SHWE TAUNG MINING COMPANY LIMITED

Mudstone Quarry
Biannual Environmental Monitoring Report
(June 2023 to November 2023)

This page is a record of all revisions of this document. All previous issues are hereby superseded and are to be destroyed.

Rev	Date	Description	Prepared by	Checked by	Approved by
0	February 2024	Bi-annual reporting to ECD	Thiri Tin Htut Environmental Manager	Aung Khaing Nyi Head of HSE	Kyaw Naing Soe COO of STC

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၁ စီမံကိန်း မိတ်ဆက်

၁.၁ အကျဉ်းချုပ်အစီရင်ခံစာ

ရွှေတောင်ဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် မြန်မာနိုင်ငံ၌ ကဏ္ဍများစုံတွင် စီးပွားရေးလုပ်ငန်းအမျိုးမျိုးတို့ကို ပိုင်ဆိုင်လုပ်ကိုင်လည်ပတ်နေသော Shwe Taung Group (STG) ၏ အစိတ်အပိုင်းတစ်ရပ်အနေဖြင့် မြန်မာနိုင်ငံ၊ မန္တလေးတိုင်းဒေသကြီး၊ သာစည်မြို့နယ်၊ ပြည်ညောင်ကျေးရွာတွင် ၎င်း၏ တည်ရှိနေပြီးသော ရွှံ့ကျောက်တိုးချဲ့ ထုတ်လုပ်မှုတစ်ရပ်ကို ဆောင်ရွက်ရန် စီစဉ်လျက်ရှိပါသည်။ စီမံကိန်းသည် ရွှံ့ကျောက်ထုတ်လုပ်မှုကို တစ်နှစ်လျှင် တန် ၉၇,၀၀၀ မှ တန် ၂၉၀,၀၀၀ ထိ တိုးချဲ့ ထုတ်ယူရန် ရည်ရွယ်ပါသည်။ စီမံကိန်းတည်နေရာကို ပုံ ၁ တွင် ဖော်ပြထားပါသည်။

STC သည် ရွှံ့ကျောက်ကျင်းစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ကို ဆောင်ရွက်ရန် Environmental Resources Management (ERM)- Hong Kong Limited ထံသို့ တာဝန်လွှဲအပ်ခဲ့ပါသည်။

ရွှံ့ကျောက်ကျင်းသည် STC ဘိလပ်မြေစက်ရုံ၏ အနောက်ဘက်တွင် တည်ရှိပါသည်။ ရွှံ့ကျောက်ကျင်းနှင့် STC ဘိလပ်မြေစက်ရုံ အရှေ့ဘက်ရှိ ထုံးကျောက်ကျင်းနှင့် စစ်ကိုင်းတိုင်းဒေသကြီး၊ ကလေးဝမြို့နယ်ရှိ ကျောက်မီးသွေးသတ္တုတွင်းတို့သည် ကုန်ကြမ်းများကို ထောက်ပံ့ပေးလျက် STC ဘိလပ်မြေစက်ရုံတိုးချဲ့မှုကို အထောက်အပံ့ပြုသွားမည်ဖြစ်ပါသည်။

ရွှေတောင်သတ္တုတူးဖော်ထုတ်လုပ်ရေးကုမ္ပဏီလီမိတက် (STM) သည် ရွှံ့ကျောက်ထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုအစီရင်ခံစာကို ၂၀၂၂ ခုနှစ် နိုဝင်ဘာလ ၁၈ ရက်နေ့တွင် သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန (ECD) ထံမှ အတည်ပြုချက် ရယူခဲ့သည်။ ရွှံ့ကျောက်ထုတ်ယူခွင့် လိုင်စင်သည် ၂၀၂၂ ခုနှစ် နိုဝင်ဘာ ၁၅ ရက်တွင် သက်တမ်းကုန်ဆုံးခဲ့ပြီး ၂၀၂၃ ခုနှစ် ဇွန် ၂၈ ရက်တွင် MONREC မှ လိုင်စင်သက်တမ်းတိုးခြင်းကို လက်ခံရရှိခဲ့ပါသည်။ ထို့ကြောင့် ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက်သည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ လုပ်ငန်းစဉ်များ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေနှင့် နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များကို လိုက်နာဆောင်ရွက်လျက်ရှိပြီး ၂၀၂၃ ခုနှစ်၊ ဇွန်လမှ ၂၀၂၃ ခုနှစ်၊ နိုဝင်ဘာလအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုစစ်ဆေးခြင်း အစီရင်ခံစာကို တင်ပြခြင်း ဖြစ်ပါသည်

1. Introduction

1.1 Executive Summary

Shwe Taung Cement Company Ltd. (STC), is planning an expansion of the mudstone production at its existing mudstone quarry in Pyi Nyaung Village, Thazi Township in the Mandalay region of Myanmar (the Project). The Project aims to expand extraction of mudstone from 97,500 tonnes to 290,000 tonnes per year. The location of the Project is shown in Figure 1 and 1.2. STC has commissioned Environmental Resources Management (ERM)-Hong Kong, Limited to undertake the Environmental Impact Assessment (EIA) for the mudstone quarry Project.

The mudstone quarry is located to the west of the STC cement plant (Figure 1.1). The limestone and mudstone quarries as well as a coal mine in Kalaywa township of Sagaing region are operated by Shwe Taung Mining (STM), subsidiary of Shwe Taung Cement (STC) which supply raw materials exclusively to the STC cement plant. The limestone quarry, mudstone quarry and coal mine of STM are thus considered as associated facilities of the STC cement plant.

Shwe Taung Mining (STM) Co., Ltd. received the approval letter from Environmental Conservation Department (ECD), Ministry of Natural Resources and Environmental Conservation (MONREC) for the project of the Mudstone Quarry EIA report on 18th November 2022. However, the Mudstone Extraction License was expired on 15th November 2022 and received the license renewal from MONREC on 28th June 2023. STM conducted environmental monitoring program in line with Environmental Management Plan and comply Environmental Conservation Law and Rules, the Procedure of ECD and submit this biannual environmental monitoring report for June 2023 to November 2023.

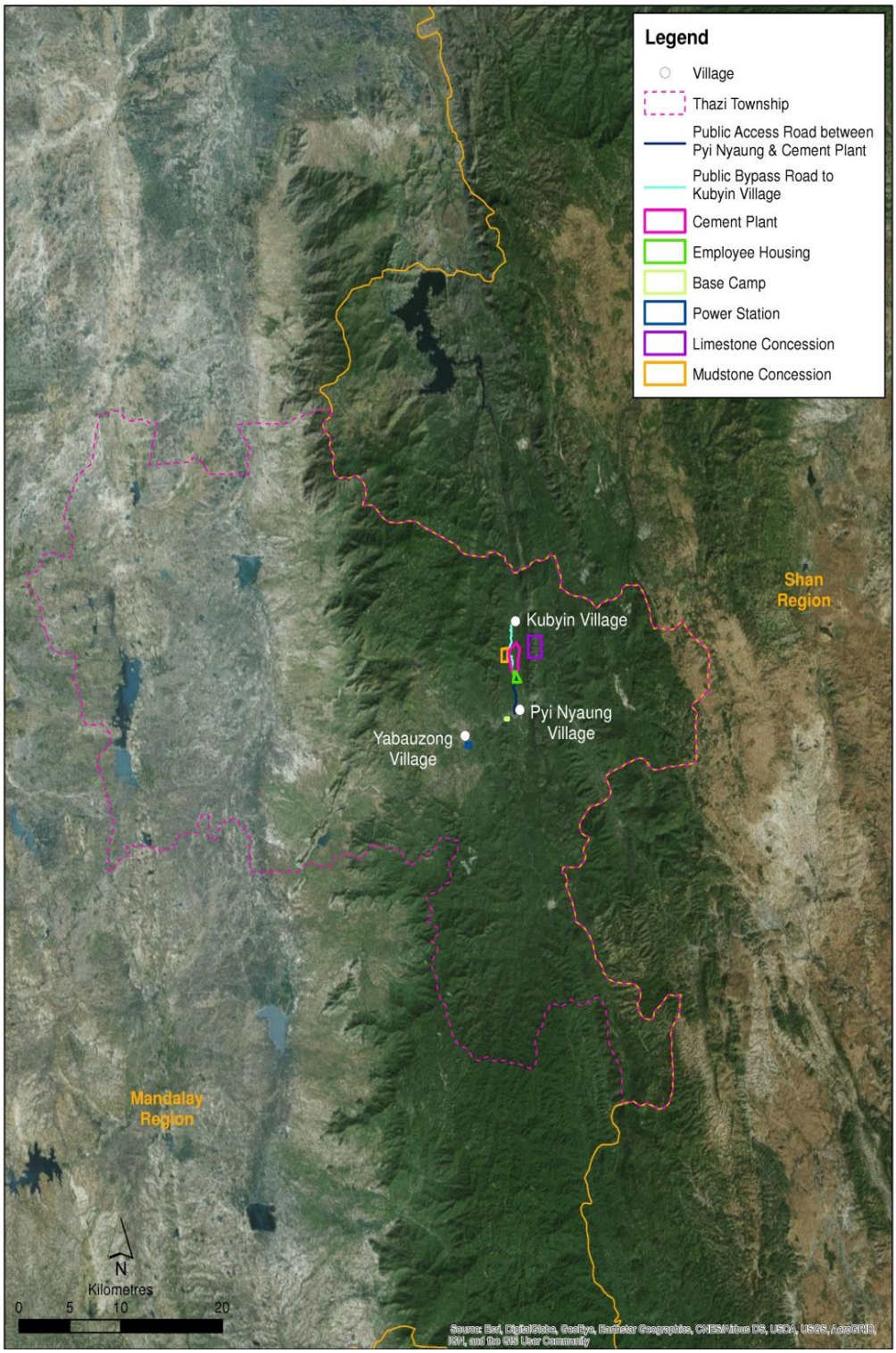


Figure 1 Location of the Mudstone Quarry (Township Level)

1.2 Purpose of Environmental Monitoring

Monitoring is a means of verifying the effectiveness of the management and mitigation measures contained within the management plans listed in STC EIA for Cement Plant.

1) The Environmental Engineers from HSE department of Cement Plant shall do the following:
   - Monitor and implement the this ESMP at site;
   - Conduct Environmental monthly inspection checklist audit;
   - Monitor laboratory personnel while conducting their water sampling and testing method;
   - Assist and monitor the implementation of Waste Management; and
   - Monitor and review the air emission test result for compliance recommendation.

2) All inspection checklist audit finding that needs rectification shall be recorded in Environmental and Social tracker and will be assigned by Environmental Manager to concerned department head for rectification.
3) All water, effluent and air emission test results will be compiled for review and analyses by Environmental Manager and approved by Head of HSE Department.
4) All generated waste according to their classification and final disposal will be entered to waste management matrix for monthly report.
5) The Environmental Executive will be implementing and monitoring within the project area, new infestation and according to BAP.

1.3 Health, Social and Environment (HSE) Department

Shwe Taung Cement Co., Ltd. established HSE Department and responsibility of HSE Department are as follows.

1) Implementation of Environmental Management Plans of approved EIA report of STM Cement Plant, Comply Rules and Regulations of Environmental Conservation, report Environmental Monitoring
2) Supervise third party stakeholders, contractors and other organizations for environmental monitoring program
3) Monitoring environmental impact and report the relevant documents
4) Promote the ability of employees by conducting knowledge sharing training and awareness on environmental conservation.

2. Environmental Performance Indicators and Monitoring Schedule

Physical, biological and social environmental management components of particular significance have been identified as performance indicators. A comprehensive monitoring plan for each performance indicator has been prepared for all phases of the Project, presented in Table 1.0.

This includes the parameters to be measured, methods to be utilized, sampling locations, frequency of measurements, detection limits and responsibilities for implementation and supervision.

Impact monitoring will be undertaken during the life of the Project to verify the predicted levels of residual impacts from the Project and the effectiveness of the various management plans and mitigation measures. Shwe Taung Mining Co., Ltd. will prepare an environmental monitoring report and submit to the Ministry of Natural Resources and Environmental Conservation, MONREC in every six months as per the EIA Procedure requirements.

Table 1 - Environmental Monitoring Program

Project Stage/ Component	Potential Impact	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
Operation / Mudstone Quarry	Inspection of mitigation compliance	General compliance with mitigation measures presented in the ESMP.	Project activity areas	Visual inspection of all active work areas and inspection of records	Weekly	HSE Team of Appointed Contractor and STM HSSE Department Head and Environmental Manager
Operation / Mudstone Quarry	Dust Impacts	Dust deposition	Cement Plant, Ku Pyin and Pyi Nyaung Villages (***Error! Reference source not found.***)	Dust deposition gauge	Monthly	STM HSSE Department Head and Environmental Manager
Operation / Mudstone Quarry	Discharge of treated wastewater and runoff.	Check compliance with Myanmar National Environmental Quality (Emissions) Guidelines for site runoff and wastewater discharges (for BOD, COD, TSS, oil and grease, pH, total coliform bacteria, total nitrogen, total phosphorus)	Sampling at: 1. Ku Pyin River, 2. Reservoir, and 3. Pyi Nyaung Village 4. Ye Shin Chaung creek 5. Mudstone runoff area	Standard analytical methods	Monthly	STM HSSE Department Head and Environmental Manager
Operation / Mudstone Quarry	Noise and vibration	Check compliance with noise levels specified in Myanmar National Environmental Quality (Emission) Guidelines	Ku Pyin Village and Pyi Nyaung Village	Standard analytical methods	Twice per year	STM HSSE Department Head and Environmental Manager

Project Stage/ Component	Potential Impact	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
		(2015) for noise.				
Operation / Mudstone Quarry	Soil and sediment	As per parameters in Section 5.5	At mudstone quarry run off area	Standard analytical methods	Twice per year	STM HSSE Department Head and Environmental Manager

3. Project Information

3.1 Project Location

The 165-acre mudstone quarry is located west of the STC cement plant (Figure 3.1). The concession to operate the mudstone quarry is renewed annually with the Forest Department since the concession was initially granted on 31 October 2013. An operating agreement for small-scale production of mineral was signed on 13 December 2017 with No. (1) Mining Enterprise of the Ministry of Natural Resources and Environmental Conservation (MONREC) for a five (5) year term. New medium-scale production of mineral was signed on 28 June 2023 with No. (1) Mining Enterprise of the Ministry of Natural Resources and Environmental Conservation (MONREC).

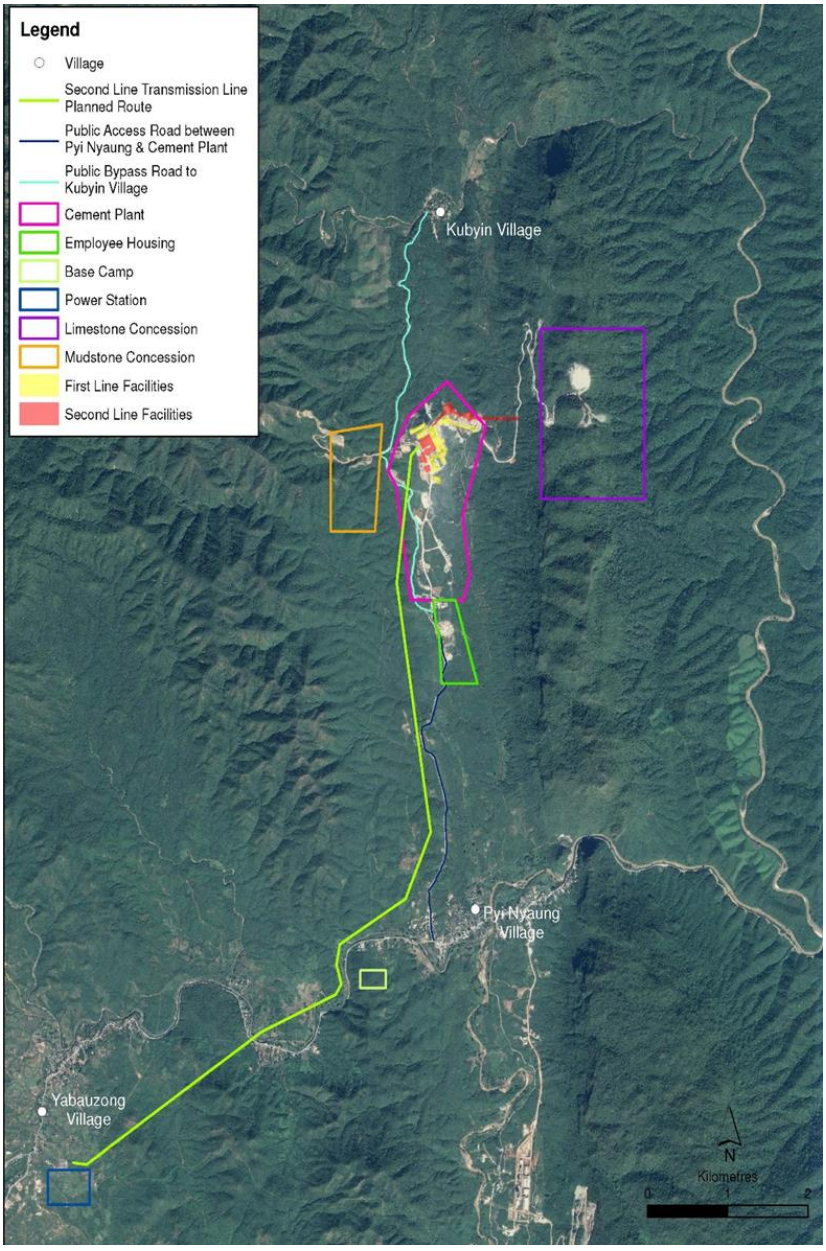


Figure 2. Location of STM Mudstone Quarry

3.2 Project Description

Mudstone extraction is currently undertaken by open excavation approximately 500 m above sea level to provide raw material for the existing cement plant. The extracted mudstone is transported by truck to the cement plant, which requires 97,500 tonnes of mudstone per annum to meet the current production capacity. Expansion of the STC Cement Plant with a second kiln will require an additional 262,260 tonnes of mudstone per year bringing the total to 359,760 tonnes of required mudstone per year. The life of the mudstone quarry is estimated at around 55 years based on annual mining volumes of approximately 290,000 tonnes.

