Environmental Monitoring Report

For

Thapyaywa (3) 30 MW Ground Mounted Solar Power Plant Project

(Operation Phase)

(2nd Time)

(18th July 2024 – 18th January 2025)

Proposed by

Natural Solar Power Co., Ltd.

Prepared by

E Guard Environmental Services

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Introduction

This environmental monitoring report is prepared for Thapyaywa (3) 30 MW ground mounted solar power plant project connected to Thapyaywa Substation, proposed by Natural Solar Power Co., Ltd., which is formed by Gold Energy Co., Ltd. The project proponent won tender from the Ministry of Electricity and obtained permit for construction and electricity generation from solar energy of the proposed project.

This project is located at Wet Toe Village Tract and Hanza Village Tract, Thazi Township, Meiktila District, Mandalay Region, Myanmar. Its coordinate points are 20° 59' 19.36" N, 96° 0' 57.37" E and the average altitude of the site is 158 m. The total capacity of capacity of AC side of the proposed project is 33 MW and DC side is 40.887 MWp, it will consist of 5 sets of 6.6 MW PV sub-arrays in the project. This project is developed Natural Solar Power Co., Ltd., which is formed by the Gold Energy Co., Ltd (100% full investment). After construction period, proposed project will generate electricity from solar energy and distribute to the Thapyaywa Substation via 33 kV overhead transmission line and proposed operation period is 20 years. As the proposed project is a Build, Own and Operate (BOO) basis project, project proponent will extend operation period at relevant authorities and continue operation activities after 20 years.

Environmental quality monitoring team included U Aung Moe Oo, U Ye Chit Zaw and U Khin Zaw Min. The environmental quality monitoring report includes air, water and noise. Air quality monitoring was carried out in one location as source (Project Site) and also water quality test was carried out in three places as surface water (SW- Hanza Inn), ground water (GW- project site) and waste water (WW- Outlet of waste water cannel from the project site). Noise are also measured in two locations as source (Project Site) and receptor (staff housing). Most of the environmental monitoring results (air, water and noise) are within the guidelines.

1. METHODOLOGY

Baseline environmental parameters and sampling locations were defined according to the objectives for environmental impact assessment, and monitoring purposes. Locations for sampling and analysis of water quality, ambient air quality and noise level of the project site were identified by e Guard Environmental Services Co., Ltd.

1.1 Ambient Air Quality

The emissions of dust particles and gases were measured for 24hrs continuously at the selected sites using the Environmental Perimeter Air Station (EPAS). The results were compared with National Environmental Quality Guidelines NEQG, American Conference of Governmental Industrial Hygienists (ACGIH) and National Ambient Air Quality Standards (NAAQS). EPAS provides direct readings in real time with data-logging capabilities. Air quality is composed of dust and gas emissions of the ambient air.

Table 1. 1 Ambient Air Quality Measurement

Ambient Air Quality (1 location)	
Gas Emission	CO, CO_2, SO_2, NO_2
Dust Emission	PM_{10}, $PM_{2.5}$

1.2 Ambient Noise

Noise level LAeq (dBA) will be measured at the selected locations that can reflect the exposure of the nearest local community and sensitive locations. Duration and frequency were measured for 24hrs continuously at the selected site using the Sound Pressure Level Meter.

The monitoring procedures, data analysis and interpretation were carried out in accordance with the instrument's manufacture and National Environmental Quality (Emission) Guidelines, World Health Organization (WHO) and International Finance Corporation (IFC) guidelines in order to be in line with Environmental Conservation Department, Ministry of Natural Resources and Environment Conservation (MONREC). "National Environmental Quality (Emission) Guidelines" for Myanmar was also presented the value of noise level as LAeq (dBA).

Table 1. 2 Noise level monitoring

Noise monitoring (2 locations)	
Noise Emission	LAeq (dBA) (1hrs, 24 hrs.)

Table 1. 3 Equipment used to measure ambient air and noise measurement

Davis Vantage Pro2 Wireless Weather Station Provides detailed current weather conditions and expanded forecasts - all at a glance The Vantage Pro2 uses a frequency-hopping spread spectrum radio from 902 MHz to 928 MHz to transmit and receive data up to 1,000' (300m) line of sight. In addition, the weather station features a	

bubble level, improved anemometer base, redesigned wind cups, and factory-calibrated wind direction. The integrated sensor suite combines temperature and humidity sensors, rain collector with an aluminum-plated tipping bucket, and anemometer into one package for easy setup. Measure inside and outside temperature and humidity, heat index, barometric pressure, dew point, rainfall, wind direction and speed, and wind chill.	
Haz-Scanner EPAS PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO, CO_2, Temperature, and Relative Humidity	
Digital Sound Level Meter Noise	

Figure 1. 1 Environmental Quality Measuring during Operation Period

	Air and noise quality measuring at Thapyaywa 3 Solar Power Project 14.01.2025 to 15.01.2025 (at source project site)

	Noise quality measuring at Thapyaywa 3 Solar Power Project 14.01.2025 to 15.01.2025 (at staff housing)

1.3 Water Quality

Water samples were collected on site with appropriate sampling equipment and procedures. The sampling team has pre-arranged with the labs in Yangon for analysis and logistic arrangement made to reach the preserved samples with unique IDs to the designated labs within 48hrs.

The sampling and survey team has a list of local laboratories providing analytical services for ground water, waste water and surface water quality analysis. Up to this date, there is no laboratory having accredited certification for water quality testing (environmental analysis) in Myanmar. SGS (Myanmar), ISO (Myanmar). Laboratories have used for water quality analysis among the list of laboratories. These laboratories have been recognized as a long-term establishment in Myanmar and employed qualified technical staffs.

The following laboratories were used for analysis of water and parameter shown in the **Table 1. 4.**

1. PRO Lab, No. (9), Sabae Housing, Pyi Htaung Su Road, (26) Ward, South Dagon Tsp, Yangon, Myanmar. Tel: 09 893 767424
2. Water Quality Laboratory, Forest Research Institute, Yezin, Nay Pyi Taw. Tel: 09 430 19169, 09 420 705131

Table 1. 4 Environmental Quality Parameters for Water quality

Waste Water Parameters (1 location)	
Physical Parameter	Total Suspended Solids
Chemical Parameter	BOD, COD, pH
Biological Parameter	Total Coliform Bacteria
Nutrients	Total Nitrogen, Total Phosphorus

Compounds	Oil & grease
Ground Water Parameters (1 location)	
Physical Parameter	Total Suspended Solids, Turbidity, Total Dissolved Solids, Dissolved Oxygen
Chemical Parameter	BOD, COD, pH, EC, Salinity, Oxidation Reduction Potential (ORP)
Biological Parameter	Total Coliform Bacteria
Metal	Potassium
Nutrients	Total Nitrogen, Total Phosphorus
Compounds	Oil & grease
Surface Water Parameters (1 Location)	
Physical Parameter	Total Suspended Solids, Turbidity, Total Dissolved Solids, Dissolved Oxygen
Chemical Parameter	BOD, COD, pH, EC, Salinity, Oxidation Reduction Potential (ORP)
Biological Parameter	Total Coliform Bacteria
Metal	Potassium
Nutrients	Total Nitrogen, Total Phosphorus
Compounds	Oil & grease

Water samplings are conducted using the following equipment as shown in figure **(Table 1. 5).**

Table 1. 5 Equipment for Water Sampling

Water Sampling Bottle	

1.4 Monitoring and Sampling Locations

Sampling locations were confirmed by environmental specialist on site before doing the sampling. Water quality sampling locations consist of one waste water locations (WWQ: outlet of waste water cannel from the project site), one ground water location (GWQ: Project Site) and one surface water location (SWQ: Hanza Inn) which is situated near the project site). Air quality was monitored at the selected one location (Thapyaywa 3 solar power project site (source) that can get results of the existing ambient air quality.

