

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)
REPORT**

FOR

WATER DISTRIBUTION PROJECT

TO

MYEIK TOWNSHIP, MYEIK DISTRICT

(VERSION – 00)

Project Proponent;



Prepared By;



May, 2023

Report Review Form

Report Title: Environmental Impact Assessment (EIA) Report for Water Distribution Project to Myeik Township, Myeik District.

Report Version: Version - 00

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Summary: EIA Report

This document presents the Environmental Impact Assessment (EIA) report as required for Myeik Water Distribution Project for Myeik Township, Myeik District.

Approved by:

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This report has been prepared by third party, E Guard Environmental Services Co., Ltd. for BBWI&MCPC Company Limited for Water Distribution Project to Myeik Township, Myeik District in which project locations will be located at Myeik Township and Taninthayi Township, Myeik District, Tanintharyi Region, Lower Myanmar. The report preparation was done inside the framework of Myanmar Environmental Impact Assessment Procedure 2015.

The analysis works had been done based on the provided information and data of the proposed plan of project and onsite observation of environmental study team guided by Myanmar Government Environmental Authority, Environmental Conservation Department, hereinafter ECD.

The impact assessment and mitigation measures are prepared based on the facts and figures of detail plan/process of the project acquired from the project proponent. Moreover, this report is carefully prepared with the prevailing active Laws, Rules, Regulations, Procedures, Guidelines and Standards etc. of current Myanmar Legal System on May, 2023.

However, the drawings, sketches, maps and other illustrative figures contained in this report are for the demonstrative or descriptive purpose only and not to be considered as neither approved boundary nor accepted territory nor recognized properties extend of any kind. Furthermore, in case of dual or multiple meanings of the wordings, those wordings should be interpreted as relevant meaning to the concerned areas of discussed in this report.

The individual/personal, organizational and commercial data and information found in this report are included based on the concerned authority's demand and requirement. The privacy and tradesecrets concerned are to be addressed to the concerned authority ECD.

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List of Abbreviation

AQI -	Air Quality Index
BBWI -	Bright Blue Water International Corporation Company Limited
CEMP -	Construction/Contractor Environmental Management Plan
CSR -	Cooperate Social Responsibility
ECD -	Environmental Conservation Department
EIA -	Environmental Impact Assessment
EMoP -	Environmental Monitoring Plan
EMPT -	Environmental Management Program Team
EMP -	Environmental Management Plan
EPA -	Environmental Protection Agency
GAD-	General Administration Department
GRM -	Grievance Redress Mechanism
IFC -	International Finance Corporation
JICA -	Japan International Cooperation Agency
KII -	Key Informant Interview
MCPC -	Myeik Corporation Public Company Limited
MONREC -	Ministry of Natural Resources and Environmental Conservation
MSDS -	Material Safety Data Sheet
OHS -	Occupational Health and Safety
PC -	Public Consultation
PPE -	Personal Protective Equipment
PM -	Particulate Matter
WHO -	World Health Organization

Chapter 1. EXECUTIVE SUMMARY

Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI&MCPC) have signed the Memorandum of Understanding (MOU) with Tanintharyi Region Government for Feasibility Study of “**Water Distribution Project to Myeik Township, Myeik District**” on 31st October, 2019. According to this MOU, BBWI&MCPC have the responsibility to prepare Environmental Impact Assessment Study for the development of their proposed project. In addition, BBWI&MCPC officially submitted their Project Proposal to the Environmental Conservation Department to get environmental suggestion. ECD has officially replied that Environmental Impact Assessment will be required for the proposed project. This report is prepared for Environmental Impact Assessment of “**Water Distribution Project to Myeik Township, Myeik District**” by Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI&MCPC) to initiate the required processes under Environmental Impact Assessment Procedure (2015).

Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI&MCPC) have to prepare Environmental Impact Assessment (EIA) Report for their project implementation and have to submit to the Ministry of Natural Resources and Environmental Conservation (MONREC). On behalf of MONREC, the Environmental Conservation Department (ECD) is responsible for implementing National Environmental Policy, strategy, framework, planning and action plan for the integration of environmental consideration into the national sustainable development processes. Thus, the scoping report for the EIA had been submitted to ECD Head Office on April 2020. After reviewing on this scoping report, ECD suggested some comments on July, 2020 and these comments were revised and resubmitted on November, 2022. The scoping report got Approval on March, 2023. (*See details in Chapter 2*)

The law section describes the National Laws and Regulations for the Environmental Protection and Management related and applicable to the proposed project. Among these laws and regulations, the Constitution of the Republic of the Union of Myanmar (2008) is the main concern and governing law for the environmental conservation in Myanmar. The others are the newly introduced National Environmental Policy (2019), the National Land Use Policy (2016), Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedures (2015), National Environmental Quality (Emission) Guidelines (2015), Myanmar National Drinking Water Quality Standards (2014) etc.

The following laws and rules are related to the Environment -

- Myanmar National Environmental Policy (2019)
- The Environmental Conservation Law (2012)
- The Environmental Conservation Rules (2014)
- The Environmental Impact Assessment Procedure (2015)

- National Environment Quality (Emission) Guidelines (2015)

Since this project is being carried out in cooperation with Myeik Corporation Public Co., Ltd. and Bright Blue Water International Corporation Co., Ltd. (Thailand). So, the following laws and rules are also included-

- The Myanmar Investment Law (2016)
- The Myanmar Investment Rules (2017)

For water distribution project, the following laws and standards are also applicable.

- Myanmar National Water Policy (2014)
- The Conservation of Water Resources and Rivers Law (2006)
- Myanmar National Drinking Water Quality Standards (2014)
- The Underground Water Act (1930)

In implementing the project, the following acts and laws are required for labors-

- The Labor Organization Law (2011)
- The Settlement of Labor Dispute Law (2012)
- The Employment and Skill Development Law (2013)
- The Minimum Wages Law (2013)
- The Payment of Wages Law (2016)
- Workmen's Compensation Act (1923)
- The Leaves and Holiday Act (1951)
- Social Security Law (2012)

Since the project is located in Tanintharyi Region, Myeik District, the Regional Development law (Tanintharyi Region Development law) is also recommended to use it. For the employee's health and safety, the occupational health and safety law is demand during Construction phase.

- Prevention of Hazard from Chemical and Related Substance Law (2013)
- Occupational Health and Safety Law (2019)
- Natural Disaster Management Law (2013)

For the land use and pipeline alignment, the project proponent has to follow the following laws as well in implementing the project.

- National Land Use Policy (2016)
- Law Amending the Farm Land Law (2020)
- The Administration of Vacant, Virgin and Fallow Land Law (2018)
- Law Amending the Highways Law (2015)

For Health Sector,

- The Public Health Law (1972)
- Law Amending the Prevention and Control of Communicable Diseases Law (2011)

The project is related to the following laws, rules, procedure and guideline-

1. The Environmental Conservation Law (2012)
2. The Environmental Conservation Rules (2014)
3. Environmental Impact Assessment Procedure (2015)
4. National Environmental Quality (Emission) Guideline (2015)
5. The Rights of National Races Law (2015)
6. Myanmar Investment Law (2016)
7. Myanmar Investment Rules (2017)
8. Private Industrial Enterprise Law (1990)
9. The Public Health Law (1972)
10. Prevention and Control of Communicable Disease Law (1995)
11. The Control of Smoking and Consumption of Tobacco Product Law (2006)
12. Myanmar Fire Force Law (2015)
13. The Motor Vehicle Law (2015) and Rules (1987)
14. The Myanma Insurance Law (1993)
15. Labour Organization Law (2011)
16. Settlement of Labour Disputes law (2012)
17. The Development of Employment and Skill Law (2013)
18. Minimum Wages Law (2013)
19. Payment of Wages Law (2016)
20. Workmen's Compensation Act (1923)
21. The Leaves and Holiday Act (1951)
22. Social Security Law (2012)
23. The Occupational Safety and Health Law (2019)
24. Factories Act (1951)
25. The Law relating to Petroleum and products of petroleum (2017)
26. The Petroleum Rules (1937)
27. Conservation of Water Resources and Rivers Law (2006)
28. Freshwater Fisheries Law (1991)