All land leased to date by the company is state-owned forest land. With the exception of a small amount of land to accommodate the new transmission line, no new land is required to accommodate the expanded facilities.

4. Environmental Monitoring Program

4.1 Dust Monitoring

Cement industry is a potential anthropogenic source of air pollution. Cement manufacturing is a highly energy intensive process, in other word intensive fuel consumption for clinker making and resulting in emissions. The cement dust produced by cement manufacturing units i.e. calcining, crushing, grinding, packing, loading/unloading are considered one of the most pollutants such as PM10, PM2.5, SO2 and NO2 which affect the surrounding environment.

Stack Emission monitoring from Kiln System is measured with Testo PG-350 Portable Combustion and Emission Analyzer. Ambient Air Quality monitoring is measured with portable HAZ-SCANNER™ EPAS device.

Dust deposition gauges have been installed in Kubyin and Pyi Nyaung Villages and STM monitored dust deposition with 15points at cement plant and limestone quarry, cement plant housing/ accommodation area, Ku Pyin and Pyi Nyaung village.

4.1.1 Monitoring Result for Dust Deposition Monitoring

STM monitored dust deposition with 6 points at cement plant, housing/ accommodation area, Ku Pyin and Pyi Nyaung village. Water suppression was also undertaken on the roads by using the water from sedimentation ponds to mitigate dust emission on surrounding area in plant site, quarries and plant accommodation area.

Please refer the table 10 for dust deposition monitoring results from July 2023 to December 2023.

No	Monitoring Location	Latitude	Longitude
1	STM Accommodation (Ingyin Hostel)	20°51'23.1"N	96°23'34.7"E
2	STM Accommodation (55acres)	20°50'54.5"N	96°23'34.8"E
3	Ku Pyin (Behind Library)	20°53'26.9"N	96°23'24.8"E
4	Ku Pyin (Primary School)	20°53'25.7"N	96°23'33.6"E
5	Pyi Nyaung (Near Main Road)	20°49'09.5"N	96°23'50.9"E
6	Pyi Nyaung (Information Center)	20°49'03.9"N	96°23'40.6"E

Figure 8 – Dust Deposition Monitoring

Table 10 – Dust Deposition Monitoring results at Workers Accommodation, Ku Pyin and Pyi Nyaung villages from July 2023 to December 2023

Date: July 2023 to Dec 2023	**Samplers:** Jerico E. Agitan, Khaing Khaing Tun, Nay Hlaing Oo						
	Test Result						
Parameter	**Australia & New Zealand Guideline (g/m2/Day)**	**July 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**	**Dec 2023**
STM Accommodation (Ingyin Hostel)	1.191	1.07	0.51	0.29	0.39	0.47	0.75
STM Accommodation (55acres)		0.36	0.32	0.27	0.25	0.22	0.40
Ku Pyin (Behind Library)		0.34	0.29	0.19	0.30	0.38	0.42
Ku Pyin (Primary School)		0.27	0.22	0.25	0.41	1.21	0.25
Pyi Nyaung (Near Main Road)		0.39	0.49	0.33	0.45	0.60	0.68
Pyi Nyaung (Information Center)		0.47	0.31	0.24	0.30	0.31	0.60

4.2 Ambient Air Monitoring

4.2.1 Monitoring Location

4.2.1.1 Location Map for Ambient Air Monitoring

Ambient air quality monitoring location had been selected by identifying potentially affected with consideration given to the prevailing wind conditions through Operation and Construction activities.

No	Monitoring Location	Latitude	Longitude
1	AQ1_Worker Accommodation	20°50'56.15"N	96°23'35.97"E
2	AQ2_Ku Pyin Village	20°53'20.47"N	96°23'27.58"E
3	AQ3_Pyi Nyaung Village	20°49'4.58"N	96°23'40.42"E

Figure 4. Ambient Air Quality Monitoring

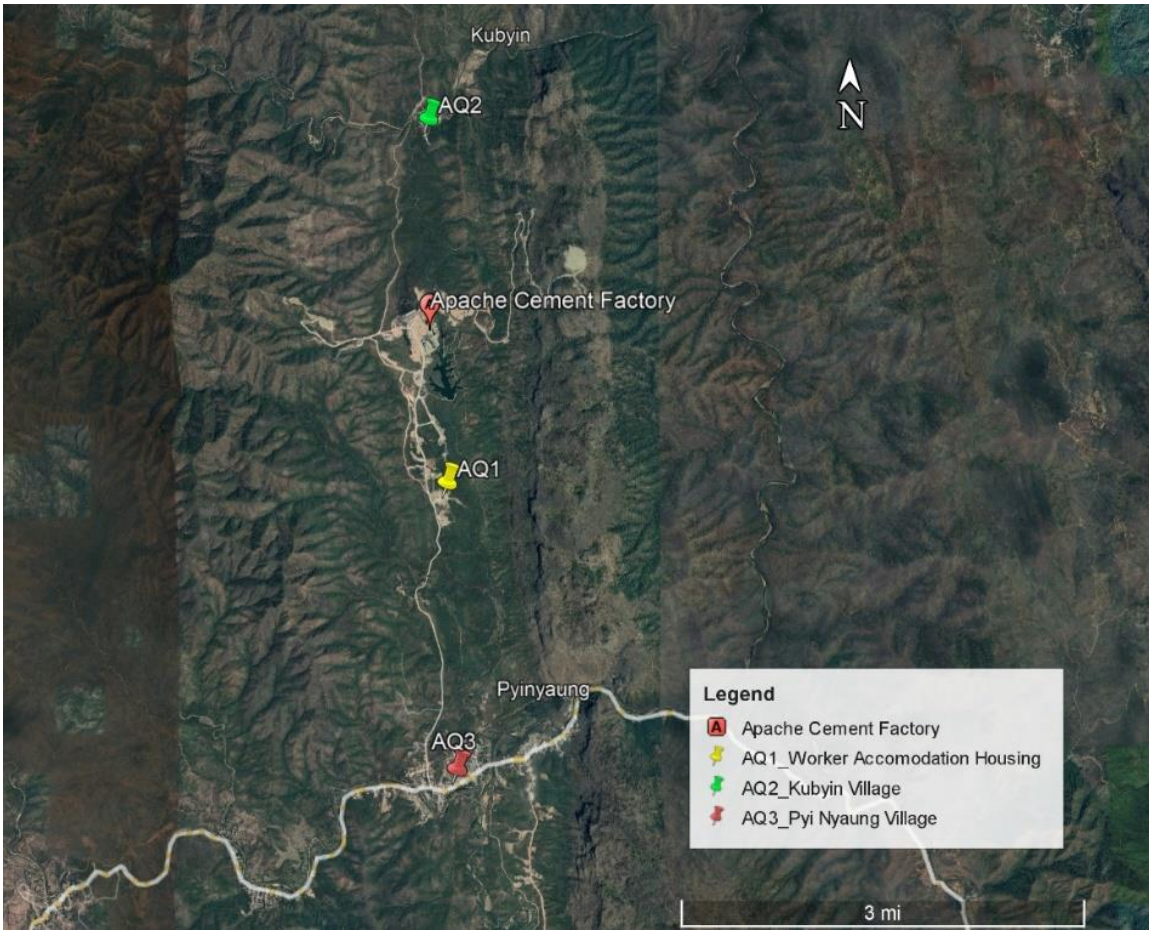


Figure 5 - Location Map of Ambient Air Monitoring at STM Mudstone

4.2.2 Monitoring Method

The portable HAZ-SCANNER™ EPAS wireless environmental perimeter air station is easily deployed as an ambient air quality monitor to measure and document critical U.S. EPA criteria pollutants including nitrogen dioxide, sulfur dioxide, ozone, carbon dioxide, particulates, VOCs, and more. The EPAS provides direct readings in real time with data logging capabilities.
Web link: https://www.skcinc.com/catalog/pdf/instructions/EPAS%20manual%20v.3.1.pdf

4.2.3 Monitoring Result for Ambient Air Quality Monitoring

Table 4 - Summary of Ambient Air Quality Monitoring at Worker Accommodation from June to November 2023

Ambient Air Monitoring by Haz-scanner								
Date: July 2023 to Dec 2023	**Machine Name: Haz-scanner (EPAS)**		**Operator:** Nay Hlaing Oo					
			Location: Worker Accommodation					
	ECD/ WHO / IFC Guideline		**Test Result**					
Parameter	**Averaging Period**	**Guideline Value in µg/m3**	**Jun 2023**	**July 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**
Nitrogen dioxide	24 hours	200	Power supply cable error	105.88	79.82	37.44	53.58	54.38
Ozone		100		59.32	50.90	54.37	32.06	33.43
PM10		50		11.52	21.31	8.19	13.09	20.35
PM2.5		25		6.22	10.45	4.99	7.75	5.37
Sulphur dioxide		20		72.25	35.92	32.59	41.34	25.78
Carbon dioxide		ppm		356.73	354.26	360.66	407.63	374.85
Carbon monoxide		10 ppm		0.98	0.09	0.09	0.07	0.09

Table 5 - Summary of Ambient Air Quality Monitoring at Pyi Nyaung village from June to November 2023

Ambient Air Monitoring by Haz-scanner								
Date: Jul 2023 to Dec 2023	**Machine Name: Haz-scanner (EPAS)**		**Operator:** Nay Hlaing Oo					
			Location: Pyi Nyaung					
	ECD/ WHO / IFC Guideline		**Test Result**					
Parameter	**Averaging Period**	**Guideline Value in µg/m3**	**Jun 2023**	**Jul 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**
Nitrogen dioxide	24 hours	200	Power supply cable error	70.04	33.10	31.03	24.06	44.44
Ozone		100		43.15	23.73	27.47	16.48	29.69
PM10		50		15.53	18.19	14.74	20.75	25.09
PM2.5		25		6.73	11.39	3.32	6.25	4.97
Sulphur dioxide		20		61.75	57.29	27.01	38.61	24.10
Carbon dioxide		ppm		370.78	364.84	359.722	312.21	329.89
Carbon monoxide		10 ppm		0.12	0.11	0.09	0.08	0.10

Table 6 - Summary of Ambient Air Quality Monitoring at Ku Pyin village from June to November 2023

Ambient Air Monitoring by Haz-scanner								
Date: Jul 2023 to Dec 2023	**Machine Name: Haz-scanner (EPAS)**		**Operator:** Nay Hlaing Oo					
			Location: Ku Pyin					
	ECD/ WHO / IFC Guideline		**Test Result**					
Parameter	**Averaging Period**	**Guideline Value in µg/m3**	**Jun 2023**	**Jul 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**
Nitrogen dioxide	24 hours	200	Power supply cable error	119.17	85.74	59.31	11.86	76.57
Ozone		100		67.87	52.56	37.00	13.95	44.76
PM10		50		13.73	15.26	11.18	9.25	24.65
PM2.5		25		7.88	10.18	5.41	3.31	4.62
Sulphur dioxide		20		82.50	40.97	30.44	20.43	35.39
Carbon dioxide		ppm		352.75	369.91	369.94	85.84	328.62
Carbon monoxide		10 ppm		0.10	0.10	0.07	0,13	0.10

Note: Result that exceeded the guideline limit is highlighted in red.

Note: This data submitted to ECD on a monthly basis

4.2.4 Air Quality Index

The HAZ-SCANNER™, ambient air quality monitoring system, provides a comprehensive data of current air contaminants in a project location. Then, air monitoring data of pollutants is processed into a dimensionless unit called the "Air Quality Index" (AQI); it serves as an information medium for the people to know the air quality health of their location and takes preventative steps accordingly (public participation). As instructed from Meiktila ECD to HSE Department in September 2023, STM has updated this bi-annual monitoring report and verified with Meiktila ECD on the reporting format during last quarter of 2023. Meiktila ECD accepted the updated report during January 2023. Therefore, STM has updated the AQI results in all bi-annual monitoring reports of STM Cement Plant during January – February 2023.

The AQI is divided into six categories. Each category corresponds to a different level of health concern. Each category also has a specific color. Thus, the AQI is a beneficial tool for the company, public, stakeholders, and regulators to understand the current state of air quality. The color makes it easy for people to quickly determine whether air quality is reaching unhealthy levels in their communities.

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Figure 6 - AQI Basics for Ozone and Particle Pollution

Table 7 - Summary of AQI at Plant Site from June to November 2023

Air Quality Index (AQI)									
Date: Jul 2023 to Dec 2023	**Machine Name: Haz-scanner (EPAS)**		**Operator:** Nay Hlaing Oo						
			Location: Worker Accommodation						
			AQI Results						
Parameter	**Averaging Period**	**Unit**	**Jun 2023**	**July 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**	**Sensitive Group**
PM_{10}	24 hour	ug/m3	Power supply cable error	0	0	0	12	19	People with respiratory disease are the group most at risk.
$PM_{2.5}$	24 hour	ug/m3		28	23	22	32	22	People with respiratory or heart disease, the elderly and children are the groups most at risk.
Carbon monoxide	8 hour	ppm		53	40	18	0	0	People with heart disease are the group most at risk.
Ozone	8 hour	ppb		39	19	17	19	14	Children and people with asthma are the groups most at risk.
Nitrogen dioxide	1 hour	ppb		10	19	7	26	26	People with asthma or other respiratory diseases, the elderly, and children are the groups most at risk.
Sulphur dioxide	1 hour	ppb		26	44	21	21	13	People with asthma are the group most at risk.

Remark: PM2.5 values are majorly impacted by human activities (forest firing & open burning, etc.) from surrounding environment

Table 8 - Summary of AQI at Pyi Nyaung Village from June to November 2023

Air Quality Index (AQI)									
Date: Jul 2023 to Dec 2023	**Machine Name: Haz-scanner (EPAS)**		**Operator:** Nay Hlaing Oo						
			Location: Pyi Nyaung Village						
			AQI Results						
Parameter	**Averaging Period**	**Unit**		**July 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**	**Sensitive Group**
PM_{10}	24 hour	ug/m3	Power supply cable error	1	1	0	19	23	People with respiratory disease are the group most at risk.
$PM_{2.5}$	24 hour	ug/m3		22	11	13	26	20	People with respiratory or heart disease, the elderly and children are the groups most at risk.
Carbon monoxide	8 hour	ppm		34	16	15	0	1	People with heart disease are the group most at risk.
Ozone	8 hour	ppb		31	30	14	7	14	Children and people with asthma are the groups most at risk.
Nitrogen dioxide	1 hour	ppb		14	17	13	11	22	People with asthma or other respiratory diseases, the elderly, and children are the groups most at risk.
Sulphur dioxide	1 hour	ppb		28	47	14	20	13	People with asthma are the group most at risk.

Table 9 - Summary of AQI at Ku Pyin Village from June to November 2023

Air Quality Index (AQI)									
Date: Jul 2023 to Dec 2023	**Machine Name: Haz-scanner (EPAS)**		**Operator:** Nay Hlaing Oo						
			Location: Ku Pyin Village						
			AQI Results						
Parameter	**Averaging Period**	**Unit**	**June 2023**	**July 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**	**Sensitive Group**
PM_{10}	24 hour	ug/m3	Power supply cable error	0	1	0	8	22	People with respiratory disease are the group most at risk.
$PM_{2.5}$	24 hour	ug/m3		33	23	16	14	19	People with respiratory or heart disease, the elderly and children are the groups most at risk.
Carbon monoxide	8 hour	ppm		62	42	29	1	1	People with heart disease are the group most at risk.
Ozone	8 hour	ppb		43	23	16	6	20	Children and people with asthma are the groups most at risk.
Nitrogen dioxide	1 hour	ppb		13	14	10	6	38	People with asthma or other respiratory diseases, the elderly, and children are the groups most at risk.
Sulphur dioxide	1 hour	ppb		34	43	23	10	19	People with asthma are the group most at risk.

