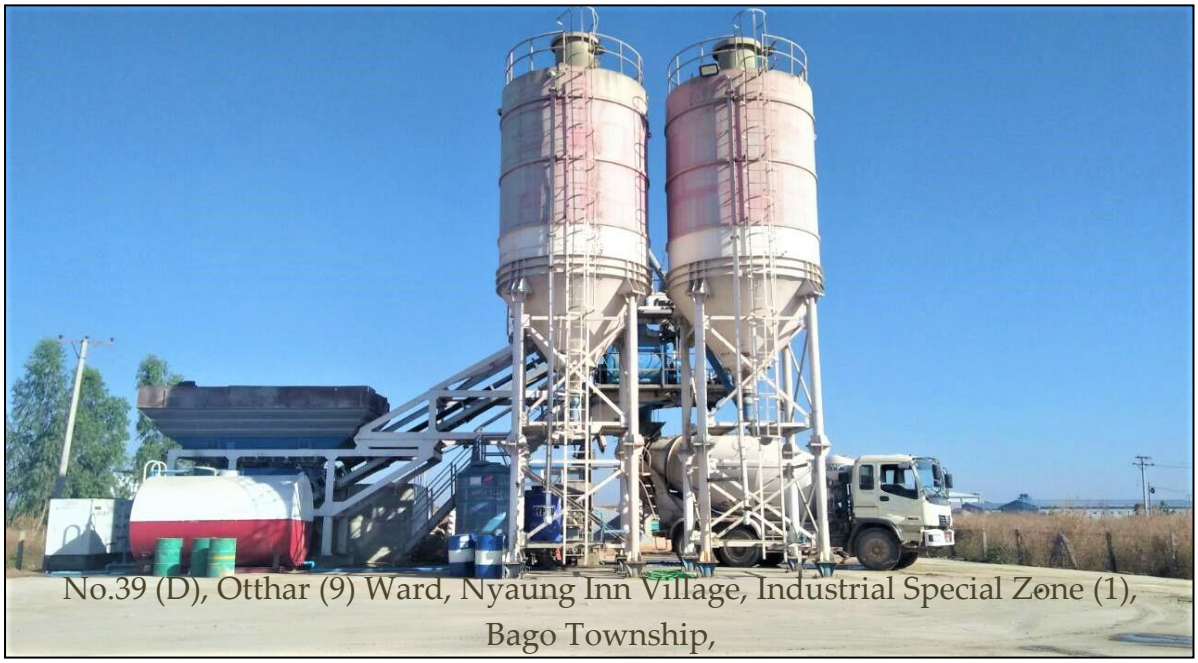
ENVIRONMENTAL MANAGEMENT PLAN



No.39 (D), Otthar (9) Ward, Nyaung Inn Village, Industrial Special Zone (1),
Bago Township,

SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED (BAGO)

Prepared by

GREEN ENVIRONMENTAL, HEALTH, SAFETY & SOCIAL CONSULTANCY COMPANY LTD.

1112/C2 (A), Time Square Condo, Merchant Road,
Botataung Township, Yangon, Union of Myanmar

Revision (1) August 2022

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ABBREVIATIONS

µg/m3	microgram of gaseous pollutant per cubic meter of ambient air
BOD	Biochemical Oxygen Demand
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COD	Chemical Oxygen Demand
CSR	Corporate Social Responsibility
dBA	'A' weighted equivalent decibels
Dy IC	Dy- Incident Controller
ECD	Environmental Conservation Department
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMT	Environmental Management Team
ERT	Emergency Response Team
ft	Feet
g	gram
Green EHSS	Green Environmental, Health, Safety and Social
hr	hour
HR	Human Resource
HSE	Health, Safety and Environmental
i.e.	that is
IC	Incident Coordinator
IFC	International Finance Corporation
Kg	kilogram
km	Kilometer
KVA	Kilo (Volt P x Amps)

Kw	Kilowatt
LAeq	Equivalent Continuous Sound Pressure Level
mg/l	miligrams per liter
MIC	Myanmar Investment Commission
MOECAF	Ministry of Environmental Conservation and Forestry
MONREC	Ministry of Natural Resources and Environmental Conservation
MSDS	Material Safety Data Sheet
N/A	Not Applicable
NEQEG	National Environmental Quality Emission Guideline
NO_x	Nitrogen Dioxide
O_3	Ozone
OHS	Occupational Health and Safety
OIC-AA	Officer-in-charge at Assembly Area
pH	potential of hydrogen
p.m.	Post meridiem (after noon)
PM	Particulate Matter
PPE	Personal protective equipment
ppm	parts per million
Qty.	Quantity
RC	reinforced concrete
RST	Report Supported Team
S.U	Standard Unit
SEZ	Special Economic Zone
SO_2	Sulphur Dioxide
sq	square
TS	Total solids
TSS	Total suspended solids

UNESCO	United Nation Economic Social and Culture Organization
US	US Dollar
USD	US Dollar
WHO	World Health Organization
YCDC	Yangon City Development Committee
YESC	Yangon Electricity Supply Corporation
˚C	Celsius
µg	Micro gram
m^3	Cubic meter

1.0 EXECUTIVE SUMMARY

Environmental Management Plan (EMP), which is important in managing the impacts of the factory, is constructed based on the findings of initial assessment. The Environmental Management Plan (EMP) is an integral part of the Health, Safety and Environmental Management System. This is also a tool to ensure the impacts are properly managed.

The EMP started from November 2018 and ended by July 2019.

1. Introduction

1.1. Project Proponent

The project proponent is **SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED (MCA) – BAGO BATCHING PLANT** established by Mr. Sorasak Keeratichokechaikul. The main business is "Ready-mixed Concrete Batching Plant". The location of this factory is No.39 (D), Otthar (9) Ward, Nyaung Inn Village, Industrial Special Zone (1), Bago Township, Bago Region, Myanmar.

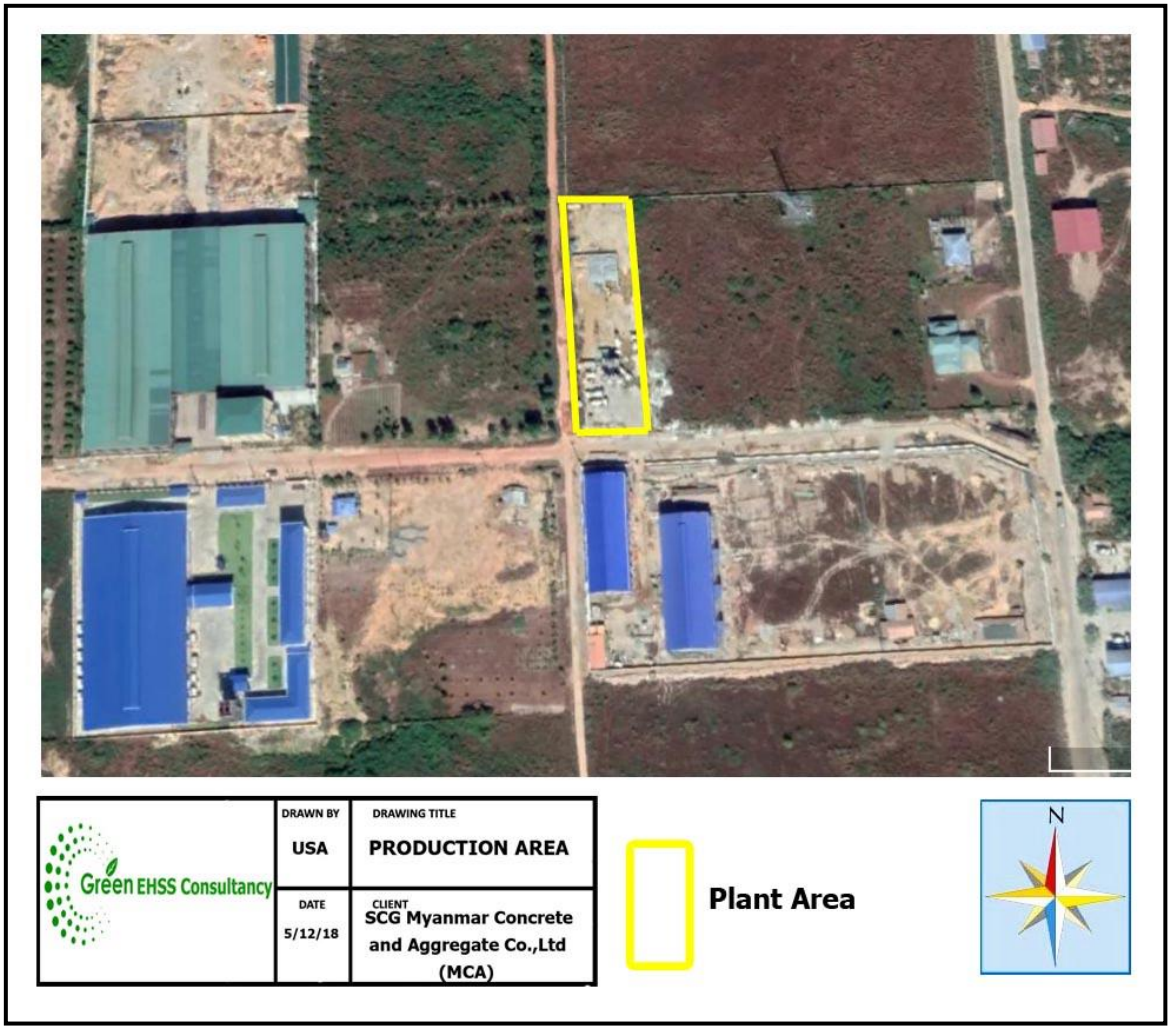
Environmental Management Plan for operation of **SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant** is conducted by **GREEN ENVIRONMENTAL, HEALTH, SAFETY & SOCIAL CONSULTANCY COMPANY LIMITED**.

Environmental Department of Bago Region directed SCG Myanmar Concrete and Aggregate Company Limited (MCA) to submit the Environmental Management Plan (EMP). Therefore, SCG Myanmar Concrete and Aggregate Company Limited (MCA) needs to submit an EMP to Environmental Conservation Department of Bago Region.

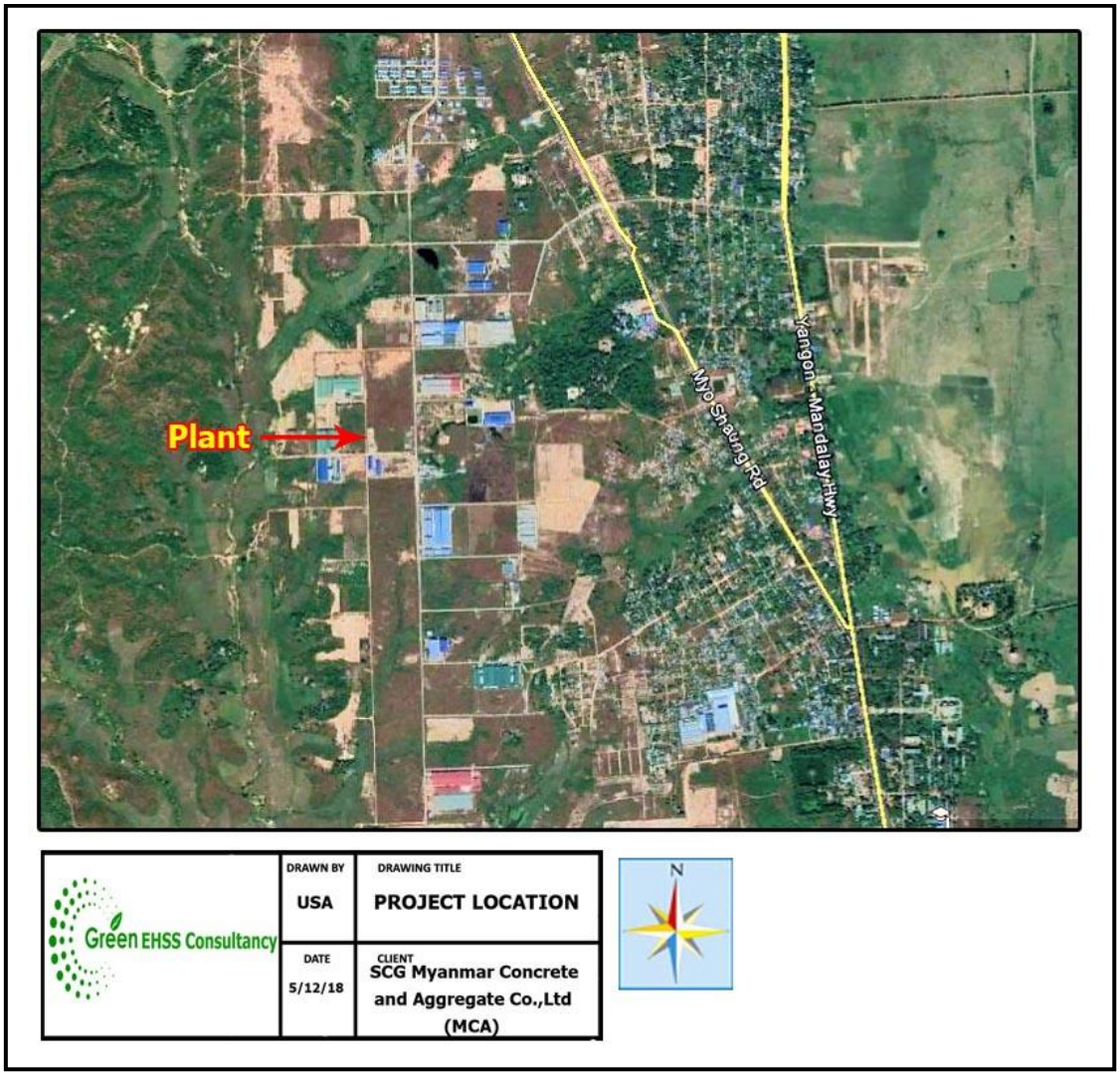
1.2. Project Location

SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant is located at No.39 (D), Otthar (9) Ward, Nyaung Inn Village, Industrial Special Zone (1), Bago Township, Bago Region, Myanmar at the coordinates 17° 16′ 49.96″ N and 96° 27″ 0.82″ E. The factory is built on 0.75 acre.

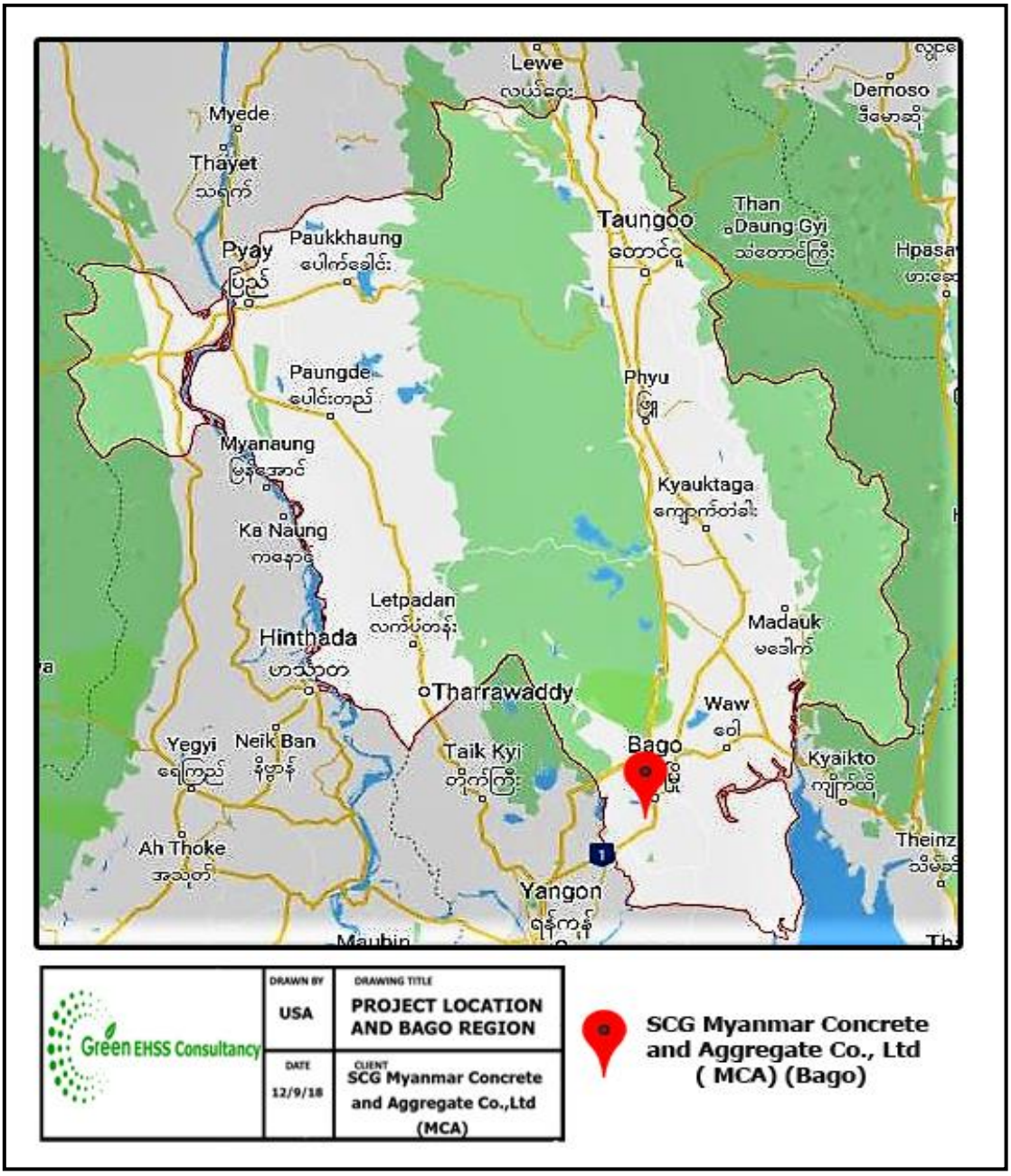
The investment is Joint Venture investment, and the objective of the investment is to manufacturing of ready-mixed concrete.



Production Area



Location Map of the Factory



Bago Region and Factory Location

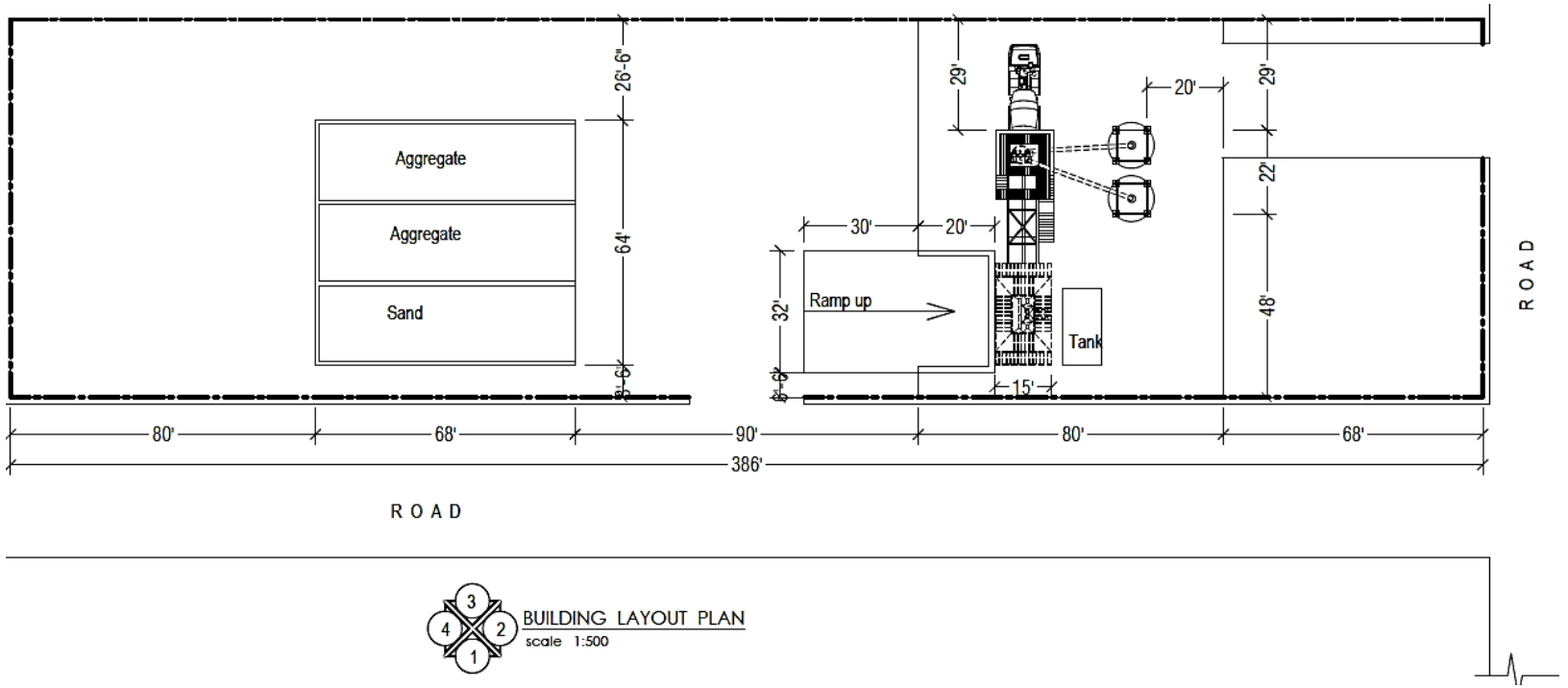
2. Legal Requirement

EMP team observed thoroughly the legal requirements that SCG Myanmar Concrete and Aggregate Company Limited (MCA) shall comply with are as follows:

- The Conservation of Environment Law(2012) and Rules (2014)
- Myanmar Investment Law (2016)
- Myanmar Investment Rule (2017)
- Minimum Wage Law (March,2013)
- The Myanmar Insurance Law (1993)
- The Social Security Law (2012)
- Factories Acts (1951)
- Workman Compensation Act(1923)
- The Public Health Law
- Underground Water Act ,1930
- The City Development Law and Rules
- The Water Power Act, 1927

3. Project Description

3.1. Plant Layout



Layout Plan of the Factory

3.2. Annual raw material requirement

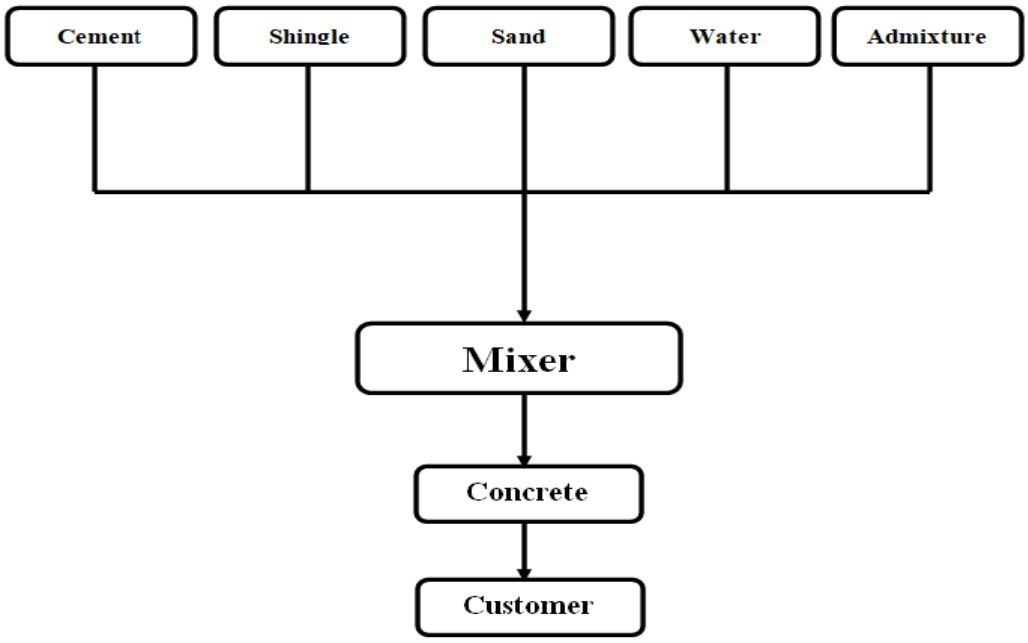
The main raw materials are as follow:

Annual Material Requirements

SR. No	PARTICULARS	Unit	A/U
1	Cement	Ton	4479.53
2	Admixture(Chemical)	Ton	25812.92
3	Rock	Ton	14549.46
4	Sand	Ton	10254.768

3.3. Production Activity

The Manufacturing Process Flow is shown in following chart.



Manufacturing Process Flows

3.4. Resource Requirement

Normally, working hours is 8:00 am to 5:00 pm and 312 working days in a year.

List of Local Employee on 1st December 2018

Sr. No.	Type of Employee	Male	Female	Total
1	Local Employees	5	-	5

3.5. Products and Production Capacity

The main product of Ready-mixed concrete plant of MAC is ready-mixed concrete and the annual production capacity is 12679 M^3. Ready-mixed concrete is locally supplied.

Ready Mix Concrete

Photos of Products

3.6. Water Supply

The production water source is from on- site tube well. The estimated water use for process is 200 gallons/day and, 72,000 gallons/ year.

3.7. Electricity

A set of generator- 200 KVA is installed. Annual electricity requirement is 10000 kw. Annual fuel requirement is 500 gallons.

4. Baseline Environmental Quality

4.1. Spatial Boundaries of the Project

Being situated in industry zone, the surrounding land use is industrial land use and factories are scattered in the area with low density.

The surrounding conditions of the project site are as follows:

East : Land Plot (Industrial Land)
West : Land Plot (Industrial Land)
South : Street, Land Plot (Industrial Land)
North : Land Plot (Industrial Land)

Location Map of the Factory with Surrounding Land Use

4.2. Physical Environment

Climate in Bago Township has a tropical climate. The hottest day of the year is April 11, with an average high of 100°F and low of 78°F. The coldest day of the year is January 9, with an average low of 64°F and high of 89°F. The most rain falls during the 31 days centered around August 1, with an average total accumulation of 7.9 inches.

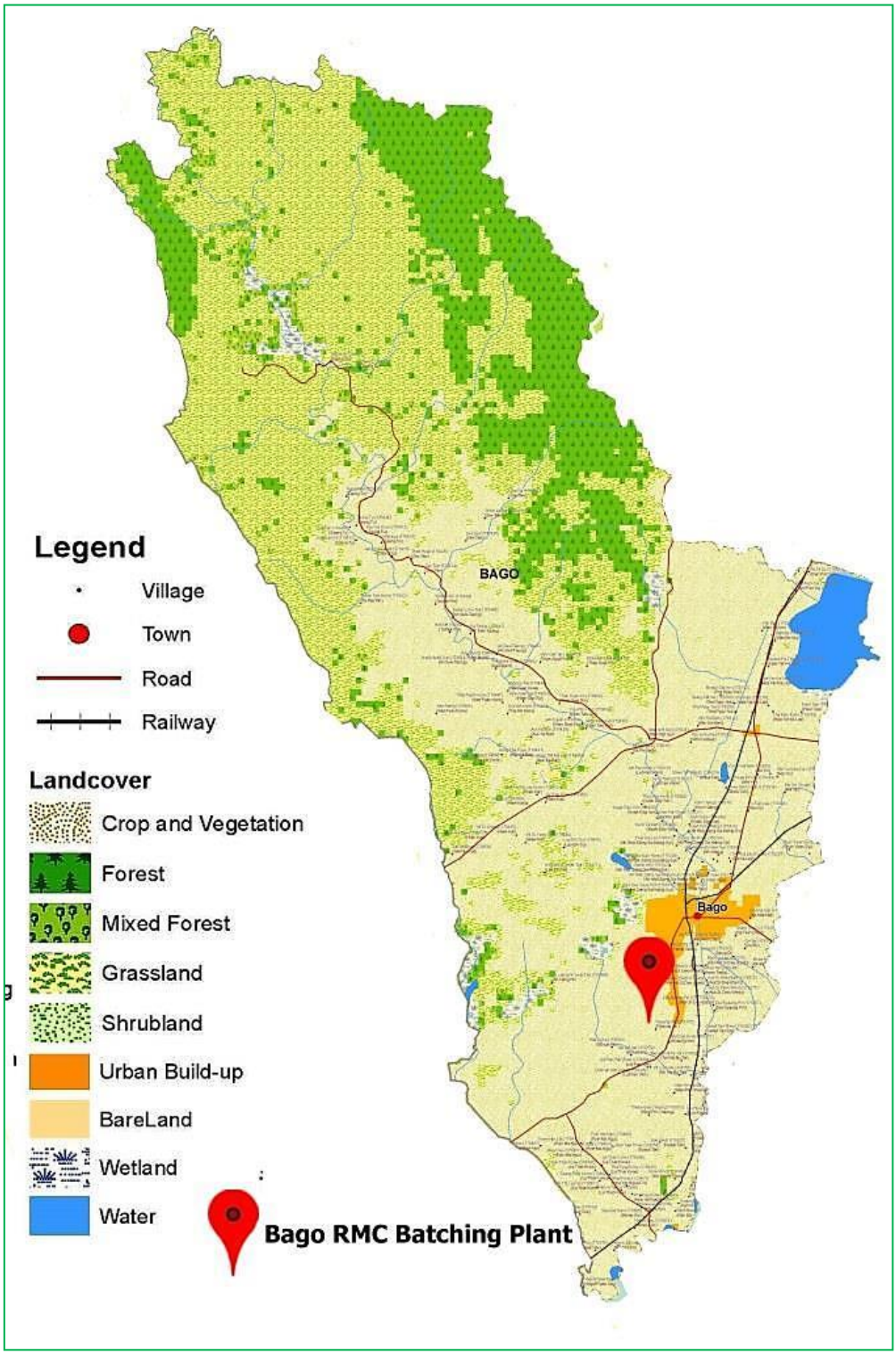
The surrounding terrain contains only modest variations in elevation, the elevation the surrounding area approximately ranges from +95 ft to +120 ft.

SCG Myanmar Concrete and Aggregate Company Limited (MCA) - Bago Batching Plant is situated in Industrial Zone. Current land use is industrial land use and and factories are scattered in the area with low density.

According to the FAO / UNESCO Soil Classification, the soil compositions around the plant area include Dystric Nitosols.

4.3. Socio-Economic Environment

SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago RMC Site is located within Bago Township. Area of Township is 2,905.08 km2 (1121.66 sq mi) wide. The township has Bago Town, Hpa Yar Gyi Town and Inn Ta Kaw Town. Bago Township comprises of 40 wards and 65 village tracts including 211 villages. Bago Township has a total population of 434,822 (207,029 male and 227,793 female) with 105,280 households including 115,440 families. The population is mainly Bamar Buddhist. The crops are Paddy (107,859 acres), Mung Bean (winter-12457 acres), Green Gram (winter-30933 acres) and Sesame (rainy- 23 acres). There is some garden land use.



Site Location and Bago Township

5. Environmental Impact Assessment

According to the assessment methods, the factory could not expected to have significant impact on water pollution. Noise pollution can be considered to be low because all of these impacts are small scales at site level.

Summary of Impact Assessment

Activity	Environmental Impact
Pollution	
-Vehicle movement. - Loading and unloading raw materials. - Generator. -Production activities such as Mixer. - Facilities usages.	Air Quality
-The facility in the production section (mixing, Weighing, etc) -Forklift movements -Operation DG set - Delivery vehicle movement	Noise and Vibration
-Domestic wastewater. -Production waste water -Sanitation wastewater	Water Quality
- Operation process (Cement waste, Concrete waste) -Office facilities	Solid Waste
Natural Environment	
-Clearance activity of land	Flora/Fauna and Ecosystem
Social Environment	

-Permitting employees for factory operation	Population Influx
Health and safety	
-Population Influx - Operation activities	- Negative impact on health condition of local people - Accident

6. Stakeholder Engagement and Information Disclosure

In the frame of the preparation of this EMP report, Green EHSS has organized several meetings with stakeholders with the active support of SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant. In December 2018, ward administrator of the nearest area of the factory was informed of the Project activities and there was **face to face meeting** for the commencement of baseline studies and household survey.

On 7th December 2018, public consultation and participation was conducted by Green EHSS Social consultant with two representatives of SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant. It was held at Administrator Office of Otthar (8) Ward, (Bago Township) with 9 attendees.

7. Environmental and Social Management Plan

According to the outcomes from the Environmental and Social Impact Analysis, **ENVIRONMENTAL MANAGEMENT PLANS** are addressed to mitigate the potential impacts. Summary of EMP generally takes account of the following crucial management plans.

Summary of Environmental and Social Management Plans

Waste Water Management Plans and Budget			
Performance Indicator(s)	• Monitoring results of tube well water quality. • Concentration of BOD, COD,TSS		
Budget	**US$ 3000**	**Responsibility**	**Timing**
Control(s)	• Establish wastewater holding ponds. • Reducing the volume of water used during washouts. • Concrete agitator mixers and chutes must not be rinsed on roadways. • All sewers should be disposed of through septic tanks and discharge periodically by contacting Engineering Department. • Train employees to minimize water use and on water conservation practices.	Plant Manager Site Supervisor HSE Supervisor	Throughout processing phase
Air Emission and Dust Management Plans and Budget			
Performance Indicator(s)	Concentration level of dust, particulate matters, PM_{10} and $PM_{2.5}$, CO_2,CO, SO_2, NO_x		
Budget	**US$ 1000**	**Responsibility**	**Timing**
Control(s)	• Minimize surface areas of aggregate storage piles. • Cement dust emissions from the silo during filling operations	Plant Manager Site Supervisor	Throughout processing phase

	must be minimised. • Water spraying at the unpaved road and factory site during dry season. • All vehicles are regularly inspected and maintained to reduce the gas emission. • Reduce vehicle speed limits.	HSE Supervisor	
Noise Management Plans and Budget			
Performance Indicator(s)	• No complaints from adjacent residential and commercial premises or community regarding noise exposure. • Acceptable noise levels (dBA)		
Budget	**US$ 700**	**Responsibility**	**Timing**
Control(s)	• All equipment should be properly maintained to limit noise emissions and fitted with functioning exhaust and muffler systems. • Weighing fine aggregates before coarse aggregates. • All the personnel working in high noise generating areas will be provided with sufficient ear protecting devices such as ear muffs.	Plant Manager Site Supervisor HSE Supervisor	Throughout processing phase
Solid Waste Management Plans and Budget			
Performance Indicator(s)	• Chemical wastes will be appropriately disposed. • Recycling or reuse of all recyclable wastes. • Removed from on-site at regular intervals.		

Budget	US$ 700	Responsibility	Timing
Control(s) of production waste and hazardous waste	• Provide segregated and adequate size of waste bins. • Dispose wastes regularly and not to allow wastes overflow from bins or accumulate on-site. • Separate recyclable materials from waste. • Applies waste reducing practices by paying careful attention during, storing raw material. • Hardened cement-sand slurry and returned concrete is generally be recycled as fill material. • Concrete waste will be used in concrete testing block. • Hazardous waste must be contained to prevent it from blowing away and from leaching into surface or groundwater • Ensure licensed contractors are used to collect hazardous wastes. Train employees to store and handle hazardous waste.	Plant Manager Site Supervisor HSE Supervisor	Throughout processing phase
Traffic Management Plans and Budget			
Performance Indicator(s)	• Public complaint with regards to traffic congestion. Road Accident.		

Budget	US$ 1000	Responsibility	Timing
Control(s)	• To schedule delivery movements outside of peak vehicle traffic times. • Control speed limit and provide traffic signage in and around the factory area. • Be sure that trucks and other vehicles are in good working order. • Keep trucks away from nearby homes whenever possible. • The plant will use locally available materials. • Follow the established truck routes in the community. • Driver behaviour, awareness and training will be undertaken.	Plant Manager Site Supervisor HSE Supervisor Truck operators	Throughout processing phase
Occupational Health And Safety Plan			
Performance Indicator(s)	• Accident and Incident statistics.		
Budget	**US$ 1000**	**Responsibility**	**Timing**
Control(s) of **-Accidents** **-Traffic**	• Drivers are trained correct operation of truck mixers including maintenance and cleaning. • Each new worker is given a plant orientation before they start work. • .Improve the driving skills and requiring licensing of drivers.	Plant Manager Site Supervisor Factory Doctor/Nurse	Throughout processing phase

safety **-Safety measure**	• Driver behaviour, awareness and training will be undertaken. • Fire extinguishers and facilities. • All workers should be provided with proper Personal Protective Equipment. • Fire drill will be conducted once per year. • Providing competency training.	HSE Supervisor	
Community Health And Safety Plan			
Performance Indicator(s)	• Public complaints.		
Budget	**US$ 700**	**Responsibility**	**Timing**
Control(s)	• Reused and recycled the concrete waste. • Store chemicals properly. • Traffic safety is promoted. • Follow the established truck routes in the community. • Driver behaviour, awareness and training will be undertaken. • The emergency response team has developed. • Fire Prevention Plans has developed.	Plant Manager Site Supervisor ERTeam HSE Supervisor	Throughout processing phase

8. Environmental Monitoring Plan

The environmental monitoring plan including monitoring items and locations in the operation is shown in the following Table.

Proposed Environmental Monitoring Programmes – Operation Phase

Environmental Issues	Monitoring Location	Monitoring and Reporting Frequency	Training	Budget (USD) One Time	Responsibility Party
Air Pollution					
Env.Standard	National Environmental Quality (Emission) Guideline for Air Emission				
Parameters	SO_2, NO_2, CO, $PM_{2.5}$, PM_{10}, dusts and O_3				
Ambient Air	1.Work Place 2. At the boundary of the property	Twice a year	Engaged to trained consultant	500 (Monitoring fees)	HSE personnel External Consultant firm
Noise					
Env.Standard	National Environmental Quality (Emission) Guideline				
Parameters	Acceptable noise levels (dB)				
Noise level dB(A)	1. Workplace 2.Generator 3. Site boundary	Twice a year	Use of handle noise level meter	200 (Sound meter device cost)	HSE personnel External Consultant firm

Water Quality					
Env.Standard	WHO Drinking water Quality Guidelines				
Parameters	-pH, Colour, Turbidity, Hardness, Iron, Chloride, Conductivity, Salinity, TSS, Dissolved Oxygen, Temperature - BOD, COD, pH, TSS				
Water Quality Waste Water Quality	1. Tube Well 2- Wastewater	Twice a year	Engaged to outside third party for laboratory tests	200 (laboratory tests fees)	HSE personnel External Laboratory for water quality tests
Health and Safety					
Parameters	Statistic of accidents and injuries.				
Safety Measures for Health Status	-Within the factory -Firefighting training and drill	Daily Annually	Mandatory HSE training HSE Supervisor Training Incident Investigation Training	1000 500 (Training fees)	Site Supervisor HSE personnel

9. Conclusion

Based on the overall impact assessment of the SCG Myanmar Concrete and Aggregate Company Limited (MCA) operation, it can be concluded that the factory creates more positive impacts to the regional and national economic growth and manageable negative impacts on the environment.

SCG Myanmar Concrete and Aggregate Company Limited (MCA) has allocated 2% on net profit for spending CSR activities. SCG Myanmar Concrete and Aggregate Company Limited (MCA) is already engaged with many activities under various sectors such as educational, public health, religion as well as welfare activities, and will continue the activities with updated mechanisms. The company shall be proactive to provide a risk free and safe workplace for all of its employees.

The company should therefore be licensed to implement this project subject to adherence to the environmental management plan proposed in this report.