Figure 1. 2 Air Quality Monitoring Locations of Thapyaywa 3 Solar Power Project

Figure 1. 3 Noise Quality Monitoring Locations of Thapyaywa 3 Solar Power Project

Figure 1. 4 Water Quality Sampling Locations of Thapyaywa 3 Solar Power Project

Table 1. 6 Locations of Environmental Quality sampling points

Locations No.	Points	Coordinate	Locations
Ambient Air Quality Monitoring Location			
1.	AQ1	Lat - 20°58'59.57"N, Long - 96° 1'5.09"E	Project Site
Noise Quality Monitoring Locations			
1.	NQ1	Lat - 20°58'59.57"N, Long - 96° 1'5.09"E	Project Site
2.	NQ2	Lat - 20°58'36.57"N, Long - 96° 0'45.49"E	Project Site (Receptor)
Waste Water Quality Monitoring Location			
1.	WWQ	Lat - 20°59'1.12"N, Long - 96° 1'3.50"E	Outlet of waste water cannel from the project site
Ground Water Quality Sampling Location			
1.	GWQ	Lat - 20°58'58.67"N, Long - 96° 1'2.68"E	Project Site
Surface Water Quality Sampling Location			
1.	SWQ	Lat - 20°59'16.24"N, Long - 96° 2'2.08"E	Hanza Inn

2. ENVIRONMENTAL QUALITY

2.1 Ambient Air Quality

The air quality monitoring was done at selected locations during 14th to 15th January 2025. During this survey, these parameters were measured with adequate devices named Environmental Perimeter Air Station (EPAS) viz; Particulate Matters (PM_{10} and $PM_{2.5}$) and gases CO_2, CO, SO_2, NO_2 via 24-hour basis. The results and guidelines of all emission pollutants are shown in table.

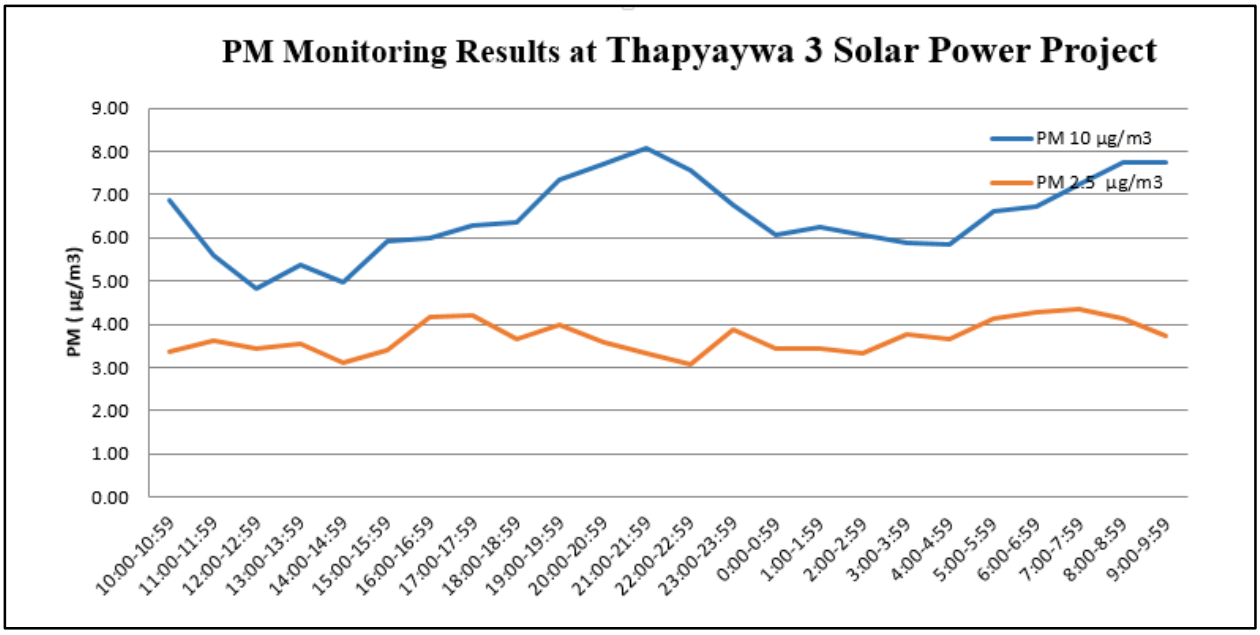


Figure 2. 1 PM Monitoring Results at Thapyaywa 3 Solar Power Project

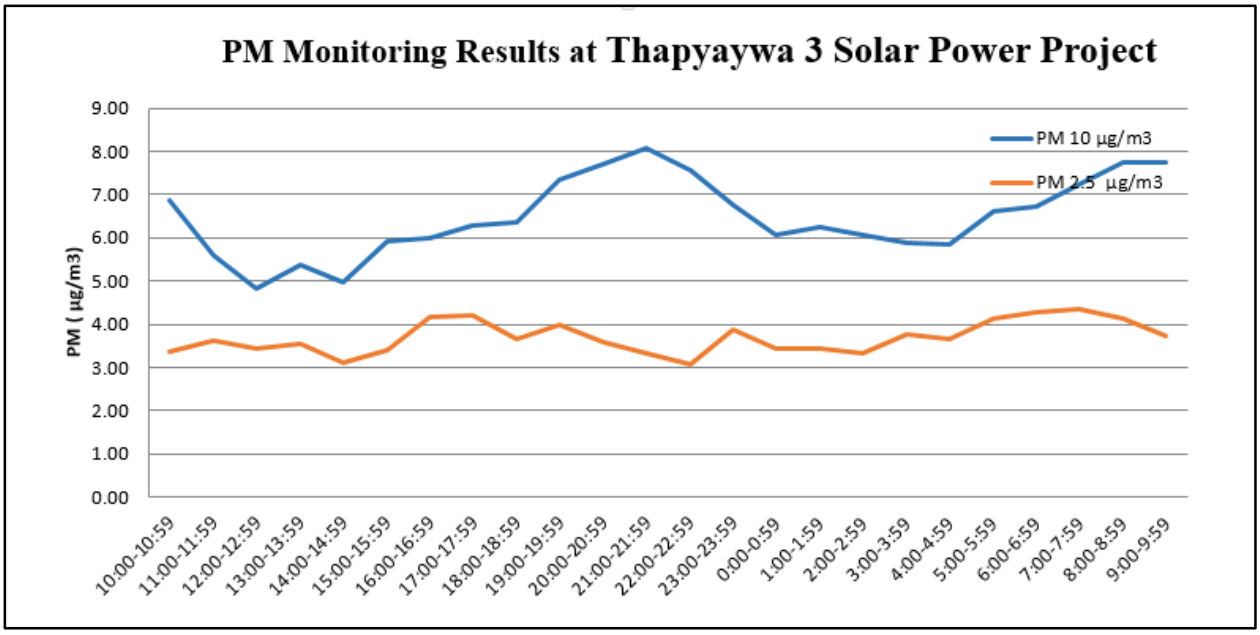


Figure 2. 2 Fluctuation of Air Pollutants during Dial Cycle at Thapyaywa 3 Solar Power Project

Particulate matters (PM_{10} and $PM_{2.5}$) results are with in guideline values as shown in table. Atmospheric particulate matters such as PM_{10} and $PM_{2.5}$ have their ability to reach the deepest part of lungs and so affect respiratory process. In this air quality survey of the project site, the surveyed results of these particulate matters gathered from EPAS. The results with one-hour interval are shown in the following table.