4.2.5 Evaluation

Ambient Air monitoring was monthly tested at location of Sensitive Air Respecters such as Cement Plant Accommodation area and nearby villages which are Pyi Nyaung and Ku Pyin from July 2021 to December 2021, as Cement Plant EIA report (2018). All results are within Myanmar National Environmental Quality (Emission) Guidelines (2015), except higher results of Sulphur Dioxide results. STM has noted that there was a lot of forest bush fires set up by some villagers to clean the bushes, nearly every day.

Factors Affecting Ambient Air Quality

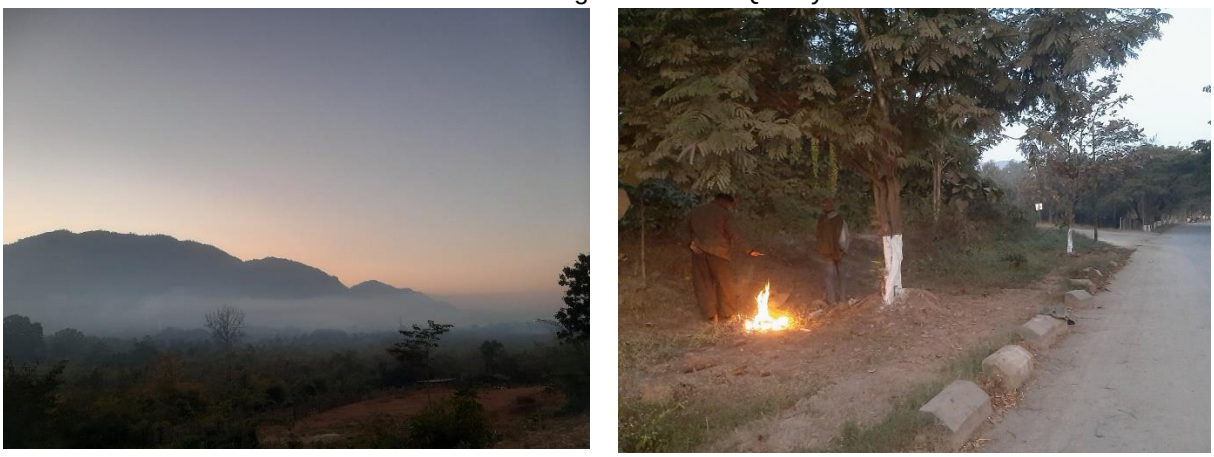


Figure 7 - Human activities affected the Ambient Air Quality around STM Mudstone Quarry

STM has investigated the reason of SO_2 result more than Myanmar National Environmental Quality (Emission) Guidelines (2015) as STC uses the low Sulphur content in coal that used as fuel for cement production as stated in STC Cement Plant EIA report. STM has analyzed the monitoring results from the portable HAZ-SCANNER™ EPAS device and found out that SO_2 results were a lot higher during day time and less value at night time. This indicate that the plant is operating 24hours and it couldn't be less during night time.

AQI across the globe considers the number of pollutants (most of the developed countries and some developing countries considers PM2.5 to measure the overall status of air quality being monitored), averaging time for which pollutants are measured, calculation method to compute air quality indices for each pollutant, calculation mode to aggregate the overall index, scale of an index, categories, color coding scheme, and related descriptive terms of the pollutants. There are many air quality index models to represent air quality level in the world. STM selected to assess ambient air quality results in Pyi Nyaung area based on AirNow, which is a partnership with the U.S. Environmental Protection Agency (EPA), color-coded index standards.

By analyzing all the AQI results, it is noted that PM2.5 values are majorly impacted by human activities (forest firing & open burning, etc.) from surrounding environment. STM will raise the public awareness among Mudstone Quarry community and also disclosed these air quality monitoring results and AQI results at Pyi Nyaung Information Center and Ku Pyin library according to STM Stakeholder Engagement Plan.

STM engaged 3rd party Environmental consultant as auditor and the auditor advised that this was the case as forest fires in the hills surrounding the plant were numerous at the time of the audit and consistent haze was present over the general area. The Auditor considered that the forest fires are contributing to elevated particulate readings being recorded by STM and elevated readings cannot be solely apportioned to emissions from Mudstone Quarry and associated facilities.

Therefore, STM was looking other factors that can be impacting on SO_2 results and found out that it was related to emission of mobile vehicles that were higher SO_2 than Kiln emission by using Testo PG-350 Portable Combustion and Emission Analyzer at STC Apache cement plant. There were a lot of heavy machineries and trailer trucks movement during day time and only trailer trucks movement during night

time. So STM has raised awareness among the vehicle drivers to stop when they are parking or waiting, with sticker campaign “Turn Off Your Engine While Waiting or Parked” at Apache Cement plant.

These were a notable deterioration in regional air quality was found at Pyi Nyaung area. Moreover, cold air during the cold season can’t hold as much moisture, and so the air is usually drier during winter. These habits were also noted on contributing factors of higher results of PM_{10} and $PM_{2.5}$.

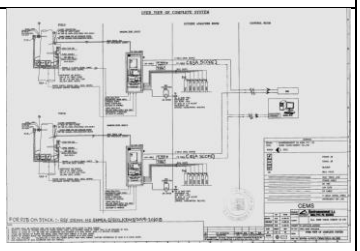
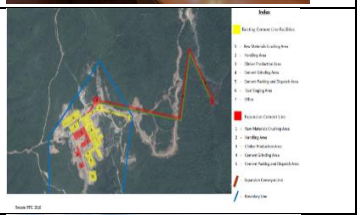
Moreover, there were regular device servicing and maintenance with NANOVA, authorized supplier of Myanmar of EPAS device, in January and March 2020 during the reporting period. The detail servicing records are attached at Appendix. STM noted the Haz-scanner EPAS SO2 sensor has some issue as the ambient air quality monitoring result of SO2 was complied with Myanmar National Environmental Quality (Emission) Guidelines (2015) after NANOVA, the local authorized support of Myanmar.

Carried out sensor checking, testing using zeroing filter and internal tube cleaning by supplier 3 times due to sensor error reading of Haz-scanner devices.

Water suppression are also undertaken on the roads to mitigate dust emission on surrounding area in plant site and accommodation area. (See in Appendix).

4.2.6 Air Quality Mitigation Measures

Table 11 – Air Quality Management

Affected Aspect	Mitigation Measures	Action Taken	Photos
Air Quality	• The discharge to kiln stack at both new and existing plant will be fitted with continuous emission monitoring capable of real-time measurement of NO2, SO2, Particulate Matter and O2 and transmitted to the operator control room. They will not exceed those outlined in Myanmar National Environmental Quality Emission Guidelines (2015) for cement and lime manufacturing and should be further reduced as far as practicable.	CEMS equipment parts have already arrived to Apache Cement Plant on 19 Nov 2019. Calibration gas cylinder and regulator 6pcs (1set) will be arrived cement plant in July 2020.	
	• New kiln stack shall be fitted with sampling platform and two sampling ports at 90 degrees. Sampling ports should be four-inch (minimum) inner diameter threaded pipe connections with a cap. This is primarily to allow calibration of in stack continuous monitoring systems but was also allow for monitoring of additional parameters if needed in the future.	Completed and installed. (See in Section 3.1.3 for stack emission monitoring results)	
	• Emission concentrations of NOx, SO2 and PM from existing and proposed kiln system and clinker cooler will exceed those outlined in Myanmar National Environmental Quality Emission Guidelines (2015) for cement and lime manufacturing and should be further reduced as far as practicable.	Regular monitoring (See in Section 3.1.3 for stack emission monitoring results)	
	• An occupational exposure monitoring program for workers will be put in place to monitor indoor air quality.	Completed by HR & OHS. Result TBA ECD conducted test for Exposure Limits	
	• Reduce number of material transfer points by simple, linear layout for material handling operations;	Completed and installed for line 1 and line 2 design	
	• Use of enclosed belt conveyors for material transportation and emission controls at transfer points;	Implementation on line 2	
	• Regular cleaning of conveyor belt systems;	Included in PME scope (Regular Maintenance of bag filter and electrostatic precipitator, see in Appendix)	
	• Crushed and blended raw materials should be stored in covered or closed bays;	Additional silo constructed in line 2	

	• Pulverized coal should be stored in silos or closed storage;	Implemented	
	• Clinker should be stored in covered or closed bays or silos with dust extractions;	Implemented	
	• Routine plant maintenance to keep air leaks and spills to a minimum;	Included in PME and PRD scope (Regular Maintenance of bag filter and electrostatic precipitator, see in Appendix)	
	• Material handling processes including crushing operations, raw milling and clinker grinding should be undertaken in enclosed systems maintained under negative pressure by exhaust fans. Dust should be removed using cyclones and bag filters; and	Equipped with cyclones and bag filters (Regular Maintenance of bag filter and electrostatic precipitator, see in Appendix)	
	• Implementation of automatic bag filling and handling systems;	Implemented both line 1 and line 2	
	• Use of electrostatic precipitators (ESPs) or fabric filter systems to collect and control fine suspended particulate emissions in the kiln gases;	Installed (Regular Maintenance of bag filter and electrostatic precipitator, see in Appendix)	
	• Use of cyclones to separate larger particulates of cooler gases followed by fabric filters and finally	Equipped with cyclones and bag filters line 1 and line 2 (Regular Maintenance of bag filter and electrostatic precipitator, see in Appendix)	
	• Mild dust should be captured and recycled using fabric filters within the mill.	Equipped with bag filters (Regular Maintenance of bag filter and electrostatic precipitator, see in Appendix)	

4.3 Water Quality Monitoring

Monitoring of water quality regularly is quite necessary for the assessment of water quality for beneficial purposes. Operation is dry process and do not generate wastewater. Sanitary wastewater from office and household are discharged to bio tank and treated wastewater are monitored in compliance with the NEQEG on BOD, COD, pH, SS, oil & grease, TN & TP and as per WHO Drinking water guidelines.

4.3.1 Monitoring Location

Figure 10, 11, 12 and 13 shows the location of Water Quality sampling point monthly on WHO Drinking Water Guidelines and IFC Effluent Water Guidelines for Water Quality Monitoring (e.g. pH, Color, Turbidity, Iron, BOD, COD etc.) are the parameters for measurement.

No	Sampling Location	Latitude	Longitude
1	Bio Tank Effluent Discharge to Sedimentation # 9	20°50'51.2"N	96°23'45.4"E
2	Supply Water	20°51'35.3"N	96°23'37.7"E
3	Sedimentation Pond Effluent	20°52'14.0"N	96°23'23.6"E

