tidal effect. The tide record for Yangon River, Myanmar on 21 October 2019 is shown in Table 2.4-2.

Table 2.4-1 Sampling Time of Each Station

No.	Station	Sampling Time
1	SW-1	21/10/2019 10:07
2	SW-2	21/10/2019 14:24
3	SW-4	21/10/2019 09:09
4	SW-5	21/10/2019 10:42
5	SW-6	21/10/2019 11:03
6	GW-1	21/10/2019 15:25

Source: Myanmar Koei International Ltd.

Table 2.4-2 Tide Record for Yangon River, Myanmar

Date	Time	Height	Tide Conditions
21/10/2019	03:29	1.71	Low Tide
	08:34	5.10	High Tide
	16:17	1.46	Low Tide
	21:41	4.68	High Tide

Source: Myanmar Port Authority, Tide Table for the Yangon River and Elephant Point, 2019.

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, Appendix-3 and Appendix-4. 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 Water Quality at the Outlet of Sewage Treatment Plant of Industrial Area of Thilawa SEZ and at the Point before Discharging to Creek

As the comparison with the target value, the results of suspended solids (SS), total coliform and iron exceeded than the target values.

As for the result of SS, the result at the outlet of the centralized STP (SW-6) complied with the target value. It implied 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) before discharging to creek, exceeded the target value due to the surface water run-off from bare land in Zone A.

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 monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the target value due to the expected reason; the potential expected reason might be natural bacteria existed in all area of Zone A because there are various kinds of vegetation and creature such as birds, and small animals in and along the retention canals and retention ponds.

Since the composition of the total coliform include bacteria from natural origin, and even after 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 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) 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) complied with the target value. 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 pond (SW-1) slightly exceeded the target value. The possible reason may be due to the influence of natural origin (iron can reach out from soil by run-off). In Yangon, soil is naturally rich in iron. 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 the comparison with the living environment standard value in Japan, iron result in SW-1 is lower than the standard value. 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 (Reference Value for Self-Monitoring)
1	Temperature	°C	31	32	30	≤ 35
2	pH	-	8.7	8.2	6.9	6~9
3	Suspended Solid (SS)	mg/L	96.00	46.00	4.00	50
4	Dissolved Oxygen (DO)	mg/L	8.94	6.55	5.84	-
5	BOD (5)	mg/L	9.03	5.32	2.33	30
6	COD (Cr)	mg/L	25.3	37.2	6	125
7	Total Coliform	MPN/ 100ml	930	820	240	400
8	Total Nitrogen (T-N)	mg/L	5	1.8	11.3	80
9	Total Phosphorous (T-P)	mg/L	0.087	0.197	0.439	2
10	Color	TCU (True Color Unit)	4.52	4.59	2.82	150
11	Odor	TON (Threshold Odor Number)	1	1	1	-
12	Oil and Grease	mg/L	< 3.1	< 3.1	< 3.1	10
13	Mercury	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.005
14	Iron	mg/L	3.710	2.630	0.068	3.5
15	Total Dissolved Solids	mg/L	410	186	506	2000
16	Escherichia Coli	MPN/100ml (SW)	9.2	2.0	-	(1000)* (CFU/100ml)
17	Flow Rate	m^3/s	0.02	-	0.02	-

Note: Red color means exceeded value than target value.
*Note: Based on the water utilization at discharged creek, water quality C of 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 for Comparison with Discharged Points and Baseline of Discharged Creek

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

As the comparison with the target value, the results of Suspended Solid (SS), total coliform and iron exceeded than the target value.

As for the result of SS, results at the surface water monitoring points (SW-2 and SW-4) exceeded the target value due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which outside of Thilawa SEZ, and ii) influence by water from the downstream of monitoring points due to flow back by tidal fluctuation.

As for the result of total coliform of surface water, results at surface water monitoring points (SW-2 and SW-4) exceeded the target value due to two expected reasons; i) runoff of animal waste from the undeveloped area and delivered from local industrial zone and illegal dumping site from outside of Thilawa SEZ in the upstream area, and ii) delivered from surrounding area by tidal effect.

As for the result of iron, the result at the monitoring point of surface water monitoring point (SW-2 and SW-4) exceeded the target value. The possible reasons may due to the influence of natural origin (iron can reach out from soil by run-off). In Yangon, soil is naturally rich in iron. However, since it cannot reach to the conclusion of what is the reason for this result, the periodic monitoring will be necessary.

Table 2.5-2 Result of Water Quality Survey for Reference Monitoring Points for Comparison with Discharging Points and Baseline of Discharged Creek

No.	Parameters	Unit	SW-2	SW-4	GW-1	Target Value (Reference Value for Self-Monitoring)
1	Temperature	˚C	31	29	29	≤ 35
2	pH	-	7.9	7.6	8.2	6~9
3	Suspended Solid (SS)	mg/L	70.00	194.00	2.00	50
4	Dissolved Oxygen (DO)	mg/L	4.75	7.43	5.61	-
5	BOD (5)	mg/L	6.81	8.52	7.22	30
6	COD (Cr)	mg/L	29.3	12.5	9.4	125
7	Total Coliform	MPN/ 100ml	>160000	35000	49	400
8	Total Nitrogen (T-N)	mg/L	2.4	2.9	1.5	80
9	Total Phosphorous (T-P)	mg/L	0.091	0.098	0.09	2
10	Color	TCU (True Color Unit)	12.20	3.78	1.16	150
11	Odor	TON (Threshold Odor Number)	1	1	1	-
12	Oil and Grease	mg/L	< 3.1	< 3.1	< 3.1	10
13	Mercury	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.005
14	Iron	mg/L	4.052	11.186	0.478	3.5
15	Total Dissolved Solids	mg/L	196	278	1390	2000
16	Escherichia Coli	MPN/100ml* (SW)	-	-	-	(1,000)* (CFU/100ml)
		MPN/100ml** (GW)	-	-	< 1.8	(100)** (MPN/100ml)
17	Flow Rate	m^3/s	-	0.51	-	-

Note: Red color means the exceeded results than target value.
*Note: Based on the water utilization at discharged creek, water quality C of 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.
**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: 2008/BTNMT) is set as a reference value of self-monitoring for ground water monitoring.
Source: Myanmar Koei International Ltd.

CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

As for the result of SS, total coliform and iron at the outlet of the centralized STP (SW-6) complied with the target value. It may prove that effluent from each locator was treated well by the STP. On the other hand, the parameters of SS, results at the monitoring points of retention pond (SW-1) before discharging to creek, exceeded the target value due to the expected reason; surface water run-off from bare land in Zone A.

Moreover, the parameters of total coliform at retention pond (SW-1) and retention canal (SW-5) exceeded the target values in this period for main discharged points of Thilawa SEZ Zone A. In addition, according to the result of self-monitoring of E. coli at retention pond (SW-1) and (SW-5), result was under the reference value. Therefore, although the target value of total coliform was exceeded at monitoring point (SW-1) and (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 pond (SW-1) slightly exceeded the target value. The possible reasons maybe due to the influence of natural origin (iron can reach out from soil by run-off). In Yangon, soil is naturally rich in iron. As for the result of the iron, the result at the monitoring point of retention pond (SW-1) exceeded the target value may be due to the influence of natural origin (iron can reach out from the soil 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 the comparison with the living environment standard value.

As for parameters of SS, total coliform and iron in surface water exceeded the target values at reference monitoring points. The expected reasons for exceeding the target value of SS at (SW-2 and SW-4) are delivered from upstream area such as natural origin and wastewater from local industrial zone which is outside of Thilawa SEZ and influence by water from the downstream due to flow back by tidal fluctuation.

The expected reasons for exceeding the target values of total coliform at (SW-2 and SW-4) are by natural origin (natural bacteria existed).

The expected reasons for exceeding the target values of iron at SW-2 and SW-4 may be due to the influence of natural origin (iron can reach out from soil by run-off). In Yangon, soil is naturally rich in iron. However, since it cannot reach to the conclusion of what is the reason for this result, the periodic monitoring will be necessary.

As for future subject for main discharged points of Thilawa SEZ Zone A, the following action may be taken to achieve the target levels of SS, total coliform, iron and appropriate water quality monitoring:
- To continue monitoring Escherichia coli (E. coli) level to identify health impact by coliform bacteria; and
- To monitor the possibility of the overflow water from construction sites.
- To monitor the possibility of the domestic wastewater from construction sites.

End of the Document

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

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

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

APPENDIX-2 LABORATORY RESULTS

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

DOWA

GOLDEN DOWA ECO-SYSTEM MYANMAR CO., LTD.
Lot No E1. Thilawa SEZ Zone A, Yangon Region, Myanmar.
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motivate our planet
Doc No: GEM-LB-R001E/00
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Report No. : GEM-LAB-201910188
Revision No. : 1
Report Date : 31 October, 2019
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-1-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910167 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	96.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	9.03	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	25.3	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	930	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	5	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.087	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.52	0.00
8	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

Analysed By :

Ni Ni Aye Lwin
Assistant Manager

LAB
Oct 31, 2019
GEM

Approved By :

Tomoya Suzuki Oct 31, 2019
Director

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED
MJTD

DOWA

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Doc No: GEM-LB-R004E/00
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Report No. : GEM-LAB-201910189
Revision No. : 1
Report Date : 31 October, 2019
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-5-1021 — Sampling Date : 21 October, 2019
Sample No. : W-1910168 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	46.00	_
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	5.32	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	37.2	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	820	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.8	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.197	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.59	0.00
8	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

Analysed By :

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Assistant Manager

LAB Oct 31, 2019 GEM

Approved By :

Tomoya Suzuki Oct 31, 2019
Director

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

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Report No. : GEM-LAB-201910190
Revision No. : 1
Report Date : 31 October, 2019
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-6-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910169 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	4.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	2.33	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	6	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	240	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	11.3	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.439	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	2.82	0.00
8	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

Analysed By :

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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-201910191
Revision No. : 1
Report Date : 31 October, 2019
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-2-1021 — Sampling Date : 21 October, 2019
Sample No. : W-1910170 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	70.00	_
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	6.81	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	29.3	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	> 160000	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	2.4	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.091	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	12.20	0.00
8	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0
9	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
10	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.008	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

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Report No. : GEM-LAB-201910192
Revision No. : 1
Report Date : 31 October, 2019
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-4-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910171 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	194.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	8.52	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	12.5	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	35000	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	2.9	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.098	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	3.78	0.00
8	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0
9	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
10	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.022	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

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Report No. : GEM-LAB-201910193
Revision No. : 1
Report Date : 31 October, 2019
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-1-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910172 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	2.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	7.22	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	9.4	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	49	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.5	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.09	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	1.16	0.00
8	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

Analysed By :

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Tomoya Suzuki Oct 31, 2019
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APPENDIX-3 LABORATORY RESULT OF ESCHERICHIA COLI (SELF-MONITORING)

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

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Report No. : GEM-LAB-201910165
Revision No. : 1
Report Date : 31 October, 2019
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-1-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910154 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	9.2	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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Report No. : GEM-LAB-201910166
Revision No. : 1
Report Date : 31 October, 2019
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-5-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910155 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	2.0	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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FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGING POINTS AND BASELINE OF DISCHARGED CREEK

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Report No. : GEM-LAB-201910168
Revision No. : 1
Report Date : 31 October, 2019
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-1-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910157 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	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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APPENDIX-4 LABORATORY RESULTS (SELF-MONITORING)

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

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Report No. : GEM-LAB-201910180
Revision No. : 1
Report Date : 31 October, 2019
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-1-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910159 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	410	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	3.710	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

Analysed By :

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Director

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Report No. : GEM-LAB-201910181
Revision No. : 1
Report Date : 31 October, 2019
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-5-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910160 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	186	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	2.630	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

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Report No. : GEM-LAB-201910182
Revision No. : 1
Report Date : 31 October, 2019
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-6-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910161 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	506	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.068	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

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

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Report No. : GEM-LAB-201910183
Revision No. : 1
Report Date : 31 October, 2019
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-2-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910162 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	196	-
2	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
3	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	4.052	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

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Report No. : GEM-LAB-201910184
Revision No. : 1
Report Date : 31 October, 2019
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-4-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910163 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	278	-
2	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
3	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	11.186	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

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Oct 31, 2019
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Report No. : GEM-LAB-201910185
Revision No. : 1
Report Date : 31 October, 2019
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-1-1021 Sampling Date : 21 October, 2019
Sample No. : W-1910164 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 21 October, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	1390	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.478	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

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MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED
MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix

Water and Waste Water Monitoring Report

December, 2019

WATER QUALITY MONITORING REPORT

FOR DEVELOPMENT OF INDUSTRIAL AREA

IN THILAWA SEZ ZONE A

(OPERATION STAGE)

(Bi-Annually Monitoring)

December 2019

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 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 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 which is located in the monastery compound. Location of sampling points for water quality monitoring is shown in Figure 1.1-1.

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 so as 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 carried out at four locations (SW-1, SW-4, SW-5 and SW-6) where can be measured by Current Meter. 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	BOD (5)	○	○	○	○	○	○	Laboratory analysis
5	COD (Cr)	○	○	○	○	○	○	Laboratory analysis
6	Total Nitrogen	○	○	○	○	○	○	Laboratory analysis
7	Suspended Solids	○	○	○	○	○	○	Laboratory analysis
8	Total Coliform	○	○	○	○	○	○	Laboratory analysis
9	Total Phosphorous	○	○	○	○	○	○	Laboratory analysis
10	Color	○	○	○	○	○	○	Laboratory analysis
11	Odor	○	○	○	○	○	○	Laboratory analysis
12	Zinc	○	○	○	○	○	○	Laboratory analysis
13	Arsenic	○	○	○	○	○	○	Laboratory analysis
14	Chromium	○	○	○	○	○	○	Laboratory analysis
15	Cadmium	○	○	○	○	○	○	Laboratory analysis
16	Selenium	○	○	○	○	○	○	Laboratory analysis
17	Lead	○	○	○	○	○	○	Laboratory analysis
18	Copper	○	○	○	○	○	○	Laboratory analysis
19	Barium	○	○	○	○	○	○	Laboratory analysis
20	Nickel	○	○	○	○	○	○	Laboratory analysis
21	Cyanide	○	○	○	○	○	○	Laboratory analysis
22	Total Cyanide	○	○	○	○	○	○	Laboratory analysis
23	Free Chlorine	○	○	○	○	○	○	Laboratory analysis
24	Sulphide	○	○	○	○	○	○	Laboratory analysis
25	Formaldehyde	○	○	○	○	○	○	Laboratory analysis
26	Phenols	○	○	○	○	○	○	Laboratory analysis
27	Total Residual Chlorine	○	○	○	○	○	○	Laboratory analysis
28	Chromium (Hexavalent)	○	○	○	○	○	○	Laboratory analysis
29	Ammonia	○	○	○	○	○	○	Laboratory analysis
30	Fluoride	○	○	○	○	○	○	Laboratory analysis
31	Silver	○	○	○	○	○	○	Laboratory analysis
32	Oil and Grease	○	○	○	○	○	○	Laboratory analysis
33	Total Dissolved Solids	○	○	○	○	○	○	Laboratory analysis
34	Iron	○	○	○	○	○	○	Laboratory analysis
35	Mercury	○	○	○	○	○	○	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 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 and water flow rate measurement.
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. 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 due to flow back by tidal fluctuation. In addition, it seems that a part of wastewater 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, construction site of Zone B and Zone A, 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 domestic wastewater from surrounding. 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 flow back 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 conducted by using the on-site instrument "Tamaya Digital Current Meter".

Table 2.3-1 Analytic Method for Water Quality

No.	Parameter	Method
1	Temperature	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
2	pH	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
3	Suspended Solids (SS)	APHA 2540 D (Dry at 103-105°C Method)
4	Dissolved Oxygen (DO)	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
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	Total Nitrogen (T-N)	HACH Method 10072(TNT Persulfate Digestion Method)
9	Total Phosphorous (T-P)	APHA 4500-P E (Ascorbic Acid Method)
10	Color	APHA 2120C (Spectrophotometric Method)
11	Odor	APHA 2150 B (Threshold Odor Test)
12	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)
13	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
14	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
15	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
16	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
17	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
18	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
19	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
20	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
21	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
22	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
23	Cyanide	HACH 8027 (Pyridine-Pyrazalone Method)
24	Total Cyanide	Distillation process: APHA 4500-CN-C. Total Cyanide after Distillation, Determine cyanide Concentration Process: HACH 8027 (Pyridine – Pyrazalone Method)
25	Free Chlorine	APHA 4500-CL G (DPD Colorimetric Method)
26	Sulphide	HACH 8131 (USEPA Methylene Blue Method)
27	Formaldehyde	HACH 8110 (MBTH Method)
28	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4 AAP With Distillation))
29	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
30	Total Dissolved Solids	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)
31	Total Residual Chlorine	APHA 4500-CL G (DPD Colorimetric Method)
32	Chromium (Hexavalent)	ISO 11083:1994 (Determination of chromium (VI) Spectrometric method using 1,5-diphenylcarbazide)
33	Ammonia	HACH Method 10205 (Silicylate TNT Plus Method)
34	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)
35	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
36	Escherichia Coli	APHA 9221 F (Escherichia Coli Procedure Using Fluorogenic Substrate)
37	Flow Rate	Detection of Electromagnetic Elements (Real-time measurement by UC-200V Digital Current Meters)

Source: Myanmar Koei International Ltd.

2.4 Monitoring Period

Water quality and water flow rate monitoring conducted on 18 December 2019 and sampling time is shown in Table 2.4-1 to avoid tidal effect. The tide record for Yangon River, Myanmar on 18 December 2019 is shown in Table 2.4-2.

Table 2.4-1 Sampling Time of Each Station

No.	Station	Sampling Time
1	SW-1	18/12/2019 09:59
2	SW-2	18/12/2019 11:28
3	SW-4	18/12/2019 09:27
4	SW-5	18/12/2019 11:07
5	SW-6	18/12/2019 10:32
6	GW-1	18/12/2019 12:49

Source: Myanmar Koei International Ltd.

Table 2.4-2 Tide Record for Yangon River, Myanmar

Date	Time	Height	Tide Conditions
18/12/2019	03:31	1.07	Low Tide
	08:29	5.13	High Tide
	16:17	0.68	Low Tide
	21:25	4.99	High Tide

Source: Myanmar Port Authority, Tide Table for the Yangon River and Elephant Point, 2019.

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 and Appendix-3. 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 Water Quality at the Outlet of Sewage Treatment Plant of Industrial Area of Thilawa SEZ and at the Point before Discharging to Creek

As the comparison with the target value, the results of suspended solids (SS), total coliform and iron exceeded than the target values.

As for the result of SS, the result at the outlet of the centralized STP (SW-6) complied with the target value. It implied that effluents from each locator was treated well by the STP. On the other hand, results at the monitoring point of retention canal (SW-5) before discharging to creek, exceeded the target value due to the surface water run-off from bare land in Zone A.

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 monitoring points of retention pond (SW-1) and retention canal (SW-5) exceeded the target value due to the expected reason; the potential expected reason might be natural bacteria existed in all area of Zone A because there are various kinds of vegetation and creature such as birds, and small animals in and along the retention ponds and retention canals.

Since the composition of the total coliform include bacteria from natural origin, and even after 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 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) 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) complied with the target value. 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 target value may be due to the influence of natural origin (iron can reach out from the soil 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 the comparison with the living environment standard value in Japan, iron result in SW-5 is lower than the standard value. 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 (Reference Value for Self-Monitoring)
1	Temperature	˚C	27	28	30	≤ 35
2	pH	-	8.1	8.8	6.5	6~9
3	Suspended Solid (SS)	mg/L	28.00	116.00	2.00	50
4	Dissolved Oxygen (DO)	mg/L	5.53	6.05	5.57	-
5	BOD (5)	mg/L	4.20	6.27	4.42	30
6	COD (Cr)	mg/L	22.1	30.2	26.5	125
7	Total Coliform	MPN/ 100ml	1600	540	170	400
8	Total Nitrogen (T-N)	mg/L	5.7	1.6	16.1	80
9	Total Phosphorous (T-P)	mg/L	0.159	0.123	0.888	2
10	Color	TCU (True Color Unit)	4.01	4.55	4.46	150
11	Odor	TON (Threshold Odor Number)	2	2	1.4	-
12	Oil and Grease	mg/L	< 3.1	< 3.1	< 3.1	10
13	Mercury	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.005
14	Zinc	mg/L	0.02	0.038	0.318	2
15	Arsenic	mg/L	≤ 0.01	≤ 0.01	≤ 0.01	0.1
16	Chromium	mg/L	≤ 0.002	0.002	≤ 0.002	0.5
17	Cadmium	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.03
18	Selenium	mg/L	≤ 0.01	≤ 0.01	≤ 0.01	0.02
19	Lead	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.1
20	Copper	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.5
21	Barium	mg/L	0.016	0.05	≤ 0.002	1
22	Nickel	mg/L	0.018	0.016	0.016	0.2
23	Cyanide	mg/L	< 0.002	< 0.002	< 0.002	0.1
24	Total Cyanide	mg/L	0.017	< 0.002	0.008	1
25	Free Chlorine	mg/L	< 0.1	< 0.1	< 0.1	1
26	Sulphide	mg/L	0.099	0.112	0.007	1
27	Formaldehyde	mg/L	0.071	0.090	0.052	1
28	Phenols	mg/L	< 0.002	0.004	< 0.002	0.5
29	Iron	mg/L	2.632	5.270	0.138	3.5
30	Total Dissolved Solids	mg/L	226	246	476	2000
31	Total Residual Chlorine	mg/L	< 0.1	< 0.1	< 0.1	0.2
32	Chromium (Hexavalent)	mg/L	< 0.05	< 0.05	< 0.05	0.1
33	Ammonia	mg/L	0.205	0.526	0.094	10
34	Fluoride	mg/L	1.262	0.267	1.529	20
35	Silver	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.5
36	Escherichia Coli	MPN/100ml (SW)	4.0	2.0	-	(1000)* (CFU/100ml)
37	Flow Rate	m^3/s	2.89	0.30	0.03	-

Note: Red color means exceeded value than target value.

*Note: Based on the water utilization at discharged creek, water quality C of 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 for Comparison with Discharged Points and Baseline of Discharged Creek

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

As the comparison with the target value, the results of Suspended Solid (SS), Total Dissolved Solids (TDS), total coliform and iron exceeded than the target value.

As for the result of SS and TDS, results at the surface water monitoring point (SW-4) exceeded the target value due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which outside of Thilawa SEZ, and ii) influence by water from the downstream due to flow back by tidal fluctuation.

As for the result of total coliform of surface water, results at surface water monitoring points (SW-2 and SW-4) exceeded the target value due to two expected reasons; i) runoff of animal waste from the undeveloped area and delivered from local industrial zone and illegal dumping site from outside of Thilawa SEZ in the upstream area, and ii) delivered from surrounding area by tidal effect.

As for the result of iron, the result at the monitoring point of surface water monitoring point (SW-4) exceeded the target value. The possible reasons may be due to the influence of natural origin (iron can reach out from soil by run-off). In Yangon, soil is naturally rich in iron. However, since it cannot reach to the conclusion of what is the reason for this result, the periodic monitoring will be necessary.

Table 2.5-2 Result of Water Quality Survey for Reference Monitoring Points for Comparison with Discharging Points and Baseline of Discharged Creek

No.	Parameters	Unit	SW-2	SW-4	GW-1	Target Value (Reference Value for Self-Monitoring)
1	Temperature	˚C	27	27	32	≤ 35
2	pH	-	7.7	8.1	8.1	6~9
3	Suspended Solid (SS)	mg/L	20.00	382.00	2.00	50
4	Dissolved Oxygen (DO)	mg/L	3.40	5.85	5.36	-
5	BOD (5)	mg/L	9.42	4.86	2.75	30
6	COD (Cr)	mg/L	31.2	5.4	6.9	125
7	Total Coliform	MPN/ 100ml	35000	24000	5	400
8	Total Nitrogen (T-N)	mg/L	2.3	2.5	0.7	80
9	Total Phosphorous (T-P)	mg/L	0.173	< 0.05	0.093	2
10	Color	TCU (True Color Unit)	13.85	1.49	1.36	150
11	Odor	TON (Threshold Odor Number)	1.4	1	1	-
12	Oil and Grease	mg/L	< 3.1	< 3.1	< 3.1	10
13	Mercury	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.005
14	Zinc	mg/L	≤ 0.002	0.05	≤ 0.002	2
15	Arsenic	mg/L	≤ 0.01	≤ 0.01	≤ 0.01	0.1
16	Chromium	mg/L	≤ 0.002	0.044	≤ 0.002	0.5
17	Cadmium	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.03
18	Selenium	mg/L	≤ 0.01	≤ 0.01	≤ 0.01	0.02
19	Lead	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.1
20	Copper	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.5
21	Barium	mg/L	0.018	0.04	0.056	1
22	Nickel	mg/L	0.006	0.078	≤ 0.002	0.2
23	Cyanide	mg/L	< 0.002	< 0.002	< 0.002	0.1
24	Total Cyanide	Mg/L	< 0.002	< 0.002	< 0.002	1
25	Free Chlorine	mg/L	< 0.1	< 0.1	< 0.1	1
26	Sulphide	mg/L	0.039	0.072	< 0.005	1
27	Formaldehyde	mg/L	0.061	0.051	0.008	1
28	Phenols	mg/L	0.008	0.007	< 0.002	0.5
29	Iron	mg/L	1.688	25.840	0.730	3.5
30	Total Dissolved Solids	mg/L	202	2036	1426	2000
31	Total Residual Chlorine	mg/L	< 0.1	< 0.1	< 0.1	0.2
32	Chromium (Hexavalent)	mg/L	< 0.05	< 0.05	< 0.05	0.1
33	Ammonia	mg/L	1.110	0.038	1.540	10
34	Fluoride	mg/L	0.207	0.155	0.146	20
35	Silver	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.5
36	Escherichia Coli	MPN/100ml* (SW)	-	-	-	(1,000)* (CFU/100ml)
		MPN/100ml** (GW)	-	-	< 1.8	(100)** (MPN/100ml)
37	Flow Rate	m^3/s	-	0.82	-	-

Note: Red color means the exceeded results than target value.
*Note: Based on the water utilization at discharged creek, water quality C of 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.
**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: 2008/BTNMT) is set as a reference value of self-monitoring for ground water monitoring.
Source: Myanmar Koei International Ltd.

CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

As for the result of SS, TDS, total coliform and iron at the outlet of the centralized STP (SW-6) complied with the target value. It may prove that effluent from each locator was treated well by the STP. On the other hand, the parameters of SS, results at the monitoring point of retention canal (SW-5) before discharging to creek, exceeded the target value due to the surface water run-off from bare land in Zone A.

The parameters of total coliform at retention pond (SW-1) and retention canal (SW-5) exceeded the target values in this period for main discharged points of Thilawa SEZ Zone A. In addition, according to the result of self-monitoring of E. coli at retention pond (SW-1) and retention canal (SW-5), result was under the reference value. Therefore, although the target value of total coliform was exceeded at monitoring point (SW-1) and (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 target value may be due to the influence of natural origin (iron can reach out from the soil 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 the comparison with the living environment standard value in Japan, iron result in (SW-5) is lower than the standard value. Therefore, it can be considered that there is no significant impact on the living environment.

As for parameters of SS, TDS, total coliform and iron in surface water exceeded the target values at reference monitoring points. The expected reasons for exceeding the target values of SS and TDS at (SW-4) are delivered from upstream area such as natural origin and wastewater from local industrial zone which outside of Thilawa SEZ. The expected reasons for exceeding the target values of total coliform at (SW-2) and (SW-4) are by natural origin (natural bacteria existed).

The expected reason for exceeding the target value of iron at SW-4 may be due to the influence of natural origin (iron can reach out from soil by run-off). In Yangon, soil is naturally rich in iron. However, since it cannot reach to the conclusion of what the reason for this result, the periodic monitoring will be necessary.

As for future subject for main discharged points of Thilawa SEZ Zone A, the following action may be taken to achieve the target levels of SS, TDS, total coliform, iron and appropriate water quality monitoring:
- To continue monitoring Escherichia coli (E. coli) level to identify health impact by coliform bacteria; and
- To monitor the possibility of the overflow water from construction sites.
- To monitor the possibility of the domestic wastewater from construction sites.

End of the Document

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

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

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

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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Doc No: GEM-LB-R004E/00
Page 1 of 1

Report No. : GEM-LAB-202001031
Revision No. : 1
Report Date : 8 January, 2020
Application No. : 0001-C001

Analysis Report

Client Name : Myanmar Kiwi 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-1-1218 Sampling Date : 18 December, 2019
Sample No. : W-1912178 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	28.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	4.20	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	22.1	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	1600	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	5.7	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.159	0.050
8	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.01	0.00
9	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	0
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	226	-
11	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
12	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.02	0.002
13	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
14	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
15	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
16	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
17	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
18	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
19	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.016	0.002
20	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.018	0.002
21	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
22	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	2.633	0.002
23	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method	mg/l	< 0.002	0.002
24	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	0.017	0.002
25	Ammonia	HACH Method 10205 (Salicylate TNT Plus Method)	mg/l	0.205	0.020
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	< 0.05	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Fluent Conductivity)	mg/l	1.262	0.014
28	Free Chlorine	APHA 4500 Cl. G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
29	Total Chlorine	APHA 4500 Cl. G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.099	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.071	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	< 0.002	0.002

Remark : LOQ - Limit of Quantitation
APHA - American Public Health Association, AWWA - 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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Jan 8, 2020
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Assistant Manager

Approved By :
Tomoya Suzuki Jan 8, 2020
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Doc No GEM-LB-R0041/00
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Report No. : GEM-LAB-202001032
Revision No. : 1
Report Date : 8 January, 2020
Application No. : 0001-C001

Analysis Report

Client Name : Myanmar Kowi 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-S-1218
Sample No : W-1912179
Waste Profile No. : -
Sampling Date : 18 December, 2019
Sampling By : Customer
Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	116.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	6.27	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	30.2	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	540	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.6	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.123	0.050
8	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.55	0.00
9	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	0
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	246	-
11	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
12	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.038	0.002
13	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
14	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.002	0.002
15	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
16	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
17	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
18	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
19	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.05	0.002
20	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.016	0.002
21	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
22	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	5.270	0.002
23	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method	mg/l	< 0.002	0.002
24	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	0.002
25	Ammonia	HACH Method 10205 (Salicylate TNT Plus Method)	mg/l	0.526	0.020
26	Hexavalent Chromium (Cr6+)	ISO 11083 1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	< 0.05	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.267	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
29	Total Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.112	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.090	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	0.004	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

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Jan 8, 2020
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Doc No: GEM-LB-R004E/00
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Report No. : GEM-LAB-202001033
Revision No. : 1
Report Date : 8 January, 2020
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-6-1218 Sampling Date : 18 December, 2019
Sample No. : W-1912180 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	2.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	4.42	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	26.5	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	170	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	16.1	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.888	0.050
8	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.46	0.00
9	Odor	APHA 2150 B (Threshold Odor Test)	TON	1.4	0
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	476	-
11	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
12	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.318	0.002
13	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
14	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
15	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
16	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
17	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
18	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
19	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
20	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.016	0.002
21	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
22	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.138	0.002
23	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method	mg/l	< 0.002	0.002
24	Total Cyanide	Distillation Process:APHA 4500-CN- C. Total Cyanide after Distillation, Determine Cyanide Concentration Process: HACH 8027 (Pyridine -Pyrazalone Method)	mg/l	0.008	0.002
25	Ammonia	HACH Method 10205 (Salicylate TNT Plus Method)	mg/l	0.094	0.020
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	< 0.05	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	1.529	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
29	Total Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.007	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.052	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	< 0.002	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

Analysed By :
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Assistant Manager

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Jan 8, 2020
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Approved By :
Tomoya Suzuki Jan 8, 2020
Director

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

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

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Doc No. GEM-(LB-R004E/00
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Report No. : GEM-LAB-202001034
Revision No. : 1
Report Date : 8 January, 2020
Application No. : 0001-C001

Analysis Report

Client Name : Myanmar Kpei 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 1218
Sample No. : W-1912181
Waste Profile No : -
Sampling Date : 18 December, 2019
Sampling By : Customer
Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	20.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	9.42	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	31.2	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	35000	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	2.3	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.173	0.050
8	Color	APHA 2120C (Spectrophotometric Method)	TCU	13.65	0.00
9	Odor	APHA 2150 B (Threshold Odor Test)	TON	1.4	0
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	202	-
11	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
12	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
13	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
14	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
15	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
16	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
17	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
18	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
19	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.018	0.002
20	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.006	0.002
21	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
22	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	1.688	0.002
23	Cyanide	HACH 8027 (Pyridine-Pyrazalone Method	mg/l	< 0.002	0.002
24	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	0.002
25	Ammonia	HACH Method 10205 (Salicylate TNT Plus Method)	mg/l	1.110	0.020
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	< 0.05	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.207	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
29	Total Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.039	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.061	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	0.008	0.002

Remark : LOQ - Limit of Quantitation
APHA : American Public Health Association (APHA), 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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Jan 8, 2020
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Doc No: GEM LB-R004E/00
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Report No. : GEM-LAB-202001035
Revision No. : 1
Report Date : 8 January, 2020
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-4-1218
Sample No. : W-1912182
Waste Profile No. : -
Sampling Date : 18 December, 2019
Sampling By : Customer
Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2340D (Dry at 103-105°C Method)	mg/l	382.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	4.86	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	5.4	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	24000	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	2.5	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	< 0.05	0.050
8	Color	APHA 2120C (Spectrophotometric Method)	TCU	1.49	0.00
9	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	2036	-
11	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
12	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.05	0.002
13	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
14	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.044	0.002
15	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
16	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
17	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
18	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
19	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.04	0.002
20	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.078	0.002
21	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
22	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	25.840	0.002
23	Cyanide	HACH 8027 (Pyridine -Pyrazalone Method	mg/l	< 0.002	0.002
24	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	0.002
25	Ammonia	HACH Method 10205 (Salicylate TNT Plus Method)	mg/l	0.038	0.020
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	< 0.05	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.155	0.014
28	Free Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
29	Total Chlorine	APHA 4500 CL G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	0.072	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.051	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	0.007	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

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MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

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Doc No: GEM-LB-R004E/00
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Report No. : GEM-LAB-202001036
Revision No. : 1
Report Date : 8 January, 2020
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, Tarmwe Township, Yangon, Myanmar
Project Name : Environment Monitoring report for Zone A & B
Sample Description :
Sample Name : MKI-GW 1-1218 — Sampling Date : 18 December, 2019
Sample No : W-1912183 — Sampling By : Customer
Waste Profile No : - — Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	2.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	2.75	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	6.9	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermantation Technique)	MPN/100ml	5	1.8
5	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
6	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	0.7	0.5
7	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.093	0.050
8	Color	APHA 2120C (Spectrophotometric Method)	TCU	1.36	0.00
9	Odor	APHA 2150 B (Threshold Odor Test)	TON	1	0
10	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	1426	-
11	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
12	Zinc	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
13	Arsenic	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
14	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
15	Cadmium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
16	Selenium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.01	0.01
17	Lead	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
18	Copper	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
19	Barium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.056	0.002
20	Nickel	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
21	Silver	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
22	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.730	0.002
23	Cyanide	HACH 8027 (Pyridine-Pyrazalone Method	mg/l	< 0.002	0.002
24	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	0.002
25	Ammonia	HACH Method 10205 (Salicylate TNT Plus Method)	mg/l	1.540	0.020
26	Hexavalent Chromium (Cr6+)	ISO 11083:1994 (Determination of chromium(VI) Spectrometric method using 1,5-diphenylcarbazide)	mg/l	< 0.05	0.05
27	Fluoride	APHA 4110 B (Ion Chromatography with Chemical Suppression of Eluent Conductivity)	mg/l	0.146	0.014
28	Free Chlorine	APHA 4500 Cl G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
29	Total Chlorine	APHA 4500 Cl G (DPD Colorimetric Method)	mg/l	< 0.1	0.1
30	Sulphide	HACH 8131 (USEPA Methylene Blue Method)	mg/l	< 0.005	0.005
31	Formaldehyde	HACH 8110 (MBTH Method)	mg/l	0.008	0.003
32	Phenols	USEPA Method 420.1 (Phenolics (Spectrophotometric, Manual 4AAP With Distillation))	mg/l	< 0.002	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

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MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

APPENDIX-3 LABORATORY RESULT OF ESCHERICHIA COLI (SELF-MONITORING)

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

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Report No. : GEM-LAB-202001026
Revision No. : 1
Report Date : 8 January, 2020
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-1-1218 — Sampling Date : 18 December, 2019
Sample No. : W-1912173 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	4.0	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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Doc No: GEM-LB-R004E/00
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Report No. : GEM-LAB-202001027
Revision No. : 1
Report Date : 8 January, 2020
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-5-1218 Sampling Date : 18 December, 2019

Sample No. : W-1912174 Sampling By : Customer

Waste Profile No. : - Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	Escherichia Coli	APHA 9221 F Escherichia Coli Procedure Using Fluorogenic Substrate	MPN/100ml	2.0	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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Tomoya Suzuki Jan 8, 2020
Director

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGING POINTS AND BASELINE OF TUBE WELL

DOWA

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Page1of1

Report No. : GEM-LAB-202001029
Revision No. : 1
Report Date : 8 January, 2020
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-1-1218 Sampling Date : 18 December, 2019
Sample No. : W-1912176 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 18 December, 2019

No.	Parameter	Method	Unit	Result	LOQ
1	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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Assistant Manager

Tomoya Suzuki Jan 8, 2020
Director

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix

Water and Waste Water Monitoring Report

February, 2020

WATER QUALITY MONITORING REPORT

FOR DEVELOPMENT OF INDUSTRIAL AREA

IN THILAWA SEZ ZONE A

(OPERATION STAGE)

(Bi-Monthly Monitoring)

February 2020

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 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 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 which is located in the monastery compound. Location of sampling points for water quality monitoring is shown in Figure 1.1-1.

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 so as 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 carried out at four locations (SW-1, SW-4, SW-5 and SW-6) where can be measured by Current Meter. 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	BOD (5)	○	○	○	○	○	○	Laboratory analysis
5	COD (Cr)	○	○	○	○	○	○	Laboratory analysis
6	Total Nitrogen	○	○	○	○	○	○	Laboratory analysis
7	Suspended Solids	○	○	○	○	○	○	Laboratory analysis
8	Total Coliform	○	○	○	○	○	○	Laboratory analysis
9	Total Phosphorous	○	○	○	○	○	○	Laboratory analysis
10	Color	○	○	○	○	○	○	Laboratory analysis
11	Odor	○	○	○	○	○	○	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 and water flow rate measurement.
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. 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 due to flow back by tidal fluctuation. In addition, it seems that a part of wastewater 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, construction site of Zone B and Zone A, 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 domestic wastewater from surrounding. 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 flow back 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 conducted by using the on-site instrument "Tamaya Digital Current Meter".

Table 2.3-1 Analytic Method for Water Quality

No.	Parameter	Method
1	Temperature	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
2	pH	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
3	Suspended Solids (SS)	APHA 2540 D (Dry at 103-105°C Method)
4	Dissolved Oxygen (DO)	Instrument Analysis Method (Horiba, U-52, Multi Water Quality Checker)
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	Total Nitrogen (T-N)	HACH Method 10072(TNT Persulfate Digestion Method)
9	Total Phosphorous (T-P)	APHA 4500-P E (Ascorbic Acid Method)
10	Color	APHA 2120C (Spectrophotometric Method)
11	Odor	APHA 2150 B (Threshold Odor Test)
12	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)
13	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
14	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)
15	Total Dissolved Solids	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)
16	Escherichia Coli	APHA 9221 F (Escherichia Coli Procedure Using Fluorogenic Substrate)
17	Flow Rate	Detection of Electromagnetic Elements (Real-time measurement by UC-200V Digital Current Meters)

Source: Myanmar Koei International Ltd.

2.4 Monitoring Period

Water quality and water flow rate monitoring conducted on 17 February 2020 and sampling time is shown in Table 2.4-1 to avoid tidal effect. The tide record for Yangon River, Myanmar on 17 February 2020 is shown in Table 2.4-2.

Table 2.4-1 Sampling Time of Each Station

No.	Station	Sampling Time
1	SW-1	17/02/2020 09:37
2	SW-2	17/02/2020 08:31
3	SW-4	17/02/2020 11:32
4	SW-5	17/02/2020 10:40
5	SW-6	17/02/2020 10:02
6	GW-1	17/02/2020 13:38

Source: Myanmar Koei International Ltd.

Table 2.4-2 Tide Record for Yangon River, Myanmar

Date	Time	Height	Tide Conditions
17/02/2020	05:50	0.95	Low Tide
	11:10	4.13	High Tide
	17:58	1.27	Low Tide
	23:48	4.45	High Tide

Source: Myanmar Port Authority, Tide Table for the Yangon River and Elephant Point, 2020.

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

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, Appendix-3 and Appendix-4. 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 Water Quality at the Outlet of Sewage Treatment Plant of Industrial Area of Thilawa SEZ and at the Point before Discharging to Creek

As the comparison with the target value, the results of pH, suspended solids (SS) and iron 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. 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) might be due to the water polluted with concrete washout water discharge from construction sites of Zone A, (ii) might be due to water storage for a long period of time and presence of algae in the stored water.

As for the result of SS, the result at the outlet of the centralized STP (SW-6) complied with the target value. It implied that effluents from each locator was treated well by the STP. On the other hand, results at the monitoring point of retention canal (SW-5) before discharging to creek, exceeded the target value due to the surface water run-off from bare land in Zone A.

As for the result of the iron, the result at the outlet of the centralized STP (SW-6) complied with the target value. 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 target value may be due to the influence of natural origin (iron can reach out from the soil 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 the comparison with the living environment standard value in Japan, iron result in SW-5 is lower than the standard value. 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 (Reference Value for Self-Monitoring)
1	Temperature	°C	28	29	29	≤ 35
2	pH	-	10.2	9.7	6.9	6~9
3	Suspended Solid (SS)	mg/L	30.00	92	2	50
4	Dissolved Oxygen (DO)	mg/L	9.13	8.96	5.69	-
5	BOD (5)	mg/L	5.52	5.37	1.62	30
6	COD (Cr)	mg/L	42	46	29.9	125
7	Total Coliform	MPN/ 100ml	23	49	4.5	400
8	Total Nitrogen (T-N)	mg/L	3.7	7.8	13.8	80
9	Total Phosphorous (T-P)	mg/L	0.12	0.30	0.78	2
10	Color	TCU (True Color Unit)	6.42	5.71	4.13	150
11	Odor	TON (Threshold Odor Number)	2	2	1.4	-
12	Oil and Grease	mg/L	< 3.1	< 3.1	< 3.1	10
13	Mercury	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.005
14	Iron	mg/L	0.478	4.078	0.021	3.5
15	Total Dissolved Solids	mg/L	426	526	670	2000
16	Escherichia Coli	MPN/100ml (SW)	< 1.8	< 1.8	-	(1000)* (CFU/100ml)
17	Flow Rate	m^3/s	5.38	0.06	0.01	-

Note: Red color means exceeded value than target value.

*Note: Based on the water utilization at discharged creek, water quality C of 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 for Comparison with Discharged Points and Baseline of Discharged Creek

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

As the comparison with the target value, the results of pH, Suspended Solid (SS), total coliform and Total Dissolved Solids (TDS) exceeded than the target value.

As for the result of pH, results at the surface water monitoring point (SW-4) exceeded the target value due to two expected reasons; i) might be wastewater discharged from of local industrial zone, and ii) might be domestic wastewater discharge that contains detergents and soap-based products.

As for the result of SS and TDS, results at the surface water monitoring point (SW-4) exceeded the target value due to two expected reasons; i) delivered from upstream area such as natural origin and wastewater from local industrial zone which outside of Thilawa SEZ, and ii) influence by water from the downstream due to flow back by tidal fluctuation.

As for the result of total coliform of surface water, result at surface water monitoring (SW-2) exceeded the target value due to two expected reasons; i) runoff of animal waste from the undeveloped area and delivered from local industrial zone and illegal dumping site from outside of Thilawa SEZ in the upstream area and ii) delivered from surrounding area by tidal effect.

Table 2.5-2 Result of Water Quality Survey for Reference Monitoring Points for Comparison with Discharging Points and Baseline of Discharged Creek

No.	Parameters	Unit	SW-2	SW-4	GW-1	Target Value (Reference Value for Self-Monitoring)
1	Temperature	˚C	25	28	32	≤ 35
2	pH	-	7.9	9.6	8.2	6~9
3	Suspended Solid (SS)	mg/L	44	64	6	50
4	Dissolved Oxygen (DO)	mg/L	2.03	8.79	8.10	-
5	BOD (5)	mg/L	3.01	6.27	0.86	30
6	COD (Cr)	mg/L	48	35.3	5.7	125
7	Total Coliform	MPN/ 100ml	24000	140	23	400
8	Total Nitrogen (T-N)	mg/L	1.9	4.0	1.8	80
9	Total Phosphorous (T-P)	mg/L	0.11	< 0.05	0.09	2
10	Color	TCU (True Color Unit)	22.19	7.85	1.35	150
11	Odor	TON (Threshold Odor Number)	2	2	1	-
12	Oil and Grease	mg/L	< 3.1	< 3.1	< 3.1	10
13	Mercury	mg/L	≤ 0.002	≤ 0.002	≤ 0.002	0.005
14	Iron	mg/L	1.610	1.148	0.818	3.5
15	Total Dissolved Solids	mg/L	946	3762	1422	2000
16	Escherichia Coli	MPN/100ml* (SW)	-	-	-	(1,000)* (CFU/100ml)
		MPN/100ml** (GW)	-	-	< 1.8	(100)** (MPN/100ml)
17	Flow Rate	m^3/s	-	0.05	-	-

Note: Red color means the exceeded results than target value.
*Note: Based on the water utilization at discharged creek, water quality C of 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.
**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: 2008/BTNMT) is set as a reference value of self-monitoring for ground water monitoring.
Source: Myanmar Koei International Ltd.

CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

As for the result of pH, SS and iron at the outlet of the centralized STP (SW-6) complied with the target value. It may prove that effluent from each locator was treated well by the STP. On the other hand, the parameters of SS, results at the monitoring point of retention canal (SW-5) before discharging to creek, exceeded the target value due to the surface water run-off from bare land in Zone A.

The parameter of pH at retention pond (SW-1) and retention canal (SW-5) exceeded the target value due to the expected reason; i) might be due to the water polluted with concrete washout water discharge from construction sites of Zone A, (ii) might be due to water storage for a long period of time and presence of algae in the stored water.

As for the result of the iron, the result at the monitoring point of retention canal (SW-5) exceeded the target value may be due to the influence of natural origin (iron can reach out from the soil 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 the comparison with the living environment standard value in Japan, iron result in (SW-5) is lower than the standard value. Therefore, it can be considered that there is no significant impact on the living environment.

As for parameters of pH, SS, TDS and total coliform in surface water exceeded the target values at reference monitoring points. The expected reasons for exceeding the target values of pH at (SW-4) are by wastewater discharged from the construction site of local industrial zone and domestic wastewater discharge that contains detergents and soap-based products.

The expected reasons for exceeding the target values of SS and TDS at (SW-4) are delivered from upstream area such as natural origin and wastewater from local industrial zone which outside of Thilawa SEZ. The expected reasons for exceeding the target values of total coliform at (SW-2) are by natural origin (natural bacteria existed).

As for future subject for main discharged points of Thilawa SEZ Zone A, the following action may be taken to achieve the target levels of pH, SS, TDS, total coliform, iron and appropriate water quality monitoring:
- To continue monitoring Escherichia coli (E. coli) level to identify health impact by coliform bacteria; and
- To monitor the possibility of the overflow water from construction sites.
- To monitor the possibility of the domestic wastewater from construction sites.