Sulfur Dioxide (SO_2) is generated from combustion of fuels such as oil and coal, and as by-product from some chemical production or wastewater treatment processes. On-road and off-road

vehicles are also emission source of SO_2. SO_2 irritates the respiratory tract, injures lung tissues and reduces visibility and level of sunlight. The emission can be controlled by implementation of manufacturer recommended engine maintenance programs, good driving practices, installing and maintaining emissions control devices, and implementing a regular vehicle maintenance and repair program.

Nitrogen Oxides (NO_X) in the ambient air consist of nitric oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O). NO_2 is formed by chemical reaction of NO and ozone. The main sources of NO_2 are combustion of fuel and on-road and off-road vehicles. NO_2 decreases lung function and resistance to infection. The gas emission can be monitored by combustion modification, flue gas recirculation, water/ steam injection and the same measures for SO_2 reduction.

Likewise, **Carbon Monoxide (CO) and Carbon dioxide (CO_2)** have the same emission sources and mitigation measures for SO_2 and NO_2. They are poisonous gas and cause damage to the respiratory organ. Guidelines 2013, adopted threshold limit values of CO_2 is 5,000 ppm for 8-hour, time-weighted average. Thus, it can be concluded that the existing CO_2 level is acceptable for human health.

Detail results and variation patterns with one-hour interval of pollutants are shown in tables and figures below. Results of average, peak and minimum of a day are calculated in the table.

Table 2. 1 Air Pollutants Emission Results (Thapyaywa Solar Power Project)

Date	Time		CO_2 (ppm)	CO (ppb)	NO_2 (ppb)	PM_{10} µg/m^3	$PM_{2.5}$ µg/m^3	RH %	SO_2 (ppb)
14.01.2025	10:00-10:59	Average	359.23	0.29	2.80	6.88	3.36	21.43	0.12
14.01.2025	11:00-11:59	Average	361.31	0.26	2.95	5.60	3.60	21.32	0.12
14.01.2025	12:00-12:59	Average	363.49	0.27	2.69	4.83	3.42	21.64	0.00
14.01.2025	13:00-13:59	Average	358.34	0.21	2.83	5.37	3.55	21.37	0.05
14.01.2025	14:00-14:59	Average	353.32	0.00	2.68	4.97	3.11	21.39	0.12
14.01.2025	15:00-15:59	Average	353.58	0.13	3.26	5.90	3.40	21.09	0.00
14.01.2025	16:00-16:59	Average	351.49	0.00	2.55	5.99	4.18	21.56	0.16
14.01.2025	17:00-17:59	Average	356.79	0.00	3.03	6.29	4.19	22.37	0.25
14.01.2025	18:00-18:59	Average	350.00	0.00	2.67	6.36	3.67	21.05	0.00
14.01.2025	19:00-19:59	Average	365.46	0.00	2.61	7.34	3.99	21.70	0.00
14.01.2025	20:00-20:59	Average	355.72	0.00	2.58	7.70	3.59	21.76	0.00
14.01.2025	21:00-21:59	Average	362.82	0.00	2.39	8.06	3.34	21.63	0.17
14.01.2025	22:00-22:59	Average	358.33	0.41	2.83	7.56	3.07	21.44	0.00
14.01.2025	23:00-23:59	Average	354.54	0.12	2.48	6.76	3.89	21.96	0.00
15.01.2025	0:00-0:59	Average	359.89	0.00	2.39	6.05	3.42	21.22	0.03
15.01.2025	1:00-1:59	Average	352.37	0.36	2.34	6.25	3.42	21.58	0.06
15.01.2025	2:00-2:59	Average	360.91	0.19	2.71	6.08	3.33	20.96	0.00
15.01.2025	3:00-3:59	Average	355.14	0.00	2.82	5.87	3.75	21.94	0.00
15.01.2025	4:00-4:59	Average	356.96	0.00	2.97	5.83	3.64	21.33	0.12
15.01.2025	5:00-5:59	Average	362.53	0.00	3.10	6.61	4.15	21.40	0.00
15.01.2025	6:00-6:59	Average	354.09	0.17	2.80	6.72	4.26	22.28	0.00
15.01.2025	7:00-7:59	Average	357.80	0.00	3.09	7.23	4.34	21.75	0.00
15.01.2025	8:00-8:59	Average	355.32	0.26	2.90	7.76	4.12	21.56	0.00
15.01.2025	9:00-9:59	Average	359.31	0.21	3.36	7.74	3.73	21.64	0.13
Average			357.45	0.12	2.78	6.49	3.69	21.56	0.06
1 hour Minimum			350.00	0.00	2.34	4.83	3.07	20.96	0.00
1 hour Maximum			365.46	0.41	3.36	8.06	4.34	22.37	0.25

Table 2. 2 Air Emission Levels (Standard)

No.	Parameter	Unit	Maximum Concentration	
			National	Average Period
1.	Carbon monoxide	mg/m^3	9	8-hour
2.	Carbon dioxide	ppm	5000	8-hour
3.	Sulfur dioxide	$\mu g/m^3$	20 500	24-hour 10-minute
4.	Nitrogen dioxide	$\mu g/m^3$	40 200	1 year 1 hour
5.	Particulate matter PM_{10}	$\mu g/m^3$	20 50	1-year 24-hour
6.	Particulate matter $PM_{2.5}$	$\mu g/m^3$	10 25	1-year 24-hour

Source: Myanmar National Environmental Quality (Emission) Guidelines, National Ambient Air Quality Standards (NAAQS), American Conference of Governmental Industrial Hygienists (ACGIH).

Detail results with one-hour interval of pollutants are shown in **Table 2. 1**. The average, peak and minimum values of results per day are calculated. All results are under the Myanmar National Environmental Quality (emission) Guidelines.

Table 2. 3 Observed Ambient Air Quality Results from Selected Points

Parameters	Observed Values	NEQG Guidelines Value	ACGIH Guidelines Value	NAAQS Guidelines Value	Unit	Averaging Period
PM_{10}	6.49	50	-	-	$\mu g/m^3$	24hrs
$PM_{2.5}$	3.69	25	-	-	$\mu g/m^3$	24hrs
CO	0.00015	-	-	9	ppm	8hrs
CO_2	357.76	-	5000	-	ppm	8hrs
SO_2	0.15	20	-	-	$\mu g/m^3$	24hrs
NO_2	6.31	200	-	-	$\mu g/m^3$	1hrs

2.2 Ambient Noise

Ambient noise level for the proposed project was measured with Digital Sound Level Meter at the project site. The noise level measurement is conducted at Thapyaywa 3 solar power project points: these points are nearly the air monitoring points and staff housing on 14th to 15th January 2025. Measuring period is 24 hours continuously. The observed values are described in **Table 2. 4** and **Table 2. 5** and the following figures are noise level measurement at the proposed project.