Figure 9 – Bio Tank

4.3.1.1 Location Map of Water Quality Sampling Points

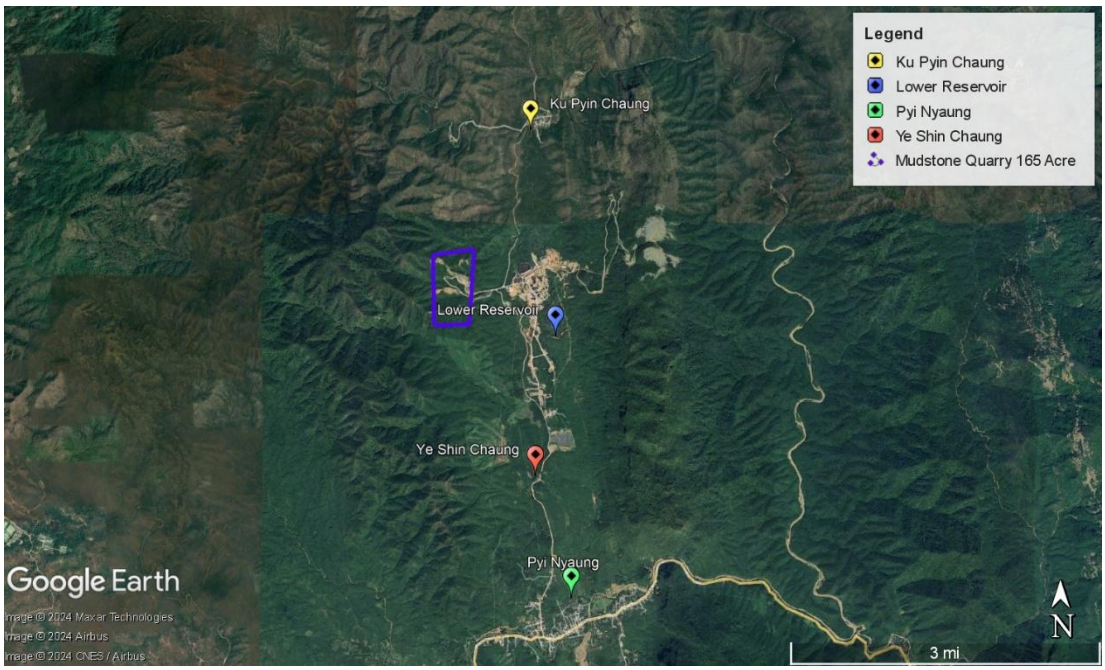


Figure 10 - Overview Map of sampling point for River Water Quality

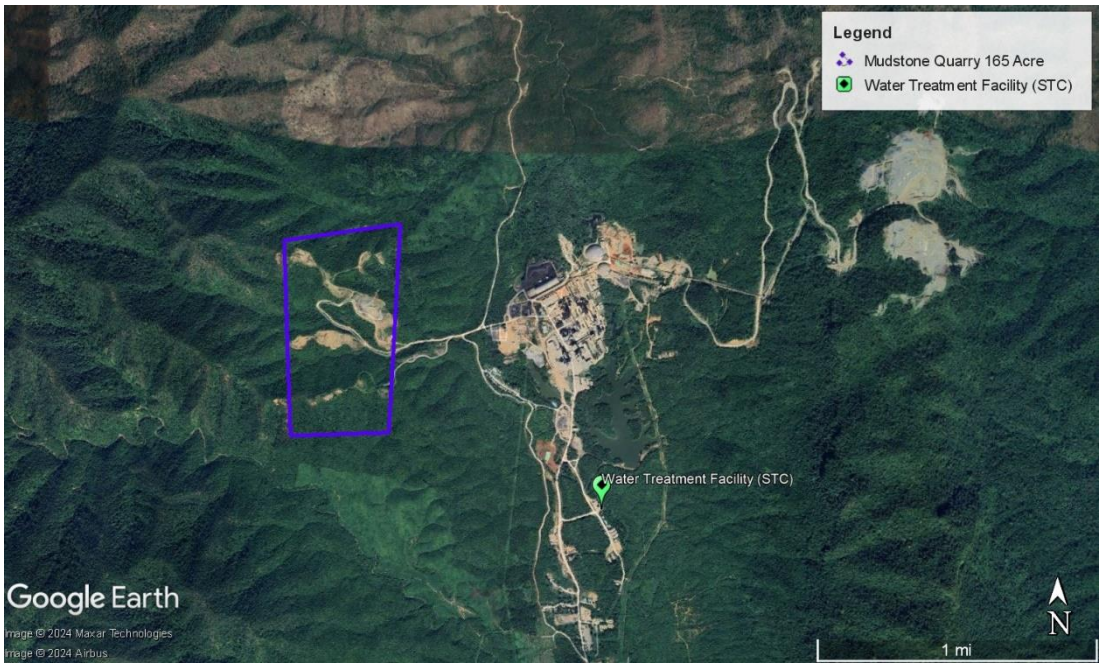


Figure 11 - Overview Map of sampling point for Drinking water facility

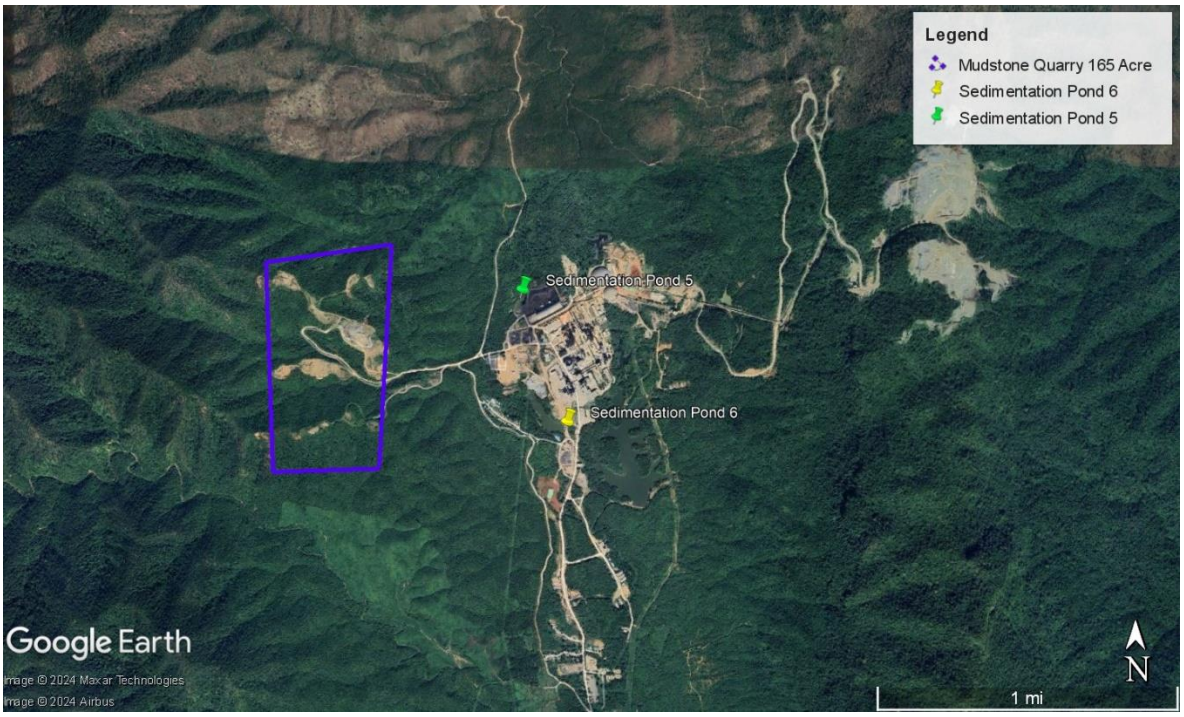


Figure 12 - Overview Map of sampling point for Sanitary Wastewater

Figure 13 – Water Quality Sampling

4.3.2 Monitoring Result for Water Quality

Table 12 – Monitoring Result of Water Quality

Bio Tank Effluent Discharge to Sedimentation # 9							
Parameter	**IFC Wastewater Guideline**	**Jun 2023**	**Jul 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**
pH	6~9	7.7	8.3	8.4	8	7.8	7.9
COD	0~125 mg/l	18	50	58	13	11	20
BOD	0~30 mg/l	14	35	25	3	15	10
TSS	Max 50 mg/l	109	38	37	11	34	96
TDS	-	-	-	-	-	-	-
Total Nitrogen	10 mg/l	ND	-	-	3.16	4.09	4.31
Total Nitrate	44.29 mg/l	ND	-	-	14	18.1	19.1
Total Phosphorus	2 mg/l	0.8	0.9	0.1	0.5	0.3	0.1
Oil and Grease	10 mg/l	ND	ND	ND	8	7.6	ND

**STM couldn't buy reagent from local supplier to test Total Nitrogen and Tor*

** There was no effluent water from the sedimentation pond #9 in December 2023.*

** STM has tested the water quality from the sedimentation ponds for using water with water truck to suppress dust around the cement plant and quarry sites.*

Table 13 – Supply Water Quality Monitoring Result

Supply Water Analysis							
ITEM	**WHO Drinking Water Guideline**	**Jun 2023**	**July 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**
pH	6.5 – 8.5	8.6	8.5	8.6	8.1	8	8.2
Color	15 PCU	25	35	5	25	30	25
Turbidity	5 NTU	6.7	4.52	2.71	5.91	7.28	4.17
Calcium hardness (CaCO3)	500 mg/l	120	1114	125	129	154	165
Chloride (Cl)	250 mg/l	4	4	5	5	5	5
Sulphate (SO4)	200 mg/l	20	20	20	20	20	10
TSS	50 mg/l	29	19	11	20	21	17
Nitrate	50 mg/l	14.9	9.7	-	9	2.4	3.7
E-coli	-	-	-	-	-	-	-
Coliform	-	-	-	-	-	-	-

** Not for drinking water. No effect for Health & Environment.*

Table 14 – Sedimentation Pond Effluent Test Result

Sedimentation Pond 4 (Near Coal Staging Area) Effluent Test Result							
Parameters	**IFC Waste Water Guideline**	**Jun 2023**	**July 2023**	**Aug 2023**	**Sep 2023**	**Oct 2023**	**Nov 2023**
pH	6 ~ 9	7.5	7.9	7.9	7.8	7.6	8
Chemical Oxygen Demand (COD)	0~125 mg/l	17	32	25	14	23	23
Biological Oxygen Demand (BOD)	0~30 mg/l	13	16	13	10	11	11
Total Suspended Solid (TSS)	Max 50 mg/l	12	13	18	44	146	26
Total Nitrogen	10 mg/l	3.14	-	-	3.29	2.78	1.87
Total Nitrate	44.29 mg/l	13.9	-	-	14.6	12.3	8.3
Total Phosphorous	2 mg/l	0.8	0.8	0.3	0.3	0,2	0.2
Oil and grease	10 mg/l	4.8	9.2	8.5	ND	ND	8.4

** Not for drinking water. No effect for Health & Environment.*

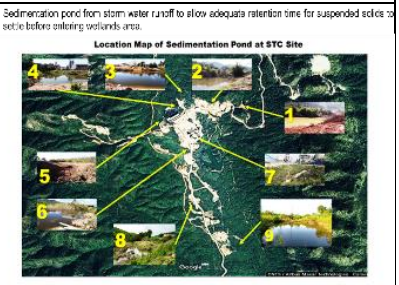
** There was no effluent water from the sedimentation pond #4 during June to November 2023.*

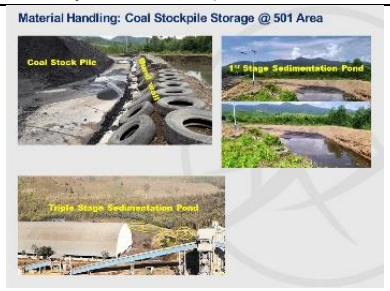
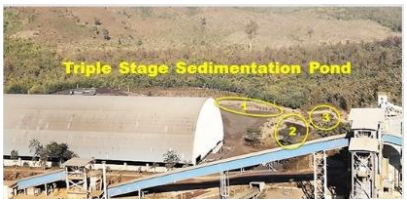
** STM has tested the surface water quality from the sedimentation ponds for using water with water truck to suppress dust around the cement plant and quarry sites.*

Laboratory results for water quality are attached in Appendix-B.

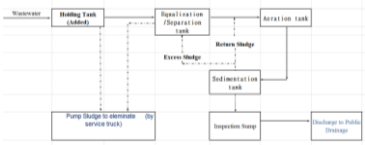
4.3.3 Water Quality Mitigation Measures

Table 15 – Water Quality Management

Affected Aspect	Mitigation Measures	Action Taken	Photos
Surface Water Quality	• Implementing storm water management practices to manage the flow of storm-water, prevent uncontrolled migration and minimize erosion and sediment transport from project facilities and disturbed areas. • Construction of a dedicated drainage network to intercept and diversion runoff;	Constructed stormwater drain around the cement plant channel to sedimentation ponds	  Figure (2) Drainage for catchment area
	• Divert runoff from the mudstone quarry to an appropriately sized and maintained sedimentation pond to allow adequate retention time for suspended solids to settle;	Constructed sedimentation pond dual stage.	 
	• Divert runoff from the limestone quarry to the wetland created by STM via a weir to remove suspended solids before entering the wetland;	Constructed sedimentation pond dual stage.	
	• Baffles or other measures to reduce the velocity of runoff downhill slopes should be installed to minimize scouring;	Visual monitoring by MNE	 Figure (1) Zoning for slope protection measures

	• Exposed areas and overburden dumps should be revegetated as quickly as possible.	Tree planting during monsoon season	
	• STM will prepare and implement a Storm water Management Plan taking into account the mitigation committed above.	Plan have been developed and construction on progress for Line 2 area. Line 1 area was constructed since 2014.	 Figure 3.2 Storm water flow, cement plant and limestone mine area
	• All areas used to store and/or handle coal, laterite and limestone should be paved and surrounded by perimeter drains. For the coal storage area, it should be covered;	Implemented and covered during monsoon season	
	• Runoff from the laterite and limestone staging areas shall be diverted to retention ponds and may be used for greening, dust suppression or discharged to the onsite reservoir.	Constructed sedimentation pond dual stage and reuse for gardening and dust control.	 Coal Staging Stockpile: Double Stage Sedimentation Pond 
	• For the coal storage area, STM has agreed to cover this area. Water from the roof will be diverted via storm water drains to retention ponds and may be used for greening, dust suppression or discharged to the onsite reservoir. Runoff collected by the interceptor drains (small volume) within the covered coal storage area will be diverted for treatment at the wastewater treatment plant.	Constructed sedimentation pond triple stage.	

	• Discharges into the reservoir and any runoff discharged to surface streams should be monitored monthly for compliance with Myanmar National Environmental Quality (Emissions) Guidelines for site runoff and wastewater discharges (for TSS, oil and grease, pH).	Conducted and monitored by LQC result documented (See in 3.2.2 water result)	Table – Supply Water Quality Monitoring Result Supply Water Analysis ITEM | WHO Drinking Water Guideline | Jan 2020 | Feb 2020 | Mar 2020 | Arp 2020 | May 2020 | Jun 2020 pH | 6.5 – 8.5 | 7.1 | 7.1 | 7 | 7.7 | 7.5 | 7.1 Color | 15 PCU | 5 | 10 | 20 | 35 | 25 | 30 Turbidity | 5 NTU | 3.66 | 4.33 | 4.87 | 4.02 | 0.44 | 0.51 Calcium hardness (CaCO3) | 500 mg/l | 120 | 120 | 120 | 120 | 102 | 90 Iron | 0.3 mg/l | 4 | Nil | Nil | Nil | Nil | Nil Chloride (Cl) | 250 mg/l | 4 | 3 | 7 | 5 | 5 | 5 Sulphate (SO4) | 200 mg/l | 20 | 40 | 20 | 20 | 20 | 50 TDS | 1000 mg/l | 150 | 150 | 150 | 150 | 140 | 140 TSS | 50 mg/l | 18 | 18 | 19 | 23 | 24 | 23 Manganese | 0.05 mg/l | Nil | Nil | Nil | Nil | Nil | Nil Nitrate | 50 mg/l | - | - | - | 2.2 | 0.8 | 16 Copper | 2 mg/l | Nil | Nil | Nil | Nil | Nil | Nil Methyl orange acidity | - | Nil | Nil | Nil | Nil | Nil | Nil Phenolphthalein acidity | - | 8 | 32 | 35 | 43 | 28 | 20 Cyanuric acid | - | Nil | Nil | Nil | Nil | Nil | Nil Zinc | - | Nil | Nil | Nil | Nil | Nil | Nil
	• Lightning protection should be installed at all areas used to store bulk fuel and other flammables;	Installed at fuel depot.	 Constructed bunded hardstand with containment for 110% of the volume of stored fuel and equipped with oil-water separator. Installed lightning protection post.
	• The fuel storage facility should be constructed on bunded hardstand with containment sufficient for 110% of the volume of the single largest tank;	Equipped.	 Constructed bunded hardstand with containment for 110% of the volume of stored fuel and equipped with oil-water separator. Installed lightning protection post.
	• Discharges from this bunded area should pass through an oil-water separator;	Installed	 Constructed bunded hardstand with containment for 110% of the volume of stored fuel and equipped with oil-water separator. Installed lightning protection post.
	• Spill Response Plan should be developed and implemented; (conducted awareness training and deliver pamphlet to relevant employees in the plant)	Approved and implemented	 SHWE TAUNG CEMENT SPILL CONTROL & RESPONSE TRAINING Develop training materials for spill control response.  Conducted training and drill for Spill Response Procedure   Inside Each MSDS M.S.D.S Material Safety Data Sheets Know what you're working with

			
	• Discharges from the coal staging area should be monitored monthly for compliance with Myanmar National Environmental Quality (Emissions) Guidelines for site runoff and wastewater discharges (for TSS, oil and grease, pH).	Conducted and monitored by LQC result documented (See in Section 3.2.2 for water test result)	Table – Sedimentation Pond Effluent Test Result Sedimentation Pond (Near Coal Staging Area) Effluent Test Result Parameters / IFC Waste Water Guideline / Jan 2020 / Feb 2020 / Mar 2020 / Apr 2020 / May 2020 / Jun 2020 pH / 6 – 9 / 6.8 / 7 / 7 / No storm water deposit / No storm water deposit / 7 Chemical Oxygen Demand (COD) / 0–125 mg/l / 10 / 19 / 63 / No storm water deposit / No storm water deposit / Nil Biological Oxygen Demand (BOD) / 0–30 mg/l / Nil / 9 / 11 / No storm water deposit / No storm water deposit / Nil Total Suspended Solid (TSS) / Max 50 mg/l / 45 / 50 / 111 / No storm water deposit / No storm water deposit / 24 Total Dissolved Solid (TDS) / - / 190 / 210 / 240 / No storm water deposit / No storm water deposit / 260 Total Nitrogen / 10 mg/l / - / - / - / No storm water deposit / No storm water deposit / 2.03 Total Nitrate / 44.29 mg/l / - / - / - / No storm water deposit / No storm water deposit / 9 Total Phosphorous / 2 mg/l / 0.33 / 0.33 / 0.65 / No storm water deposit / No storm water deposit / 0.33 Oil and grease / 10 mg/l / 5.6 / ND / ND / No storm water deposit / No storm water deposit / ND
	• Sanitary wastewater (includes toilet, sink, shower) should be discharged to the wastewater treatment plant and not be directly discharged to any water bodies. Kitchen flows should be discharged for treatment at dedicated grease trap / water purification unit and not be directly discharged to any water bodies.	Constructed Bio Tank for treatment of sanitary wastewater.	 
	• Treated wastewater will be monitored monthly at the centralized treated wastewater tank to check compliance with the NEQEG on BOD, COD, pH, SS, oil and grease, TN, TP and residual chlorine and monitored annually for compliance with the full list of parameters on the NEQEQ for Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (General Application). Sludge generated from the wastewater treatment units will be dewatered to meet with the Myanmar NEQEG for Bio solids and Sludge Disposal before disposal to the non-hazardous solid waste management facility. Sludge samples from each modular tank will be checked yearly for compliance with the NEQEG for Bio solids and Sludge Disposal.	Conducted and monitored by LQC result documented (See Section 3.2.2 for water result)	

**Data from Environment shared google drive*

Notice: Presently all the discharge from bund wall areas directly channel to sedimentation pond.

4.3.4 Evaluation

The establishment of sewage and sanitary waste management and storm water management is executing in plant site. Since the dry process is used for the cement production and the second line is also adopted a similar dry process as the first line, do not generate wastewater from first line and second line production. Discharge sanitary wastewater from plant office and household accommodation are diverted for treatment at the wastewater treatment plant. Treated wastewater from water treatment plant are monitored monthly in compliance with the NEQEG guideline. Wheel washing bay shall be installed at the cement plant guardhouse to avoid cement trail trucks tracking dirt onto public sealed roads and generating dust.

4.4 Waste Management Monitoring

4.4.1 Generation of Non- Hazardous Waste

In Shwe Taung Cement Factory, collect non-hazardous waste generated from plant site and accommodation area every day and dispose them to Temporary Non-hazardous Storage Area. For kitchen wastes, compost or use as animal feed in nearby villages. On the other hand, dispose laboratory and clinical wastes to Meikhtila Incinerator, Meikhtila District, Mandalay Region, approved by Meikhtila City Development Committee and have plan to dispose hazardous wastes to Golden Dowa Eco-system Myanmar Co., Ltd., Accredited Waste Management Company. Figure 15 and 16 shows location map of waste disposal area and waste collection points.