အကျဉ်းချုပ်အစီရင်ခံစာ

စက်ရုံ၏ လုပ်ငန်းဆောင်တာ များကြောင့် ဖြစ်ပေါ် လာမည့် ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများကို စီမံခန့်ခွဲရာ တွင် အရေးပါသည့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ် Environmental Management Plans (EMP) ကို ကနဦးလေ့လာတွေ့ ရှိချက် များနှင့် အကဲဖြတ်ချက်များ အရ ရေးဆွဲထားပါသည်။ EMP သည် ကျမ်းမာရေး၊ လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေး နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့် ခွဲမှုစနစ် တွင် အရေးပါသော အစိတ်အပိုင်း တစ်ခုပင်ဖြစ်သည်။ စက်ရုံလည်ပတ်မှု ကြောင့် ဖြစ်ပေါ်လာမည့် ပတ်ဝန်း ကျင်ဆိုင်ရာ ဆိုးကျိုးများကို သင့်လျော် စွာလုပ်ဆောင် နိုင်ရေးအတွက် EMP ကို အသုံးပြုနိုင်ပါသည်။

ပတ်ဝန်းကျင် စီမံခန့် ခွဲမှုအစီအစဉ် (EMP) ရေး သားခြင်း လုပ်ငန်းအဆင့်ဆင့်ကို နိဝင်ဘာ ၂၀၁၈ ခုနှစ် တွင် ပြုလုပ် ခဲ့ပြီး ဇူလိုင်လ ၂၀၁၉ ခုနှစ်တွင် ပြီးဆုံးခဲ့ပါသည်။

1. နိဒါန်း

1.1. စီမံကိန်းအဆိုပြုအဖွဲ့အစည်း

စီမံကိန်းအဆိုပြုအဖွဲ့အစည်းမှာ SCG Myanmar Concrete and Aggregate Company Limited (MCA) ၏ ပဲခူး ကွန်ကရစ်ဖျော်စက်ရုံ ဖြစ်ပြီး Mr. Sorasak Keeratichokechaikul မှတည်ထောင်ခဲ့ပါသည်။ အဓိက စီးပွားရေးလုပ်ငန်းမှာ ကွန်ကရစ်များကို အသင့်ဖျော်ပေးပြီး တည်ဆောက်ရေးလုပ်ငန်းခွင် ရှိရာသို့ လိုက်လံ ပို့ဆောင်ရန်ဖြစ်ပါသည်။ ပဲခူးကွန်ကရစ်ဖျော်စက်ရုံသည် အကွက်အမှတ် (၃၉/ဃ)၊ ဥဿ (၉)ရပ်ကွက်၊ ညောင်အင်းရွာ၊ အထူးစက်မှုဇုန်(၁)၊ ပဲခူးမြို့နယ်၊ ပဲခူးတိုင်းဒေသကြီးတွင် တည်ရှိပါသည်။

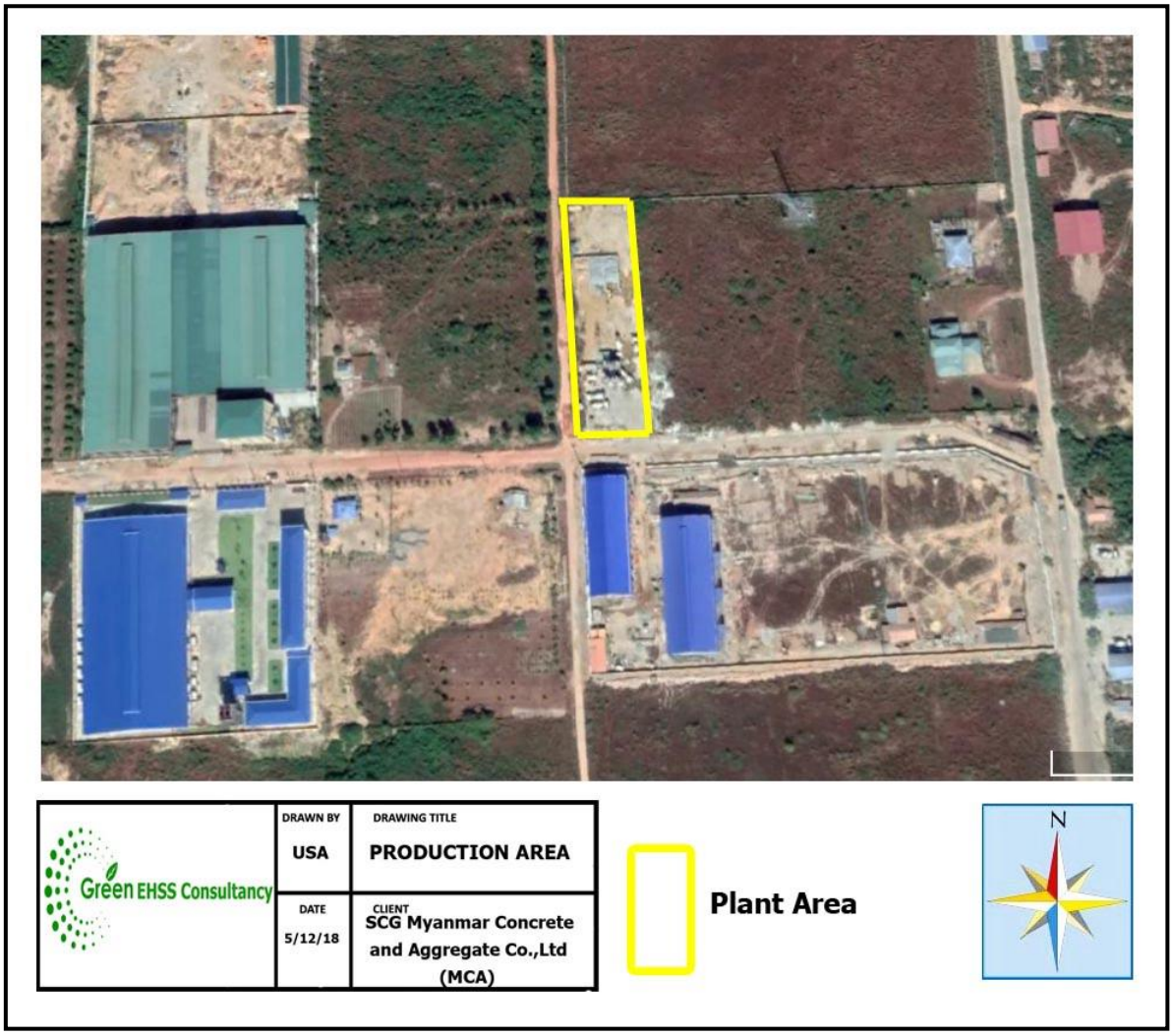
SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant ၏ ပတ်ဝန်းကျင် စီမံခန့် ခွဲမှုအစီအစဉ် ကို Green Environmental, Health, Safety & Social Consultancy Company Limited မှ ရေးဆွဲပေးပါသည်။

ပဲခူးတိုင်းဒေသကြီး ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာနမှ SCG Myanmar Concrete and Aggregate Company Limited (MCA) အား ပတ်ဝန်းကျင် စီမံခန့် ခွဲမှုအစီအစဉ် (EMP) ကို တင်ပြရန် ညွှန်ကြားသည့် အတွက် SCG Myanmar Concrete and Aggregate Company Limited (MCA) သည် ပတ်ဝန်းကျင် စီမံခန့် ခွဲမှုအစီအစဉ် ကို ပဲခူးတိုင်းဒေသကြီး ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာနသို့ တင်ပြရန် လိုအပ်ပါသည်။

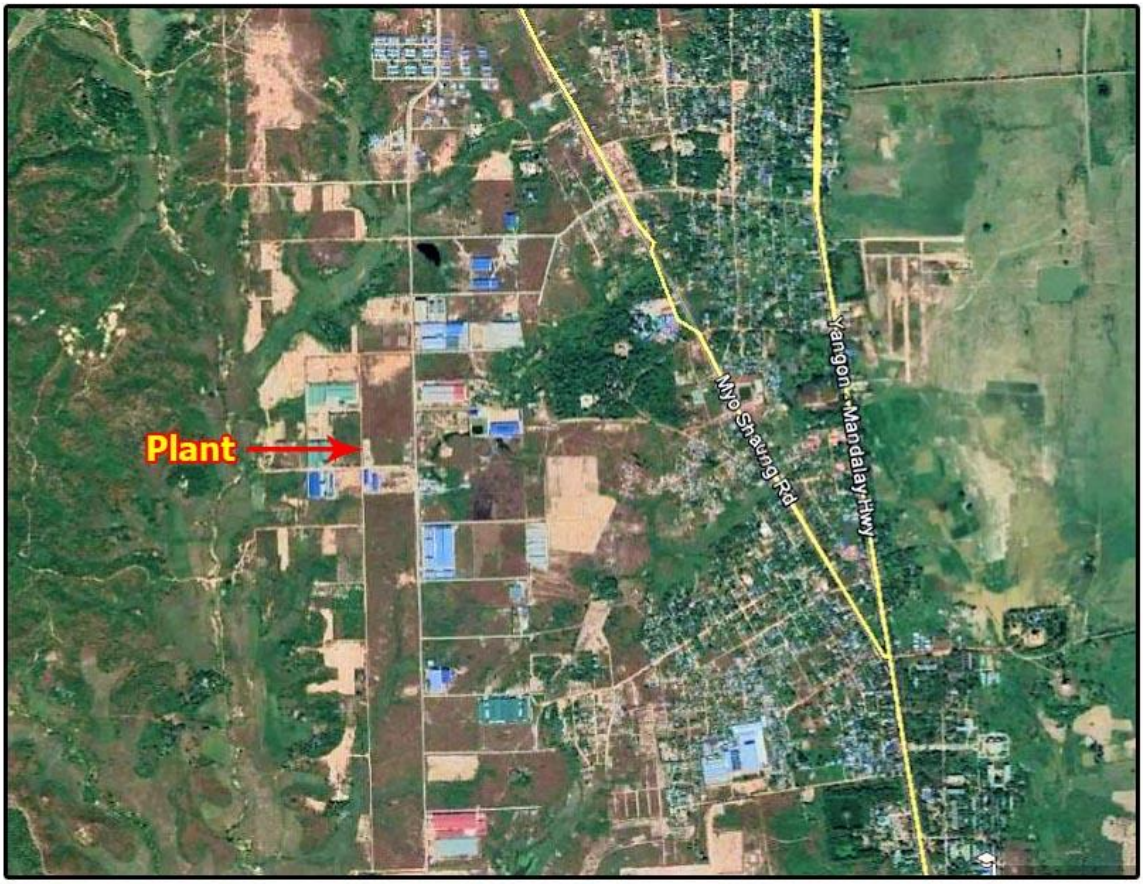
1.2. စီမံကိန်းတည်နေရာ

SCG Myanmar Concrete and Aggregate Company Limited (MCA) ၏ ပဲခူးကွန်ကရစ်ဖျော်စက်ရုံသည် အကွက်အမှတ် အကွက်အမှတ် (၃၉/ဃ)၊ ဥဿ (၉)ရပ်ကွက်၊ ညောင်အင်းရွာ၊ အထူးစက်မှုဇုန်(၁)၊ ပဲခူး မြို့နယ်၊ ပဲခူးတိုင်းဒေသကြီးတွင် တည်ရှိပါသည်။ မြောက်လတ္တီကျူ 17° 16’ 49.96” N နှင့် အရှေ့လောင်ဂျီကျူ 96° 27” 0.82” E တွင် တည်ရှိပါသည်။ စက်ရုံမြေအကျယ်အဝန်းမှာ ၀.၇၅ ဧက ကျယ်ဝန်းပါသည်။

ရင်းနှီးမြုပ်နှံမှု အမျိုးအစားမှာ ပြည်တွင်းနှင့် နိုင်ငံခြားဖက်စပ် ရင်းနှီးမြုပ်နှံမှုဖြစ်ပါသည်။ ရင်းနှီးမြုပ်နှံရခြင်း၏ ရည်ရွယ်ချက်မှာ တည်ဆောက်ရေးလုပ်ငန်းများကို ကွန်ကရစ်များကို အသင့်ဖျော်ပေးပြီး တည်ဆောက်ရေးလုပ်ငန်းခွင်ရှိရာသို့ လိုက်လံပို့ဆောင်ရန် ဖြစ်ပါသည်။



ကုန်ထုတ်လုပ်သည့်ဧရိယာ



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	DATE: 5/12/18	CLIENT: SCG Myanmar Concrete and Aggregate Co.,Ltd (MCA)

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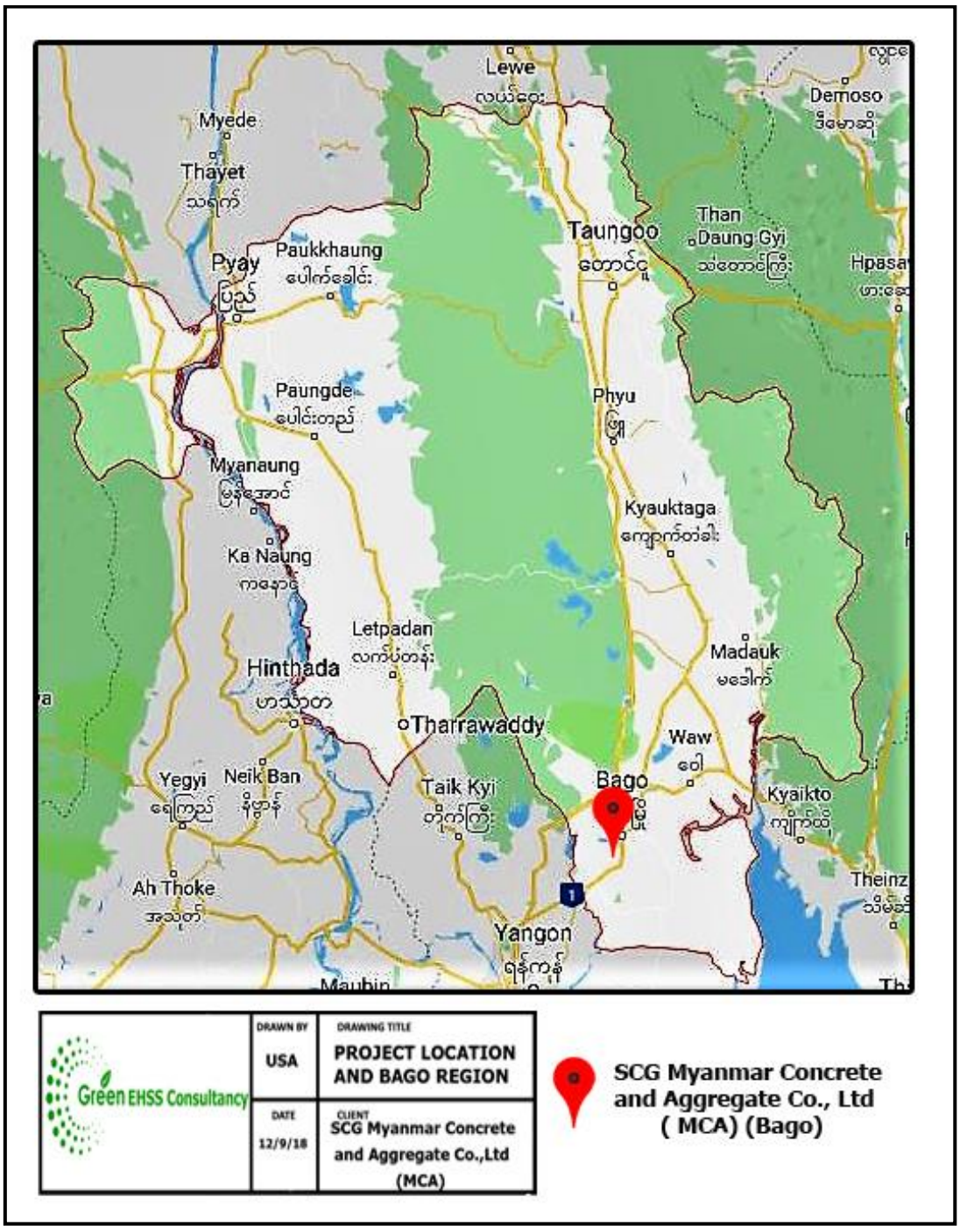
စက်ရုံတည်နေရာပြပုံ



ပဲခူးတိုင်းဒေသကြီးနှင့်စက်ရုံတည်နေရာပြပုံ

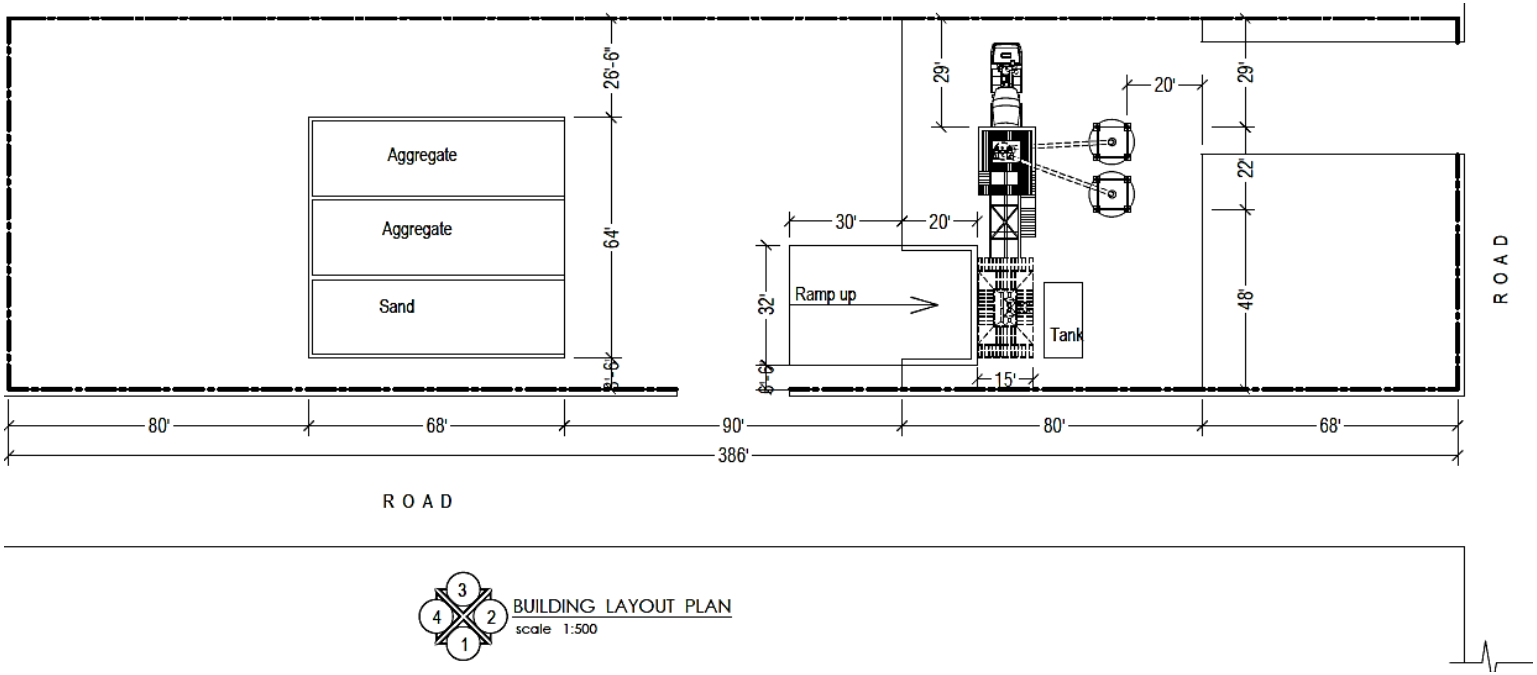
2. ဥပဒေကြောင်းဆိုင်ရာလိုအပ်ချက်

(EMP) အဖွဲ့သည် SCG Myanmar Concrete and Aggregate Company Limited (MCA) ၏ စက်ရုံမှ ဥပဒေဆိုင်ရာ လိုက်နာရန် လိုအပ်ချက်များပါ အောက်ဖော်ပြပါ အချက်များအပေါ် လိုက်နာမှုရှိစေရန် သေချာစွာ စောင့်ကြည့် လေ့လာမှုပြုထားပါသည်။

- သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဥပဒေ (၂၀၂၁) နှင့် စည်းမျဉ်းဥပဒေ များ (၂၀၀၄)
- မြန်မာရင်းနှီးမြှုပ်နှံမှုဥပဒေ
- အနည်းဆုံးလုပ်ခလစာဥပဒေ (မတ် ၂၀၁၃)
- မြန်မာ့အာမခံဥပဒေ (၁၉၉၃)
- လူမှုဖူလုံရေး ဥပဒေ (၂၀၁၂)
- စက်ရုံများအက်ဥပဒေ (၁၉၅၁)
- အလုပ်သမား နစ်နာကြေးအက်ဥပဒေ (၁၉၂၃)
- ပြည်သူ့ကျန်းမာရေးဥပဒေ
- မြေအောက်ရေအက်ဥပဒေ (၁၉၃၀)
- မြို့တော်ဖွံ့ဖြိုးရေး ဥပဒေနှင့် စည်းမျဉ်းဥပဒေများ
- ရေစွမ်းအား အရင်းအမြစ်ဥပဒေ (၁၉၇၂)

3. စီမံကိန်းအကြောင်းဖော်ပြချက်

3.1. စက်ရုံအပြင်အဆင်ပုံစံ



စက်ရုံအနေအထားအပြင်အဆင်

3.2. တစ်နှစ်ကုန်ကြမ်းလိုအပ်ချက်

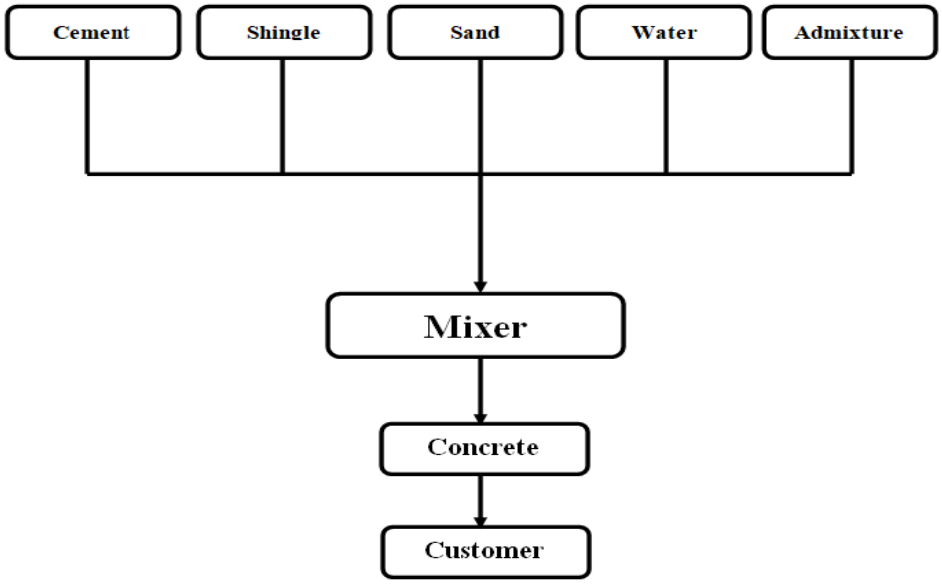
အဓိကလိုအပ်သော ကုန်ကြမ်းပစ္စည်းများကို အောက်ပါအတိုင်းဖော်ပြ ထားပါသည်။

တစ်နှစ်ကုန်ကြမ်းလိုအပ်ချက်များ

အမှတ်စဉ်	အမျိုးအစား	ယူနစ်	ခန့်မှန်းစာရင်း
၁	Cement	တစ်နှစ်	4479.53
၂	Admixture(Chemical)	တစ်နှစ်	25812.92
၃	Rock	တစ်နှစ်	14549.46
၄	Sand	တစ်နှစ်	10254.768

3.3. ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်

စက်ရုံလုပ်ငန်းခွင်တွင် ကွန်ကရစ်များဖျော်စပ်ပြီးနောက် mixer trucks ဖြင့် ဆောက်လုပ်ရေးလုပ်ငန်း ခွင် သို့ပို့ ဆောင်ပါသည်။ ထုတ်လုပ်ခြင်းလုပ်ငန်းအဆင့်ဆင့်မှာ အောက်ပါ အတိုင်း ဖြစ်ပါသည်။



ကုန်ထုတ်လုပ်မှုအဆင့်ဆင့်

3.4. လူစွမ်းအားအရင်းအမြစ်လိုအပ်ချက်

စက်ရုံလည်ပတ်မှုသည် ပုံမှန်အားဖြင့် တစ်နှစ်လျင် ၃၁၂ ရက် ဖြစ်ပါသည်။

၂၀၁၈ ခုနှစ်၊ ဒီဇင်ဘာ ၁ရက် နေ့ရှိဝန်ထမ်းအင်အားဇယား

စဉ်	အမျိုးအစား	ကျား	မ	စုစုပေါင်း
၁	ပြည်တွင်း	၅	-	၅

3.5. ထုတ်ကုန်အမျိုးအစား

အဓိက ထုတ်ကုန်မှာ အသင့်ဖျော်ကွန်ကရစ် များဖြစ်ပြီး တစ်နှစ်လျှင် ၁၂၅၇၉ ကုဗမီတာ ထွက်ရှိပါသည်။ ကွန်ကရစ်များကို mixer truck ဖြင့် ဒေသအတွင်းရှိ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်များသို့ ပို့ဆောင်ပါသည်။

အသင့်ဖျော်ကွန်ကရစ်များ

ထုတ်ကုန်ဓာတ်ပုံများ

3.6. ရေလိုအပ်ချက်

စက်ရုံ ၏ ထုတ်လုပ်မှု အတွက် အသုံးပြုသော ရေ ကို စက်ရုံ ရှိ အဝီစီ တွင်းမှ ရရှိပါသည်။ ခန့် မှန်း ရေ လိုအပ်ချက် မှာ တစ်နေ့ လျှင် ၂၀၀ ဂါလံ နှင့် တစ်နှစ်လျှင် ၇၂၀၀၀ ဂါလံ ဖြစ်ပါသည် ။

3.7. မီး သုံးစွဲ မှု

စက်ရုံ သည် ၂ ၀၀ KVA မီးစက် ရှိပါသည် ။ လစဉ် လျှပ်စစ်မီး လိုအပ်ချက် မှာ ယူနစ် ၁၀၀၀၀၀ ဖြစ်ပါသည် ။ တစ်နှစ် ဒီဇယ် လိုအပ်ချက် ၅၀၀၀ ဂါလံ ဖြစ်ပါသည် ။

4. ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံ အရည်အသွေးများ

4.1. စက်ရုံ ပတ်ဝန်းကျင် အကြမ်းဖျင်း ဖော်ပြချက်

စက်ရုံ သည် ပဲခူး မြို့နယ် အတွင်း အထူး စက်မှုဇုန် . တွင် တည်ရှိသော ကြောင့် ပတ်ဝန်းကျင် မြေအသုံးချ မှုမှာ စက်မှုဇုန် မြေဖြစ်ပြီး Bago RMC Batching Plant ၏ ဘေးပတ်လည်တွင် အခြားသော စက်မှု လုပ်ငန်းများ ၊ စက်ရုံများ ကျဲပါးစွာ တည်ရှိပါသည်။ စက်ရုံ ၏ ဘေးပတ်ဝန်းကျင် တို့တွင် အောက်ပါ အတိုင်း တွေ့ ရှိ ရပါသည် ။

အရှေ့	: မြေ ကွက် (စက်မှုဇုန် မြေ)
အနောက်	: မြေ ကွက် (စက်မှုဇုန် မြေ)
တောင်	: လမ်း , မြေ ကွက် (စက်မှုဇုန် မြေ)
မြောက်	: မြေ ကွက် (စက်မှုဇုန် မြေ)

စက်မှုဇုန်နှင့် စက်ရုံတည်နေရာပြပုံ

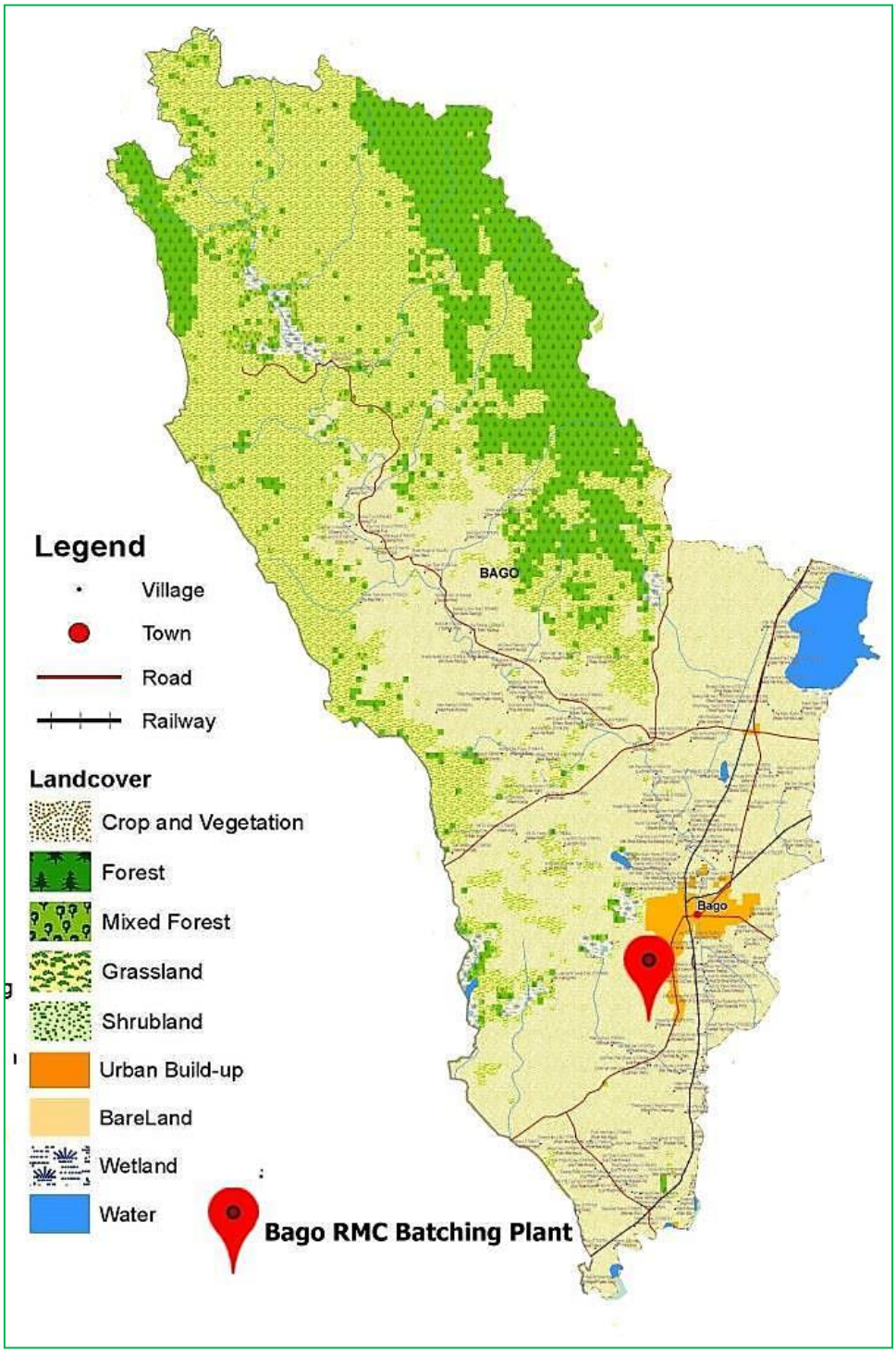
4.2. ရုပ်ပိုင်းဆိုင်ရာ ပတ်ဝန်းကျင်

ပဲခူး မြို့နယ် ၏ ရာသီဥတုသည် အပူပိုင်း ရာသီဥတု ဖြစ်ပါသည် ။ အပူဆုံး ရက် သည် ဧပြီလ ၁၁ ရက် ဖြစ်ပြီး အ မြင့်ဆုံးအပူချိန် ၁၀၀ ဒီဂရီဖာရင်ဟိုက် နှင့် အနိမ့်ဆုံး အပူချိန် ၇၈ ဒီဂရီဖာရင်ဟိုက် တို့ဖြစ်ပါသည်။ အအေးဆုံးရက် သည် ဇန်နဝါရီလ ၉ ရက် ဖြစ်ပြီး အမြင့်ဆုံး အပူချိန် ၈၉ ဒီဂရီ ဖာရင်ဟိုက် နှင့် အနိ မ့်ဆုံး အပူချိန် ၆၄ ဒီဂရီ ဖာရင်ဟိုက် တို့ဖြစ်ပါသည်။ မိုးအများဆုံး ရွာသွန်း သည့် လ မှာ ဩဂုတ်လ ဖြစ်ပြီး ပျမ်း ပိုး ရေချိန် သည် ၇.၉ လက်မ ဖြစ်ပါသည် ။

စက်ရုံပတ်ဝန်းကျင် မြေမျက်နှာပြင် သည် အနိမ့်အမြင့် ကွာခြားချက်များ ရှိပြီး ခန့်မှန်းချေအား ဖြင့် အမြင့် ပေ ၉၅ ပေ မှ ၁၂၀ ပေ အထိ မြင့်ပါသည် ။ SCG Myanmar Concrete and Aggregate Company Limited (MCA) - Bago Batching Plant သည် အထူးဧနု (၁) အတွင်း တည်ရှိပြီး ပတ်ဝန်းကျင်ရှိ မြေအသုံးချ မှုမှာ စက်မှုဧနု မြေအသုံးချခြင်း ဖြစ်ပြီး ဒေသအတွင်း စက်ရုံများ ကျဲပါးစွာ ပြန့်ကျဲ တည်ရှိနေပါသည် ။ FAO / UNESCO Soil Classification အ ရ စက်ရုံပတ်ဝန်းကျင်ရှိ မြေဆီလွှာ မြေအမျိုးအစား မှာ Dystric Nitosols ဖြစ်ပါသည် ။

4.3. လူမှုစီးပွား ဆိုင်ရာပတ်ဝန်းကျင်

SCG Myanmar Concrete and Aggregate Company Limited (MCA) - Bago RMC Site သည် ပဲခူး မြို့နယ် အတွင်းတည်ရှိပါသည်။ ပဲခူးမြို့နယ်သည် ၁၁၂၁.၆၆ စတုရန်းမိုင် ကျယ်ဝန်းပါသည်။ ပဲခူး မြို့နယ် သည် ပဲခူးမြို့ ၊ ဘုရားကြီးမြို့ ၊ အင်းတကော်မြို့ တို့ ရှိပြီး ရပ်ကွက် ၄၀ ခု ၊ ကျေးရွာပေါင်း ၂၁၁ ရွာ ပါဝင် သော ကျေးရွာအုပ်စု ၆၅ ခု တို့ ဖြင့် ဖွဲ့စည်းထားပါသည်။ မြို့နယ် ၏ စုစုပေါင်း လူဦးရေမှာ ၄၃၄၈၂၂ ယောက် (ကျား ဦးရေ ၂၀၇၀၂၉ ယောက်၊ မဦးရေ ၂၂၇၇၉၃ ယောက်) ရှိပြီး အိမ်ခြေ ၁၀၅၂၈၀ နှင့် မိသားစု ၁၁၅၄၄၀ ဖြစ်ပါသည်။ အဓိက နေထိုင်သူများ မှ ဗမာလူမျိုး ၊ ဗုဒ္ဓဘာသာ တို့ ဖြစ်ပါသည်။ အဓိက စိုက်ပျိုးသီးနှံများ မှာ စပါး၊ မတ်ပဲ၊ ပဲတီစိမ်း ၊ နှမ်း တို့ ဖြစ်ပါသည် ။ မြို့နယ်အတွင်း ဥယျာဉ်ခြံ လုပ်ငန်းများလည်း လုပ်ကိုင်ပါသည်။



စက်ရုံတည်နေရာ နှင့် ပဲခူးမြို့နယ်ပြပုံ

5. ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက် နိုင်မှု အကဲဖြတ် ချက်များ

ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများကို အကဲဖြတ်မှုများ အရစက်ရုံသည် သိသာသော သက်ရောက်မှုများ မရှိဘဲ ရေထု ညစ်ညမ်းမှု နှင့် အသံဆူညံမှုများ ၏ သက်ရောက်မှု ကိုအနည်းငယ်သာ သက်ရောက်သည်ဟု မှတ်ယူ နိုင်ပါသည် ။ အဘယ်ကြောင့် ဆိုသော် သေးငယ်သော စကေး အတိုင်းအတာ (small scales at site level) ခြင်း ကြောင့် ဖြစ်ပါသည် ။

သက်ရောက်မှု အကဲဖြတ် ဆန်းစစ်ချက်အကျဉ်းချုပ်

ဆောင်ရွက်မှု	ပတ်ဝန်းကျင် အပေါ် ထိခိုက်မှု
ညစ်ညမ်းမှု များ	
- မော်တော်ယဉ်များသွားလာ မှု - ကုန်ကြမ်းပစ္စည်းများ သယ်ယူ ပို့ဆောင် ခြင်း ၊ ကုန်တင် ကုန် ချ ခြင်း - အ ရန် မီးစက်မှ အမှုန် နှင့် အ ခိုး အငွေ့ထုတ်လွှတ် ခြင်း - ကုန်ထုတ်လုပ်မှု ဆောင်ရွက် မှု ဥပမာ Mixer - အခြေခံ အထောက်အပံ့ ပစ္စည်းများ အသုံးပြုခြင်း	လေထု ညစ်ညမ်း ခြင်း
- ကုန် ထုတ်လုပ်မှု လုပ်ငန်း စဉ် များ ဥပမာ - (mixing , Weighing , etc) -Forklift များ မောင်းနှင် ခြင်း - အ ရန် မီးစက် မှ ဆူညံ သံ ထွက်ရှိ ခြင်း - ကွန်ကရစ် များ ပို့ဆောင်သည့် ယာဉ်များ သွားလာခြင်း	ဆူညံ သံ နှင့် တုန် ခါမှု
- မီးဖိုဆောင် သုံး စွန့်ပစ် အရည် - စက်ရုံ စွန် ပစ် ရေ ဆိုး - သန့် စင် ခန်း နှင့် မိလ္လာ စွန့်ပစ် အရည်	ရေ ထု ညစ်ညမ်း ခြင်း
ကုန် ထုတ်လုပ်မှု လုပ်ငန်း စဉ် မှ ထွက်သော (Cement waste, concrete waste) -ရုံးခန်းမှထွက်သောစွန့်ပစ်အမှိုက်များ	စွ န့် ပစ် အ စိုင် အခဲ
သဘာဝပတ်ဝန်းကျင်	
- မြေနေရာ ရှင်းလင်း ခြင်း နှင့် စက်ရုံ တည်ဆောက် မှုများ	အပင် အကောင် နှင့် ဇီဝ ပတ်ဝန်းကျင်

လူမှုဝန်းကျင်	
စက်ရုံ လည်ပတ်ရန် ဝ န် ထမ်း များ ခန့် အပ် ခြင်း	လူမှုရေး မြင့်တက် ခြင်း
ကျမ်းမာရေး နှင့် ဘေးအန္တရာယ်	
- လူမှုရေး မြင့်တက် ခြင်း - စက်ရုံ ၏ ကုန် ထုတ်လုပ်မှု ဆောင်ရွက်ချက်များ	-ဒေသခံပြည်သူများ အပေါ် ကျမ်းမာရေး ဆိုင်ရာ ဆိုးကျိုး သက်ရောက်မှု များ -မတော်တဆ ဖြစ် မှုများ

6. အများပြည်သူ နှင့် တိုင်ပင် ဆွေးနွေးခြင်း နှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်း

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် Environmental Management Plans (EMP) ကို ပြင်ဆင် ရေးဆွဲရာတွင် အကြံပေးအဖွဲ့ Green EHSS သည် SCG Myanmar Concrete and Aggregate Company Limited (MCA) Bago RMC Batching Plant စက်ရုံ ရှိ တာဝန်ရှိသူများ၏ ကူညီထောက်ပံ့မှုများဖြင့် ဒေသခံများ နှင့် တိုင်ပင်ဆွေးနွေးခြင်း များကို ပြုလုပ်ခဲ့ပါသည်။ စီမံကိန်း၏ နောက်ခံ အကြောင်းအရာများ နှင့် ဒေသခံများ၏ သဘောထားအမြင်များကို ရရှိရန် ကွင်းဆင်းခြင်း လုပ်ငန်းများကို စတင်ပြုလုပ်နိုင်ရန် ရည်ရွယ်၍ အကြံပေးအဖွဲ့သည် ၂၀၁၈ ခုနှစ် ၊ ဒီဇင်ဘာလတွင် စက်ရုံ အနီးဆုံး ရှိ ပဲခူး မြို့နယ် ၊ ဥသ(၈)ရပ်ကွက် ၊ အုပ်ချုပ်ရေးမှူး နှင့် မျက်နှာဆုံညီ ဆွေးနွေးခြင်း (face to face meeting) ကို ပြုလုပ်ခဲ့ပါသည်။

အကြံပေးအဖွဲ့ သည် ၂၀၁၈ ခုနှစ်၊ ဒီဇင်ဘာလ ရ ရက်နေ့တွင် အများပြည်သူ နှင့် တိုင်ပင်ဆွေးနွေးပွဲ အစည်းအဝေးကို ပြုလုပ်ခဲ့ပါသည်။ ထိုအစည်းအဝေးကို SCG Myanmar Concrete and Aggregate Company Limited (MCA) Bago RMC Batching Plant စက်ရုံမှ တာဝန်ရှိသူများ လည်း တက်ရောက်ခဲ့ပါသည်။ အဆိုပါ အစည်းအဝေးကို ပဲခူး မြို့နယ်၊ ဥသ(၈) ရ ပ် ကွက်၊ အုပ်ချုပ်ရေးမှူးရုံး တွင် ကျင်းပခဲ့ပြီး ဒေသခံ ၉ ဦး မှ အစည်းအဝေး တက်ရောက် ခဲ့ပါသည်။

7. သဘာဝပတ်ဝန်းကျင် နှင့် လူမှု ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်

သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုပတ်ဝန်းကျင်များကို ဆန်းစစ်မှုများ အရ ဖြစ်ပေါ်လာနိုင်သည့် သက်ရောက်မှု များကို လျော့ပါးအောင် ပြုလုပ်နိုင်ရန်အတွက် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် (ENVIRONMENTAL MANAGEMENT PLANS) ကို ရေးဆွဲ ပြုစု ပါသည် ။ EMP ၏အဓိက စီမံခန့်ခွဲမှု အစီအစဉ် အကျဉ်း ချုပ်မှာ အောက်ပါအတိုင်း ဖြစ်ပါသည်။

သဘာဝပတ်ဝန်းကျင် နှင့် လူမှု ပတ်ဝန်းကျင် စီမံ ခန့် ခွဲ မှု အစီအစဉ် အကျဉ်း ချုပ်

စွ န့် ပစ် ရည် စီမံ ခန့် ခွဲရေး အစီအစဉ်များ နှင့် ဘတ်ဂျက်			
လုပ်ဆောင် ချက် ပြ အညွှန်း (များ)	• စက်ရုံ မြေအောက်ရေ အရည်အသွေးကို စောင့် ကြည့် တိုင်း တာ ရန် • စွ န့် ပစ် ရေ တွင် BOD , COD , TSS ပြင်းအား များ တိုင်း တာ ရန်		
ဘတ်ဂျက်	**အမေ ရိကန် ဒေါ်လာ (၃၀၀၀)**	**တာဝန်ဝတ္တရား**	**အချိန်**
ထိန်းချုပ် မှု (များ)	• စွန့်ပစ်ရေဆိုးများ ထိန်းသိမ်းထား နိုင်သည့် အနည် ထိုင်ကန်များ ဆောက်လုပ်ရန် • ရေဆေးရာတွင် ရေပမာဏ ကို လျော့ချသုံးစွဲရန် • Concrete agitator mixers and chutes များကို လမ်းများပေါ်တွင် ဆေးကြောခြင်း မပြုရန် • ရေနှင့်သန့်ရှင်းရေး ဌာန သို့ ဆက်သွယ်ပြီးမိလ္လာ ကန်မှစွန့်ထုတ် မှု များကို ပုံမှန် ဆောင်ရွက်ရန် • ရေကိုချွေတာ သုံးစွဲနိုင်ရေး စက်ရုံဝန်ထမ်း များ အား အသိပညာပေးရန်	စက်ရုံ မန်နေဂျာ ကြီးကြပ်သူ HSE ကြီးကြပ်သူ	လုပ်ငန်း လုပ် ဆောင် နေ စဉ် ကာလ တစ် လျှောက် လုံး
လေထုတ်လွှတ်မှု နှင့် အမှုန်အမွှား စီမံခန့်ခွဲသည့် အစီအစဉ် နှင့် ဘတ်ဂျတ်			
လုပ်ဆောင်ချက် ပြ အညွှန်း(များ)	• ဖုန်သိပ်သည်း သည့် အဆင့် ၊ အမှုန်အမွှား ၊ PM10 နှင့် PM2.5 , CO2 , C9 , 02 , . NOX		
ဘတ်ဂျက်	**အမေရိကန်ဒေါ်လာ (၁၀၀၀)**	**တာဝန်ဝတ္တရား**	**အချိန်**
ထိန်းချုပ်မှု (များ)	• သဲ၊ ကျောက်များကို ဇရိယာအနည်းငယ်အတွင်း သာ စု ပုံ သိုလှောင် ရန် • ဘိလပ်မြေကို စိုင်လို(silo) သို့ ဖြည့်တင်း ရာ တွင် မြေမှုန်များ လွင့်စင်ခြင်း မရှိစေရေး သေ ချာ စေရန် • ခြောက်သွေ့ ရာသီ တွင် စက်ရုံဝင်း အတွင်း နှင့် မြေသာလမ်း ပေါ်တွင် ရေဖြန်းခြင်း လုပ်ဆောင် ရန် • ဓါတ်ငွေ့ ထုတ်လွှတ်မှု လျော့ချ ရန်အတွက် ယာဉ် များ၊ စက်ယန္တရားများ အားလုံးကို ပုံမှန် စစ်ဆေး	စက်ရုံ မန်နေဂျာ ဆိုဒ်ကြီး ကြ ပ် သူ HSE ကြီးကြပ် သူ	လုပ်ငန်းလုပ် ဆောင်နေ စဉ် ကာ လ တစ် လျှောက်လုံး

	ခြင်း နှင့် ထိန်းသိမ်း ပြ ပြုပြင်ခြင်း ပြုလုပ်ရန် • ယာဉ်များကို အရှိန်ထိန်းသိမ်း မောင်းနှင်ရန်		
ဆူညံမှု စီမံခန့် ခွဲရေး အစီအစဉ်များ နှင့် ဘက်ဂျတ်			
လုပ်ဆောင်ချက်ပြ အညွှန်း(များ)	• ဘေးချင်းကပ် လူနေအိမ်ယာ၊ စီးပွားရေး အဆောက်အဦး (သို့) ရပ်ရွာ လူထုမှ ဆူညံမှု နှင့် ပတ်သက်သည့် စောဒကတက် တိုင်းတန်းမှု မရှိခြင်း ။ • လက်ခံ နိုင်သော ဆူညံ မှု အဆင့် (dBA)		
ဘတ်ဂျက်	အမေရိကန်ဒေါ်လာ (၇၀၀)	တာဝန်ဝတ္တရား	အချိန်
ထိန်းချုပ်မှု (များ)	• ဆူညံမှုများကို ကန့်သတ်ရန်အတွက် ကိရိယာများ အားလုံး (equipment) ကို သင့်လျော်စွာ ထိန်းသိမ်း ပြုပြင်ခြင်းနှင့် အိတ်ဇော နှင့် အသံတိတ် စနစ်များ (exhaust and muffler systems) တပ်ဆင်ထား ရန် လိုအပ်ပါသည် ။ • သေးငယ်သော သဲ၊ ကျောက်များကို ဦးစွာ ချိန်တွယ် ပြီးမှ ပိုမို ကြီးမားသော ကျောက်များကို ချိန် ကွယ် ရန် • ဆူညံသံမြင့်မားသော လုပ်ငန်းခွင် ရှိ အလုပ်သမား များကို နားကာကိရိယာများ လုံလောက်စွာ ပံ့ပိုး ပေးရန်	စက်ရုံ မန်နေဂျာ ကြီးကြပ်သူ HSE ကြီးကြပ်သူ	လုပ်ငန်းလုပ်ဆောင်နေ စဉ် ကာလ တစ်လျှောက်လုံး
စွ နှ် ပစ် ပစ္စည်း စီမံ ခန့် ခွဲ သည့် အစီအစဉ်များ နှင့် ဘတ်ဂျက်			
လုပ်ဆောင်ချက်ပြ အညွှန်း(များ)	• ဓါတု စွ နှ် ပစ် ပစ္စည်းများ ကို သင့် လျော် အောင် စွ နှ် ပစ် ရမည် ။ • ရီ ဆိုင်ကယ် ပြန်လည် လုပ်ဆောင် နိုင် သည့် စွ နှ် ပစ် ပစ္စည်း အားလုံး ကို ရီ ဆိုင်ကယ် လုပ် ဆောင် ခြင်း နှင့် ပြန်လည် အသုံးပြုခြင်း ပြုလုပ်ရန်		
ဘတ်ဂျက်	**အမေရိကန်ဒေါ်လာ (၇၀၀)**	**တာဝန်ဝတ္တရား**	**အချိန်**
ထိန်းချုပ်မှု (များ)	• စွန့်ပစ်ပစ္စည်းများကို အမျိုးအစား အလိုက် ခွဲခြား ထားပြီး လုံလောက်စွာ ထည့်သွင်းထား နိုင် သော စွန့်ပစ် ပစ္စည်းပုံးများကို ပံ့ပိုးပေးရန် • စွန့်ပစ်ပစ္စည်း ပုံးများမှ ပြည့်လျှံခြင်း (သို့) လုပ်ငန်းခွင် အတွင်း စုပုံလာခြင်းကို ခွင့်မပြုရန် နှင့် စွန့်ပစ်ပစ္စည်းများကို ပုံမှန် စွန့်ပစ်ရန်	စက်ရုံ မန်နေဂျာ ကြီးကြပ်သူ	လုပ်ငန်းလုပ်ဆောင်နေ စဉ် ကာ လ တစ်လျှောက်လုံး

	• စွန့်ပစ်ပစ္စည်း မှ ပြန်လည် အသုံးပြု၍ ရနိုင်သည့် အရာများ ကို ခွဲထုတ် ရန် • စွန့်ပစ်ပစ္စည်းလျော့ချနိုင်ရေးအတွက် ကုန်ကြမ်းများကို သိုလှောင်ရာတွင် သေချာစွာဂရုစိုက် ဆောင်ရွက်ရန် • ကွန်ကရစ် အ မာ များ နှင့် returned concrete များကို မြေဖို့ခြင်းတွင် ပြန်လည်အသုံးပြု ၍ ရနိုင် ပါသည်။ • Concrete waste များကို ကွန်ကရစ် အရည်အသွေး စမ်းသပ်သည့် အတုံးများ ပြုလုပ်ရာတွင်ပြန်လည် အသုံးပြုရန် • ဘေးအန္တရာယ် ဖြစ်စေသော စွန့်ပစ် ပစ္စည်းများကို မြေသားအတွင်းစိမ့်ဝင်ခြင်း (သို့) မြေအောက် ရေ အတွင်းစိမ့်ဝင်ခြင်း၊ လေတိုက်စား သယ်ဆောင်ခြင်း မရှိစေရန် ကောင်းမွန်သော ထားသိုရန်ပစ္စည်းအ တွင်း ထားရှိရမည် • ထိန်းချုပ်ထားသည့် စွန့်ပစ်ပစ္စည်းများ ကို သိမ်းစည်းရာတွင် လိုင်စင်ရှိ ကန်ထရိုက်တာ များသာ အသုံးပြု ခြင်းသေချာစေရန် • စက်ရုံ ဝန်ထမ်းများအား ဘေးအန္တရာယ် ဖြစ်စေသော စွန့်ပစ္စည်းများ သိုလှောင်ခြင်း၊ ကိုင်တွယ်ခြင်းများ နှင့် ပက်သက်၍ အသိပညာ ပေးရန်	HSEကြီးကြပ်သူ	
ယာဉ်ကြောကြပ်မှု စီမံခန့်ခွဲရေးအစီအစဉ်များ နှင့် ဘတ်ဂျက်			
လုပ်ဆောင်ချက်ပြ အညွှန်း(များ)	• ယာဉ်ကြောကြပ်မှု နှင့် ဆိုင်သည့် အများပြည်သူ တိုင်တန်းမှု • ယာဉ်မတော်တဆမှုများ		
ဘတ်ဂျက်	**အမေရိကန်ဒေါ်လာ (၁၀၀၀)**	**တာဝန်ဝတ္တရား**	**အချိန်**
ထိန်းချုပ်မှု (များ)	• ယာဉ်အသွားအလာများသည့် ယာဉ်ကြောကြပ်ချိန်ပြင်ပတွင် ပို့ဆောင်ရေးကားများ ကို အချိန်ဇယား ဆွဲပေးရန် • စီမံကိန်းဇရိယာအတွင်းနှင့် အနီးဝန်းကျင် တွင် ယာဉ်ကြောဆိုင်ရာ သတိပေးဆိုင်းဘုတ်များ	စက်ရုံ မန်နေဂျာ ကြီးကြပ်သူ	လုပ်ငန်းလုပ်ဆောင်နေ စဉ်ကာ လ တစ်လျှောက်လုံး