Table 2. 4 Observed Values of Noise Level Measurement at Thapyaywa 3 Solar Project Site (Source)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	15.01.2025	7:00:28-7:59:28	40.84	A	Day	
2	15.01.2025	8:00:28-8:59:28	40.04	A	Day	
3	15.01.2025	9:00:28-9:59:28	39.77	A	Day	
4	14.01.2025	10:00:28-10:59:28	50.90	A	Day	
5	14.01.2025	11:00:28-11:59:28	55.51	A	Day	
6	14.01.2025	12:00:28-12:59:28	41.50	A	Day	
7	14.01.2025	13:00:28-13:59:28	45.36	A	Day	
8	14.01.2025	14:00:28-14:59:28	44.98	A	Day	44.74
9	14.01.2025	15:00:28-15:59:28	43.59	A	Day	
10	14.01.2025	16:00:28-16:59:28	48.63	A	Day	
11	14.01.2025	17:00:28-17:59:28	43.54	A	Day	
12	14.01.2025	18:00:28-18:59:28	43.85	A	Day	
13	14.01.2025	19:00:28-19:59:28	43.99	A	Day	
14	14.01.2025	20:00:28-20:59:28	43.90	A	Day	
15	14.01.2025	21:00:28-21:59:28	44.68	A	Day	
16	14.01.2025	22:00:28-22:59:28	44.55	A	Night	
17	14.01.2025	23:00:28-23:59:28	44.51	A	Night	
18	15.01.2025	0:00:28-0:59:28	44.41	A	Night	
19	15.01.2025	1:00:28-1:59:28	44.72	A	Night	
20	15.01.2025	2:00:28-2:59:28	47.06	A	Night	46.18
21	15.01.2025	3:00:28-3:59:28	47.33	A	Night	
22	15.01.2025	4:00:28-4:59:28	49.95	A	Night	
23	15.01.2025	5:00:28-5:59:28	47.13	A	Night	
24	15.01.2025	6:00:28-6:59:28	45.99	A	Night	
Average			**45.28**			

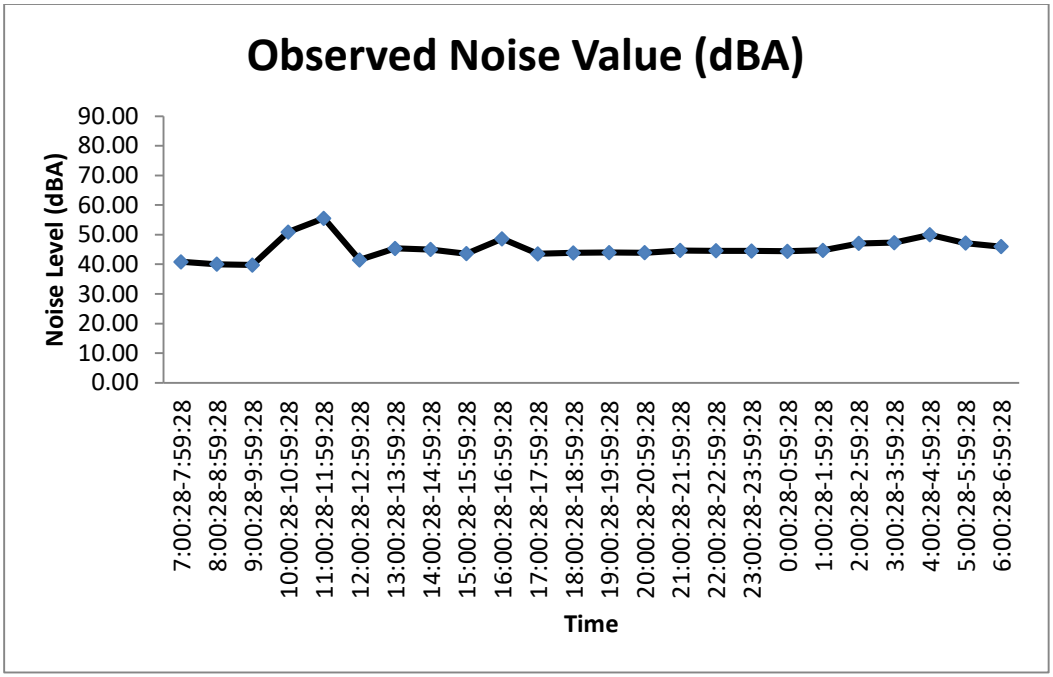


Figure 2. 3 Noise Level at Thapyaywa 3 Solar Project Site (Source)

Table 2. 5 Observed Values of Noise Level Measurement at Staff Housing (Receptor)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	15.01.2025	7:00:28-7:59:28	45.27	A	Day	45.55
2	15.01.2025	8:00:28-8:59:28	47.52	A	Day	
3	15.01.2025	9:00:28-9:59:28	43.37	A	Day	
4	14.01.2025	10:00:28-10:59:28	40.27	A	Day	
5	14.01.2025	11:00:28-11:59:28	45.60	A	Day	
6	14.01.2025	12:00:28-12:59:28	45.02	A	Day	
7	14.01.2025	13:00:28-13:59:28	43.86	A	Day	
8	14.01.2025	14:00:28-14:59:28	43.58	A	Day	
9	14.01.2025	15:00:28-15:59:28	37.65	A	Day	
10	14.01.2025	16:00:28-16:59:28	40.19	A	Day	
11	14.01.2025	17:00:28-17:59:28	52.08	A	Day	
12	14.01.2025	18:00:28-18:59:28	52.35	A	Day	
13	14.01.2025	19:00:28-19:59:28	52.36	A	Day	
14	14.01.2025	20:00:28-20:59:28	48.89	A	Day	
15	14.01.2025	21:00:28-21:59:28	45.30	A	Day	
16	14.01.2025	22:00:28-22:59:28	47.46	A	Night	44.64
17	14.01.2025	23:00:28-23:59:28	43.48	A	Night	
18	15.01.2025	0:00:28-0:59:28	45.15	A	Night	

19	15.01.2025	1:00:28-1:59:28	42.03	A	Night	
20	15.01.2025	2:00:28-2:59:28	44.09	A	Night	
21	15.01.2025	3:00:28-3:59:28	46.60	A	Night	
22	15.01.2025	4:00:28-4:59:28	45.21	A	Night	
23	15.01.2025	5:00:28-5:59:28	43.31	A	Night	
24	15.01.2025	6:00:28-6:59:28	44.42	A	Night	
Average			**45.21**			

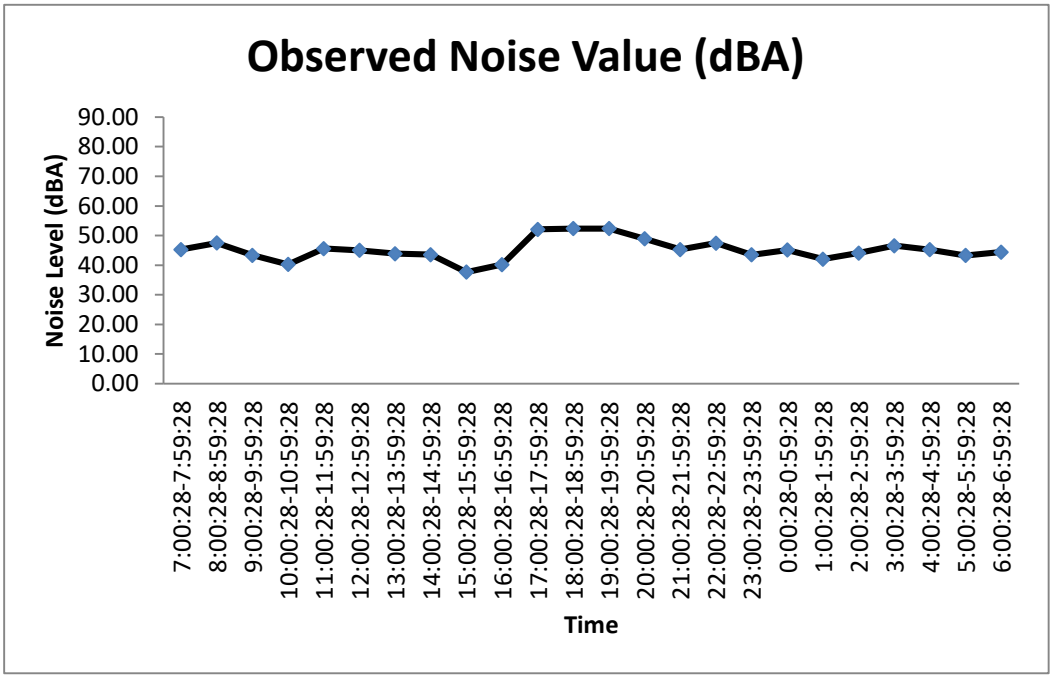


Figure 2. 4 Noise Level at Staff Housing (Receptor)

Table 2. 6 Observed Ambient Noise Level Results from Selected Points

Point	Thapyaywa 3 Solar Power Project	
	Day Time	Night Time
Project Site (Source)	**44.75**	**46.18**
Guideline Values for Industrial	**70**	**70**
Staff Housing (Receptor)	**45.55**	**44.64**
Guideline Values for Residential	**55**	**45**

The observed values are compared with the National Environmental Quality (Emission) Guidelines as shown in **Table 2. 6** except receptor point, which indicates the separate level for residential and industrial points.