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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Doc No: GEM-LB-R004E/00
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Report No. : GEM-LAB-202002174
Revision No. : 1
Report Date : 28 February, 2020
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, Tarmwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-SW-1-0217 — Sampling Date : 17 February, 2020
Sample No. : W-2002118 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	30.00	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	5.52	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	42	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	23	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	3.7	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.12	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	6.42	0.00
8	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	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-202002175
Revision No. : 1
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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-5-0217 Sampling Date : 17 February, 2020
Sample No. : W-2002119 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	92	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	5.37	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	46	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	49	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	7.8	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.30	0.05
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	5.71	0.00
8	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	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-202002176
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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-6-0217 Sampling Date : 17 February, 2020
Sample No. : W-2002120 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 17 February, 2020

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	1.62	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	29.9	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	4.5	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	13.8	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.78	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	4.13	0.00
8	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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FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGED POINTS AND BASELINE OF DISCHARGED CREEK

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Report No. : GEM-LAB-202002177
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Report Date : 14 March, 2020
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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-2-0217 Sampling Date : 17 February, 2020
Sample No. : W-2002121 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105°C Method)	mg/l	44	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	3.01	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	48	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	24000	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.9	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.11	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	22.19	0.00
8	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	0
9	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
10	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	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

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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-4-0217 Sampling Date : 17 February, 2020
Sample No. : W-2002122 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	64	-
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	6.27	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	35.3	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	140	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	4	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	< 0.05	0.05
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	7.85	0.00
8	Odor	APHA 2150 B (Threshold Odor Test)	TON	2	0
9	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
10	Chromium	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	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

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Report No. : GEM-LAB-202002179
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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, Tarmwe Township, Yangon, Myanmar.
Project Name : Environment Monitoring report for Zone A & B
Sample Description
Sample Name : MKI-GW-1-0217 Sampling Date : 17 February, 2020
Sample No. : W-2002123 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	SS	APHA 2540D (Dry at 103-105'C Method)	mg/l	6	_
2	BOD (5)	APHA 5210 B (5 Days BOD Test)	mg/l	0.86	0.00
3	COD (Cr)	APHA 5220D (Close Reflux Colorimetric Method)	mg/l	5.7	0.7
4	Total Coliform	APHA 9221B (Standard Total Coliform Fermentation Technique)	MPN/100ml	23	1.8
5	Total Nitrogen	HACH Method 10072 (TNT Persulfate Digestion Method)	mg/l	1.8	0
6	Total Phosphorous	APHA 4500-P E (Ascorbic Acid Method)	mg/l	0.09	0.050
7	Color	APHA 2120C (Spectrophotometric Method)	TCU	1.35	0.00
8	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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APPENDIX-3 LABORATORY RESULT OF ESCHERICHIA COLI (SELF-MONITORING)

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

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Report No. : GEM-LAB-202002169
Revision No. : 1
Report Date : 28 February, 2020
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-1-0217 — Sampling Date : 17 February, 2020

Sample No. : W-2002113 — Sampling By : Customer

Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	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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Approved By :

Tomoya Suzuki Feb 28, 2020
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Report No. : GEM-LAB-202002170
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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-S-0217 — Sampling Date : 17 February, 2020

Sample No. : W-2002114 — Sampling By : Customer

Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	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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Approved By :

Tomoya Suzuki Feb 28, 2020
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FOR REFERENCE MONITORING POINTS FOR COMPARISON WITH DISCHARGING POINTS AND BASELINE OF TUBE WELL

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Report No. : GEM-LAB-202002172
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Report Date : 28 February, 2020
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-1-0217 — Sampling Date : 17 February, 2020
Sample No. : W-2002116 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	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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Approved By :
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Director

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

APPENDIX-4 LABORATORY RESULTS (SELF-MONITORING)

FOR DISCHARGED POINTS AND AFTER CENTRALIZED STP

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Report No. : GEM-LAB-202002182
Revision No. : 1
Report Date : 28 February, 2020
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-1-0217 — Sampling Date : 17 February, 2020
Sample No. : W-2002126 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	426	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.478	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

Analysed By :

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Report No. : GEM-LAB-202002183
Revision No. : 1
Report Date : 28 February, 2020
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-5-0217 — Sampling Date : 17 February, 2020
Sample No. : W-2002127 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180°C Method)	mg/l	526	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	4.078	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

Analysed By :

Ni Ni Aye Lwin
Assistant Manager

LAB
Feb 28, 2020
GEM

Approved By :

Yoshiyuki Narabe Feb 28, 2020
Manager

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

DOWA

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Lot No E1, Thilawa SEZ Zone A, Yangon Region, Myanmar.
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motivate our planet
Doc No: GEM-LB-R004E/00
Page1of1

Report No. : GEM-LAB-202002184
Revision No. : 1
Report Date : 28 February, 2020
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-6-0217
Sample No. : W-2002128
Waste Profile No. : -

Sampling Date : 17 February, 2020
Sampling By : Customer
Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	670	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.021	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

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MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED
MJTD

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

DOWA

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motivate our planet
Doc No: GEM-LB-R004E/00
Page1of1

Report No. : GEM-LAB-202002185
Revision No. : 1
Report Date : 28 February, 2020
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-2-0217 — Sampling Date : 17 February, 2020
Sample No. : W-2002129 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	946	-
2	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
3	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	1.610	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

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Report No. : GEM-LAB-202002186
Revision No. : 1
Report Date : 28 February, 2020
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-4-0217 — Sampling Date : 17 February, 2020
Sample No. : W-2002130 — Sampling By : Customer
Waste Profile No. : - — Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	3762	-
2	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
3	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	1.148	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

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Doc No: GEM-LB-R004E/00
Page1of1

Report No. : GEM-LAB-202002187
Revision No. : 1
Report Date : 28 February, 2020
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-1-0217 Sampling Date : 17 February, 2020
Sample No. : W-2002131 Sampling By : Customer
Waste Profile No. : - Sample Received Date : 17 February, 2020

No.	Parameter	Method	Unit	Result	LOQ
1	Oil and Grease	APHA 5520B (Partition-Gravimetric Method)	mg/l	< 3.1	3.1
2	TDS	APHA 2540 C (Total Dissolved Solids Dried at 180'C Method)	mg/l	1422	-
3	Mercury	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	≤ 0.002	0.002
4	Iron	APHA 3120 B (Inductively Coupled Plasma (ICP) Method)	mg/l	0.818	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

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MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix

Air Quality Monitoring Report

February, 2020

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

(BI-ANNUALLY MONITORING)

February 2020

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 10 February 2020 – 17 February 2020 as follows;

Table 1.2-1 Outlines of Air Quality Monitoring Plan

Monitoring Date	Monitoring Item	Parameters	Number of Point	Duration	Monitoring Methodology
From 10 February – 17 February, 2020	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 10 February – 17 February, 2020.

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, TSP, PM_{10} and SO_2. The certificate of calibration for air quality monitoring equipment is shown in Appendix-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, 7 days average concentration of CO, NO_2, TSP, PM_{10} and SO_2 were lower than the target value. However, Day 1, Day 5, Day 6 and Day 7 daily values of TSP and PM_{10} were higher than the target value. Additionally, Day 1 and Day 2 daily values of SO_2 were higher 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
10-11 Feb, 2020	0.269	0.089	0.407	0.148	0.171
11-12 Feb, 2020	0.217	0.037	0.248	0.090	0.130
12-13 Feb, 2020	0.156	0.037	0.173	0.063	0.088
13-14 Feb, 2020	0.176	0.034	0.172	0.062	0.029
14-15 Feb, 2020	0.207	0.068	0.364	0.132	0.053
15-16 Feb, 2020	0.150	0.078	0.331	0.120	0.061
16-17 Feb, 2020	0.097	0.073	0.438	0.159	0.043
7 Days Average Value	0.182	0.059	0.305	0.111	0.082
Target Value	11.45	0.11	<0.33	<0.12	0.11

Note: The target value of CO_2, 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
2. (NO_2, mg/m³) = (NO_2, ppm) * (Molecular Weight of NO_2 (46)) / 24.45
3. (SO_2, mg/m³) = (SO_2, ppm) * (Molecular Weight of SO_2 (64)) / 24.45

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. Status of air quality monitoring point and wind direction are described in Figure 2.5-1.

Source: Google Earth

Figure 2.5-1 Status of Air Quality Monitoring Point and Wind Direction at AQ-1

Remark: ***N*** *North* ***NNE*** *North-Northeast* ***NE*** *Northeast* ***ENE*** *East-Northeast* ***E*** *East* ***ESE*** *East-Southeast* ***SE*** *Southeast* ***SSE*** *South-Southeast* ***S*** *South* ***SSW*** *South-Southwest* ***SW*** *Southwest* ***WSW*** *West-Southwest* ***W*** *West* ***WNW*** *West-Northwest* ***NW*** *Northwest* ***NNW*** *North-Northwest*

Overall summary of total exceeded hours during the seven days monitoring period are shown in Table 2.5-2. According to the daily average values, Day 1, Day 5, Day 6 and Day 7 daily values of TSP and PM_{10} were higher than the target value. Day 1 and Day 2 daily values of SO_2 were higher than the target value.

For TSP and PM_{10}, the total exceeded hours for seven days were 56 hours. Day 1, Day 5, Day 6 and Day 7 exceeded hours were 50 hours and the wind direction are shown in Table 2.5-3.

For SO_2, the total exceeded hours for seven days were 36 hours. Day 1 and Day 2 exceeded hours were 16 hours and the wind direction are shown in Table 2.5-4.

The overall summary of wind direction during the seven days monitoring period is shown in Figure 2.5-2. Exceeded hours are come from West-Southwest (WSW), West (W) and Southwest (SW).

Possible emission sources for PM_{10} and TSP are affected from construction activities of Zone A's locators, natural origin such as dust from unpaved vacant area and transportation in and around the monitoring area.

Possible emission sources for SO_2 are affected from the combustion of fuel for vehicles on Dagon-Thilawa Road and the operation and construction activities of Zone A's locators.

Table 2.5-2 Total Exceeded Hours

	Parameters	Total Exceeded Hours
Day 1 - Day 7	TSP	56
	PM_{10}	56
	SO_2	36

Source: Myanmar Koei International Ltd.

Table 2.5-3 Total Exceeded Hours and Wind Direction for TSP and PM_{10}

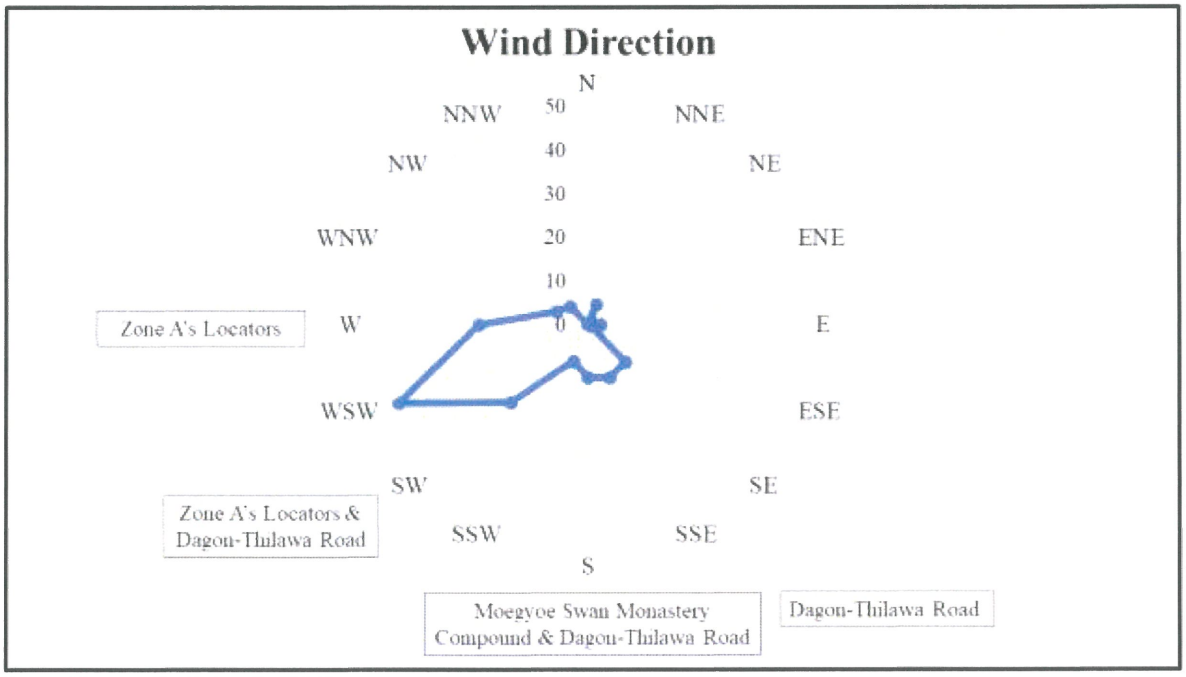
Day	Time	TSP	PM_{10}	Wind Direction
Day 1	18:00 ~ 18:59	0.341	0.124	SE
	19:00 ~ 19:59	0.396	0.144	SSE
	20:00 ~ 20:59	0.450	0.164	SSE
	21:00 ~ 21:59	0.563	0.205	SE
	22:00 ~ 22:59	0.838	0.305	SSE
	23:00 ~ 23:59	0.724	0.263	S
	0:00 ~ 0:59	0.491	0.179	WSW
	1:00 ~ 1:59	0.447	0.163	WSW
	2:00 ~ 2:59	0.364	0.132	WSW
	4:00 ~ 4:59	0.375	0.136	WNW
	5:00 ~ 5:59	0.391	0.142	WNW
	6:00 ~ 6:59	0.453	0.165	WNW
	7:00 ~ 7:59	0.569	0.207	WNW
	8:00 ~ 8:59	0.676	0.246	ENE
	9:00 ~ 9:59	0.387	0.141	NNE
Day 5	21:00 ~ 21:59	0.369	0.134	SW
	22:00 ~ 22:59	0.447	0.162	WSW
	23:00 ~ 23:59	0.659	0.239	WSW
	0:00 ~ 0:59	0.938	0.341	SW
	1:00 ~ 1:59	0.508	0.185	WSW
	3:00 ~ 3:59	0.674	0.245	SSW
	4:00 ~ 4:59	0.420	0.153	SSE
	5:00 ~ 5:59	0.346	0.126	SSE
	7:00 ~ 7:59	0.348	0.127	S
	8:00 ~ 8:59	0.388	0.141	SW
	9:00 ~ 9:59	0.463	0.168	WSW
	10:00 ~ 10:59	0.392	0.142	WNW
Day 6	15:00 ~ 15:59	0.538	0.196	W
	16:00 ~ 16:59	0.504	0.183	W
	17:00 ~ 17:59	0.609	0.222	W
	18:00 ~ 18:59	0.652	0.237	SSE
	19:00 ~ 19:59	0.606	0.220	S
	20:00 ~ 20:59	0.565	0.206	SSE
	21:00 ~ 21:59	0.662	0.241	S
	22:00 ~ 22:59	0.883	0.321	S
	5:00 ~ 5:59	0.631	0.229	WSW
	6:00 ~ 6:59	0.371	0.135	W
Day 7	13:00 ~ 13:59	0.334	0.121	S
	14:00 ~ 14:59	0.518	0.188	SSE
	15:00 ~ 15:59	0.523	0.190	SE
	16:00 ~ 16:59	0.526	0.191	SE
	17:00 ~ 17:59	0.644	0.234	SE
	18:00 ~ 18:59	0.714	0.260	SE
	19:00 ~ 19:59	0.675	0.245	SSE
	20:00 ~ 20:59	0.691	0.251	SSE
	21:00 ~ 21:59	0.745	0.271	SW
	22:00 ~ 22:59	0.860	0.313	SSW
	23:00 ~ 23:59	0.952	0.346	SW
	3:00 ~ 3:59	0.749	0.272	WSW
	4:00 ~ 4:59	0.534	0.194	S

Note: Time Duration when TSP Values are exceeded over Target Value (0.33 mg/m^3)
Time Duration when PM_{10} Values are exceeded over Target Value (0.12 mg/m^3)
Source: Myanmar Koei International Ltd.

Table 2.5-4 Total Exceeded Hours and Wind Direction for SO_2

Day	Time	SO_2	Wind Direction
Day 1	12:00 ~ 12:59	0.497	SW
	13:00 ~ 13:59	0.655	W
	14:00 ~ 14:59	0.724	NW
	15:00 ~ 15:59	0.779	SW
	16:00 ~ 16:59	0.594	SE
	17:00 ~ 17:59	0.330	SE
	18:00 ~ 18:59	0.134	SE
	11:00 ~ 11:59	0.138	NW
Day 2	12:00 ~ 12:59	0.255	NW
	13:00 ~ 13:59	0.396	SW
	14:00 ~ 14:59	0.517	WSW
	15:00 ~ 15:59	0.486	WNW
	16:00 ~ 16:59	0.403	W
	17:00 ~ 17:59	0.348	SSE
	18:00 ~ 18:59	0.192	SSE
	11:00 ~ 11:59	0.222	NW

Note: Time Duration when SO_2 Values are exceeded over Target Value (0.11 mg/m^3)
Source: Myanmar Koei International Ltd



Source: Myanmar Koei International Ltd.

Figure 2.5-2 Wind Direction at AQ-1

CHAPTER 3: CONCLUSION AND RECOMMENDATION

As for the result of air quality at AQ-1, daily values of TSP and PM_{10} were higher than the target value at Day (1, 5, 6 and 7). Daily values of SO_2 were higher than the target value at Day (1 and 2). During the seven days (total 168 hours) monitoring period, 56 hours were exceeded for TSP, 56 hours were exceeded for PM_{10} and 36 hours were exceeded for SO_2.

Some daily values of TSP, PM_{10} and SO_2 were higher than the target value however average concentration of CO, NO_2, TSP, PM_{10} and SO_2 during seven days monitoring were not exceeded the target value. Therefore, operation activities of Zone A could not have serious impacts on the surrounding environment.

Most of the exceeded hours are come from West-Southwest (WSW), West (W) and Southwest (SW). Possible emission sources are affected from running vehicles on Dagon-Thilawa road, construction and operation activities of Zone A's locators, natural origin such as dust from unpaved vacant area and transportation in and around the monitoring area.

As for future subject for air quality monitoring in Zone A, the following action may be taken to achieve the target level:

1) To spray the water during construction period for Zone A's locators
2) To control the speed limit of all machinery and vehicle (25km/hr) on site to avoid excessive dust creation and to minimize air pollution by the exhaust fumes
3) To conduct the proper operation (stop idling while no operation)
4) To implement the regular maintenance of machine used for construction and operation activities
5) To give awareness training to workers on machinery
6) To check and maintain the generator regularly

The continuous monitoring will be necessary to grasp the environmental conditions in 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/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3	kph	Deg.	Direction
			Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
10 Feb, 2020	12:00	12:59	0.131	0.004	0.221	0.080	0.497	1.27	235.17	SW
10 Feb, 2020	13:00	13:59	0.068	0.004	0.191	0.069	0.655	1.28	267.67	W
10 Feb, 2020	14:00	14:59	0.144	0.004	0.231	0.084	0.724	1.23	305.17	NW
10 Feb, 2020	15:00	15:59	0.140	0.004	0.255	0.093	0.779	1.27	229.00	SW
10 Feb, 2020	16:00	16:59	0.176	0.004	0.308	0.112	0.594	1.43	127.83	SE
10 Feb, 2020	17:00	17:59	0.365	0.010	0.314	0.114	0.330	1.27	130.83	SE
10 Feb, 2020	18:00	18:59	0.307	0.062	0.341	0.124	0.134	1.15	126.17	SE
10 Feb, 2020	19:00	19:59	0.301	0.117	0.396	0.144	0.044	0.48	161.83	SSE
10 Feb, 2020	20:00	20:59	0.465	0.151	0.450	0.164	0.013	0.38	158.67	SSE
10 Feb, 2020	21:00	21:59	0.438	0.168	0.563	0.205	0.013	0.23	137.67	SE
10 Feb, 2020	22:00	22:59	0.315	0.168	0.838	0.305	0.013	0.12	157.50	SSE
10 Feb, 2020	23:00	23:59	0.361	0.164	0.724	0.263	0.013	0.23	178.17	S
11 Feb, 2020	0:00	0:59	0.290	0.159	0.491	0.179	0.013	0.67	246.67	WSW
11 Feb, 2020	1:00	1:59	0.313	0.132	0.447	0.163	0.013	0.70	254.60	WSW
11 Feb, 2020	2:00	2:59	0.295	0.131	0.364	0.132	0.013	0.63	245.83	WSW
11 Feb, 2020	3:00	3:59	0.252	0.135	0.314	0.114	0.013	0.95	269.83	W
11 Feb, 2020	4:00	4:59	0.303	0.156	0.375	0.136	0.013	0.47	302.00	WNW
11 Feb, 2020	5:00	5:59	0.378	0.153	0.391	0.142	0.013	0.53	301.17	WNW
11 Feb, 2020	6:00	6:59	0.387	0.152	0.453	0.165	0.013	0.53	299.00	WNW
11 Feb, 2020	7:00	7:59	0.217	0.149	0.569	0.207	0.013	0.48	302.50	WNW
11 Feb, 2020	8:00	8:59	0.195	0.089	0.676	0.246	0.013	1.07	76.50	ENE
11 Feb, 2020	9:00	9:59	0.169	0.014	0.387	0.141	0.013	1.53	13.83	NNE
11 Feb, 2020	10:00	10:59	0.223	0.004	0.257	0.094	0.021	1.52	231.17	SW
11 Feb, 2020	11:00	11:59	0.220	0.004	0.202	0.074	0.138	1.65	318.33	NW

Max	0.465	0.168	0.838	0.305	0.779
Avg	0.269	0.089	0.407	0.148	0.171
Min	0.068	0.004	0.191	0.069	0.013

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	kph	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
11 Feb, 2020	12:00 ~ 12:59	0.177	0.004	0.188	0.068	0.255	1.85	320.67	NW
11 Feb, 2020	13:00 ~ 13:59	0.268	0.004	0.166	0.060	0.396	1.73	228.17	SW
11 Feb, 2020	14:00 ~ 14:59	0.255	0.004	0.184	0.067	0.517	1.75	253.17	WSW
11 Feb, 2020	15:00 ~ 15:59	0.168	0.004	0.288	0.105	0.486	2.27	281.67	WNW
11 Feb, 2020	16:00 ~ 16:59	0.165	0.004	0.249	0.091	0.403	2.15	267.33	W
11 Feb, 2020	17:00 ~ 17:59	0.343	0.004	0.369	0.134	0.348	0.93	166.25	SSE
11 Feb, 2020	18:00 ~ 18:59	0.384	0.005	0.410	0.149	0.192	0.73	148.00	SSE
11 Feb, 2020	19:00 ~ 19:59	0.415	0.054	0.350	0.127	0.032	0.73	135.50	SE
11 Feb, 2020	20:00 ~ 20:59	0.173	0.103	0.557	0.203	0.013	0.38	162.83	SSE
11 Feb, 2020	21:00 ~ 21:59	0.264	0.106	0.479	0.174	0.013	0.47	199.17	SSW
11 Feb, 2020	22:00 ~ 22:59	0.233	0.090	0.328	0.119	0.013	0.62	224.33	SW
11 Feb, 2020	23:00 ~ 23:59	0.176	0.067	0.301	0.109	0.013	0.67	239.17	WSW
12 Feb, 2020	0:00 ~ 0:59	0.128	0.059	0.145	0.053	0.013	1.85	271.83	W
12 Feb, 2020	1:00 ~ 1:59	0.112	0.051	0.142	0.052	0.013	1.68	259.83	W
12 Feb, 2020	2:00 ~ 2:59	0.143	0.030	0.149	0.054	0.013	1.78	264.50	W
12 Feb, 2020	3:00 ~ 3:59	0.113	0.042	0.168	0.061	0.013	1.73	262.83	W
12 Feb, 2020	4:00 ~ 4:59	0.117	0.044	0.096	0.035	0.013	1.68	259.33	W
12 Feb, 2020	5:00 ~ 5:59	0.125	0.043	0.136	0.049	0.013	1.52	260.50	W
12 Feb, 2020	6:00 ~ 6:59	0.152	0.055	0.146	0.053	0.013	1.68	266.00	W
12 Feb, 2020	7:00 ~ 7:59	0.255	0.072	0.196	0.071	0.013	0.78	207.17	SSW
12 Feb, 2020	8:00 ~ 8:59	0.279	0.024	0.282	0.102	0.013	0.74	263.60	W
12 Feb, 2020	9:00 ~ 9:59	0.289	0.004	0.186	0.068	0.013	0.98	316.67	NW
12 Feb, 2020	10:00 ~ 10:59	0.430	0.004	0.218	0.079	0.083	0.93	259.33	W
12 Feb, 2020	11:00 ~ 11:59	0.046	0.004	0.221	0.080	0.222	1.50	311.33	NW

Max	0.430	0.106	0.557	0.203	0.517
Avg	0.217	0.037	0.248	0.090	0.130
Min	0.046	0.004	0.096	0.035	0.013

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

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	kph	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
12 Feb, 2020	12:00 ~ 12:59	0.081	0.004	0.140	0.051	0.360	2.05	292.83	WNW
12 Feb, 2020	13:00 ~ 13:59	0.028	0.004	0.130	0.047	0.400	2.95	257.67	WSW
12 Feb, 2020	14:00 ~ 14:59	0.044	0.004	0.143	0.052	0.324	3.40	242.33	WSW
12 Feb, 2020	15:00 ~ 15:59	0.095	0.004	0.157	0.057	0.272	3.48	256.17	WSW
12 Feb, 2020	16:00 ~ 16:59	0.140	0.004	0.142	0.052	0.229	2.97	251.00	WSW
12 Feb, 2020	17:00 ~ 17:59	0.185	0.004	0.193	0.070	0.168	2.03	241.67	WSW
12 Feb, 2020	18:00 ~ 18:59	0.178	0.004	0.400	0.146	0.133	0.55	222.50	SW
12 Feb, 2020	19:00 ~ 19:59	0.232	0.004	0.178	0.065	0.013	0.75	236.83	WSW
12 Feb, 2020	20:00 ~ 20:59	0.298	0.035	0.178	0.065	0.013	0.55	200.67	SSW
12 Feb, 2020	21:00 ~ 21:59	0.267	0.062	0.192	0.070	0.013	0.82	226.67	SW
12 Feb, 2020	22:00 ~ 22:59	0.224	0.065	0.174	0.063	0.013	2.02	244.67	WSW
12 Feb, 2020	23:00 ~ 23:59	0.176	0.052	0.167	0.061	0.013	1.87	242.83	WSW
13 Feb, 2020	0:00 ~ 0:59	0.150	0.040	0.119	0.043	0.013	1.38	239.17	WSW
13 Feb, 2020	1:00 ~ 1:59	0.128	0.026	0.095	0.035	0.013	1.73	251.67	WSW
13 Feb, 2020	2:00 ~ 2:59	0.132	0.035	0.111	0.040	0.013	0.95	239.83	WSW
13 Feb, 2020	3:00 ~ 3:59	0.144	0.053	0.103	0.037	0.013	1.38	244.67	WSW
13 Feb, 2020	4:00 ~ 4:59	0.169	0.077	0.132	0.048	0.013	1.77	252.67	WSW
13 Feb, 2020	5:00 ~ 5:59	0.201	0.098	0.203	0.074	0.013	1.72	260.67	W
13 Feb, 2020	6:00 ~ 6:59	0.206	0.115	0.259	0.094	0.013	2.10	258.67	WSW
13 Feb, 2020	7:00 ~ 7:59	0.174	0.127	0.277	0.101	0.013	2.28	252.67	WSW
13 Feb, 2020	8:00 ~ 8:59	0.151	0.064	0.236	0.086	0.013	2.65	257.83	WSW
13 Feb, 2020	9:00 ~ 9:59	0.134	0.009	0.149	0.054	0.013	2.65	269.83	W
13 Feb, 2020	10:00 ~ 10:59	0.105	0.004	0.135	0.049	0.013	3.20	282.50	WNW
13 Feb, 2020	11:00 ~ 11:59	0.104	0.004	0.124	0.045	0.013	3.68	274.33	W