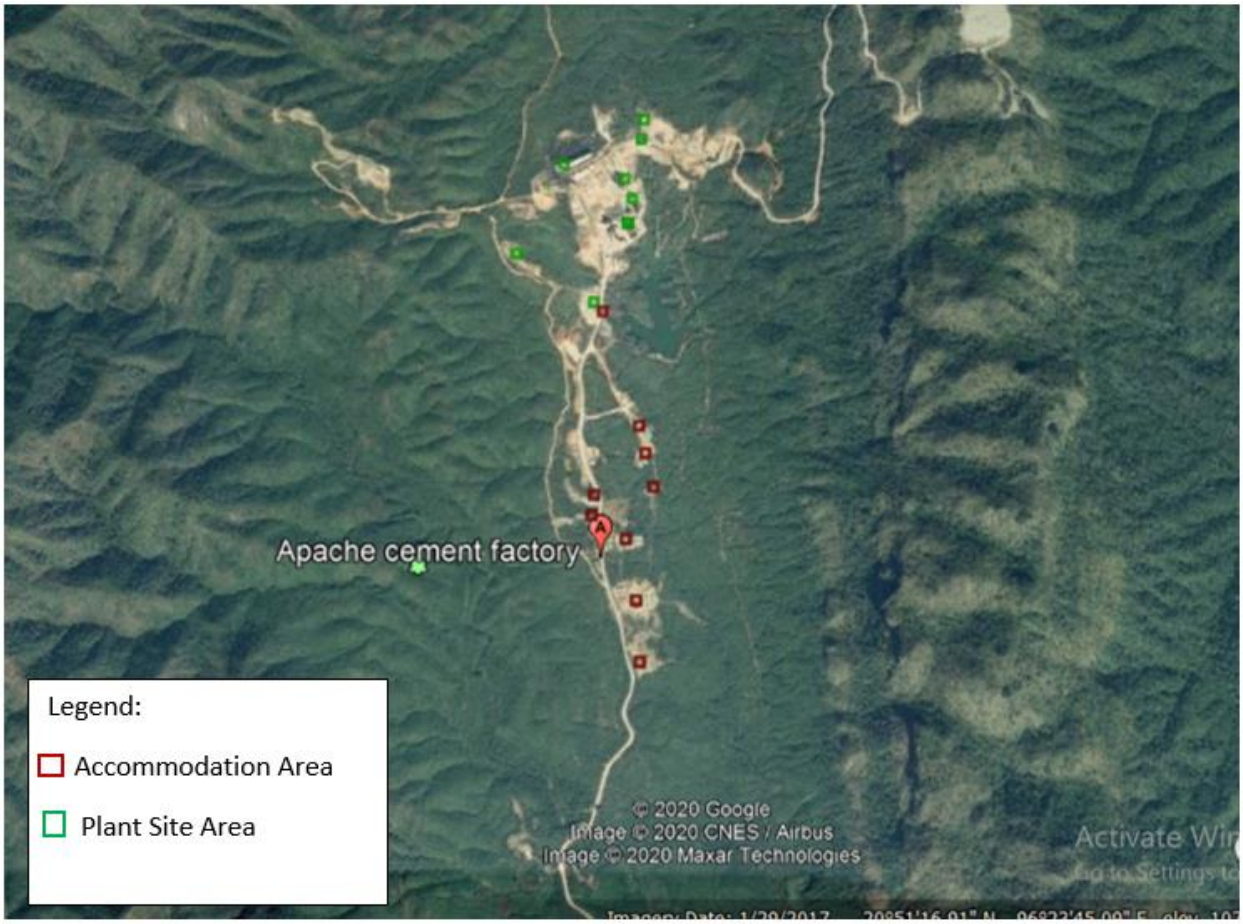


Figure14 - Location Map of Collection Points of All Generated Wastes from Plant Site and Accommodation Area

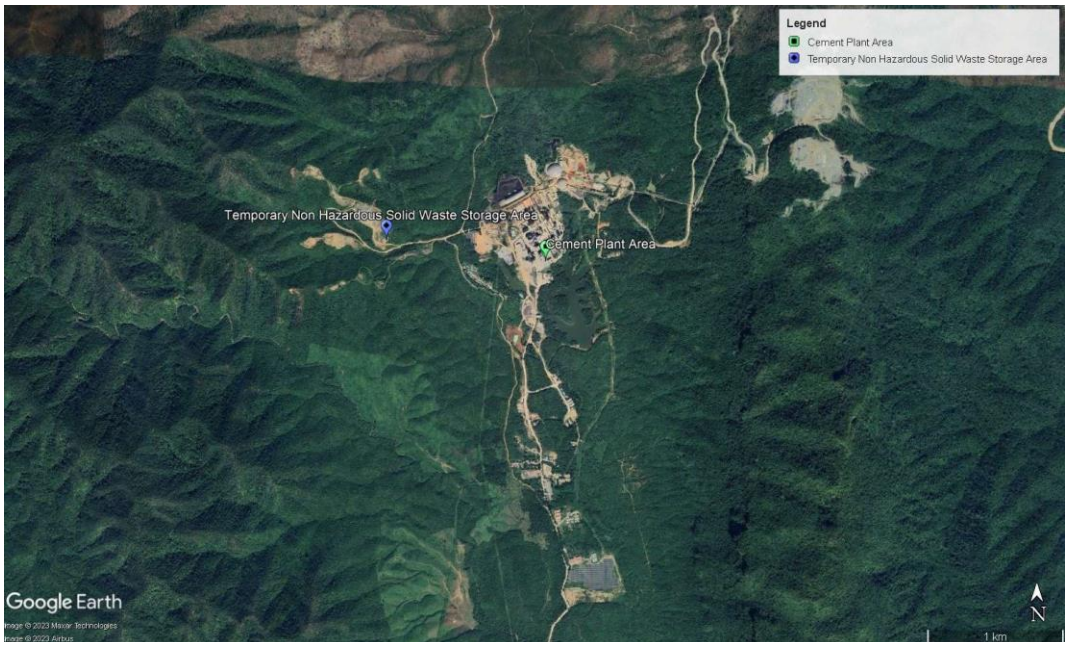


Figure 15 - Location Map of Disposal Sites for Waste from Plant and Accommodation Area

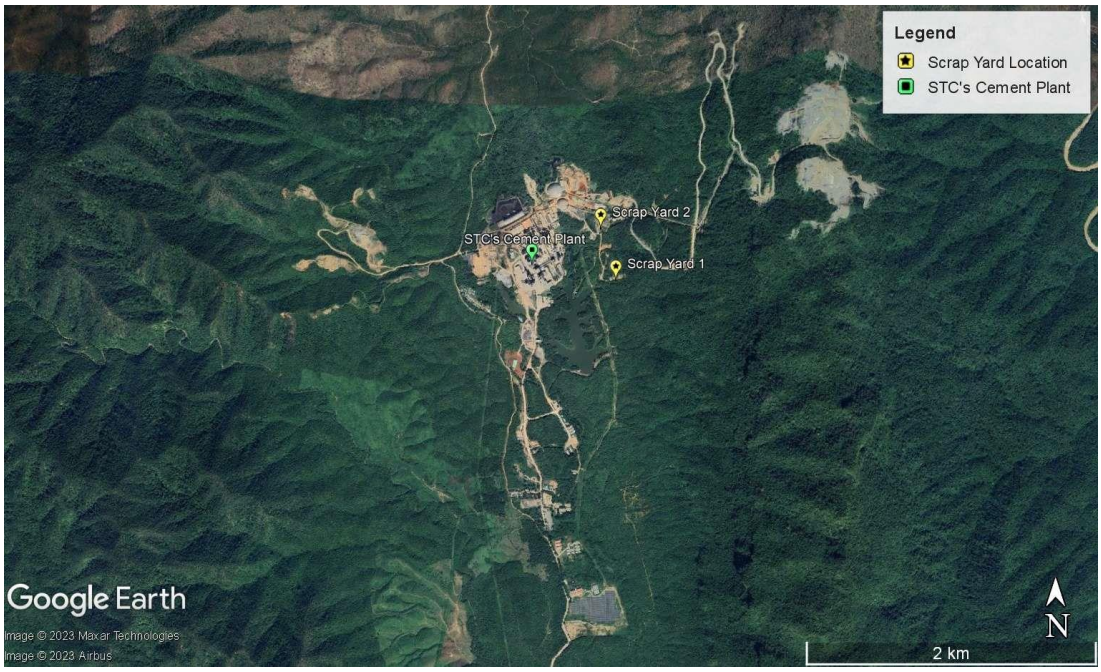


Figure 16 - Location Map of Scrap Yard Area

Table 16 – Generated Non-Hazardous Waste

STM Non-hazardous Waste Generated in June 2023 – November 2023		
Month	**Weight (kg)**	**Remark**
June 2023	18040	Disposed to Temporary Non-hazardous Solid Waste Storage Area
July 2023	18040	
August 2023	18760	
September 2023	17520	
October 2023	14380	
November 2023	19880	

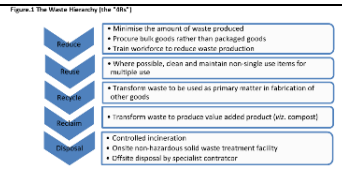
4.4.2 Generation of Hazardous Waste

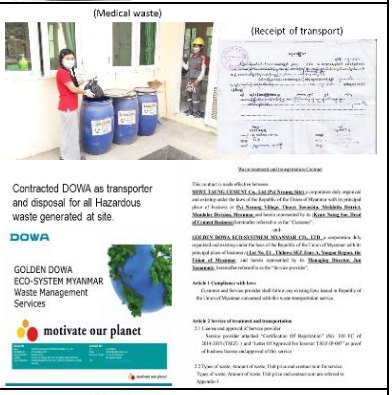
Table 17 – Generated Hazardous Waste

STM Generated Hazardous Waste and Scrap Materials						
Sr.	**Date**	**Type of Waste**	**Quantity**	**Amount (kg)**	**Treatment Facility**	**Remarks**
1	14 Sep 2023	Clinical, Laboratory and Contaminated Oil rags	1600 kg	Meikhtila Municipal Incinerator	Disposal	

4.4.3 Waste Management Mitigation Measures

Table 18 – Waste Management Mitigation Measures

Affected Aspect	Mitigation Measures	Action Taken	Photos
Waste Management	A waste management plan (WMP) for the project has been developed that include the following as a minimum:	Approved waste management	
	• A waste inventory should be created to establish the types of wastes;	Established (dispose Non-hazardous waste to Temporary N-H Solid Waste Storage area whereas Hazardoous waste will be disposed to DOWA, accredited waste management company. Clinical and Laboratory waste are disposed to Meikhtila Incinerator, approved for disposal by Meikhtila City Development Committee)	STC Non-hazardous Waste Generated in 2020 Month / Weight (kg) / Remark January / 16,020 / Temporary Non-hazardous Solid Waste Storage Area February / 14,900 / Temporary Non-hazardous Solid Waste Storage Area March / 14,500 / Temporary Non-hazardous Solid Waste Storage Area April / 17,420 / Temporary Non-hazardous Solid Waste Storage Area May / 16,160 / Temporary Non-hazardous Solid Waste Storage Area STC Generated Hazardous Waste Sr. / Date / Type of Waste / Quantity / Amount (kg) / Treatment Facility / Remarks 1 / Feb 2019 / Used Oil/ Grease from PME & HME / 33 Drums / 33 (100) = 3,300 / Top Star Co. Ltd. / Re-Sale 2 / 25 June 2019 / Clinical and Laboratory Waste / 7 CW = 2 LQC = 5 / 7 (20) = 140 / Meikhtila Municipal Incinerator / Disposal 3 / 28 Sep 2019 / Clinical and Laboratory Waste / 5 CW = 2 LQC = 3 / 5 (20) = 100 / Meikhtila Municipal Incinerator / Disposal 4 / Oct 2019 / Used Oil/ Grease from PME & HME / 33 Drums / 33 (100) = 3,300 / Top Star Co. Ltd. / Re-Sale 5 / 1 May 2020 / Clinical, Laboratory and Operation Waste / 5 CW = 2 LQC = 3 / 5 (20) = 100 / Meikhtila Municipal Incinerator / Disposal 6 / February 2020 / Used Oil/ Grease from PME & HME / 25 Drums / 25 (100) = 2,500 / Top Star Co. Ltd. / Re-Sale 
	• Identify disposal routes (including transport options and disposal sites) for all wastes generated;	Identified waste streams (See Figure---- for waste collection point and disposal site)	

	• Segregate wastes and recycle wherever possible;	Segregated scrap materials for resale and reuse (See Figure----- for Scrap Yard Area)	
	• Hazardous wastes should be segregated and disposed separately from non-hazardous wastes using a license contractor;	Hazardous waste treatment by DOWA and non-hazardous waste, municipal waste disposed at Temporary Non-hazardous solid waste storage area. Medical and laboratory waste dispose to Meikthila Incinerator, approved by Meikhtila City Development Committee)	
	• Hazardous wastes shall be labelled and stored in sealed containers that are stored on bunded hardstand. Hazardous wastes that are unsuitable for disposal in the cement kiln (such as waste oil drums) shall be returned to the manufacturer or trucked to Mandalay for appropriate disposal at a hazardous waste facility;	Commissioned and contracted DOWA	
	• Waste oil should be used for kiln start-up;	Resale by ADM	 
	• Organic waste for composting or use as animal feed in nearby villages;	Organic waste collected by locals for as animal feed	

	• Waste suitable for use as fuel in the Mudstone Quarry should be considered; and	Used waste oil resale to local merchant	
	• The existing landfill is not lined and should be only used for inert (non-reactive) and non-hazardous waste only.	Implemented (Constructed Old Temporary Non-hazardous solid storage area for disposing Non-hazardous waste and operated it from 2012 to June 2019. Replantation in old place after closure. After inspection of New Temporary Non-hazardous solid storage area from ECD and governmental organizations in 5 July 2019, operate that one until now.)	 Former landfill was backfilled with top soil and conducted re-plantation.  Constructed Temporary Solid Non-hazardous wastes storage equipped with clay liner..  Temporary Solid Non-hazardous wastes storage inspected by ECD and other government entities for the approval of EIA.

4.4.4 Assessment

Implementing principles of the waste hierarchy in the most responsible manner (reduce, reuse, recycle, reclaim, dispose) in the plant site by conducting tool box talk, delivering pamphlet, offering waste bin in each plant site department and accommodation area, undertaking simultaneous mass housekeeping 9 campaigns occasionally, using waste manifest form, daily conducting housekeeping in the site and surrounding area to get awareness on waste reduction, segregation, collection and disposal practices that avoid impacts on the physical, biophysical and social environments.

5. Biodiversity Action Plan Implementation

STM is continuous implementing Biodiversity Action Plan (BAP) with regular Transect Survey, Invasive Survey, Wildlife Market Survey, maintaining the 20% Ecosystem Restoration Plantations and 3 nurseries, and raising biodiversity conservation activities around the Mudstone Quarry operation.

Table 19 - Biodiversity Action Plan Implementation for 2023

Biodiversity Action Plan Implementation

No.	Type of Survey	Implementation Month	Frequency	Process	Remark
1	Transect Survey	September	Quarterly	Done	-
		December	Quarterly	Done	-
2	Invasive Species Survey	July	Quarterly	Done	-
		December	Quarterly	Done	-
3	Wildlife Market Survey	July	Quarterly	Done	-
		September	Quarterly	Done	-

Table 20 - Wildlife Market Survey

Date	Village	Village Tract	Township	Region	No. of HH Conducted Survey
11 September 2022	Pyi Nyaung	Pyi Nyaung	Thazi	Mandalay	20
12 September 2022	Pyi Nyaung	Pyi Nyaung	Thazi	Mandalay	20
13 September 2022	Pyi Nyaung	Pyi Nyaung	Thazi	Mandalay	10
14 September 2022	Pyi Nyaung	Pyi Nyaung	Thazi	Mandalay	10
15 September 2022	Pyi Nyaung	Pyi Nyaung	Thazi	Mandalay	10

Note: 30 % of total HH was conducted for Wildlife Market Survey (Interview Survey).