	ပံ့ပိုးပေးရန် နှင့် အရှိန်နှုန်းကို ကန့်သတ် ထိန်းချုပ်ရန် • Trucks နှင့် အခြားယာဉ်များအား ကောင်းမွန်စွာ အသုံးပြုနိုင်ရန် ဆောင်ရွက်ထားရန် • ဖြစ်နိုင်လျှင် များကို အနီးအနားရှိ လူနေအိမ်များမှ ဝေးရာ နေရာတွင်သာထားရှိရန် • စက်ရုံသည် ဒေသတွင်းအနီးအနားရှိ ကုန်ကြမ်းကို အသုံးပြုရန် • ရပ်ကွက်မှ သတ်မှတ်ထားသော ကားလမ်းကြောင်း ဆိုင်ရာ များကို လိုက်နာရန် • ယာဉ်မောင်းများ ဆိုင်ရာ အပြုအမူများ အသိပညာများ၊ သင်တန်းများ ပေးရန်	HSEကြီးကြပ်သူ	
လုပ်ငန်းခွင် ကျမ်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရေးအစီအစဉ်			
လုပ်ဆောင်ချက် ပြအညွှန်း(များ)	• မတော်တဆဖြစ်သည့် စာရင်းများ		
ဘတ်ဂျက်	**အမေရိကန်ဒေါ်လာ (၁၀၀၀)**	**တာဝန်ဝတ္တရား**	**အချိန်**
ထိန်းချုပ်မှု (များ)	• ယာဉ်မောင်းများကို ယာဉ်ကို ထိန်းသိမ်း ပြုပြင်ခြင်း၊ သန့်ရှင်းရေးပြုလုပ်ခြင်းများ အပါအဝင် မှန်ကန်စွာ ယာဉ် ကိုင်တွယ် မောင်းနှင်ခြင်း ဆိုင်ရာ သင်တန်းများပြုလုပ်ပေးရန် • ဝန်ထမ်းသစ်များကို လုပ်ငန်းခွင် သို့ မဝင်မီ လုပ်ငန်းခွင် ကျမ်းကျင်မှု သင်တန်း ပြုလုပ်ပေးရန် • လိုအပ်သော ယာဉ်မောင်း လိုင်စင်ရှိရေး နှင့် ယာဉ်မောင်းနှင်မှု ကျမ်းကျင် မှ မှု ကို မြှ င့် တင်ပေးရန် • ယာဉ်မောင်းများဆိုင်ရာ အပြုအမူများ၊ အသိပညာများ ၊ သင်တန်းများ ပေးရန် • မီးသတ်ဆေးဗူး အပါအဝင် အထောက်အပံ့ပစ္စည်း များ ရှိရန် • ဝန်ထမ်းများအား လိုအပ်သော အကာအကွယ်ပ စ္စည်းများ ပေးအပ်ရန် • မီးသတ်သရုပ်ပြခြင်းကို အနည်းဆုံး တစ်နှစ်	စက်ရုံမန်နေဂျာ ကြီးကြပ်သူ HSEကြီးကြပ်သူ	လုပ်ငန်းလုပ်ဆောင်နေ စဉ်ကာ လ တစ်လျှောက်လုံး

	တစ်ကြိမ် ပြုလုပ်ရန် • လုပ်ငန်းခွင် စွမ်းရည် ဖွံ့ဖြိုးရေး သင်တန်းများ ပြုလုပ်ရန်		
ရပ်ရွာ ကျမ်းမာရေး နှင့် ဘေးအန္တ ရာယ် ကင်းရေး အစီအစဉ်			
လုပ်ဆောင်ချက် ပြ အညွှန်း(များ)	အများပြည်သူ တိုင်တန်း မှုများ		
ဘတ်ဂျက်	**အမေရိကန်ဒေါ်လာ (၇၀၀)**	**တာဝန်ဝတ္တရား**	**အချိန်**
ထိန်းချုပ်မှု (များ)	• ကွန်ကရစ် စွ နှ် ပစ် ပစ္စည်းများကို ပြန်လည် အ သုံး ပြု ခြင်း နှင့် ရီ ဆိုင်ကယ် ပြုလုပ်ခြင်း • ဓာတုဗေဒ ပစ္စည်းများကို သေချာစွာ သိုလှောင် ခြင်း • ယာဉ် အန္တရာယ် ကင်းရှင်းရေးမြှင့် တင်ရန် • ရပ်ကွက်မှ သတ်မှတ် ထားသော ကား လမ်းကြောင်း ဆိုင်ရာ များကို လိုက် နာ ရန် • ယာဉ် မောင်း များဆိုင်ရာ အပြုအမူ များ ၊ အသိပညာ များ ၊ သင်တန်းများ ပေးရန် • အရေးပေါ် ကယ်ဆယ် ရေးအဖွဲ့ အား ဖွဲ့စည်း ခြင်း • မီးသတ် လုံခြုံရေး စီမံချက် ရေးဆွဲခြင်း	စက်ရုံ မန်နေဂျာ ကြီးကြပ်သူ HSEကြီးကြပ် သူ	လုပ်ငန်းလုပ် ဆောင်နေ စဉ်ကာ လ တစ် လျှောက်လုံး

8. ပတ်ဝန်းကျင် စောင့် ကြပ် ကြည့် ရှု မှု အစီအစဉ်

လုပ်ငန်း လည်ပတ် ဆောင်ရွက်သည့် ကာလအတွက် ပတ်ဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ် ကို စောင့်ကြပ်ကြည့်ရှုမည့် အကြောင်းအရာ၊ စောင့်ကြပ်ကြည့်ရှုမည့် နေရာများ အပါအဝင် အောက်ပါ ဇယား အတိုင်း ဖော်ပြထားပါသည် ။

ပတ်ဝန်းကျင် စောင့် ကြပ် ကြည့် ရှ မှု အစီအစဉ် - စက်ရုံ လည်ပတ် သည့် ကာ လ

သက်ရောက်မှု အကြောင်းအရာ	စောင့် ကြပ် ကြည့် ရှု သည် နေရာ	အကြိမ် အ ရေ အတွက်	သင်တန်း ပေးခြင်း	ခန့် မှန်း ကုန်ကျ စရိတ် (USD) တစ်ကြိမ်	တာဝန်ရှိ အဖွဲ့အစည်း
လေထု ညစ်ညမ်း ခြင်း					
Standards စံနှုန်းများ	အမျိုးသား ထုတ် လွှတ် မှု ဆိုင်ရာ အရည်အသွေး - လေထု အတွင်း ထုတ် လွှတ် မှု Guideline				
Parameters ပါ ရာ မီတာ	SO2 , NO2 , CO , PM2.5 , PM10 , dusts and O3				
ဝ နံ း ကျင် လေထု	1. လုပ်ငန်းခွင်အတွင်း 2. စက်ရုံ ဝ င်း အတွင်း နှင့် နယ်နိမိတ် ခြံစည်းရိုး	တစ်နှစ် နှစ်ကြိမ်	ပြင်ပ အဖွဲ့ အစည်း ဖြင့် လေ့ ကျင့် သင် ကြား ခြင်း	၅၀၀	HSE ကြီးကြပ် သူ ပြင်ပ တ တိ ယ အဖွဲ့အစည်း
ဆူညံသံ					
Standards စံနှုန်းများ	အမျိုးသား ထုတ် လွှတ် မှု ဆိုင်ရာ အရည်အသွေး				
Parameters ပါ ရာ မီတာ	ဆူညံ သံ အဆင့် (dB)				
အသံ ဆူညံ မှ dB (A)	1. လုပ်ငန်းခွင်အတွင်း 2. စက်ရုံ ဝ င်း အတွင်း နှင့် နယ်နိမိတ် ခြံစည်းရိုး	တစ်နှစ် နှစ်ကြိမ်	ဆူညံ သံ တိုင်း တာ မှု ကိရိယာ ဖြင့် တိုင် တာ ခြင်း	၂၀၀	HSE ကြီးကြပ် သူ ပြင်ပ တတိယ အဖွဲ့အစည်း

ရေ အရည်အ သွေး					
Standards စံနှုန်းများ	WHO ရေအရည်အသွေး guideline				
Parameters ပါရာ မီတာ	-pH , Colour , Turbidity , Hardness , Iron , Chloride , Cornductivity , Salinity , TSS , Dissolved Oxygen , Temperature - BOD , COD , pH , TSS				
ရေအရည်အသွေး စွန့်ပစ် ရေ	1. အဝီစိ ရေ 2- စွန့်ပစ်ရေ ကား ဆေး ရေ နေရာ	တစ် နှ စ် နှစ်ကြိမ်	ဓာတ်ခွဲခန်း ရလာဒ် များ စစ်ဆေး ခြင်း	၂၀၀	HSE ကြီးကြပ် သူ ပြင်ပ ဓာတ် ခွဲ ခန်း
ကျမ်းမာရေး နှင့် ဘေး အန္တ ရာယ် ကင်းရှင်းရေး					
Parameters ပါရာ မီတာ	မ တော် မ ဆ ဖြစ်ပွားမှု နှင့် ဖြစ်ရပ် ဖြစ်ပွားမှု စာရင်းအင်း				
ကျမ်းမာရေး နှင့် ဘေး အန္တ ရာယ် တိုင်း တာ မှုများ	- စက်ရုံ အတွင်း -မီးသတ် သရုပ်ပြ လေ့ ကျင့် ခြင်း	နေ့ စဉ် နှစ်စဉ်	HSE သင်တန်း HSE Supervisor သင်တန်း	၁၀၀၀ ၅၀၀	ဆိုဒ် ကြီးကြပ် သူ HSE ကြီးကြပ် သူ

9. နိဂုံး

SCG Myanmar Concrete and Aggregate Company Limited (MCA) ဆောင်ရွက်မှုများ အား ယေဘူယျ အကဲဖြတ် ဆန်းစစ်ချက် များအရ စက်ရုံသည် ဒေသတွင်း စီးပွားရေး ၊ နိုင်ငံစီးပွားရေး တိုးတက်မှု များအတွက် ကောင်းကျိုး သက်ရောက်မှု များ ကို ဖော်ဆောင် နိုင်ပြီး ပတ်ဝန်းကျင် အတွက် ဆိုးကျိုး သက်ရောက်မှု များကို ထိန်းချုပ် ကာကွယ် နိုင်ပါသည် ။

SCG Myanmar Concrete and Aggregate Company Limited (MCA) သည် စီမံကိန်း ကာလ တစ် လျှောက်တွင် လူမှုရေးဆိုင်ရာ တာဝန်ခံမှု အစီအစဉ် (CSR) ကို လုပ်ဆောင် လျက်ရှိပြီး အသားတင် အမြတ် ငွေ၏ ၂ % ကို လူမှုရေးဆိုင်ရာ တာဝန်ခံမှု လုပ်ငန်းများတွင် အသုံးပြုရန် အတွက် လျာထားပါသည် ။ SCG Myanmar Concrete and Aggregate Company Limited (MCA) သည် အဆိုပါ ရံပုံငွေ အား

ပညာရေး၊ ပြည်သူလူထု ကျမ်းမာရေး၊ ဘာသာရေး၊ သက်သာ ချောင်ချိရေး စသည်တို့တွင် လှူဒါန်း ပေးအပ်မှုများကို လုပ်ဆောင်နေ လျက်ရှိပြီး ဆက်လက်၍ လည်းလုပ်ဆောင်သွားမည် ဖြစ်ပါသည်။ ဝန်ထမ်းများအားလုံးအတွက် ဆိုးကျိုးကင်းစင် ၍ ဘေးအန္တရာယ်ကင်းသည့် လုပ်ငန်းခွင်ကို ဖန်တီးပေးနိုင် ရေးအတွက် အစဉ် ကြိုးပမ်းလုပ်ဆောင်နေပါသည်။

ထို့ ကြောင့် SCG Myanmar Concrete and Aggregate Company Limited (MCA) မှ အဆိုပြုထား သောပတ်ဝန်းကျင် စီမံခန့် ခွဲမှ အစီအစဉ်ကို အကောင်အထည်ဖော်လုပ်ဆောင်ရန် ခွင့်ပြုချက်ရရှိသင့် ပါသည်။

2.0 INTRODUCTION

2.1 PROJECT PROPONENT AND BACKGROUND

The project proponent is **SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED (MCA)** established by Mr. Sorasak Keeratichokechaikul. SCG Myanmar Concrete and Aggregate Company Limited (MCA) is a Joint Venture Company Limited between the Concrete Products and Aggregate Co., Ltd from the Kingdom of Thailand, and Farmer Phoyarzar Co., Ltd and Myintmakha Engineering Co., Ltd in Myanmar. SCG Myanmar Concrete and Aggregate Company Limited (MCA) of Bago plant- is a ready-mixed concrete batching plant with a MIC registration number 987/2015 issued on 6th August 2015 and with Incorporate Registration No: 80 FC/ 2015-2016 (YGN).

The Bago Batching Plant was built in 1.10.2017 and completed in 1.12.2017. The Bago Btching Plant has been in operation since 17.12.2017.

Environmental Department of Bago Region directed SCG Myanmar Concrete and Aggregate Company Limited (MCA) to submit the Environmental Management Plan (EMP). Therefore, SCG Myanmar Concrete and Aggregate Company Limited (MCA) needs to submit an EMP to Environmental Conservation Department of Bago Region.

2.2 SALIENT FEATURES OF THE COMPANY

The salient features of the company are mentioned below.

Name of Company	:	SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago Batching Plant
Name of Factory	:	Bago RMC Batching Plant
Established By	:	Mr. Sorasak Keeratichokechaikul
Address	:	No.39 (D), Otthar (9) Ward, Nyaung Inn Village, Industrial Special Zone (1), Bago Township, Bago Region, Myanmar

Product	:	Ready Mixed Concrete
Name of Principal Organization	:	Siam Cement Group
Type of Investment	:	Joint Venture
Authorized Capital	:	4.664 million in USD
Duration of Investment	:	50 years
Type of Business Organization	:	Private Company Limited
System of Sales	:	100% Local
Total Land Area	:	0.75 acre (32,670 sq ft)
Building Area	:	855 sq ft
Type of Land	:	Industrial Land
Business Permit	:	MIC Permit
Commence date of Operation	:	17.12.2017
Contact	:	09 430 372905 (Daw Nan Thandar Htway)
Email	:	thandar@scg.com
Website	:	www.scg.com

2.3 OBJECTIVE OF THE PROJECT

"High-quality ready mixed concrete offered to meet the various needs of customers" is the objective of the SCG Myanmar Concrete and Aggregate Company Limited (MCA).

2.4 PURPOSES OF THE ENVIRONMENTAL MANAGEMENT PLAN

GREEN ENVIRONMENTAL, HEALTH, SOCIAL & SAFETY CONSULTANCY CO., LTD. conducted Environmental Management Plan for "Ready-mixed Concrete Batching Plant" developed by **SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED (MCA)**.

The purpose of this EMP is to assist SCG Myanmar Concrete and Aggregate Company Limited (MCA), in managing ready-mixed concrete plant. It is to develop an effective environmental management plan (EMP) or to improve programs, which may already be in place. The environmental management plan will help the factory to assess its present performance in protection of environment and identify opportunities for additional environmental protection measures.

2.4.1 TIMEFRAME OF EMP

The EMP started from November 2018 and ended by July 2019 and reviewed report is finished in August 2022.

2.5 CONSULTANT TEAM

Environmental Management Plan for operation of **SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED (MCA)** is conducted by **GREEN ENVIRONMENTAL, HEALTH, SAFETY & SOCIAL CONSULTANCY COMPANY LIMITED**. GREEN EHSS COMPANY LIMITED is established in Myanmar under Incorporate Registration No: 4289/2011-12.

Green EHSS Consultancy firm has been providing Environmental, Health, Safety and Social related services for local and international organizations. EMP consultant team includes competent professionals with more than 20 years of local and international experience in Environment, Health, Safety and Social domain.

2.5.1 PERSONNEL INFORMATION OF CONSULTANT TEAM

No.	Name	Designation	Academic and Professional Qualifications	Field of EIA
1	Catherine Soe Soe Aung	Team Leader, Sr. Environmentalist Certified Environmental Professional, Canada Approved Risk Consultant, MOM, Singapore ADB's Consultant Management	Master in Environmental Engineering, National University of Singapore Master in Zoology, YU Bachelor in Zoology, YU	Air Pollution Soil and Noise and Vibration Occupational health and safety
	Contact	catherine@greenehss.com 09 42 5353553		
2	Dr. Theingi Ye Myint	Waste Management and Water Quality Specialist	Ph.D(YU) Master in Environmental Engineering, NUS Master in Industrial Chemistry, YU Bachelor in Industrial Chemistry, YTU	Waste Management Water pollution
	Contact	095095555		
3	Dr. Esther Kumar	Biodiversity Specialist, Fauna Team Leader	Master in Zoology, YU Bachelor in Zoology, YU	Biodiversity
	Contact	info@greenehss.com		
4	U San Aye	Mapping and GIS Specialist	Bachelor in Maths, Diploma in Mapping, Japan	Geology and Map

	Contact	marketing@greenehss.com		
5	Daw Swe Swe Aung	Social Impact Assessment Specialist	Master in Geography, YU Bachelor in Geography, YU Diploma in GIS, Communication Skill for Business, Singapore Polytechnic	Social Impact Assessment
	Contact	green.sweaung@gmail.com 095026245		
6	Daw Mi Mi Soe	Social Impact Assessment Specialist	Master in Public Administration Bachelor in Chemistry Diploma in Computer Science Post-Graduate Diploma In Applied Psychology	Social Impact Assessment
	Contact	09965026245		
7	U Aung Aung	Project Assistant	B.Sc (Chemistry)	Monitoring and Data collection
8	U Aung Ze Ya	Project Manager	B.Sc (Math)	Oversee project
	Contact	09787874674		

3.0 ENVIRONMENTAL COMMITMENT

"SCG Myanmar Concrete and Aggregate Company Limited (MCA)"

SCG Myanmar Concrete and Aggregate Company Limited (MCA) မှ တင်ပြထားသော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီရင်ခံစာ တွင် ပါရှိသော အကြောင်းအရာ များသည် မှန်ကန်တိကျခိုင်မာပြီး ပြည့်စုံပါသည်။ သဘာဝသယံဇာတ နှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန နှင့် ဒေသဆိုင်ရာ အစိုးရများမှာ ချမှတ်ထားသော ဥပဒေ၊ နည်းဥပဒေ၊ လုပ်ထုံးလုပ်နည်းများကို တိကျစွာလိုက်နာမည် ဖြစ်ကြောင်း ကတိကဝတ် ပြုပါသည်။ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပါအဝင် သက်ဆိုင်ရာ ဥပဒေများကို တိကျစွာ လိုက်နာ၍ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ကို ရေးဆွဲထားပါသည်။ SCG Myanmar Concrete and Aggregate Company Limited (MCA) သည် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီရင်ခံစာပါ ကတိကဝတ်များ၊ ပတ်ဝန်းကျင် ထိခိုက်မှု လျော့ချရေး လုပ်ငန်းများ နှင့် အစီအစဉ်များကို အပြည့်အဝ အစဉ်အမြဲ လိုက်နာဆောင်ရွက်မည် ဖြစ်ပါသည်။

စက်ရုံလုပ်ငန်း ပြီးစီး၍ စီမံကိန်းပိတ်သိမ်းချိန်တွင် လူမှုဝန်းကျင်အား ထိခိုက်မှု မဖြစ်စေရန် စီစဉ်ဆောင်ရွက်မည်ဖြစ်ပြီး အကယ်၍ ထိခိုက်မှုများ ရှိလာပါက ထိခိုက်မှု အနည်းဆုံး ဖြစ်စေရေး အစီအမံများ ချမှတ်ဆောင်ရွက် မည်ဖြစ်ပါသည်။

SCG Myanmar Concrete and Aggregate Co., Ltd.

Signature : _____

Nan Thandar Htwe
Procurement and Administration Manager
SCG Myanmar Concrete and Aggregate Co., Ltd.

GREEN ENVIRONMENTAL, HEALTH, SAFETY & SOCIAL CONSULTANCY CO., LTD

ပဲခူးတိုင်းဒေသကြီး၊ ပဲခူးမြို့နယ်၊ ညောင်အင်းရွာ၊ အထူးစက်မှုဇုန် (၁)၊ ဥဿရပ်ကွက်၊ အမှတ် (၃၉/ဃ) ရှိ SCG Myanmar Concrete and Aggregate Company Limited (MCA) ကွန်ကရစ်ဖျော်စက်ရုံ ၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် Environmental Management Plan (EMP) အား သယံဇာတ နှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန မှ ထုတ်ပြန်ထား သော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ၊ နည်းဥပဒေများ နှင့် ကိုက်ညီအောင် ရေးဆွဲထားပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) ကို အဓိက အခြေ ခံပြီး အခြားလိုက်နာ ဆောင်ရွက်ရမည့် သက်ဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေများ နှင့် ဆက်စပ် ကျင့်သုံး နိုင်ရေး ရေးသားပြုစု တင်ပြထားပါသည်။

ဤပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်တွင် စီမံကိန်းနှင့် ပတ်သက်သော အချက်အလက်များ နှင့် စီမံကိန်းအကောင်အထည် ဖော်ဆောင်ရွက်မည့်ဒေသ၏ လက်ရှိ ပတ်ဝန်းကျင် အခြေအနေများကို စီမံခန့်ခွဲမှု အစီအစဉ်ရေးဆွဲသော အဖွဲ့၏ အတွေ့အကြုံအပေါ် အခြေခံသော သုံးသပ်ချက်များနှင့် ပေါင်းစပ်ပြီး ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုဖြစ်ပေါ် စေနိုင်သော အကြောင်းအရာများ နှင့် ကုစားနိုင်မည့် နည်းလမ်းများကို ရေးဆွဲ ဖော်ပြ ထားပါသည်။

အစီရင်ခံစာပါ အချက်အလက်များမှာ အဖွဲ့တွင်ပါဝင်သော ပညာရှင်များမှ မြေပြင်တွင် ကွင်းဆင်း လေ့လာပြီး ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း ပြုလုပ်ရေးဆွဲထားခြင်း ဖြစ်ပါ၍ အစီရင်ခံစာတွင် ပါဝင် သော အချက်အလက်များမှာ တိကျမှန်ကန်၍ ပြည့်စုံမှန်ကန် မှု ရှိပါသည်။

Signature : _____

Catherine Soe Soe Aung
Managing Director
Green EHSS Consultancy Co.,Ltd.

4.0 LEGAL REQUIREMENT

4.1 ENVIRONMENTAL POLICY

SCG Myanmar Concrete and Aggregate Company Limited (MCA) describes its environmental policy as follows:

- SCG Myanmar Concrete and Aggregate Company Limited (MCA) shall be responsible for the protection as well as perseveration of environment in and around the area of the project site;
- SCG Myanmar Concrete and Aggregate Company Limited (MCA) shall be able to control pollution of air, water and land, and not to cause environment degradation; and
- SCG Myanmar Concrete and Aggregate Company Limited (MCA) will comply with any applicable environmental protection laws and regulations of the Republic of the Union of Myanmar.

4.2 HEALTH POLICY

SCG Myanmar Concrete and Aggregate Company Limited always comply with all health and safety legislation.

SCG Myanmar Concrete and Aggregate Company Limited will establish and implement the Occupational, Health and Safety Management.

SCG Myanmar Concrete and Aggregate Company Limited help the workers by providing them with a workplace health services and medical care and workplace safety.

SCG Myanmar Concrete and Aggregate Company Limited aims for continual improvement of its health and safety management system.

The **FIRST AID KITS** and emergency medical boxes are supplied sufficiently in all work sites for minor cuts or ailment. SCG Myanmar Concrete and Aggregate Company Limited will send the injured employee to the nearest Private Clinic/Hospital with factory transportation at no cost. Some employees who hold social security cards, on their request or consent, are sent to **SOCIAL SECURITY**

CLINIC nearby the factory's transport arrangement. The factory arranges plenty of safe drinking water, at no cost, to all workers at all time.

4.3 NATIONAL LAWS AND REGULATIONS

The National laws and regulations for the environmental protection applicable to the project are compiled and presented. The Constitution of the Republic of the Union of Myanmar (2008) is the main concern for the environment conservation in Myanmar. The others are as follows:

i. Environmental Conservation Law (2012)
ii. Environmental Conservation Rules (2014)
iii. The Conservation of Water Resources and River Law, 2nd October (2006)
iv. Myanmar Investment Law (2016)
v. Myanmar Investment Rule (2017)
vi. The Import Export Law (2012)
vii. Building Regulations (2014)
viii. The Amended Law for Factory Act (2016)
ix. Myanmar Fire Brigade Law (2015)
x. The Conservation of Water Resources and River Law, (2006)
xi. Environmental Impact Assessment Procedure (Ministry of Natural Resources and Environmental Conservation No. 616/2015) (29 Dec, 2015)
xii. National Environmental Quality (Emission) Guidelines (No. 615/ 2015)(29 Dec, 2015)
xiii. Land Acquisition Law (2015)
xiv. The Payment of Wages Law 2016 (Jan 2016)
xv. The Minimum Wages Law (2013)
xvi. Minimum Wage Notification 1/2018
xvii. The Development of Employment and Expertise (2013)
xviii. The Social Security Law (2012)
xix. The Social Security Rules, Notification, No. 41/2014
xx. The Leave and Holiday Act, 1951(Law Amended July,2014)
xxi. The Settlement of Labor Dispute Law, 2012 (Amendment, 2014)
xxii. Workman Compensation (Amendment) Act (1955)
xxiii. The Public Health Law
xxiv. Prevention and Control of Communicable Diseases Law (1995)

xxv. The Petroleum Act (2016) and Rule (2002)

xxvi. Environmental Conservation and Cleansing Rules and Regulations (YCDC, Order No. 10/99 of 24 Dec, 1999)

xxvii. The related laws enacted by the respected Regional Hlauttaw and rules issued by respected Regional Government

xxviii. The Water Power Act (1927)

xxix. The Labour Organization Law (2011)

xxx. The Labour Organization Rules (2012)

xxxi. Vehicle Law(1964)

xxxii. Motor Vehicle Rules (1989)

xxxiii. Road and Inland Water Transport Law(1963)

xxxiv. Myanmar Forest Law (1992)

xxxv. Myanmar Forest Law (1995)

xxxvi. Inland Stream Vessel Act (1917)

xxxvii. The Port Act (1908)

xxxviii. The Control of Smoking and Consumption of Tobacco Product Law (2006)

xxxix. National Health Policy (1993)

4.4 OTHER ACTS, LAWS

The project proponent shall comply with the disciplines described in the permit and licences required.

In addition, project proponent shall comply with the law, rules and regulations which related with the project activities and the regulations issued by the Industrial Zone Management.

4.5 ENVIRONMENTAL STANDARDS AND GUIDELINES

The Plant abides the relevant regulations and guidelines issued by the Regional Government. The Plant has obtained the mandatory permit and licences required to operate the ready mixed cement production processes.

Safety, Health and Environment:

- General Environmental, Health, and Safety Guidelines- International Finance Corporation(www.ifc.org)
- ISO 45001:2018 Occupational Health and Safety Management System (www.iso.org)

Ministry of Natural Resources and Environmental Conservation - MONREC (former Ministry of Environmental Conservation and Forestry - MOECAF) issued National Environmental Quality (Emission) Guidelines, NEQGs, in December 2015 according to the provision of Paragraph (42), Sub-paragraph (b) of the Environmental Conservation Law (2012).

Table 4.1 Water Quality Standards (Effluent Level) for Construction Materials Extraction

Parameter	Unit	Guideline Value
Biochemical Oxygen Demand	mg/l	30
Chemical Oxygen Demand	mg/l	125
Oil and Grease	mg/l	10
pH	S.U[a]	6~9
Total Coliform Bacteria	100ml	400
Total nitrogen	mg/l	10
Total Phosphorous	mg/l	2
Total Suspended Solids	mg/l	50

[a] Standard Unit

Table 4.2 Air Quality Standards

Parameter	Averaging Period	Guidelines Value µg/m³
Nitrogen Dioxide	1-year 1-hour	400 200
Ozone	8-hours daily maximum	100
Particular matter PM_{10}[a]	1-year 24-hour	20 50
Particular matter $PM_{2.5}$[b]	1-year 24-hour	10 25
Sulphur Dioxide	1-hour 10-minute	20 500

[a] Particular matter 10 micrometer or less in diameter

[b] Particular matter 2.5 micrometer or less in diameter

Source: National Environmental Quality (Emission) Guideline for Myanmar, 2015 Dec 29

Table 4.3 Noise Level Standard

Receptor	One Hour LAeq (dBA)[a]	
	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

[a] Equivalent continuous sound level in decibels

4.6 INSTITUTIONAL FRAMEWORK

4.6.1 FACTORY ORGANIZATION

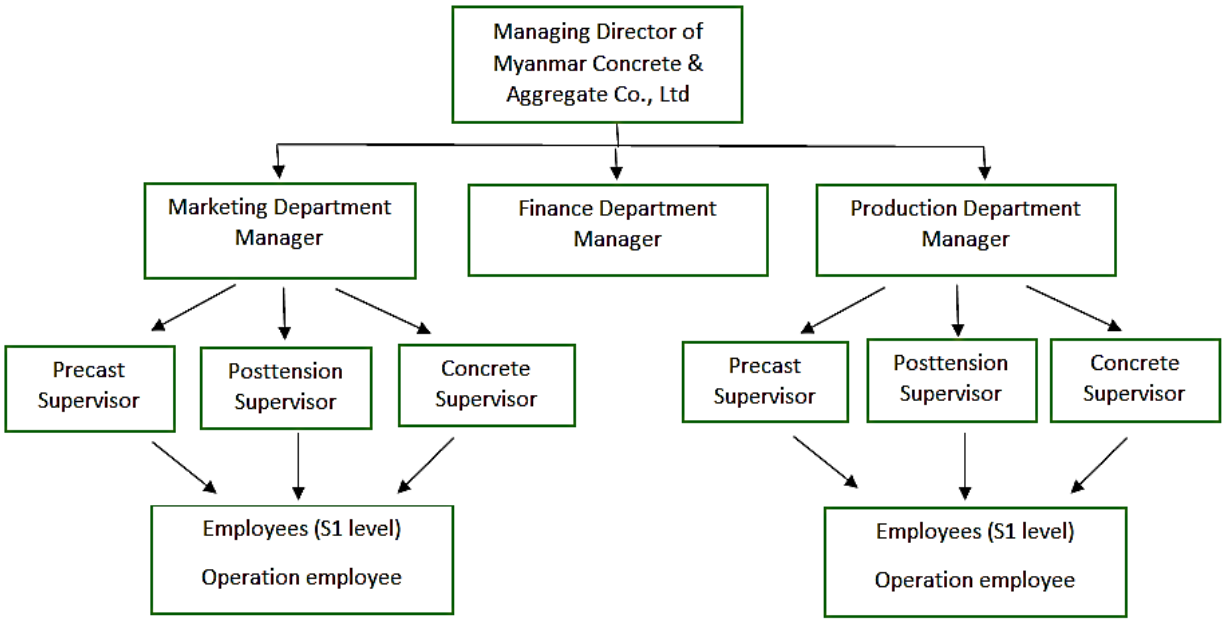


Figure 4.1 Organization Chart

5.0 PROJECT DESCRIPTION

5.1 COMPANY'S OBJECTIVE

"High-quality ready mixed concrete offered to meet the various needs of customers" is the objective of the SCG Myanmar Concrete and Aggregate Company Limited (MCA).

5.2 PROJECT LOCATION

SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant is located at No.39 (D), Otthar (9) Ward, Nyaung Inn Village, Industrial Special Zone (1), Bago Township, Bago Region, Myanmar at the coordinates 17° 16′ 49.96″ N and 96° 27″ 0.82″ E (Figure 5.1 and 5.2). The factory is built on 0.75 acre.

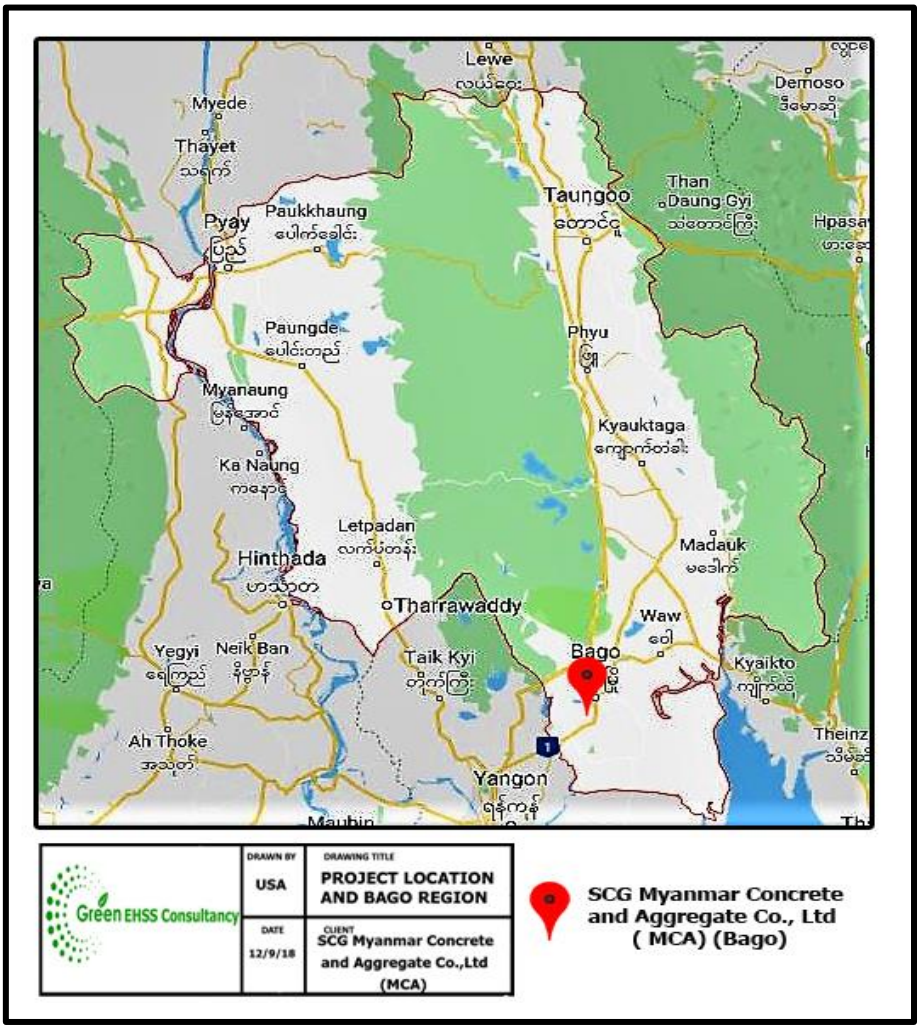


Figure 5.1 Bago Region and Factory Location

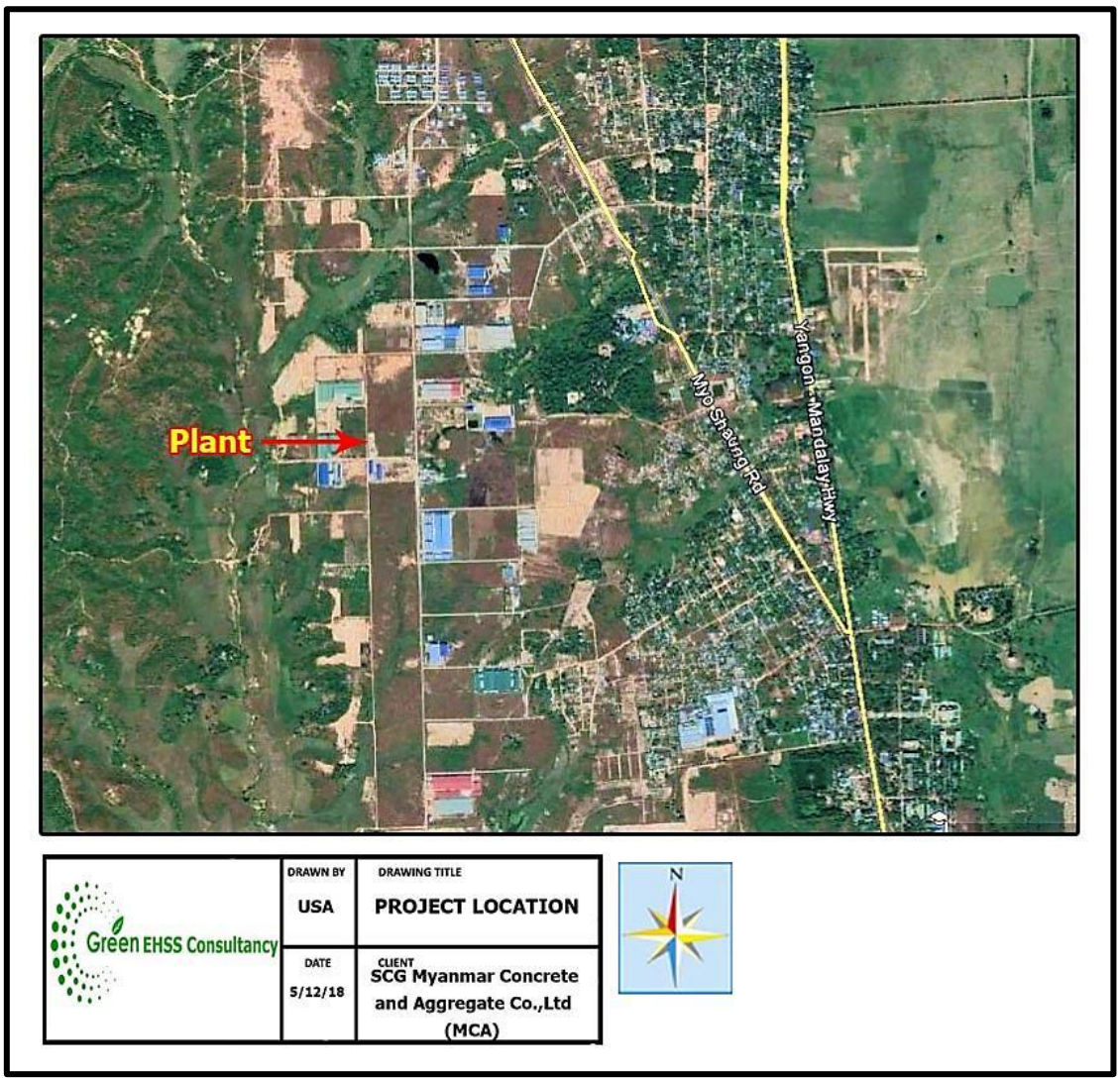


Figure 5.2 Location Map of the Factory with Industrial Zone

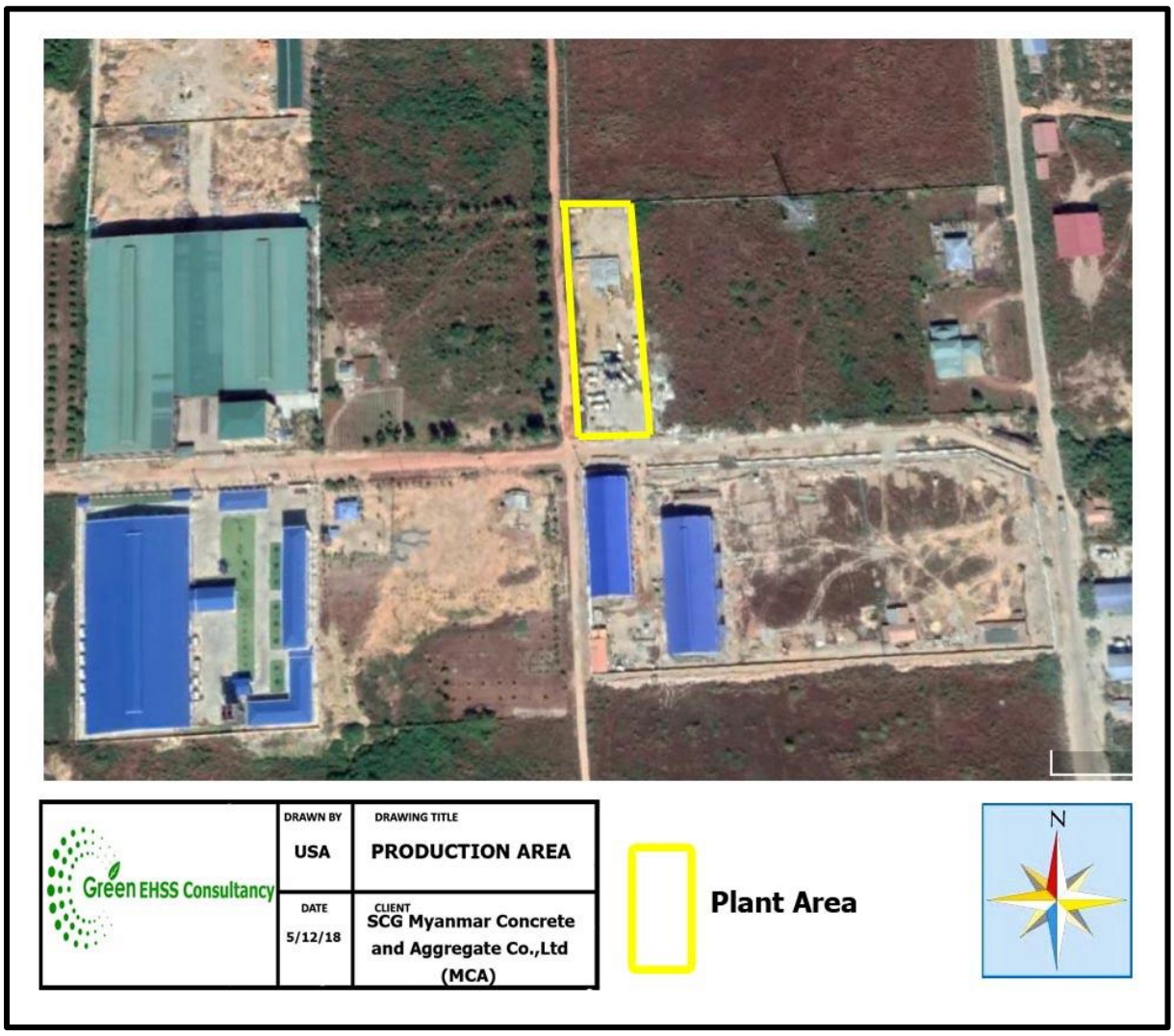


Figure 5.3 Production Area

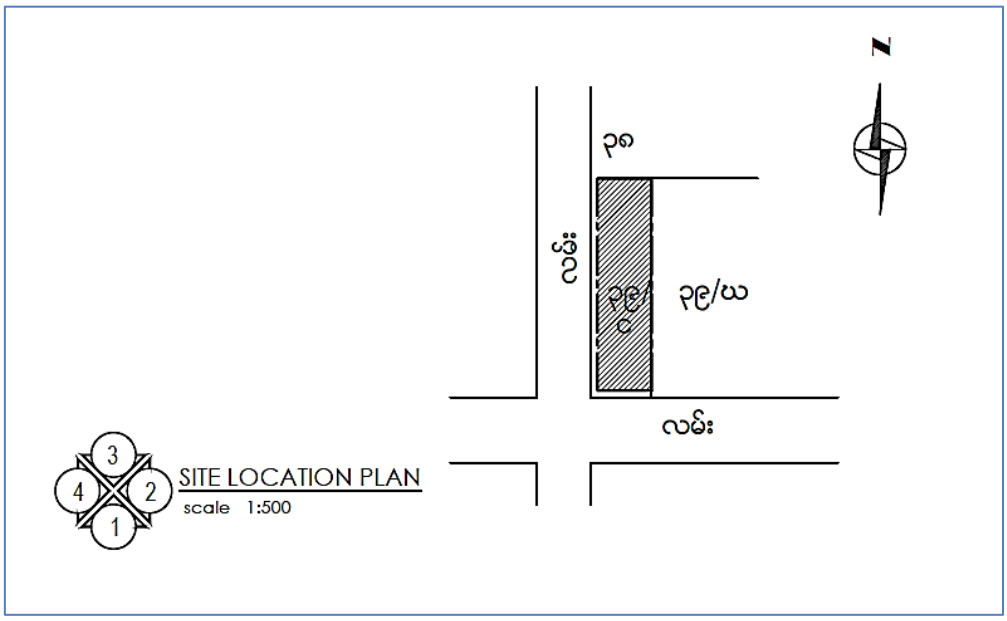
5.3 PROJECT TIMEFRAME

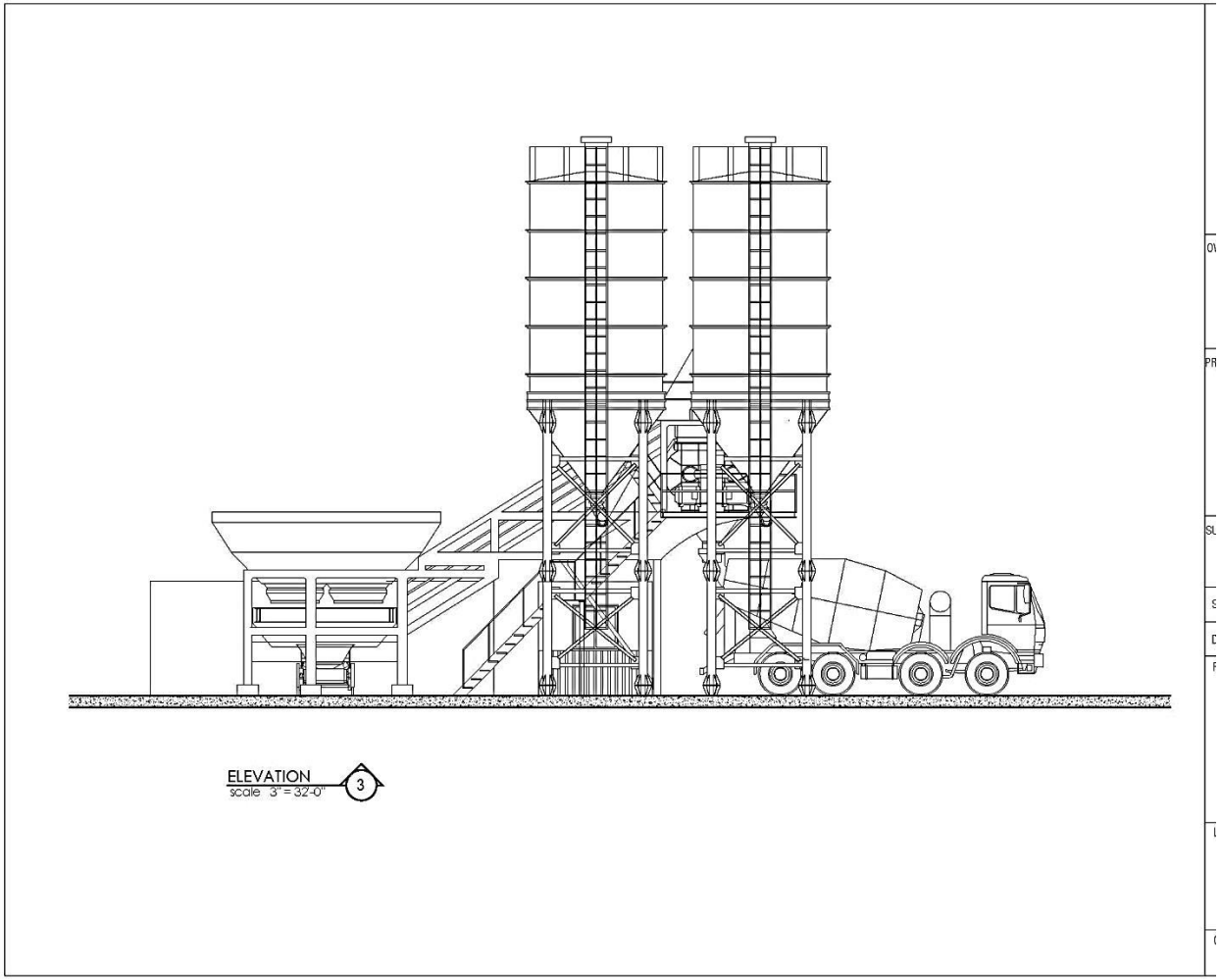
The Bago Batching Plant was built in 1.10.2017 and completed in 1.12.2017. The Bago Btching Plant has been in operation since 17.12.2017. Project duration is 50 years.