29. The Protection and Preservation of Cultural Heritage Regions Law (2019)
30. The Protection and Preservation of Antique Objects Law (2015)
31. The Protection and Preservation of Ancient Monument Law (2015)
32. Myanmar Engineering Council Law (2014)
33. Farm Land Law (2012)
34. The Administration of Vacant, Fallow and Virgin Land Law (2012)
35. Forest Law (2018)
36. Protection of Biodiversity and Protected Area Law (2018)
37. Prevention of Hazard from Chemical and Related Substances Law (2013)
38. Tanintharyi Region Development Law (2017)
39. The Underground Water Act (1930)
40. The Natural Disaster Management Law (2013)

In addition, the proposed project will follow the relevant international guidelines, standards and polices.

The project proponent is generally water distribution company with water treatment plant, water pumping stations and water pipelines. One of the important goals of the project proponent is to stand as a responsible and ethical organization with compliance of the environmental legislation and requirements.

In order to ensure Environmental Management Program for sustainable environment management in the local area, the project proponent will form an Environment Management Program Team (EMP Team) with specific technicians and operate watching all kinds of purposes for environment management.

Then, the project proponent will ensure to seek continual improvement of the environmental performance of the proposed project. *(See details in Chapter 3)*

The two organizations made a commitment each other as a collaboration agreement to form joint venture company “**BBWI & MCPC Company Limited**” to operate the project. Therefore, the two organizations have collaborated for the proposed project and have established a new company which is officially registered in Myanmar.

The main concept of the proposed project is to pump river water and to distribute after proper treatment. The locations and land use of the required facilities of the proposed project is as follows;

Sr.	Type of Facilities	Location	Area
1.	River Water Pumping Station	East Maw Tone (Za Lone) Village,	4.5 Acres

		Tanintharyi Township	
2.	River Water Pumping Station	Sin Din/Pyin Won Village, Tanintharyi Township	2.95 Acres
3.	River Water Pumping Station	Tone Byaw Gyi (Mwae Shaung) Village, Myeik Township	2.84 Acres
4.	Water Treatment Plant	Ma Zaw Village, Myeik Township	300 Acres
5.	Water Storage Tanks for Distribution	Da La Shaung Village, Myeik Township	7.77 Acres

The proposed project will use raw water resources from the Tanintharyi River by conducting raw water pumping stations at three points. In general, raw water pumping station in Maw Tone, Sindin/ Pyinwon and Tone Byaw Gyi villages can pump 4,400 cubic meters/hour (100,000 cubic meters/day) as shown in the following table.

No.	Station	Capacity (m ³ / hour)	Running Hours	Rotation
1	Maw Tone	4400	24 Hours	February - June
2	Sin Din/ Pyin Won	4400	24 Hours	October - February
3	Tone Byaw Gyi	4400	24 Hours	June - October

The raw water ponds will be built at Treatment Plant to cover at least 2 months water consumption because the pumping stations cannot get fresh water the whole year.

The conventional water treatment process consists of the following steps generally.

- (1) Fast Agitation or Sediment Formation (Coagulation)
- (2) Slow Agitation or Sediment Consolidation (Flocculation)
- (3) Sedimentation Tanks
- (4) Filtration
- (5) Disinfection

The proposed project will supply clean and treated water to total population of 180,500 in three village tracts and twelve wards of Myeik City. The project will use small distribution water pipe lines (Service Lines) in City area from Circular (1) and (2) Roads where are minimum potential disturbances to existing fiber cables in collaboration with Township Development Committee. The size of the pipe lines within City area will be assessed based on availability of land also in corporation with Township Development Committee. Daily water distribution is up to 100,000 cubic meters.