Market Survey Record at Pyi Nyaung Market and Pyi Nyaung Village

Figure 17 – Market Survey on Wild life

Table 21 - Invasive Species Survey

Date	Location	Species Found	Density	Control Measure
24 July 2023	47Q 228457 E 2308612 N	*Bidens pilosa,Agreatum conyzoides*	High	Mechanical
24 July 2023	47Q 228537 E 2309146 N	*Ziziphus jujuba, Chromolaena odorata, Mimosa pudica*	Low	No need to be clean
24 July 2023	47Q 228912 E 2310128 N	*Mimosa pudica,Chromolaena odorata, Leucaena leucocephala, Oroxylum* ***indicum***	Low	No need to be clean
11 December 2023	47Q 228239 E 2309796 N	*Mimosa pudica, Leucaena leucocephala, Chromolaena odorata, Oroxylum* ***indicum***	Low	No need to be clean
11 December 2023	47Q 228579 E 2308897 N	*Mimosa pudica, Bidens pilosa*	Medium	Mechanical
11 December 2023	47Q 228377 E 2309312 N	*Leucaena Leucocephala, Chromolaena odorata, Ziziphus jujuba, Mimosa pudica, Ageratum conyzoides*	High	Mechanical

Leucaena leucocephala

Chromolaena odorata

Figure18 – Invasive Species Survey

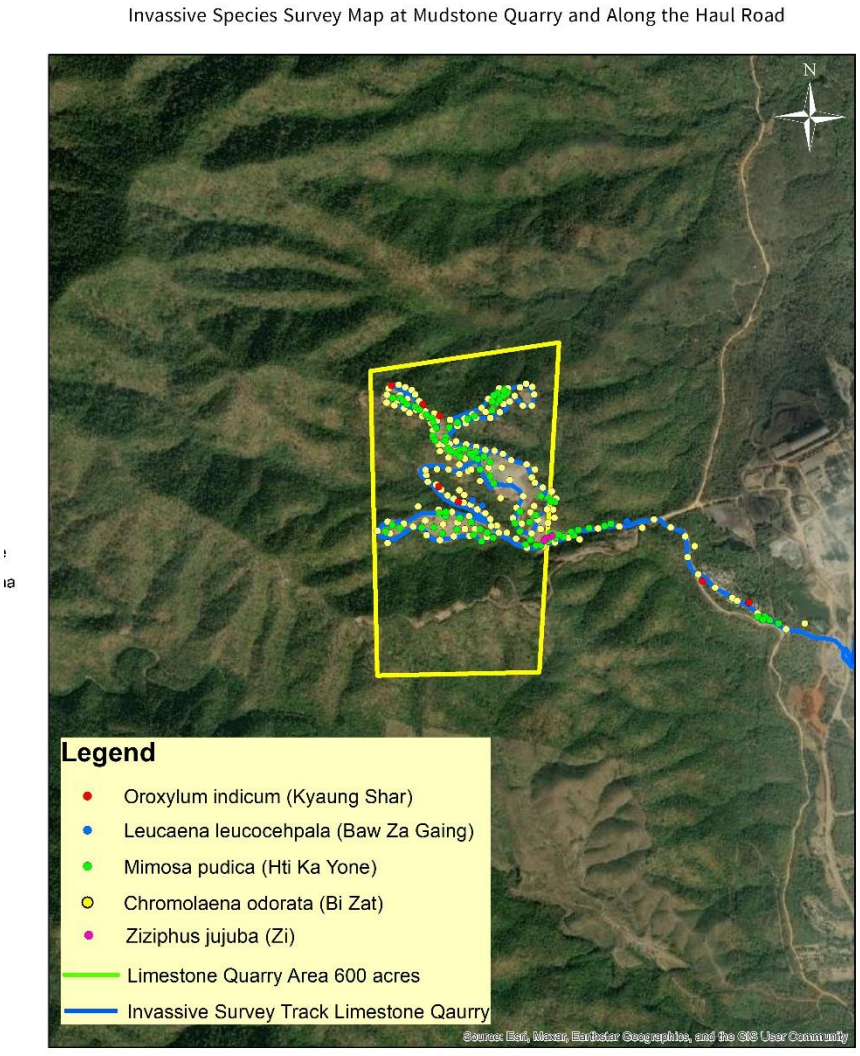


Figure 19- Map of Invasive Species Occurrence at Cement Plant

Plantation List									
No	Name of Operation	Acre	20% of Replacement	No. of Plants	Progress in 2016	Progress in 2017	Progress in 2018	Progress in 2019	Remark
1	Cement Plant	400	-	-	11,000	6500	225	1,980	Acacia,Sein Talone, Tamalan,Khayae, Kankaw, Sein Pan, Tamar, Kokko, Teak, Padauk, Bamboo, Pyinkado
2	Staff housing and Parking lot	55	-	-	1,200	550	35	2,150	Sein Pan, Kokko, Banda, Si Thapay
3	Limestone	600	120	89550	-	5,950	60500	23,100	Acacia, Bamboo, Mangium, Yinmar, Mazali, Seinpan, Kokko, Teak, Pinlaekabue
4	Mudstone	165	33	17,820	-	12,000	5820	540	Teak
5	Red Clay	140	20	8,400	-	-	-	8,400	Acacia, Bamboo, Mangium, Yinmar, Mazali, Seinpan, Kokko, Teak, Pinlaekabue
6	Power Transmission Line	2.668	2.668	1,120	-	-	-	1,120	
7	Proposed Water Pipe Line	1.04496	1.04496	420	-	-	-	420	
STM has successfully implemented an ecosystem restoration initiative by establishing plantations for land leased agreement with the government since 2019. The maintenance of these plantations is diligently carried out through routine operations, including weeding, patching, and fire protection across all areas. In August 2023, STBM undertook the patching of 28165 plants within the plantation, followed by thorough weeding activities, fertilizing in August, survival counting in December of the same year.									

Table 22 – Ecosystem Restoration Plantation List of previous years

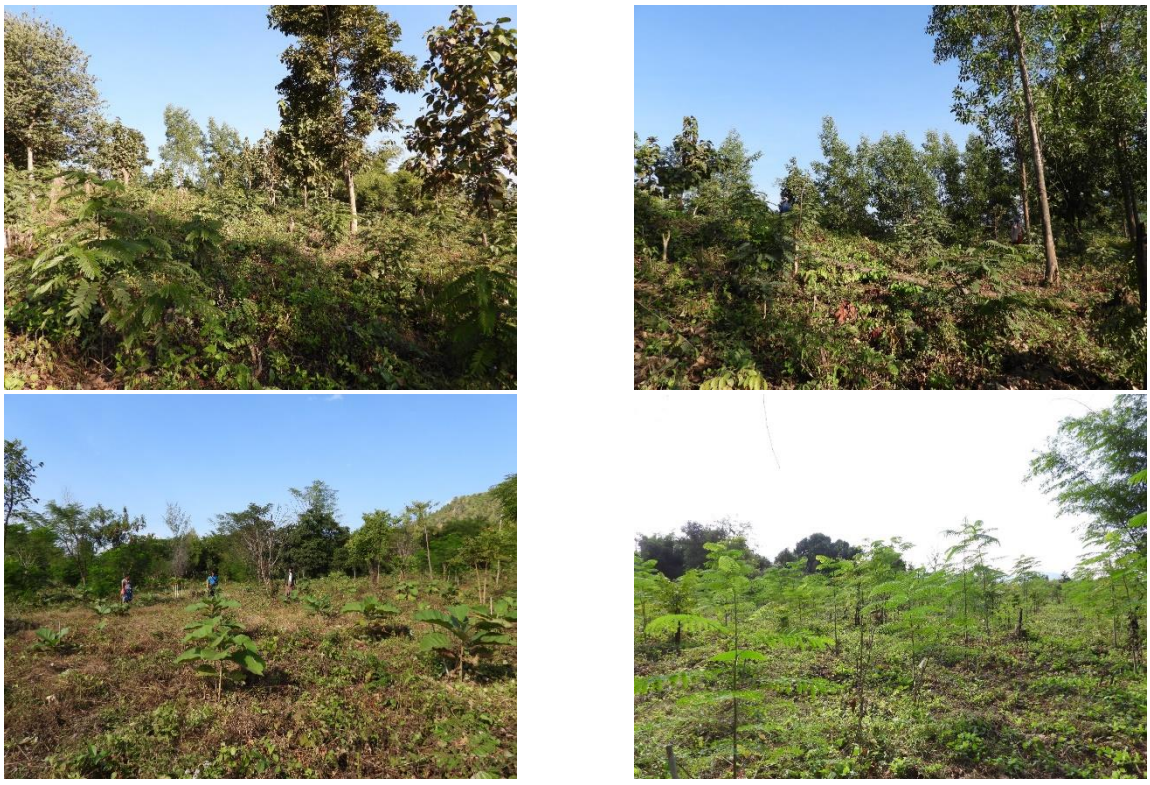
Table 23- Patching Record at Ecosystem Restoration Plantation in 2023

Name of Operation	Plantation Acre	Established Year	Location	Number of Patching in 2023	Name of Patched Species
Mudstone	33	2017	Ku Byin Reserved Forest	3,564	Mazali, Kokko, Thit Padauk
Limestone	15	2017	Ku Byin Reserved Forest	1,192	Mazali, Kokko, Thit Padauk
Limestone	50	2018	Ku Byin Reserved Forest	15,000	Mazali, Kokko, Thit Padauk
Limestone & Red clay and others	100	2019	Pyi Nyaung Reserved Forest	8,400	Mazali, Kokko, Thit Padauk, Teak, Sein Pan
Total	198	198		28,156	

Figure 20 – Maintenance Process at Ecosystem Restoration Plantation in 2023

Fertilization and Ploughing Process

Record of Second Weeding



Third Weeding Operation at Ecosystem Restoration Plantation

Camera Trap Installation

The environmental team of STM successfully installed a total of 18 camera traps, strategically placing 5 at the Limestone Quarry, 3 at the Mudstone Quarry, and 4 at the Cement Plant Area, with an additional 6 at the adjacent area. The traps were securely installed using steel weir and bolt nut mechanisms without cases. The selection criteria for trap placement were based on tracks and signs, such as scratches, footprints, and feces of wildlife species, as well as proximity to food sources like fruiting trees and water sources. The designated key performance indicator (KPI) for the camera traps is to achieve 60 days of trapping per year. The targeted species for monitoring includes the Chinese pangolin, elongated tortoise, Bengal slow loris, red muntjac, and various other wildlife species.

The camera traps were set up during the period from October 21 to October 26, 2023. The environmental team plans to monitor biodiversity richness seasonally for continuous observation. After the installation, the team retrieved all 18 camera traps. The recorded data revealed several wildlife species, including the red muntjac near Sedimentation Pond 1 of STM. Notably, some camera traps captured images of humans and domestic animals.

The documented wildlife species include jungle fowl (LC), red muntjac (LC), and rhesus monkey (LC). Although the IUCN status of the red muntjac is classified as Least Concern (LC), its population has experienced a decline due to hunting and poaching by local communities.

Table 24- Installation of Camera Trap at Cement Plant and Quarries

Camera Trap Setup Record by STM & STM						
Camera Name	Start Date	End Date	Latitude	Longitude	Status of Wildlife	Status of Others
CT01	24/10/2023	21/11/2023	20°52'19.90"N	96°23'46.27"E	None	None
CT02	24/10/2023	21/11/2023	20°52'13.87"N	96°23'55.73"E	Jungle Fowl, Red Muntjac, Rhesus Monkey	None
CT03	24/10/2023	21/11/2023	20°52'2.66"N	96°23'56.52"E	Red Muntjac, Rhesus Monkey	Buffalo
CT04	25/10/2023	21/11/2023	20°52'49.80"N	96°24'9.06"E	None	None
CT05	25/10/2023	21/11/2023	20°52'49.53"N	96°24'18.62"E	None	None
CT06	25/10/2023	21/11/2023	20°52'20.55"N	96°24'11.23"E	None	Human
CT07	23/10/2023	21/11/2023	20°52'2.34"N	96°23'46.05"E	Lost	Lost
CT08	23/10/2023	21/11/2023	20°51'50.82"N	96°23'47.21"E	None	Human
CT09	23/10/2023	21/11/2023	20°51'48.35"N	96°23'48.30"E	Lost	Lost
CT10	23/10/2023	21/11/2023	20°51'42.35"N	96°23'49.74"E	None	None
CT11	21/10/2023	21/11/2023	20°51'30.94"N	96°23'33.17"E	None	Human, Buffalo
CT12	21/10/2023	21/11/2023	20°51'44.37"N	96°23'33.88"E	None	Human
CT13	21/10/2023	21/11/2023	20°51'50.15"N	96°23'33.61"E	Jungle Fowl	None
CT14	26/10/2023	21/11/2023	20°51'49.01"N	96°22'48.78"E	None	Human
CT15	26/10/2023	21/11/2023	20°51'54.12"N	96°22'41.00"E	None	None
CT16	26/10/2023	21/11/2023	20°52'5.15"N	96°22'34.50"E	None	Human
CT17	25/10/2023	21/11/2023	20°52'34.53"N	96°24'7.02"E	None	Human
CT18	25/10/2023	21/11/2023	20°52'47.48"N	96°24'11.84"E	Rhesus Monkey, Spotted Dove	None

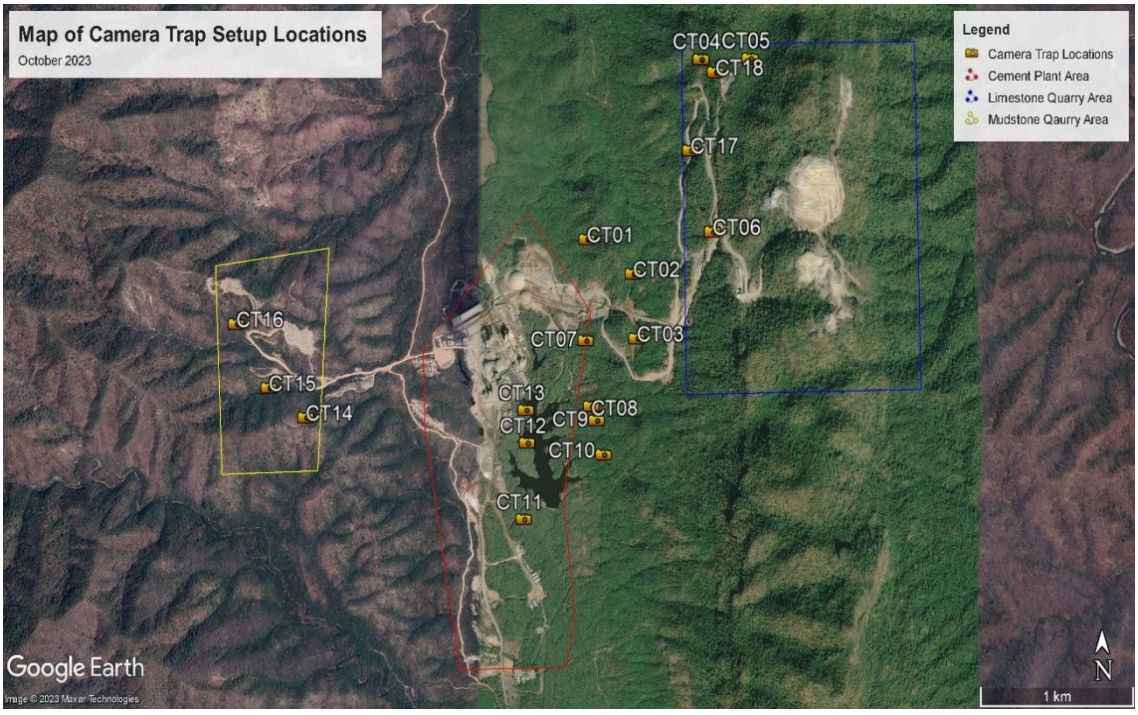


Figure 21 - Location Map of Camera Trap Installation

Figure 22- Photo Record of Camera Trap

6. Corporate Social Responsibility

STM Mudstone Quarry implements Corporate Social Responsibility (CSR) to communities and release newsletter in quarterly, see in Appendix-D.

7. Conclusion and Recommendation

STM Mudstone Quarry demonstrates the implementation of Environment Monitoring Plan in which they are operating and has properly assessed the key potential environmental and social impacts associated with the Mudstone Quarry operation. It is ensuring that the Myanmar environmental legislative compliance and IFC standards of good practice during the Mudstone Quarry expansion project and operations in Thazi Township, Mandalay Region.

Mitigation measures are properly implemented as per stated in EMP, it is expected that the environmental and social impacts are managed by STM with robust environmental management system that is implemented by a well-resourced, integrated and competent HSE staffs as per compliance of STM Mudstone Quarry EIA report.

The Environment Management Plan concludes that no major direct impacts are anticipated from this Project and all environmental impacts have been properly and progressively mitigated. These monitoring results will be properly communicated to stakeholders, especially local community, as per Stakeholders Engagement Plan when the travel restriction is allowed due to COVID19 situation.

7.0 Appendix

APPENDIX-A

NANOVA Co., Ltd.
Medical, Scientific & Industrial

Field Service Report

Date: 15.1.2020

Customer Details
Shwe Taung Cement Factory
Person Contacted
Tel/Fax No:

Instrument Details
Brand SKC, EDC
Product Line Ambient Air Monitoring System
Model EDAS Serial 919217

Type of Work
☐ Billable ☐ Contract ☑ Warranty ☐ Installation ☑ Maintenance ☑ Service ☐ Operator Training ☐ Others

Complaint Detail

Complain Person	Complain Ph No.	Complaint Time:
Daw Khaing Khaing Tun. Shwe Taung Cement Factory (Apache)		

Date	Engineers.	Engineer			Total
Person	Nanda Mg				
	Saw Htoo				

Action Performed
* Cleaning PM10, 2.5 Inpector sleeve and cap part.
* Cleaning PM10, 2.5 Sensor optic.
* Adjust CO_2, NO_2, SO_2 Sensor milli volts.