5.4 PLANT LAYOUT

Table 5.1 List of Buildings

Sr.	Facilities	North	East
1	Machine Area	17° 16′ 49.3″ N	96° 27′ 00.9″
2	Temporary Shelter 1	17° 16′ 51.7″ N	96° 27′ 01.1″
3	Temporary Shelter 2	17° 16′ 51.6″ N	96° 27′ 00.8″
4	Raw Material Area	17° 16′ 50.7″ N	96° 27′ 00.8″




ELEVATION
scale 3/32"=1'-0"
3

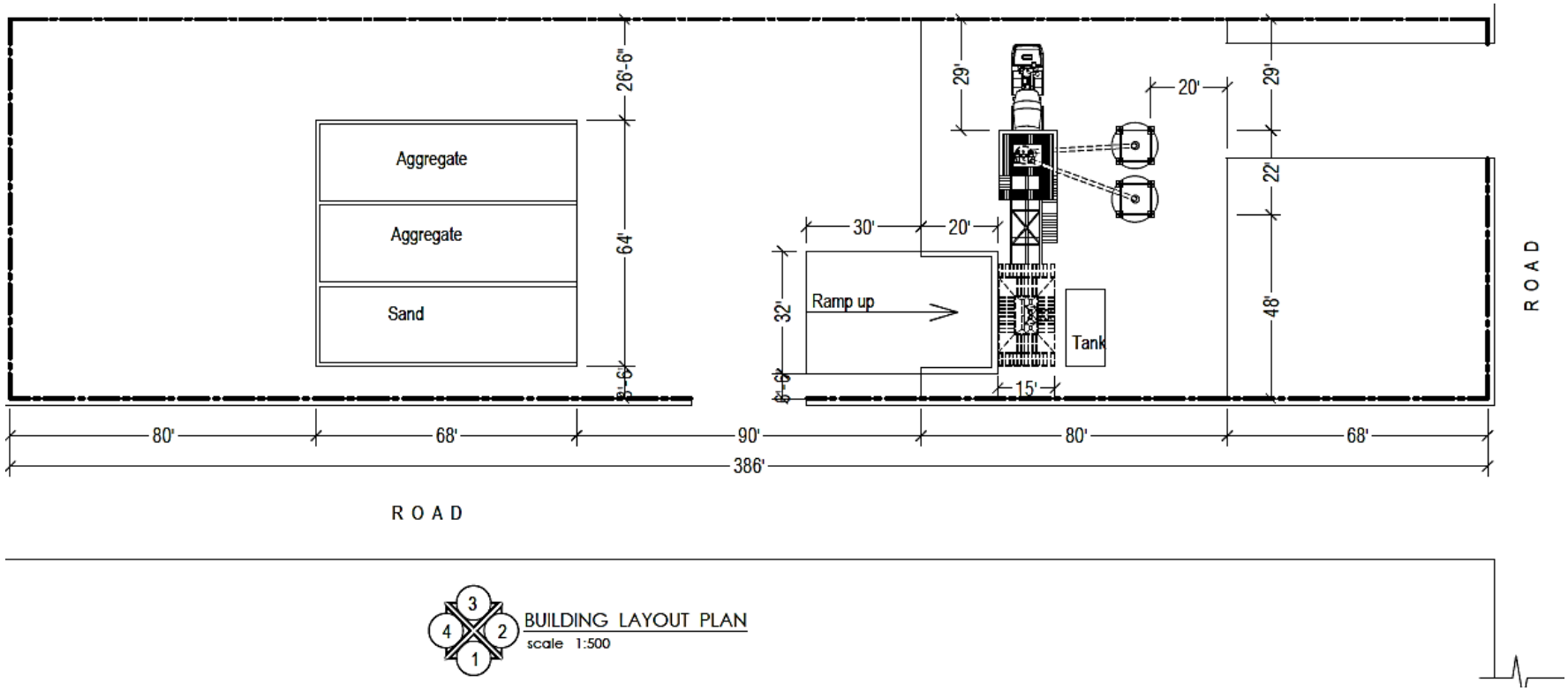


Figure 5.4 Building Layout Plan of the Factory

5.5 RAW MATERIAL REQUIREMENT

The annual requirements of main raw materials are listed as follows. The plant installed the storage areas for each raw material item (Figure 5.5). The proportions and type of materials used in individual concrete mixtures depend on the end use and performance required of the concrete.

Table 5.2 Annual Raw Materials

SR. No	Particulars	Unit	A/U	Local Supplier Source	
				Location	Company Name
1	Cement	Ton	4479.53	Yangon	Myanmar Conch Cement Co., Ltd
2	Admixture (Chemical)	Ton	25812.92	Yangon	Tiger Supply Co., Ltd
3	Rock	Ton	14549.46	Bago	Royal Mya Thida Co., Ltd
4	Sand	Ton	10254.768	Bago	Royal Mya Thida Co., Ltd

Storage

These raw materials are stored separately at designated areas as shown in following figures.

Storage Areas of Sand and Shingle

Cement Silo

Figure 5.5 Photos of Raw Material Store area

5.5.1 CHEMICAL

Ready mixed concrete plants use a variety of admixtures as ingredients in concrete. These chemicals are liquids, which are supplied in bulk and stored in tanks in the batching area of the plant.

The most common of chemical admixtures are: Daratard 152, mighty 150, mighty 40WP, Mira 188EX.

The batching plant installed the 1000 gallons capacity of plastic tank for chemical storage and chemical are transferred into these tanks to avoid having empty chemical containers.

Table 5.3 Annual Chemical Requirements

SR. No	PARTICULARS	Unit	A/U	Source
1	Daratard 152	Liter	11440.06	Thailand
2	Mighty 150	Liter	14372.86	Thailand
3	mighty 40WP	Liter	3000	Thailand
4	Mira 188EX.	Liter	570	Thailand

Storage

The chemical used for production process are stored in the chemical storage containers shown in Figure 5.6.

Figure 5.6 Photos of Chemical Store area

5.6 PRODUCTION ACTIVITY

Ready Mixed Concrete is produced in the production area and loaded into mixer trucks. Truck mixer transports the materials to a construction site and truck operator assists with the casting process.

စံနှုန်းနှင့် ကိုက်ညီသည့် ဘိလပ်မြေ၊ သဲ၊ ကျောက်၊ ရေ နှင့် ဓာတုပစ္စည်း အစရှိသည့် ကုန်ကြမ်းတို့ အား အချိုးကျကျ ရောစပ်ပြီး အသင့် ဖျော်ကွန်ကရစ် ရရှိလာပီးနောက် မှာယူသုံးစွဲသူထံသို့ AG Trucks တို့ဖြင့် ပို့ဆောင်ပေးပါသည်။

The Manufacturing Process Flow is shown in Figure 5.7.

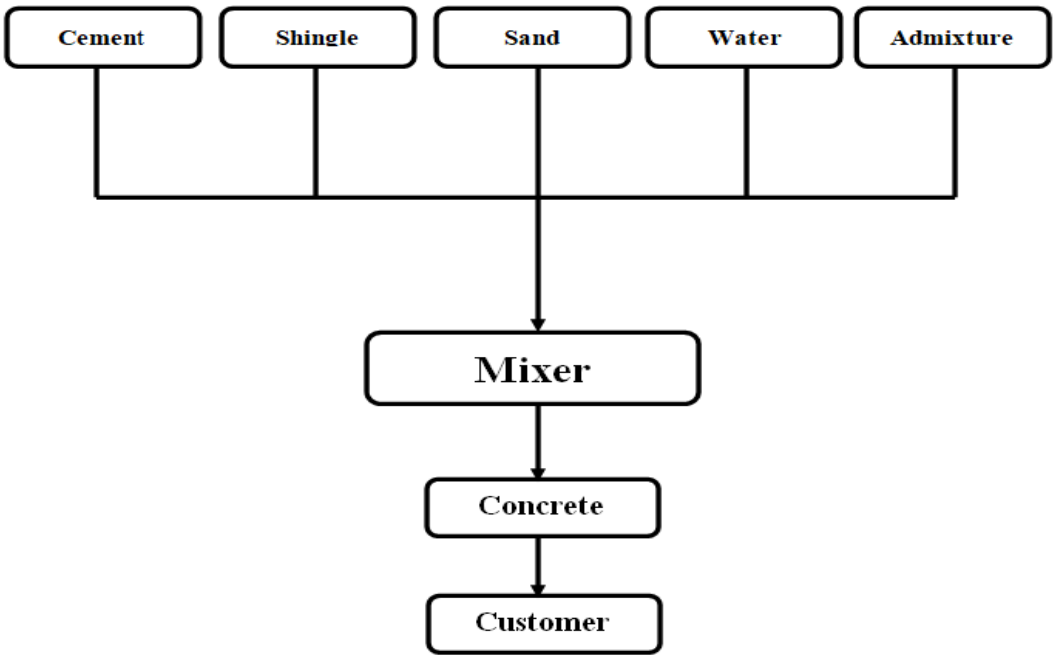


Figure 5.7 Manufacturing Process Flow

Figure 5.8 Photos of Production Activities and Machines

Figure 5.9 Photos of the Batching Plant

5.7 MACHINERIES AND EQUIPMENT

Ready mix concrete plants have many more components to it. In other words, it is the assembly of tools and machines such as mixers, cement batchers, aggregate batchers, conveyors, radial stackers, aggregate bins, cement bins, heaters, chillers and cement silos.

The imported machineries and locally purchased materials are shown in the following Table 5.4.

Table 5.4 List of Machinery and Equipment

Sr. No	Name	HP
1	WATER TANK	-
2	DISTRIBUTION BOARDS	-
3	WATER PUMP	20 hp
4	WATER TANK (for mould)	-
5	MOTOR PUMP FOR TRUCK MIXER WATER	3 hp
6	PRESSURE TANK AND PUMP	2 hp
7	BOOM DRAGLINE SCRAPER	-
8	MOTOR GEAR FOR SCRAPER	-
9	MOTOR GEAR FOR SWINGING BOOM	-
10	MOTOR GEAR FOR ADJUSTING BOOM	-
11	MOTOR GEAR FOR SKIP HOIST	30 hp
12	CONCRETE MIXER	5 hp
13	MOTOR FOR MIXER	50 hp
14	GEAR FOR MIXER LEFT	-
15	GEAR FOR MIXER RIGHT	-
16	CEMENT WEIGHING BATCHER	30/3h
17	MOTOR FOR VIBRATING CEMENT	1 hp
18	MOTOR GEAR FOR SCREW CONVEYOR	12 hp
19	MOTOR GEAR FOR SCREW CONVEYOR	12 hp
20	SCREW CONVEYOR	10 m^3/h
21	SCREW CONVEYOR	10 m^3/h
22	STRUCTURE FOR MACHINE	

23	AGGREGATE WEIGHING BATCHER	
24	MOTOR FOR VIBRATING SAND	1 hp
25	MOTOR FOR VIBRATING SAND	1 hp
26	WATER WEIGHING BATCHER	
27	MOTOR PUMP FOR DISCHARGING WATER	10 hp
28	ADMIXTURE WEIGHING BATCHER	10 kw
29	AIR COMPRESSOR TANK	
30	MOTOR FOR AIR COMPRESSOR	7 hp
31	AIR COMPRESSOR	
32	POWER CABIN	-
33	CONTROL CABIN	-
34	MOBILE OFFICE	-
35	PNUEMATIC CHISEL	2 hp
36	ADMIXTURE TANK WITH MOTOR	4 hp
37	MULTI METER	-
38	SMALL PNEUMATIC CHISEL	2 hp
39	PLC SET	-
40	SILO 100 Tons	-
41	SILO 100 Tons	-
42	Cement Bulk	-
43	Cement Compressure	40 hp
44	Cement Warehouse	-
45	Compression Machine	-
46	Admixture Weighting Machine	-
47	1500L Can Steel Tank	-
48	1500L Can Steel Tank	-
49	Air Condition	1.5
50	Air Condition	1.5
51	COMPUTOR	-
52	MONITOR	-
53	Electric system	-
54	Desktop computer for production control	-

Shingle and Sand hopper

Mixer and Cement Box

Figure 5.10 Photographs of Machines Used in Production

5.8 RESOURCE REQUIREMENT

5.8.1 HUMAN RESOURCE REQUIREMENT

Ready-mixed concrete plant of MAC (Bago Plant) composes of well-trained staffs and local people. During the Project assessment process, 5 employees are local people. Local employment is the main socio-economic benefit that the Project can directly bring to people living in the community nearest to the Plant.

Table 5.5 List of Local Employee on 1st December 2018

Sr. No.	Type of Employee	Male	Female	Total
1	Local Employees	5	-	5

5.8.2 WORKING DAY AND HOUR

Normally, working hours is 8:00 am to 5:00 pm and 312 working days in a year. Basic pay for monthly salary is 144,000 kyats. Overtime fee is paid according to the labour law.

Monday to Friday:	Working time	8:00 a.m. to 12:00 a.m.
	Lunch time	12:00 a.m. to 1:00 p.m.
	Working time	1:00 p.m. to 5:00 p.m.
Saturday:	Working time	8:00 a.m. to 12:00 a.m.
	Lunch time	12:00 a.m. to 1:00 p.m.

5.9 PRODUCTS/ BY PRODUCTS AND PRODUCTION CAPACITY

The main product of Ready-mixed concrete plant of MAC is ready-mixed concrete and the annual production capacity is 12679 M^3.

There is no other by products generated from the manufacturing activities. Surplus concrete and hardened concrete are generated as waste and they are generally be **recycled** as fill material in places on the concrete plant's property or donated to

monasteries, schools and some societies for landfill purposes. Some surplus concete is used in concrete testing block.

Ready Mix Concrete

Figure 5.11 Photos of Products

5.9.1 SALE SYSTEM

Ready-mixed concrete is locally supplied.

5.10 WATER SUPPLY

The production water source is from on- site tube well. The depth of the tube well is about 61 m and the diameter is 102 mm (4 in). The water is stored in the steel tank with 3200 with 3200 gallons capacity. The estimated water use for process is 200 gallons/day and, 72,000 gallons/ year.

5.11 ELECTRICITY

The project uses generator to generate electricity. A set of generator- 200 KVA is installed to ensure continuous power supply to the factory. Annual electricity requirement is 10000 kw.

Figure 5.12 Photos of Generators

5.11.1 FUEL REQUIREMENT

Annual fuel requirement is 500 gallons. Primary fuel is diesel and required diesel for generator and vehicles are purchased from the nearest petrol station. Required diesel is direct filling from the nearest petrol station for vehicles and direct store inside the generator.

To handle the leakage and spillage of the diesel, an interception with sand is kept under the tank.

5.12 WASTE

Waste can be any solid, liquid or contained gaseous material that is no longer usable as part of the ready mixed concrete plant operations and is being disposed of on a routine basis or stored and contained onsite for future disposal.

5.12.1 SOLID WASTE (TYPE/ AMOUNT/ MANAGEMENT)

Domestic Waste

Wastes include domestic and organic wastes like leftover, foods, paper, packing wastes from office and dormitory. The domestic waste is collected first at the trash bins for normal waste. The factory produced 15 kg of domestic waste on average per month. Temporal storage area is at the back of the raw material storage area (Figure 5.13).

Process Waste

The main waste type of RMC Plant is returned concrete and drum washout. Estimated amount of returned concrete is 45 m^3 per month and drum washout is 20 m^3 per month. Hardened cement-sand slurry and returned concrete is generally be **recycled** as fill material in places on the concrete plant's property. Before recycle process, they are heaped near operation area. Concrete waste will be also used in concrete testing block. The testing block area is near operation area.

Figure 5.13 Temporary Storage Area of Domestic Waste

SCG Myanmar Concrete and Aggregate Company Limited (MCA) develops a waste control and management system for production process.

Systematic management of solid waste is of importance as mismanagement of the waste will lead critical occupational hazard including fire hazard. Waste generation from the whole production process and waste management is as follows:

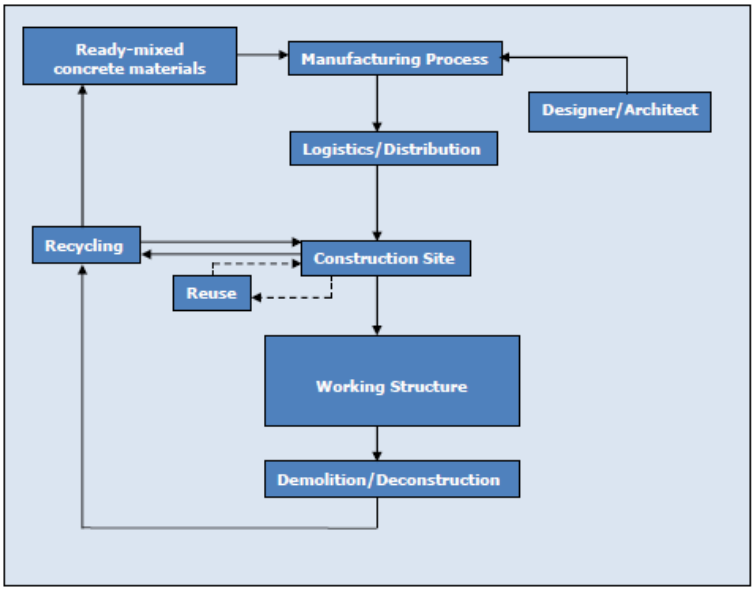


Figure 5.14 Process Flow and Waste Generation and Waste Management

MCA batch plant applies **3R** management for factory's solid waste. The principle of Reduce, Reuse and Recycle is applied in managing factory's solid waste. The management will be done with the waste hierarchy approach whereby the first aim is to reduce the amount of waste generated through factory process, and waste generated by the on-site personnel, general office supplies; engineering equipment, food and associated waste are included.

The plant applies waste **reducing** practices by paying careful attention during, storing raw material like sand, aggregates, cement etc. in order to reduce waste.

The batching plant has established the waste **reusing** management or taken to a **recycling** facility or landfill site.

There is very limited waste of packaging waste and concrete waste generated at the manufacturing stage, with surplus fresh and hardened concrete being **recycled**. Surplus concrete may be returned from the construction site to the manufacturing site but there is a need to collect data and develop targets for reduction.

Hardened cement-sand slurry and returned concrete is generally be **recycled** as fill material in places on the concrete plant's property. Concrete waste will be used in

concrete testing block. Testing is done to determine material specifications. These waste materials are transported off-site and disposed of in landfill.

The MCA batching plant donates concrete solid waste to monasteries, schools and some societies for landfill purposes and any reuse as a road base purpose.

Ready-mixed concrete does not require packaging. Admixtures and additions are mainly delivered in reusable containers.

Hazardous solid waste

All hazardous wastes shall be handling in a way that meets the requirements of the hazardous waste section of the Environmental Management Plan and hazardous waste should not be disposed of with general waste.

Some examples of hazardous wastes that may exist at a concrete plant are: motor oil, oily rags, used oils, spent chemicals (admixture), empty chemical containers, cleaners, fuel, etc. The MCA plant shall segregate the wastes into reusable wastes, hazardous wastes and domestic wastes. Empty chemical containers are sending back to the supplier and sold to recycler.

Disposing

For disposing some domestic waste such as plastic bags, plastic water bottles, papers, broken glasses, packing paper and putrid foods and other wastes from factory, they are transported by the factory arrangement to be discarded at the destined site as directed by Industrial Zone Management Committee, City Development Committee. Waste amount is 15 kg per month.

Figure 5.15 Concrete Waste Area to be Recycled for Landfill

Figure 5.16 Testing Block Area

(Recycled from Surplus Concrete/Returned Concrete)

5.12.2 WASTE WATER

The main sources of wastewater at batching plants are:

1) waste water generated from water sprayed dust control
2) wastewater from truck wash systems
3) washing of central mixing plant

Wash water discharge from truck wash contains cementitious materials and chemical admixture residue. Due to the high content of dissolved limestone solids the wash water is caustic and has a high pH value. In general the waste water contains dissolved solids which include: sulfates and hydroxides from cement, chlorides from the use of calcium chloride as an admixture, oil and grease from the equipment, and small quantities of other chemicals associated with chemical admixtures.

Daily flow rate of waste water is 50 gallons day. Mostly, truck wash is done at the construction site. Bago Batching Plant currently **reuses** the washing wastewater at the batching site to harden the land property.

Bago Batching Plant has a plan to establish wastewater holding ponds.

In order to prevent contamination to the underground water, frequent cleaning and pumping out of septic tank are done.

5.12.3 HAZARDOUS SOLID WASTE

All hazardous wastes should be handling in a way that meets the requirements of the hazardous waste section of the Environmental Management Plan and hazardous waste should not be disposed of with general waste.

Some examples of hazardous wastes that exist at a concrete plant are: motor oil, oily rags, used oils, spent chemicals (admixture), empty chemical containers, cleaners, fuel, etc.

The MCA plant shall segregate the wastes into reusable wastes, hazardous wastes and domestic wastes. Empty chemical containers are sending back to the supplier and sold to recycler. Used oil is sold to recycler.

5.13 DECOMMISSION ACTIVITIES

During this phase the plant site will be decommissioned and closed. Works involve the removal of machinery, equipment, vehicles, the dismantling and tearing down of building and structures.

As the Contractors are responsible for environmental conservation, in accordance with the contract, the Contractors shall restore the project site to original conditions before handing over the site to the Project Proponent as follows;

- Site cleaning
- Erosion and sediment control
- Removal of materials from site

a. Site cleaning

During this phase, works involve the removal of machinery, equipment, vehicles, the dismantling and tearing down of building and structures. All buildings and free standing and underground structures (e.g. piping, underground tanks,) shall be removed.

Movable equipment would be moved to another site location (detailed in "Removal of Movable Equipment"). Once all usable equipment and facilities have been removed from site the next step would be the dismantling of the remaining equipment and segregation of components into various material types for sale as scrap.

Dismantling activities for structure for machine, concrete mixer, conveyor, water tank, weighing batchers, admixture tank, silo will occur after project implementation. The dismantled material shall be stored in isolated units.

Where buildings and structures (dormitory, aggregate shed) to be removed, they will be demolished with reusable or recyclable waste removed from site. All fixed and mobile equipment with marketable value will be removed from site and sold or reused wherever possible.

Sand, rock, and cement stored on site will be checked for condition and either returned to the supplier or transport to another SCG plant site.

During the initial closure stage, the generator shall be used for on-going activities. At the end of the closure phase, the remaining generator will be removed from the site.

The presence of a water supply (tube well) may provide much needed infrastructure to the industrial opportunities, due to the cost of establishing such facilities. Project proponent shall transfer of these assets to the industrial management committee.

b. Erosion and Sediment Control

a) Restore Drainage;

Land shall be levelled to ensure that run-off water drains without eroding soil or stagnating in pools.

b) Rehabilitated

Main works will include backfilling of washout pits and leveling of the ground. Sharp or unstable items shall be rendered inoffensive. Industrial management can use the site without inheriting significant future liability.

c. Removal of Materials from Site

Movable equipment both motorized such as motor vehicles, truck mixer, etc. and non - motorized such as furniture, computers and other office equipment, etc. would be moved to a central location.

Once the dismantling exercise has been completed the materials will be sold as scrap to the various scrap users. SCG company shall focus on maximising the opportunities for reuse of concrete foundations and frames. If the waste cannot be reused or recycled then it should be disposed of in an appropriately landfill facility.

Hazardous wastes are likely to include fuels, oils, contaminated soils and sludges, and components of equipment and machinery. Remaining unused acids, admixtures and other bulk products may be transferred to other plant site operations, provided they are transported safely and not mixed with other products.

6.0 BASELINE ENVIRONMENTAL AND SOCIAL QUALITY

6.1 CURRENT ENVIRONMENTAL PROFILE OF THE FACTORY

6.1.1 BACKGROUND HISTORY OF BAGO TOWNSHIP

ပဲခူးမြို့ကို ဟံသာဝတီဟုလည်းခေါ်ပါသည်။ ရှေးမြန်မာမင်း အစဉ်ဆက်တို့၏ မင်းနေပြည်တော်အဖြစ် ထီးနန်းစိုက်ခဲ့ရာ မြို့ ဖြစ်ပါသည်။ အထူးသဖြင့် မွန်တို့ကြီးစိုးခဲ့ရာ မြို့တော်တည်ရှိမည့် နေရာသည် ဘုရားဗျာဒိတ်တော်နှင့် အညီ ဖြစ်သည်ဟုသိရ၏။ ရှေးယခင် ဂေါတမမြတ်စွာဘုရား သက်တော် ထင်ရှား ရှိစဉ် ဝါတော်(၆)ဝါ ရသောအခါ ရာမညဒေသ မွန်ပြည်နယ်တည်ရှိရာ သထုံသုဝဏ္ဏ (ဘူမိ) မှ လည့်လည်ကြွချီရာတွင် မြတ်စွာဘုရားသည် ဟံသာဝတီမြို့တော်ကြီး ပေါ်ထွန်းမည့်နေရာသို့ ရောက် ရှိရာ၌ ပင်လယ်ပြင်မှ ပေါ်ထွန်းစ ကုန်းမြေအငူသို့ရောက်ရှိရာတွင် ဟင်္သာဖိုမ တို့ကို တွေ့မြင် တော်မူလေသည်။ ကုန်းမြေမှ ကျဉ်းမြောင်း၍ ဟင်္သာဖိုမ ယှဉ်တွဲနားနေစရာ မရှိသောကြောင့် ဟင်္သာဖို၏ ကျောကုန်းပေါ်၌ ဟင်္သာမ နားရလေသည်။ ဘုရားရှင်ကို ဖူးမြင်ရသော အခါ ဟင်္သာ မောင်နှံသည် တောင်ပံကိုယှက်၍ ဘုရားရှင်အား ပူဇော်ပသမှု ပြုကြလေသည်။ ဤနေရာ၌ နောင်တွင် ဟံသာဝတီပြည်ကြီး တည်ထွန်းလာမည့် အကြောင်းနှင့် မြတ်စွာဘုရား သာသနာတော်ကြီး စည်ပင် ဖွံ့ဖြိုးလာမည့် အကြောင်း ဗျာဒိတ်ပေးတော်မူခဲ့သည်။ ဘုရားရှင်၏ ဗျာဒိတ်တော်နှင့် အညီ ဟံသာဝတီ ကို ခရစ်နှစ် (၈၂၅) တွင် သမဂ္ဂ၊ ဝိမလညီနောင်တို့မှ စတင်တည် ထောင်ခဲ့ပြီး ဟံသာဝတီမြို့တည် နှစ်ကြိမ် ဖြစ်ပေါ်ခဲ့သည်။ ဟံသာဝတီဟူသောအမည်သည် ဟင်္သာတို့ ကျက်စားပျော်ပါးရာ ဖြစ်၍ နယ်ပယ်ကူး၊ ဥပယ်ခိုး၊ ပဲခူးဟူ၍ရှိသည်။ တချို့ပညာရှင်များက ဟင်္သာသည် ဝမ်းဘဲငှက် အမျိုး အစားဖြစ်၍ ဝမ်းဘဲငှက်တို့ လူးလာပျံခတ် ပျော်ပါးရာဖြစ်၍ ဝမ်းဘဲကူး ဟုခေါ်ကြောင်း၊ အချို့ကလည်း တိုင်းတစ်ပါးသားတို့ မကြာခဏ နယ်ပယ်ကူး၍ တိုက်ခိုက်လာခြင်း ကြောင့် နယ်ပယ်ကူးကမှ တဆင့် ပဲခူးဟု တွင်ခဲ့သည်။

Table 6.1 Particulars of nearby Townships

Sr.	Township	Sq. Mile	Town	Sq. Mile
1	Bago	1121.66	Bago-	18.45
2			Hpayar Gyi	7.04
3			Inn Ta Kaw	37.33
Total		1121.66	-	62.82

Source: “ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019”

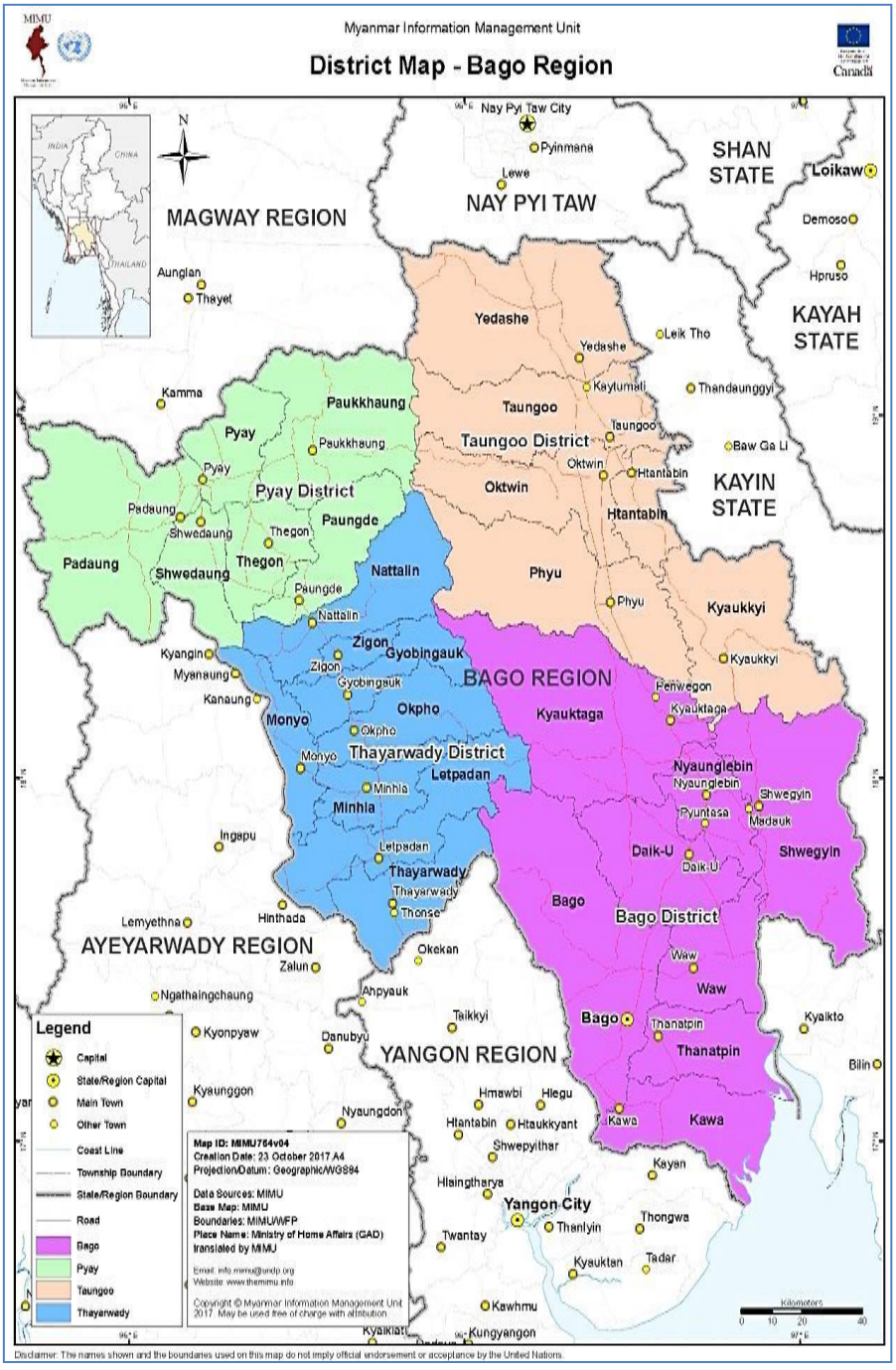


Figure 6.1 Bago Region and Township Map

6.2 LOCATION AND SPATIAL BOUNDARIES OF THE FACTORY

SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant is located at No.39 (D), Otthar (9) Ward, Nyaung Inn Village, Industrial Special Zone (1), Bago Township, Bago Region, Myanmar at the coordinates 17° 16′ 49.96″ N and 96° 27″ 0.82″ E.

Being situated in industry zone, the surrounding land use is industrial land use and factories are scattered in the area with low density. The nearby land use comprises other factories and industries such as New Hope Hatchery (Livestock Breeder), Sein Hninthar Food Industry, and Brew Master Co. Ltd (Beer Distributor).

The surrounding conditions of the project site are as follows:

East : Land Plot (Industrial Land)
West : Land Plot (Industrial Land)
South : Street, Land Plot (Industrial Land)
North : Land Plot (Industrial Land)

Figure 6.2 Location Map of the Factory with Surrounding Land Use

6.3 TOPOGRAPHY

Bago is situated in drainage area of the Eastern Bago Yoma. Weatern part of the township is highland with dense forest area. Northern part is higher and reserved forest.

The surrounding terrain of the factory contains only modest variations in elevation, the elevation the surrounding area approximately ranges from +95 ft to +120 ft. The ground elevation around the factory approximately ranges from + 105 ft to +107 ft.

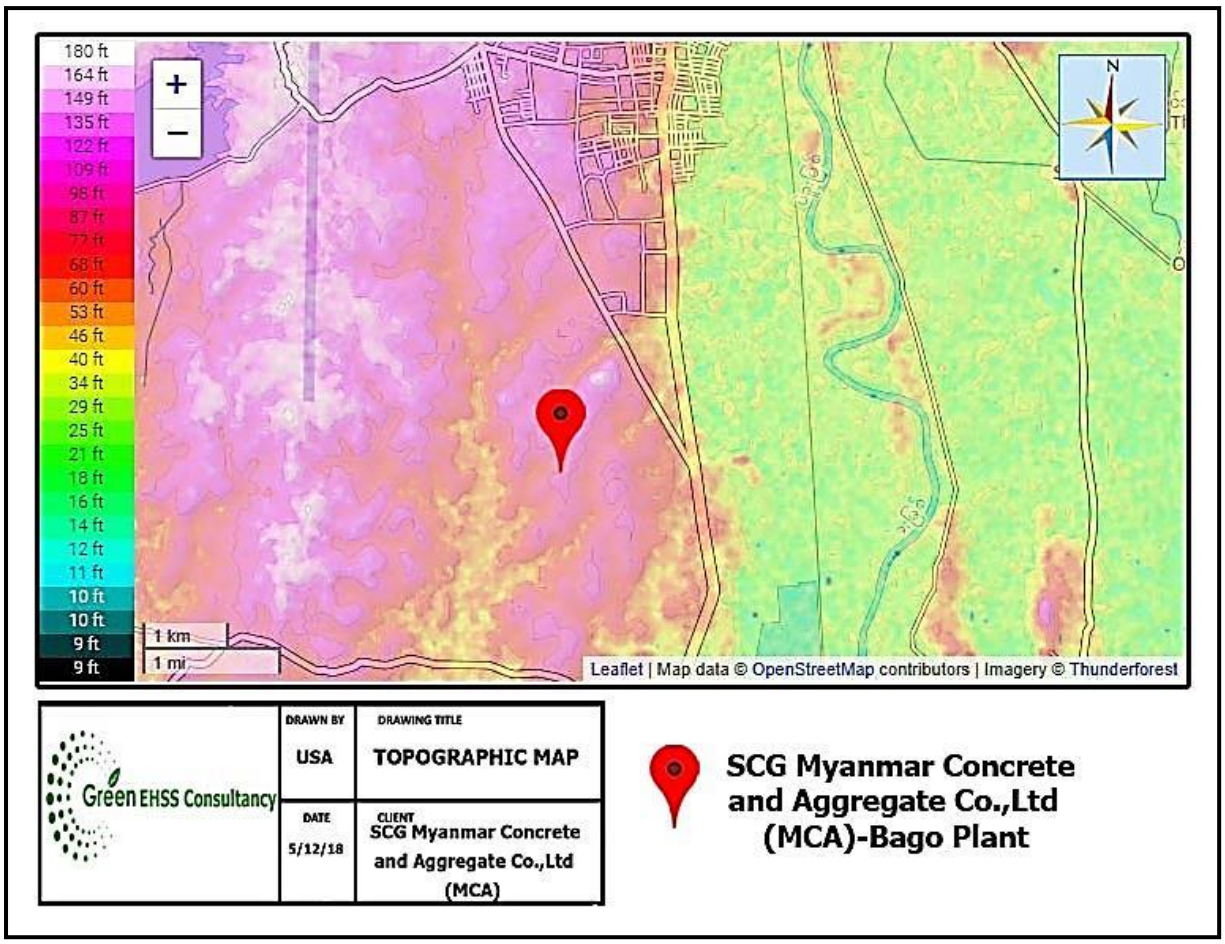


Figure 6.3 Map Showing Topographic Feature of Surrounding Area

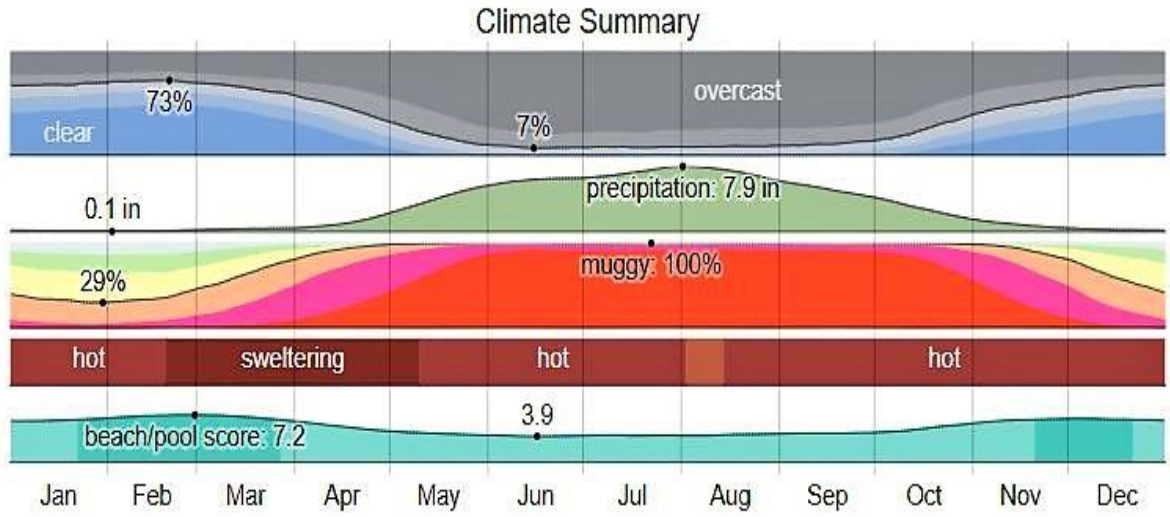
6.4 CLIMATE

Climate in Bago Township has a tropical climate. Generally the maximum temperature is 39.80°C and minimum temperature is 16.40 °C. The annual temperature and rainfall data are tabulated as follows:

Table 6.2 Precipitation and Temperature of Bago Township

Sr.	Year 2018	Precipitation		Temperature	
		Rainday Day	Total Rainfall (inches)	Hot Season (°C)	Cold Season (°C)
				Maximum	Minium
1	April	3	4.49	39.3	20.0
2	May	12	18.15	38.5	20.0
3	June	25	22.36	33.8	21.3
4	July	29	44.21	31.5	22.4
5	August	26	25.39	33.4	23.0
6	September	21	17.80	35.0	23.6
7	October	8	9.17	-	-

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

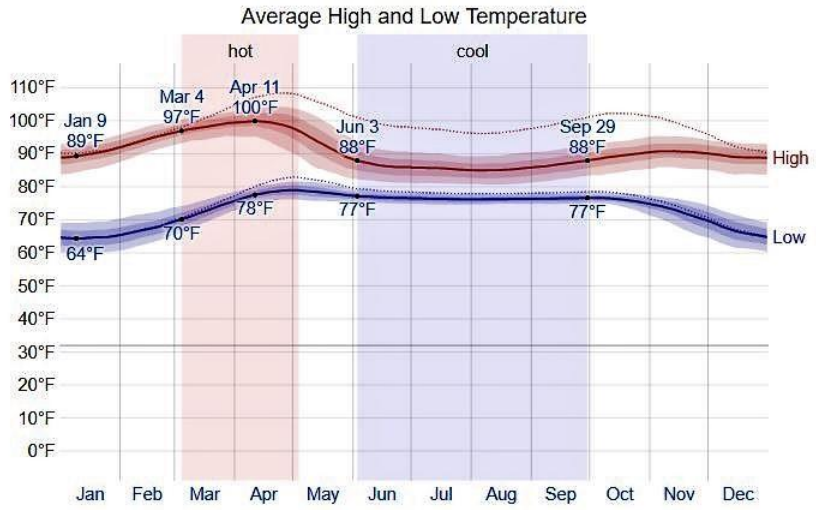


Source: https://weatherspark.com/y/112638/Average-Weather-in-bago-Myanmar-(Burma)-Year-Round

Figure 6.4 Climate Summary

6.4.1 TEMPERATURE

The hot season lasts for 2.0 months, from March 4 to May 4, with an average daily high temperature above 97°F. The hottest day of the year is April 11, with an average high of 100°F and low of 78°F. The cool season lasts for 3.9 months, from June 3 to September 29, with an average daily high temperature below 88°F. The coldest day of the year is January 9, with an average low of 64°F and high of 89°F.



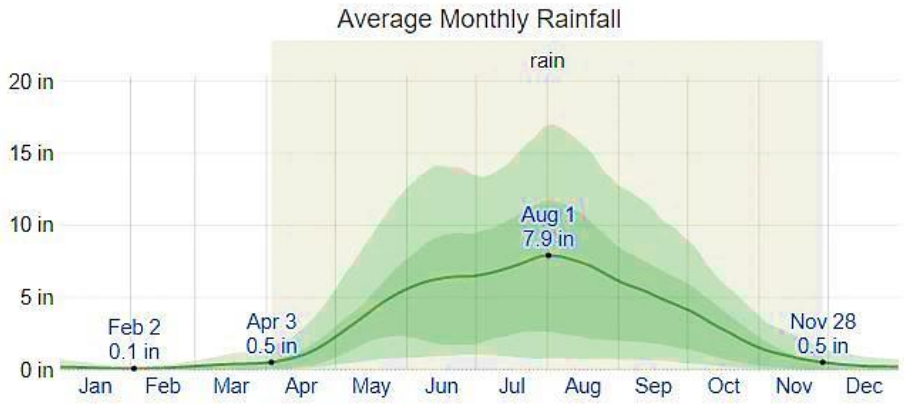
Source:https://weatherspark.com/y/112638/Average-Weather-in-Bago-Myanmar-(Burma)-Year-Round

Figure 6.5 Average High and Low Temperature

6.4.2 PRECIPITATION

The rainy period of the year lasts for 7.8 months, from April 3 to November 28, with a sliding 31-day rainfall of at least 0.5 inches. The most rain falls during the 31 days centered around August 1, with an average total accumulation of 7.9 inches.

The rainless period of the year lasts for 4.2 months, from November 28 to April 3. The least rain falls around February 2, with an average total accumulation of 0.1 inches.

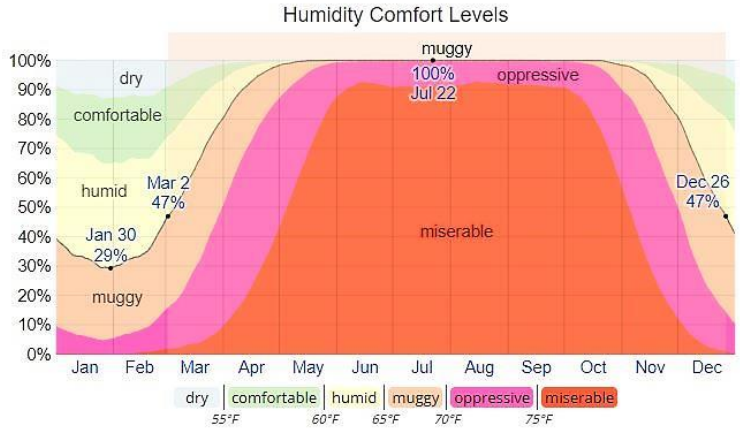


Source: https://weatherspark.com/y/112638/Average-Weather-in-Bago-Myanmar-(Burma)-Year-Round

Figure 6.6 Average Monthly Rainfall

6.4.3 HUMIDITY

The comfort level humidity is based on the dew point. Lower dew points feel drier and higher dew points feel more humid. Dew point tends to change slowly and muggy day is typically followed by a muggy night. Bago experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for 9.8 months, from March 2 to December 26, during which time the comfort level is muggy, oppressive, or miserable at least 47% of the time. The muggiest day of the year is July 22, with muggy conditions 100% of the time. The least muggy day of the year is January 30, with muggy conditions 29% of the time.