Max	0.298	0.127	0.400	0.146	0.400
Avg	0.156	0.037	0.173	0.063	0.088
Min	0.028	0.004	0.095	0.035	0.013

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	kph	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
13 Feb, 2020	12:00 ~ 12:59	0.120	0.004	0.130	0.047	0.013	4.02	276.17	W
13 Feb, 2020	13:00 ~ 13:59	0.133	0.004	0.115	0.042	0.023	3.67	266.00	W
13 Feb, 2020	14:00 ~ 14:59	0.135	0.004	0.083	0.030	0.069	3.78	263.17	W
13 Feb, 2020	15:00 ~ 15:59	0.184	0.004	0.112	0.041	0.113	3.37	267.17	W
13 Feb, 2020	16:00 ~ 16:59	0.205	0.004	0.161	0.058	0.104	3.33	256.17	WSW
13 Feb, 2020	17:00 ~ 17:59	0.196	0.004	0.010	0.004	0.048	2.88	258.83	W
13 Feb, 2020	18:00 ~ 18:59	0.197	0.004	0.069	0.025	0.014	2.08	255.00	WSW
13 Feb, 2020	19:00 ~ 19:59	0.287	0.026	0.207	0.075	0.013	0.57	211.67	SSW
13 Feb, 2020	20:00 ~ 20:59	0.248	0.031	0.197	0.072	0.013	0.92	219.67	SW
13 Feb, 2020	21:00 ~ 21:59	0.207	0.039	0.173	0.063	0.013	1.50	240.83	WSW
13 Feb, 2020	22:00 ~ 22:59	0.190	0.056	0.179	0.065	0.013	1.33	237.83	WSW
13 Feb, 2020	23:00 ~ 23:59	0.208	0.071	0.170	0.062	0.013	2.02	247.00	WSW
14 Feb, 2020	0:00 ~ 0:59	0.178	0.082	0.269	0.098	0.013	1.43	243.50	WSW
14 Feb, 2020	1:00 ~ 1:59	0.173	0.098	0.271	0.098	0.013	1.57	240.83	WSW
14 Feb, 2020	2:00 ~ 2:59	0.179	0.100	0.215	0.078	0.013	0.63	233.67	SW
14 Feb, 2020	3:00 ~ 3:59	0.167	0.102	0.216	0.078	0.013	0.32	178.67	S
14 Feb, 2020	4:00 ~ 4:59	0.147	0.108	0.235	0.085	0.013	0.40	171.00	S
14 Feb, 2020	5:00 ~ 5:59	0.152	0.066	0.243	0.088	0.013	0.42	185.50	S
14 Feb, 2020	6:00 ~ 6:59	0.183	0.004	0.251	0.091	0.013	0.95	198.17	SSW
14 Feb, 2020	7:00 ~ 7:59	0.153	0.004	0.246	0.089	0.013	1.05	227.33	SW
14 Feb, 2020	8:00 ~ 8:59	0.112	0.000	0.166	0.060	0.013	1.50	232.00	SW
14 Feb, 2020	9:00 ~ 9:59	0.117	0.004	0.110	0.040	0.013	2.42	241.50	WSW
14 Feb, 2020	10:00 ~ 10:59	0.167	0.004	0.139	0.050	0.051	2.82	254.17	WSW
14 Feb, 2020	11:00 ~ 11:59	0.177	0.004	0.158	0.057	0.065	2.60	256.67	WSW

Max	0.287	0.108	0.271	0.098	0.113
Avg	0.176	0.034	0.172	0.062	0.029
Min	0.112	0.000	0.010	0.004	0.013

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	kph	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
14 Feb, 2020	12:00 ~ 12:59	0.249	0.004	0.198	0.072	0.054	2.52	252.67	WSW
14 Feb, 2020	13:00 ~ 13:59	0.230	0.004	0.268	0.097	0.020	2.50	241.00	WSW
14 Feb, 2020	14:00 ~ 14:59	0.247	0.019	0.100	0.036	0.013	2.92	241.17	WSW
14 Feb, 2020	15:00 ~ 15:59	0.285	0.053	0.154	0.056	0.013	3.10	247.17	WSW
14 Feb, 2020	16:00 ~ 16:59	0.263	0.060	0.302	0.110	0.013	2.77	247.33	WSW
14 Feb, 2020	17:00 ~ 17:59	0.220	0.065	0.302	0.110	0.013	2.27	240.00	WSW
14 Feb, 2020	18:00 ~ 18:59	0.177	0.082	0.270	0.098	0.013	0.88	216.67	SW
14 Feb, 2020	19:00 ~ 19:59	0.173	0.092	0.293	0.107	0.013	0.52	191.17	S
14 Feb, 2020	20:00 ~ 20:59	0.151	0.102	0.315	0.115	0.013	0.60	200.17	SSW
14 Feb, 2020	21:00 ~ 21:59	0.139	0.115	0.369	0.134	0.013	0.72	213.83	SW
14 Feb, 2020	22:00 ~ 22:59	0.145	0.124	0.447	0.162	0.013	1.13	240.50	WSW
14 Feb, 2020	23:00 ~ 23:59	0.162	0.137	0.659	0.239	0.013	1.62	249.17	WSW
15 Feb, 2020	0:00 ~ 0:59	0.262	0.144	0.938	0.341	0.013	0.97	228.83	SW
15 Feb, 2020	1:00 ~ 1:59	0.202	0.143	0.508	0.185	0.013	1.30	246.83	WSW
15 Feb, 2020	2:00 ~ 2:59	0.205	0.146	0.107	0.039	0.013	0.98	237.33	WSW
15 Feb, 2020	3:00 ~ 3:59	0.065	0.162	0.674	0.245	0.013	0.30	200.17	SSW
15 Feb, 2020	4:00 ~ 4:59	0.118	0.109	0.420	0.153	0.013	0.33	159.67	SSE
15 Feb, 2020	5:00 ~ 5:59	0.174	0.046	0.346	0.126	0.013	0.52	148.67	SSE
15 Feb, 2020	6:00 ~ 6:59	0.190	0.006	0.320	0.116	0.013	0.20	132.17	SE
15 Feb, 2020	7:00 ~ 7:59	0.203	0.004	0.348	0.127	0.017	0.22	186.33	S
15 Feb, 2020	8:00 ~ 8:59	0.328	0.004	0.388	0.141	0.112	0.95	228.50	SW
15 Feb, 2020	9:00 ~ 9:59	0.327	0.004	0.463	0.168	0.236	1.82	253.83	WSW
15 Feb, 2020	10:00 ~ 10:59	0.257	0.004	0.392	0.142	0.286	1.52	290.00	WNW
15 Feb, 2020	11:00 ~ 11:59	0.186	0.004	0.144	0.052	0.333	1.27	307.83	NW

Max	0.328	0.162	0.938	0.341	0.333
Avg	0.207	0.068	0.364	0.132	0.053
Min	0.065	0.004	0.100	0.036	0.013

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	kph	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
15 Feb, 2020	12:00 ~ 12:59	0.270	0.004	0.023	0.008	0.287	0.98	231.33	SW
15 Feb, 2020	13:00 ~ 13:59	0.292	0.004	0.010	0.004	0.175	1.13	273.83	W
15 Feb, 2020	14:00 ~ 14:59	0.246	0.025	0.220	0.080	0.075	1.33	241.50	WSW
15 Feb, 2020	15:00 ~ 15:59	0.143	0.039	0.538	0.196	0.013	1.48	264.33	W
15 Feb, 2020	16:00 ~ 16:59	0.081	0.072	0.504	0.183	0.013	1.70	279.17	W
15 Feb, 2020	17:00 ~ 17:59	0.204	0.106	0.609	0.222	0.013	1.48	259.17	W
15 Feb, 2020	18:00 ~ 18:59	0.133	0.114	0.652	0.237	0.013	0.53	164.83	SSE
15 Feb, 2020	19:00 ~ 19:59	0.189	0.127	0.606	0.220	0.013	0.35	174.50	S
15 Feb, 2020	20:00 ~ 20:59	0.149	0.117	0.565	0.206	0.013	0.37	151.17	SSE
15 Feb, 2020	21:00 ~ 21:59	0.156	0.123	0.662	0.241	0.013	0.62	178.17	S
15 Feb, 2020	22:00 ~ 22:59	0.151	0.131	0.883	0.321	0.013	0.63	178.00	S
15 Feb, 2020	23:00 ~ 23:59	0.122	0.139	0.040	0.015	0.013	0.62	233.50	SW
16 Feb, 2020	0:00 ~ 0:59	0.117	0.140	0.000	0.000	0.013	0.93	238.17	WSW
16 Feb, 2020	1:00 ~ 1:59	0.103	0.137	0.000	0.000	0.013	0.58	208.50	SSW
16 Feb, 2020	2:00 ~ 2:59	0.132	0.138	0.000	0.000	0.013	0.55	214.83	SW
16 Feb, 2020	3:00 ~ 3:59	0.140	0.140	0.000	0.000	0.013	0.42	223.67	SW
16 Feb, 2020	4:00 ~ 4:59	0.159	0.147	0.204	0.074	0.013	1.05	239.83	WSW
16 Feb, 2020	5:00 ~ 5:59	0.150	0.132	0.631	0.229	0.013	1.22	247.33	WSW
16 Feb, 2020	6:00 ~ 6:59	0.092	0.027	0.371	0.135	0.013	1.02	275.00	W
16 Feb, 2020	7:00 ~ 7:59	0.081	0.004	0.299	0.109	0.013	0.75	223.33	SW
16 Feb, 2020	8:00 ~ 8:59	0.098	0.004	0.255	0.093	0.060	0.93	28.83	NNE
16 Feb, 2020	9:00 ~ 9:59	0.119	0.004	0.289	0.105	0.165	1.07	20.83	NNE
16 Feb, 2020	10:00 ~ 10:59	0.123	0.004	0.319	0.116	0.238	1.15	185.83	S
16 Feb, 2020	11:00 ~ 11:59	0.142	0.004	0.260	0.095	0.248	1.43	103.00	ESE

Max	0.292	0.147	0.883	0.321	0.287
Avg	0.150	0.078	0.331	0.120	0.061
Min	0.081	0.004	0.000	0.000	0.013

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

Date	Time	CO	NO_2	TSP	PM_{10}	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	kph	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
16 Feb, 2020	12:00 ~ 12:59	0.143	0.004	0.031	0.011	0.092	1.55	99.00	E
16 Feb, 2020	13:00 ~ 13:59	0.164	0.011	0.334	0.121	0.014	1.77	188.67	S
16 Feb, 2020	14:00 ~ 14:59	0.244	0.055	0.518	0.188	0.013	1.40	149.00	SSE
16 Feb, 2020	15:00 ~ 15:59	0.172	0.080	0.523	0.190	0.013	1.92	126.17	SE
16 Feb, 2020	16:00 ~ 16:59	0.051	0.101	0.526	0.191	0.013	2.70	130.33	SE
16 Feb, 2020	17:00 ~ 17:59	0.072	0.108	0.644	0.234	0.013	2.33	130.33	SE
16 Feb, 2020	18:00 ~ 18:59	0.109	0.119	0.714	0.260	0.013	1.30	133.17	SE
16 Feb, 2020	19:00 ~ 19:59	0.110	0.126	0.675	0.245	0.013	0.58	147.83	SSE
16 Feb, 2020	20:00 ~ 20:59	0.111	0.129	0.691	0.251	0.013	0.33	168.67	SSE
16 Feb, 2020	21:00 ~ 21:59	0.114	0.126	0.745	0.271	0.013	0.57	222.50	SW
16 Feb, 2020	22:00 ~ 22:59	0.088	0.120	0.860	0.313	0.013	0.58	194.67	SSW
16 Feb, 2020	23:00 ~ 23:59	0.078	0.122	0.952	0.346	0.013	1.12	227.67	SW
17 Feb, 2020	0:00 ~ 0:59	0.138	0.124	0.287	0.104	0.013	0.83	229.67	SW
17 Feb, 2020	1:00 ~ 1:59	0.113	0.123	0.000	0.000	0.013	0.67	225.33	SW
17 Feb, 2020	2:00 ~ 2:59	0.343	0.133	0.000	0.000	0.013	0.87	235.67	SW
17 Feb, 2020	3:00 ~ 3:59	0.174	0.141	0.749	0.272	0.013	0.78	245.00	WSW
17 Feb, 2020	4:00 ~ 4:59	0.016	0.092	0.534	0.194	0.013	0.28	187.50	S
17 Feb, 2020	5:00 ~ 5:59	0.027	0.005	0.263	0.096	0.013	0.17	137.17	SE
17 Feb, 2020	6:00 ~ 6:59	0.006	0.004	0.231	0.084	0.013	0.50	99.00	E
17 Feb, 2020	7:00 ~ 7:59	0.006	0.004	0.249	0.090	0.040	0.57	28.33	NNE
17 Feb, 2020	8:00 ~ 8:59	0.003	0.004	0.257	0.093	0.094	0.72	17.50	NNE
17 Feb, 2020	9:00 ~ 9:59	0.003	0.004	0.223	0.081	0.136	1.20	36.33	NE
17 Feb, 2020	10:00 ~ 10:59	0.008	0.004	0.239	0.087	0.212	1.68	85.33	E
17 Feb, 2020	11:00 ~ 11:59	0.030	0.004	0.273	0.099	0.224	1.75	144.83	SE

Max	0.343	0.141	0.952	0.346	0.224
Avg	0.097	0.073	0.438	0.159	0.043
Min	0.003	0.004	0.000	0.000	0.013

APPENDIX 2: CALIBRATION CERTIFICATE OF AIR QUALITY EQUIPMENT

Certificate of Calibration

Certificate Number: EDCQP200-4.11.5

Environmental Devices Corporation certifies the Haz-Scanner model EPAS is calibrated to published specifications and NIST traceable.

Calibration Dust Specifications are NIST traceable using Coulter Mutisizer II e. ISO12103 –1 A2 Fine Test Dust and is designed to agree with EPA Class I and Class III FRM and FEM particulate samplers and monitors and EN 12341 and EN 14907 standards.

Gas sensors are Calibrated against NIST/EPA traceable Calibration Gas using NIST primary Flow Standard: LFE774300 to ISO 17025 and EPA Instrumental Test Methods as defined by 40 CFR Part 60.

Quality system standard to meet the requirements of ANSI/ASQC standard Q9000-1994 (ISO 9001), MIL-STD 45662A, and customer's specification if required.

Temperature = 22°C
Relative Humidity = 30%
Atmospheric Pressure = 760 mmHg
Measurement Uncertainty Estimated @ 95% Confidence Level (k=2) using ISO 17025 guidelines.

Model	Serial Number	Calibration Date	Next Calibration Due
EPAS	918189	October 28, 2019	October 2020

Calibration Span Accessory if purchased	Sensor A	Sensor B	Model :
	K= 12.830	K= 9.615	CS-105

Technician	Supervisor
Dan Okuniewicz	Mark Sullivan

Environmental Devices Corporation
4 Wilder Drive Building #15
Plaistow, NH 03865
ISO-9001 Certified

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix

Noise and Vibration Monitoring Report

February, 2020

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

(BI-ANNUALLY MONITORING)

February 2020

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 10 February 2020 – 13 February 2020 as follows;

Table 1.2-1 Outlines of Noise and Vibration Level Monitoring

Monitoring Date	Monitoring Item	Parameters	Number of Points	Duration	Monitoring Methodology
From 10 February – 11 February, 2020	Noise Level	L_{Aeq}(dB)	1 (NV-1)	24 hours	On-site measurement by "Rion NL-42 sound level meter"
From 12 February – 13 February, 2020	Noise Level	L_{Aeq}(dB)	1 (NV-2)	24 hours	On-site measurement by "Rion NL-42 sound level meter"
From 11 February – 12 February, 2020	Noise Level	L_{Aeq}(dB)	1 (NV-3)	24 hours	On-site measurement by "Rion NL-42 sound level meter"
From 10 February – 11 February, 2020	Vibration Level	L_{v10} (dB)	1 (NV-1)	24 hours	On-site measurement by "Vibration Level Meter- VM-53A"
From 12 February – 13 February, 2020	Vibration Level	L_{v10} (dB)	1 (NV-2)	24 hours	On-site measurement by "Vibration Level Meter- VM-53A"
From 11 February – 12 February, 2020	Vibration Level	L_{v10} (dB)	1 (NV-3)	24 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 (L_{V10})

Source: Myanmar Koei International Ltd.

2.2 Monitoring Location

The 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 construction of 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, construction of 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 in 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 to a memory card.

The measurement period of noise and vibration was 24 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 for one location on a 24-hour basis. 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 Levels (L_{Aeq}) Monitoring at NV-1

Date	(Traffic Noise Level) Equivalent Noise Level (L_{Aeq}, dB)	
	Day Time (6:00 AM – 10:00 PM)	Night Time (10:00 PM – 6:00 AM)
10 February – 11 February, 2020	59	56
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 Levels (L_{Aeq}) Monitoring at NV-2

Date	(Commercial and Industrial Areas) Equivalent Noise Level (L_{Aeq}, 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)
12 February – 13 February, 2020	63	55	52
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 Levels (L_{Aeq}) Monitoring at NV-3

Date	(Commercial and Industrial Areas) Equivalent Noise Level (L_{Aeq}, 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)
11 February – 12 February, 2020	51	51	52
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 (L_{Aeq}) Monitoring Results at NV-1

Date	Time	(L_{Aeq}, dB)	(L_{Aeq}, dB) Each Category	(L_{Aeq}, dB) Target Value
10 February – 11 February, 2020	6:00-7:00	57	59	75
	7:00-8:00	59		
	8:00-9:00	58		
	9:00-10:00	57		
	10:00-11:00	58		
	11:00-12:00	58		
	12:00-13:00	58		
	13:00-14:00	58		
	14:00-15:00	59		
	15:00-16:00	62		
	16:00-17:00	61		
	17:00-18:00	60		
	18:00-19:00	61		
	19:00-20:00	59		
	20:00-21:00	59		
	21:00-22:00	59		
	22:00-23:00	58	56	70
	23:00-24:00	58		
	24:00-1:00	55		
	1:00-2:00	55		
	2:00-3:00	55		
	3:00-4:00	57		
	4:00-5:00	55		
	5:00-6:00	53		

Source: Myanmar Koei International Ltd.

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

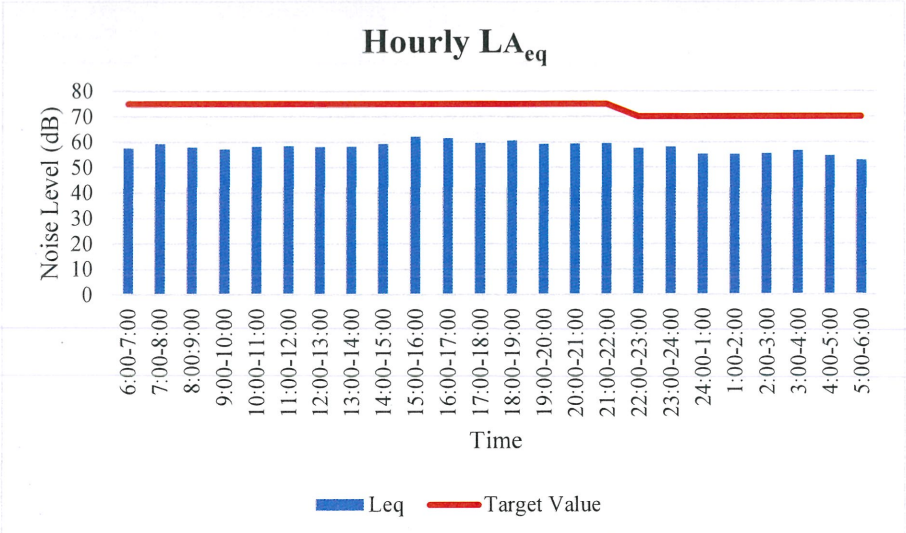
Date	Time	(L_{Aeq}, dB)	(L_{Aeq}, dB) Each Category	(L_{Aeq}, dB) Target Value
12 February – 13 February, 2020	7:00-8:00	66	63	70
	8:00-9:00	62		
	9:00-10:00	62		
	10:00-11:00	67		
	11:00-12:00	63		
	12:00-13:00	62		
	13:00-14:00	60		
	14:00-15:00	59		
	15:00-16:00	58		
	16:00-17:00	61		
	17:00-18:00	62		
	18:00-19:00	62		
	19:00-20:00	57	55	65
	20:00-21:00	54		
	21:00-22:00	52		
	22:00-23:00	53	52	60
	23:00-24:00	46		
	24:00-1:00	47		
	1:00-2:00	45		
	2:00-3:00	45		
	3:00-4:00	47		
	4:00-5:00	52		
	5:00-6:00	50		
	6:00-7:00	59		

Source: Myanmar Koei International Ltd.

Table 2.4-6 Hourly Noise Level (LA_{eq}) Monitoring Results at NV-3

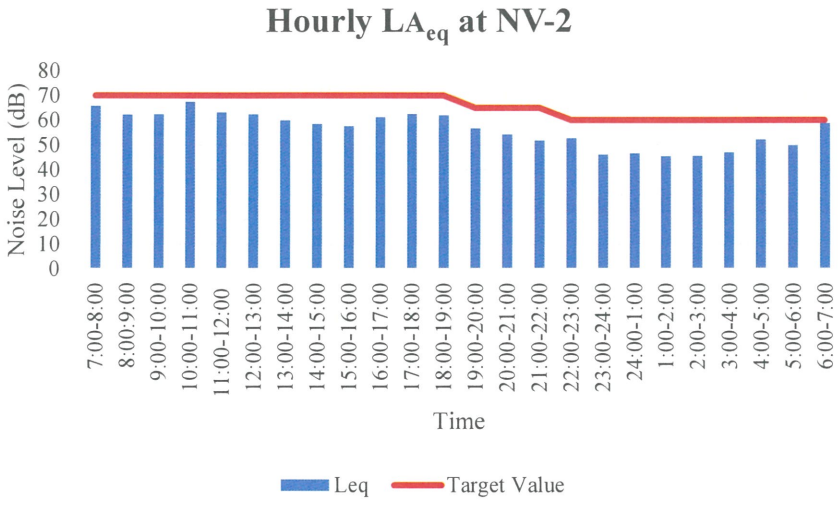
Date	Time	(LA_{eq}, dB)	(LA_{eq}, dB) Each Category	(LA_{eq}, dB) Target Value
11 February – 12 February, 2020	7:00-8:00	45	51	70
	8:00-9:00	42		
	9:00-10:00	45		
	10:00-11:00	46		
	11:00-12:00	45		
	12:00-13:00	45		
	13:00-14:00	45		
	14:00-15:00	48		
	15:00-16:00	48		
	16:00-17:00	56		
	17:00-18:00	57		
	18:00-19:00	54		
	19:00-20:00	55	51	65
	20:00-21:00	46		
	21:00-22:00	45		
	22:00-23:00	46	52	60
	23:00-24:00	47		
	24:00-1:00	48		
	1:00-2:00	46		
	2:00-3:00	49		
	3:00-4:00	52		
	4:00-5:00	56		
	5:00-6:00	58		
	6:00-7:00	47		

Source: Myanmar Koei International Ltd.