Part Used

No.	Description	Part No.	Qty	Price

Final Status
☑ Complete ☐ Ongoing ☐ Monitoring ☐ Follow-up ☐ Other

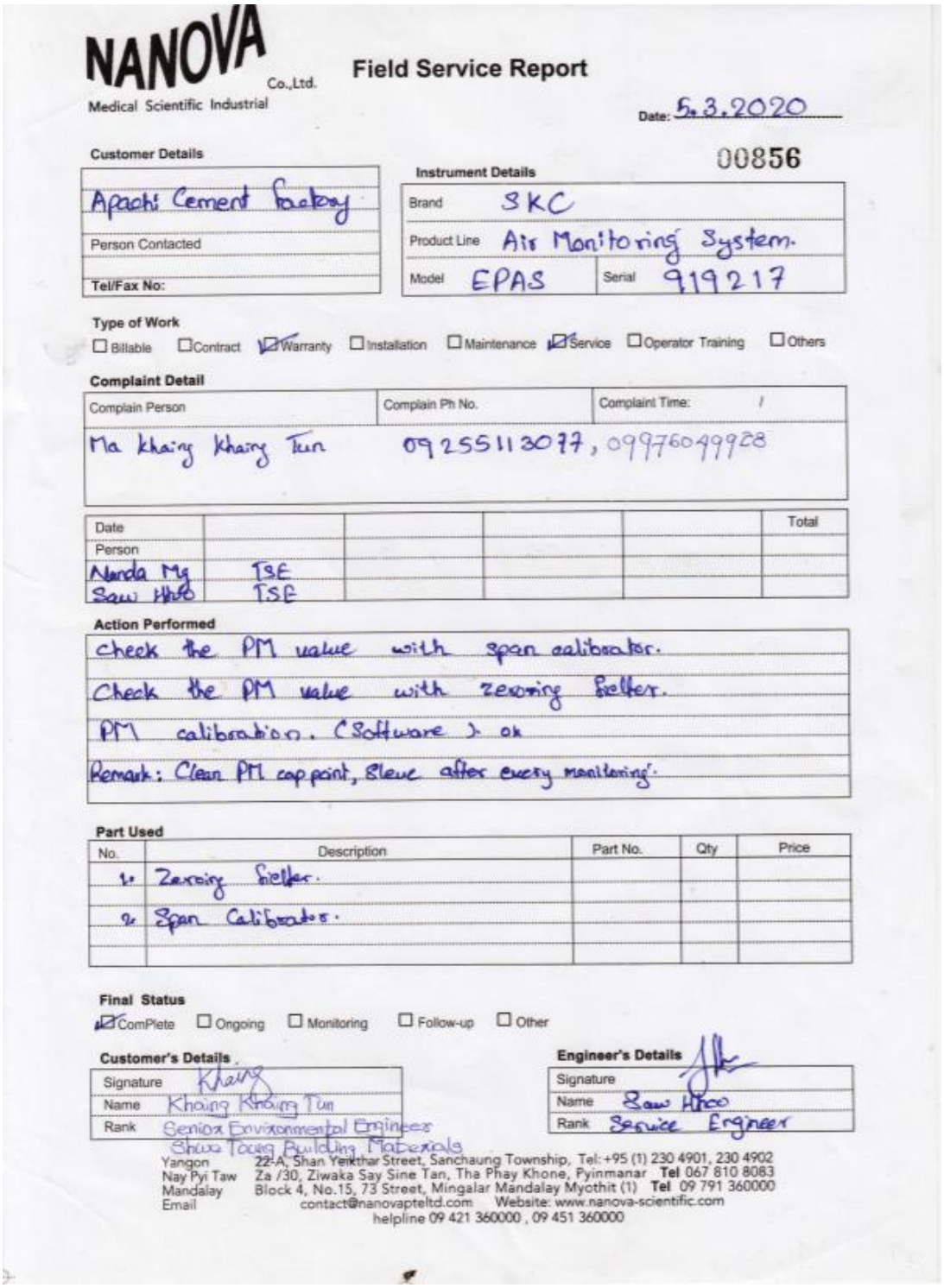
Customer's Details
Signature
Name Khaing Khaing Tun
Rank Senior Environmental Engineer
Shwe Taung Cement Co., Ltd.

0150

Engineer's Details
Signature
Name Nanda Mg, Saw Htoo
Rank Service Engineer.

Yangon 33-B, Pyintaung Su Yeiktha Street, Dagon Tsp. Tel 01-221 347, 01-211 470, 01-230 2075 Fax 01-2316400
Nay Pyi Taw Za /31, Ziwaka Say Sine Tan, Tha Phay Khone, Zabu Thiri Tsp, Pyinmanar. Tel 067 810 8083, 067-810 8179
Email contact@nanovapteltd.com helpline 09 421 360000 , 09 451 360000

Figure- Field Service Report for Haz-Scanner by Supplier on 15 January 2020 (1st time)



NANOVA Co.,Ltd.
Medical Scientific Industrial

Field Service Report

Date: 5.3.2020

00856

Customer Details

Apachi Cement Factory

Person Contacted

Tel/Fax No:

Instrument Details

Brand: SKC

Product Line: Air Monitoring System.

Model: EPAS | Serial: 919217

Type of Work

☐ Billable ☐ Contract ☑ Warranty ☐ Installation ☐ Maintenance ☑ Service ☐ Operator Training ☐ Others

Complaint Detail

Complain Person	Complain Ph No.	Complaint Time:
Ma Khaing Khaing Tun	09255113077, 09976049928	

Date					Total
Person					
Nanda Mg	TSE				
Saw Htoo	TSE				

Action Performed

Check the PM value with span calibrator.
Check the PM value with zeroing filter.
PM calibration. (Software) ok
Remark: Clean PM cap point, Sleeve after every monitoring.

Part Used

No.	Description	Part No.	Qty	Price
1.	Zeroing filter.			
2.	Span Calibrator.			

Final Status

☑ ComPlete ☐ Ongoing ☐ Monitoring ☐ Follow-up ☐ Other

Customer's Details

Signature: Khaing
Name: Khaing Khaing Tun
Rank: Senior Environmental Engineer
Shwe Taung Building Materials

Engineer's Details

Signature:
Name: Saw Htoo
Rank: Service Engineer

Yangon: 22-A, Shan Yeikthar Street, Sanchaung Township, Tel: +95 (1) 230 4901, 230 4902
Nay Pyi Taw: Za /30, Ziwaka Say Sine Tan, Tha Phay Khone, Pyinmanar Tel 067 810 8083
Mandalay: Block 4, No.15, 73 Street, Mingalar Mandalay Myothit (1) Tel 09 791 360000
Email: contact@nanovapteltd.com Website: www.nanova-scientific.com
helpline 09 421 360000 , 09 451 360000

Figure- Field Service Report for Haz-Scanner by Supplier on 5 Mar 2020 (2nd time)

NANOVA Co.,Ltd.
Medical Scientific Industrial

Field Service Report

Date: 23. 3. 2020

00861

Customer Details

Apache Cement Factory

Person Contacted:

Tel/Fax No:

Instrument Details

Brand: SKC. Ex

Product Line: Ambient Air Monitoring System

Model: EPAS | Serial: 919217

Type of Work

☐ Billable ☐ Contract ☐ Warranty ☐ Installation ☐ Maintenance ☑ Service ☐ Operator Training ☐ Others

Complaint Detail

Complain Person	Complain Ph No.	Complaint Time: /
09976049928		

Date	23.3.2020				Total
Person					
Saw Htoo	Engineer				

Action Performed

- Check the air flow and filter, tubing line.
- Replace filter (inner gas) with new complete set.
- Check the millivolt for sensors. (ok)
- Cleaning the tubing line. (ok)
- Cleaning PM impactor A and B. (ok)

Part Used

No.	Description	Part No.	Qty	Price
1.	gas filter x 4	-	-	-

Final Status

☑ Complete ☐ Ongoing ☐ Monitoring ☐ Follow-up ☐ Other

Customer's Details

Signature:

Name: [illegible]

Rank: STC

Engineer's Details

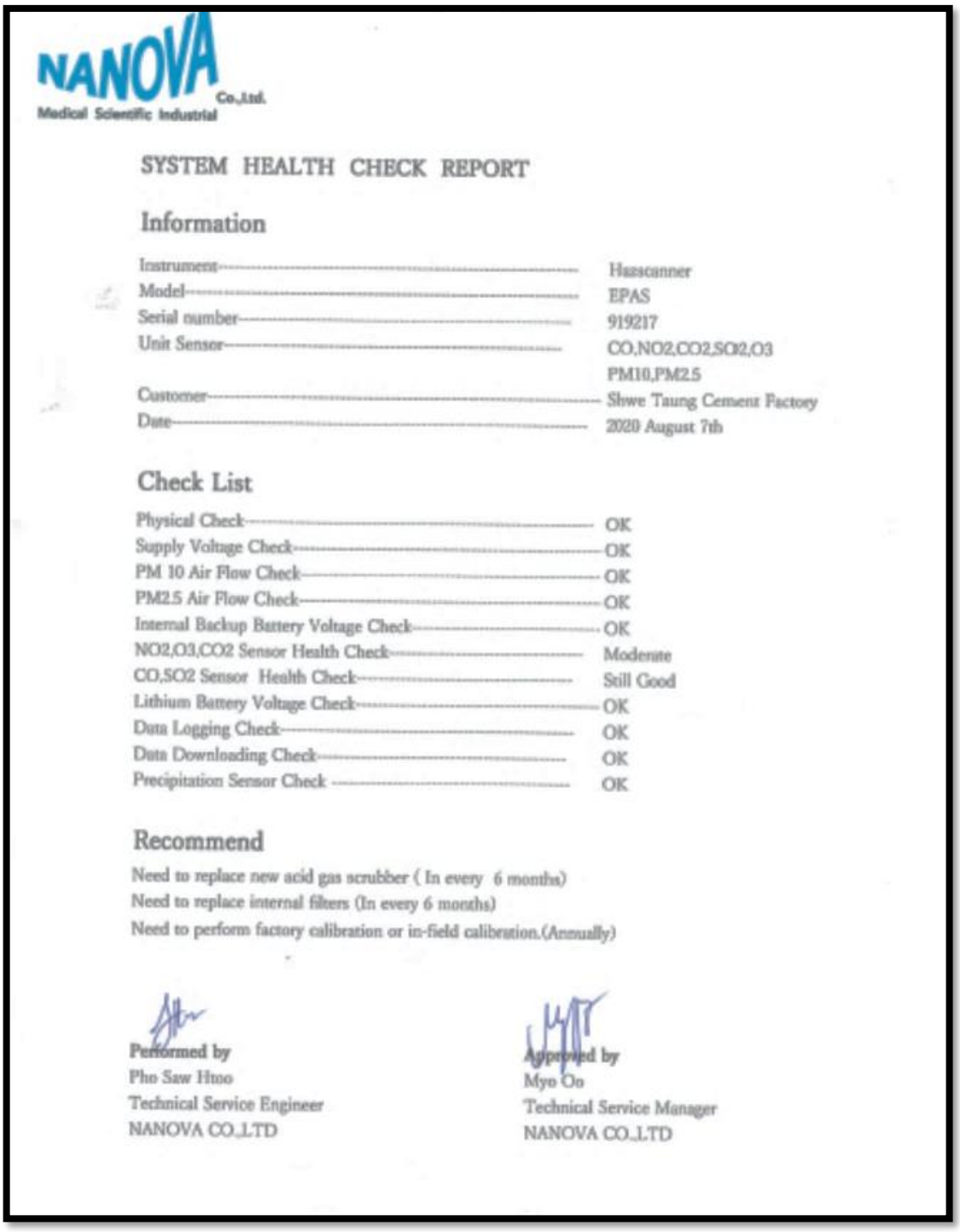
Signature:

Name: Saw Htoo

Rank: Service Engineer

Yangon: 22-A, Shan Yeiktha Street, Sanchaung Township, Tel +95 (1) 230 4901, 230 4902
Nay Pyi Taw: Za /30, Ziwaka Say Sine Tan, Tha Phay Khone, Pyinmanar Tel 067 810 8083
Mandalay: Block 4, No 15, 73 Street, Mingalar Mandalay Myothit (1) Tel 09 791 360000
Email: contact@nanovaptsltd.com Website: www.nanova-scientific.com
helpline 09 421 360000, 09 451 360000

Figure- Field Service Report for Haz-Scanner by Supplier on 23 Mar 2020 (3rd time)



NANOVA Co.,Ltd.
Medical Scientific Industrial

SYSTEM HEALTH CHECK REPORT

Information

Instrument	Haxscanner
Model	EPAS
Serial number	919217
Unit Sensor	CO,NO2,CO2,SO2,O3 PM10,PM2.5
Customer	Shwe Taung Cement Factory
Date	2020 August 7th

Check List

Physical Check	OK
Supply Voltage Check	OK
PM 10 Air Flow Check	OK
PM2.5 Air Flow Check	OK
Internal Backup Battery Voltage Check	OK
NO2,O3,CO2 Sensor Health Check	Moderate
CO,SO2 Sensor Health Check	Still Good
Lithium Battery Voltage Check	OK
Data Logging Check	OK
Data Downloading Check	OK
Precipitation Sensor Check	OK

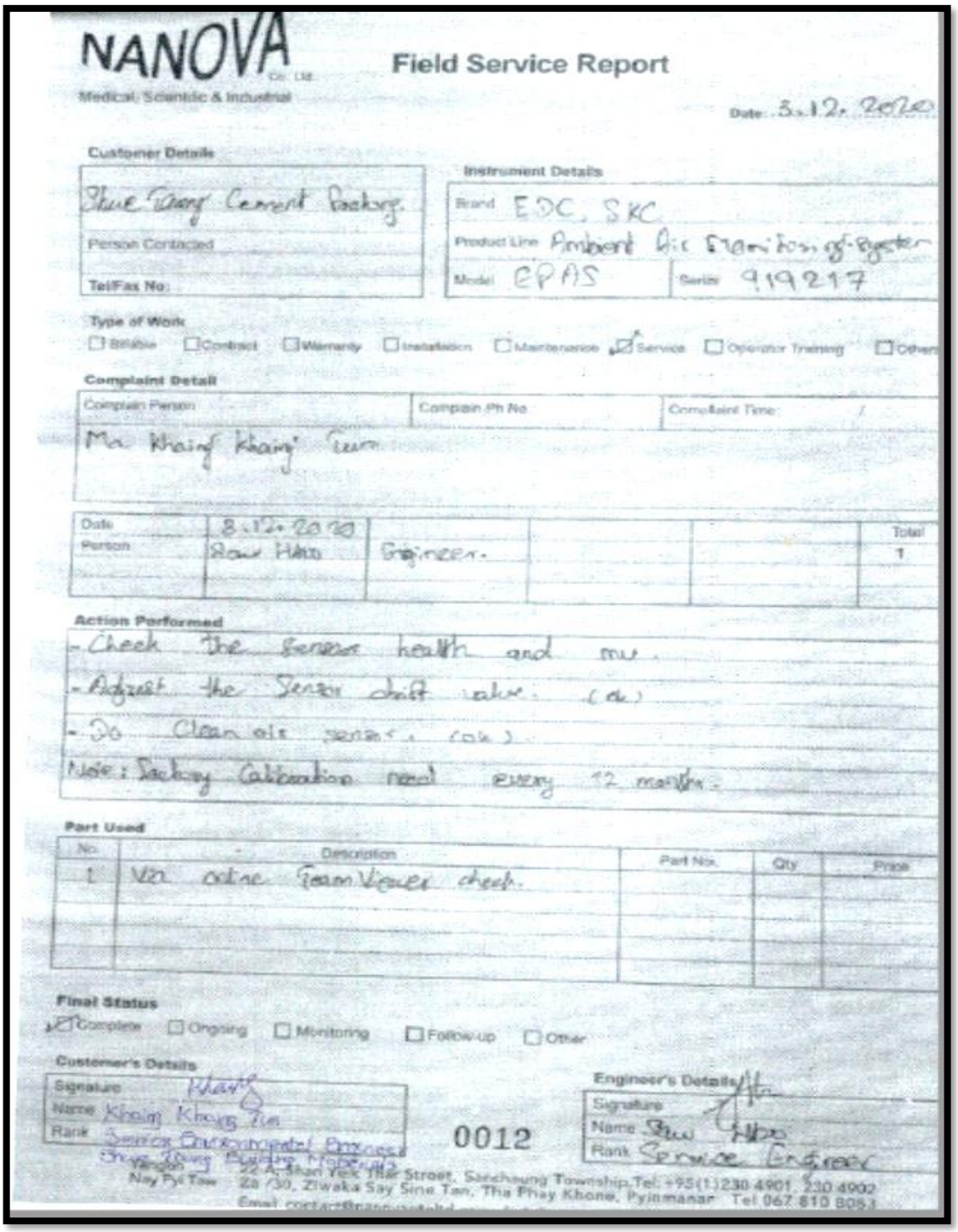
Recommend

Need to replace new acid gas scrubber (In every 6 months)
Need to replace internal filters (In every 6 months)
Need to perform factory calibration or in-field calibration.(Annually)

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

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

Figure- Field Service Report for Haz-Scanner by Supplier on 7 August 2020



NANOVA Co. Ltd.
Medical, Scientific & Industrial

Field Service Report

Date: 3.12.2020

Customer Details

Shwe Taung Cement Factory

Person Contacted:

Tel/Fax No:

Instrument Details

Brand: EDC, SKC

Product Line: Ambient Air Examination System

Model: EPAS | Serial: 919217

Type of Work

☐ Billable ☐ Contract ☐ Warranty ☐ Installation ☐ Maintenance ☑ Service ☐ Operator Training ☐ Others

Complaint Detail

Complain Person: Mr. Khaing Khaing Tun | Complain Ph No: | Complaint Time:

Date	Person					Total
3.12.2020	Saw Hlaa	Engineer.				1

Action Performed

- Check the Sensor health and mv.
- Adjust the Sensor drift value. (0)
- Do Clean air sensor. (0%)

Note: Factory Calibration need every 12 months.