Source:https://weatherspark.com/y/112638/Average-Weather-in-Bago-Myanmar-(Burma)-Year-Round

Figure 6.7 Humidity Comfort Levels

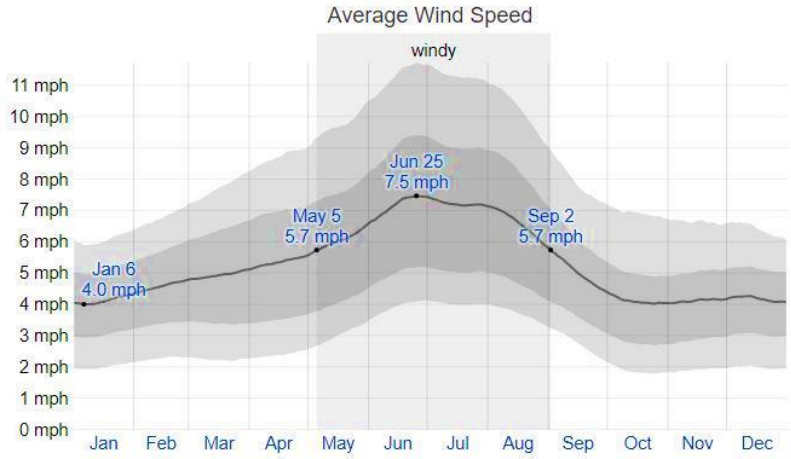
6.4.4 WIND DIRECTION AND WIND SPEED

The average hourly wind speed in Bago experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 3.9 months, from May 5 to September 2, with average wind speeds of more than 5.7 miles per hour. The windiest day of the year is July 25, with an average hourly wind speed of 7.5 miles per hour.

The calmer time of year lasts for 8.1 months, from September 2 to May 5. The calmest day of the year is January 6, with an average hourly wind speed of 4.0 miles per hour.

The wind is most often from the south for 1.5 months, from January 1 to February 16 and for 5.9 months, from April 26 to October 22, with a peak percentage of 71% on June 18. The wind is most often from the west for 2.3 months, from February 16 to April 26, with a peak percentage of 47% on April 15. The wind is most often from the east for 2.3 months, from October 22 to January 1, with a peak percentage of 52% on December 4.



Source:https://weatherspark.com/y/112638/Average-Weather-in-Bago-Myanmar-(Burma)-Year-Round

Figure 6.8 Average Wind Speed

6.5 NATURAL VEGETATION AND WILD LIFE

From the environmental impact point of view, biological resources are not relevant to the project as it is located in the Industrial Zone. In addition, within the factory area, there are no forests and protected land.

Table 6.3 Existing Condition of Ecological Resources

Ecological Resources	Existing condition
Fisheries, aquatic biology	The nearest river Bago River is 2.3 mile east of the factory. Fresh water fish species are residing in the river.
Wildlife	Non existence
Forests	Non existence
Rare or endangered species	Non existence
Protect areas	The nearest protected areas is Moe Yin Gyi Wildlife Reserve which is located 22 mile north of the factory.

6.6 HAZARD CONSIDERATION

6.6.1 EARTHQUAKE

By the global scope of geology, Myanmar lies in one of the great earthquake provinces called the Alpine Earthquake Belt. Therefore, minor to catastrophic earthquakes has occurred many times in the territory of Myanmar since long ago.

The buildings and structures where they are constructed at or near seismic distribution zone are possible to experience some destruction due to ground shaking effect during earthquake event. Hence, the building or structures has to be considered possible of destruction due to earthquake. Due to this unstable activity of ground earthquake occurrences can expect at any time in Myanmar.

6.6.1.1 EARTHQUAKE INTENSITY OF MYANMAR

Earth quake intensity in the area can be seen in Figure 6.9. The map is an earthquake probable intensity zoning map. The approach is mainly empirical and historical in the sense that it makes use of past seismic event and history to make educated guesses about region wide intensities in the future. It is hoped that a probabilistic seismic risk (or earthquake hazard map) on horizontal ground acceleration should be taken into account in the design.

As shown in the map, five seismic zones are demarcated and named (from low to high) **Zone I (Low Zone), Zone II (Moderate Zone), Zone III (Strong Zone), Zone IV (Severe Zone),** and **Zone V (Destructive Zone),** mainly following the nomenclature of the European Macro seismic Scale 1992. For each zone, a probable range of ground acceleration in g values and equivalent Modified Mercalli (MM) Scale classes are given. The highest intensity zone designated for Myanmar is the **Destructive Zone (**with probable intensity range of 0.4 – 0.5 g) which is equivalent to MM class IX. There are four areas in that zone; namely, Bago-Phyu, Mandalay-Sagaing-Tagaung, Putao-Tanaing, and Kale Myo-Homalin areas. The latter two, however, would not have major earthquake hazards as they are only sparsely populated. Important cities and towns that lie in **Zone IV** (Severe Zone, with probable intensity range of 0.3 – 0.4 g) are Taungoo, Taungdwingyi, Bagan-Nyaung-U, Kyaukse, PyinOoLwin, Shwebo, Wuntho, Hkamti, Haka, Myintkyina, Taunggyi, and Kung Long. Regarding the Modified Mercalli (MM) Scale classes, the level of probable damage and destruction may be summarized as in Table 6.4.

According to the seismic zone map of Myanmar (after Dr. Maung Thein et.al, 2005 Dec), the Plant area is shown in Figures 6.9, the probable ground peak acceleration when earthquake occur will be 0.4g.

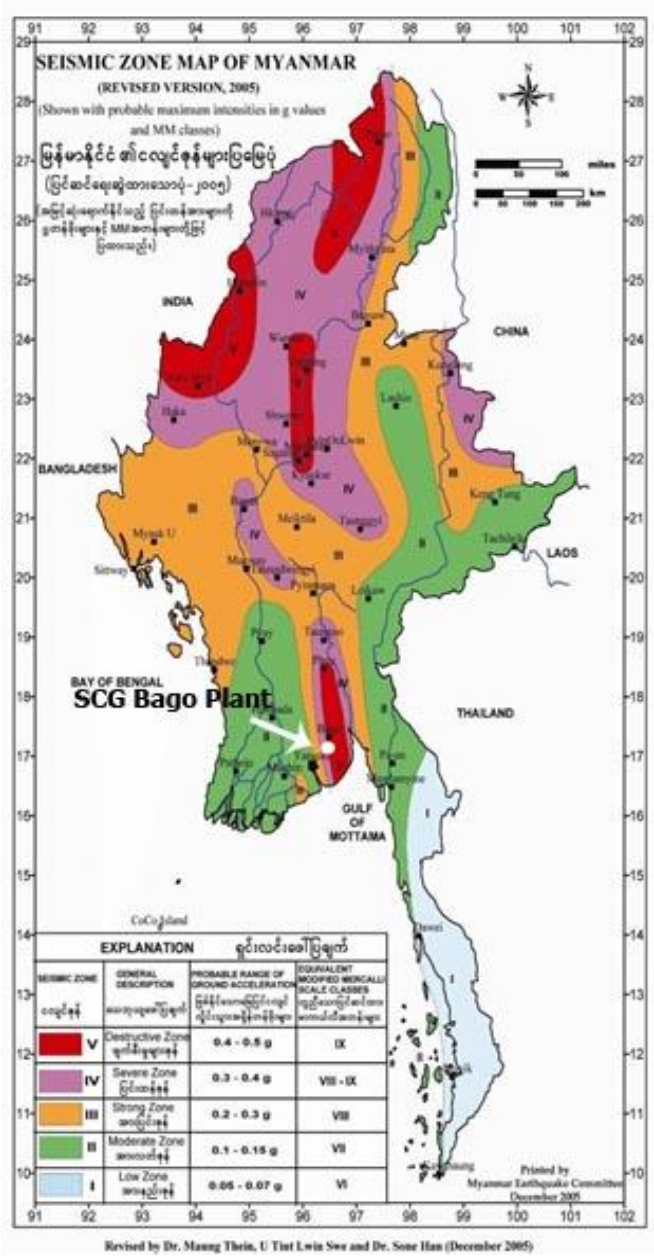


Figure 6.9 Seismic Zone Map of Myanmar and Plant area

Table 6.4 Level of Probable Damage and Destruction

Zone	MM Class	Probable Damage	Examples of Damage
V	IX	Major damage	Considerable damage in specially designed structures Major damage in good RC buildings
IV	VIII-IX	Considerable damage	Considerable damage in good RC buildings Major damage in ordinary brick buildings
III	VII	Moderate damage	Moderate damage in good RC buildings Considerable damage in ordinary brick buildings
II	VII	Minor damage	Minor damage in good RC buildings Moderate damage in ordinary brick buildings
I	VI	Slight damage	Minor damage in ordinary brick buildings

6.6.2 FLOOD

Myanmar is prone to various natural hazards that include earthquakes, floods, cyclones, droughts, fires, tsunamis, some of which have the potential to impact large numbers of people.

Since 2002, more than 13 million people have been affected by natural disasters, including three Category 4 cyclones, several major earthquakes, and in 2015 the country experienced the worst flooding in decades. In 2008, Cyclone Nargis devastated southern Myanmar, killing 140,000 people and causing extensive damage to infrastructure.

Bago City is situated in lowlying plain and flood occurs frequently in the township. Flood is the main source of natural hazard.

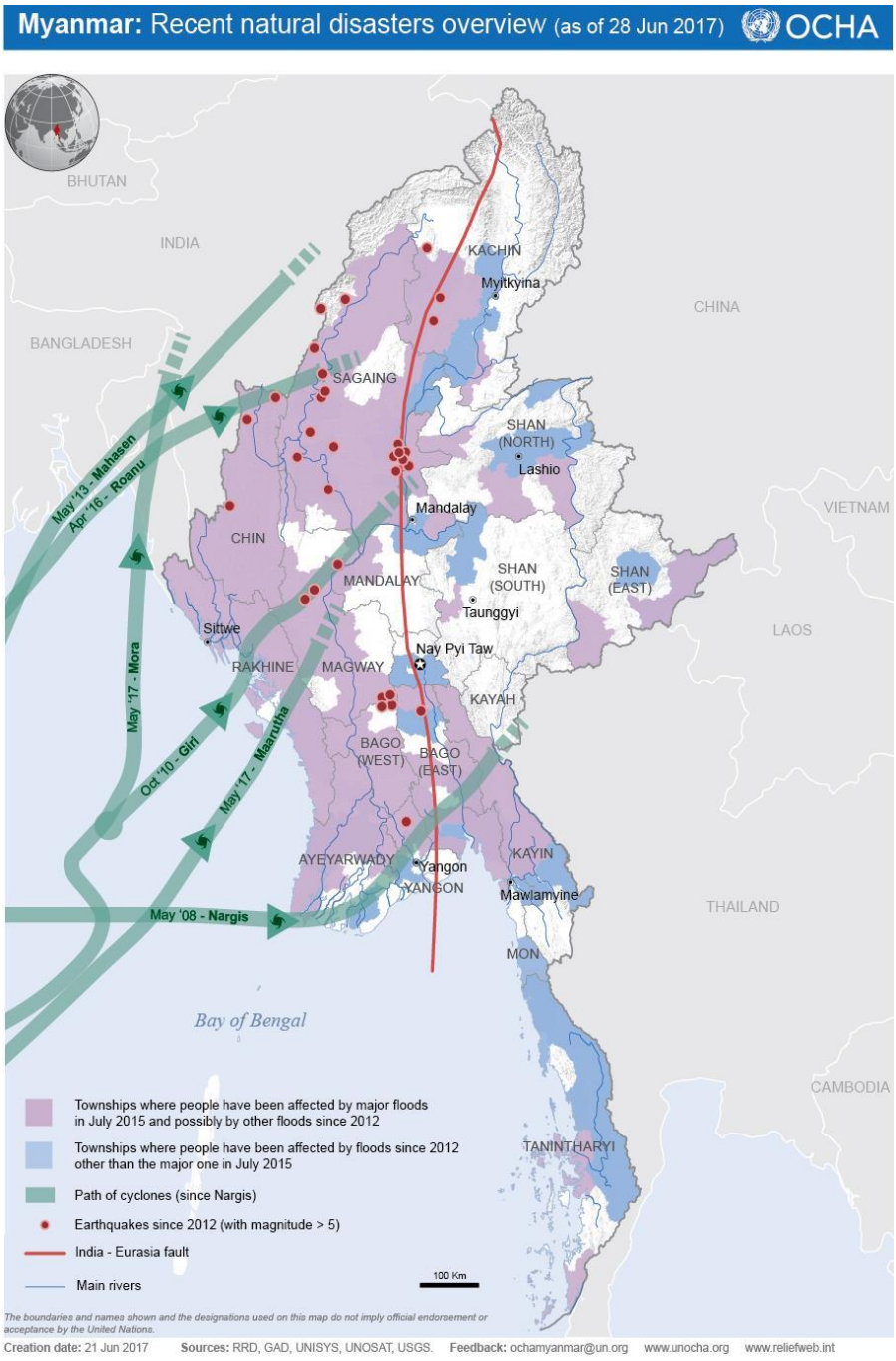


Figure 6.10 Natural Disasters Overview Map of Myanmar

6.7 LAND USE

Agricultural and gardening are the dominant land use in **Bago Township**. Bago Township is 1,121.66 square miles (717,862.4 acres). Agricultural land use is 104,772 acres, *Kaing Kyun* land use is 5906 acres, gardening land use is 94,799 acres, pasture land use is 5189 acres, industrial land use is 1775 acres, urban and settlement land use is 30,100 acres, reserved forest is 395,851 acres and bare land is 78,487 acres.

SCG Myanmar Concrete and Aggregate Company Limited (MCA) - Bago Batching Plant is situated in Industrial Special Zone (1) and current land use is industrial land use. Being situated in industry zone, the surrounding land use is industrial land use and factories are scattered in the area with low density. The nearby land use comprises other factories and industries such as New Hope Hatchery (Livestock Breeder), Sein Hninthar Food Industry, and Brew Master Co. Ltd (Beer Distributor).

6.8 SOIL COMPOSITION OF THE PLANT AREA

According to the FAO / UNESCO Soil Classification, the soil compositions around the plant area include Dystric Nitosols (Figure 6.11).

Nitosol is a deep, red, well-drained tropical with diffuse horizon boundaries and a subsurface with a clay content of more than 30% and moderate to strong angular blocky structure element that easily fall apart into characteristic shiny, polyhedric elements.

Parent material and environment

Parent material: finely textured weathering products of intermediate to basic parent rocks, possibly rejuvenated by recent admixtures of volcanic ash. The clay assemblage is dominated by kaolinite. Nitisols are rich in Fe and have little water-dispersible (natural) clay.

Environment: Nitisols are predominantly found in level to hilly land under tropical rain forest or savannah vegetation.

Characteristics of Nitisols

a. Morphological characteristics

- Nitisols are normally deeper than 150 cm and dusky red or dark red in color.
- They are well-drained soils with a clayey subsurface horizon that is deeply strechted and has nutty or polyhedric blocky structure elements with shiny ped faces.

b. Physical characteristics

Normally, they have a good soil structure, good porosity and good water holding capacity and very good rootability.

However, depending on their clay content they might be hard when dry and sticky when wet.

c. Biological characteristics

Intense faunal activity and termites are accountable for the typical gradual horizon boundaries of Nitisols. (Termites) are particularly effective in homogenizing soil.

Dystric Nitosols have a base saturation of less than 50 percent in at least a part of the B horizon within 125 cm of the surface.

Suitable Crops

Forest, Orchards, Groundnut, Sesame, Upland crops are suitable for Nitosols.

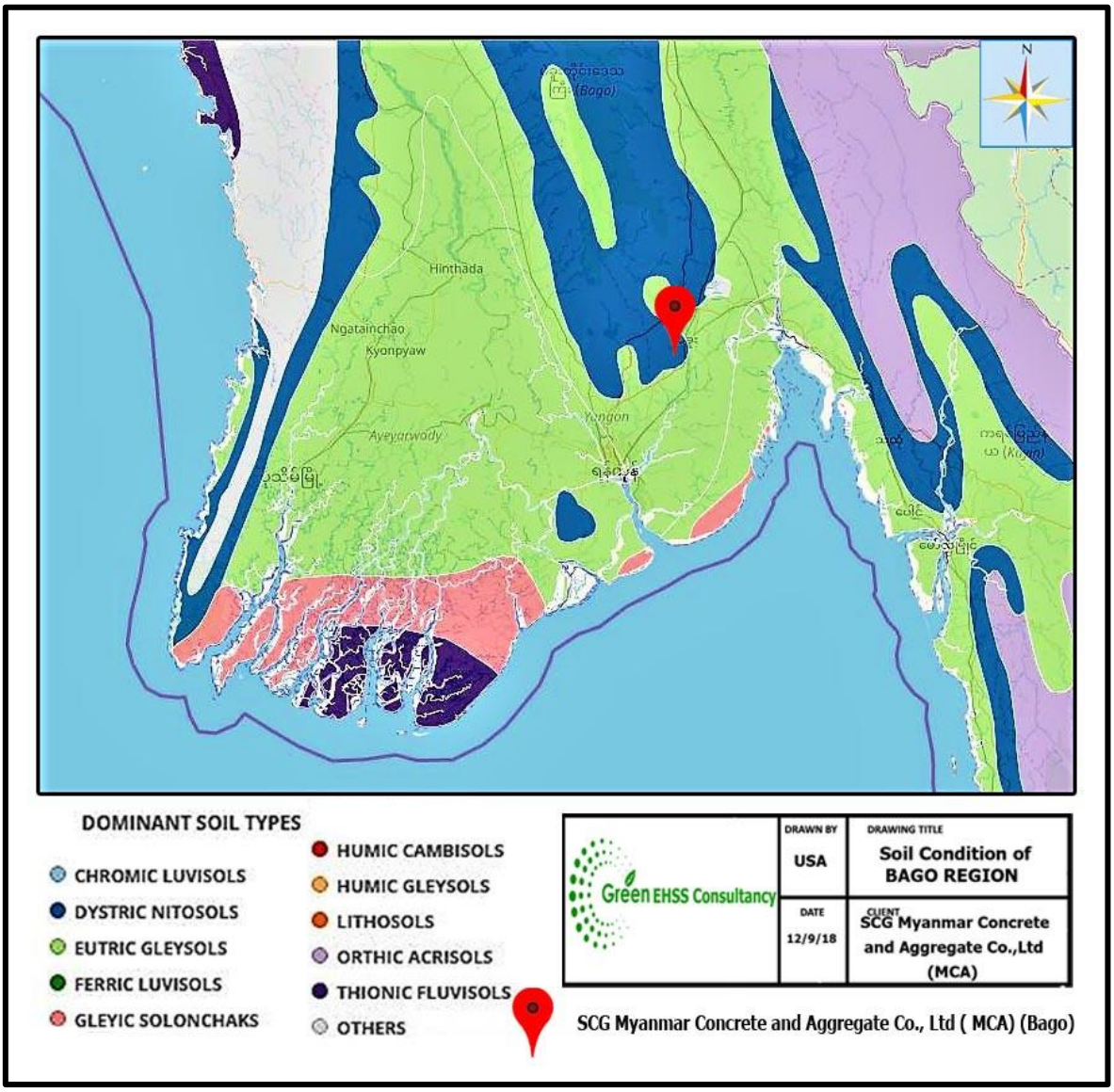


Figure 6.11 Soil Map of Factory

6.9 WATER QUALITY

Water supply during operation is extracted from the tube well water. Domestic wastewater from toilets is disposed in the septic tank.

Batching plant uses tube well tap water for process water and sanitation. Factory arranges purified drinking water for all employees.

6.9.1 GROUND WATER QUALITY

The ground water quality analyzed from a tube well (treated) located in the factory area can provide some indications of water quality of the factory. Table 6.7 shows the baseline data of ground water quality in December, 2018.

6.9.1.1 METHODOLOGY

Ground water sampling was collected and transporting to the laboratory. Water samples have been sent to laboratory of **"Myanmar Water Engineering & Products Co., Ltd.** All of the test items are listed below as:

1) Turbidity
2) pH
3) Total Dissolved Solid
4) Total Alkalinity
5) Total Hardness
6) Iron
7) Conductivity
8) Chloride
9) Colour
10) Temperature

Table 6.5 Geographic Position of Monitoring Points

No.	Location	North	East
1	Tube Well	17° 16′ 49.5″	96° 27′ 00.9″

6.9.1.2 WATER QUALITY STANDARD

Table 6.6 WHO Drinking Water Quality Standards

Parameters	WHO Standard
pH	6.5-8.5
Colour	Clear
Total Dissolved Solid	<250
Total Hardness	<16
Total Alkalinity	<250
Calcium	<8
Magnesium	<8
Iron	<0.3
Chloride	<250
Bicarbonate	<250
Carbonate	<250
Hydroxide	<100

6.9.1.3 GROUNDWATER QUALITY ASSESSMENT RESULTS

The ground water quality analyzed from a tube well (treated) located in the factory area can provide some indications of water quality of the factory.

Table 6.7 Ground Water Quality

Parameters	Sample Result	WHO Standard
Temperature		- -
pH	7	6.5 - 8.5
Colour	Clear	Clear
Conductivity	453.13 micro S / cm	
Total Dissolved Solid	290 mg/l	< 250
Total Hardness	20 mg /l as $CaCO_3$	<16
Total Alkalinity	180 mg /l as $CaCO_3$	<250
Sodium (as Na^+)	-	-
Calcium (as Ca^{++})	4 mg /l as $CaCO_3$	<8
Magnesium (as Mg^{++})	2.39 mg /l as $CaCO_3$	<8
Potassium (as K^+)	- -	-
Iron (as Fe^{++})	0.05 mg /l	<0.3
Chloride (as Cl^-)	15 mg /l	<250
Sulphate (as $SO_4^=$)	- -	-
Bicarbonate (as HCO_3^-)	180 mg /l as $CaCO_3$	<250
Carbonate (as $CO_3^=$)	ND mg /l	<250
Hydroxide (as OH^-)	- - mg /l	<100

Conclusion

According to the result, water condition is slightly high total hardness content.

Batching plant uses tube well tap water for process water and sanitation. Factory arranges purified drinking water for all employees.

6.9.2 WASTE WATER QUALITY

The main sources of wastewater at batching plants are:

1) waste water generated from water sprayed dust control
2) wastewater from truck wash systems
3) washing of central mixing plant

6.9.2.1 METHODOLOGY

Wastewater sampling was taken and transported to the laboratory.

In order to monitor the wastewater quality, wastewater sample was taken from the plant site and transported to the laboratory on 11 January 2019. Water sample had

been sent to laboratory of **"Amd" Water and Wastewater Treatment Division.** Parameters of wastewater including pH, Dissolved oxygen (DO), Biochemical Oxygen Demand (BOD), chemical oxygen demand (COD), nitrate (NO_3N) and total suspended solids (TSS) were analyzed. Table 6.9 shows the results of the physico-chemical parameters.

Table 6.8 Geographic Position of Monitoring Points

No.	Location	North	East
1	Near Mixer Plant	17° 16′ 49.3″	96° 27′ 00.9″

6.9.2.2 WASTEWATER QUALITY ASSESSMENT RESULTS

Following table shows the results of the physico-chemical parameters. According to the baseline data, COD and BOD values are within the limit and other values are within the guideline.

Effluent quality values of BOD, COD and TSS are showed with mg/l and compare with NEQEG (Construction Materials Extraction) in Table 6.9.

Table 6.9 Wastewater Quality (Effluent Level)

Parameters	Unit	Wastewater Outside Drainage	National Environmental Quality (Emission) Guidelines Construction Materials Extraction
Biochemical Oxygen Demand	mg/l	22.5	30
Chemical Oxygen Demand	mg/l	0	125
Dissolved Oxygen (DO)	mg/l	2.5	°C
pH effluent water	-	8.58	6~9
Total suspended solids (TSS)	mg/l	8	50

6.10 AIR QUALITY

Before starting this industrial zone, there were no baseline data for dust and greenhouse gas pollution.

Air quality is composed of dust and gas emission of ambient air. Gas emissions which can reduce ambient air quality are Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_x), Carbon Monoxide (CO), Carbon Dioxide (CO_2), and Ozone (O_3).

6.10.1 METHODOLOGY

The air quality monitoring is performed by using Aeroqual Series 500 Air monitoring device from New Zealand and 770-1100 HAZ-DUST I, Aerosol Monitor, 110-240V from USA. The Aerosol Sensor heads for Carbon Monoxide, Nitrogen Oxide and Sulphur Dioxide and H_2S. Aerosol monitor is used to monitor dusts. PM2.5 and PM10 were monitored by using HOLDPEAK 5800D $PM_{2.5}$/PM_{10} Monitor Detector. Carbon dioxide concentration was measured with Carbon Dioxide sensor meter M0198132S.

Air monitoring activities were taken on 10 December 2018 to 11 December 2018 (24 hours). The sampling points were selected based on emission sources within the plant premise and to cover all direction of the plant.

The following reasons are considered in selection of the monitoring points of the project.

- In accordance with the nature of the plants' processes, it can be considered as a smallscale plant.
- The Batching plant' processes considerably create less environmental and social impacts due to nature of operation and existing impact mitigation measures.
- Monitoring points are selected based on sensitivity of the receptors.

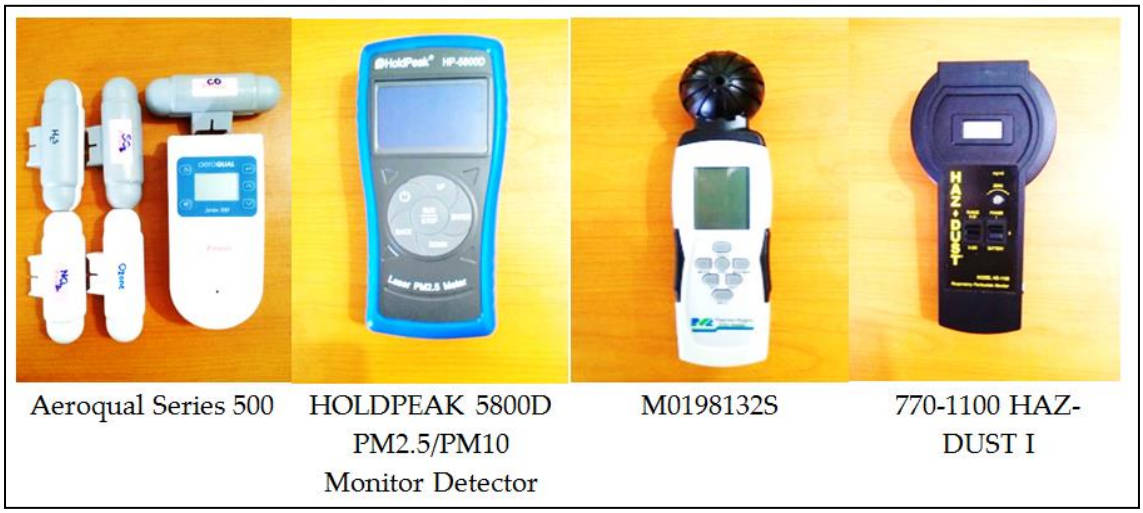


Figure 6.12 Photos of Air Monitoring Devices

6.10.2 AMBIENT AIR QUALITY STANDARDS

The values of air quality parameters were much below the permissible maximum values prescribed in the Ambient Air Quality Standard of National Environmental Quality (Emission) Guidelines as shown in the following Table. These values shall be applied by all project to ensure that air emission conform to good practice.

Table 6.10 Air Quality Standards

Parameter	Averaging Period	Guidelines Value µg/m³
Nitrogen Dioxide	1-year 1-hour	40 200
Ozone	8-hours daily maximum	100
Particular matter PM_{10}[a]	1-year 24-hour	20 50
Particular matter $PM_{2.5}$[b]	1-year 24-hour	10 25
Sulphur Dioxide	1-hour 10-minute	20 500

[a] Particular matter 10 micrometer or less in diameter

[b] Particular matter 2.5 micrometer or less in diameter

Source: National Environmental Quality (Emission) Guideline for Myanmar, 2015 Dec 29

6.10.3 AIR MONITORING POINTS

EMP team conducted ambient air quality monitoring at total 5 points in and around the factory on 10 December 2018 to 11 December 2018.

Figure 6.13 Air Quality Monitoring

Table 6.11 Geographic Position of Monitoring Points

No.	Location	North	East
1	Car Parking	17° 16′ 48.9″	96° 27′ 00.7″
2	Mixing Plant	17° 16′ 49.4″	96° 27′ 01.1″
3	Center of the factory area	17° 16′ 50.4″	96° 27′ 01.0″
4	South of the factory area	17° 16′ 48.5″	96° 27′ 01.1″
5	North of the factory area	17° 16′ 51.5″	96° 27′ 01.0″

6.10.4 AIR MONITORING RESULTS

Table 6.12 Air Quality Measured at the Factory

Area	H_2S ppm	SO_2 ppm	NO_2 ppm	CO ppm	CO_2 ppm	O_3 ppm	$PM_{(2.5)}$ $\mu g/m^3$	$PM_{(10)}$ $\mu g/m^3$
Car Parking	0.0	0.00	0.031	0.00	418	0.000	12.3	21.9
Mixing Plant	0.0	0.00	0.019	0.00	379	0.007	13.0	31.0
Center of the factory area	0.0	0.00	0.056	0.00	392	0.013	11.8	20.6
South of the factory area	0.0	0.00	0.021	0.00	363	0.000	16.4	29.7
North of the factory area	0.0	0.00	0.021	0.02	349	0.000	9.3	16.7
Average	0.016	0.00	0.029	0.003	385.5	0.003	14.03	27.1

Table 6.13 Comparison of Observed Values (WHO Air Quality Standards Criteria)

Parameter	Averaging Period	Guidelines Value ($\mu g/m^3$)	Observed Value ($\mu g/m^3$)
NO_2	1-hour	200	54.57
O3	8-hours daily maximum	100	0.00
$PM_{2.5}$	24-hour	25	14.03
PM_{10}	24-hour	50	27.1
SO_2	10-minute	500	0.00

Conclusion

The measured values of SO_2, NO_2, O_3, PM_{10} and $PM_{2.5}$ lie within the range of Air Quality Guidelines.

6.11 NOISE AND VIBRATION CONDITION

The main sources of noises during the operation period are from the production activities and functions.

6.11.1 METHODOLOGY

EMP Team conducted the noise measurement inside and outside of the building. In order to assess the noise levels from the potential noise sources, the noise levels are measured at potential sources by using a digital noise level meter, 5T436355.

Figure 6.14 Photos of Noise Monitoring Device

6.11.2 NOISE QUALITY STANDARDS

MONREC has issued National Environmental Quality (Emission) Guidelines to provide the basis for regulation and control of noise level. Noise impact should not exceed the levels presented in Table 6.14.

Table 6.14 Noise Level Standard

Receptor	One Hour LAeq (dBA)[a]	
	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

[a] Equivalent continuous sound level in decibels

6.11.3 NOISE MONITORING POINTS

EMP team conducted one hour noise quality monitoring at total 6 points in and around the factory on 10 December 2018 to 11 December 2018 (24 hours).

Figure 6.15 Noise Quality Monitoring

Table 6.15 Geographic Position of Monitoring Points

No.	Location	North	East
1	Wash Bay	17° 16′ 51.3″	96° 27′ 01.1″
2	Mixing Plant	17° 16′ 49.4″	96° 27′ 01.1″
3	Center of the factory area	17° 16′ 50.4″	96° 27′ 01.0″
4	South of the factory area	17° 16′ 48.5″	96° 27′ 01.1″
5	North of the factory area	17° 16′ 51.5″	96° 27′ 01.0″
6	Car Parking	17° 16′ 48.9″	96° 27′ 00.7″

6.11.4 NOISE MONITORING RESULTS

Table 6.16 Monitoring Measurement of Noise (dBA)

No.	Location	Measured Value (dBA)	Standard Value
1	Wash Bay	53.9	70
2	Mixing Plant	64.4	70
3	Center of the factory area	50.0	70
4	South of the factory area	64.1	70
5	North of the factory area	41.6	70
6	Car Parking	68.4	70

Conclusion

The measured values of noise are below the level of National Emission guidelines.

6.12 SOIL QUALITY

Soil pH within the Plant and around the Plant was measured by using Soil pH meter, Dr. Meter Soil Moisture Meter S30. Table 6.17 Summary of Soil pH results showed pH at the monitoring points lies within 6 to 7. It can be considered that soil quality around the processing areas and communities' lands are neutral, neither acid nor alkaline.

Table 6.17 Summary of Soil pH

Location	North	East	Soil pH
Within the factory (Near Centre)	17° 16′ 49.7″	97° 27′ 01.1″	7.6
Within the factory (North)	17° 16′ 51.2″	97° 27′ 01.0″	7.2
Outside the factory (East)	17° 16′ 49.8″	97° 27′ 01.7″	6.8
Outside the factory (South west)	17° 16′ 48.7″	97° 26′ 59.9″	7.0

Figure 6.16 Soil Quality Monitoring

6.13 TRANSPORTATION AND TRAFFIC INCREASING AND CONGESTION

The batching plant is located in Industrial Special Zone (1). Yangon – Taungoo-Mandalay Road is located approximately 1.1 mile east of the palnt. Bago Myo Shaung Road is located 0.8 mile east of the plant.

Ready-mixed concrete is locally supplied. The delivery process uses 3 concrete mixer trucks (Agitator) on Bago Myo Shaung Road to Yangon-Taungoo- Mandalay Road to factory earth road only three times/day.

The maximum delivery distance from the production site to the construction site is 5-mile radius and thus the environmental impact as a result of delivery is small.

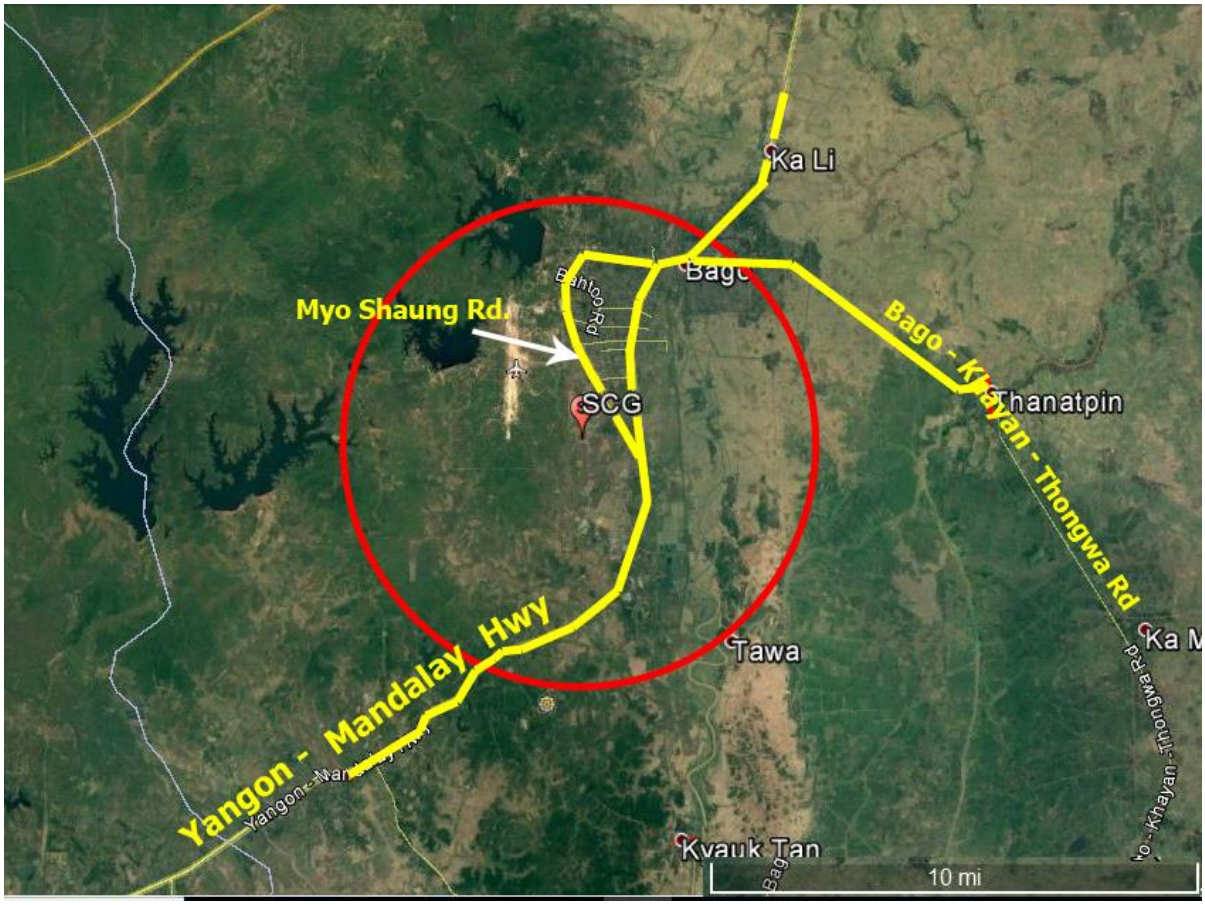


Figure 6.17 Delivery routes to and from the plant

6.14 SOCIO-ECONOMIC ENVIRONMENT

SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago RMC Site is located within Bago Township, Bago Region, Myanmar.

6.14.1 SOCIAL CONDITION

Bago Township is 2,905.08 km2 (1121.66 sq mi) wide. The township has a total population of 434,822 (207,029 male and 227,793 female) with 105,280 households including 115,440 families. Population increasing rate is 0.027.

The population characteristics in Bago Township are as follow.

a) Population By Sex

Table 6.18 Population by Sex in Bago Township

	Male	Female	Total
Urban	101771	116316	218087
Rural	105258	111477	216735
Total	207029	227793	434,822

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

b) Religion

Table 6.19 Religious Groups of Ethnic in Bago Township

Sr.	Type of Religion	No. of Person
1	Buddhist	406580
2	Christian	17135
3	Hindu	6137
4	Islam	2925
5	Other	2045
Township Total		434822

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

c) Population by Foreigner Living

Table 6.20 Population by Foreigner Living in Bago Township

Sr.	Ethnic Race	No. of Person
1	Chinese	2228
2	Indian	6389
3	Pakistan	848
4	Bangladesh	196
5	Other	1353
Township Total		11014

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

d) Education

Table 6.21 Number of University and Schools in Bago Township

Sr.	Uni/School	Quantity
Higher Education		
1	Bago University	1
Basic Educatin		
1	State High School	18
2	State high school (branch)	14
3	Middle School	4
4	State Middle school (branch)	68
5	State Primary School	5
6	State Primary School (over)	121
7	Kindergarten	16
8	Monastic education school	27

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

e) Health

The main diseases in Bago Township are diarrhoea-related illnesses and tuberculosis.

Table 6.22 Number of University and Schools in Bago Township

Sr.	Type	Quantity	Remark
1	Government General Hospital	1	500 beds
2	Private Hospital	1	25 beds
3	Department of Health (Ward)	2	General clinic
4	Department of Health (Rural)	7	
5	Sub Department of Health (Rural)	42	

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

f) Status of Religious Organization

Table 6.23 Religious Organization in Bago Township

Sr.	Description	Quantity
1	Pagoda	78
2	Monastery	689
3	Nun dwelling	92
4	Religious Hall	20

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

6.14.2 ECONOMIC CONDITION

a) Status of Economic Organization

Table 6.24 Economic Organization in Bago Township

Sr.	Type	Quantity
1	Industrial Zone	1
2	Fish/prawn farm ponds	242
3	Government Factory	1
4	Private factory	15
5	Industry and Craft of Domestic	12
6	Private Petroleum Station	56
7	Hotel/ Motel/ Inn/ Guest house	23
8	Government Major market	11
9	Private Super Market	-
10	Government Bank	1
11	Private Bank	12
12	Shop house and stores	799
13	Media/ Studio/ Publication	9

Source: "ပဲခူးမြို့နယ် ဒေသဆိုင်ရာ အချက်အလက်များ2019"

6.15 ARCHAEOLOGICAL AND CULTURAL RESOURCES

There is no archaeological site or recreational area within the project vicinity. Consequently no impacts to cultural heritage are anticipated.

7.0 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURE

7.1 OVERVIEW OF IMPACTS

The SCG Myanmar Concrete and Aggregate Company Limited (MCA)'s production activity is unlikely to cause any major negative environmental and social impacts. The project operation would create potential environmental issues and proper management is pertinent to minimize the environmental impacts.

With timely and proper implementation of this EMP and application of appropriate mitigation measures, most if not all the potential negative impacts can be prevented or minimised.

The social outcomes of the factory are expected to be positive by creating employment opportunity (Figure 7.1).

Table 7.4 provides summary of environmental risks related to the construction phase, plant operation and decommission phases of the project.

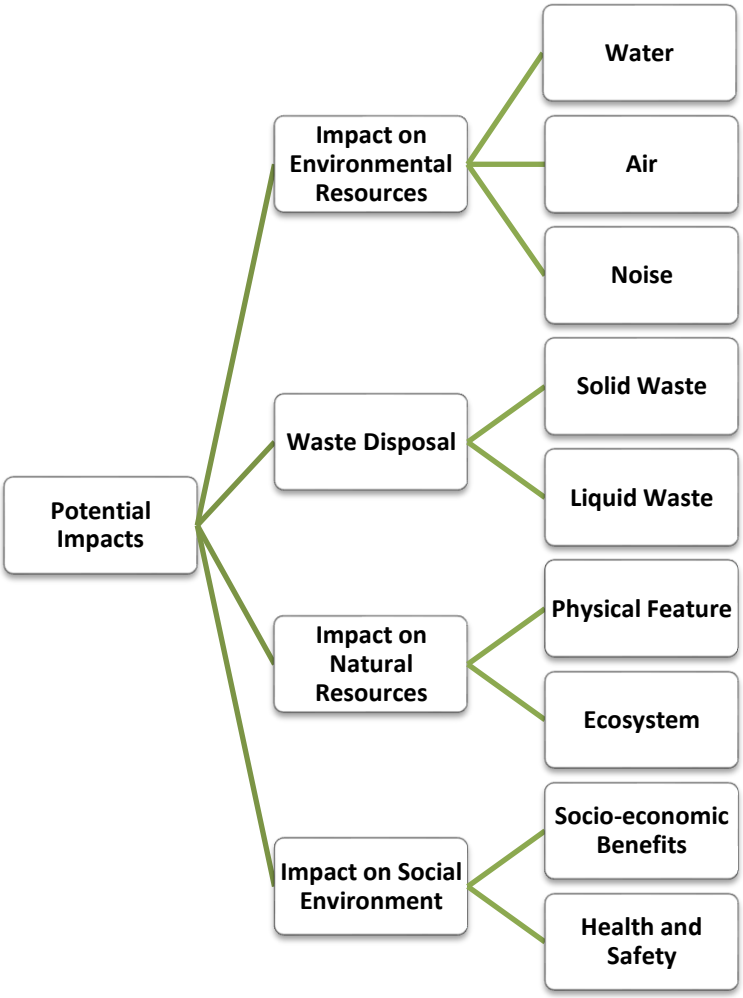


Figure 7.1 Overview of Potential Impacts

7.2 IMPACT PREDICTION METHODOLOGIES

To identify impacts, the methods of description of the environment likely to be affected and description of the likely significant effects are used.

In terms of impact analysis, the following considerations have been applied.

a. Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?); and
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?).

Table 7.1 Evaluation of Severity/ Magnitude of Impacts

Environmental Aspects	Environmental Impact							
	Scale of Impact	Score	Scale of Impact	Score	Scale of Impact	Score	Scale of Impact	Score
	Low	1	Medium	2	Critical	3	High	4
Reversible/ Irreversible	Reversible		Reversible		Irreversible		Irreversible	
Extent	Site		Local		Regional		National	
Duration	Short Term		Medium Term		Long Term		Permanent	
Effluent	Non-toxic pollutant, easily biodegradable (ex: treated domestic waters, clean drainage effluents)		Low toxicity pollutant(e.g., treated production waters)		Toxic pollutant, production waters with chemical content and poor treatment.		High toxicity pollutant	
Gaseous emissions (abnormal situation)	Gas pollutant (PM, NOx, SO2, SO3, CO_2)		Gas < 1 kg of pollutant. Flaring rate increase of 100 000 m^3 per day)		Gas 1 kg to 300 kg of pollutant Flaring rate increase:100 000 m^3 /d to 3Mm^3/d		Gas > 300kg of pollutant. Increase of flaring rate> 3Mm^3/d	
Waste Production	Easily recyclable wastes		Inert wastes		Industrial wastes, low toxicity, available local treatment		Industrial toxic waste requires specific treatment.	
Hazardous wastes	Low Quantity and low effect on		Average quantity spilled and / or low effect on		Important quantity and impact on		Very important quantity and impact on	

discharge	environment	environment (pollution of soils and surface waters)	environment	environment (soils and water table pollution)
Soil pollution	Low effect on environment, no remediation required.	Moderate effect on environment	Major damage on land requiring mitigation and remediation.	Immediate planning and action required. International response required
Land Use	Affective use of lands	Somewhat benefit to the locals	Only benefit to the project owner and no benefit to locals	Benefit to no party
Use of natural resources: water, energy, raw materials	Use of renewable resources, use of recyclable resources	Use of resources with sustainable practices Less significant effect of a critical asset	Significant effect of a high asset	Significant loss of critical assets and resources
Impacts on biodiversity	Very small population of non- significant fauna and flora may be affected.	Significant loss of species and vegetation at local level	Major damage on High environmental sensitive areas such as primary forest, endangered flora and fauna species	Loss of Ecosystem Extinction of endangered species regionally
Other impacts on ecosystems: noise, vibration, etc.	Insignificant short term disturbance with no environmental 'scarring ' or	Moderately environmental damages and injuries that can be readily absorbed but	Severe damage resulting from a significant event that can be managed under normal	Catastrophic damage with potential long term consequences affecting the

	injuries.	management effort is still required to minimize the impact.	procedures.	environmental integrity and livelihood of the area.
Public Health & Safety	No nuisance or health effect and safety hazards to human.	Acute or Chronic effect of some sensitive human	Chronic effect of human health	Serious Health impacts or death of a person or people

b. Probability of Occurrence (O)

- Probability of occurrence (how likely is it that the impact may occur?); and
- Duration of occurrence (how long may it last?)