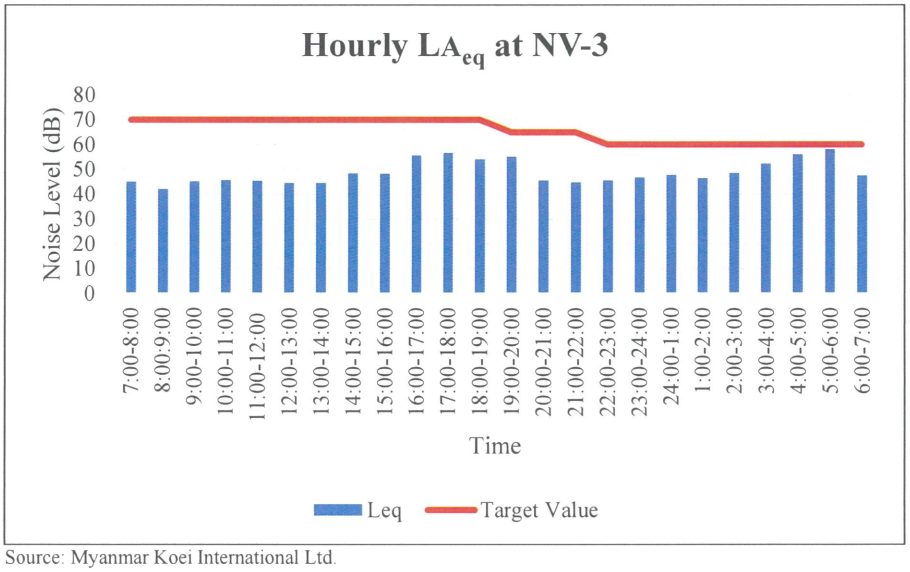
Source: Myanmar Koei International Ltd.

Figure 2.4-1 Results of Noise Levels (LA_{eq}) Monitoring at NV-1



Source: Myanmar Koei International Ltd.

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



Source: Myanmar Koei International Ltd.

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

Vibration Monitoring Results

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 Levels (L_{v10}) Monitoring at NV-1

Date	(Office, commercial facilities, and factories) Equivalent Vibration Level (L_{v10}, 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)
10 February – 11 February, 2020	48	46	43
Target Value	70	65	65

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 2.4-8 Results of Vibration Levels (L_{v10}) Monitoring at NV-2

Date	(Office, commercial facilities, and factories) Equivalent Vibration Level (L_{v10}, 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)
12 February – 13 February, 2020	37	29	25
Target Value	70	65	65

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 2.4-9 Results of Vibration Levels (L_{v10}) Monitoring at NV-3

Date	(Office, commercial facilities, and factories) Equivalent Vibration Level (L_{v10}, 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)
11 February – 12 February, 2020	31	26	22
Target Value	70	65	65

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 2.4-10 Results of Hourly Vibration Levels (L_{v10}) Monitoring at NV-1

Date	Time	(L_{v10}, dB)	(L_{v10}, dB) Each Category	(L_{v10}, dB) Target Value
10 February – 11 February, 2020	7:00-8:00	45	48	70
	8:00-9:00	45		
	9:00-10:00	47		
	10:00-11:00	49		
	11:00-12:00	49		
	12:00-13:00	48		
	13:00-14:00	48		
	14:00-15:00	48		
	15:00-16:00	50		
	16:00-17:00	49		
	17:00-18:00	48		
	18:00-19:00	46		
	19:00-20:00	46	46	65
	20:00-21:00	45		
	21:00-22:00	46		
	22:00-23:00	44	43	65
	23:00-24:00	45		
	24:00-1:00	42		
	1:00-2:00	43		
	2:00-3:00	42		
	3:00-4:00	43		
	4:00-5:00	41		
	5:00-6:00	40		
	6:00-7:00	45		

Source: Myanmar Koei International Ltd.

Table 2.4-11 Results of Hourly Vibration Levels (L_{v10}) Monitoring at NV-2

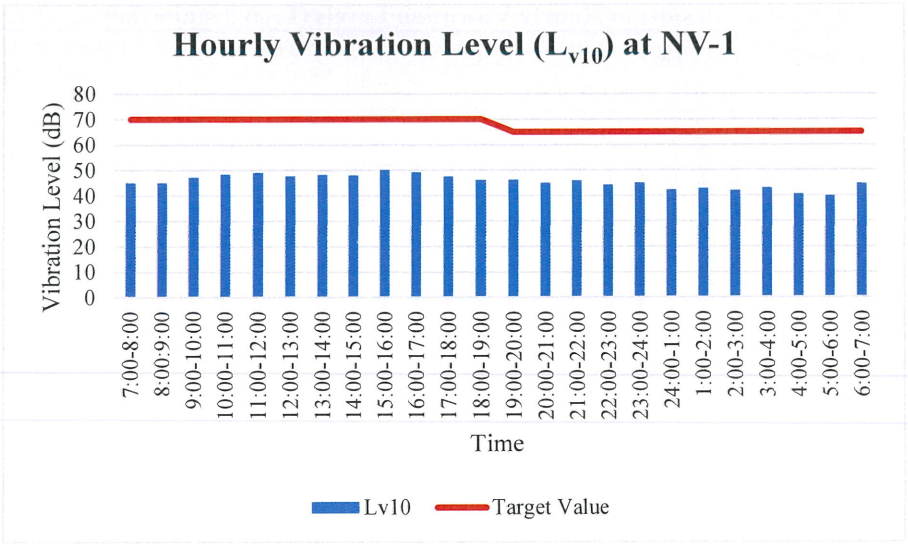
Date	Time	(L_{v10}, dB)	(L_{v10}, dB) Each Category	(L_{v10}, dB) Target Value
12 February – 13 February, 2020	7:00-8:00	39	37	70
	8:00-9:00	41		
	9:00-10:00	37		
	10:00-11:00	37		
	11:00-12:00	38		
	12:00-13:00	36		
	13:00-14:00	37		
	14:00-15:00	38		
	15:00-16:00	35		
	16:00-17:00	36		
	17:00-18:00	36		
	18:00-19:00	32		
	19:00-20:00	31	29	65
	20:00-21:00	29		
	21:00-22:00	24		
	22:00-23:00	25	25	65
	23:00-24:00	22		
	24:00-1:00	20		
	1:00-2:00	21		
	2:00-3:00	24		
	3:00-4:00	23		
	4:00-5:00	21		
	5:00-6:00	24		
	6:00-7:00	32		

Source: Myanmar Koei International Ltd.

Table 2.4-12 Results of Hourly Vibration Levels (L_{v10}) Monitoring at NV-3

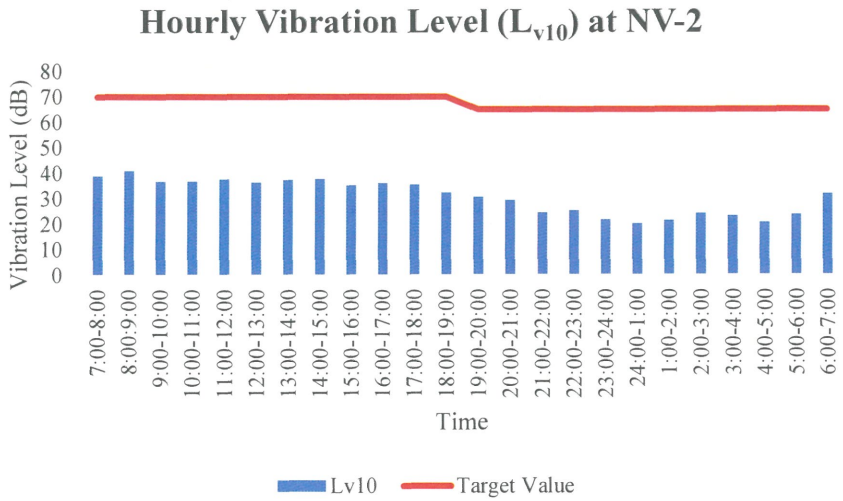
Date	Time	(L_{v10}, dB)	(L_{v10}, dB) Each Category	(L_{v10}, dB) Target Value
11 February – 12 February, 2020	7:00-8:00	26	31	70
	8:00-9:00	34		
	9:00-10:00	29		
	10:00-11:00	28		
	11:00-12:00	32		
	12:00-13:00	32		
	13:00-14:00	31		
	14:00-15:00	32		
	15:00-16:00	30		
	16:00-17:00	33		
	17:00-18:00	32		
	18:00-19:00	26		
	19:00-20:00	29	26	65
	20:00-21:00	24		
	21:00-22:00	24		
	22:00-23:00	24	22	65
	23:00-24:00	20		
	24:00-1:00	24		
	1:00-2:00	21		
	2:00-3:00	24		
	3:00-4:00	21		
	4:00-5:00	18		
	5:00-6:00	18		
	6:00-7:00	21		

Source: Myanmar Koei International Ltd.



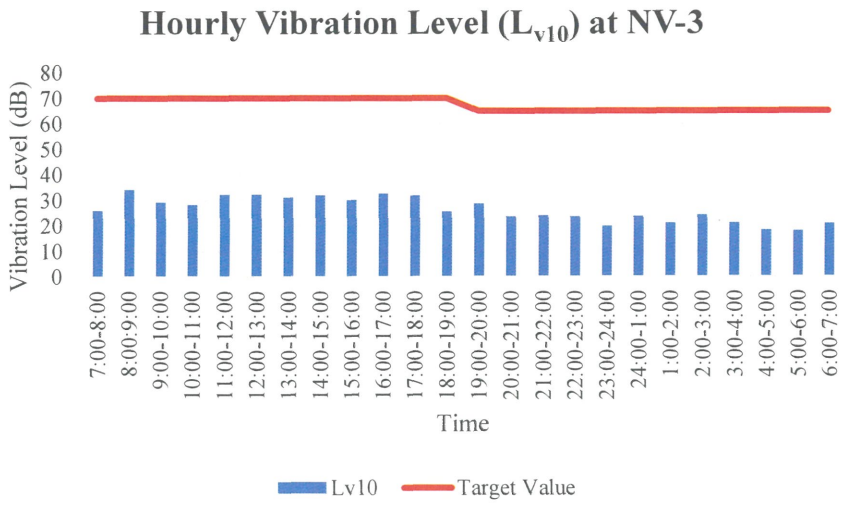
Source: Myanmar Koei International Ltd.

Figure 2.4-4 Results of Vibration Levels (L_{v10}) Monitoring at NV-1



Source: Myanmar Koei International Ltd.

Figure 2.4-5 Results of Vibration Levels (L_{v10}) Monitoring at NV-2



Source: Myanmar Koei International Ltd.

Figure 2.4-6 Results of Vibration Levels (L_{v10}) 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 (Zone A)

Development Project (Operation Phase)

Appendix

Soil contamination survey in Thilawa SEZ

December, 2019

MJTD MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED

SOIL CONTAMINATION SUREVEY IN THILAWA SEZ (ZONE A)

December 2019

Resource & Environment Myanmar Ltd. B-702/401 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)

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 is 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 of the Thilawa SEZ car road and intended to plant the trees along the slop. The soil condition is fine to medium grained, reddish brown colored silty caly.

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 (Phase-2). 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

Survey Period

Soil sampling was carried out on 5th December 2019.

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 top soil 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 is 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 are complied with the proposed standard value of contamination whereas arsenic concentration at two locations is slightly higher than only Vietnam standard.

Table 4 Soil quality result

No.	Parameter	Unit	S-1	S-2	S-3	S-4	S-5	Standard		
								Japan	Thailand	Vietnam
1	pH	-	5.5	5.3	7.4	6.7	7.2	-	-	-
2	Mercury	Mg/kg	0.149	ND	ND	ND	ND	15	610	-
3	Arsenic	Mg/kg	16.0	6.21	10.8	6.74	14.6	150	27	12
4	Lead	Mg/kg	24.5	13.0	20.4	15.5	19.8	150	750	300
5	Cadmium	Mg/kg	ND	ND	ND	ND	ND	150	810	10
6	Copper	Mg/kg	28.5	18.5	28.4	23.6	25.8	125	-	100
7	Zinc	Mg/kg	40.7	32.1	78.0	53.9	59.8	150	-	300
8	Chromium	Mg/kg	63.3	34.4	67.6	38.4	89.0	250	640	-
9	Fluoride	Mg/kg	1.20	1.00	2.57	1.55	4.11	4000	-	-
10	Boron	Mg/kg	28.6	15.3	21.9	15.3	28.9	4000	-	-
11	Selenium	Mg/kg	0.292	0.124	ND	0.158	0.314	150	10,000	-

Appendix

Lab Result


MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED
MJTD

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel. 0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

ANALYSIS REPORT

PROJECT NAME : SOIL CONTAMINATION SURVEY IN THILAWA SEZ (ZONE A)
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : THILAWA
SAMPLE TYPE : SOIL
SAMPLING DATE : DECEMBER 5, 2019
SAMPLING TIME : -
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

RECEIVED DATE : DECEMBER 11, 2019
ANALYTICAL DATE : DECEMBER 11-22, 2019
REPORT NO. : 2019-U76110
WORK NO. : 2019-008763
ANALYSIS NO. : T19AR594-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			S-1 T19AR594-0001	
FLUORIDE	mg/kg	ION SELECTIVE ELECTRODE METHOD (U.S. EPA 1996:9214)	1.20	0.80
pH (1:1)	-	ELECTROMETRIC METHOD (U.S. EPA 2004:9045 D)	5.5 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1992:7061 A)	16.0	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	ND	0.300
MERCURY (Hg)	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (U.S.EPA 2007:7471 B)	0.149	0.100
SELENIUM (Se)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1994:7742)	0.292	0.100
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	63.3	0.500
COPPER (Cu)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	28.5	0.300
BORON (B)	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (U.S.EPA 1996:3050 B AND 2018:6010 D)	28.6	0.250
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	24.5	1.55
ZINC (Zn)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	40.7	0.350
SAMPLE CONDITION			BROWN SOIL	

ND : NON-DETECTABLE.
RESULT(S) REPORTED ON A DRY WEIGHT BASIS.

*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

DECEMBER 23, 2019

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

ANALYSIS REPORT

PROJECT NAME : SOIL CONTAMINATION SURVEY IN THILAWA SEZ (ZONE A)
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : THILAWA
SAMPLE TYPE : SOIL
SAMPLING DATE : DECEMBER 5, 2019
SAMPLING TIME : -
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

RECEIVED DATE : DECEMBER 11, 2019
ANALYTICAL DATE : DECEMBER 11-22, 2019
REPORT NO. : 2019-U76081
WORK NO. : 2019-008763
ANALYSIS NO. : T19AR594-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			S-2 T19AR594-0002	
FLUORIDE	mg/kg	ION SELECTIVE ELECTRODE METHOD (U.S. EPA 1996:9214)	1.00	0.80
pH (1:1)	-	ELECTROMETRIC METHOD (U.S. EPA 2004:9045 D)	5.3 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1992:7061 A)	6.21	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	ND	0.300
MERCURY (Hg)	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (U.S.EPA 2007:7471 B)	ND	0.100
SELENIUM (Se)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1994:7742)	0.124	0.100
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	34.4	0.500
COPPER (Cu)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	18.5	0.300
BORON (B)	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (U.S.EPA 1996:3050 B AND 2018:6010 D)	15.3	0.250
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	13.0	1.55
ZINC (Zn)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	32.1	0.350
SAMPLE CONDITION			BROWN SOIL	

ND : NON-DETECTABLE.
RESULT(S) REPORTED ON A DRY WEIGHT BASIS.

*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

DECEMBER 23, 2019

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

ANALYSIS REPORT

PROJECT NAME	: SOIL CONTAMINATION SURVEY IN THILAWA SEZ (ZONE A)		
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.		
ADDRESS	: B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR		
CONTACT INFORMATION	: TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net		
SAMPLING SOURCE	: THILAWA		
SAMPLE TYPE	: SOIL	**RECEIVED DATE**	: DECEMBER 11, 2019
SAMPLING DATE	: DECEMBER 5, 2019	**ANALYTICAL DATE**	: DECEMBER 11-22, 2019
SAMPLING TIME	: -	**REPORT NO.**	: 2019-U76082
SAMPLING METHOD	: -	**WORK NO.**	: 2019-008763
SAMPLING BY	: CUSTOMER	**ANALYSIS NO.**	: T19AR594-0003
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			S-3 T19AR594-0003	
FLUORIDE	mg/kg	ION SELECTIVE ELECTRODE METHOD (U.S. EPA 1996:9214)	2.57	0.80
pH (1:1)	-	ELECTROMETRIC METHOD (U.S. EPA 2004:9045 D)	7.4 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1992:7061 A)	10.8	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	ND	0.300
MERCURY (Hg)	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (U.S.EPA 2007:7471 B)	ND	0.100
SELENIUM (Se)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1994:7742)	ND	0.100
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	67.6	0.500
COPPER (Cu)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	28.4	0.300
BORON (B)	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (U.S.EPA 1996:3050 B AND 2018:6010 D)	21.9	0.250
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	20.4	1.55
ZINC (Zn)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	78.0	0.350
SAMPLE CONDITION			BROWN SOIL	

ND : NON-DETECTABLE.
RESULT(S) REPORTED ON A DRY WEIGHT BASIS.

*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

DECEMBER 23, 2019

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

ANALYSIS REPORT

PROJECT NAME : SOIL CONTAMINATION SURVEY IN THILAWA SEZ (ZONE A)
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : THILAWA
SAMPLE TYPE : SOIL
SAMPLING DATE : DECEMBER 5, 2019
SAMPLING TIME : -
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

RECEIVED DATE : DECEMBER 11, 2019
ANALYTICAL DATE : DECEMBER 11-22, 2019
REPORT NO. : 2019-U76083
WORK NO. : 2019-008763
ANALYSIS NO. : T19AR594-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			S-4 T19AR594-0004	
FLUORIDE	mg/kg	ION SELECTIVE ELECTRODE METHOD (U.S. EPA 1996:9214)	1.55	0.80
pH (1:1)	-	ELECTROMETRIC METHOD (U.S. EPA 2004:9045 D)	6.7 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1992:7061 A)	6.74	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	ND	0.300
MERCURY (Hg)	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (U.S.EPA 2007:7471 B)	ND	0.100
SELENIUM (Se)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1994:7742)	0.158	0.100
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	38.4	0.500
COPPER (Cu)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	23.6	0.300
BORON (B)	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (U.S.EPA 1996:3050 B AND 2018:6010 D)	15.3	0.250
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	15.5	1.55
ZINC (Zn)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	53.9	0.350
SAMPLE CONDITION			BROWN SOIL	

ND : NON-DETECTABLE.
RESULT(S) REPORTED ON A DRY WEIGHT BASIS.
*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

DECEMBER 23, 2019

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

ANALYSIS REPORT

PROJECT NAME	: SOIL CONTAMINATION SURVEY IN THILAWA SEZ (ZONE A)		
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.		
ADDRESS	: B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR		
CONTACT INFORMATION	: TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net		
SAMPLING SOURCE	: THILAWA		
SAMPLE TYPE	: SOIL	**RECEIVED DATE**	: DECEMBER 11, 2019
SAMPLING DATE	: DECEMBER 5, 2019	**ANALYTICAL DATE**	: DECEMBER 11-22, 2019
SAMPLING TIME	: -	**REPORT NO.**	: 2019-U76084
SAMPLING METHOD	: -	**WORK NO.**	: 2019-008763
SAMPLING BY	: CUSTOMER	**ANALYSIS NO.**	: T19AR594-0005
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			S-5 T19AR594-0005	
FLUORIDE	mg/kg	ION SELECTIVE ELECTRODE METHOD (U.S. EPA 1996:9214)	4.11	0.80
pH (1:1)	-	ELECTROMETRIC METHOD (U.S. EPA 2004:9045 D)	7.2 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1992:7061 A)	14.6	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	ND	0.300
MERCURY (Hg)	mg/kg	ACID DIGESTION AND COLD VAPOUR AAS METHOD (U.S.EPA 2007:7471 B)	ND	0.100
SELENIUM (Se)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (U.S.EPA 1996:3050 B AND 1994:7742)	0.314	0.100
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	89.0	0.500
COPPER (Cu)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	25.8	0.300
BORON (B)	mg/kg	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (U.S.EPA 1996:3050 B AND 2018:6010 D)	28.9	0.250
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	19.8	1.55
ZINC (Zn)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (U.S.EPA 1996:3050 B AND 2007:7000 B)	59.8	0.350
SAMPLE CONDITION			BROWN SOIL	

ND : NON-DETECTABLE.
RESULT(S) REPORTED ON A DRY WEIGHT BASIS.

*United Analyst Engineering Consultant Co., Ltd is Sub-contractor of REM-UAE Laboratory and Consultant Co., Ltd

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

DECEMBER 23, 2019

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix

Ground Subsidence Monitoring Status

(Location- Admin Complex Compound)

October 2019 to March 2019

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	

Thilawa Special Economic Zone- B

(Phase-1 Operation Phase)

Appendix

General Waste Disposal Record

(October 2019 to March 2020)

Manifest	C-Slip	*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 27 - Sep - 2019	Issuer	(Name&Sign)
Number of issuance	9999 - 1909 - ~~0278~~ 0281		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd	GEM	GEM
Tel			

	Kind	Name	Style of packing
Waste	☑Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	840 kg	A001

Customer code	0001	Waste Profile code	A001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) 3K-8896 Kyaw Naing Oo	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(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) 27 - Sep - 2019	Issuer	(Name&Sign)
Number of issuance	9999 - 1909 - ~~0279~~ 28 0282		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd	GEM	GEM
Tel			

Waste	Kind	Name	Style of packing
	☑Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	1,400 kg	B001

Customer code	0001	Waste Profile code	A001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) Sep 27/09/19	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(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) 12 - Oct - 2019	Issuer	(Name&Sign)
Number of issuance	0999 - 1010 - 0138		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd	GCM	GCM
Tel			

Waste	Kind	Name	Style of packing
	☐Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	960 kg	0001

Customer code	0001	Waste Profile code	0001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) Saw Saw Seng Win 3R-8896	(Day Month, Year)
Waste service company	(Name&Sign) Phyo Dhyu Aye	(Day Month, Year)

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

Manifest — C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 12 - Oct - 2019	Issuer	(Name&Sign)
Number of issuance	0999 - 1010 - 0139		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd	GCM	GCM
Tel			

Waste	Kind	Name	Style of packing
	☑Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	1480 kg	0001

Customer code	0001	Waste Profile code	0001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) Saw Saw Seng Win 3R-8896	(Day Month, Year)
Waste service company	(Name&Sign) Phyo Dhyu Aye	(Day Month, Year)

JAPAN THILAWA DEVELOPMENT LIMITED MJTD MYANMAR

Manifest — C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 09-Nov-2019	Issuer	(Name&Sign)
Number of issuance	9999-1911-0040		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd.	GEM	GEM
Tel	Ltd.		

Waste	Kind	Name	Style of packing
	☑Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	~~800 kg~~ 880 kg	ECO1

Customer code	OCO1	Waste Profile code	ACO1

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign)	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(Day Month, Year)

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

Manifest — C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 09-NOV-2019	Issuer	(Name&Sign)
Number of issuance	9999-1911-0107		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd	GEM	GEM
Tel	Ltd		

Waste	Kind	Name	Style of packing
	☑Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	1180 kg	ECO1

Customer code	COO1	Waste Profile code	ACO1

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign)	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(Day Month, Year)

Designed by GOLDEN DOWA ECO-SYSTEM MYANMAR CO., LTD.

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

Manifest — C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 7th Dec. 2019	Issuer	(Name&Sign)
Number of issuance	9999 - 1912 - 0004		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development	GCM	GCM
Tel			

Waste	Kind	Name	Style of packing
	☐Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	800 kg	0001

Customer code	0001	Waste Profile code	0001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) Myint Htut 3k 8896	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(Day Month, Year)

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

Customer: Golden Dowa Eco-System Myanmar Co., Ltd

Materials: ~~SLUDGE~~ General Waste

8120kg G
5320kg PI
800kg M

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

Manifest

C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 3rd Jan - 2020	Issuer	(Name&Sign)
Number of issuance	1999 - 2001 - 0024		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Mayan Co. Japan Thilawa Development Ltd	GEM	GEM
Tel			

	Kind	Name	Style of packing
Waste	☐Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	820 kg	0001

Customer code	0001	Waste Profile code	A0001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) Sein Sein Sein Win 3R-8896	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(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) 27 - Jan - 2020	Issuer	(Name&Sign) Tar Yar Linn
Number of issuance	9999 - 2001 - 0273		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd.	GEM	GEM
Tel			

	Kind	Name	Style of packing
Waste	☐Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	1,100 kg	0001

Customer code	0001	Waste Profile code	A001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) Htaypo 32/8896	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(Day Month, Year)

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

27 JAN

MJTD

Manifest C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 27 - Jan - 2020	Issuer	(Name&Sign) Tar Yar Linn
Number of issuance	9999 - 2001 - 0282		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd.	GEM	GEM
Tel			

	Kind	Name	Style of packing
Waste	☑Non-Hazardous	General waste	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	1,200 kg	0001

Customer code	0001	Waste Profile code	A001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) Htaypo 32/8896	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(Day Month, Year)

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

Manifest. C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 26-Feb-2020	Issuer	(Name&Sign)
Number of issuance	9999 - 2002 - 0320		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd	GEM	GEM
Tel			

Waste	Kind	Name	Style of packing
	☐Non-Hazardous	General waste.	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	840 kg	0001

Customer code	0001	Waste Profile code	A001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) 3K-8896	(Day Month, Year)
Waste service company	(Name&Sign) Phyu Phyu Aye	(Day Month, Year)

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

Manifest C-Slip

*Transportation company to Waste Generator

Date of issuance	(Day Month, Year) 26/Feb/2020	Issuer	(Name&Sign)
Number of issuance	9999 - 2002 - 0339		

Contractors	Waste generator	Transportation company	Waste service company
Company Name	Myanmar Japan Thilawa Development Ltd.	GEM	GEM
Tel			

Waste	Kind	Name	Style of packing
	☑Non-Hazardous	General waste.	
	☐Hazardous	Quantity(Unit)	Remark
	☐Others	740 kg	0001

Customer code	0001	Waste Profile code	A001

Trace	PIC(Name&Sign)	Date of Completion
Transportation company	(Name&Sign) 3K-8896	(Day Month, Year)
Waste service company	(Name&Sign) Aei Mya Thet Mar	(Day Month, Year)

Designed by GOLDEN DOWA ECO-SYSTEM MYANMAR CO., LTD.