The proposed project will use Tanintharyi River water for the source of the treated clean water distribution. The project will use maximum 100,000 cubic meter river water daily for

the distribution. The surveys and studies have been conducted to ensure to use this amount of water not to affect the environmental flow of the river.

The proposed project will require about 6 MW electricity to operate the overall project activities. The project will consider to implement renewable energy plant for electricity source such as Biomass Power Plant for the requirement of the project because Tanintharyi Region still cannot access electricity from National Grid.

During the construction stage of the Project, it is estimated that 262 positions will be opened for local people followed with 131 positions opened for people with different professional skills in the operation stage of the Project.

The project proponent will use the most suitable site locations and technology for the proposed project in collaboration with high experienced and skillful international company. Some project locations can be changed a little based on the decision of land owners and other reasons. *(See details in Chapter 4)*

Chapter 5 describes environmental and socio-economic conditions of surrounding area of proposed project area, Myeik Township and Tanintharyi Township, based on the available secondary information and primary information collected and measured from field surveys.

Locations of sampling sites were identified by E Guard Environmental Quality Team for both seasons (Dry and Wet Season). The following Table shows the locations of monitoring and sampling of Environmental Quality.

Air, Noise and Vibration Quality Monitoring <i>(Point 2 of Dry and Wet season differed because of the updated proposed location of Water Treatment Plant)</i>	Dry Season	Point 1. Pannel Taung Village Point 2. Pa Thaung Village Point 3. Tone Byaw Gyi Village Point 4. Sin Din/Pyin Won Village Point 5. East Maw Tone Village
	Wet Season	Point 1. Pannel Taung Village Point 2. Ma Zaw Village Point 3. Tone Byaw Gyi Village Point 4. Sin Din/Pyin Won Village Point 5. East Maw Tone Village
Soil Quality Sampling	Wet Season	Point 1. Pannel Taung Village Point 2. Ma Zaw Village Point 3. Pa Nat Nge Village
Water Quality Onsite Measurement and Sampling	Dry and Wet Season	Tanintharyi River

All parameters measured for air quality are within the National Environmental Quality (Emission) Guideline (NEQG), National Ambient Air Quality Standards (NAAQS) and American Conference of Governmental Industrial Hygienists (ACGIH).

The proposed project is located adjacent to the residential area. For dry season, the observed noise values of the proposed project for daytime at Pannel Taung Village, Tone Byaw Gyi Village, Sin Din/Pyin Won Village, and East Maw Tone Village are under the National Environmental Quality (Emission) Guidelines. But Pa Thaung Village are upper the National Environmental Quality (Emission) Guidelines because noise monitoring location is near Myeik- Kawthaung Highway Road. So, this road is passing through more highway buses and motorcycles. So, Pa Thaung Village are upper the National Environmental Quality (Emission) Guidelines. The observed values of the proposed project for Nighttime at Pannel Taung Village, Pa Thaung Village, Tone Byaw Gyi Village, Sin Din/Pyin Won Village, and East Maw Tone Village are upper the National Environmental Quality (Emission) Guidelines because all monitoring location are near road, residential area and monasteries. In addition, all villages are using Loud Speaker and Television.

For wet season, the observed values of the proposed project for daytime and nighttime at Pannel Taung Village, Ma Zaw Village, Tone Byaw Gyi Village, Sin Din/Pyin Won Village, and East Maw Tone Village are upper the National Environmental Quality (Emission) Guidelines because noise monitoring location is near Myeik- Kawthaung Highway Road. So, this road is passing through more highway buses and motorcycles. All monitoring locations are near road, houses and monasteries. In addition, all villages are using loud speaker and television.