Table 2. 7 National Environmental Quality (Emission) Guidelines Values for Noise Level

Receptor	**One Hour LAeq (dBA)**	
	Daytime 07:00 - 22:00 (10:00 - 22:00 for Public Holidays)	**Nighttime 22:00 - 07:00 (22:00 - 10:00 for Public Holidays)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

The observed values of the proposed project for daytime at Thapyaywa 3 Solar Power Project Site (source) and Staff Housing (Receptor) are 44.75 dB (A) and 45.55 dB (A). The observed values of the proposed project for nighttime at Thapyaywa 3 Solar Power Project Site (source) and Staff Housing (Receptor) are 46.18 dB (A) and 44.64 dB (A). So, the observed daytime value and night time value for Thapyaywa 3 Solar Power Project Site (source) and Staff Housing (Receptor) are lower than the guideline value.

2.3 Wind Speed and Direction

The following figures describe the wind speed and wind direction of the proposed project site (Thapyaywa 3 Solar Power Project Site at source) on 14th to 15th January 2025 respectively. According to the data, the wind direction is following **Figure 2. 5** and **Figure 2. 6**.

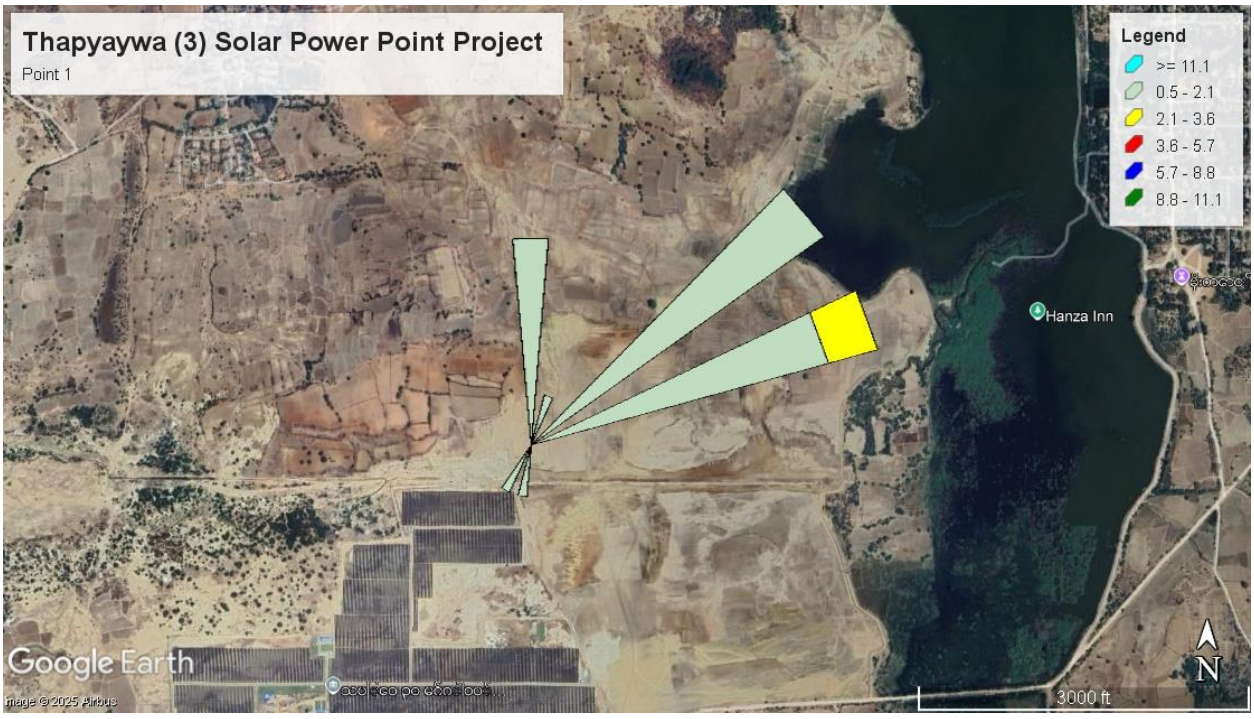
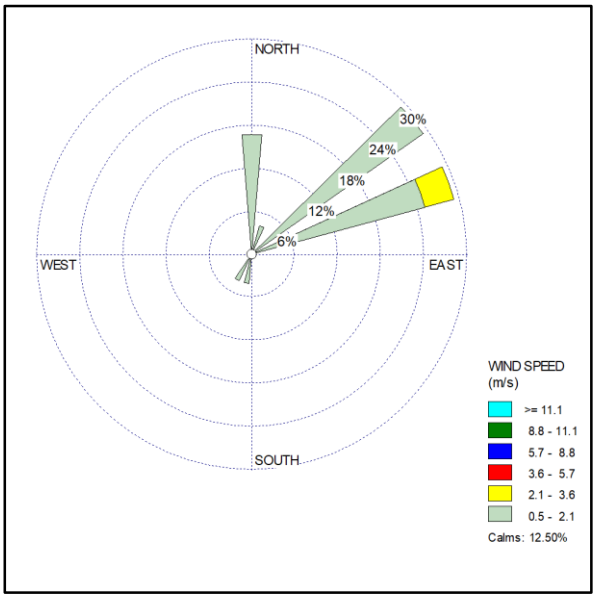


Figure 2. 5 Wind Speed and Wind Direction (Blowing From) at Thapyaywa 3 Solar Power Project Site



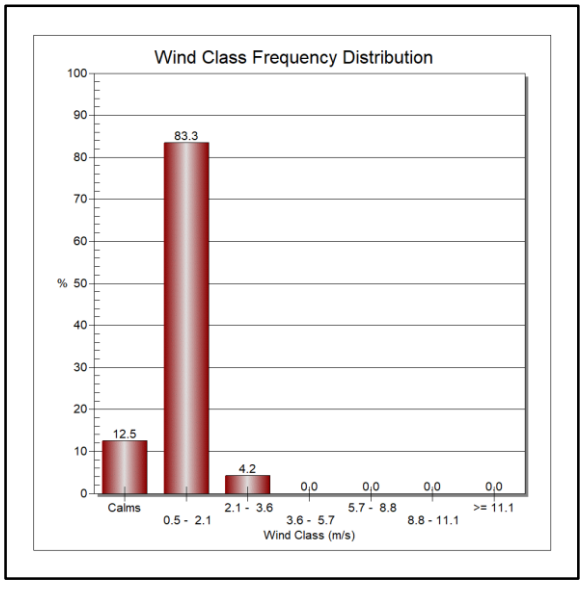


Figure 2. 6 Wind Class Frequency Distribution at the Thapyaywa 3 Solar Power Project Site

2.4 Water quality

The project proponent is responsible for ensuring the drainage or runoff from the project or its related activities do not deteriorate the existing waste water, surface water and ground water quality before the project implementation. Waste water, surface water and ground water quality were recorded by laboratory analysis at three selected locations systematically. The field surveys for environmental quality monitoring and sampling were done during 14th January 2025.