This criterion is corresponding to the frequency of the impact occurrence.

Table 7.2 Evaluation of Probability of Occurrence

Probability of Occurrence	**1**	Annual frequency or never occurred
	2	Monthly Frequency
	3	Weekly Frequency
	4	Daily frequency or chronicle

c. Control (C)

This criterion is used to evaluate the level of control of the aspect, depending on the detection available means, the operating procedures and the precautions taken.

Table 7.3 Evaluation of Level of Existing Controls

Level of Control	**1**	**Highly Control**	Easy detection and control with operating procedures regularly checked and/or important precautions taken to lower impact.
	2	**Medium Control**	Detection and control with operation procedures not regularly checked and/or average precautions taken to lower impact.
	3	**Low control**	Detection without control (operating procedures not adapted) and/or few precautions taken to lower impact.
	4	**No control**	No detection and/or no precaution taken to lower impact.

7.3 IMPACTS IDENTIFIED

Environmental issues in ready-mixed concrete batching plant primarily include the following:

- Wastewater
- Emissions to air
- Solid waste
- Noise

7.3.1 WASTEWATER

Surface water and ground water contamination may result from various activities during operation phase. The main sources of wastewater at batching plants are:

1) Surface and underground water quality impact by discharge of water
2) Wastewater generated from workers and staff
3) Oil and grease leakage from machines and vehicles
4) wastewater from truck wash systems and central mixing plant

1) Surface and underground water quality impact by discharge of water

Rain / storm water flow movement at site can lead the storm water runoff to nearby areas. Flooding and stagnant water (which could lead to mosquito breeding and silted water) discharge into public water course. The poor storm water management and drainage system at the factory can create impact on surrounding areas and the water quality. Debris in the runoff water can block waterways that may lead to flooding in and around the project site.

2) Wastewater generated from workers and staff

Domestic waste water from sanitation and cleaning daily can release through septic tank and drainage channel. They can pollute the water environment.

3) Oil and grease leakage from machines, vehicles and oil storage tanks

Oil and grease leakage from machines, vehicles and oil storage tanks may result water pollution.

4) Wastewater from truck wash systems and central mixing plant

After loading, the truck moves to a wash down area to wash down the truck exterior with freshwater or recycle water. The loaded truck mixer then proceeds to make its delivery at the job site.

7.3.2 EMISSION TO AIR

Various identified sources, in production activities that can cause potential impacts on air quality are emissions from:

A. Emissions from vehicular movement
B. Generator
C. Dust emission from production activities

A. Emissions from vehicular movement

The factory uses the vehicles for transportation of raw materials as well as finished goods. Combustion of fuel (petrol and diesel) in an engine produces carbondiocide (CO_2) and water (H_2O) from exhaust system. The largest part of most combustion gas is nitrogen (Nx), water vopor (H_2O) (except with pure carbon fuels), and carbon

dioxide (CO2) (except for fuels without carbon). A relatively small part of combustion gas is such as carbon monoxide (CO) from incomplete combustion, nitrogen oxides (NOx) from excessive combustion temperatures, and particulate matter (mostly soot: a mass of impure carbon particles resulting from the incomplete combustion of hydrocarbons.) Particulate matter PM10 and PM2.5 emissions came from the exhaust of on-road motor vehicles (mostly from diesel engines).

B. Generator

Burning diesel of other fuels creates exhaust gasses. Diesel generators mainly produce carbon dioxide (CO2), nitrogen oxide (NOx), and particulate matter.

C. Dust emission from production activities

Ready mixed concrete plants generate and disperse varying amounts of dust during routine operations. Dust and particulate matter can be generated within the concrete plant and the plant property:

- Delivery of cement and fly ash releases during silo loading
- Delivery and stockpiling of aggregates
- Transfer points when handling raw materials
- Aggregate and cement weighing
- Truck mixer loading and charging

7.3.3 SOLID WASTE

Domestic Waste

Domestic wastes are plastic bags, plastic water bottles, papers, broken glasses and putrid foods.

Process Waste

The main waste type of RMC Plant is returned concrete and drum washout. These wastes can pollute the environment without proper management.

7.3.4 NOISE EXPOSURE

Permanent hearing loss may be caused by a number of things, including disease, aging, sudden loud noise or long-term exposure to loud noise.

Transportation of materials, vehicle movement, generator, operation machinery such as weighing aggregate, mixing concrete from the processing activities will give rise to noise levels of the site area.

7.3.5 HAZARDOUS MATERIAL/WASTE

Hazardous materials /wastes generated from the production activities are as follow:

A. Diesel, machine oil, lubricant
B. Spent chemicals (admixture)

A. Diesel, machine oil, lubricating oil

Diesel is used for motor vehicles and generator.

Hazard statements : Flammable liquid and vapour
May be fatal if swallowed and enters airways
Causes skin irritation
Harmful if inhaled
May cause dowsiness or dissiness
Suspected of causing cancer
May cause damage to organs (liver, thymus, bone) through prolonged or repeated exposure.
Flash Point : 125°F

Machine oil, lubricating oil are used for generators and machines.

Hazard statements : liquid (only liquid)
May cause eye and skin irritation. Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling

B. Spent chemicals (admixture)

Ready mixed concrete plants use a variety of admixtures as ingredients in concrete. In the event of spills or direct worker contact, these admixtures present hazard to the environment and workers.

Mighty 150 : Naphthalenesulfonic acid, polymer wity formaldehyde, sodium salt

Hazard statements : Eye contact: Rinse cautiously wity water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Skin contact: Gently wash wity plenty of water and soap.
Inhalation: Remove person to fresh air and keep comfortable for breathing

Daratard 152

Hazard statements : Eye contact: Rinse cautiously wity water for several minutes.
General information: Get medical advice/attention if you feel unwell.
Skin contact: wash wity plenty of soap and water.
Inhalation: No Special measure required
Suitable extinguishing agents: CO2, powder or water spray.

The sample Material Safety Data Sheet (MSDS) are as follow and shown detail in Appendix.

SAFETY DATA SHEET

DIESEL FUEL

000003000395

Version 4.1 | Revision Date 2018/06/06 | Print Date 2018/06/06

Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

Contaminated packaging : Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	: UN 1202
Proper shipping name	: Diesel fuel
Class	: 3
Packing group	: III
Labels	: Class 3 - Flammable Liquid
Packing instruction (cargo aircraft)	: 366

IMDG-Code

UN number	: UN 1202
Proper shipping name	: DIESEL FUEL
Class	: 3
Packing group	: III
Labels	: 3
EmS Code	: F-E, S-E
Marine pollutant	: no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

National Regulations

TDG

UN number	: UN 1202
Proper shipping name	: DIESEL FUEL
Class	: 3
Packing group	: III
Labels	: 3
ERG Code	: 128
Marine pollutant	: no

SECTION 15. REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all of the information required by the HPR.

The components of this product are reported in the following inventories:

DSL On the inventory, or in compliance with the inventory

KCDS-No 104173-06 | MIGHTY 150 | 1 / 6
Kao Industrial(Thailand)Co.,Ltd. | Revised Date October 02, 2014 | Set Up Date January 31, 2005

SAFETY DATA SHEET

[1.PRODUCT AND COMPANY IDENTIFICATION]

PRODUCT NAME	:	MIGHTY 150
SUPPLIER	:	Kao Industrial(Thailand)Co.,Ltd.
ADDRESS	:	55 Wave Place Bldg.14th & 15th Floor Wireless Road, Pathumwan, Bangkok 10330, Thailand
DIVISION	:	Chemical Division
TELEPHONE NUMBER	:	66-2-655-4433
FAX NUMBER	:	66-2-655-4333
E-MAIL ADDRESS	:	
EMERGENCY TELEPHONE NUMBER	:	66-2-655-4433
RECOMMENDED USE AND RESTRICTIONS ON USE	:	

[2.HAZARDS IDENTIFICATION]

GHS CLASSIFICATION

PHYSICAL AND CHEMICAL HAZARDS	:	Not classified
HEALTH HAZARDS		
ACUTE TOXICITY (Oral)	:	Not classified
ACUTE TOXICITY (Dermal)	:	Not classified
ACUTE TOXICITY (Inhalation)	:	Not applicable(Vapours)
SKIN CORROSION / IRRITATION	:	Not classified
SERIOUS EYE DAMAGE / EYE IRRITATION	:	Not classified
RESPIRATORY SENSITIZATION	:	Classification not possible
SKIN SENSITIZATION	:	Classification not possible
GERM CELL MUTAGENICITY	:	Classification not possible
CARCINOGENICITY	:	Classification not possible
REPRODUCTIVE TOXICITY	:	Classification not possible
SPECIFIC TARGET ORGAN TOXICITY		
- SINGLE EXPOSURE	:	Classification not possible
- REPEATED EXPOSURE	:	Classification not possible
ASPIRATION HAZARD	:	Classification not possible
ENVIRONMENTAL HAZARDS		
HAZARDOUS TO THE AQUATIC ENVIRONMENT		
- ACUTE HAZARD	:	Category 3
- LONG-TERM HAZARD	:	Category 3
- HAZARDOUS TO THE OZONE LAYER	:	Classification not possible

GHS LABEL ELEMENTS

PICTOGRAMS OR SYMBOLS	:	Not applicable
SIGNAL WORD	:	Not applicable
HAZARD STATEMENTS	:	Harmful to aquatic life with long lasting effects
PRECAUTIONARY STATEMENTS		
PREVENTION	:	Avoid release to the environment.
RESPONSE	:	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF ON SKIN: Gently wash with plenty of water and soap. Call a POISON CENTER or doctor if you feel unwell.
STORAGE	:	
DISPOSAL	:	Passed to a licensed waste contractor.

Safety Data Sheet

Printing Date: 28.03.2017 **Version Number: 1.0** **Revision Date: 28.03.2017**

1 Identification of the substance/mixture and of the company/undertaking

Product identifier:

Trade name: ***DARATARD® 152***

Relevant identified uses of the substance or mixture, and uses advised against:

Relevant identified uses of the substance or mixture: Concrete Admixtures

Identified uses advised against: No further relevant information available.

Details of the supplier of the safety data sheet:

Manufacturer/supplier:

GCP (Thailand) Limited
253/2 Bangpoo Industrial Estate
Sukhumvit Road, Km 34, Samutprakarn 10280
Bangpoo, Thailand

Telephone: ++66 (2) 709-4470 to 84
Telefax : ++66 (2) 323-1385

Emergency telephone number: EHS Department, Bangpoo, Thailand - Tel. No.: ++66 (2) 709-4470 to 84

2 Hazards identification

Classification of the substance or mixture:

The product is not classified according to the Globally Harmonised System (GHS).

Label elements:

GHS label elements Not classified.

Hazard pictograms Not classified.

Signal word Not classified.

Hazard statements Not classified.

Other hazards:

Results of PBT and vPvB assessment:

PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixture:

Dangerous components: Not classified.

4 First aid measures

Description of first aid measures:

General information: Get medical advice/attention if you feel unwell.

After inhalation: No special measures required.

After skin contact: Wash with plenty of soap and water.

(Contd. on page 2)

7.3.6 OCCUPATIONAL HAZARD

Ready Mixed Concrete industry has its distinctive risks in terms of occupational safety. The employees of this sector experience the risks that emerge not only during the fabrication process of concrete, but also during its delivery to the construction site.

Primary OHS issues related to concrete manufacturing and potential hazards of ready mixed concrete drivers are: eye, skin and respiratory tract irritation from exposure to cement dust; chemical exposure and contact with concrete products and additives; impact and mechanical hazards during equipment operations; slips, trips and falls; exposure to ergonomic risk factors; noise exposure; confined spaces; and hazards generated by vibration and radiation.

7.4 ENVIRONMENTAL IMPACT AND MITIGATION MEASURES FOR CONSTRUCTION PHASE

7.4.1 ENVIRONMENTAL NOISE IMPACT

During construction phase, transportation of construction materials, operation of heavy machinery such as excavators and loaders, construction activities and using diesel generators will give rise to noise levels of the project area. Temporary noise barriers and properly controlled system of equipment and occupational preventive measures should be applied in this phase. Construction activities are implemented during daytime and avoid later than 8 p.m. Noise barriers should be built for diesel generator. Working employing in high noise area should be worked on shifts and hearing protective wear such as earplugs, earmuffs, etc. should be provided.

7.4.2 SOLID WASTE

None-hazardous solid waste generated at construction site includes excess fill materials from grading and excavation activities, scrap wood and small concrete spills. Other non-hazardous solid waste includes office, kitchen, and dormitory wastes when these types of operations are part of construction project activities. Hazardous solid waste includes contaminated soils, which could potentially be

encountered on-site due to previous land use activities, or small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oils, as well as spill clean-up materials from oil and fuel spills.

7.4.3 WATER ENVIRONMENT

Surface and ground water contamination may result from various activities during construction phase. These activities can include wastewater generated from workers and staff and oil and grease leakage from machines and vehicles used for transportation of construction materials and machinery. Heavy storage of construction materials can percolate through the soil and can cause soil contamination and eventually ground water pollution. These contaminations shall be reduced by avoiding earth work in rainy season, discharging wastewater into existing sewer line, provision of oil and grease, and keeping the impervious floors of oil and grease handling areas. During construction phase, water usage will be high for site preparation and using of labour and staff on site. Water demand can be reduced by avoiding wastage of water and efficient water use for construction.

7.4.4 AIR EMISSIONS

During construction phase, transportation of construction materials, transfer of heavy machinery and construction activities may give rise to dust emissions. This nuisance will be temporary in nature and is not expected to affect the surrounding environment since the project is located within an industrial zone. In case of extreme dry and windy condition prevails, water sprinkling should be carried out by means of a dedicated water bowser so as to suppress windborne dust emissions.

7.5 ENVIRONMENTAL IMPACT AND MITIGATION MEASURES FOR OPERATION PHASE

7.5.1 MITIGATION MEASURES FOR WASTEWATER

A. Surface and underground water quality impact by discharge of water

- Containers/equipments are stored up off the ground so that water running on the ground will not contact materials.
- Runoff from the concrete plant site should be minimized to prevent contamination.
- Any leakage of pipe water should be promptly reported to engineering department as soon as possible.
- Regular removal of debris and sediments in the drain is done.

B. Wastewater Generated From Workers and Staff

- Domestic wastewater from the toilets is disposed to the septic tanks located in the factory compound and breakup naturally.
- Sludge waste from septic tanks is discharge periodically by contacting Engineering Department (Water and Sanitation).
- All factory staffs are trained to turn on water taps only when needed and not to allow water to run continuously.
- The engineering department staffs maintain all water piped taps and storage tanks.
- Employees are trained on proper handling and storage of materials to prevent run-off problems.

C. Oil and Grease Leakage From Machines and Vehicles

- Staffs are clean and check regularly for surface water contamination by oil/fuel leakage from vehicles and diesel generator.
- Any leakage is promptly reported to engineering department as soon as possible.
- Leakage and spillage are immediate clean.

D. Wastewater from truck wash systems and central mixing plant

- Mostly, the truck is washed down after unloading at the jobsite. Some jobsites allow the chute washout material to be discharged on the ground in a designated area of the construction site.
- Washing down chutes and the mixer at the jobsite are managed in an environmentally acceptable manner to avoid uncontrolled discharges from the jobsite.
- Mixer truck operators never washout the chute where the water and slurry mixture can drain directly into a catch basin or onto a surface that drains into a catch basin.
- Reducing the volume of water used during washouts may significantly reduce waste generation.
- Minimize the need for exterior truck washing by controlling the dust losses from the plant and batch (tower) area during loading.
- Conduct chemical washing of trucks in a safe manner (appropriate PPE).
- Using water-reducing chemical admixtures that reduce the amount of given water in a batch of concrete.
- Train employees to minimize water use, ensuring that they understand the importance of controls and the possible impact on the environment and company liability.
- The factory will develope site drainage plans to capture and reuse storm water and process water.
- Waste waters can be directed to the washout pit.

7.5.2 MITIGATION MEASURE FOR EMISSION TO AIR

Air pollution can be caused by various activities during construction, operation and decommission phases of the project. These activities can be categorized based on the spatial characteristic of the source including point sources, fugitive sources, and mobile sources and further, by process, such as production processes, materials storage, or transportation.

A. Emissions from vehicular movement

Exhaust gas emission

- All vehicles are regularly inspected and maintained to reduce the gas emission.
- The factory applies systematic management for vehicles use (eg. Reducing the vehicles use, collaborated using on same route of vehicles).
- Using the high grade of diesel fuel quality for reducing SO_2 emission.
- The factory keeps the enterprise premises green by planting trees.
- The factory plants and maintains trees and vegetation along the roadside to decrease the water vopour released and CO_2 emission.

Particulate Matter and Dust

- The factory uses vehicles having efficient engines and exhaust system to reduce Particulate matter PM_{10} and $PM_{2.5}$ emissions.
- Reduce fugitive dust from roads and areas by cleaning and maintaining a sufficient level of humidity.

B. Generator

- Using the high grade of diesel fuel quality for reducing SO_2 emission.
- Regular checking and changing of lubricating oil and engine oil to prolong engine life and reduce CO emission.
- Generators are regularly inspected and maintained to reduce the particulate matter emission.
- Increasing roadside plantations make localized air pollution reduced due to the blocking effect of foliage and through photosynthesis.

C. Dust emission from production activities

- More effective methods of controlling dust include using dust control (spraying water) on the road and factory yard.
- Sand and aggregates are transported in a dampened state when delivery of raw materials in trucks.
- Minimize surface areas of aggregate storage piles to prevent the dust from cement, sand and aggregates.

- Careful attention on the transfer of raw materials by front end loaders, conveyors, hoppers and agitators.
- Spills and leaks must be contained and cleaned up immediately, before dust is generated.
- When leakage or spillage of cement from silos and inspection covers occur, spills and leaks are contained and cleaned up immediately, before dust is generated.
- Careful attention during silo filling operations to prevent overfilling. Therefore, cement dust emissions from silo over-fill is minimised.

7.5.3 MITIGATION MEASURE FOR SOLID WASTE

Systematic management of solid waste is of importance as mismanagement of the waste will lead critical occupational hazard including fire hazard. Project proponent should segregate the wastes into reusable wastes, hazardous wastes and domestic wastes.

MCA batch plant will establish and implement comprehensive waste management plan to ensure segregation, handling, labelling, storage and disposal of hazardous and nonhazardous waste in safe and environmental friendly manner.

Domestic Waste

- Provision of adequate waste bins.
- Recycling waste bins are provided in factory premise.
- Recyclable wastes will be reused accordingly.
- Wastes are removed from on-site at regular intervals to prevent release to the environment, and to avoid additional permit requirement.
- Domestic wastes like plastic bags, plastic water bottles, papers, broken glasses and putrid foods are disposed once a week to waste dumping site of designated by Industrial Zone by factory owned car.

Figure 7.2 Separate Bins for Recycle Wastes

Process Waste

The main solid waste generated by batching plants is waste concrete. Waste minimisation is the preferred approach to dealing with this problem. Waste minimisation includes good housekeeping practices and staff attitudes, as well as technical factors. Careful matching of orders with production could minimise the need to return unused concrete to the batching plant.

The plant undertakes site clean-ups with all resulting debris regularly. The plant use good housekeeping practices to clean up spills of cement and concrete as soon as possible. Sometime the plant changes work practices to minimize spills.

The factory applies 3R management as follows:

- **Reduce:**
  - The plant applies waste reducing practices by paying careful attention during, storing raw material.
  - Careful matching of orders with production.

- **Reuse:**
  - Concrete waste will be used in concrete testing block.
  - Reuse returned concrete for other purposes.

- **Recycle:**
  - Some concrete testing blocks are recycled as drainage cover block.
  - Hardened cement-sand slurry is generally recycled as fill material in places on the concrete plant's property.
  - Some concrete wastes are transported off-site and disposed of in landfill. The plant donates the concrete waste to others for the purpose of landfill.

Figure 7.3 Concrete Waste Area to be Recycled for Landfill

Figure 7.4 Testing Block Area

(Recycled from Surplus Concrete/Returned Concrete)

7.5.4 MITIGATION MEASURE FOR NOISE EXPOSURE

- Proper maintenance of diesel generator.
- Vehicles used in delivery are regularly inspected and maintained the engine and exhaust system to minimize the noise exposure to public area.
- Regular maintenance of the machines to reduce noise emission.
- Weighing fine aggregates before coarse aggregates makes noise pollution.
- Employees working in high noise generating areas are provided with sufficient ear protecting devices such as ear muffs and ear plugs.
- Caution boards are provided in such areas to ensure wearing of personal protective equipment.
- Provide adequate ear protection (ear plus or muffs) to workers working in the excessive noise areas (exceed 85 decibels).

7.5.5 MITIGATION MEASURE FOR HAZARDOUS MATERIAL/WASTE

Hazardous solid waste includes small amount of machinery maintenance materials, such as oily rags, used oil, damaged tube light and bulb, batteries, machine oil containers, empty chemical admixtures containers.

The most common derivatives of are: Daratard 152, mighty 150, mighty 40WP, Mira 188EX.

- Fuel oil is store in separate room with roof and locked.
- Spent oils, batteries, electric tubes and other hazardous waste are contained to prevent it from blowing away and from leaching into surface or groundwater.
- Obtaining material safety data sheet (MSDS).
- Used oil is sold to third party collector for recycling purpose.
- For disposing, hazardous wastes are packed with plastic bag and disposed by Bago Region Development as hazardous waste.
- Proper PPE such as mask, goggle, apron and glove are provided for employees.
- Display warning signage at the working area.

7.5.6 MITIGATION MEASURE FOR OCCUPATIONAL HAZARDOUS

As with any manufacturing facility, worker safety should be an important consideration. A safe workplace is important to the factory and the employees.

Exposure to cement dust

- Wear a dust mask to minimize inhalation of cement dust.
- Eat and drink only in dust-free areas to avoid ingesting cement dust.
- Use soap and water to wash off dust to avoid skin damage.
- Implement PPE usage for eye protection.
- Wash contaminated skin areas with cold, running water as soon as possible.
- Drivers should be trained to avoid direct contact with concrete during the removal of hardened concrete process and correct operation of truck mixers including maintenance and cleaning.

Falling Object

- Avoid walking or working under overhead loads.
- Stack and store materials properly to limit the risk of falling objects.
- Avoid working beneath cuber elevators, conveyor belts and stacker/destacker machinery.

Worker falls from the top of mixer

- Ladders on truck mixers should be inspected for defects before every usage.
- Keep floors clear to avoid slipping and tripping hazards.
- Stack and store materials properly to limit the risk of falling objects.

Vehicle Safety

- Trucks and other vehicles are in good working order.
- Sufficient parking areas with traffic signage.
- Watch for traffic in a concrete yard and give right of way to all vehicles and be sure to make eye contact with the drivers before crossing their path.
- Each new worker is given a plant orientation before they start work.

7.5.7 MITIGATION MEASURE FOR MECHANICAL HAZARDS

Ready mixed concrete (RMC) industry, one of the barebones of construction sector, has its distinctive occupational safety and health (OSH) risks. Employees experience risks that emerge during the fabrication of concrete, as well as its delivery to the construction site. Ready mix concrete plants have many more components to it. In other words, it is the assembly of tools and machines such as mixers, cement batchers, aggregate batchers, conveyors, radial stackers, cement bins, and cement silos. Defective equipment in use may cause injury and unsafe condition. Unguarded machinery used in the manufacturing process can lead to worker injuries.

Control methods for mechanical hazards during equipment operations are as follows:

- Safeguarding Method
    - Safeguarding implemented to protect individuals from hazards by the physical arrangement of distance, holding, openings, or positioning of the machine or machine production system to ensure that the operator cannot reach the hazard.
    - Primary safeguarding includes control methods that protect (e.g., prevent employee contact with hazardous machine areas) employees from machine hazards through effective machine guarding techniques
    - Be sure adequate safety guards on equipment.
    - Ensure that guards are in place to protect workers using mixers.
    - Be sure appropriate guards are in place on power tools before using them.
    - Make sure guards are in place to protect employee from moving parts of machinery and tools before the employee operate the equipment.
- Energy Control Program
    - In addition, a hazardous energy control (lockout/tagout) program needs to complement machine safeguarding methods in order to protect employees during potentially hazardous servicing and maintenance work activities.
    - Establish and follow effective lockout/tagout procedures when servicing equipment.

- Reduce machine and equipment hazards by implementing programs for machine lockout/tagout.
- Adequate lockout/tagout systems on machinery.
- Use lockout/tagout procedures to deenergize conveyors and other machinery before attempting to free any jams.

- Inspection and Maintenance
  - Good inspection, maintenance and repair procedures contribute significantly to the safety of the maintenance crew as well as to the operators.
  - Maintain conveyor belt systems to avoid jamming and use care in clearing jams.
  - Ensure that all tools and equipment -- including forklifts, cranes, hoists and rigging -- re maintained in good working condition, are inspected regularly and are operated by thoroughly trained, tested and competent workers.
- Safe Work Procedures
  - Formal written instructions developed by the user which describe how a task is to be performed.
  - Train workers in safe work practices and methods for all work activities, procedures and equipment as well as how to recognize and respond to potential workplace hazards, including rendering first aid.

7.6 ENVIRONMENTAL IMPACT AND MITIGATION MEASURES FOR DECOMMISSIONING PHASE

7.6.1 WATER ENVIRONMENT

Surface water and ground water contamination may result from various activities during decommission phase. These activities can include wastewater generated from workers and staff and oil and grease leakage from machines and vehicles. Sedimentation/ siltation of drainage or waterway may also result from unconfined stockpiles of soil and other materials. These activities shall be reduced by avoiding earth work in rainy season and discharging wastewater into existing sewage line.

Suitable facilities or portable toilets must be provided to prevent discharging sanitary waste to the ground.

7.6.2 AIR EMISSIONS

Negative impact on ambient air quality such as dust particles emissions could be expected due to demolition works during the decommission phase of the factory after the lifespan of the project. During decommissioning phase, transportation of materials, transfer of heavy machinery and demolition activities may give rise to dust emissions. In case of extreme dry and windy condition prevails, water sprinkling should be carried out by means of a dedicated water bowser so as to suppress windborne dust emissions. This nuisance will be temporary in nature and is not expected to affect the surrounding environment since the factory is located far from the residential area.

7.6.3 SOLID WASTE

Contamination and degradation of soil can be caused during the decommissioning phase. All unused or surplus building materials can be sold to other who needs it. Solid waste can be also used in the land level adjustments in the landfill area. Organic waste and construction debris should be properly collected at a dedicated storage area and suitably disposed of at designated place.

Hazardous Waste

Decommissioning activities may pose the potential for release of petroleum based products such as lubricants, hydraulic fluids, of fuels during their storage, transfer, of use in equipment. These materials may also be encountered during decommissioning activities in building components or industrial process equipment. Techniques for prevention or control of these impacts include:

- Provide adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids.
- Using impervious surfaces for refuelling areas and other fluid transfer areas

- Isolated storage for hazardous wastes release from the site should be provided and installation of fire extinguisher shall be done near storage of hazardous wastes.

7.6.4 ENVIRONMENTAL NOISE IMPACT

After the lifespan of the project, decommissioning of the factory can also affect noise level. Temporary noise barriers and properly controlled system of equipment and occupational preventive measures should be applied in this phase. Noise barriers should be built for diesel generator. Decommissioning activities are implemented during day time and avoid later than 8 p.m. Occupational preventive measure should be applied in this phase. Workers employing in high noise areas should be worked on shifts and hearing protective wear such as earplugs, earmuffs, etc. should be provided. Sensitization of truck drivers to switch off vehicle engines while loading materials avoid running of vehicle engines or hooting especially.

7.6.5 SOCIAL ENVIRONMENT

Loss of jobs of the employees may occur during decommissioning phase and it may reduce by taking responsibility on gradual reducing or transferring of work force.

7.6.6 OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY

During decommissioning phase, health and safety impacts can result from working at height and electric shock hazards. Site fencing and safety signatures should be done in this phase. Personal protective equipment (PPE) such as safety harness for working at height, safety gloves, helmet, goggles, earmuffs, etc. should be provided.

7.7 SUMMARY OF POTENTIAL IMPACT

The Environmental risk assessment has been developed through assessing Severity/ Magnitude of the impact(s), Occurrence/Probability of the impacts(s) and existing control measures. Table 7.4 stated summary of environmental risks related to the construction phase, plant operation and decommission phase.

Table 7.4 Environmental and Social Risk Assessment

Category	Scoping Item	Scoping Results			Assessment Result			Reason for Assessment
		Construction	Operation	Decommission	Construction	Operation	Decommission	
Environmental Resources	Air Quality	L	L	L	L	L	L	The main air pollution sources include the emission from generator, vehicular movements. Generator and all vehicles are regularly inspected and maintained to reduce the gas emission. Air emission may occur from transportations of construction materials and demolition activities for decommission phase.
	Dust	L	L	L	L	L	L	The impact of dust can be considered to be low because cement is stored in the silo and other raw materials are bought in required amount and stored systematically. The factory also controls the traffic speed limit in the factory compound. Emission of dust particles could be expected during the decommissioning phase.
	Offensive Odor	NA	L	NA	NA	L	NA	Factory's operation activities may not result in odour impact.

	Noise and vibrate	L	L	L	L	L	L	Any manufacturing facility is known to generate a certain amount of noise and vibration. Although it may results from proximity to noisy machinery (eg.mixer, generator, pumps) the potential impact is considered to be low because the plant has wide area for production. Noise emission may occur from demolition activities for decommission phase.
	Water Consumption	L	L	L	L	L	L	The plant reduces the volume of water used during washouts. And employees are trained to minimize water use. In the decommissioning phase, there is no water consumption.
	Hazardous Substances	NA	M	NA	NA	L	NA	The impact is considered to be low as the factory handles the chemical in safe manner.
Waste Disposal	Solid Waste	L	L	L	L	L	L	The impact is considered to be low with proper management of concrete waste. To implement 3R for all waste to be low impact. Construction debris should be properly collected at a dedicated storage area and suitably disposed for decommissioning phase.
	Liquid Waste	L	M	L	L	L	L	Cleaning of mixer can cause water pollution. The significance assigned to this impact is considered to be medium. However, mixer trucks are washed down after unloading at the jobsite.

Natural Environment	Topography and geology	NA	L	NA	NA	L	NA	Topography and geology impacts are considered to be low as the factory is situated on the flat plain.
	Landscape	L	L	NA	L	+L	NA	Landscape is expected to be low impact without mitigation and becoming positive impact as the factory applies management on greening.
	Protected Area	NA	NA	NA	NA	NA	NA	The project is located in Industrial Zone. There is no protected area in the project area.
	Flora/Fauna and Ecosystem	L	L	NA	L	L	NA	Ecology impacts is considered to be low or almost nil, as the factory, being amidst the already established industrial zone, was already devoid of any Biotopes, either Flora or Fauna or Ecosystem Values since the advent of the industrial zone. The impact is considered to be low for construction because the factory will implement the greening plan for land clear area.
Social Environment	In voluntary Resettlement	NA	NA	NA	NA	NA	NA	No physical resettlement is necessary.
	Local conflict of interests	L	L	NA	L	L	NA	The plant is located in the designated industrial zones. The plant comply with laws and relevant internal guidelines
	Gender	L	L	NA	L	L	NA	Employment conditions will meet national laws and international standards. There shall be no discrimination on the basis of

								gender.
	Ethnic minorities and indigenous peoples	NA	NA	NA	NA	NA	NA	There are no indigenous people in the project area.
	Poor	+M	+H	L	+M	+H	L	Positive impact for operation phase. It is expected to accept and to be employed in the project's activities with high hopes for improvement in neighborhood would bring higher living standard and education status. Loss of employment is negative impact for decommissioning phase.
	Living and livelihood	+L	+M	L	+L	+M	L	Job opportunities and business development should be considered as positive economic impact for regional or national development. It is considered to be significant positive impact for local people.
	Existing social infrastructures and services	NA	L	NA	NA	L	NA	There is low significance impact for existing urban condition. Negative changes in over use of public roads due to operation.
	Cultural heritage	NA	NA	NA	NA	NA	NA	The plant is located in Industrial Zone. There are no historical and cultural monuments located nearby the project site.
Health and Safety	Risks for infectious disease such as AIDS/HIV	L	L	NA	L	L	NA	Influx of people may cause negative impact on health condition of local people. The significance assigned to this impact for the operation phase is considered to be low with mitigation by knowledge and health care

								support.
	Working Conditions (including occupational safety)	L	L	L	L	L	L	The significance assigned to this impact for the operation phase is considered to be low with providing effective trainings.
	Transportation	L	L	L	L	L	L	The plant use raw material locally and delivery truck movement on the main route are considerably low.
	Accident	L	L	L	L	L	L	Accident prevention measures inside and outside the factory area will be planned for operational phase. Accident for decommissioning phase is expected to be low impact with proper mitigation such as providing PPE, fencing, warning sign, etc.

NA: Not Applicable
+: positive impact

8.0 STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE

Public consultation and information disclosure ensures that communities and stakeholders are part and parcel of the proposed developments and in so doing assure the sustainable use of resources. Public consultations form a useful component for gathering, understanding and establishing likely impacts of projects determining community and individual preferences and selecting alternatives.

Green EHSS has organized meetings with SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant. The objectives of the meeting was to collect up-to-date and precise information on the project activities. The outcome of the meeting will help in the assessment of the anticipated impacts.

SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant is situated in Bago Industrial Zone, Otthar (9), Nyaung Inn Village. Green EHSS has conducted stakeholder engagement with local residents near Industrial Zone to inform the local administration on the project, to collect the views, and to obtain the input into the impact and mitigation measures to be included in the EMPs.

8.1 CONSULTATION PROCESS

Green EHSS has conducted 3 times of stakeholder engagements with local residents (first time engagement was conducted with ward administrator, second time engagement was by means of opinion survey and third time was public meeting). Key issues and concerns were identified through:

- **Face to face meeting**
  The key stakeholder (Ward Administrator) was interviewed through holding **face to face meeting** and administration of questionnaires. One of the strategies was to collect the perceptions of authority persons.
- **Socio-economic and opinion surveys**
  Detailed socio economic, and opinion surveys were also conducted in December 2018.
- **Public Meeting**
  Public Consultation was conducted in December 2018.

Face To Face Meeting

In December 2018, ward administrator of Otthar (8) Ward, Bago Township was informed of the Project activities and there was face to face meeting for the commencement of baseline studies and household survey. Face to face meeting was conducted by GREEN EHSS social consultant.

Figure 8.1 Discussion with Ward Administrator of Otthar (8) Ward

Socio-Economic and Opinion Survey

The purpose of the socio economic and opinion questionnaire was to collect general socio economic and opinion information in this area and to obtain opinions and understanding of the activities of SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant in Industrial Zone.

The household interviews were conducted inform of **socio-economic survey** through the use of predefined questionnaires targeting the PAP. The interviewers targeted the general public residing in the vicinity of SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant (Figure 8.2).

During December 2018, opinion surveys were conducted with 7 respondents in total from Otthar (8) Ward of Bago Township. The ward leaders and household leaders were consulted with the objective of understanding the existing socio-economic conditions of the area of influence and the immediate surroundings of the project. Data collected during the survey included data on the particulars of the community members and their opinion on the project.

Figure 8.2 Socio-Economic Surveys with Ward Leaders and Household Leaders

Public Meeting

On 7th December 2018, public consultation and participation was conducted by Green EHSS Social consultant with two representatives of SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant. It was held at Administrator Office, Otthar (8) Ward, (Bago Township) with 9 attendees. Public meeting conducted to collect the ideas and opinions of ward leaders, ward elders and local residents with questionnaires to give their perceptions and the potential impacts in order to influence project design, implementation and follow-up (Figure 8.3, Figure 8.4).

In an open-ended question, the respondents were asked to identify the negative and positive impacts they expect this project to have on the local community. Moreover, respondents were given an opportunity at the end of the questionnaire to provide any additional comments they wanted recorded.

Figure 8.3 Photograph of Otthar (8) Ward Administrator Office for Public Consultation

Figure 8.4 Public Consultations with Otthar (8) Ward Leaders and Local Residents

Table 8.1 List of Participants to the Meeting

Date of Meeting		7th December 2018	
Venue for Meeting		Administrator Office, **Otthar (8) Ward**, Bago Tsp.	
No.	Organization/ Village	Name of Individual	Position of Individual
1	SCG	Saw Judson Win	Government Affair Officer
2	SCG	U Nyein Chan	Operator
3	Otthar (8) Ward	U Kyaw Soe Oo	Ward Administrator
4	Otthar (8) Ward	U Nyunt Aung	Ward Elders
5	Otthar (8) Ward	U Yan Wai	Ward Leader
6	Otthar (8) Ward	U Khin Soe	Local Resident
7	Otthar (8) Ward	Daw Mya Than	Ward Elder
8	Otthar (8) Ward	U Tun Aung Kyaw	Local Resident
9	Otthar (8) Ward	Daw Aye Nga Htway	Ward Development Committee Member

8.2 ENGAGEMENT TECHNIQUES

SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant has implemented a comprehensive range of engagement activities using varied techniques to ensure that the project effectively involves stakeholders. The using techniques for aforementioned discussions, meetings and survey are showed in following table.

Table 8.2 Engagement Methods and Techniques

Engagement Technique	Description
Company address, Factory address, Plant location map	SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant provides factory location in Bago. Using location map makes the interested stakeholders and community clarified. These are relevant tactics in easily way of accessibility for all kinds of stakeholders.
Hot line number,	The plant operates a hot line number which is available during business hours. Hot Line 09 771630763
Pamphlet	SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant has produced pamphlet available in community meetings for general information related with plant activities, environmental management, safety, community development and public involvement.
Booklet	SCG Myanmar Concrete and Aggregate Company Limited (MCA) has produced booklets to provide the community with project related activities including the machine used, product value and their services. Booklets are available in community meetings for the provision of information with pictures and photographs.
Face to face meeting	SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant engages directly with a range of stakeholders as required. In particular, SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant has an ongoing engagement with local authority persons, and community organizations.
Questionnaires and Surveys	SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant conducted household survey in the vicinity of the plant location, to evaluate the effectiveness of engagement

	mechanisms and gain an understanding of community perception, interests and issues.
Public Meeting	SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant has conducted public meeting to generate more in-depth information around issues and concerns raised by stakeholders. These were giving stakeholders an opportunity to directly obtain information and ask questions concerned with the project.

8.3 COMMENTS AND SUGGESTIONS

Consultation with communities affected by the project as well as the focus groups with local government and ward leaders highlighted the most important issues. Several of these are issues directly related to the plant activities and facilities during operation

The results of public consultation and socio-economic survey show that respondents were positive on the project for the operation of SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant.

Community level consultation revealed that there were no complaints from the surrounding area on SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant.

The consultation and survey revealed that employment opportunity of the factory is the positive impact on the local community .

The community has revealed to provide the concrete waste for their ward. The main themes of discussion were focus on the traffic management in delivery and on the price negotiation of ready-mixed concrete donation for community development for future need.

8.4 RESPONSES AND IMPLEMENTATION ACTION FOR COMMENTS

Table 8.3 Responses of the Factory for the Comment and Suggestion Received

Comment	Response and Action Plan
To negotiate the price of ready-mixed concrete donation for community development Ready-mixed concrete donation for community development for future need.	SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant will decrease the price of concrete for community development.
Traffic management in delivery	SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Concrete Batching Plant will follow the traffic route in the community.

8.5 FUTURE PLAN FOR STAKEHOLDER ENGAGEMENT

SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant provides an opportunity to all the stakeholders and communities in the surrounding area to raise issues and concerns pertaining to the factory.

The ongoing consultation process will handle through five mechanisms as follows:

a) Neighbouring community/stakeholders can directly inform their perception to the SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago RMC Batching Plant Office.
b) They can give their suggestions to the factory through the township/ ward administration office or industrial zone office.

c) SCG Myanmar Concrete and Aggregate Company Limited (MCA) develops the website www.scg.com to obtain community input effectively.
d) SCG Myanmar Concrete and Aggregate Company Limited (MCA) will continue to engage the relevant government departments annually for receiving required permit and license.
e) Conduct discussions with wards leaders both informally through phone conversation and formally through face to face meetings whenever necessary.

The required contact information from both sides of SCG as well as community contacts had been already disclosure. The ongoing consultation process will be handed by plant operator associated with government affair officer.

8.6 COMMUNITY INVOLVEMENT AND DEVELOPMENT PROGRAM

SCG Myanmar Concrete and Aggregate Company Limited (MCA) intends to maximise opportunities for individuals, communities and stakeholder groups to engage in the project activities. The factory collaborates with local authorities as well as personnel of industrial zone office. SCG Myanmar Concrete and Aggregate Company Limited (MCA) provides an opportunity to all the stakeholders and communities in the surrounding area as well as all employees to raise issues and concerns pertaining to the factory.

SCG Myanmar Concrete and Aggregate Company Limited (MCA) implements Corporate Social Responsibility (CSR) plan during the project lifespan. The objective of this plan is to create social welfare of factory workers and local community. SCG Myanmar Concrete and Aggregate Company Limited has allocated 2% on net profit after for spending CSR activities.

The Funds will be allocated as mentioned below:

(1) 30% of CSR fund will be used for education scheme;
(2) 30% of CSR fund will be used for health;
(3) 20% of CSR fund will be used for welfare program; and
(4) 20% of CSR fund will be used for religion and regional development.

SCG Myanmar Concrete and Aggregate Company Limited (MCA) is already engaged with many activities under various sectors such as educational, public health, religion as well as welfare activities, and will continue the CSR activities with updated mechanisms.

Education

- SCG Sharing The Dream (YGN,MLM)
- SCG Sharing The Dream for University Students
- SCG International Internship programs
- SCG giving safety knowledge to community

Health

- Sharing A Brighter Vision – Cataract Eyes surgery (MLM)
- Mobile Blood Donation (YGN,MLM)
- Mobile Clinic (MLM)
- Phaco Machine donation to Mon State

Religion

- Shwedagon Pagoda renovation project
- Win Sein Taw Ya Pagoda donation/ cleaning
- Kyaik-Htee-Yoe Pagoda renovation flooring system

Media Relations

- Media Press Release
- Media Visit to Thailand Cement Plant
- Media Visit to Architect Fairs

ရေဘေးသင့်ပြည်သူများအတွက် သိန်း ၂၅၀ တန်ဘိုး ပစ္စည်းလှူဒါန်းပေးအပ်ခြင်း

Image of Sharing the Dream

ကြည်လင်သောအမြင်ကိုမျှဝေခြင်း
Sharing a Brighter Vision Project

Phacoemulsification Machine Donation 23 August, 2016

Figure 8.5 Photo Records of CSR Activities

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Environmental and social management plan is intended to develop a management framework for the factory. The environmental practices, procedures and responsibilities are defined to get full compliance with the existing environmental policy, law, rules and regulation of the Environmental Department.

The environmental management plans for SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago Ready-mixed Concrete plant have been developed due to the significant environmental impacts associated with the Plant activities.

9.1 ENVIRONMENTAL MANAGEMENT TEAM (EMT)

SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago Ready-mixed Concrete plant establishes the Environmental Management Team (EMT) for implementing environmental and social management and monitoring plan for the operation phase of the project.

Environmental Management Team (EMT)

EMT shall comprise:

a)	Managing Director	– Mr.Sorasak Keeratichokehaikul
b)	Assistance Managing Director	- Mr. Tippatai Ragumtong
a)	Sale and Marketing Manager	- Mr. Tanetr Hengpradis
b)	Post tension Engineer	– U Aung Chit Moe
c)	Area Plant Manager	– U Min Min Chit
d)	HR Officer	- Saw JJ Ler Bwe Lay (HSE Representative)

9.2 ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT TEAM

Table 9.1 Roles and Responsibilities of Environmental Management Team

POSITION	RESPONSIBILITIES	CONTACT DETAILS
Plant Manager	• Evaluate and supervise corrective and preventive actions taken and the management of identified environmental impacts and OHS hazards and issues. • Monitor the environmental and social management plans implementation. Make sure that the plans are effectively followed and the results are discussed and evaluated for effectiveness and continual improvement. • Guide the relevant personnel to effectively implement the environmental and social monitoring programme and supervise immediate actions taken in emergency situations. • Represent the company in handling environmental and social issues / program with the media or regulatory agencies • Conduct Management Review on a regular basis. Reporting to top management on the key performances and monitoring of environmental and social issues for review, including recommendation for improvements.	
Line Manager	• Ensure the risk assessments and environmental and social management plans are implemented.	

	• Ensure compliance with applicable legal requirements and other requirements that the company subscribes. • Ensure that all employees, contractors and visitors under their control are instructed regarding the company's environmental health and safety rules & regulations and there is good level of compliance. • Ensure to monitor and review the environmental and OHS impacts and risks.	
Foemen/Supervisor	• Conduct of regular EHS inspection with maintenance of relevant EHS inspection records. • Performs random verification of Tool Box Meeting conducted by foremen or sub-contractor representatives for work groups. • Supports the Plant Manager on other assigned tasks. • Monitors the works carried out by respective workgroups in terms of schedule and adopted environmental and social management plans.	
HSE Representative	• Conduct environment, safety and health inspections at once a month. • Participate in incident investigations. • Conduct environmental, health and safety talks and in-house trainings. • Assist the managers in communicating to the employees under their control and ensure employees follow accordingly. • Assist in implementing environmental, health and safety & social management plans, monitoring plans.	

9.3 IMPLEMENTATATION OF MONITORING AND REPORTING

9.3.1 MONITORING PROGRAM

Environmental Management Team (EMT) is responsibility for implementing to inspect the working area. Requirement for inspection procedure is described in Table 9.2.