Wet season of observed values are more than Dry season because of raining and thunder clap. In addition, this period is Pandemic Period and the local authorities usually announce Pandemic Control Orders and Suggestions by using Loud Speakers. Another possible reason is that some houses of the villages use Bird Sound Machines for the purpose of Bird Nest Production.

There is still no official released vibration guidelines in Myanmar. Therefore, Japan vibration guidelines are used to analyze the current vibration results of this project. These results are within the Japan vibration guidelines.

All locations of water quality sampling results are compared with National Environmental Quality (Emission) Guidelines and Ambient Water Quality Standards for the Protection of Aquatic Life. Generally, most of the lab results of parameters analyzed is within the national water quality standard.

In Myanmar, there is still no government guideline for determination of background values of metals and metalloids in soil. Internationally, respective national guidelines use definition of natural background concentration in natural soil. The stepwise approach for deriving background values involves collection of data, statistical analysis of the data and determination of the background value. In this project, baseline soil contamination was collected to understand the soil quality of existing conditions.

In addition, the biodiversity survey results, the socio-economic survey results, and the township profiles are presented in details in this chapter. (*See details in Chapter 5*)

In this EIA report, in order to assess the significance of the potential impacts of the proposed project, the appropriate approach and methodology are used. It also provides the consideration, identification and assessment of likely impacts on the environment and social status associated with the proposed project development.

In order to assess the environmental impacts of the project, the following Ranking Scale Methodology is applied. Each source of impact is assessed by four parameters, magnitude, duration, extent and probability.

Assessment	Scale				
	1	2	3	4	5
Magnitude (M)	Insignificant	Small and will have no effect on working environment	Moderate and will result in minor changes on working environment	High and will result in significant changes on working environment	Very high and will result in permanent changes on working environment
Duration (D)	0-1 year	2-5 year	6-15 year	Life of operation	Post Closure
Extent (E)	Limited to the site	Limited to the local area	Limited to the region	National	International
Probability (P)	Very improbable	Improbable	Probable	Highly probable	Definite

Then, **Significant Point (SP) = (Magnitude + Duration + Extent) * Probability**

Impact Significance: Based on calculated significant point, impact significance can be categorized as follows:

Impact Significance Significant Point (SP)	Impact Significance
<15	Very Low
15-29	Low
30-44	Moderate
45-59	High

>60	Very high
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Impact assessments are implemented within 500-meter radius of each proposed project locations.

As a water supply project, there are many activities that may cause negative impacts along with positive impacts during both construction and operation phases. The factors such as environment, biodiversity, socio-economic are identified, assessed and described based on the project and overall environmental and social conditions in the surrounding area.

There may be some positive and negative impacts in the surrounding environment of the proposed project due to the implementation of the project. The possible environmental impacts are identified based on the analysis of environmental baseline information and project activities. Most of the identified impacts have been quantified to the extent possible on the value judgment. Each of the environmental issues has been examined in terms of their current conditions, likely impacts during construction and operation phases.

In this EIA study, impact assessment for the proposed project is conducted. The potential environmental impacts from various project activities of the proposed project can be categorized as follows:

- (i) Impacts on Land: Land Acquisition, Land Use, Land Subsidence
- (ii) Impacts on Environmental Resources: Air Quality, Noise and Vibration, Water Quality, Soil Quality
- (iii) Impacts on Ecological Resources: Protected Areas, Biodiversity, Hydrology
- (iv) Impacts on Human: Resettlement, Living Conditions and Livelihood, Heritage, Landscape, Ethnic Minorities and Indigenous People, Occupational Health and Safety
- (v) Waste Disposal: Solid Waste, Liquid Waste, Hazardous Waste

Potential impact identification and proposed mitigation measures for these impacts are also presented. *(See details in Chapter 6)*

Cumulative impacts are those that result from the successive, incremental, and or combined effects of an action, project, or activity when added to other existing, planned, and reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important because of scientific concerns and concerns of affected communities.