Part Used

No.	Description	Part No.	Qty	Price
1	Via online TeamViewer check.			

Final Status

☑ Complete ☐ Ongoing ☐ Monitoring ☐ Follow-up ☐ Other

Customer's Details

Signature:
Name: Khaing Khaing Tun
Rank: Senior Environmental Engineer
Shwe Taung Building Materials

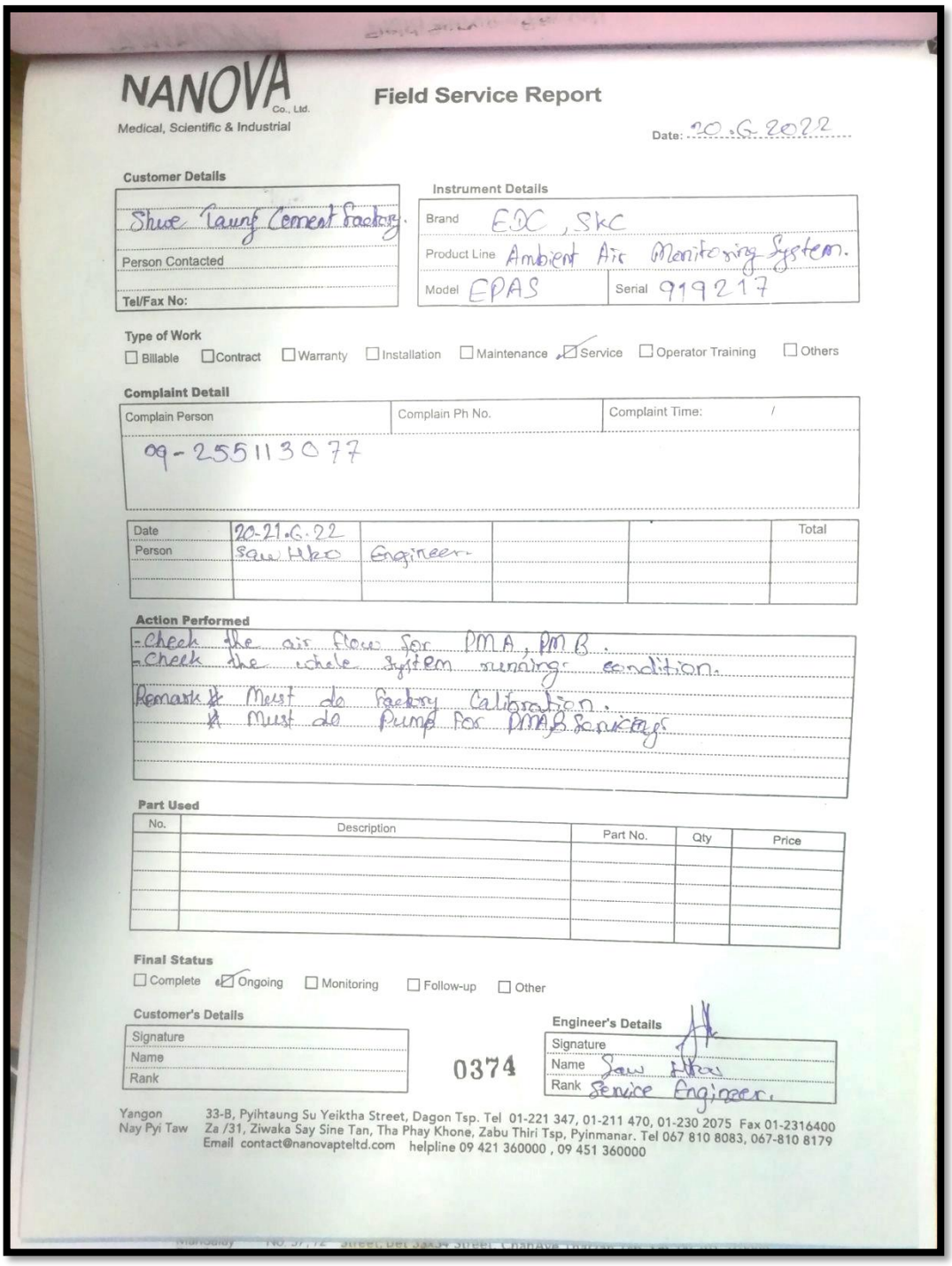
0012

Engineer's Details

Signature:
Name: Saw Hlaa
Rank: Service Engineer

Yangon: 22 A, Shan Yeik Thar Street, Sanchaung Township, Tel: +95(1)230 4901, 230 4902
Nay Pyi Taw: 28 /30, Ziwaka Say Sine Tan, Tha Phay Khone, Pyinmanar, Tel 067 810 8051
Email: contact@nanova.com.mm

Figure- Field Service Report for Haz-Scanner by Supplier on 3 December 2020



NANOVA Co., Ltd.
Medical, Scientific & Industrial

Field Service Report

Date: 20.6.2022

Customer Details

Shwe Taung Cement Factory.
Person Contacted
Tel/Fax No:

Instrument Details

Brand EDC, SKC
Product Line Ambient Air Monitoring System.
Model EPAS Serial 919217

Type of Work

☐ Billable ☐ Contract ☐ Warranty ☐ Installation ☐ Maintenance ☑ Service ☐ Operator Training ☐ Others

Complaint Detail

Complain Person	Complain Ph No.	Complaint Time: /
09-255113077		

					Total
Date	20-21.6.22				
Person	Saw Hko	Engineer.			

Action Performed

-Check the air flow for PM A, PM B.
-Check the whole system running condition.
Remark ※ Must do Factory Calibration.
※ Must do Pump for PM A, B Servicing.

Part Used

No.	Description	Part No.	Qty	Price

Final Status

☐ Complete ☑ Ongoing ☐ Monitoring ☐ Follow-up ☐ Other

Customer's Details

Signature
Name
Rank

0374

Engineer's Details

Signature
Name Saw Hko
Rank Service Engineer.

Yangon
Nay Pyi Taw

33-B, Pyihtaung Su Yeiktha Street, Dagon Tsp. Tel 01-221 347, 01-211 470, 01-230 2075 Fax 01-2316400
Za /31, Ziwaka Say Sine Tan, Tha Phay Khone, Zabu Thiri Tsp, Pyinmanar. Tel 067 810 8083, 067-810 8179
Email contact@nanovapteltd.com helpline 09 421 360000 , 09 451 360000

Figure- Field Service Report for Haz-Scanner by Supplier on 20 June 2022

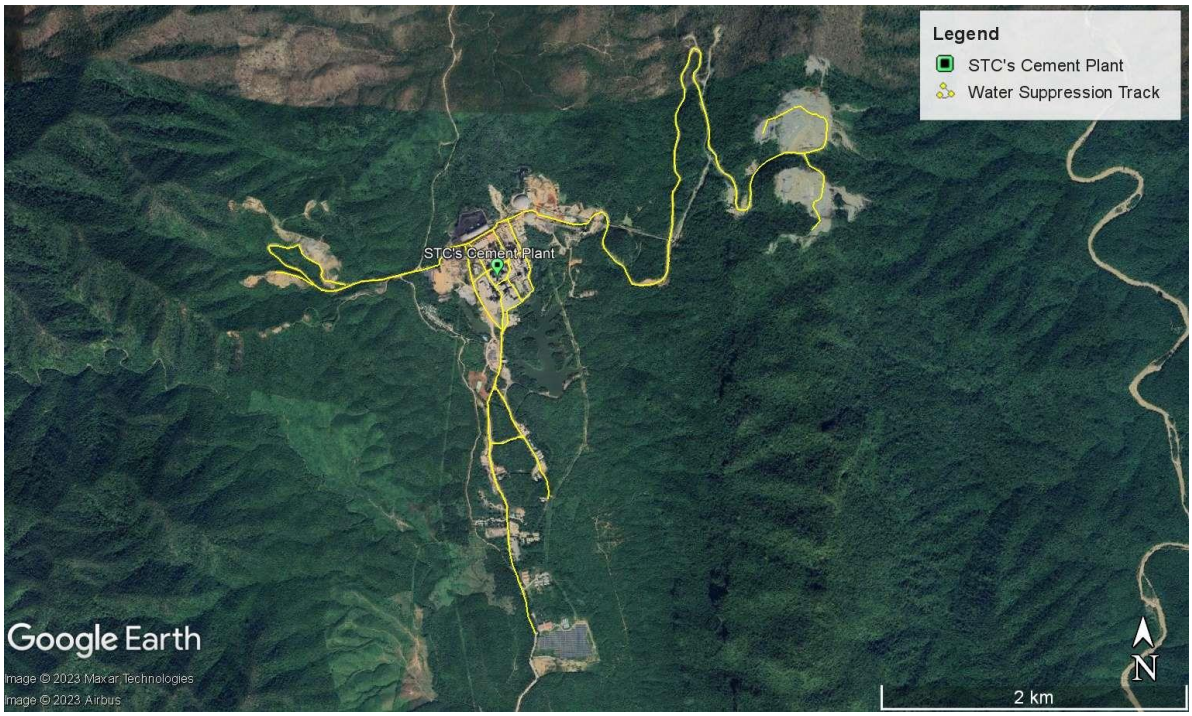


Figure- Water Suppression Map to mitigate dust emission in plant site

Table - Water Suppression Record from June to November 2023 to mitigate dust suppression in plant site.

Vehicle No.	Capacity of Tank (Gallons)	July		Aug		Sep		Oct		Nov		Dec	
		Total Loads	Water Consumption (gallons)	Total Loads	Water Consumption (gallons)	Total Loads	Water Consumption (gallons)	Total Loads	Water Consumption (gallons)	Total Loads	Water Consumption (gallons)	Total Loads	Water Consumption (gallons)
Water Truck No.1	3800 gal	-	-	-	-	-	-	-	-	-	-	-	-
Water Truck No.2	4000 gal	83	332000	31	124000	58	232000	70	280000	888	352000	62	2480000
Water Truck No.3	4000 gal	-	-	-	-	-	-	-	-	-	-	-	-
Water Truck No.4	4500 gal	103	463500	108	486000	100	450000	107	481500	114	513000	75	337500
Water Truck No.5	3000 gal	-	-	-	-	-	-	-	-	-	-	-	-
Total		**186**	**795500**	**139**	**610000**	**158**	**682000**	**177**	**761500**	**1002**	**865000**	**137**	**2817500**

Note: Source of water supply from Sedimentation Ponds

Table - Electrostatic Precipitator Maintenance Record

History of Maintenance (Electrical Department)									
Sr.	Date	Section	Location	Description	Root Cause	Action Taken	Job completion Date	Time	Action Team
1	07-Jul-23	303	L1	Checking 303EP	Controller Damage	L1-303 EsP02 can't close main breaker, so we are check of rectifier door, SCR and controller. We are found of controller not good, so we are new change this controller from takeout EsP CP03. Now is ok.		2hr	Clinker Team
2	26-Jul-23	202	L1	Checking 202EP	Inlet Temperature Error/ DC Power Cable Damage	L1-202EsP inlet temperature do not show on CCR cause of DC power cable is cut off, so we are new cable laying and reconnect it.		1hr	Raw Meal
3	27-Jul-23	202	L1	Checking 202EP	Overload Fault Stop/ Bearing Damage	L1-202 EP cathode motor no2 overload fault stop cause of both side bearing are not good. So, we are changed both side bearing (6202) and then now it is running.		2hr	Raw Meal
4	02-Aug-23	202	L1	Checking 202EP	Temperature Sensor Checking	L1-202EsP inlet temperature sensor check and PM.		2hr	Raw Meal
5	21-Aug-23	303	L1	Checking 303EP	Motor Overhaul Service	L1-303EsP outlet rotary motor overhaul service and both sides bearing 6206(2nos) new change.		3hr	Clinker Team
6	30-Aug-23	303	L1	Checking 303EP	mA Increase/ SCR Damage	L1-303EsP01 mA suddenly high but voltage 0kV so we are checking because of SCR is not good and then we are SCR 2nos new replacement. Now it is ok.		1hr	Clinker Team
7	30-Aug-23	303	L2	Checking 303EP	Controller Damage	L2-303EP03 Controller Damage and Change with new.		2hr	Clinker Team
8	30-Aug-23	303	L1	Checking 303EP	SCR Damage	L1-303EsP03 are SCR 2nos new replacement and controller 1 nos new replacement. Will test run tomorrow.		2hr	Clinker Team
9	01-Oct-23	303	L1	Checking 303EP	Inlet Temperature Sensor Damage	L1-303 EsP inlet temperature not correct because of this temperature sensor damage, so we are new change K-type, 0-1200C°, L-900mm. Now is ok.		2hr	Clinker Team
10	08-Oct-23	303	L2	Checking 303EP	Reducer Damage/ Bearing Housing Damage	L2-303 EsP outlet chain conveyor 01 reducer damage also our motor key line and DE side bearing housing not good, so we are repair this bearing housing after run back it ok. Motor ampere Ia=7.2A,Ib=7.1A,Ic=6.9A.		2hr	Clinker Team
11	09-Oct-23	303	L2	Checking 303EP	Motor Key Line Damage	L2-303 EsP outlet chain conveyor 01,02 sparer motor key line repair 701 workshop.		2hr	Clinker Team

12	10-Oct-23	303	L2	Checking 303EP	Preventive Maintenance	L1-303 all EsP insulator check, inspection and preventive maintenance.		4hr	Clinker Team
13	13-Oct-23	303	L2	Checking 303EP	Bearing Motor Damage	L2-303 EsP outlet chain conveyor 01 sparer motor key line repair, both sides bearing 6308 (2nos) new change and test run. Motor ampere 8.1A.		2hr	Clinker Team
14	19-Oct-23	303	L1	Checking 303EP	Checking	L1-303EsP inside checking together with Plant Reliability team. All DE and CE plates are good condition.		4hr	Clinker Team
15	01-Nov-23	202	L1	Checking 202EP	Overload Fault Stop	L1-202Esp C6 cathode rapping motor motor overload fault stop. So, we are checking motor condition. PME reducer is not work well.		1hr	Raw Meal

History of Maintenance (Plant Mechanical Department)

Sr	Start Date	Finished Date	M/C Code	M/C Name	Job Description	Remedy/ analysis	Remark
1	01-07-2023	01-07-2023	1#202EP01	Electrostatic Precipitator	Rapping hammer reducer repair		
2	27-07-2023	28-07-2023	1#202EP01-c2	Electrostatic Precipitator	Lifting drive unit inspection		
3	06-10-2023	06-10-2023	1#202EP01	Electrostatic Participator	Inspection EP		
4	10-10-2023	14-10-2023	1#303EP01	Electrostatic precipitator	EP duct line welding		
5	19-10-2023	21-10-2023	1#202EP01	Electrostatic Precipitator	DE rapping drive device inspection and repair.		
6	19-10-2023	20-10-2023	1#202EP01	Electrostatic Precipitator	CE rapping drive device inspection and repair.		
7	20-10-2023	29-10-2023	1#202EP01	Electrostatic Precipitator	DE hammer shaft and lifting rod inspection and repair.		
8	20-10-2023	22-10-2023	1#202EP01	Electrostatic Precipitator	Inspect and adjust the DE hammer and Anvil alignment.		
9	21-10-2023	23-10-2023	1#202EP01	Electrostatic Precipitator	Inspect and adjust the CE hammer and Anvil alignment.		
10	21-10-2023	23-10-2023	1#202EP01	Electrostatic Precipitator	Inspect and adjust CE and DE plate gap.		
11	22-10-2023	24-10-2023	1#202EP01	Electrostatic Precipitator	Inspect and repair the inlet X- type distribution plate.		
12	27-10-2023	27-10-2023	1#303EP01	Electrostatic Precipitator	ESP CE hammer inspection and repair work		
13	11-11-2023	11-11-2023	1#202EP01	Electrostatic Precipitator	Bearing renew		
14	11-11-2023	11-11-2023	1#202EP01	Electrostatic Precipitator	Bearing renew		
15	20-09-2023	20-09-2023	2#303EP01	Electrostatic Precipitator	Electrostatic Precipitator inspection at inside		

APPENDIX-B

APPENDIX-(B-1)

(Bio-Tank Effluent Discharge Water)

APPENDIX-(B-2)

(Coal Staging Area Effluent Water)

APPENDIX-(B-3)

(Supply Water (Lower Reservoir))

APPENDIX-C

Ambient Air Quality Results

APPENDIX-D

Corporate Social Responsibility