Objectives of the sampling and analysis of waste water and ground water is to understand the existing water quality at the selected locations and to monitor the impacts during operation period.

Table 2. 8 Ground Water Quality of Thapyaywa 3 Solar Power Project

Item	Unit	Ground Water	WHO Drinking Water Guideline	NDWQS (2014), MOH, Myanmar.
Biological Oxygen Demand (BOD)	mg/l	0.39	-	-
Chemical Oxygen Demand (COD)	mg/l	5.6	-	-
Dissolved Oxygen (On-site)	mg/l	7.43	-	-
Electrical Conductivity (On-site)	mS/cm	6.91	-	-
pH (On-site)	-	8.37	6.5-8.5	-
Oil & Grease	mg/l	5	-	-
Oxidation Reduction Potential (ORP) (On-site)	ORPmV	291	-	-
Salinity (On-site)	ppt	3.8	-	-
Turbidity (On-site)	NTU	0.0	-	-
Total Dissolved Solids (On-site)	g/l	7.43	-	-
Total Nitrogen	mg/l	2.81	-	-
Total Phosphorus	mg/l	0.04348	-	-
Total suspended solid (TSS)	mg/l	0.9	-	-
Total coliform bacteria	MPN/ml	< 0.3	Not detected	3
Potassium	mg/l	0.36	-	-

Table 2. 9 Surface Water Quality of Thapyaywa 3 Solar Power Project

Item	Unit	Surface Water	Australian and Newzeland guidelines for fresh and marine water quality
Biological Oxygen Demand (BOD)	mg/l	2.29	-
Chemical Oxygen Demand (COD)	mg/l	10.4	-
Dissolved Oxygen (On-site)	mg/l	11.29	-
Electrical Conductivity (On-site)	mS/cm	0.570	-
pH (On-site)	-	8.49	-

Oil & Grease	mg/l	4	Substantially absent, no iridescent sheen
Oxidation Reduction Potential (ORP) (On-site)	ORPmV	247	-
Salinity (On-site)	ppt	0.3	-
Turbidity (On-site)	NTU	146	-
Total Dissolved Solids (On-site)	g/l	0.365	-
Total Nitrogen	mg/l	2.21	-
Total Phosphorus	mg/l	0.149	-
Total suspended solid (TSS)	mg/l	44	10
Total coliform bacteria	MPN/ml	< 0.3	-
Potassium	mg/l	0.41	-

Table 2. 10 Waste Water Quality of Thapyaywa 3 Solar Power Project

Item	Unit	Waste Water	National Environmental Quality (Emission) Guideline for Electric Power Transmission and Distribution
Biological Oxygen Demand (BOD)	mg/l	4.03	30
Chemical Oxygen Demand (COD)	mg/l	18.94	125
pH	-	8.9	6-9
Total Nitrogen	mg/l	1.25	10
Total Phosphorus	mg/l	0.157	2
Oil and Grease	mg/l	7	10
Total suspended solid (TSS)	mg/l	3.4	50
Total coliform bacteria	CFU/100ml	< 0.3	400

Photo Record for Water Quality Sampling

	WWQ 1 (outlet from the project site)
	GWQ (from the project site)
	SWQ (from Hanza Inn)

3. ENVIRONMENTAL MONITORING PLAN

3.1 Monitoring Records for Safety Plan

Monitoring Record for Safety Plan

Monthly Record					
Date	Place	Activity	Organization	Number of Attendees	Remark
August, 2024	PV Field	Hazard and Safety Training	Thapyaywa Solar Power Plant	35	
September, 2024	Working Area	Aware Training About PPE	Thapyaywa Solar Power Plant	25	
October, 2024	Power Station	Fire Safety Training	Thapyaywa Solar Power Plant	75	
November, 2024	Working Area	Electrical Safety Training	Thapyaywa Solar Power Plant	35	
December, 2024	Power Station	Provide PPE Safety Equipment	Thapyaywa Solar Power Plant	35	
January, 2025	Office Meeting Room	Health Care	Thapyaywa Solar Power Plant	35	

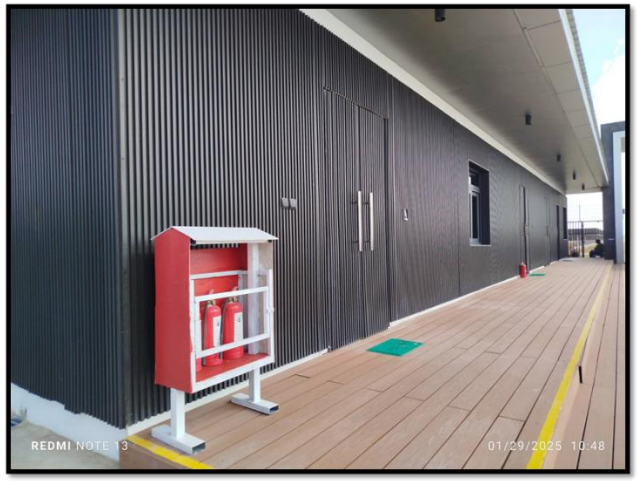
Monitoring Record for Occupational Safety Equipment

Date	Place	Type	Quality	Remark	Inspected By	Supervisor
12-September-2024	Store	Safety Shoe	25		U Kyaw Htun Lin	U Toe Toe
12-September-2024	Store	Safety Helmet	25		U Kyaw Htun Lin	U Toe Toe
12-September-2024	Store	Safety Gloves	25		U Kyaw Htun Lin	U Toe Toe
12-September-2024	Store	Safety Belt	25		U Kyaw Htun Lin	U Toe Toe

Records of Health and Safety Plan Activities


DO NOT LIGHT THE MATCH.
(မီးခြစ်မခြစ်ရ)
NO SMOKING.
(ဆေးလိပ်မသောက်ရ)
NO FIRE
(မီးမရှို့ရ)
NO BETEL NUT SPITTING
(ကွမ်းတံတွေးမထွေးရ)
DO NOT KILL ANIMALS.
(တိရိစ္ဆာန်များမသတ်ရ)
DO NOT THROW GARBAGE.
(အမှိုက်မပစ်ရ)
DO NOT DRINK ALCOHOL.
(အရက်မသောက်ရ)
NO MOTORCYCLES
ဆိုင်ကယ်မမောင်းရ


TOOLBOX MEETING
AREA
လုပ်ငန်းဆိုင်ရာ အစည်းအဝေး
ရုံ
သင်၏အန္တရာယ် ကင်းရှင်းရေး ဆိုသည်မှာ


REDMI NOTE 13
01/29/2025 10:48

Emergency Contact List Attached in the Project Site

အရေးပေါ်အခြေအနေတုန့်ပြန်မှုအခြေအနေ			
စီမံကိန်းလုပ်ငန်းအတွင်းမှ အရေးကြီးဆက်သွယ်ရမည့် ဖုန်းနံပါတ်များ			
စဉ်	အမည်	ရာထူး	ဖုန်းနံပါတ်
၁	ဦးစည်သူဖြိုးဆွေ	စက်ရုံမှူး	09-777464755
၂	ဦးဇော်ရဲမောင်	ဒုစက်ရုံမှူး	09-260083285
၃	ဦးဟိန်းသူရိန်	အန္တရာယ်ကင်းရှင်းရေးအရာရှိ	09-985197758
၄	ဦးတိုးတိုး	ကြီးကြပ်ရေးမှူး	09-978876757
၅	ဦးကျော်ထွန်းလင်း	ရှေးဦးသူနာပြု	09-258255775
၆	ဦးသန်းဝင်းနိုင်	အရေးပေါ်အခြေအနေထိန်းချုပ်ရေးမှူး	09-766785118