The main activities of the proposed project are situated in rural area of Myeik and Tanintharyi Townships along Myeik to Tanintharyi Express Way mentioned in Project Description Section. Generally, there is no significant existing or approved project near the proposed project area. Asia World Palm Oil Factory is situated at West Kone Maw Village beside of this express way. But the distance of this factory and the proposed project activities are far away (About 5 km). The information available to assess cumulative impact of other related projects is minimal.

The cumulative assessment has been performed based on the following steps: Projects that are either proposed or recently approved but not yet operational and located either are identified within the area of the proposed project activities. The spatial boundary of 500 m will be used for the cumulative impacts. Where existing projects are located away from each other cumulative impacts are likely to be less significant.

The temporary boundary (time-frame) to be used for the initiation of the project is defined. Where the operation schedule for projects is not overlapping, the potential cumulative impacts are likely to be less significant.

Generally, the cumulative impact of the proposed project associated with the existing Asia World Palm Oil Factory has been considered as low cumulative impact.

In addition, the illegal gold mines in the upstream of Tanintharyi River may impact the river water quality. Also, some households along the river bank are still using unsystematic toilets on River Bank. These facts are other potential cumulative impacts for the proposed project. Therefore, the proposed project will conduct continuous monitoring system for their supplied tap water quality. (*See details in Chapter 7*)

The Environment Management Plan (EMP) is required to ensure sustainable development in the area of the project site. Hence, an all-encompassing plan is envisaged in this Chapter, even though the identification and quantification of impacts based on scientific matrix and professional judgment have been presented in Chapter 6.

The objectives of the EMP are as follows;

- To identify the possible environmental impacts of the operation activities
- To develop measures to minimize, mitigate, and manage these impacts, and
- To implement sustainable development with responsibility and accountability.

In this section, the potential environmental impacts with related project activities for the construction and operation phases of the proposed project are presented with proposed mitigation measures and responsible parties.

Since all the data cannot bring out all variations induced by the natural or human activities, regular monitoring program of the environmental parameters is essential to take into account the changes in the environment.

The objective of monitoring is:

- To check or assess the efficacy of the controlling measures
- To detect deviations in order to initiate necessary measures
- To establish a database for Impact Assessment Studies for new projects.

In order to implement this EMP effectively, it will be necessary to define the responsibilities of various stakeholders. The following entities should be involved in the implementation of this EMP:

- BBWI&MCPC

- Environmental Conservation Department, ECD
- Third-Party Environmental Consultant

Moreover, collaboration with regional authorities and local people especially living in project area is very important to conduct the proposed plans successfully.

In addition, the proposed locations for monitoring, proposed parameters, estimated budgets and responsible parties are also presented with location maps. In addition, Occupational Health and Safety Plan, Emergency Response Plan, Waste Management Plan, Grievance Redress Mechanism, and Cooperate Responsibility Plan are also included in this chapter. *(See details in Chapter 8)*

In this EIA Stage, the proposed project planned to conduct Public Consultations two times in Myeik and Tanintharyi Townships with relevant stakeholders, interested parties and local people. But the Public Consultation at Tanintharyi Township could not be held because of the conditions of World Pandemic COVID 19. Therefore, the proposed project conducted Public Consultation at only Myeik Township by inviting relevant stakeholders from both Myeik and Tanintharyi Townships in order to reduce the risk of Pandemic. In this report, the results of Public Consultation at Myeik Township the results and conditions of Socio-Economic Survey are presented to cover the opinions, expressions and suggestions of the stakeholders.

The Public Consultation was held on 21st December, 2022, at MCPC Head Office Meeting Hall, Myeik Township, Tanintharyi Region. The government officials, NGOs, media and local people (from the project area) were invited by Invitation Card before the meeting. Total 159 people of government officials, representatives from companies and local people attended in this Public Consultation.