Table 9.2 Requirements for Implementing and Inspection

No.	Description	Frequency	Remark
1	Monitoring and inspection in the working area	Monthly	Site inspection checklist
2	Reporting the inspection findings, accidents and emergency cases to Top Management;	When the case occurs	Report form for accidents
3	Recording the environmental management actions	After taking action	Record File
4	Monitoring Checklist	After taking action	Monitoring File
5	Organizational capacity and competency (Environmental Management Knowledge, Training)	After training	Training Registers

9.3.2 REPORTING

Report Supported Team (RST)

Report supported team is developed as follows:

a) A representative from EMT – Team Leader
b) A representative from Admin – Team Member
c) A representative from HR – Team Member

Table 9.3 Roles and Responsibilities of Report Supported Team

POSITION	RESPONSIBILITIES	CONTACT DETAILS
Team Leader	• Reporting to top management on the key performances and monitoring of environmental and social issues for review, including recommendation for improvements. • Represent the company in reporting the environmental and safety issues to the governmental department and other agencies concerned. • Report submission to local Environmental Conservation Department (ECD), through the company.	
Team member	• Record of the monitoring results in files. • Develop the monitoring report with related documents.	

9.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR OPERATION PHASE

9.4.1 WASTEWATER MANAGEMENT PLANS AND BUDGET

Objective(s)	• To control and mitigate impacts of liquid wastes from the processing • To ensure to meet the national emission standards • To meet the WHO Drinking water Quality Guidelines		
Management Strategy	Provision of settling ponds for washing of central mixing plant and wastewater from truck wash		
Budget	**US$ 3000**	**Responsibility**	**Timing**
Control(s)	• Establish wastewater holding ponds. • Reducing the volume of water used during washouts. • Concrete agitator mixers and chutes must not be rinsed on roadways. • All sewers should be disposed of through septic tanks and discharge periodically by contacting Engineering Department. • Train employees to minimize water use and on water conservation practices.	Plant Manager Site Supervisor HSE Supervisor	Throughout processing phase
Performance Indicator(s)	• Monitoring results of tube well water quality. • Concentration of BOD, COD,TSS		Throughout processing period

Monitoring	• Monitoring of tube well water and final discharge quality from settling pond should be done biannually by sending the water into the laboratory.	HSE Supervisor Third party HSE firm Engage for laboratory tests	Throughout processing period
Reporting	• The Plant Manager or designated person shall review the monitoring results. • The results will be evaluated during internal EHS audits and take corrective action as necessary. • The monitoring results and corrective actions will be reported to top management	Plant Manager Top Management	Throughout processing period

9.4.2 AIR EMISSION AND DUST MANAGEMENT PLANS AND BUDGET

Objective(s)	• To ensure the impacts of dust and other air born particulates and dusts on adjacent areas and the nearby community are minimised. • To ensure to meet acceptable Air emission level of National Emission Standards. (MOECAF, 2015 December)		
Management Strategy	Potential air emission sources and activities will be managed by mainly engineering controls and administrative controls		
Budget	**US$ 1000**	**Responsibility**	**Timing**
Control(s)	• Minimize surface areas of aggregate storage piles. • Cement dust emissions from the silo during filling operations must be minimised. • Water spraying at the unpaved road and factory site during dry season. • All vehicles are regularly inspected and maintained to reduce the gas emission. • Reduce vehicle speed limits.	Plant Manager Site Supervisor HSE Supervisor	Throughout processing phase
Performance Indicator(s)	Concentration level of dust, particulate matters, PM_{10} and $PM_{2.5}$, CO_2,CO, SO_2, NO_x		Throughout processing period
Monitoring	• Monitoring and measurement of selected performance indicators of air quality at least once per six month or as and	HSE Supervisor Third party	Throughout processing period

	when necessary by third party. • Record the emission results. Define standards for air emission measurement comparison.	HSE firm	
Reporting	• The Plant Manager or designated person shall review the monitoring results. • The results will be evaluated during internal EHS audits and take corrective action as necessary. • The monitoring results and corrective actions will be reported to top management	Plant Manager Top Management	Throughout processing period

9.4.3 NOISE MANAGEMENT PLANS AND BUDGET

Objective(s)	• To minimise the impacts of environmental noise and vibration on the surrounding areas. • To ensure to meet acceptable noise level of National Emission Standards. (MOECAF, 2015 December)		
Management Strategy	Potential noise emission sources and activities will be managed by mainly engineering controls and administrative controls.		
Budget	**US$ 1000**	**Responsibility**	**Timing**
Control(s)	• All equipment should be properly maintained to limit noise emissions and fitted with functioning exhaust and muffler systems.	Plant Manager Site Supervisor HSE	Throughout processing phase

	• Weighing fine aggregates before coarse aggregates. • All the personnel working in high noise generating areas will be provided with sufficient ear protecting devices such as ear muffs.	Supervisor	
Performance Indicator(s)	• No complaints from adjacent residential and commercial premises or community regarding noise exposure. • Acceptable noise levels (dBA)		Throughout processing period
Monitoring	• Noise monitoring should be conducted by the plant personnel or third party to ensure the predicted impacts are not exceeded as National Noise Emission Standards.	HSE Supervisor Third party HSE firm	Throughout processing period
Reporting	• The Plant Manager or designated person shall review the monitoring results. • The results will be evaluated during internal EHS audits and take corrective action as necessary. • The monitoring results and corrective actions will be reported to top management.	Plant Manager Top Management	Throughout processing period

9.4.4 SOLID WASTE MANAGEMENT PLANS AND BUDGET

Objective(s)	• Reduce waste volume, maximise recycling, reuse and recovery, prevent any process waste entering the environment.		
Management Strategy	Minimise environmental impacts through proper waste management and controls.		
Budget	**US$ 700**	**Responsibility**	**Timing**
Control(s) of production waste and hazardous waste	• Provide segregated and adequate size of waste bins. • Dispose wastes regularly and not to allow wastes overflow from bins or accumulate on-site. • Separate recyclable materials from waste. • Applies waste reducing practices by paying careful attention during, storing raw material. • Hardened cement-sand slurry and returned concrete is generally be recycled as fill material. • Concrete waste will be used in concrete testing block. • Hazardous waste must be contained to prevent it from blowing away and from leaching into surface or groundwater • Ensure licensed contractors are used to collect hazardous	Plant Manager Site Supervisor HSE Supervisor	Throughout processing phase

	wastes. • Train employees to store and handle hazardous waste.		
Performance Indicator(s)	• Chemical wastes will be appropriately disposed. • Recycling or reuse of all recyclable wastes. • Removed from on-site at regular intervals.		Throughout processing period
Monitoring	• Daily inspection of around the plant and waste bins.	Supervisor HSE Supervisor	Throughout processing period
Reporting	• The Plant Manager or designated person shall review the monitoring results. • The results will be evaluated during internal EHS audits and take corrective action as necessary. • The monitoring results and corrective actions will be reported to top management	Plant Manager Top Management	Throughout processing period

9.4.5 TRAFFIC MANAGEMENT PLANS AND BUDGET

Objective(s)	Control and manage traffic congestion at the public roads due to delivery truck movements.		
Management Strategy	Minimize traffic congestion through proper traffic management..		
Budget	**US$ 1000**	**Responsibility**	**Timing**
Control(s)	• To schedule delivery movements outside of peak vehicle traffic times. • Reducing the vehicles use, and collaborated using on same route of venicles. • Control speed limit and provide traffic signage in and around the factory area. • Be sure that trucks and other vehicles are in good working order. • Keep trucks away from nearby homes whenever possible. • The plant will use locally available materials. • Follow the established truck routes in the community. • Driver behaviour, awareness and training will be undertaken.	Plant Manager Site Supervisor HSE Supervisor Truck operators	Throughout processing phase
Performance Indicator(s)	• Public complaint with regards to traffic congestion.		Throughout processing

	• Road Accident.		period
Monitoring	• Visual check of traffic congestion around the project area.	Supervisor HSE Supervisor	Throughout processing period
Reporting	• To report Plant Manager if there is any unsolvable traffic congestion. • The monitoring results and corrective actions will be reported to top management	Plant Manager Top Management	Throughout processing period

9.5 OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY

9.5.1 OCCUPATIONAL HEALTH AND SAFETY PLAN

Objective(s)	• To control or mitigate significant occupational health and safety hazards and risks associated with operations.		
Management Strategy	Own employees are educated about potential OHS hazards and risks and community safety. Provide necessary resources to control potential hazards and risks and to maintain a healthy and safe working environment.		
Budget	**US$ 1000**	**Responsibility**	**Timing**
Control(s) of -Accidents	• Drivers are trained correct operation of truck mixers including maintenance and cleaning. • Each new worker is given a plant orientation before they start work.	Plant Manager Site Supervisor	Throughout processing phase

-Traffic safety **-Safety measure**	• .Improve the driving skills and requiring licensing of drivers. • Driver behaviour, awareness and training will be undertaken. • Fire extinguishers and facilities. • All workers should be provided with proper Personal Protective Equipment. • Workers must be educated on the use of material data safety sheets (MSDSs), which are information sheets available from suppliers, giving information on the contents of the hazardous product and the related health hazards, emergency action, first aid and so on. • Fire drill will be conducted once per year. • Providing competency training.	HSE Supervisor	
Performance Indicator(s)	• Accident and Incident statistics.		Throughout processing period
Monitoring	• Supervisor and HSE Supervisor should conduct daily HSE inspection to make sure a safe working environment. • Plant Manager and Line	Supervisor HSE Supervisor	Throughout processing period

	Manager should conduct a plant inspection once per week.		
Reporting	• The Plant Manager or designated person shall review the monitoring results. • The results will be evaluated during internal EHS audits and take corrective action as necessary. • The monitoring results and corrective actions will be reported to top management.	Plant Manager Top Management	Throughout processing period

9.5.2 COMMUNITY HEALTH AND SAFETY PLAN

Objective(s)	• To control or mitigate significant community health and safety hazards and risks associated with operations.		
Management Strategy	Provide necessary resources to control potential hazards and risks and to maintain a healthy and safe environ.		
Budget	**US$ 700**	**Responsibility**	**Timing**
Control(s)	• Reused and recycled the concrete waste. • Store chemicals properly. • Traffic safety is promoted. • Follow the established truck routes in the community. • Driver behaviour, awareness and training will be undertaken. • The emergency response team has developed. • Fire Prevention Plans has	Plant Manager Site Supervisor ERTeam HSE Supervisor	Throughout processing phase

	developed.		
Performance Indicator(s)	• Public complaints.		Throughout processing period
Monitoring	• Supervisor and HSE Supervisor should conduct daily HSE inspection to make sure a safe working environment. • Plant Manager and Line Manager should conduct a plant inspection once per week.	Supervisor HSE Supervisor	Throughout processing period
Reporting	• The Plant Manager or designated person shall review the monitoring results. • The results will be evaluated during internal EHS audits and take corrective action as necessary. • The monitoring results and corrective actions will be reported to top management.	Plant Manager Top Management	Throughout processing period

9.6 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR DECOMMISSIONING PHASE

Table 9.4 Environmental and Social Management Plan for Decommissioning Phase

Objectives	To control or mitigate significant impacts, hazards and risks associated with demolition activities during decommissioning phase.		
Management Strategy	Providing awareness about potential OHS hazards and risks and community safety for Contractors for decommissioning phase. Provide necessary resources to control potential hazards and risks and to maintain a healthy and safe working environment.		
Budget	**US$ 1500**	**Responsibility**	**Timing**
Noise (Long/short term noise nuisance and hearing loss)			
Performance Indicator(s)	• No complaints from adjacent residential and commercial premises or community regarding noise exposure. • Acceptable noise levels (dBA)		
Controls	• Schedule noisy activities during day time period. • Ensure machinery is well maintained to reduce noise generating. • Switching off installations and equipment when they are not used. • Minimization of work during evening/night time. • Provide PPE such as noise defenders, ear plugs and ear muffs to the workers in high noise area.	Through-out decommissioning phase	Contractor Site Supervisor OHS Supervisor

Air/ Dust (Chronic respiratory disease and eye complication)			
Performance Indicator(s)	Concentration level of dust, particulate matters, PM_{10} and $PM_{2.5}$, CO_2,CO, SO_2, NO_x		
Controls	• All vehicles used are inspected and done regular maintenance. • Restriction of transport speed on roads. • Installation of temporary cover. • Set up dust barriers at strategic locations: Dust nets will be provided around the demolition area. • Practice dust management techniques, including watering down dust. • Provide PPE against dust (i.e. mask)	Through-out decommission-ing phase	Contractor Site Supervisor OHS Supervisor
Water Pollution (Contamination of surface and underground water sources)			
Performance Indicator(s)	• Monitoring results of tube well water quality. • Concentration of BOD, COD,TSS		
Controls	• Ensure sewage system is functional during demolition to prevent pollution of nearby underground and surface water sources. • Proper demolition of the sewage system to prevent pollution by contents into the environment and ground water.	Through-out decommi-ssioning phase	Contractor Site Supervisor OHS Supervisor

Solid Waste (Pollution of water, air and soil)			
Performance Indicator(s)	• Chemical wastes will be appropriately disposed. • Recycling or reuse of all recyclable wastes. • Removed from on-site at regular intervals.		
Controls	• Enforce segregation of waste at the source to encourage reuse and recycling. • To store waste temporary in containers, in case of large dimension it is possible to store wastes with waterproof cover. • Disposal of solid waste in compliance with local government policy • Usable infrastructures will be hand over to the township authorities (or) industrial management committee for future community use.	Through-out decommission -ing phase	Contractor Site Supervisor OHS Supervisor
Traffic congestion (Vehicle accidents due to traffic volume and higher speed)			
Performance Indicator(s)	• Public complaint with regards to traffic congestion. • Road Accident.		
Controls	• Control speed of vehicles through road safety education and fines. • Provide adequate signage, barriers and flag persons for traffic control. • Vehicle maintenance and refuelling should be confined to areas in the site camp. • Restriction of transport speed on	Through-out decommission -ing phase	Contractor Site Supervisor OHS Supervisor

	roads without special covering up to 29km/hr.		
Social Environment **(**Interaction with Public)			
Performance Indicator(s)	• Accident and Incident statistics. • Public complaints.		
Controls	• Informing of public on demolition process.	Through-out decommission-ing phase	Contractor Site Supervisor OHS Supervisor
Occupational and Community Health and Safety (Incidents and accidents leading to serious injury or fatalities)			
Management Strategy	• Own employees are educated about potential OHS hazards and risks and community safety. • Provide necessary resources to control potential hazards and risks and to maintain a healthy and safe working environment.		
Controls	• Placing at the site of information and warning signs and fences. • Ensure provision of appropriate PPE for staff such as o earmuffs for ear protection, o helmets for head protection, o dust masks for dust protection for all project works, o goggles with good visibility for eye protection, o overalls and dust coats to protect the skin, o safety shoes for protection of the	Through-out decommi-ssioning phase	Contractor Site Supervisor OHS Supervisor

	feet, ○ gloves of different types according to specific works in relation to: puncture resistance; sharps resistance; cut resistance; flexibility; abrasion resistance; grip.		
Emergency situations	• Storage of inflammable and explosive substance and materials at closed warehouses or fenced sites. • Regular territory clearing. • Availability of necessary means for fire prevention and provision of operative access to them.	Through-out decommi-ssioning phase	Contractor Site Supervisor OHS Supervisor

9.7 EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Myanmar is prone to various natural hazards that include earthquakes, floods, cyclones, droughts, fires, tsunamis, some of which have the potential to impact large numbers of people.

The overall goal of the **emergency preparedness and response plan** is to mitigate the impact of disasters and save as many lives as possible from preventable causes.

SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago Ready-mixed Concrete plant has prepared an **emergency preparedness and response plan** in order to prevent consequences of natural disasters such as fire, floods and earthquakes and man-made errors (e.g. electricity shock, fire hazards).

Emergency response plan describes the requirements for planning and preparing to protect workers in the event of an emergency. Emergency response plan describes the requirements for planning and preparing to protect workers in the event of an emergency.

Requirements

- Factories must have procedures to prepare for possible emergencies such as fire, earthquakes, hurricanes, and chemical spills.
- Factories must have an emergency evacuation plan, and evacuation routes must be posted in each work area.
- Factories must hold emergency evacuation drills often enough that workers know the drill procedure and consider it routine.
- Factories must have a fire prevention plan.

9.7.1 EMERGENCY RESPONSE TEAM (ERT)

SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago Ready-mixed Concrete plant has developed the **Emergency Response Team (ERT)** to fulfill the requirement of **emergency preparedness and response plan** and to promote a safe working environment at the factory.

Emergency Response Team (ERT)

ERT shall comprise:

a) Factory Manager – Mr. Chirasak Khanthachumpoo
b) HR Manager – Mr. Tarit Sri-am-pai
c) Admin Officer – U Saw Judson Win
d) Mechanic Officer – U Mya Min Min Pike
e) Area Plant Manager – U Kyaw Thu
f) Supervisors – Warden
g) Designated workers – First Aiders, Fire Fighters, etc.

9.7.2 ROLES AND RESPONSIBILITIES FOR EMERGENCY RESPONSE TEAM

The team members shall have knowledge of or can be trained in responding to emergencies such as emergency plan, firefighting, precautions.

The **ERT** should be on call in case of safety problem that occurs during off-hours/ or Security shall contact the Township Fire Department immediately.

Responsibilities of ERT

Incident Controller	• Commands and control the ERT to response to an emergency. • Communicates with authorities eg. Police/ Township Fire Department in the event of an emergency. • Ensure emergency plan are reviewed regularly and ERT are appropriately trained and equipped to carry out their assigned task. • Crowd control and monitor overall headcount at the Assembly Area. • Initiate drill exercises and post exercise review with ERT on an annual basis.
Dy- Incident Controller	• Conduct head count of all staff, consultants and workers. • Consolidate the headcount list from wardens. • Report evacuation status such as any missing person to the IC .
Member- Fire Fighters	• To be trained in firefighting, and assist in firefighting at no personal risk.
Member- Wardens	• Area combing, to ensure all staff and workers leave the workplace promptly during an evacuation. • Direct staff and workers to the Assembly Area. • Conduct headcount for their workers at the Assembly Area.
Member- First Aiders	• Successfully completed first aid training. To render first aid to any injured during any emergency. • Standby at the Assembly Area with first aid kit during a mass evacuation.

9.7.3 FIRE PREVENTION PLANS

A small spark of fire may result into loss of properties and the damage by fire may produce high economic losses. This type of losses can be avoided by preventing and controlling the fire instantly for which **Emergency Response Teams** are established **(detailed in 9.6.1**).

Hazard Assessment

- Factories should consider all the types of emergencies that may occur at their location (e.g. fire, chemical spill, earthquake, typhoon, etc.) and include them in emergency preparedness procedures.
- Fire and explosion hazards can exist in almost any work area. Potential hazards include:
    a) Improper operation or maintenance of gas-fired equipment.
    b) Improper storage or use of flammable liquids.
    c) Smoking in prohibited areas.
    d) Accumulation of trash.
    e) Hot Work (welding, soldering, any use of open flame or torch) operations without proper controls.

Hazard Controls

- Factories should have rules and procedures to make sure that aisles and exits are kept clear, are properly and clearly marked, and allow workers to quickly and safely leave the factory in an emergency.
- Fire extinguishers should match the potential fire hazard and should be located within 15 m (50ft) of flammable liquids and 23 m (75ft) of every worker.
- Fire extinguishers should have maintenance tags attached to them to indicate the date they were last checked and serviced. Ensure that workers how to use fire extinguishers in the immediate area.

Rules to Follow

- Electrical lines must be checked not to leave without switching off when working hours is over or when there is blackout.
- All the fuel and diesel are to be kept and stored, away from fire prone facilities and equipped with specific fire extinguishers for emergency use.
- Flammable by-products or wastes are to be kept at a specific site.
- Smoking is strictly restricted except in a specific smoking area defined.
- Matches must not be used near the machines.

- Establish a firm rule that any repair or maintenance work on powered machines should only be down when the power is turned off and the switch is locked in the off position.
- Be certain that the electrical power can be shut off immediately in case of emergency.

Emergency Contact List

Emergency Contact List consisting contact nos. of authorities, hospital, clinic, ERT personnel shall be prepared and displayed at the factory. The list shall be reviewed at least once a year or as and when there is change in personnel or change in contact number.

The contact no. for local authorities below shall be included in the list :

- Township Fire Department – fires, explosions, ambulance
- Police – local emergencies, life threatening situation
- Nearest Hospital – medical emergencies
- Local clinic or on-site doctor/nurse – medical emergencies

Outside Assembly Points

- Outside assembly points will be marked and all site personnel instructed where to assemble in the event of an emergency.
- An assembly area will be assigned outside the factory so that evacuated workers can be accounted for in an emergency.

First Aider and First Aid Facilities

Trained first aider(s) shall be appointed for the project, and for each shift.

Drills

Factories should have emergency evacuation procedures that require all workers and managers to participate in drills. During a drill, workers and managers should leave the building, go to an assigned location (assembly area) and remain there until a signal is given to return to the factory. The focus should be on orderly evacuation,

rather than on speed. Awareness talk for protection will be held and workers will be sent to trainings administered by Fire Bridge. The following exercise shall be conducted at least once a year for the ERT or otherwise stated :

- Fire fighting
- Evacuation Drill for all personnel at the factory

Fire Extinguisher

A portable fire extinguisher is a "first aid" device and is very effective when used while the fire is small. The use of a fire extinguisher that matches the class of fire, by a person who is well trained, can save both lives and property. Portable fire extinguishers should be installed in workplaces regardless of other fire-fighting measures. The successful performance of a fire extinguisher in a fire situation largely depends on its proper selection, inspection, maintenance, and distribution.

Classification of Fires and Selection of Extinguishers

- Fires are classified into four general categories depending on the type of material or fuel involved. The type of fire determines the type of extinguisher that should be used to extinguish it:
- Extinguishers should be selected according to the potential fire hazard, the construction and occupancy of facilities, the hazard to be protected, and other factors pertinent to the situation.
- Use water from nearby tap water if the fire is caused by burning of wood, paper, plastics, textile and trash.
- Dry powder extinguisher (blue) can be used for most types of fire such as those involving burning of wood, paper, plastics, textile, trash, chemical, flammable liquid and electrical fires.
- Carbon dioxide extinguisher (black) is only suitable for flammable liquids and electrical fires only. It is not suitable for use in indoor/ enclosed environment.

The diagram below illustrates the color coding of fire extinguishers and can be used as a guideline for Fire Extinguisher selection.

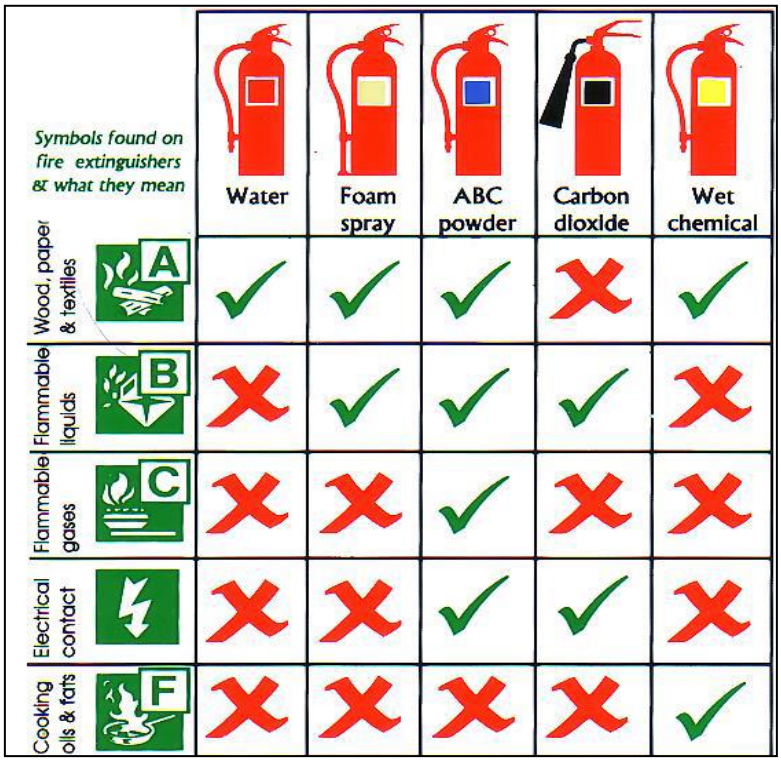


Figure 9.1 Selection Guidelines for Fire Extinguishers

9.7.4 FLOOD PREPAREDNESS AND RESPONSE

The Emergency Response Preparedness (ERP) approach seeks to improve effectiveness by reducing both time and effort, enhancing predictability through establishing predefined roles, responsibilities and coordination mechanisms. The components of Emergency Response Preparedness Plan (ERPP) for flood hazard are as follows:

i) Risk Assessment
ii) Prevention
iii) Protection
iv) Preparation
v) During the Flood Warning Period
vi) Evacuation
vii) Site Reoccupation
viii) Training
ix) Documentation

i) Risk Assessment,

The Myanmar coastline is susceptible to severe cyclones which form in the Bay of Bengal, which has two cyclone seasons: April to May and September to November. According to the Myanmar Hazard Profile, the frequency of cyclone landfalls in Myanmar was once in three years before the year 2000. More recently, cyclones cross the Myanmar coast every year.

The plant lies within the area has been affected by major floods in July 2015 and possibly by other floods since 2012 (detailed in section 6.6.2). Possible months are May, June, October and November due to the cyclone hit and July and August by heavy rainfall.

ii) Prevention

Redevelop the plant site to raise the floor level of the storage area for chemical tanks as well as raw material storage area as a mitigation against flood. No further preventative measures have been possible because of the nature of the business activities (ie. there are no large buildings in the plant yard).

iii) Protection

Installed the flood barriers or place sandbags around the mixer at risk from flooding to allow some protection, but these measures are only intended to allow extra time for evacuation in the flood scenario.

iv) Preparation

Ensure that emergency supplies and equipment are on hand and ready for thr on site emergency action team. Obtain cash for post-flood needs such as buying food and supplies or paying employees.

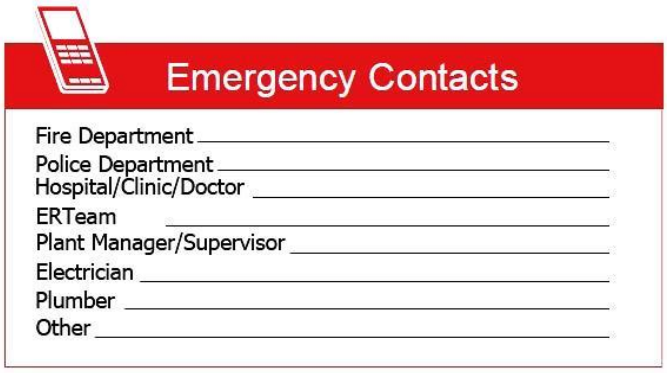
a. Prepare and maintain full flood kit.

b. Prepare Emergency Contact List

Emergency Contact List consisting contact nos. of authorities, hospital, clinic, ERT personnel shall be prepared and displayed at the factory. The list shall be reviewed at least once a year or as and when there is change in personnel or change in contact number.

The contact no. for local authorities below shall be included in the list :

- Township Fire Department – fires, explosions, ambulance
- Police – local emergencies, life threatening situation
- Nearest Hospital – medical emergencies
- Local clinic or on-site doctor/nurse – medical emergencies



c. Drill

A flood evacuation drill is carried out if possible.

v) During the Flood Warning Period

- Move vital business records, equipment, and materials that might become hazardous when wet to a safe place either to another location or to floors above the expected flood level, if possible.
- Seal the building to keep water out.
- Close vavles in piping carrying flammable or hazardous materials.
- Anchor or weigh down buoyant materials.
- Shut off electricity.
- Fill sandbags for emergency use at openings that may be overlocked.

vi) Evacuation

- Keep names and phone numbers of the contact list.
- If advised by authorities to evacuate, do so immediately under the guidance of ERTeam.
- Take the flood kit and look the business, choose a route away from the flood area.
- Do not walk through moving water, walk where the water is not moving, and use a stick to check the firmness of the ground in front of you.
- Do not camp along streams, rivers, or creeks.
- Do not drive into flooded areas.Do not attempt of drive through a flooded road.
- Do not try to take shortcuts, as they may be blocked. Stick to designate evacuation routes.

- Continue ensuring employee safety.
- Be mindful indoor safety. If backup power suppliers are needed, do not use an electric generator indoors, inside a garage, or near building air intakes because of the risk of carbon monoxide poisoning.

vii) Site Reoccupation

- Searching of any missing people by ERTeam.
- Once outdoors, stay away from power lines.
- Secure the plant site and watch.
- Visually check for the exposed insulators before re-energizing electrical systems.
- Clear roof drains and debirs from roofs.
- The ERTeam should determain who have special needs, such as disabled persons.
- Remove mud and silt from the building and from equipment to minimize futher damage.
- Salvage computers, electronics, and mechanical equipment. Salvage is high if these items are cleaned promptly with fresh water and then carefully dried. This should be done by a professional salvage company.
- Check broken windows and damaged roof coverings immediately.
- Survey facilities for damage. Take photographs of the damage.
- Separate damaged goods.

viii) Training

- Brief to employee new to site
- Provide staff evacuation training.
- Ensure that all workers know what to do in case of an emergency.
- Exercising/testing.

ix) Documentation

- Distribution the procedure to the team member as well as all staff.
- Regularly update plans and procedures based on lessons learned from exercises.
- Review the action plan.

9.7.5 PROCEDURE FOR EMERGENCY SITUATIONS

I) In the event of Fire & Explosion (Fire Emergency Procedures)

a) If you discover a fire

- Evacuate and alert all personnel in the area and notify the ERT
- The person who discovers can attempt to extinguish any incipient fire with the available firefighting equipment and without personal risk.

b) Fight the fire ONLY if:

- ERT has been notified of the fire, and
- The fire is small and confined to its area of origin, and
- You have the proper extinguisher, in good working order, and have been trained and know how to use it.
- If you are not sure of your ability or the fire extinguisher's capacity to contain the fire, leave the area.

c) If you hear a fire alarm:

- Evacuate the area.
- Assemble in an assigned area.
- Supervisors and Coordinators should account for all workers in their area to determine that all personnel have evacuated.

d) Evacuation

- Be familiar with exit routes, assembly areas, and evacuation maps.
- Report to assembly area coordinator if evacuating from other than your normally assigned location, also report to assembly area coordinator if co-worker is missing.

e) Power Failure

- In the event of a power failure, remain in your work area. Wait for instruction from your coordinator, Supervisor, or shift leader.
- Stop and park all moving equipment immediately for the duration of the power failure.

II) In the event of Storm and Flood Period

a) During Storm and Flood Period

- Shut off electricity.
- Move vital business records, equipment, and materials that might become hazardous
- Close vavles in piping carrying flammable or hazardous materials.
- Anchor or weigh down buoyant materials.
- Fill sandbags for emergency use at openings that may be overlocked.

b) Evacuation

- Keep names and phone numbers of the contact list.
- Evacuate immediately under the guidance of ERTeam.
- Take the flood kit .
- Do not walk through moving water.
- Do not drive into flooded areas.
- Do not try to take shortcuts, as they may be blocked. Stick to designate evacuation routes.

c) Site Reoccupation

- Visually check for the exposed insulators before re-energizing electrical systems.
- The ERTeam should determain who have special needs, such as disabled persons.
- Secure the plant site and watch.

III) Incident and Accident Emergency

- In cases of incident and accident, prompt reporting (verbal reporting) has to be carried out.
- Move to safe place.
- First aid treatment and subsequent admission to hospital for serious cases.
- Prepare the written statement include the location, the time, and cause of accident to take future action for emergency management.

IV) Road Traffic Accidents

- In case of a road traffic accident, immediately inform to the supervisor.
- Make vehicles safe by switching off the ignition of all damage and surrounding cars and if you can, disconnect the battery.
- Call to nearby Traffic Police Station.
- Obtain the particulars of the other involved parties, i.e. vehicle registration number, driver's name, witnesses etc.
- Collaborate with the Police who will investigate the accident.
- ERT member shall immediately go to the accident scene to handle the emergency case.
- Prepare the written statement include the location, the time, and cause of accident to take future action for emergency management.

V) Earthquake

- Alert by a loud voice or warning device to alarm at the time of earthquake.
- At operation area, falling object and heavy equipment hazards include sand hopper, mixer, silos, trees and fences, and make sure employees away from these danger areas.
- Identify safe places at batching plant area.
- Remaining in your respective safe-place until the shaking has spopped.
- At the assembly point, the evacuees are grouped by department.
- Ensure the head count and ERT would have to be dispatched to look for those missing.
- First aid treatment if necessary.
- Follow up site reoccupation after earthquake.

9.8 TRAINING, AWARENESS AND COMPETENCY

Training and human resource development is an import link to achieve sustainable environmental management. SCG Myanmar Concrete and Aggregate Company Limited has concentrated on in-factory capacity building on productivity improvements, improved management trainings and modern HR management practices. All personnel of the factory will be trained on health and safety procedure and to be familiar with, operation processes and procedures (eg. Firefighting exercises, emergency drill and practices, first aid training, etc.).

Topics of training workshops and in-house consultancies delivered are as follows:

1) Emergency Response Plan Workshop
2) Safety training for Supervisor
3) Fire Evacuation Training
4) First Aid and CPR Training
5) Safety Performance Assestment Program
6) Safety Performance Training

Sharing Safety Knowledge

Improvement about the Systems, Safety and Service to Mixer Truck Team

9+1 Life Saving Rules card distribution to employee

Figure 9.2 Photos Records of Trainings

10.0 ENVIRONMENTAL MONITORING PLAN

10.1 OBJECTIVES

The objective of environmental monitoring is to systematically collect environmental data and support information needed for evaluation of the environmental performance. The frequency and methods of data collection must ensure that the data obtained are reliable and meaningful, i.e. they will adequately reflect the project environmental performance. A proposed environmental monitoring program must be practical, relevant and cost effective.

Environmental monitoring is a very important aspect of environmental management during construction, operation and decommissions stages of the project to safeguard the environment. A chemical or process industry in general produces solid, liquid and gaseous wastes, which are discharged to the environment. The waste product may contain pollutants which may harm environment. It is the responsibility of the industries to prevent or minimize the discharges of waste products by adopting suitable control measures in the factory. The effectiveness of such measures is ascertained by systematic monitoring of discharges at factory level and at receiving level.

10.2 REGULATORY REQUIREMENT

Environmental Standards

Ministry of Natural Resources and Environmental Conservation - MONREC (former Ministry of Environmental Conservation and Forestry - MOECAF) issued National Environmental Quality (Emission) Guidelines, NEQGs, in December 2015 according to the provision of Paragraph (42), Sub-paragraph (b) of the Environmental Conservation Law (2012).

Governing Parameters

Table 10.1 Environmental and Social Monitoring Parameters

Sr.	Items	Parameters
1	Air Quality	SO2, NO2, CO, PM2.5, PM10, dusts and O3 concentrations of National Emission guidelines, 2015 December
2	Noise	Acceptable noise levels of National Emission guidelines, 2015 December
3	Water Quality (Factory use water)	WHO Drinking water Quality Guidelines pH, Colour, Turbidity, Hardness, Iron, Chloride, Conductivity, Salinity,
4	Waste	Waste recycle plan, removed from on-site at regular intervals.
5	Health and Safety	Medical kit box, fire evacuation, emergency plan, PPE.
6	Socio-economic situation	Job availability, providing skill enhancement training, CSR

10.3 IMPLEMENTATION AND REPORTING

The project proponent will also be responsible for the implementation of monitoring, summarization of monitoring results, and submission of monitoring report to the Ministry of Natural Resources and Environmental Conservation (MONREC) periodically through the local Environmental Conservation Department (ECD).

SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED (MCA) – BAGO BATCHING PLANT shall submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry.

10.4 ENVIRONMENTAL MONITORING PLAN AND BUDGET FOR OPERATION PHASE

The environmental monitoring plan including monitoring items and locations in the operation is shown in following Table.

Table 10.2 Environmental Monitoring Plan

Environmental Issues	Monitoring Location	Monitoring and Reporting Frequency	Training	Budget (USD) One Time	Responsibility Party
Air Pollution					
Env.Standard	National Environmental Quality (Emission) Guideline for Air Emission				
Parameters	SO_2, NO_2, CO, $PM_{2.5}$, PM_{10}, dusts and O_3				
Ambient Air	1.Work Place 2. At the boundary of the property	Twice a year	Engaged to trained consultant	500 (Monitoring fees)	HSE personnel External Consultant firm
Noise					
Env.Standard	National Environmental Quality (Emission) Guideline				
Parameters	Acceptable noise levels (dB)				
Noise level dB(A)	1. Workplace 2.Generator 3. Site boundary	Twice a year	Use of handle noise level meter	200 (Sound meter device cost)	HSE personnel External Consultant firm

Water Quality					
Env.Standard	WHO Drinking water Quality Guidelines				
Parameters	-pH, Colour, Turbidity, Hardness, Iron, Chloride, Conductivity, Salinity, TSS, Dissolved Oxygen, Temperature - BOD, COD, pH, TSS				
Water Quality Waste Water Quality	1. Tube Well 2- Wastewater	Twice a year	Engaged to outside third party for laboratory tests	200 (laboratory tests fees)	HSE personnel External Laboratory for water quality tests
Health and Safety					
Parameters	Statistic of accidents and injuries.				
Safety Measures for Health Status	-Within the factory -Firefighting training and drill	Daily Annually	Mandatory HSE training HSE Supervisor Training Incident Investigation Training	1000 500 (Training fees)	Site Supervisor HSE personnel

10.5 MONITORING PLAN FOR DECOMMISSIONING PHASE

The environmental monitoring plan including monitoring items and locations in the decommissioning phases is shown in following Table. Monitoring for the decommissioning phase will be implemented by project proponent and the contractors.

Table 10.3 Monitoring Plan for Decommissioning Phase

Environmental Issues	Monitoring Location and Indicator	Monitoring and Reporting Frequency	(USD) One Time	Responsibility Party
Air Pollution				
Ambient air quality	Suitable points on site	Monthly	500	Project proponent/ Contractor
Dust Situation	Project area	Monthly	Visual check	Contractor
Noise				
Noise level dB(A)	Suitable points on site	Monthly	200	Project proponent/ Contractor
Water Quality				
Water Quality	Tube well for site use	Monthly	100	Project proponent/ Contractor
Status of maintenance of septic tank	Project site	Monthly	Visual check	Contractor
Soil Quality				
Spill of fuel oil and hydraulic oil, Status of maintenance of soak pit for sewage collection	Project site	Monthly	Visual check and record	Contractor

Waste Disposal				
Solid waste	Project area	Monthly	Visual check and record amount	Contractor
Occupational, Health and Safety				
Record of accidents and infectious diseases	Project area	Monthly	Check of record	Contractor

11.0 LIST OF COMMITMENT

Project proponent is commitment to comply with the existing environmental rules and regulations and criteria laid down by the Ministry of Natural Resources and Environmental Conservation.

Table 11.1 Project Key Commitments

ကတိကဝတ်၏အတိုချုပ်	အမှတ်စဉ်	ကတိကဝတ်အား ရှင်းလင်း ဖော်ပြချက်	အစီရင်ခံစာပါ ညွှန်းချက် (အခန်း)
EMP Executive Summary	1	The company shall be proactive to provide a risk free and safe workplace for all of its employees.	Chapter 1.0
Legal Requirement	2	SCG Myanmar Concrete and Aggregate Company Limited (MCA) shall be responsible for the protection as well as perseveration of environment in and around the area of the project site.	Chapter 4.0 Section 4.1
	3	SCG Myanmar Concrete and Aggregate Company Limited (MCA) shall be able to control pollution of air, water and land, and not to cause environment degradation.	Chapter 4.0 Section 4.1
	4	SCG Myanmar Concrete and Aggregate Company Limited (MCA) will comply with any applicable environmental	Chapter 4.0 Section 4.1

		protection laws and regulations of the Republic of the Union of Myanmar.	
	5	SCG Myanmar Concrete and Aggregate Company Limited always comply with all health and safety legislation.	Chapter 4.0 Section 4.2
	6	SCG Myanmar Concrete and Aggregate Company Limited will establish and implement the Occupational, Health and Safety Management.	Chapter 4.0 Section 4.2
	7	In addition, project proponent shall comply with the law, rules and regulations which related with the project activities and the regulations issued by the Industrial Zone Management.	Chapter 4.0 Section 4.4
Project Description (Solid Waste)	8	The plant applies waste **reducing** practices by paying careful attention during, storing raw material like sand, aggregates, cement etc. in order to reduce waste.	Chapter 5.0 Section 5.12.1
Solid Waste (Process Waste)	9	Concrete waste will be also used in concrete testing block. The testing block area is near operation area.	Chapter 5.0 Section 5.12.1
Mitigation Measure for Solid Waste	10	MCA batch plant will establish and implement comprehensive waste management plan to ensure segregation, handling, labelling, storage and disposal of hazardous and nonhazardous waste in safe and environmental friendly manner.	Chapter 7.0 Section 7.5.3

Mitigation Measure for Solid Waste	11	Recyclable wastes will be reused accordingly.	Chapter 7.0 Section 7.5.3
Community Involvement and Development	12	SCG Myanmar Concrete and Aggregate Company Limited has allocated 2% on net profit after for spending CSR activities.	Chapter 8.0 Section 8.6
Environmental and Social Management Plan (Environmental Management Team)	13	SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago Ready-mixed Concrete plant establishes the Environmental Management Team (EMT) for implementing environmental and social management and monitoring plan for the operation phase of the project.	Chapter 9.0 Section 9.1
Environmental and Social Management Plan (Emergency Response Team)	14	SCG Myanmar Concrete and Aggregate Company Limited (MCA)- Bago Ready-mixed Concrete plant has developed the Emergency Response Team (ERT) to fulfill the requirement of emergency preparedness and response plan and to promote a safe working environment at the factory.	Chapter 9.0 Section 9.7.1
Training	15	All personnel of the factory will be trained on health and safety procedure and to be familiar with, operation processes and procedures	Chapter 9.0 Section 9.8
Environmental Monitoring Plan (Monitoring Reporting)	16	SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED (MCA) – BAGO BATCHING PLANT shall submit monitoring reports to the Ministry not less	Chapter 9.0

		frequently than every six (6) months, as provided in a schedule in the EMP, or	
Conclusion	17	The project proponent has to implement the project in compliance with National laws and regulations for environmental protection.	Chapter 12.0

12.0 CONCLUSION

This Environmental Management Plan (EMP) was carried out for the SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant which manufactures ready-mixed concrete in Industrial Special Zone (1), Bago Township, Bago Region, Myanmar. The main objective of the study is to identify the major environmental impacts due to the implementation of the project activities. Environmental Management Plan (EMP) has been conducted for the SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant project under the Myanmar Environmental Conservation Law as per the comments of Environmental Conservation Department (ECD). The project proponent has to implement the project in compliance with National laws and regulations for environmental protection.

Baseline air, noise and water parameters were measured during December 2018. The measured values of SO_2, NO_2, CO, O_3, **$PM_{2.5}$** and **PM_{10}** lie within the range of Air Quality Guidelines.

In order to monitor the water quality, groundwater samples from tube well was taken and tested during December, 2018. According to the baseline data, all parameters are acceptable within the range of WHO standard. Waste water sample was also collected and tested lab analysis during December. According to the baseline data, COD and BOD values are within the guideline.

And SCG Myanmar Concrete and Aggregate Company Limited (MCA) is always proactive to provide a risk free and safe workplace for all of its employees. SCG Myanmar Concrete and Aggregate Company Limited (MCA) provides proper leave scheme, over-time allowance and yearly bonus which shall be satisfactory for the workers. The factory also practices good employee welfare plan. Furthermore, SCG Myanmar Concrete and Aggregate Company Limited (MCA) is already engaged with many activities under various sectors such as educational, public health, religion as well as welfare activities, and will continue the activities with updated mechanisms.

Based on the overall impact assessment of the SCG Myanmar Concrete and Aggregate Company Limited (MCA) – Bago Batching Plant operation, it can be concluded that the factory is environmentally acceptable and it is expected that the plant will implement a high standard of equipment and maintenance, and good housekeeping and operational practices, at all times.

APPENDIX (A) CERTIFICATE OF INCORPORATION

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
အမျိုးသားစီမံကိန်းနှင့် စီးပွားရေးဖွံ့ဖြိုးတိုးတက်မှုဝန်ကြီးဌာန
ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်
၈၀ အက်ဖ်စီ ၂၀၁၅-၂၀၁၆ (ရက)
အမှတ် ...../
အက်(စ်)စီကျွဲ မြန်မာ ကွန်ကရစ် အင်န် အက်ဂရီဂိတ်
မြန်မာနိုင်ငံ ကုမ္ပဏီများ အက်ဥပဒေအရ .....
ကုမ္ပဏီ လိမိတက်
.....အား ပေးရန်တာဝန် ကန့်သတ်ထားသော လီမိတက်
ကုမ္ပဏီအဖြစ် ၂၀၁၅ နှစ်၊ ဧပြီ လ၊ ၂၇ ရက်နေ့တွင် မှတ်ပုံတင်ခွင့်ပြုလိုက်သည်။

ညွှန်ကြားရေးမှူးချုပ်(ကိုယ်စား)
(နီလာမူ၊ ညွှန်ကြားရေးမှူး)
ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF NATIONAL PLANNING AND ECONOMIC DEVELOPMENT

CERTIFICATE OF INCORPORATION

NO. 80 FC of 2015-2016 (YGN)

I hereby certify that SCG MYANMAR CONCRETE AND AGGREGATE COMPANY LIMITED. is this day incorporated under the Myanmar Companies Act and that the company is Limited.

Given under my hand at Yangon this TWENTY SEVENTH day of APRIL, TWO THOUSAND AND FIFTEEN.