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED MJTD

မြို့နယ်စည်ပင်သာယာရေးအဖွဲ့

ကျောက်တန်းမြို့

ငွေလွှဲပြောင်း/လက်ခံပြေစာ

၁။ လွှဲပြောင်းပေးသည့်ငွေ(စာဖြင့်) ---------ငါးသောင်းကျပ်တိတိ---------

၂။ လွှဲပြောင်းပေးသည့်ငွေ(ဂဏန်းဖြင့်) ---------၅၀,၀၀၀---------

၃။ လွှဲပြောင်းပေးသည့်အကြောင်းအရာ ---------အိမ်ယမင်းအမှိုက်သယ်ယူခ---------

၄။ လွှဲပြောင်းပေးသည့်ရက်စွဲ ---------၀၇.၃.၂၀၂၃---------

၅။ အထက်ဖော်ပြပါငွေကျပ်(---------ဒဿမတစ်---------) အား လက်ခံရရှိပါကြောင်းအောက်တွင်လက်မှတ်

ရေးထိုးပါသည်-

လွှဲပြောင်းပေးသူ

အမည်၊ Kyaw Khine Phyo

ရာထူး၊ Accountant

လွှဲပြောင်းလက်ခံသူ

အမည်၊

လိပ်စာ၊

MJTD MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED

Thilawa Special Economic Zone (Zone A)

Development Project (Operation Phase)

Appendix

Sewage Treatment Plant Monitoring Record

October 2019 to March 2020

Monitoring Parameters Result for STP(Phase-1)

Month	Date	Inlet																																						
		pH	ORP	DO	EC	TDS	Turbidity	Temp	COD	SS	BOD	T-Coli	T-N	T-P	O&G	Color	Odor	Mercury	Zinc	Arsenic	Chromium	Cadmium	Selenium	Lead	Copper	Barium	Nickel	Silver	Iron	Cyanide	Total Cyanide	Ammonia	Hexavalent Chromium	Fluoride	Free Chlorine	Sulphide	Formal-dehyde	Phenols	Total Chlorine
		Daily Parameters								Weekly Parameters						Monthly Parameters																										
Standard		6 – 9	-	-	-	Max 2,000	-	Max 35	Max 400	Max 200	Max 200	–	Max 80	Max8	Max 40	150	150	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	Max3.5	Max 0.1	Max1	Max80	Max0.1	Max20	Max 1	Max 1	Max 1	Max 0.5	Max0.2
Unit		-	mv	mg/L	µs/cm	ppm	FNU	°C	ppm	ppm	ppm	MPN/100m	ppm	ppm	ppm	Co-Pt	Co-Pt	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Oct	1-Oct-19	7.32	307.1	1.36	830	415	13.7	30.77																																
Oct	2-Oct-19	7.57	191.3	1.61	703	351	25.4	30.59	69	38	33.55	-	17.4	2.11	< 3.1																									
Oct	3-Oct-19	7.32	267.8	1.82	599	300	-	30.86	-																															
Oct	4-Oct-19				Low Battery		-	-	-																															
Oct	5-Oct-19				Low Battery																																			
Oct	6-Oct-19				Low Battery																																			
Oct	7-Oct-19				Low Battery		-	-	47																															
Oct	8-Oct-19	7.24	320.8	2.58	946	473	12.6	30.77	-																															
Oct	9-Oct-19	7.48	354.2	2.04	668	334	9.6	30.8	-																															
Oct	10-Oct-19	7.44	299.6	1.74	679	340	10.4	30.82	-																															
Oct	11-Oct-19	7.6	331.1	1.31	1147	574	16.6	30.89																																
Oct	12-Oct-19	7.48	268.2	1.28	1110	698	15.4	30.68																																
Oct	13-Oct-19	7.34	274.4	1.38	998	674	16.2	31.42																																
Oct	14-Oct-19	7.42	268.4	1.29	982	664	15.3	31.52																																
Oct	15-Oct-19	7.21	356.4	1.71	702	351	25	30.63																																
Oct	16-Oct-19	7.31	400.6	1.54	607	303	16	-	435																															
Oct	17-Oct-19	7.37	298.6	1.63	700	350	141	-	-																															
Oct	18-Oct-19	7.61	326	1.89	1178	589	196	31.08	-																															
Oct	19-Oct-19	7.86	336.2	1.62	1078	684	186	31.2																																
Oct	20-Oct-19	7.68	331.4	1.66	1120	520	146	30.26																																
Oct	21-Oct-19	7.4	353.1	1.08	1001	501	21.6	30.37	-																															
Oct	22-Oct-19	7.46	168.1	1.02	957	479	7	31.21	-																															
Oct	23-Oct-19	7.5	17.1	1.28	518	259	23.5	32.18	28																															
Oct	24-Oct-19	7.35	234.4	0.91	992	496	29	28.06	-																															
Oct	25-Oct-19	7.53	90	0.94	6.78	253	19.7	30.8	-																															
Oct	26-Oct-19	7.46	86.2	0.72	598	456	18.2	30.72																																
Oct	27-Oct-19	7.37	87.3	0.74	574	472	17.4	31.1																																
Oct	28-Oct-19	7.42	80.9	0.77	586	484	16.6	31.12	-																															
Oct	29-Oct-19	7.31	289.3	1.15	810	449	13.6	30.72	-																															
Oct	30-Oct-19	7.52	19.6	1.74	837	464	21.5	30.79	59																															
Oct	31-Oct-19	7.4	-	-	-	448	-	31	-																															
Nov	1-Nov-19	7.26	408.6	2.18	652	362	26.4	30.68	-																															
Nov	2-Nov-19	7.47	134.3	1.06	778	389	23.7	31.11																																
Nov	3-Nov-19	7.48	203	1.03	755	378	18.5	30.93																																
Nov	4-Nov-19	7.37	123.1	0.77	862	431	12.4	30.84	-																															
Nov	5-Nov-19	7.26	200.9	0.98	824	412	27.6	30.91	-																															
Nov	6-Nov-19	7.59	230.1	1.04	950	475	15.7	30.91	50	28	25.06	-	11.3	1.45	< 3.1																									
Nov	7-Nov-19	7.5	-	-	-	508	-	30.78	-																															
Nov	8-Nov-19	7.25	547.4	1.38	376	188	43.9	29.96	-																															
Nov	9-Nov-19	7.22	525.6	1.26	384	192	48.2	28.72																																
Nov	10-Nov-19	7.28	300.9	1.25	749	374	28.3	30.02																																
Nov	11-Nov-19	7.37	250.9	1.08	745	372	23.3	30.26																																
Nov	12-Nov-19	7.44	241.4	1.18	719	360	29.1	30.23																																
Nov	13-Nov-19	7.42	294.5	1.04	667	334	28.5	30.75	103																															
Nov	14-Nov-19	7.33	324.7	1.15	658	329	25.6	30.46	-																															
Nov	15-Nov-19	7.27	332.3	1.1	516	258	12.7	30.64	-																															
Nov	16-Nov-19	7.34	350.8	1.19	553	277	10	30.5																																
Nov	17-Nov-19	7.5	278.2	1.18	727	364	9.2	30.69																																
Nov	18-Nov-19	7.68	125.1	0.89	794	397	12.5	30.85	33.5																															
Nov	19-Nov-19	7.43	106.6	0.59	569	285	14.9	30.21	-																															
Nov	20-Nov-19	7.38	261.2	0.65	748	374	26.9	30.65	-																															
Nov	21-Nov-19	7.41	248.3	0.56	792	297	27.4	30.64		National Day																																
Nov	22-Nov-19	7.1	258.1	0.82	574	287	21.4	30.09	-																															
Nov	23-Nov-19	7.37	152.1	0.8	1003	502	29.6	30.34																																
Nov	24-Nov-19	7.36	183.6	0.77	878	439	11	30.49																																
Nov	25-Nov-19	7.19	180.6	0.64	720	362	14.9	30.16	-																															
Nov	26-Nov-19	7.22	282.2	0.87	1100	550	18.5	30.59	-																															
Nov	27-Nov-19	7.51	113.6	6.78	678	339	18.8	30.46	48																															
Nov	28-Nov-19	7.3	-	-	-	350	-	30.44	-																															
Nov	29-Nov-19	7.28	131.6	0.9	1008	114	32.8	30.5	-																															
Nov	30-Nov-19	6.68	128.7	2.66	694	347	7.9	30.7																																
Dec	1-Dec-19	6.56	110.1	1.32	614	307	10	30.3																																
Dec	2-Dec-19	6.4	89.5	1.95	673	336	7.9	30.43	-																															
Dec	3-Dec-19	6.93	63.8	2.39	700	350	33.1	30.46																																
Dec	4-Dec-19	-	-	-	-	-	-	-	42	16	4.51	-	13.1	1.27	< 3.1	5.66	1	≤0.002	0.028	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	≤0.002	0.012	≤0.002	1.338	< 0.002	0.007	14.7	< 0.05	1.492	< 0.1	0.018	0.057	< 0.002	-
Dec	5-Dec-19	-	-	-	-	-	-	-	-																															
Dec	6-Dec-19	6.62	22.6	3.04	1015	602	31.5	29.81	-																															
Dec	7-Dec-19	6.64	182.4	3.38	601	300	11.3	29.91	-																															
Dec	8-Dec-19	6.81	7.8	2.69	763	381	15.8	29.43	-																															
Dec	9-Dec-19	6.58	61	1.06	1120	560	8.5	28.93	-																															
Dec	10-Dec-19	6.63	168.2	1.13	1226	613	8	29.21	-																															
Dec	11-Dec-19	-	-	-	-	-	-	-	39.1																															
Dec	12-Dec-19	-	-	-	-	-	-	-	-																															
Dec	13-Dec-19	6.41	90.5	1.21	668	334	10.3	29.39	-																															
Dec	14-Dec-19	6.64	189.8	0.72	649	325	10.4	29.26	-																															
Dec	15-Dec-19	6.98	80.8	3.17	808	404	12	29.55	-																															
Dec	16-Dec-19	6.79	18.5	4.29	781	390	14.9	29.81	-																															
Dec	17-Dec-19	6.98	172.5	3.77	916	458	32.7	29.44	-																															
Dec	18-Dec-19	6.96	177.5	-	-	-	-	-	38																															
Dec	19-Dec-19	6.84	228.4	4.39	774	387	32.4	29.69	-																															
Dec	20-Dec-19	6.56	300.2	5.09	535	268	19.8	29.69	-																															
Dec	21-Dec-19	6.83	360	0.46	818	409	162	29.48	-																															
Dec	22-Dec-19	6.75	134.8	3.53	686	748	13	29.76	-																															
Dec	23-Dec-19	-	-	-	-	-	-	-	68																															
Dec	24-Dec-19	6.69	11.3	3.44	1264	632	53.9	27.91	-																															
Dec	25-Dec-19	-	-	-	-	-	-	-	-																															
Dec	26-Dec-19	-	-	-	-	-	-	-	-																															
Dec	27-Dec-19	6.6	4.7	3.65	823	412	17.7	28.16	-																															
Dec	28-Dec-19	6.75	276	5.09	517	258	25	29.57	-																															
Dec	29-Dec-19	6.85	199.7	4.06	496	248	17.5	29.25	-																															
Dec	30-Dec-19	6.61	114.2	3.76	473	236	11.6	29.23	108																															
Dec	31-Dec-19	6.4	369.1	3.22	524	262	80.8	29.34	-																															
Jan	1-Jan-20	6.79	361.4	4.45	650	325	13.3	29.46	-																															
Jan	2-Jan-20	6.8	293	6.18	526	263	49.7	30.12	-																															

Jan	3-Jan-20	6.38	104.7	3.81	1013	506	38.6	27.68	-						
Jan	4-Jan-20	-	-	-	-	-	-	-	-						
Jan	5-Jan-20	-	-	-	-	-	-	-	-						
Jan	6-Jan-20	-	-	-	-	-	-	-	-						
Jan	7-Jan-20	-	-	-	-	-	-	-	-						
Jan	8-Jan-20	-	-	-	-	-	-	-	52	30	16.57	-	23	1.11	< 3.1
Jan	9-Jan-20	6.46	-	-	-	-	-	-	-						
Jan	10-Jan-20	6.39	270	5.64	793	396	8.3	29.31	-						
Jan	11-Jan-20	6.48	369.6	4.15	853	426	11	29.46	-						
Jan	12-Jan-20	6.58	151.9	4.88	680	340	13.1	29.11	-						
Jan	13-Jan-20	6.71	224.1	4.25	752	376	9.2	29.16	-						
Jan	14-Jan-20	6.32	237.6	4.08	502	251	18.2	29.31	-						
Jan	15-Jan-20	-	-	-	-	-	-	-	251						
Jan	16-Jan-20	6.88	203	1.98	751	375	11.2	29.47	-						
Jan	17-Jan-20	7.1	195.9	3.08	996	498	29.4	29.34	-						
Jan	18-Jan-20	7.37	194.5	3.33	903	452	23.2	30.46	-						
Jan	19-Jan-20	8.42	78.5	4.06	801	401	17	29.23	-						
Jan	20-Jan-20	7.07	121.8	1.69	981	491	13.9	28.94	-						
Jan	21-Jan-20	6.92	5.2	2.89	971	485	0.47	21.8	-						
Jan	22-Jan-20	6.74	5.8	2.96	865	458	0.46	21.5	54						
Jan	23-Jan-20	7.16	-	-	-	-	-	-	-						
Jan	24-Jan-20	7.28	275.4	1.49	878	439	22.9	29.64	-						
Jan	25-Jan-20	8.79	249.8	2.56	683	341	13.8	29.04	-						
Jan	26-Jan-20	8.86	138.3	1.96	697	351	11.8	29	-						
Jan	27-Jan-20	8.59	184.7	2.04	652	326	14.2	28.4	-						
Jan	28-Jan-20	8.39	311.2	2.24	920	460	51.7	29.24	-						
Jan	29-Jan-20	7.82	90.6	1.91	656	328	40.9	29.89	329						
Jan	30-Jan-20	7.55	176.3	1.49	806	403	34.1	27.44	-						
Jan	31-Jan-20	7.08	199.9	2.4	638	319	59.4	29.16	-						
Feb	1-Feb-20	8.3	171.2	1.14	724	362	17.3	29.23	-						
Feb	2-Feb-20	8.66	271.2	1.97	876	438	21.2	29.39	-						
Feb	3-Feb-20	7.91	278.3	1.88	883	442	21.4	29.36	-						
Feb	4-Feb-20	-	-	-	-	-	-	-	-						
Feb	5-Feb-20	8.03	223	1.44	1292	646	37.1	28.88	120	14	33.55	-	23	1.7	< 3.1
Feb	6-Feb-20	7.69	316.7	3.03	574	287	11.2	29.19	-						
Feb	7-Feb-20	-	-	-	-	-	-	-	-						
Feb	8-Feb-20	-	-	-	-	-	-	-	-						
Feb	9-Feb-20	7.72	302.6	1.35	813	407	15.7	29.11	-						
Feb	10-Feb-20	8.87	274.5	1.18	761	381	14	29.17	-						
Feb	11-Feb-20	8.45	359.5	1.6	1456	728	68.1	27.34	1004						
Feb	12-Feb-20	8.91	249	1.32	796	398	24.3	29.37	-						
Feb	13-Feb-20	8.4	305.4	1.59	933	466	23.6	29	-						
Feb	14-Feb-20	7.73	135.4	1.48	661	330	19.5	29.84	-						
Feb	15-Feb-20	7.71	221.9	2.03	787	393	33.1	29.11	-						
Feb	16-Feb-20	8.93	222.4	2.04	778	355	32.1	28.11	-						
Feb	17-Feb-20	7.39	229.3	2.18	793	341	29.7	28.19	-						
Feb	18-Feb-20	8.83	270.2	2.99	899	450	21	29.48	-						
Feb	19-Feb-20	7.66	209.8	2.63	617	309	16.1	28.97	280						
Feb	20-Feb-20	8.43	197.5	2.41	691	346	17.9	29.46	-						
Feb	21-Feb-20	8.82	253.1	1.72	509	255	26.8	29.89	-						
Feb	22-Feb-20	7.52	86.2	1.82	403	202	27.4	29.65	-						
Feb	23-Feb-20	6.97	216.1	0.98	534	269	14.8	29.19	-						
Feb	24-Feb-20	-	-	-	-	-	-	-	-						
Feb	25-Feb-20	7.85	212.5	1.69	584	292	38.1	29.84	-						
Feb	26-Feb-20	6.74	181.1	0.03	759	379	21.4	29.6	65						
Feb	27-Feb-20	6.73	-	-	-	718	-	29.26	-						
Feb	28-Feb-20	6.56	-	-	-	312	-	30.24	-						
Feb	29-Feb-20	6.63	-	-	-	546	-	29.51	-						
Mar	1-Mar-20	6.9	-	-	-	356	-	29.39	-						
Mar	2-Mar-20	6.75	-	-	-	359	-	29.35	-						
Mar	3-Mar-20	6.8	-	-	-	534	-	29.22	-						
Mar	4-Mar-20	6.95	-	-	-	487	-	29.17	24.9	24	3.9	-	9.4	1.06	< 3.1
Mar	5-Mar-20	6.89	-	-	-	468	-	29.37	-						
Mar	6-Mar-20	7.04	-	-	-	380.5	-	29.64	-						
Mar	7-Mar-20	6.57	-	-	-	329	-	30.03	-						
Mar	8-Mar-20	6.61	-	-	-	334	-	29.13	-						
Mar	9-Mar-20	6.38	-	-	-	458	-	29.6	-						
Mar	10-Mar-20	7.22	-	-	-	517.6	-	30.3	-						
Mar	11-Mar-20	6.96	-	-	-	358.2	-	30.5	487						
Mar	12-Mar-20	7.2	-	-	-	518.6	-	26.8	-						
Mar	13-Mar-20	6.76	-	-	-	1639	-	27.04	-						
Mar	14-Mar-20	7.01	-	-	-	479	-	26.8	-						
Mar	15-Mar-20	6.99	-	-	-	520	-	25.7	-						
Mar	16-Mar-20	7.26	-	-	-	466.1	-	27.26	-						
Mar	17-Mar-20	7.08	-	-	-	461.9	-	25.4	-						
Mar	18-Mar-20	6.57	-	-	-	1015	-	24.7	718						
Mar	19-Mar-20	7.13	-	-	-	539.8	-	24	-						
Mar	20-Mar-20	6.99	-	-	-	410.3	-	28.3	-						
Mar	21-Mar-20	7.15	-	-	-	729	-	29.85	-						
Mar	22-Mar-20	6.89	-	-	-	479	-	30.43	-						
Mar	23-Mar-20	6.24	-	-	-	1234	-	29.52	-						
Mar	24-Mar-20	6.22	-	-	-	1080	-	25.8	-						
Mar	25-Mar-20	6.81	-	-	-	2086	-	27	780						
Mar	26-Mar-20	7.06	-	-	-	548.6	-	28.6	-						
Mar	27-Mar-20	6.95	-	-	-	842.4	-	27.2	-						
Mar	28-Mar-20	7.28	-	-	-	471.3	-	28.4	-						
Mar	29-Mar-20	6.9	-	-	-	354.6	-	27.9	-						
Mar	30-Mar-20	7.14	-	-	-	526.9	-	26.2	-						
Mar	31-Mar-20	7.14	-	-	-	392	-	25.6	-						

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

Monitoring Parameters Result for STP(Phase-1)

Month	Date	pH	ORP	DO	EC	TDS	Turbidity	Temp	COD	SS	BOD	T-Coli	T-N	T-P	O&G
		Outlet													
		Daily Parameters								Weekly Parameters					
Standard		6 ~ 9	-	-	-	Max 2,000	-	Max 35	Max 125	Max 50	Max 30	Max 400	Max 80	Max 2	Max 10
Unit		-	mv	mg/L	µs/cm	ppm	FNU	°C	ppm	ppm	ppm	MNP/100ml	ppm	ppm	ppm
Oct	1-Oct-19	7.44	436.8	1.84	964	482	9.9	30.79	75						
Oct	2-Oct-19	7.5	389.3	1.82	962	481	7.7	30.84	60	8	1.52	< 1.8	11.4	0.735	< 3.1
Oct	3-Oct-19	7.33	379.6	2.24	858	429	-	31.01	58						
Oct	4-Oct-19	Low Battery							40						
Oct	5-Oct-19	Low Battery													
Oct	6-Oct-19	Low Battery													
Oct	7-Oct-19	Low Battery							17	2	7.17	< 1.8	8.6	0.805	< 3.1
Oct	8-Oct-19	7.29	343.1	2.58	886	443	3.6	30.53	43						
Oct	9-Oct-19	7.5	415.7	2.32	888	444	0.1	30.38	-						
Oct	10-Oct-19	7.5	386.9	2.04	879	440	0.4	30.48	-						
Oct	11-Oct-19	7.61	364.6	1.93	815	407	1.4	30.57							
Oct	12-Oct-19	7.47	351.5	2.12	764	382	10.9	30.75							
Oct	13-Oct-19	7.46	341.4	2.13	812	371	11.4	29.54							
Oct	14-Oct-19	7.52	342.9	2.14	829	352	10.3	30.64							
Oct	15-Oct-19	6.99	424.6	1.64	675	338	0.3	29.38							
Oct	16-Oct-19	7.31	443.6	1.58	640	320	1.3	-	31	2	39.9	130	10.1	0.356	< 3.1
Oct	17-Oct-19	7.26	390.5	1.56	623	311	3.8	-	32						
Oct	18-Oct-19	7.61	367.7	1.81	725	363	2.8	30.81	33						
Oct	19-Oct-19	7.46	358.7	1.21	898	449	3.4	30.72							
Oct	20-Oct-19	7.49	362.5	1.4	799	394	2	30.56							
Oct	21-Oct-19	7.2	395.5	1.04	919	459	6	30.26	18.2						
Oct	22-Oct-19	7.19	294.5	0.92	908	454	1.6	31.01	14.7						
Oct	23-Oct-19	7.16	245.5	0.98	897	448	4	31.47	31	2	6.77	< 1.8	8.5	0.498	< 3.1
Oct	24-Oct-19	7.22	283.9	1.12	856	428	3.1	28.2	23						
Oct	25-Oct-19	7.39	260.3	1.12	874	437	12	31.19	17						
Oct	26-Oct-19	7.18	310.4	1.33	908	454	5.9	31.6							
Oct	27-Oct-19	7.1	315.5	1.24	934	464	6.4	31.64							
Oct	28-Oct-19	7.6	310.2	1.12	981	472	5.2	31.06							
Oct	29-Oct-19	7.24	345	1.34	857	475	3.3	30.72	13						
Oct	30-Oct-19	7.49	249.8	2.4	820	454	5.7	30.66	15.5	2	45.7	7.8	8.3	0.524	< 3.1
Oct	31-Oct-19	7.33	-	-	-	452	-	30.8	15.2						
Nov	1-Nov-19	7.12	323.7	1.52	196	508	5.5	31.03	26.8						
Nov	2-Nov-19	7.47	270.5	0.99	1093	546	3.9	30.38							
Nov	3-Nov-19	7.43	271.5	0.98	1087	538	4.3	30.39							
Nov	4-Nov-19	7.2	280.9	1.03	921	461	1.7	30.48	9.6						
Nov	5-Nov-19	7.06	318.3	1.23	893	447	5.6	30.46	21.2						
Nov	6-Nov-19	7.71	266.7	1.28	927	463	16.5	30.45	14	10	14.8	< 1.8	12.1	0.857	< 3.1
Nov	7-Nov-19	7.65	293.2	1.68	772	551	14.3	30.21	24.5						
Nov	8-Nov-19	7.12	375.7	1.43	769	384	17.5	29.96	16.1						
Nov	9-Nov-19	7.19	382.6	1.33	821	375	16.9	29.96							
Nov	10-Nov-19	7.1	369.2	1.28	824	412	15.6	29.66							
Nov	11-Nov-19	7.49	330.8	1.15	817	408	11.9	29.81							
Nov	12-Nov-19	7.67	307.6	1.36	774	387	0.5	30.04							
Nov	13-Nov-19	7.51	262.5	1.02	571	285	23.6	30.11	9	2	9.02	< 1.8	5.7	0.479	< 3.1
Nov	14-Nov-19	7.46	363	1.29	723	362	1.4	29.95	OFF						
Nov	15-Nov-19	7.47	322.8	1.49	739	369	0.7	29.96	OFF						
Nov	16-Nov-19	7.13	394.2	1.4	714	357	1.6	30.09	OFF						
Nov	17-Nov-19	7.55	330.7	1.49	725	363	2	29.87	OFF						
Nov	18-Nov-19	8.1	330.8	-	727	363	2.3	29.66	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Nov	19-Nov-19	7.37	354.4	0.84	723	361	2.1	29.99	OFF						
Nov	20-Nov-19	7.52	278.6	0.95	730	365	2.8	29.74	OFF						
Nov	21-Nov-19	7.5	252.3	0.77	747	314	2.9	29.68				National Day			
Nov	22-Nov-19	7.61	352.3	0.9	742	371	13.3	29	OFF						
Nov	23-Nov-19	7.18	438.2	0.87	693	347	10	28.85	OFF						
Nov	24-Nov-19	7.29	399	0.93	824	412	3.8	30.31	OFF						
Nov	25-Nov-19	7.42	239	0.82	743	372	9.5	30.18	OFF						
Nov	26-Nov-19	7.02	335.9	1.35	692	346	10.6	30.63	OFF						
Nov	27-Nov-19	7.16	-	-	-	395	-	30.4	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Nov	28-Nov-19	7.11	-	-	-	421	-	30.35	OFF						
Nov	29-Nov-19	7.11	356.2	1.24	742	371	15.1	30.64	OFF						
Nov	30-Nov-19	6.59	317.7	2.94	682	341	12.6	29.13							
Dec	1-Dec-19	7.08	115.7	3.24	678	339	13.4	27.71							
Dec	2-Dec-19	6.33	206.7	2.96	690	345	11.4	27.63	OFF						
Dec	3-Dec-19	6.74	185.3	3.58	718	359	11.6	27.69	OFF						
Dec	4-Dec-19	-	-	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Dec	5-Dec-19	-	-	-	-	-	-	-	OFF						
Dec	6-Dec-19	6.6	324.8	5.5	699	349	11.9	25.72	OFF						
Dec	7-Dec-19	6.75	317.8	5.72	703	351	13.4	24.78							
Dec	8-Dec-19	6.6	167.5	6.8	689	344	14.2	23.83							
Dec	9-Dec-19	6.71	280.7	6.21	701	351	8	23.13	OFF						
Dec	10-Dec-19	6.9	245	6.97	708	354	6.9	23.05	OFF						
Dec	11-Dec-19	-	-	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Dec	12-Dec-19	-	-	-	-	-	-	-	OFF						
Dec	13-Dec-19	6.88	136.1	5.31	662	331	2.3	23.56	OFF						
Dec	14-Dec-19	6.55	322	4.71	704	352	3.5	23.66							
Dec	15-Dec-19	6.74	384.4	4.71	642	322	4.1	23.93							
Dec	16-Dec-19	7.83	246.7	6.3	719	360	29.3	23.95	OFF						
Dec	17-Dec-19	8	206.5	5.32	696	348	4.2	23.97	OFF						
Dec	18-Dec-19	-	-	-	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF	OFF
Dec	19-Dec-19	-	-	-	-	-	-	-	-						
Dec	20-Dec-19	6.75	345.6	6.43	721	360	4.7	25.55	OFF						
Dec	21-Dec-19	6.34	378.6	3.95	704	352	3.9	25.62							
Dec	22-Dec-19	7.13	161.1	5.48	684	342	2.9	25.67							
Dec	23-Dec-19	-	-	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Dec	24-Dec-19	7.33	293.2	6.36	915	458	51.2	26.73	39						
Dec	25-Dec-19	-	-	-	-	-	-	-	-						
Dec	26-Dec-19	-	-	-	-	-	-	-	-						
Dec	27-Dec-19	6.41	393.6	5.87	804	402	3.9	28.3	15.1						
Dec	28-Dec-19	6.74	353.2	6.59	833	416	8.8	28.56	-						
Dec	29-Dec-19	6.71	343.4	6.79	710	355	16.1	28.86	-						
Dec	30-Dec-19	6.86	186.9	5.59	739	369	0	28.48	12	2	0.91	2	11.2	0.846	< 3.1
Dec	31-Dec-19	6.32	397.5	5.09	759	380	5.2	28.1	-						
Jan	1-Jan-20	7.18	311	6.67	841	420	0	28.31	-						
Jan	2-Jan-20	7.07	216.2	6.72	829	415	0	28.05	8.1						