The Public Consultation was held in the following agenda;

1. Registration
2. Opening Remarks by **Reginal Minister of Ethnic Affairs, U Saw Martin Luthar**
3. Explanation of Brief Description of the Proposed Project by **MCPC Deputy General Manager, U Kyaw Myo Paing**
4. Presentation of EIA Part by **E Guard Environmental Services Managing Director, U Aye Thiha**
5. Exchange Opinions, Questions and Answers
6. Closing Remarks

The presentations, exchange opinions, questions and answers, discussions, attendance list and disclosure methods are also presented in details in this report. *(See details in Chapter 9)*

Generally, the proposed project can create good benefits to the development of local area. Myeik population has been growing three times than before 2010 because of urbanization and industrialization. The current main water source of the local people is ground water. But the quality and quantity of ground water has changed because of sea water intrusion. The proposed project will use natural source of fresh water from Tanintharyi River effectively. Bright Blue Water International Corporation Company Limited and Myeik Corporation

Public Company Limited (BBWI & MCPC) have collaborated to develop public utility project (Clean Water Supply) for Tanintharyi Region in Myanmar. This project aims to develop infrastructures for water production, water management service and pipe supply system. It can provide high quality tap water for municipalities, and many industries especially in fishery and processing food. This sustainable development of pipeline tap water system can encourage more foreign and local investment in Myeik.

The proposed project has significant positive effects to the local area. The local people can also gain permanent and temporary job opportunities related to project development. CSR Programs will help the social and economic development of the project area. Based on preliminary discussions with local people, most of the people welcome and wish to develop the proposed project as soon as possible.

The project proponent should make required further studies and investigations to meet the legal requirements and the suggestions of regional authorities. The Grievance Redress Mechanism should be established in collaboration with local communities to satisfy the complaints for the proposed project activities of the local people. In addition, the project proponent should disclose Environmental Reports including EIA and Monitoring Reports to the public for transparency and collect suggestions and feedbacks of the public.

Therefore, the proposed project should be implemented with responsibility and accountability to fulfill the basic requirement of the project area. Moreover, this sustainable infrastructure improvement of the project area can also achieve social and economic development of the region. *(See details in Chapter 10)*

The EIA report of “Water Distribution Project to Myeik Township, Myeik District” can be easily available and reviewed at the following download link.

[Myeik Water Distribution Project EIA Report Final](#)

အစီရင်ခံစာအကျဉ်းချုပ်

ဘရိတ်ဘလူးဝါးတားအပြည်ပြည်ဆိုင်ရာကော်ပိုရေးရှင်းကုမ္ပဏီလီမိတက်နှင့် မြိတ်ကော်ပိုရေးရှင်း အများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်တို့သည် တနင်္သာရီတိုင်းဒေသကြီးအစိုးရနှင့် မြိတ်ခရိုင်၊ မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်း၏ ဖြစ်တန်စွမ်းလေ့လာရေးအတွက် နှစ်ဦးနှစ်ဘက် သဘောတူ နားလည်မှုစာချုပ် (MOU) စာချုပ်ကို ၂၀၁၉ ခုနှစ်၊ အောက်တိုဘာ ၃၁ ရက်နေ့တွင် သဘောတူ လက်မှတ်ရေးထိုးခဲ့ပါသည်။ ဤနားလည်မှုစာချုပ်အရ ဘရိတ်ဘလူးဝါးတားအပြည်ပြည်ဆိုင်ရာ ကော်ပိုရေးရှင်းကုမ္ပဏီလီမိတက်နှင့် မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် တို့သည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာကို ပြုစုတင်ပြရန်တာဝန်ရှိပါသည်။ ထို့အတူ ဘရိတ်ဘလူးဝါးတားအပြည်ပြည်ဆိုင်ရာကော်ပိုရေးရှင်းကုမ္ပဏီလီမိတက်နှင့် မြိတ်ကော်ပိုရေးရှင်း အများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်တို့သည် စီမံကိန်းအဆိုပြုချက်ကို ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာနထံသို့ တရားဝင်တင်သွင်းခဲ့ပြီး ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်ရန်လိုအပ်မည် ဖြစ်ကြောင်း တရားဝင်ညွှန်ကြားချက် ပေးခဲ့ပါသည်။ ဤ 'မြိတ်ခရိုင်၊ မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်း' အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း (၂၀၁၅) ပါ လုပ်ငန်းစဉ်အတိုင်း ရေးသားပြုစုပြင်ဆင်ထားပါသည်။