အရေးကြီးဆက်သွယ်ရမည့် ဒေသတွင်းဖုန်းနံပါတ်များ			
စဉ်	အမည်/ဌာန	အကြောင်းအရာ	ဖုန်းနံပါတ်
၁	မြို့နယ်မီးသတ်ဦးစီးဌာန	မီးလောင်ခြင်းအတွက်	09-402665664
၂	တိုက်နယ်ရဲစခန်း	လုံခြုံရေးကိစ္စရပ်များအတွက်	09-450337701
၃	အနီးဆုံးတိုက်နယ်ဆေးရုံ	ထိခိုက်ဒဏ်ရာရရှိသူများအတွက်	09-449872690
၄	မြို့နယ်လျှပ်စစ်ဌာန	လျှပ်စစ်မီးကိစ္စ	09-256592220
၅	မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	အထွေထွေအုပ်ချုပ်ရေးကိစ္စ	

Fire Extinguisher Check List

	Date	Description	Location	Existing	Unit
1	25.10.2024	Fire Extinguisher (50) kg	Primary	1	nos
2	25.10.2024	Fire Extinguisher (3) kg	Primary	2	nos
3	25.10.2024	Fire Extinguisher (3) kg	Secondary	2	nos
4	25.10.2024	Fire Extinguisher (3) kg	BESS	12	nos
5	25.10.2024	Fire Extinguisher (3) kg	SVG	2	nos
6	25.10.2024	Fire Extinguisher (3) kg	Transformer	2	nos
7	25.10.2024	Fire Extinguisher (3) kg	Control Room	5	nos
8	25.10.2024	Fire Extinguisher (3) kg	MV Station- 1	3	nos
9	25.10.2024	Fire Extinguisher (3) kg	MV Station- 2	3	nos
10	25.10.2024	Fire Extinguisher (3) kg	MV Station- 3	3	nos
11	25.10.2024	Fire Extinguisher (3) kg	MV Station- 4	3	nos
12	25.10.2024	Fire Extinguisher (3) kg	MV Station- 5	3	nos

4. Records for CSR activities

Records for CSR Activities

Date	Place	Type	Amount (MMK) Activities	Received
	သုံးပတ်လည်ရွာ	သုံးပတ်လည်ရွာ ရေဘေး ပျက်စီးသွားသော လမ်းများအား ပြန်လည် ပြုပြင်ပေးခြင်း (၁၀ မိုင်)		
5.10.2024	သုံးပတ်လည်ရွာ	သုံးပတ်လည်ကျေးရွာသို့ ပြန်လည်ထူထောင်ရေး ပစ္စည်းများ လှူဒါန်းခြင်း		
ဝါတွင်း(သုံးလ)		စက်ရုံအနီးဝန်းကျင်တွင်ရှိသော ဘုန်းတော်ကြီးကျောင်း သံဃာတော်များအား နေ့ဆွမ်းကပ်ခြင်း။		
	သပြေဝ	သပြေဝဘုရားတွင် သံဃာတော်များအား ဆွမ်းဆန်စိမ်းလောင်းလှူခြင်း။		
4.1.2025	ဟံဇား	ဟံဇားဘုန်းကြီးကျောင်း နေ့ဆွမ်းကပ်လှူခြင်း။		
4.1.2025	ဝမ်းသာ	ဝမ်းသာရွှေကျောင်း၊ဘုန်းတော်ကြီးသင် ပညာရေးကျောင်း ပညာရေးစုံညီပွဲတော်ကျင်းပရေး ရံပုံငွေ လှူဒါန်းခြင်း။		

Photo Records of CSR Activities

5. Records for GRM

Monitoring Records for GRM

Monthly Record					
Date	**Place**	**Issue**	**Organization Or Individual**	**Action Plan**	**Recorded by**
August, 2024	Natural Solar Power Plant	-	-	-	U Si Thu Phyo Swe
September, 2024	Natural Solar Power Plant	-	-	-	U Si Thu Phyo Swe
October, 2024	Natural Solar Power Plant	-	-	-	U Si Thu Phyo Swe
November, 2024	Natural Solar Power Plant	-	-	-	U Si Thu Phyo Swe
December, 2024	Natural Solar Power Plant	-	-	-	U Si Thu Phyo Swe
January, 2025	Natural Solar Power Plant	-	-	-	U Si Thu Phyo Swe

GRM Organization of Thapyaywa Solar Power Project Site

မကျေလည်မှုများ ဖြေရှင်းပေးရေးကော်မတီ			
စဉ်	အမည်	တာဝန်	ဌာန
၁	ဦးတိုးမြင့်	ဥက္ကဋ္ဌ	ဟံဇားကျေးရွာ
၂	ဦးအောင်ကျော်ခိုင်	အတွင်းရေးမှူး	CPE Co., Ltd & NSP Co.; Ltd
၃	ဦးအောင်ထွန်း	အဖွဲ့ဝင်(၁)	ဟံဇားကျေးရွာ
၄	ဦးဝင်းမြင့်	အဖွဲ့ဝင်(၂)	ဟံဇားကျေးရွာ
၅	ဦးဖိုးမောင်	အဖွဲ့ဝင်(၃)	NSP Co., Ltd

6. Records for Waste Disposal

Monthly Record				
Date	Place	Type	Amount	Inspected by
15-August, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	30 Kg	U Toe Toe
29-August, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	35 Kg	U Toe Toe
15-September, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	40 Kg	U Toe Toe
30-September, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	25 Kg	U Toe Toe
15-October, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	45 Kg	U Toe Toe
30-Octoberl, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	30 Kg	U Toe Toe
15-November, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	40 Kg	U Toe Toe
30-November, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	35 Kg	U Toe Toe
15-December, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	30 Kg	U Toe Toe
30-December, 2024	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	25 Kg	U Toe Toe
15-January, 2025	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	35 Kg	U Toe Toe
30-January, 2025	ဝန်ထမ်းလိုင်းများရုံး	အမှိုက်စို/အမှိုက်ခြောက်	30 Kg	U Toe Toe

Records for Waste Disposal

Appendix 1 (Water Results)

PRO LAB
ANALYTICAL LABORATORY

Myanmar Innovation Group of Co., Ltd
Address : No. (9), Sabae Housing, Pyi Htaung Su Road,
(26) Ward, South Dagon Tsp, Yangon, Myanmar.
Tel : 09-893 767 424
E-mail : info@prolabmyanmar.com

LABORATORY ANALYSIS REPORT

1	Client Name	: Thapyaywa -3 Solar Power Project
2	Location	: Thazi
3	Type of Sample	: Surface Water
4	Sample No.	: 00066/2025
5	Contact Person	: Eguard Environmental Services
6	Phone No.	: 09-797005212
7	Date Received	: 15.01.2025
8	Date of Test Performed	: 15.01.2025
9	Date of Issued	: 24.01.2025
10	Result	:

No.	Parameter	Result	Unit	WHO STD 2018	Method
1	Oil and Grease	4	mg/L	NA	[a] 5520D, Soxhlet Extraction Method
2	Total Coliform	< 0.3	MPN/ml	ND per 100 mL	FDA-BAM: MPN Method

Remark:
This certificate is issued only for the receipt of the test sample.
[a] American Public Health Association, Standard Methods for the Examination of Water and Wastewater.