Month	Date	Color	Odor	Mercury	Zinc	Arsenic	Chromium	Cadmium	Selenium	Lead	Copper	Barium	Nickel	Silver	Iron	Cyanide	Total Cyanide	Ammonia	Hexavalent Chromium(Cr6+)	Fluoride	Total Chlorine	Free Chlorine	Sulphide	Formal-dehyde	Phenols
		Monthly Parameters																							
Standard		Max 150	Max 150	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	Max3.5	Max 0.1	Max 1	Max10	Max0.1	Max20	Max0.2	Max 1	Max 1	Max 1	Max 0.5
Unit		-	-	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Oct	2-Oct-19	5.96	2	≤0.002	0.048	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	≤0.002	0.036	≤0.002	0.324	< 0.002	0.007	13.3	< 0.05	2.017	0.4	0.1	< 0.005	0.026	0.005
Nov	6-Nov-19	4.32	1	≤0.002	0.6	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	≤0.002	0.012	≤0.002	0.32	< 0.002	0.01	3.36	< 0.05	1.885	0.3	0.1	0.007	0.079	0.003
Dec	4-Dec-19	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

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Jan	3-Jan-20	6.33	370.2	6.37	668	334	21	28.18	14.1																														
Jan	4-Jan-20	-	-	-	-	-	-	-	-																														
Jan	5-Jan-20	-	-	-	-	-	-	-	-																														
Jan	6-Jan-20	-	-	-	-	-	-	-	-																														
Jan	7-Jan-20	-	-	-	-	-	-	-	8																														
Jan	8-Jan-20	-	-	-	-	-	-	-	30.5	2	1.59	< 1.8	11.5	0.956	< 3.1	8.78	4	≤0.002	0.13	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	0.048	0.01	≤0.002	0.192	0.002	0.018	6.63	< 0.05	1.99	0.6	0.1	0.018	0.091	< 0.002
Jan	9-Jan-20	7.25	-	-	-	-	-	-	-																														
Jan	10-Jan-20	6.95	327.1	5.76	813	406	5.2	27.62	-																														
Jan	11-Jan-20	7.15	444.7	3.75	849	425	3.2	26.97	-																														
Jan	12-Jan-20	7.11	170.6	4.81	779	389	2	26.63	-																														
Jan	13-Jan-20	6.03	398.4	4.99	786	393	0.6	26.13	-																														
Jan	14-Jan-20	7.76	207.4	4.26	759	379	0	26.47	-																														
Jan	15-Jan-20	-	-	-	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF	OFF																								
Jan	16-Jan-20	7.59	224.03	3.92	754	377	0.7	-	-																														
Jan	17-Jan-20	8.51	328.7	3.21	810	405	0	25.87	-																														
Jan	18-Jan-20	7.79	419	2.39	781	390	0	29.23	-																														
Jan	19-Jan-20	8.81	200.8	2.45	856	428	0	25.43	-																														
Jan	20-Jan-20	8.35	137.5	1.9	764	382	0	25.72	-																														
Jan	21-Jan-20	7.94	307.8	3.81	841	420	0	25.71	-																														
Jan	22-Jan-20	6.93	311.4	3.77	850	447	0	25.66	-	OFF	OFF	OFF	OFF	OFF	OFF																								
Jan	23-Jan-20	7.59	-	-	-	-	-	-	-																														
Jan	24-Jan-20	7.45	333	3.28	857	428	1	25.9	-																														
Jan	25-Jan-20	8.11	431.4	3.32	776	388	1	25.3	-																														
Jan	26-Jan-20	8.34	224.3	6.03	764	381	0.8	24.73	-																														
Jan	27-Jan-20	7.78	206	3.87	720	360	0.7	24.16	-																														
Jan	28-Jan-20	7.23	355	6.2	766	383	0	25.15	15.5																														
Jan	29-Jan-20	7.28	310.6	2	804	402	3.5	26.74	28.1	2	1.05	7.8	15.2	0.54	< 3.1																								
Jan	30-Jan-20	7.12	352.6	1.91	869	434	5	27.91	34																														
Jan	31-Jan-20	7	290.5	5.18	839	420	11.8	28.21	54																														
Feb	1-Feb-20	8.16	157.1	2.48	745	372	6.5	28.39	-																														
Feb	2-Feb-20	8.29	355.7	2.51	931	465	1.2	28.72	-																														
Feb	3-Feb-20	7.65	317.1	3.56	897	448	0	28.25	21.6																														
Feb	4-Feb-20	-	-	-	-	-	-	-	30.9																														
Feb	5-Feb-20	7.88	319.7	1.4	1401	701	15.8	27.84	59	10	3.57	< 1.8	11.3	1.14	< 3.1	16.88	1.4	≤0.002	0.086	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	0.008	≤0.002	≤0.002	0.336	< 0.002	0.008	13.3	< 0.05	2.318	0.2	0.2	0.021	0.341	< 0.002
Feb	6-Feb-20	7.31	331.8	4.25	1099	549	10.7	27.87	30.5																														
Feb	7-Feb-20	-	-	-	-	-	-	-	42																														
Feb	8-Feb-20	-	-	-	-	-	-	-	-																														
Feb	9-Feb-20	7.61	327.6	1.37	1026	513	3.9	28.17	-																														
Feb	10-Feb-20	8.65	311.4	1.42	1023	508	3.1	27.67	12.1																														
Feb	11-Feb-20	8.02	367.5	1.59	980	490	10.9	28.18	30.7	OFF	OFF	OFF	OFF	OFF	OFF																								
Feb	12-Feb-20	8.8	404.5	1.43	995	498	13.8	27.67	-																														
Feb	13-Feb-20	8.54	355.7	2.14	1026	513	9.5	26.96	20.8																														
Feb	14-Feb-20	7.37	340.6	1.55	937	468	7.6	26.47	24.5																														
Feb	15-Feb-20	7.15	348.3	2.35	927	463	7.1	26.5	-																														
Feb	16-Feb-20	8.48	344.3	2.33	911	452	7.1	27.66	-																														
Feb	17-Feb-20	7.55	348.5	2.44	921	461	7.8	28.62	OFF																														
Feb	18-Feb-20	8.63	345.3	4.63	898	449	5.1	26.45	OFF																														
Feb	19-Feb-20	7.27	276.3	2.77	965	482	5.1	26.44	OFF	OFF	OFF	OFF	OFF	OFF	OFF																								
Feb	20-Feb-20	8.22	218.1	2.37	1013	507	3.8	26.39	OFF																														
Feb	21-Feb-20	8.36	301.9	1.75	950	475	3.9	26.5	OFF																														
Feb	22-Feb-20	7.74	270.4	1.8	880	463	4.4	26.44	OFF																														
Feb	23-Feb-20	6.71	226.2	0.44	920	458	2.8	26.53	OFF																														
Feb	24-Feb-20	-	-	-	-	-	-	-	OFF																														
Feb	25-Feb-20	7.9	327.3	1.64	754	377	4.2	26.63	OFF																														
Feb	26-Feb-20	6.74	255.1	5.21	922	503	2.5	26.48	OFF	OFF	OFF	OFF	OFF	OFF	OFF																								
Feb	27-Feb-20	6.79	-	-	-	505	-	26.52	OFF																														
Feb	28-Feb-20	6.42	-	-	-	507	-	26.09	OFF																														
Feb	29-Feb-20	6.5	-	-	-	891	-	29.91	OFF																														
Mar	1-Mar-20	6.73	-	-	-	493	-	26.55	OFF																														
Mar	2-Mar-20	7.07	-	-	-	492	-	26.5	OFF																														
Mar	3-Mar-20	6.71	-	-	-	493	-	26.49	OFF																														
Mar	4-Mar-20	6.86	-	-	-	495	-	27.31	OFF	OFF	OFF	OFF	OFF	OFF	OFF																								
Mar	5-Mar-20	6.91	-	-	-	493	-	27.09	OFF																														
Mar	6-Mar-20	6.34	-	-	-	497	-	26.96	OFF																														
Mar	7-Mar-20	6.28	-	-	-	505	-	26.73	OFF																														
Mar	8-Mar-20	6.32	-	-	-	521	-	26.14	OFF																														
Mar	9-Mar-20	6.55	-	-	-	511	-	26.92	OFF																														
Mar	10-Mar-20	6.99	-	-	-	534.7	-	27.2	OFF																														
Mar	11-Mar-20	7.21	-	-	-	502.6	-	28.5	OFF	OFF	OFF	OFF	OFF	OFF	OFF																								
Mar	12-Mar-20	7.12	-	-	-	516.2	-	25.6	OFF																														
Mar	13-Mar-20	6.58	-	-	-	516.2	-	27.2	OFF																														
Mar	14-Mar-20	6.78	-	-	-	532.2	-	26.7	OFF																														
Mar	15-Mar-20	6.91	-	-	-	498.2	-	26.1	OFF																														
Mar	16-Mar-20	6.77	-	-	-	530.1	-	30.14	OFF																														
Mar	17-Mar-20	6.85	-	-	-	546.5	-	25.3	42																														
Mar	18-Mar-20	7.32	-	-	-	529.7	-	24.7	102	22	13.52	23	7.8	1.27	< 3.1																								
Mar	19-Mar-20	7.31	-	-	-	594.5	-	24.1	56																														
Mar	20-Mar-20	7.23	-	-	-	503.8	-	27.6	42																														
Mar	21-Mar-20	6.95	-	-	-	544	-	30.55	-																														
Mar	22-Mar-20	6.93	-	-	-	545	-	30.45	-																														
Mar	23-Mar-20	6.6	-	-	-	532.4	-	30.15	27																														
Mar	24-Mar-20	6.38	-	-	-	572.9	-	26.8	53																														
Mar	25-Mar-20	5.87	-	-	-	646	-	28.5	78	8	2.02	< 1.8	13.6	0.34	< 3.1																								
Mar	26-Mar-20	6.73	-	-	-	826.1	-	27.4	104																														
Mar	27-Mar-20	6.77	-	-	-	555.7	-	26.1	-																														
Mar	28-Mar-20	7.78	-	-	-	648.3	-	25.8	-																														
Mar	29-Mar-20	7.17	-	-	-	604.9	-	26.4	-																														
Mar	30-Mar-20	7.05	-	-	-	594.8	-	26	60																														
Mar	31-Mar-20	7.07	-	-	-	553.7	-	25.7	33.8																														

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

Monitoring Parameters Result for STP(Phase-2)

Month	Date	Inlet																																								
		pH	ORP	DO	EC	TDS	Turbidity	Temp	COD	BOD	T-Coli	T-N	T-P	O&G	SS	Cyanide	Total Cyanide	Chromium	Arsenic	Mercury	Cadmium	Selenium	Lead	Color	Odor	Zinc	Copper	Barium	Nickel	Sulphide	Free Chlorine	Formal-dehyde	Silver	Iron	Ammonia	Hexavalent Chromium (	Fluoride	Total Chlorine	Phenols				
		Daily Parameters								Weekly Parameters						Monthly Parameters																													
Standard		6 – 9	-	-	-	Max 2,000	-	Max 35 °C	Max 400	Max 200	–	Max 80	Max8	Max 40	Max 200	Max 0.1	Max1	Max 0.5	Max 0.1	Max 0.005	Max 0.03	Max 0.02	Max 0.1	150	150	Max 2	Max 0.5	Max 1	Max 0.2	Max 1	Max 1	Max 1	Max0.5	Max3.5	Max80	Max0.1	Max20	Max0.2	Max 0.5				
Unit		-	mv	mg/L	µs/cm	ppm	FNU	°C	ppm	ppm	MPN/100m	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	Co-Pt	Co-Pt	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm				
Oct	1-Oct-19	7.33	274.3	1.52	1030	515	20	30.43																																			
Oct	2-Oct-19	7.56	100.5	1.26	892	446	21.1	30.23																																			
Oct	3-Oct-19	7.37	297.1	1.67	783	392	-	30.59																																			
Oct	4-Oct-19	Low Battery																																									
Oct	5-Oct-19	Low Battery																																									
Oct	6-Oct-19	Low Battery																																									
Oct	7-Oct-19	Low Battery																																									
Oct	8-Oct-19	7.11	352.7	1.86	564	282	8.7	30.56																																			
Oct	9-Oct-19	7.4	389.6	2.31	830	415	14.9	30.76																																			
Oct	10-Oct-19	7.32	334.8	2.06	674	337	9.2	30.93																																			
Oct	11-Oct-19	7.62	287.2	1.14	996	498	23.6	30.97																																			
Oct	12-Oct-19	7.56	238.2	2.13	896	568	22.4	30.86																																			
Oct	13-Oct-19	7.54	229.3	2.14	798	549	21.7	31.89																																			
Oct	14-Oct-19	7.42	239.4	2.12	784	542	21.4	30.9																																			
Oct	15-Oct-19	7.16	381.3	1.46	725	362	28.5	29.35																																			
Oct	16-Oct-19	7.28	421.8	1.59	646	323	21.2	-																																			
Oct	17-Oct-19	7.38	322.3	1.38	833	417	28.6	-																																			
Oct	18-Oct-19	7.52	366.8	1.7	849	424	10.6	30.93																																			
Oct	19-Oct-19	7.46	326.4	1.46	896	389	9.5	30.86																																			
Oct	20-Oct-19	7.47	333.2	1.32	961	294	9.7	29.28																																			
Oct	21-Oct-19	7.32	375.9	1.09	859	429	18.3	29.23																																			
Oct	22-Oct-19	7.3	238.3	0.91	711	356	19.5	31.32																																			
Oct	23-Oct-19	7.34	51.3	0.96	1770	885	65.1	31.25																																			
Oct	24-Oct-19	7.5	187.5	0.92	999	500	64.3	28.27																																			
Oct	25-Oct-19	7.52	232.1	0.84	1538	769	40.2	30.29																																			
Oct	26-Oct-19	7.4	-	-	-	-	-	31.22																																			
Oct	27-Oct-19	5.49	81	1.15	672	329	18.6	31.64																																			
Oct	28-Oct-19	6.69	80.2	1.14	698	349	19.2	31.32																																			
Oct	29-Oct-19	7.47	124	0.93	821	450	16.4	30.12																																			
Oct	30-Oct-19	7.56	123.9	1.58	980	541	18	30.52																																			
Oct	31-Oct-19	7.38	-	-	-	440	-	30.5																																			
Nov	1-Nov-19	7.29	548.4	1.6	448	224	104	30.86																																			
Nov	2-Nov-19	7.5	156.8	0.86	740	370	12.4	31.1																																			
Nov	3-Nov-19	7.61	118	0.75	893	447	17.5	31.24																																			
Nov	4-Nov-19	7.41	52.9	0.79	828	414	11	31																																			
Nov	5-Nov-19	7.26	-	-	-	410	-	30.88																																			
Nov	6-Nov-19	7.44	252.6	0.98	1020	515	17.9	30.89																																			
Nov	7-Nov-19	7.52	-	-	-	495	-	30.7																																			
Nov	8-Nov-19	7.48	272.6	1.41	269	134	56.8	29.44																																			
Nov	9-Nov-19	7.25	289.5	1.25	275	142	57.6	28.36																																			
Nov	10-Nov-19	7.55	213.1	1.09	810	405	34.8	29.62																																			
Nov	11-Nov-19	7.55	176.4	0.75	976	488	22	29.88																																			
Nov	12-Nov-19	7.55	258	1.13	560	280	17.4	30.13																																			
Nov	13-Nov-19	7.61	264.7	1.33	776	388	0.6	29.89																																			
Nov	14-Nov-19	7.49	253.7	1.01	554	277	28.9	30.24																																			
Nov	15-Nov-19	7.36	304.5	1.1	538	269	14.4	30.49																																			
Nov	16-Nov-19	7.5	305.6	1.27	654	327	7.5	30.75																																			
Nov	17-Nov-19	7.43	302.1	1.18	648	324	8.3	30.63																																			
Nov	18-Nov-19	7.8	214.6	0.73	948	474	12.1	30.73																																			
Nov	19-Nov-19	7.35	58.6	0.53	564	282	16	30.36																																			
Nov	20-Nov-19	7.3	323.7	0.63	763	381	27.9	30.52																																			
Nov	21-Nov-19	7.29	318.4	0.56	821	358	27.8	29.28																																			
Nov	22-Nov-19	7.5	172.6	0.78	579	290	22.5	30.2																																			
Nov	23-Nov-19	7.3	299.5	0.85	713	357	23.6	30.58																																			
Nov	24-Nov-19	7.52	163.3	0.71	822	411	17.3	30.31																																			
Nov	25-Nov-19	7.25	123.9	0.76	673	336	21.8	30.18																																			
Nov	26-Nov-19	7.31	218	0.87	1058	529	18.1	30.63																																			
Nov	27-Nov-19	7.32	90.6	0.91	624	312	18.3	30.4																																			
Nov	28-Nov-19	7.38	138.8	1.03	704	352	14.3	30.35																																			
Nov	29-Nov-19	7.39	104.9	0.78	1214	607	17.5	30.64																																			
Nov	30-Nov-19	6.72	133.4	4.02	1280	640	52.8	29.13																																			
Dec	1-Dec-19	6.62	33.2	2.76	625	313	17	30.64																																			
Dec	2-Dec-19	6.5	41.6	1.85	679	339	7.4	30.52																																			
Dec	3-Dec-19	6.99	18.6	1.84	650	325	35	30.4																																			
Dec	4-Dec-19	6.69	41.4	3.53	777	388	8.1	30.48																																			
Dec	5-Dec-19	6.63	31.2	1.92	584	292	21.5	30.53																																			
Dec	6-Dec-19	6.76	-	-	-	312	-	29.97																																			
Dec	7-Dec-19	6.71	164.9	3.54	653	327	8.6	30.38																																			
Dec	8-Dec-19	6.68	23.5	3.66	777	389	8.5	29.88																																			
Dec	9-Dec-19	6.52	120.4	1.07	1133	566	8	28.58																																			
Dec	10-Dec-19	6.73	88.2	0.78	1226	613	8.4	29.3																																			
Dec	11-Dec-19	6.72	57.8	3.31	527	263	15	29.68																																			
Dec	12-Dec-19	6.65	-44	1.9	643	321	16.8	29.8																																			
Dec	13-Dec-19	6.62	46	1.53	705	352	23.2	29.8																																			
Dec	14-Dec-19	6.77	113.3	2.16	522	261	7.6	29.44																																			
Dec	15-Dec-19	7.2	88.9	4.56	952	476	59.4	29.77																																			
Dec	16-Dec-19	6.79	41.4	5.12	822	411	15.4	29.89																																			
Dec	17-Dec-19	6.86	73.5	2.57	904	452	29.4	29.5																																			
Dec	18-Dec-19	6.57	100.2	2.42	551	275	30.1	30.03																																			
Dec	19-Dec-19	6.93	147	4.46	699	350	33.2	29.64																																			
Dec	20-Dec-19	6.77	145	4.29	550	275	26.8	29.71																																			
Dec	21-Dec-19	6.6	150.1	3.26	762	381	26.8	30.02																																			
Dec	22-Dec-19	6.52	194.4	3.89	668	334	18.1	29.96																																			
Dec	23-Dec-19	8.47	97.9	2.73	668	334	16.2	30.49																																			
Dec	24-Dec-19	6.77	12.5	2.31	1321	661	97.4	27.94																																			
Dec	25-Dec-19	-	-	-	-	-	-	-																																			
Dec	26-Dec-19	6.71	260.5	4.18	672	336	14.4	29.62																																			
Dec	27-Dec-19	6.82	63	2.77	850	425	20.7	28.23																																			
Dec	28-Dec-19	7.09	39	2.58	1150	575	52.4	28.06																																			
Dec	29-Dec-19	6.83	237.3	3.68	880	440	19.4	28.02																																			
Dec	30-Dec-19	6.51	98.2	2.84	836	418	24.8	27.99																																			