For Director General
(Nilar Mu - Director)
Directorate of Investment and Company Administration

ကုမ္ပဏီနှင့်သက်ဆိုင်သည့်အချက်အလက်များ

(က) အုပ်ချုပ်မှုဒါရိုက်တာအမည်၊ ဦးမြင့်ဦး (MMO - ၂၇၃၄၄၄)

(ခ) ကုမ္ပဏီ ရုံးခန်းလိပ်စာ၊ အမှတ်(၁၀၉)၊ ဆိပ်ကမ်းသာလမ်း၊ လှိုင်သာယာစက်မှုဇုံ(၃)၊ လှိုင်သာယာမြို့နယ်၊ ရန်ကုန်မြို့။

(ဂ) ဆက်သွယ်ရန် ဖုန်းနံပါတ်၊ ၀၁-၇၂၆၆၆၆ ၊ ၀၁-၆၈၅၂၃၃

(ဃ) ဒါရိုက်တာများ အမည်စာရင်း– (၁) ဒေါ်နီနီမြင့်
MMO - ၂၉၄၅၁၀

(၂) ဒေါ်လွင်
MMO - ၂၉၃၈၇၀

(၃) ဒေါ်ကြည်ကြည်မေ
MMO - ၂၇၀၀၂၆

(၄) ဦးဝမ်ချင်း (ခ) ဦးမင်းအောင်
၉/မပန(နိုင်)၀၇၇၈၈၈

မှတ်ချက် ။ (၁) ဤကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်သည်မှတ်ပုံတင်ရက်စွဲ(၁-၁၁-၂၀၁၄)မှ (၃၁-၁၀-၂၀၁၉)ရက်နေ့အထိ(၅)နှစ်သက်တမ်းအတွက်သာ ဖြစ်သည်။ သက်တမ်း မကုန်ဆုံးမီ (၃)လအလိုတွင် သက်တမ်းတိုးရန် ရင်းနှီးမြှုပ်နှံမှုနှင့် ကုမ္ပဏီများ ညွှန်ကြားမှု ဦးစီးဌာနသို့ လျှောက်ထား ရမည်။

(၂) ကုမ္ပဏီ အနေဖြင့် သင်းဖွဲ့မှတ်တမ်းတွင်အဆိုပြု တင်ပြထားသော လုပ်ငန်းရည်ရွယ်ချက်များကိုသာ လုပ်ကိုင်ရမည်။

(၃) သင်းဖွဲ့မှတ်တမ်းပါ ရည်ရွယ်ချက်များသည် သက်ဆိုင်ရာ ပြည်ထောင်စု ဝန်ကြီးဌာန၏ တည်ဆဲဥပဒေ၊ နည်းဥပဒေ၊ လုပ်ထုံးလုပ်နည်း များနှင့်အညီ ခွင့်ပြုချက် ရရှိမှသာ ဆောင်ရွက်ခွင့် ရှိမည် ဖြစ်ပါသည်။

(၄) လုပ်ငန်းရည်ရွယ်ချက် ပြောင်းလဲ လုပ်ကိုင်လိုပါက ပြောင်းလဲ လုပ်ကိုင်လိုသည့် လုပ်ငန်း ရည်ရွယ်ချက်များအား သင်းဖွဲ့မှတ်တမ်းတွင် ပြင်ဆင် မှတ်ပုံတင်ရန်အတွက် ဒါရိုက်တာအဖွဲ့(BOD)၏ အထူး အစည်းအဝေး ဆုံးဖြတ်ချက် မှတ်တမ်းနှင့်အတူ ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများ ညွှန်ကြားမှု ဦးစီးဌာန သို့ လျှောက်ထား ရမည် ။

ညွှန်ကြားရေးမှူးချုပ် (ကိုယ်စား)
(မော်မော်စိုး ၊ လက်ထောက်ညွှန်ကြားရေးမှူး)

လာရောက်ထုတ်ယူသည့် ရက်စွဲ၊ 15 SEP 2014

APPENDIX (B) MIC PERMIT

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်
အမှတ်(၁)၊သစ္စာလမ်း၊ ရန်ကင်းမြို့နယ်၊ ရန်ကုန်မြို့

တယ်လီဖုန်း-၀၁-၆၅၇၈၂၄
ဖက်စ်) ၀၁-၆၅၇၈၂၄

စာအမှတ်၊ မရက-၉/နု-ထွေ/၂၀၁၈(၁၂၈၀)
ရက်စွဲ၊ ၂၀၁၈ ခုနှစ် ဇွန်လ ၂၄ ရက်

အကြောင်းအရာ။ **SCG Myanmar Concrete and Aggregate Co., Ltd. မှ RMC Batching Plant အတွက် မြေနေရာတင်ပြခြင်း ကိစ္စ**

ရည်ညွှန်းချက် ။ SCG Myanmar Concrete and Aggregate Co., Ltd. ၏ ၅-၆-၂၀၁၈ ရက်စွဲပါစာ

၁။ SCG Myanmar Concrete and Aggregate Co., Ltd. မှ ရည်ညွှန်းပါစာဖြင့် RMC Batching Plant လုပ်ငန်း ဆောင်ရွက်ရန်အတွက် မြေနေရာတင်ပြလာပါသည်။

၂။ ကုမ္ပဏီမှ ရည်ညွှန်းပါစာဖြင့် တင်ပြလာသည့်ကိစ္စနှင့် စပ်လျဉ်း၍ RMC Batching Plant Expansion Plan 2015-2024 အရ မြေကွက် အမှတ် (၃၉/D)၊ ဥဿာ ၉ ရပ်ကွက်၊ ညောင်အင်းရွာ၊ အထူးဇုန် (၁)၊ ပဲခူးမြို့နယ်၊ ပဲခူးတိုင်းဒေသကြီးရှိ မြေဧရိယာ ၀.၇၅ ဧကတို့တွင် လုပ်ငန်းလုပ်ကိုင်ခွင့်ပြုကြောင်း အကြောင်းကြားပါသည်။

ဥက္ကဋ္ဌ(ကိုယ်စား)
(မြသူဇော၊ တွဲဖက်အတွင်းရေးမှူး)

မန်နေဂျင်းဒါရိုက်တာ
SCG Myanmar Concrete and Aggregate Co., Ltd.
မိတ္တူကို
ပဲခူးတိုင်းဒေသကြီးဦးစီးမှူးရုံး၊ ရင်းနှီးမြှုပ်နှံမှု နှင့် ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန ရုံးလက်ခံ၊ မျှောစာတွဲ

D:\Khai Khai Phay\Concrete\MCA SCG\Reply MCA SCG Bago batching plant.doc

APPENDIX (C) WATER QUALITY

Advanced Medical & Diagnostics Trading Ltd
No.20(A),YwarLae Lane, Za-North Ward ,Thingungyun Township, Yangon
The Republic of The Union of Myanmar.
Tel : 01-571656 / 01-565797 / 09-73112672 / 09-73176248
Fax : 01-8551095
E-mail :amd@amdmyanmar.com
Website : www.amdmyanmar.com

WATER & WASTE WATER TREATMENT DIVISION

Attention To	SCG Myanmar Concrete and Aggregate Co., Ltd. Bago Plant

Source of Water : Factory Outlet
Analysis : Waste Water Test
Date Attended to Lab : 11.1.2019

Sr.	Item	Factory Outlet	YCDC Target range
1.	Dissolved Oxygen (DO)	3.5	> 1 ppm
2.	Biochemical Oxygen Demand (BOD_5) (5days at 20°C) (mg/L)	22.5	20-60 ppm
3.	Chemical Oxygen Demand (COD) **(Adaptation of the USEPA 410.4 approved method)** (mg/L)	0	< 200 ppm
4.	pH effluent water	8.59	6<pH<9.6
5.	Total suspended solids (TSS)	8	< 500 ppm
6.	Nitrate (NO_3^-N)	1.5	N/A

Remarks: : pH result is beyond the range, other parameters are good within the limit.

Win Pyae Pyae Aung
Laboratory In-Charge
Water Treatment Division
Amd Trading Co., Ltd.

MYANMAR WATER ENGINEERING & PRODUCTS CO., LTD.
OFF : NO.(15), THUMINGALAR LANE 1, THUMINGALAR HOUSING ESTATE. THINGANGYUN Tsp. YANGON.
PHONE : 571694, 8564547, 573532
FAX : 573532
E mail. : mwepmyanmar@gmail.com

WATER ANALYSIS RESULT FORM

Analysis Ref. No : WR251218
Client : Green EHSS Construction
Address : SCG Concrete (Bago)

Source of Water : အစိမ်တွင်းရေ
Receiving Date : 10.12.2018
Analysis Date : 11.12.2018

Parameters	Sample Result	WHO Standard
Temperature		- -
pH	7	6.5 - 8.5
Colour	Clear	Clear
Conductivity	453.13 micro S / cm	
Total Dissolved Solid	290 mg/l	< 250
Total Hardness	20 mg /l as $CaCO_3$	<16
Total Alkalinity	180 mg /l as $CaCO_3$	<250
Sodium (as Na^+)	-	-
Calcium (as Ca^{++})	4 mg /l as $CaCO_3$	<8
Magnesium (as Mg^{++})	2.39 mg /l as $CaCO_3$	<8
Potassium (as K^+)	- -	-
Iron (as Fe^{++})	0.05 mg /l	<0.3
Chloride (as Cl^-)	15 mg /l	<250
Sulphate (as $SO_4^=$)	- -	-
Bicarbonate (as HCO_3^-)	180 mg /l as $CaCO_3$	<250
Carbonate (as $CO_3^=$)	ND mg /l	<250
Hydroxide (as OH^-)	- - mg /l	<100
Remarks	SLIGHTLY HIGH TOTAL HARDNESS CONTENT	

Analysis By : Thi Dar Soe

Approved By : Win Kalaya

APPENDIX (D) MATERIAL SAFETY DATA SHEET

KCDS-No 104173-06 | MIGHTY 150 | 1 / 6
Kao Industrial(Thailand)Co.,Ltd. | Revised Date October 02, 2014 | Set Up Date January 31, 2005

SAFETY DATA SHEET

[1.PRODUCT AND COMPANY IDENTIFICATION]

PRODUCT NAME	:	MIGHTY 150
SUPPLIER	:	Kao Industrial(Thailand)Co.,Ltd.
ADDRESS	:	55 Wave Place Bldg.14th & 15th Floor Wireless Road, Pathumwan, Bangkok 10330, Thailand
DIVISION	:	Chemical Division
TELEPHONE NUMBER	:	66-2-655-4433
FAX NUMBER	:	66-2-655-4333
E-MAIL ADDRESS	:	
EMERGENCY TELEPHONE NUMBER	:	66-2-655-4433
RECOMMENDED USE AND RESTRICTIONS ON USE	:	

[2.HAZARDS IDENTIFICATION]

GHS CLASSIFICATION

PHYSICAL AND CHEMICAL HAZARDS	:	Not classified
HEALTH HAZARDS		
ACUTE TOXICITY (Oral)	:	Not classified
ACUTE TOXICITY (Dermal)	:	Not classified
ACUTE TOXICITY (Inhalation)	:	Not applicable(Vapours)
SKIN CORROSION / IRRITATION	:	Not classified
SERIOUS EYE DAMAGE / EYE IRRITATION	:	Not classified
RESPIRATORY SENSITIZATION	:	Classification not possible
SKIN SENSITIZATION	:	Classification not possible
GERM CELL MUTAGENICITY	:	Classification not possible
CARCINOGENICITY	:	Classification not possible
REPRODUCTIVE TOXICITY	:	Classification not possible
SPECIFIC TARGET ORGAN TOXICITY		
- SINGLE EXPOSURE	:	Classification not possible
- REPEATED EXPOSURE	:	Classification not possible
ASPIRATION HAZARD	:	Classification not possible
ENVIRONMENTAL HAZARDS		
HAZARDOUS TO THE AQUATIC ENVIRONMENT		
- ACUTE HAZARD	:	Category 3
- LONG-TERM HAZARD	:	Category 3
- HAZARDOUS TO THE OZONE LAYER	:	Classification not possible

GHS LABEL ELEMENTS

PICTOGRAMS OR SYMBOLS	:	Not applicable
SIGNAL WORD	:	Not applicable
HAZARD STATEMENTS	:	Harmful to aquatic life with long lasting effects
PRECAUTIONARY STATEMENTS		
PREVENTION	:	Avoid release to the environment.
RESPONSE	:	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF ON SKIN: Gently wash with plenty of water and soap. Call a POISON CENTER or doctor if you feel unwell.
STORAGE	:	
DISPOSAL	:	Passed to a licensed waste contractor.

SAFE HANDLING ADVICE : Refer to SDS.

[3.COMPOSITION / INFORMATION ON INGREDIENTS]

SUBSTANCE OR MIXTURE : Mixture

INGREDIENTS AND CONCENTRATION RANGE

Ingredients	Concentration Range(%)	CAS RN
Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	Confidential	9084-06-4
Water	Confidential	7732-18-5

[4.FIRST-AID MEASURES]

IN CASE OF INHALATION : Remove person to fresh air and keep comfortable for breathing.

IN CASE OF SKIN CONTACT : Gently wash with plenty of soap and water.

IN CASE OF EYE CONTACT : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IN CASE OF INGESTION : Call a POISON CENTER or doctor if you feel unwell.

[5.FIRE-FIGHTING MEASURES]

EXTINGUISHING MEDIA : Powder, alcohol-resistant foam, water spray, carbon dioxide,sand

NOT SUITABLE EXTINGUISHING MEDIA : No information available

SPECIFIC HAZARDS : Produce irritating or toxic gases in a fire.

SPECIFIC METHODS : Keep away from sources of ignition and use appropriate extinguishing media.Fight fire from upwind position if possible.
Product itself is non-combustible.
Do not flow the materials causing adverse effects into the environment with effluent fire extinguishing agents.

PROTECTION OF FIRE FIGHTERS : Use goggles in combination with dust mask, and other protections as appropriate to situation.
Risk of producing harmful gases such as carbon monoxide and sulfur oxides. Avoid inhalation of smoke or gases.

[6.ACCIDENTAL RELEASE MEASURES]

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURE : Use goggles and protective gloves.
Large spills : Remove person to safety.
Ensure adequate ventilation.

ENVIRONMENTAL PRECAUTIONS : Avoid release to the environment.

METHODS FOR CLEANING UP : Small spills: Absorb spills with sand, inert absorbent, waste cloth or sawdust. Then wipe up remainder in waste cloth.
Large spills: Dike spills and dispose of in safe area.

PREVENTION OF SECONDARY HAZARDS : No information available

[7.HANDLING AND STORAGE]

HANDLING

TECHNICAL MEASURES : Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

PRECAUTIONS : No information available

SAFE HANDLING ADVICE : Use an adequate ventilation.
Wash thoroughly after handling.
If needed, use personal protective equipment as required.

STORAGE

SUITABLE STORAGE CONDITIONS : Store container tightly closed in well-ventilated place.

SAFE PACKAGING MATERIALS	:	No information available

[8.EXPOSURE CONTROLS / PERSONAL PROTECTION]

ENGINEERING MEASURES	:	Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use an adequate ventilation.
LIMIT VALUES		
ACGIH (TLV)	:	Not established
OSHA (PEL)	:	Not established
PERSONAL PROTECTIVE EQUIPMENT		
RESPIRATORY PROTECTION	:	Use as appropriate to situation.
HAND PROTECTION	:	Rubber gloves
EYE PROTECTION	:	Safety glasses
SKIN AND BODY PROTECTION	:	Full-body suit
HYGIENE MEASURES	:	No information available

[9.PHYSICAL AND CHEMICAL PROPERTIES]

APPEARANCE		
PHYSICAL STATE	:	Liquid
COLOUR	:	Dark brown
ODOUR	:	Slightly characteristic odour
pH	:	9 (5% solution)
SPECIFIC TEMPERATURES / TEMPERATURE RANGES AT WHICH CHANGES IN PHYSICAL STATE OCCUR		
BOILING POINT	:	No information available
MELTING POINT	:	No information available
FLASH POINT	:	Not applicable
FLAMMABILITY OR EXPLOSIVE PROPERTIES		
FLAMMABILITY OR EXPLOSIVE LIMITS	:	UPPER LIMIT : No information available LOWER LIMIT : No information available
VAPOUR PRESSURE	:	No information available
VAPOUR DENSITY	:	No information available
DENSITY (SPECIFIC GRAVITY)	:	1.2 g/mL (20 °C) (68 °F)
SOLUBILITY		
WATER SOLUBILITY	:	Soluble
SOLVENT SOLUBILITY	:	Insoluble in alcohol.
PARTITION COEFFICIENT: n-OCTANOL / WATER (log Pow)	:	No information available
AUTO-IGNITION TEMPERATURE	:	No information available
DECOMPOSITION TEMPERATURE	:	No information available
ODOUR THRESHOLD	:	No information available
EVAPORATION RATE	:	No information available
FLAMMABILITY (SOLID,GAS)	:	No information available
VISCOSITY	:	No information available
OTHER DATA	:	No information available

[10.STABILITY AND REACTIVITY]

CHEMICAL STABILITY	:	Stable in general.
POSSIBILITY OF HAZARDOUS REACTIONS	:	No self-reactivity.
CONDITIONS TO AVOID	:	No information available

INCOMPATIBLE MATERIALS	:	No information available
HAZARDOUS DECOMPOSITION PRODUCTS	:	Carbon dioxide
		Sulfur oxides
OTHERS	:	No information available

[11.TOXICOLOGICAL INFORMATION]

ACUTE TOXICITY

Oral

INFORMATION ON PRODUCT	:	Data on main component. Rat, LD50 : 5200 mg/kg Mouse, LD50 : 4884 mg/kg
INFORMATION ON INGREDIENTS	:	No information available

Dermal

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

Inhalation

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

SKIN CORROSION / IRRITATION

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

SERIOUS EYE DAMAGE / IRRITATION

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

RESPIRATORY OR SKIN SENSITIZATION

RESPIRATORY

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

SKIN

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

MUTAGENICITY (GERM CELL MUTAGENICITY)

INFORMATION ON PRODUCT	:	Ames test (TA98, TA100) : Negative
INFORMATION ON INGREDIENTS	:	No information available

CARCINOGENICITY

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available
IARC	:	Not listed
NTP	:	Not listed
EU	:	Not listed
OSHA	:	Not listed

REPRODUCTIVE TOXICITY

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

SPECIFIC TARGET ORGAN TOXICITY

- SINGLE EXPOSURE

INFORMATION ON PRODUCT	:	No information available
INFORMATION ON INGREDIENTS	:	No information available

- REPEATED EXPOSURE

INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
ASPIRATION HAZARD
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
OTHER INFORMATION : No information available

[12.ECOLOGICAL INFORMATION]

ECOTOXICITY : No information available
PERSISTENCE / DEGRADABILITY : Biodegradation test based on Modified MITI test I
% degradation by BOD : 1.5%
% degradation by TOC removal : 8.5%
MOBILITY IN SOIL : No information available
BIOACCUMULATIVE POTENTIAL : No information available
OTHER ADVERSE EFFECTS : No information available

[13.DISPOSAL CONSIDERATIONS]

Review "HANDLING AND STORAGE (Section 7)".
Passed to a licensed waste contractor.
Incinerate with little portions.
Risk of producing harmful gases such as carbon monoxide and sulfur oxides.

Dispose of waste in accordance with local,state and federal regulations.

[14.TRANSPORT INFORMATION]

Follow all regulations in your country or region
INTERNATIONAL REGULATIONS
UN CLASS / UN NUMBER : Not applicable (IMDG, IATA)
SPECIAL PRECAUTIONS FOR USER : Review "ACCIDENTAL RELEASE MEASURES (Section 6)".
Review "HANDLING AND STORAGE (Section 7)".
Ensure containers without breakage or leakage.
Ensure containers tightly fixed.
Follow all regulations in your country or region.

[15.REGULATORY INFORMATION]

Follow all regulations in your country or region.

INVENTORIES		
	ENCS(Japan)	Yes
	TSCA(USA)	Yes
	EINECS(EU)	Yes
	AICS(Australia)	Yes
	DSL(Canada)	Yes
	ECL(Korea)	Yes
	PICCS(Philippines)	Yes
	IECSC(China)	Yes

KAO Corporation is not able to check up the regulatory information in regard to the substances in your country or region,therefore,we request this matter would be filled by your responsibility.

[16.OTHER INFORMATION]

REFERENCE : -Safety data sheet for chemical products - Part 1: Content and order of sections(ISO 11014-1)
-International Chemical Safety Cards(ICSC) (Compiler's Guide)(1994)

KCDS-No 104173-06	MIGHTY 150 Kao Industrial(Thailand)Co.,Ltd.	6 / 6 Revised Date October 02, 2014

To the best of the manufacturer's knowledge,the information contained herein is accurate. However, neither the manufacturer, nor any of its affiliates, make any representations or warranties (expressed or implied), nor assumes any liability(including liability for any direct, incidental, consequential, or other damages) with respect to the accuracy or completeness of the information contained herein. Such information may be (without limitation) invalid if the specified material is used in combination with another ,in a particular process, or under unusual conditions. Determination of suitability of any material for any given purpose is the sole responsibility of the user who assumes all risk and responsibility therefore. All materials may present unknown hazards and should be used with appropriate caution. The manufacturer cannot and does not guarantee that the hazards described herein are the only ones that exist.

Safety Data Sheet

Printing Date: 28.03.2017 **Version Number:** 1.0 **Revision Date:** 28.03.2017

1 Identification of the substance/mixture and of the company/undertaking

Product identifier:

Trade name: ***DARATARD® 152***

Relevant identified uses of the substance or mixture, and uses advised against:

Relevant identified uses of the substance or mixture: Concrete Admixtures

Identified uses advised against: No further relevant information available.

Details of the supplier of the safety data sheet:

Manufacturer/supplier:

GCP (Thailand) Limited
253/2 Bangpoo Industrial Estate
Sukhumvit Road, Km 34, Samutprakarn 10280
Bangpoo, Thailand

Telephone: ++66 (2) 709-4470 to 84
Telefax : ++66 (2) 323-1385

Emergency telephone number: EHS Department, Bangpoo, Thailand - Tel. No.: ++66 (2) 709-4470 to 84

2 Hazards identification

Classification of the substance or mixture:

The product is not classified according to the Globally Harmonised System (GHS).

Label elements:

GHS label elements Not classified.

Hazard pictograms Not classified.

Signal word Not classified.

Hazard statements Not classified.

Other hazards:

Results of PBT and vPvB assessment:

PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixture:

Dangerous components: Not classified.

4 First aid measures

Description of first aid measures:

General information: Get medical advice/attention if you feel unwell.

After inhalation: No special measures required.

After skin contact: Wash with plenty of soap and water.

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After eye contact: Rinse cautiously with water for several minutes.

After swallowing:

Rinse mouth.

Do NOT induce vomiting.

Information for doctor:

Most important symptoms and effects, both acute and delayed: No further relevant information available.

Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Firefighting measures

Extinguishing media:

Suitable extinguishing agents: CO_2, powder or water spray. Fight larger fires with water spray.

Special hazards arising from the substance or mixture: No further relevant information available.

Advice for firefighters:

Protective equipment: Wear self-contained respiratory protective device.

Additional information: Collect contaminated fire fighting water separately. It must not enter the sewage system.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear protective equipment. Keep unprotected persons away.

Environmental precautions: Inform respective authorities in case of seepage into water course or sewage system.

Methods and material for containment and cleaning up: Send for recovery or disposal in suitable receptacles.

Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

HANDLING

Precautions for safe handling:

Do not eat, drink or smoke when using this product.

Store in a well-ventilated place. Keep container tightly closed.

Keep only in original container.

Use only outdoors or in a well-ventilated area.

Information about fire - and explosion protection: No special measures required.

Conditions for safe storage, including any incompatibilities:

STORAGE

Information about storage in one common storage facility: No special measures required.

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Further information about storage conditions:

Protect from frost.

Store in a dry place.

Keep cool.

Specific end use(s): No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical facilities: No further data; see item 7.

Control parameters:

Ingredients with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: Based on the lists valid at the date of SDS creation.

Exposure controls:

PERSONAL PROTECTIVE EQUIPMENT

General protective and hygienic measures: The usual precautionary measures are to be adhered to when handling chemicals.

Respiratory protection:

Control exposure to ingredients with workplace control parameters if mentioned above. If no ingredients are listed, respiratory protection is generally not required.

If exposure limits are listed and may be exceeded, use approved respiratory protective equipment and filter type appropriate for the listed ingredients. (NIOSH, CEN, etc.).

Protection of hands: Protective gloves.

Material of gloves: PVC gloves.

Penetration time of glove material:

The exact breakthrough time has to be determined by the manufacturer of the protective gloves and has to be observed.

Eye protection:

Safety glasses with side shield protection.

A face shield should also be worn if there is potential exposure to splash or spray.

Body protection:

Use personal protective equipment as required.

Take off contaminated clothing.

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9 Physical and chemical properties

Information on basic physical and chemical properties:

GENERAL INFORMATION	
Appearance:	
Form:	Liquid.
Colour:	According to product specification.
Odour:	Characteristic.
Odour threshold:	Not determined.
pH-value (~) at 20 °C:	7
Change in conditions:-	
Melting point/freezing point:	Undetermined.
Initial boiling point and boiling range:	Not determined.
Flash point:	Not applicable.
Flammability (solid, gas):	Not applicable.
Decomposition temperature:	Not determined.
Auto-ignition temperature:	Not determined.
Explosive properties:	Product does not present an explosion hazard.
EXPLOSION LIMITS	
Lower:	Not determined.
Upper:	Not determined.
VOC Content:	Not determined.
Vapour pressure:	Not determined.
Density at 25 °C:	~ 1.2 g/cm³
Relative density:	Not determined.
Vapour density:	Not determined.
Evaporation rate:	Not determined.
Solubility in/Miscibility with:-	
Water:	Fully miscible.
Partition coefficient: n-octanol/water:	Not determined.
VISCOSITY	
Dynamic:	Not determined.
Kinematic:	Not determined.
Molecular weight	Not applicable.
Other information:	No further relevant information available.

10 Stability and reactivity

Reactivity: Stable under normal conditions.

Chemical stability:

Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.

Possibility of hazardous reactions No dangerous reactions known.

Conditions to avoid: No further relevant information available.

Incompatible materials: No further relevant information available.

Hazardous decomposition products: Carbon monoxide and carbon dioxide.

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11 Toxicological information

Information on toxicological effects:

ACUTE TOXICITY

Primary irritant effect

Skin corrosion/irritation No irritating effect.

Serious eye damage/irritation No irritating effect.

Additional toxicological information:

When used and handled according to specifications, the product does not have any harmful effects to our experience and the information provided to us.

12 Ecological information

Toxicity:

AQUATIC TOXICITY No further relevant information available.

Persistence and degradability: No further relevant information available.

BEHAVIOUR IN ENVIRONMENTAL SYSTEMS

Bioaccumulative potential: No further relevant information available.

Mobility in soil: No further relevant information available.

ADDITIONAL ECOLOGICAL INFORMATION

General notes: Not known to be hazardous to water.

Results of PBT and vPvB assessment:

PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13 Disposal considerations

Waste treatment methods:

Recommendation:

Must not be disposed together with household garbage. Do not allow product to reach sewage system.

UNCLEANED PACKAGING

Recommendation: Disposal must be made according to official regulations.

14 Transport information

UN-Number **ADR, ADN, IMDG, IATA**	Not Regulated
UN proper shipping name **ADR, ADN, IMDG, IATA**	Not Regulated

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Transport hazard class(es)	
ADR, ADN, IMDG, IATA Class	Not Regulated
Packing group ADR, IMDG, IATA	Not Regulated
Environmental hazards:	Not applicable.
Special precautions for user:	Not Regulated
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:	Not Regulated
UN "Model Regulation":	Not regulated for transport.

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture:

See Section 2 for hazard identification.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department issuing SDS:
EHS Department,
Asia Pacific Region
SCIP, Canlubang, Calamba City, Laguna
Philippines 4028
Tel: ++63 (02) 884-0300, Fax: ++63 (49) 549-7778

The first date of preparation: 28.03.2017

Number of revision times and the latest revision date: 1.0 / 28.03.2017

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APPENDIX (E) ECD COMMENT RESPONSE TABLE

ပဲခူးတိုင်းဒေသကြီး၊ ပဲခူးမြို့နယ်၊ အထူးစက်မှုဇုန်(၁)၊ ညောင်အင်းရွာ၊ ဥသာ (၉)ရပ်ကွက်၊ အကွက်အမှတ် (၃၉/ဃ) ရှိ SCG Myanmar Concrete and Aggregate Company Limited (MCA) မှ အသင့်ဖျော်ကွန်ကရစ်လုပ်ငန်းအတွက် တင်ပြလာသည့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်(EMP) အပေါ် ECD မှ စိစစ်တွေ့ရှိချက်များနှင့် အကြံပြုချက်များ ကို ဖြေရှင်းချက်

စဉ်	ပြန်လည်ပြင်ဆင်ဖြည့်စွက်တင်ပြရန်အချက်များ	ပြန်ကြားချက်
၁။	**အတိုကောက်စာလုံးများ၊ အဓိပ္ပါယ်ဖွင့်ဆိုချက်များ**	
	သဘောထားမှတ်ချက်ပေးရန်မရှိပါ	-
၂။	**အစီရင်ခံစာအကျဉ်းချုပ်**	
	စာမျက်နှာ ၂၉ လူစွမ်းအားအရင်းအမြစ်လိုအပ်ချက်တွင် အလုပ်တက်ရက်အား ပြန်လည်ပြင်ဆင်ဖော်ပြရန်	• အခန်း (၁) ခေါင်းစဉ်ခွဲ ၃.၄ စာမျက်နှာ ၂၂, စာမျက်နှာ ၄၃, တွင်ဖော်ပြ ထားပါသည်။
၃။	**နိဒါန်း**	
	စီမံကိန်းဆောင်ရွက်ရသည့် ရည်ရွယ်ချက်အားဖော်ပြပေးရန်	• ခေါင်းစဉ်ခွဲ ၂.၃ စာမျက်နှာ ၅၈, တွင်ဖော်ပြထားပါသည်။

၄။	ကတိကဝတ်	
	အစီရင်ခံစာတွင် ကတိကဝတ်နှင့် ပက်သက်၍ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ် ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၇၇ အရ စီမံကိန်းအဆိုပြု သူမှ အောက်ပါ အချက်အလက်များ မှန်ကန်ကြောင်း အတည်ပြု ဝန်ခံချက် အားဖော်ပြရန် • ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီရင်ခံစာသည် တိကျခိုင်မာ ကြောင်း နှင့် ပြည့်စုံကြောင်း။ • ဤလုပ်ထုံးလုပ်နည်းအပါအဝင် သက်ဆိုင်ရာ ဥပဒေများကို တိကျ စွာလိုက်နာ၍ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်ကို ရေးဆွဲထား ကြောင်း • စီမံကိန်းသည် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ပါ ကတိကဝတ်၊ ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့ချရေးလုပ်ငန်းများ နှင့် အစီအစဉ် များကို အပြည့်အဝအစဉ်အမြဲ လိုက်နာဆောင်ရွက် မည်ဖြစ် ကြောင်း • အစီရင်ခံစာရေးသားပြုစုသူမှ အစီရင်ခံစာပါ အကြောင်းအရာ များသည် တိကျခိုင်မာ ကြောင်း နှင့် ပြည့်စုံကြောင်း သက်ဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေများ၊ လုပ်ထုံးလုပ်နည်းများ နှင့် အညီ ရေးဆွဲ ထားကြောင်း • စက်ရုံလုပ်ငန်း ပြီးစီး၍ စီမံကိန်းပိတ်သိမ်းချိန်တွင် လူမှုဝန်းကျင်အား ထိခိုက်မှု မဖြစ်စေရန် စီစဉ်ဆောင်ရွက်မည်ဖြစ်ပြီး အကယ်၍ ထိခိုက် မှုများရှိလာပါက ထိခိုက်မှု အနည်းဆုံး ဖြစ်စေရေး အစီအမံများ ချမှတ်ဆောင်ရွက် မည်ဖြစ်ပါသည်။	• အခန်း ၃ စာမျက်နှာ ၆၂ တွင်ဖော်ပြထားပါသည်။

၅။	**မူဝါဒ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာမူဘောင်များ**	
	အစီရင်ခံစာတွင်မူဝါဒ၊ ဥပဒေ နှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင်များ နှင့် ပက်သက်၍ အောက်ပါအတိုင်း ထပ်မံဖြည့်စွက် ဖော်ပြရန် • စီမံကိန်းကြောင့် အဓိကဖြစ်ပေါ်နိုင်မည့် သက်ရောက်မှု အပေါ် အခြေ ခံ၍ စီမံကိန်းပိုင်ရှင်မှ လက်တွေ့တွင် လိုက်နာနိုင်သည့် သို့မဟုတ် လိုက်နာသင့်သည့် ပြည်တွင်းပြည်ပမှ အရည်အသွေး ဆိုင်ရာ စံချိန်စံညွှန်းများအား သတ်မှတ် ဖော်ထုတ်ပြီး စီမံကိန်းနှင့် အဓိက သက်ဆိုင်သည့် လုပ်ငန်း ကဏ္ဍ အလိုက် တိုင်းတာရမည့် parameter များနှင့် ၄င်းတို့၏ လမ်းညွှန်တန်ဖိုးများ အား ထည့်သွင်း ဖော်ပြခြင်း • အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် အခန်း (၂) တွင်ပါရှိသော ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ပစ္စည်းထုတ်လုပ်ခြင်း အတွက် စွန့်ထုတ် အရည်နှင့် ထုတ်လွှတ် အခိုး အငွေ့ ၊ ဆူညံသံ (NEQEG ဧယားအမှတ် ၁.၃ အထွေထွေလမ်း ညွှန် ချက်အရ) ၏ အဆင့် သတ်မှတ်ချက်များအား တိုင်းတာ ဖော်ပြခြင်း	• ခေါင်းစဉ်ခွဲ ၄.၅ စာမျက်နှာ ၆၇ - ၆၉ တွင် ဖော်ပြထားပါသည်။
၆။	**လုပ်ငန်းအကြောင်းအရာဖော်ပြချက်**	
(က)	အစီရင်ခံစာတွင် စီမံကိန်း အကြောင်းအရာ ဖော်ပြချက် နှင့် ပက်သကက်၍ အောက်ဖော်ပြပါ သုံးသပ် အကြံပြုချက် များကို ထပ်မံဖြည့်စွက် ဖော်ပြရန် • အစီရင်ခံစာ အပိုဒ် ၄.၃ တွင် စီမံကိန်း အကောင်အထည်ဖော် မည့် ကာလအား ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၃ စာမျက်နှာ ၇၂ ဖော်ပြထားပါသည်။

	• အစီရင်ခံစာ အပိုဒ် ၄.၅ တွင် ကုန်ကြမ်း ရယူသည့် အရင်းအမြစ် အားဖော်ပြရန်၊ • သုံးစွဲမည့် ဓာတုပစ္စည်းအမျိုးအစား နှင့် ပမာဏ အား အသေးစိတ်ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၅ စာမျက်နှာ ၇၆ ထိ တွင် Table 5.2 တွင်ဖော်ပြ ထားပါ သည်။ • ခေါင်းစဉ်ခွဲ ၅.၅.၁ စာမျက်နှာ ၇၈ ထိ တွင် Table 5.3 တွင် ဖော်ပြ ထားပါ သည်။
	• အစီရင်ခံစာ အပိုဒ် ၄.၆ တွင် လုပ်ငန်းလည်ပတ် ဆောင်ရွက်ပုံ အဆင့် ဆင့် ကို စာသားဖြင့် အသေးစိတ် ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၆ စာမျက်နှာ ၇၉ တွင်ဖော်ပြထားပါသည်။
	• အစီရင်ခံစာ၏ အပိုဒ် ၄.၈ တွင် တစ်နှစ် စက်လည်ပတ် သည့် ရက်အားဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၈.၂ စာမျက်နှာ ၈၅ တွင်ဖော်ပြထားပါသည်။
	• အစီရင်ခံစာ၏ အပိုဒ် ၄.၁၀ တွင် အဝိစိတွင်း၏ အကျယ်နှင့် အနက်အားဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၁၀ စာမျက်နှာ ၈၆ တွင်ဖော်ပြထားပါသည်။
	• စက်ရုံဖျက်သိမ်းခြင်းအဆင့်တွင် ဆောင်ရွက်ရမည့် လုပ်ငန်းများ အား ထည့်သွင်းဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၁၃ စာမျက်နှာ ၉၃, ၉၄ တွင်ဖော်ပြ ထားပါ သည်။
	• ဂျင်နရေတာနှင့် သယ်ယူပို့ဆောင်မည့် ယာဉ်ယန္တရား တို့အတွက် လိုအပ်သော လောင်စာဆီ ပမာဏ (တစ်ရက်/ တစ်နှစ်) ရယူ/ သိုလှောင်/ သုံးစွဲမှု ပမာဏ တို့အားဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၁၁.၁ စာမျက်နှာ ၈၇ တွင်ဖော်ပြထားပါသည်။

	လုပ်ငန်းမှ တစ်နေ့ထွက်ရှိမည့် စွန့်ပစ်ပစ္စည်း အစိုင်အခဲ အမျိုးအစား လိုက် ပါဝင်သည့် ပမာဏ နှင့် စွန့်ထုတ်မည့်နေရာ (စက်ရုံဝန်း) အားညွှန်ပြသည့် တည်နေရာ ကားချပ်တို့အား ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၁၂.၁ စာမျက်နှာ ၈၈ တွင် Figure 5.13 တွင်ဖော် ပြ ထား ပါသည်။
	• လုပ်ငန်းခွင်အတွင်း တပ်ဆင်ထားသည့် စက်ယန္တရား အလိုက် power သုံးစွဲမှုတို့အား ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၅.၇ စာမျက်နှာ ၈၂, ၈၃ Table 5.4 တွင်ဖော်ပြထားပါသည်။
၇။	**လက်ရှိပတ်ဝန်းကျင်အခြေအနေ**	
	• အဝီစိတွင်းမှ ရေအားလုပ်ငန်းသုံးအပြင် သောက်သုံးရေအဖြစ် အသုံးပြုခြင်း ရှိ/မရှိ ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၆.၉ စာမျက်နှာ ၁၁၁ အထိ တွင်ဖော်ပြထားပါသည်။
	• ဒေသဆိုင်ရာ အချက်အလက်များရယူထားသည့် source များအား တိကျစွာ ဖော် ပြရန် .	• ခေါင်းစဉ်ခွဲ ၆.၁.၁ စာမျက်နှာ ၉၅, ၁၀၂, အထိ တွင်ဖော်ပြထားပါသည်။
	• စွန့်ပစ်ရေတိုင်းတာထားသော parameter ရလဒ်များအား NEQEG ပါ အထွေထွေ လမ်းညွှန်ချက်များမှ လုပ်ငန်းနေရာမှ စီးဆင်းရေ နှင့် စွန့်ပစ်ရေ စွန့်ထုတ်မှု guideline ဖြင့် နှိုင်းယှဉ်ဖော်ပြရန် guideline ထက်	• ခေါင်းစဉ်ခွဲ ၆.၉.၂.၂ စာမျက်နှာ ၁၁၄ Table 6.9 တွင်ဖော်ပြထားပါသည်။

	ကျော်လွန်မှုရှိပါက ကျော်လွန်ရသည့် အကြောင်းအရင်းအား ရှင်းလင်းဖော်ပြရန်	
	• ဆူညံသံတိုင်းရာတွင် လိုအပ်သော Monitoring Point တစ်နေရာအား ဖြည့်စွက်ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၆.၁၁.၃ စာမျက်နှာ ၁၂၀, Table 6.15 တွင်ဖော်ပြထားပါသည်။
	• စီမံကိန်း ဧရိယာ နှင့် စီမံကိန်းအနီး ပတ်ဝန်းကျင် ရှိ မြေအောက်ရေ အရည်အသွေး ပတ်ဝန်းကျင်လေထု အရည်အသွေး နှင့် ဆူညံသံ တို့၏ အရည် အသွေးများကို တိုင်းတာခြင်း ပြုလုပ်သည့် အချိန် (Time) အား ဖော်ပြရန် နှင့် တိုင်းတာသည့် နေရာများ အားရွေးချယ် ရသည့် အကြောင်းအရင်း တို့အား ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၆.၉.၂.၁ စာမျက်နှာ ၁၁၃, ခေါင်းစဉ်ခွဲ ၆.၁၀.၁ စာမျက်နှာ ၁၁၅ တွင်ဖော်ပြထားပါသည်။
	• အရည်အသွေးရလဒ်များအား ဖော်ပြရာတွင် လုပ်ငန်းမှ အမှန်တကယ် လိုက်နာ ဆောင်ရွက်ရမည့် guideline ဖြင့် နှိုင်းယှဉ် ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၆.၉.၂.၂ စာမျက်နှာ ၁၁၄, Table 6.9 တွင်ဖော်ပြထားပါသည်။
၈။	**ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှုများအား ဆန်းစစ်ခြင်း နှင့် လျော့နည်းစေရေးဆောင်ရွက်မည့်လုပ်ငန်းများ**	
	• စက်ရုံလည်ပတ်ခြင်းကြောင့် ဖြစ်နိုင်ချေရှိသော မီးဘေး၊ စက်ပစ္စည်း ကိရိယာ ချွတ်ယွင်းမှု အန္တရာယ် များအားဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၇.၅.၇ စာမျက်နှာ ၁၅၁, ၁၅၂ တွင် ရေးသားဖော်ပြထားပါသည်။
၉။	အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း	
	• ဒေသခံများနှင့် တိုင်ပင်ဆွေးနွေးခဲ့သည့် အကြိမ် အရေအတွက် အား	• ခေါင်းစဉ်ခွဲ ၈.၁ စာမျက်နှာ ၁၆၀ တွင် ဖော်ပြထားပါသည်။

	ဖော်ပြရန်	
၁၀။	**ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ်များ**	
	• လုပ်ငန်းဖျက်သိမ်းသည့် အဆင့်တွင်ပါဝင်ရမည့် sub plan များ	• ခေါင်းစဉ်ခွဲ ၉.၆ စာမျက်နှာ ၁၉၄-၁၉၈ ရှိ Table 9.4 တွင် ဖော်ပြထား ပါသည်။
	• အရေးပေါ် အခြေအနေ တုံ့ပြန်ရေးအစီအစဉ် နှင့် အရေးပေါ် အခြေအနေ ဖြစ်ပွားပါက ဆောင်ရွက်ရမည့် လုပ်ငန်းအစီအစဉ်များအား ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၉.၇ စာမျက်နှာ ၁၉၈ , ခေါင်းစဉ်ခွဲ ၉.၇.၅ စာမျက်နှာ ၂၀၉-၂၁၁ တွင် ဖော်ပြထားပါသည်။
၁၁။	• စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်	
	• စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်အား ခေါင်းကြီးတစ်ခု အဖြစ် သီးသန့် ထား၍ ရေးသားသင့်ပါသည်။	• အခန်း ၁၀ စာမျက်နှာ ၂၁၆ မှ ၂၂၁ အထိ တွင် ဖော်ပြထားပါသည်။
	• လုပ်ငန်းဖျက်သိမ်းသည့် အဆင့်တွင် ပါရှိမည့် စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ် များအား ဖော်ပြရန် လိုအပ်ပါသည်။	• ခေါင်းစဉ်ခွဲ ၁၀.၅ စာမျက်နှာ ၂၂၀, Table 10.3 တွင် ဖော်ပြထား ပါသည်။
	• ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၁၀၈ အရ စီမံကိန်း အဆိုပြုသူမှ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် ၏ ဧယားပါ အတိုင်း စောင့်ကြပ်ကြည့်ရှု မှဒ အစီရင်ခံစာ ကို ဝန်ကြီးဌာနသို့ (၆)လ တစ် ကြိမ် သို့မဟုတ် ဝန်ကြီးဌာနက သတ်မှတ်ထားသည့် အတိုင်းတင်ပြမည် ဖြစ်ကြောင်း ဖော်ပြရန်	• ခေါင်းစဉ်ခွဲ ၁၀.၃ စာမျက်နှာ ၂၁၇ တွင် ဖော်ပြထားပါသည်။

၁၂။	List of Commitment	
	• စီမံကိန်း အဆိုပြုသူမှ အစီရင်ခံစာပါ အခန်းတစ်ခန်းချင်းစီ အလိုက် ကတိကဝတ် ၏ အတိုချုပ်အမည် အမှတ်စဉ် ကတိကဝတ် အားရှင်းလင်း ဖော်ပြချက်နှင့် အစီရင်ခံစာပါ ရည်ညွှန်းချက် (အခန်း) တို့အား ဇယားဖြင့် ပြုစု၍ ဖော်ပြရန် လိုအပ်ပါသည်။	• အခန်း ၁၁. စာမျက်နှာ ၂၂၂-၂၂၅ တွင် ဖော်ပြထားပါသည်။
	အထွေထွေ	
	• စီမံကိန်းအဆိုပြုသူမှ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သုံးသပ်အကြံပြုချက်များအား ပြန်လည်ရေးဆွဲတင်ပြရာတွင် ပြင်ဆင်ထားသည့် ဖြေကြားချက် များအား အစီရင်ခံစာ၏ မည်သည့်အပိုင်း၊ မည်သည့် စာမျက်နှာ တွင် ပြင်ဆင်ဖြည့်စွက် ရေးသားထားသည်ကို (Comment Response Table) ဖြင့် ရှင်းလင်း ဖော်ပြရန်၊ • အစီရင်ခံစာတွင်ဖော်ပြရမည့် အကြောင်းအရာများနှင့် ထပ်မံဖြည့်စွက်ရမည့် အကြောင်းအရာများအား Comment Response Table တွင် ဖော်ပြခြင်း မပြုရန်။ • ဇယားပါ အခန်းခေါင်းစဉ်အလိုက် ပြင်ဆင်ဖြည့်စွက် ရန် လိုအပ်သည့် အချက်များအတိုင်းပြင်ဆင်ဖြည့်စွက်ရန်နှင့် ထိုသို့ပြင်ဆင် ဖြည့်စွက်ရာတွင် အခြားအခန်း မှ အကြောင်းအရာတို့ကို ရည်ညွှန်းခြင်းမပြုရန် • အစီရင်ခံစာတွင် တတိယ အဖွဲ့အစည်း၏ အကြံပြုတင်ပြချက် အသုံးအနှုန်းများအစာ စီမံကိန်းအဆိုပြုသူမှ အမှန်တကယ် လိုက်နာ ဆောင်ရွက်မည့် အသုံးအနှုန်း အရေးအသားဖြင့် ဖော်ပြရန်	

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