Tested By
Name : NAW EH THA KU
Position : Laboratory Technician
Signature :.....

Approved By
Name : THEMAR WINT
Position : Laboratory Manager
Signature :.....

Myanmar Innovation Group of Co., Ltd. PRO LAB

LAB-FO-024-00

PRO LAB
ANALYTICAL LABORATORY

Myanmar Innovation Group of Co., Ltd
Address : No. (9), Sabae Housing, Pyi Htaung Su Road,
(26) Ward, South Dagon Tsp, Yangon, Myanmar.
Tel : 09-893 767 424
E-mail : info@prolabmyanmar.com

LABORATORY ANALYSIS REPORT

1	Client Name	: Thapyaywa -3 Solar Power Project
2	Location	: Thazi
3	Type of Sample	: Ground Water
4	Sample No.	: 00067/2025
5	Contact Person	: Eguard Environmental Services
6	Phone No.	: 09-797005212
7	Date Received	: 15.01.2025
8	Date of Test Performed	: 15.01.2025
9	Date of Issued	: 24.01.2025
10	Result	:

No.	Parameter	Result	Unit	WHO STD 2018	Method
1	Oil and Grease	5	mg/L	NA	[a] 5520D, Soxhlet Extraction Method
2	Total Coliform	< 0.3	MPN/ml	ND per 100 mL	FDA-BAM: MPN Method

Remark:
This certificate is issued only for the receipt of the test sample.
[a] American Public Health Association, Standard Methods for the Examination of Water and Wastewater.

Tested By
Name : NAW EH THA KU
Position : Laboratory Technician
Signature :.....

Approved By
Name : THEMAR WINT
Position : Laboratory Manager
Signature :.....

Myanmar Innovation Group of Co., Ltd. PRO LAB

PRO LAB
ANALYTICAL LABORATORY

Myanmar Innovation Group of Co., Ltd
Address : No. (9), Sabae Housing, Pyi Htaung Su Road,
(26) Ward, South Dagon Tsp, Yangon, Myanmar.
Tel : 09-893 767 424
E-mail : info@prolabmyanmar.com

LABORATORY ANALYSIS REPORT

1	Client Name	: Thapyaywa -3 Solar Power Project
2	Location	: Thazi
3	Type of Sample	: Waste Water
4	Sample No.	: 00068/2025
5	Contact Person	: Eguard Environmental Services
6	Phone No.	: 09-797005212
7	Date Received	: 15.01.2025
8	Date of Test Performed	: 15.01.2025
9	Date of Issued	: 24.01.2025
10	Result	:

No.	Parameter	Result	Unit	WHO STD 2018	Method
1	Oil and Grease	7	mg/L	-	[a] 5520D, Soxhlet Extraction Method
2	Total Coliform	< 0.3	MPN/ml	-	FDA-BAM: MPN Method

Remark:
This certificate is issued only for the receipt of the test sample.
Dispose treated waste water according to state and local regulations.

[a] American Public Health Association, Standard Methods for the Examination of Water and Wastewater.

Tested By
Name : NAW EH THA KU
Position : Laboratory Technician
Signature :.....

Approved By
Name : THEMAR WINT
Position : Laboratory Manager
Signature :.....

Myanmar Innovation Group of Co., Ltd. PRO LAB

The Government of the Republic of the Union of Myanmar

Ministry of Natural Resources and Environmental Conservation

Department of Forest

Forest Research Institute

Water Quality Laboratory, Yezin

Ref: WQL/0015/2025

Date: 23-1-2025

ANALYTICAL TEST REPORT

Project Name: **Thapyaywa-3 Solar Power Plant Project**

Customer Address: **U Ye Chit Zaw**

Assignment number	2025-5-1	Sampling Location	Thazi
Sample name	**GW**	Sampling Date	-
Sample type	**Ground Water**	Sample received date	15-1-2025
Comments			

Parameter	Result	Unit	Method reference	Instruments
Biological Oxygen Demand	0.39	mg/L	Potetiometric	YSI Pro DO Tester
Chemical Oxygen Demand	5.6	mg/L	Titrimetric	Titrator
Potassium	0.36	mg/L	ISO 10304-1: 2009	Ion Chromatography (Thermo Scientific, DIONEX AQUION
Total Suspended Solid	0.9	mg/L	NS 4733:1983/NS-EU 872:2005	Circulation and Filtration System
Total Phosphorus	43.48	ug/L	NS 4725	SFA (SKALAR SAN plus Analyzer) SA 3000/5000, SA 1100
Total Nitrogen	2.81	mg/L	Kjeldahl Method	Kjeldahl Digestion and Distillation Unit

*ND - Not Detected

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature:

Name: Dr. Thida Cho
Assistant Research Officer

Approved by

Signature:

Name: Dr. Thida Swe
Assistant Research Officer

The Government of the Republic of the Union of Myanmar

Ministry of Natural Resources and Environmental Conservation

Department of Forest

Forest Research Institute

Water Quality Laboratory, Yezin

Ref: WQL/0016/2025

Date: 23-1-2025

ANALYTICAL TEST REPORT

Project Name: **Thapyaywa-3 Solar Power Plant Project**
Customer Address: **U Ye Chit Zaw**

Assignment number	2025-5-2	Sampling Location	Thazi
Sample name	**SW**	Sampling Date	-
Sample type	**Surface Water**	Sample received date	15-1-2025
Comments			

Parameter	Result	Unit	Method reference	Instruments
Biological Oxygen Demand	2.29	mg/L	Potetiometric	YSI Pro DO Tester
Chemical Oxygen Demand	10.4	mg/L	Titrimetric	Titrator
Potassium	0.41	mg/L	ISO 10304-1: 2009	Ion Chromatography (Thermo Scientific, DIONEX AQUION
Total Suspended Solid	44	mg/L	NS 4733:1983/NS-EU 872:2005	Circulation and Filtration System
Total Phosphorus	149.51	ug/L	NS 4725	SFA (SKALAR SAN plus Analyzer) SA 3000/5000, SA 1100
Total Nitrogen	2.21	mg/L	Kjeldahl Method	Kjeldahl Digestion and Distillation Unit

*ND - Not Detected

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Department of Forest

Forest Research Institute

Water Quality Laboratory, Yezin

Ref: WQL/0017/2025

Date: 21-1-2025

ANALYTICAL TEST REPORT

Project Name: **Thapyaywa-3 Solar Power Plant Project**

Customer Address: **U Ye Chit Zaw**

Assignment number	2025-5-3	Sampling Location	Thazi
Sample name	**WW**	Sampling Date	-
Sample type	**Waste Water**	Sample received date	15-1-2025
Comments			

Parameter	Result	Unit	Method reference	Instruments
Biological Oxygen Demand	4.03	mg/L	Potetiometric	YSI Pro DO Tester
Chemical Oxygen Demand	18.94	mg/L	Titrimetric	Titrator
pH	8.9	-	ISO 10523:2008	ManTech Robot (PC-1300-475E)
Total Suspended Solid	3.4	mg/L	NS 4733:1983/NS-EU 872:2005	Circulation and Filtration System
Total Phosphorus	157.64	ug/L	NS 4725	SFA (SKALAR SAN plus Analyzer) SA 3000/5000, SA 1100
Total Nitrogen	1.25	mg/L	Kjeldahl Method	Kjeldahl Digestion and Distillation Unit

*ND - Not Detected

Remark: This certificate is issued only for the receipt of the test sample.

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