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

Dec	31-Dec-19	6.59	322.8	2.68	529	264	17.7	29.33
Jan	1-Jan-20	-	-	-	-	-	-	-
Jan	2-Jan-20	-	-	-	-	-	-	-
Jan	3-Jan-20	6.39	5	2.01	996	798	36.7	27.8
Jan	4-Jan-20	-	-	-	-	-	-	-
Jan	5-Jan-20	-	-	-	-	-	-	-
Jan	6-Jan-20	-	-	-	-	-	-	-
Jan	7-Jan-20	-	-	-	-	-	-	-
Jan	8-Jan-20	-	-	-	-	-	-	-
Jan	9-Jan-20	6.43	305.3	4.12	668	334	7.6	29.74
Jan	10-Jan-20	6.41	192.8	4.75	742	371	150	29.59
Jan	11-Jan-20	6.44	323.2	4.18	916	458	11.2	29.21
Jan	12-Jan-20	6.58	190.5	5.66	885	443	14	29.31
Jan	13-Jan-20	6.35	285.7	4.52	730	361	6.8	29.38
Jan	14-Jan-20	7.3	141.1	3.17	635	317	26.7	29.49
Jan	15-Jan-20	-	-	-	-	-	-	-
Jan	16-Jan-20	6.75	288.6	2.34	644	322	15.4	29.5
Jan	17-Jan-20	7.18	135.8	2.45	1026	513	16.6	29.42
Jan	18-Jan-20	7.21	282.4	3.71	845	423	13.9	29.47
Jan	19-Jan-20	8.31	136.7	4.96	794	397	16.9	29.06
Jan	20-Jan-20	7.2	131.2	1.89	971	486	13.5	29.16
Jan	21-Jan-20	7.14	86.5	1.48	941	471	26.1	30.22
Jan	22-Jan-20	6.8	85.4	1.58	925	465	26.2	29.23
Jan	23-Jan-20	7.27	275.4	2.17	909	455	9.2	29.22
Jan	24-Jan-20	7.35	224.5	2.24	812	406	15.6	29.6
Jan	25-Jan-20	8.83	158.7	3.17	577	289	6.8	29.94
Jan	26-Jan-20	8.93	106.5	2.12	839	425	15.2	29.6
Jan	27-Jan-20	8.54	256.3	2.34	824	412	12.5	28.67
Jan	28-Jan-20	8.2	224.7	0.94	843	422	468	29.02
Jan	29-Jan-20	7.9	45.5	1.67	782	391	30.2	28.41
Jan	30-Jan-20	7.46	138.8	1.78	745	372	34.5	27.85
Jan	31-Jan-20	7.23	158.1	2.2	678	339	26.6	29.36
Feb	1-Feb-20	8.75	5	0.84	860	430	27.7	28.71
Feb	2-Feb-20	8.61	-41.6	1.13	622	311	40.4	27.84
Feb	3-Feb-20	8.1	1.2	1.39	805	402	28.3	27.52
Feb	4-Feb-20	-	-	-	-	-	-	-
Feb	5-Feb-20	7.96	87.7	1.06	1165	582	48.1	27.2
Feb	6-Feb-20	7.71	168.7	1.35	941	470	31.4	27.45
Feb	7-Feb-20	-	-	-	-	-	-	-
Feb	8-Feb-20	-	-	-	-	-	-	-
Feb	9-Feb-20	7.67	254	1.26	782	391	16.1	29.17
Feb	10-Feb-20	8.45	235.6	1.39	778	391	12.8	29.31
Feb	11-Feb-20	8.37	363	1.61	1449	725	68.8	27.29
Feb	12-Feb-20	8.86	193.3	1.42	940	470	21.4	29.6
Feb	13-Feb-20	8.54	216.9	1.63	878	439	22.6	29.18
Feb	14-Feb-20	7.95	182.3	1.46	657	328	62.3	29.81
Feb	15-Feb-20	8.24	188.5	2.08	848	424	74.4	29.16
Feb	16-Feb-20	8.26	190.4	2.16	844	414	78.4	29.18
Feb	17-Feb-20	8.29	193.5	2.21	857	428	77.1	29.39
Feb	18-Feb-20	8.8	345.3	4.63	898	449	5.1	26.45
Feb	19-Feb-20	7.95	161.6	2.02	597	298	19.7	29.34
Feb	20-Feb-20	8.42	147.3	1.98	647	324	18	29.61
Feb	21-Feb-20	8.79	283.3	1.73	502	251	20.7	29
Feb	22-Feb-20	7.24	268	1.7	513	261	29	30.4
Feb	23-Feb-20	7.34	157.1	1.51	720	362	35.1	28.37
Feb	24-Feb-20	-	-	-	-	-	-	-
Feb	25-Feb-20	8.08	189.8	1.69	594	297	30.4	29.85
Feb	26-Feb-20	6.71	97.9	1.46	956	478	28.6	29.31
Feb	27-Feb-20	6.91				547		29.5
Feb	28-Feb-20	6.71				397		30.27
Feb	29-Feb-20	6.97				450		29.43
Mar	03-03-20							
Mar	04-03-20							
Mar	05-03-20							
Mar	06-03-20							
Mar	10-03-20							
Mar	11-03-20							
Mar	12-03-20							
Mar	13-03-20							
Mar	14-03-20							
Mar	15-03-20							
Mar	16-03-20							
Mar	17-03-20							
Mar	18-03-20							
Mar	19-03-20							
Mar	20-03-20							
Mar	21-03-20							
Mar	22-03-20							
Mar	23-03-20							
Mar	24-03-20							
Mar	25-03-20							
Mar	26-03-20							
Mar	27-03-20							
Mar	28-03-20							
Mar	29-03-20							
Mar	30-03-20							
Mar	31-03-20							

MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED ★ MJTD

Monitoring Parameters Result for STP(Phase-2)

Month	Date	Outlet																																								
		pH	ORP	DO	EC	TDS	Turbidity	Temp	COD	SS	BOD	T-Coli	T-N	T-P	O&G	Color	Odor	Mercury	Zinc	Arsenic	Chromium	Cadmium	Selenium	Lead	Copper	Barium	Nickel	Silver	Iron	Cyanide	Total Cyanide	Ammonia	Hexavalent Chromium (	Fluoride	Total Chlorine	Free Chlorine	Sulphide	Formal-dehyde	Phenols
		Daily Parameters								Weekly Parameters																				Monthly Parameters												
Standard		6 – 9	-	-	-	Max 2,000	-	Max 35	Max 125	Max 50	Max 30	Max 400	Max 80	Max 2	Max 10	Max 150	Max 150	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	Max3.5	Max 0.1	Max 1	Max10	Max0.1	Max20	Max0.2	Max 1	Max 1	Max 1	Max 0.5
Unit		-	mv	mg/L	µs/cm	ppm	FNU	°C	ppm	ppm	ppm	MNP/100m	ppm	ppm	ppm	-	-	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Oct	1-Oct-19	7.33	274.5	1.86	846	423	0.8	30.67	16.5																																	
Oct	2-Oct-19	7.6	345.5	1.74	888	444	0.1	30.87	19.5	2	1.03	8	10	0.413	< 3.1	2.33	1	≤0.002	0.094	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	≤0.002	0.02	≤0.002	0.158	< 0.002	0.006	0.027	< 0.05	1.206	0.1	0.1	< 0.005	0.018	< 0.002
Oct	3-Oct-19	7.21	370.1	2.2	939	469	-	30.96	16.5																																	
Oct	4-Oct-19	Low Battery							21.1																																	
Oct	5-Oct-19	Low Battery																																								
Oct	6-Oct-19	Low Battery																																								
Oct	7-Oct-19	Low Battery							16.5	2	8.24	2	13.7	0.527	< 3.1																												
Oct	8-Oct-19	6.92	405.9	1.89	874	437	2.6	29.93	16.7																																	
Oct	9-Oct-19	7.34	419.6	2.48	880	440	6.5	30.57	18.4																																	
Oct	10-Oct-19	7.4	382.2	2.39	881	440	18.4	30.78	20.2																																	
Oct	11-Oct-19	7.71	288	2.27	773	386	1.2	30.75	-																																	
Oct	12-Oct-19	7.37	376.3	2.22	769	385	10.3	30	-																																	
Oct	13-Oct-19	7.35	346.4	3.14	764	392	10.4	29.01	-																																	
Oct	14-Oct-19	7.42	342.6	3.13	742	342	10.2	30.15	-																																	
Oct	15-Oct-19	7.11	416.2	1.88	719	360	17.4	29.62	-																																	
Oct	16-Oct-19	7.38	436.8	1.66	679	339	1.6	-	12.6	2	39.9	33	12.4	0.434	< 3.1																											
Oct	17-Oct-19	7.38	386	1.74	670	335	24.1	-	7.4																																	
Oct	18-Oct-19	7.6	381.9	1.98	834	417	18.7	30.75	12.6																																	
Oct	19-Oct-19	7.5	340.5	1.28	911	456	8.5	30.36																																		
Oct	20-Oct-19	7.62	352.4	1.46	826	349	9.4	30.26																																		
Oct	21-Oct-19	7.27	396	1.17	964	482	20.7	30.16	12.3																																	
Oct	22-Oct-19	7.3	293	1.05	852	426	14.6	31.02	25.2																																	
Oct	23-Oct-19	7.32	237.5	1.51	906	423	4.5	31.11	26.6	2	7.46	350	9.3	0.593	< 3.1																											
Oct	24-Oct-19	7.54	173.8	1.21	898	449	2.3	28.06	16.3																																	
Oct	25-Oct-19	7.52	232.6	1.12	889	444	0.9	31.25	13.3																																	
Oct	26-Oct-19	7.17	-	-	-	449	-	31.45																																		
Oct	27-Oct-19	7.29	274.3	1.15	864	432	13.7	31.17																																		
Oct	28-Oct-19	7.24	264.2	1.16	863	392	12.6	31.1																																		
Oct	29-Oct-19	7.58	48.8	1.42	935	515	3.2	30.42	12.3																																	
Oct	30-Oct-19	7.54	263.7	2.37	973	536	2.3	30.36	10.7	2	49.16	920	12.1	0.625	< 3.1																											
Oct	31-Oct-19	7.46	-	-	-	458	-	31.2	11.1																																	
Nov	1-Nov-19	7.23	322.9	1.56	1059	530	7.8	30.59	30.5																																	
Nov	2-Nov-19	7.55	260.4	1.15	1140	570	12.8	30.86																																		
Nov	3-Nov-19	7.23	250.4	14.9	1.14	1234	498	12.9	31.85																																	
Nov	4-Nov-19	7.31	274.8	1.09	920	460	1.6	30.81	12.6																																	
Nov	5-Nov-19	7.17	313.4	1.25	923	462	1.9	30.66	13.6																																	
Nov	6-Nov-19	7.77	231.4	1.3	939	469	1.2	30.29	12.3	2	15.32	2	10.3	0.748	< 3.1	2.77	1	≤0.002	0.056	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	≤0.002	0.008	≤0.002	0.074	0.002	0.011	< 0.02	< 0.05	1.923	0.2	0.1	< 0.005	0.017	< 0.002
Nov	7-Nov-19	7.87	220.3	1.45	941	526	2.2	29.26	8.3																																	
Nov	8-Nov-19	7.19	372.5	1.54	720	390	21.2	20.56	10.7																																	
Nov	9-Nov-19	7.12	382.6	1.36	682	421	19.8	28.73																																		
Nov	10-Nov-19	7.69	230.3	1.39	740	370	3	29.21																																		
Nov	11-Nov-19	7.53	193.1	1.21	807	403	2.9	29.22																																		
Nov	12-Nov-19	7.56	313.5	1.46	808	404	1.7	29.54																																		
Nov	13-Nov-19	7.55	257.7	1.35	769	385	2.2	30.26	7.8	2	9.21	< 1.8	9.5	0.593	< 3.1																											
Nov	14-Nov-19	7.52	269.5	1.44	801	400	6.8	30.34	16.3																																	
Nov	15-Nov-19	7.45	340.6	1.77	753	376	6	30.32	13.3																																	
Nov	16-Nov-19	7.53	304.6	1.53	726	363	25.6	30.52																																		
Nov	17-Nov-19	7.48	331.8	1.52	711	355	11.3	30.83																																		
Nov	18-Nov-19	8.18	346.6	1.1	700	350	0.6	30.78	24.2	2	6.31	4.5	8.2	0.466	< 3.1																											
Nov	19-Nov-19	7.47	380.2	0.86	764	382	5.4	30.45	8.1																																	
Nov	20-Nov-19	7.29	416	0.87	1224	612	8.7	30.35	24.4																																	
Nov	21-Nov-19	7.13	410	0.77	1212	528	7.9	30.38		National Day																																	
Nov	22-Nov-19	7.34	373.8	0.91	702	351	10.3	30.33	16																																	
Nov	23-Nov-19	7.06	444	0.93	737	369	13.1	30.22																																		
Nov	24-Nov-19	7.39	400.7	0.81	741	356	9.4	28.74																																		
Nov	25-Nov-19	7.4	223.7	0.95	916	456	0	30.23	27.7																																	
Nov	26-Nov-19	7.01	369.1	1.48	793	397	11.7	29.94	12.5																																	
Nov	27-Nov-19	7.43	240.1	1.29	846	423	10.8	30.17	48	2	6.6	2300	10.7	0.888	< 3.1																											
Nov	28-Nov-19	7.17	353.9	1.14	853	426	1.4	30.32	20.9																																	
Nov	29-Nov-19	7.08	366.7	1.31	805	403	13.3	30.1	15.6																																	
Nov	30-Nov-19	6.87	180.4	4.95	820	410	17	30.28																																		
Dec	1-Dec-19	6.45	333.8	4.36	859	429	3.9	30.17																																		
Dec	2-Dec-19	6.35	182.3	2.83	698	349	0	30.18	12.4																																	
Dec	3-Dec-19	6.48	192.5	4.43	713	353	2.1	30.42	17.9																																	
Dec	4-Dec-19	6.14	325	5.78	752	376	1.6	30.07	14.9	2	3.14	< 1.8	13.8	0.895	< 3.1	1.78	2	≤0.002	0.332	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	≤0.002	0.014	≤0.002	0.056	0.004	0.007	< 0.02	< 0.05	1.34	0.4	0.1	0.005	0.031	< 0.002
Dec	5-Dec-19	6.49	119	5.21	701	351	7.6	29.7	25.5																																	
Dec	6-Dec-19	6.16	-	-	-	347	-	29.58	25																																	
Dec	7-Dec-19	6.75	249.2	5.81	746	373	2.4	29.07																																		
Dec	8-Dec-19	6.31	317.3	6.04	877	409	2.3	28.84																																		
Dec	9-Dec-19	6.48	289.1	4.29	850	425	0	27.82	29.5																																	
Dec	10-Dec-19	6.42	291.2	4	798	399	0	28.03	14.9																																	
Dec	11-Dec-19	6.03	341.5	4.95	848	424	5.5	28.62	17.3	2	1.69	< 1.8	13.6	1.13	< 3.1																											
Dec	12-Dec-19	6.28	79	4.3	1060	530	27.7	28.1	39																																	
Dec	13-Dec-19	6.51	116.1	4.26	835	417	7.3	28.98	84																																	
Dec	14-Dec-19	6.47	239.2	3.6	834	417	9.6	28.8	-																																	
Dec	15-Dec-19	6.2	406.5	5.17	733	365	7.5	28.44	-																																	
Dec	16-Dec-19	7.08	245.5	5.69	852	426	3.2	28.71	20																																	
Dec	17-Dec-19	7.4	226.5	5.78	791	395	0.7	28.52	9																																	
Dec	18-Dec-19	5.74	349.7	4.68	809	405	6.5	28.82	20.1	2	5.07	130	15.7	1.06	< 3.1																											
Dec	19-Dec-19	6.88	173.9	5.52	729	364	0.2	28.89	13.8																																	
Dec	20-Dec-19	6.35	365.8	6.41	714	357	3.7	29.26	74																																	
Dec	21-Dec-19	5.81	406.5	4.37	719	359	21.9	29.32	-																																	
Dec	22-Dec-19	6.28	362.8	6.04	812	406	3.4	29.1	-																																	
Dec	23-Dec-19	6.28	334.1	5.2	814	407	0	29.07	16	2	0.83	33	15.1	1.37	< 3.1																											
Dec	24-Dec-19	6.46	334.5	5.94	833	417	10	28.3	OFF																																	
Dec	25-Dec-19	-	-	-	-	-	-	-	OFF																																	
Dec	26-Dec-19	6.9	238.3	5.66	789	394	2.6	28.5	OFF																																	
Dec	27-Dec-19	6.07	404.1	5.33	807	404	6.9	27.31	OFF																																	
Dec	28-Dec-19	6.58	96.2	3.97	827	413	5.3	27.27	OFF																																	
Dec	29-Dec-19	6.43	355.9	4.96	825	413	4.3	26.96	OFF																																	
Dec	30-Dec-19	6.1	373.9	5.28	866	433	3.4	26.52	OFF	OFF	OFF	OFF	OFF	OFF	OFF																											

JAPAN THILAWA DEVELOPMENT LIMITED ★ MYANMAR MJTD

Dec	31-Dec-19	6.13	403.1	3.53	827	414	3.9	26.35	OFF																														
Jan	1-Jan-20	-							OFF																														
Jan	2-Jan-20	-							OFF																														
Jan	3-Jan-20	6.52	372	6.77	855	427	3.5	26.25	OFF																														
Jan	4-Jan-20	-	-	-	-	-	-	-	OFF																														
Jan	5-Jan-20	-	-	-	-	-	-	-	OFF																														
Jan	6-Jan-20	-	-	-	-	-	-	-	OFF																														
Jan	7-Jan-20	-	-	-	-	-	-	-	OFF																														
Jan	8-Jan-20	-	-	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Jan	9-Jan-20	7.73	372.3	5.8	901	450	10	27.18	24.5																														
Jan	10-Jan-20	7.13	319.1	6.73	780	390	34.6	28.08	21.9																														
Jan	11-Jan-20	7.39	318	5.82	800	400	4.3	28.43	-																														
Jan	12-Jan-20	7.34	318	7.6	876	438	3	28.54	-																														
Jan	13-Jan-20	6.49	390	5.76	858	429	6.3	28.42	19.1																														
Jan	14-Jan-20	7.46	262.6	4.82	1009	505	4.3	28.39	24.4																														
Jan	15-Jan-20	-	-	-	-	-	-	-	24.7	2	0.98	< 1.8	14	1.15	< 3.1																								
Jan	16-Jan-20	7.61	195.6	5.88	723	361	1.4	28.56	32.7																														
Jan	17-Jan-20	8.59	338.6	4.26	821	411	10.8	28.25	19.9																														
Jan	18-Jan-20	7.75	452.8	5.33	876	438	19.8	28.51	-																														
Jan	19-Jan-20	8.9	180.5	5.09	931	465	0.3	28.81	-																														
Jan	20-Jan-20	8.79	305.6	4.63	944	472	0.1	28.68	19.9																														
Jan	21-Jan-20	8.08	322.3	4.98	900	450	0.8	28.64	36.1																														
Jan	22-Jan-20	7.55	360.3	8.6	987	-	2	29.16	29.4	2	1.7	< 1.8	14.4	1.15	< 3.1																								
Jan	23-Jan-20	7.96	261.7	2	936	468	3.2	28.75	24.2																														
Jan	24-Jan-20	8.22	345.4	3.76	1269	635	24.8	28.67	72																														
Jan	25-Jan-20	8.08	295.8	3.42	1025	512	4.1	28.76	-																														
Jan	26-Jan-20	7.92	195.4	2.58	889	445	0.4	28.33	-																														
Jan	27-Jan-20	8.26	370.3	5.14	776	388	0.1	27.66	18.2																														
Jan	28-Jan-20	7.81	379.5	3.55	771	385	10.1	27.4	OFF																														
Jan	29-Jan-20	8.24	131.2	3.19	657	328	4.7	26.89	OFF	OFF	OFF	OFF	OFF	OFF	OFF																								
Jan	30-Jan-20	7.52	174.6	1.79	664	332	3.5	27.92	OFF																														
Jan	31-Jan-20	6.67	301.6	2.87	725	362	3.4	26.31	OFF																														
Feb	1-Feb-20	8.56	120.5	2.53	787	354	3.2	26.41	OFF																														
Feb	2-Feb-20	8.3	94.7	1.19	857	428	3.7	26.32	OFF																														
Feb	3-Feb-20	7.86	317.6	1.8	839	415	6.2	26.51	OFF																														
Feb	4-Feb-20	-	-	-	-	-	-	-	OFF																														
Feb	5-Feb-20	7.77	153.6	1.77	829	414	7.5	26.5	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Feb	6-Feb-20	7.5	167.3	2.98	727	363	7.6	25.73	OFF																														
Feb	7-Feb-20	-	-	-	-	-	-	-	OFF																														
Feb	8-Feb-20	-	-	-	-	-	-	-	OFF																														
Feb	9-Feb-20	7.26	268	1.53	864	432	1.2	27.87	OFF																														
Feb	10-Feb-20	8.17	228.8	1.67	888	444	0	28.36	OFF																														
Feb	11-Feb-20	8.84	391.9	1.5	1077	538	38.6	28.43	OFF	6	5.04	17	13.1	1.31	< 3.1																								
Feb	12-Feb-20	8.47	192.8	1.59	918	459	15.1	28.33	OFF																														
Feb	13-Feb-20	8.51	208.3	1.85	868	434	0	28.34	OFF																														
Feb	14-Feb-20	8.77	329.7	1.75	918	459	0	28.24	OFF																														
Feb	15-Feb-20	8.11	351.9	2.01	958	479	11.9	28.15	OFF																														
Feb	16-Feb-20	7.96	401.2	2.1	944	482	11.2	28.11	OFF																														
Feb	17-Feb-20	8.14	405.8	2.19	951	457	11.9	28.14	30.8																														
Feb	18-Feb-20	8.43	383.6	4.32	932	466	2.2	28.58	21.7																														
Feb	19-Feb-20	7.4	189.5	2.33	877	438	3.9	28.56	20.7	2	1.09	< 1.8	19	1.16	1.6																								
Feb	20-Feb-20	7.44	144.7	2.18	928	464	9.8	29.32	64																														
Feb	21-Feb-20	8.64	352.7	1.87	1072	536	7.9	29.31	36.4																														
Feb	22-Feb-20	7.32	309.4	1.79	947	548	12.9	29.11	-																														
Feb	23-Feb-20	7.11	274.8	2.02	1021	510	1.9	29.37	-																														
Feb	24-Feb-20	-	-	-	-	-	-	-	17.3																														
Feb	25-Feb-20	7.88	322.3	2.39	877	439	2.3	29.37	29.4																														
Feb	26-Feb-20	6.44	384.9	7.53	1006	461	6.1	29.84	36	2	7.66	< 1.8	17.8	1.61	< 3.1																								
Feb	27-Feb-20	6.51	-	-	-	621	-	29.06	26.4																														
Feb	28-Feb-20	6.43	-	-	-	574	-	28.88	52																														
Feb	29-Feb-20	6.05	-	-	-	929	-	28.94	-																														
Mar	03-03-20	6.79	-	-	-	734	-	28.72	-																														
Mar	04-03-20	6.57	-	-	-	652	-	28.62	-																														
Mar	05-03-20	6.21	-	-	-	623	-	28.61	22.8																														
Mar	06-03-20	6.47	-	-	-	618	-	28.76	16.2	4	6.44	540	15.7	1.34	< 3.1	4.7	2	≤0.002	0.172	≤0.01	≤0.002	≤0.002	≤0.01	≤0.002	≤0.002	0.004	0.014	≤0.002	0.062	< 0.002	0.014	0.07	< 0.05	2.371	< 0.1	< 0.1	< 0.005	0.272	< 0.002
Mar	10-03-20	6.58	-	-	-	517	-	29.38	20.3																														
Mar	11-03-20	6.84	-	-	-	508	-	29.15	28.1																														
Mar	12-03-20	6	-	-	-	523	-	29.57	-																														
Mar	13-03-20	6.14	-	-	-	538	-	29.43	-																														
Mar	14-03-20	6.49	-	-	-	500	-	29.32	-																														
Mar	15-03-20	6.36	-	-	-	545.7	-	28.9	24.8																														
Mar	16-03-20	6.82	-	-	-	539.7	-	29	33.3	4	9.01	< 1.8	14.9	0.72	< 3.1																								
Mar	17-03-20	6.63	-	-	-	480	-	26	40																														
Mar	18-03-20	6.22	-	-	-	511.3	-	25.8	31.9																														
Mar	19-03-20	6.48	-	-	-	532.4	-	26.7	-																														
Mar	20-03-20	6.81	-	-	-	536.1	-	25.8	-																														
Mar	21-03-20	6.87	-	-	-	582	-	30.33	49																														
Mar	22-03-20	6.77	-	-	-	670	-	25.9	OFF																														
Mar	23-03-20	7.13	-	-	-	781.9	-	25.8	OFF	OFF	OFF	OFF	OFF	OFF	OFF																								
Mar	24-03-20	6.99	-	-	-	752.8	-	24.8	OFF																														
Mar	25-03-20	7.28	-	-	-	745.6	-	27.5	OFF																														
Mar	26-03-20	6.96	-	-	-	738	-	30.14	OFF																														
Mar	27-03-20	7.04	-	-	-	769	-	29.78	OFF																														
Mar	28-03-20	7.27	-	-	-	799.6	-	29.59	OFF																														
Mar	29-03-20	7.38	-	-	-	801.4	-	26.3	OFF																														
Mar	30-03-20	7.38	-	-	-	778.2	-	26.2	OFF	OFF	OFF	OFF	OFF	OFF	OFF																								
Mar	31-03-20	7.37	-	-	-	786.9	-	28.1	OFF																														
		7.13	-	-	-	786.7	-	27.2	OFF																														
		7.59	-	-	-	782.2	-	26.4	OFF																														
		7.5	-	-	-	784.4	-	26.8	OFF																														
		7.77	-	-	-	785.2	-	26.1	OFF																														
		7.8	-	-	-	784.2	-	25.9	OFF																														

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