ဘရိတ်ဘလူးဝါးတားအပြည်ပြည်ဆိုင်ရာကော်ပိုရေးရှင်းကုမ္ပဏီလီမိတက်နှင့် မြိတ်ကော်ပိုရေးရှင်း အများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်တို့သည် ဤစီမံကိန်းအကောင်အထည်ဖော်ရေး အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာကိုပြင်ဆင်ပြီး သယံဇာတနှင့်သဘာဝ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ တင်ပြပြီး အတည်ပြုချက်ရယူရမည် ဖြစ်ပါသည်။ သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနကိုယ်စား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနသည် အမျိုးသားအဆင့် ရေရှည်တည်တံ့ခိုင်မြဲသော ဖွံ့ဖြိုးတိုးတက်ရေးလုပ်ငန်းစဉ်တွင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာစဉ်းစားမှုများကိုပါ ထည့်သွင်းလွှမ်းခြုံနိုင်ရေးအတွက် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာမူဝါဒ၊ မဟာဗျူဟာ၊ မူဘောင်များ၊ အစီအစဉ်များချမှတ်ရေးဆွဲခြင်းနှင့် အကောင်အထည်ဖော်ခြင်း အစီအစဉ်များအတွက် တာဝန်ရှိပါသည်။ ထို့ကြောင့် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်၏ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန ရုံးချုပ်သို့ ၂၀၂၀ ခုနှစ် ဧပြီလတွင် တင်ပြခဲ့ပါသည်။ ထိုနယ်ပယ် အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာအပေါ် ပြန်လည်သုံးသပ်ပြီးနောက် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာနသည် ၂၀၂၀ ခုနှစ်၊ ဇူလိုင်လတွင် သဘောထားမှတ်ချက်အချို့ကို အကြံပြု

ပြန်ကြားခဲ့ပါသည်။ အဆိုပါ သဘောထားမှတ်ချက်များကို ပြန်လည်ပြင်ဆင်ပြီးနောက် ၂၀၂၂ ခုနှစ် နိုဝင်ဘာလတွင် ပြန်လည်တင်ပြခဲ့ပြီး နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာသည် ၂၀၂၃ ခုနှစ် မတ်လတွင် အတည်ပြုချက်ရရှိခဲ့ပါသည်။ (အသေးစိတ်ကို အခန်း ၂ တွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။)

အခန်း(၃)တွင် အဆိုပြုစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာထိန်းသိမ်းကာကွယ်ခြင်း၊ စီမံခန့်ခွဲခြင်း တို့နှင့် ဆက်စပ်၍အသုံးပြုနိုင်သော တည်ဆဲဥပဒေနှင့် နည်းဥပဒေများကို ဖော်ပြထားပါသည်။ ၎င်းဥပဒေနှင့်နည်းဥပဒေများတွင် ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော် ဖွဲ့စည်းပုံအခြေခံဥပဒေ (၂၀၀၈) သည် အခြေခံအကျဆုံးဖြစ်သည်။ အခြားဥပဒေများမှာ အသစ်ပြဋ္ဌာန်းထားသော အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာမူဝါဒ (၂၀၁၉)၊ အမျိုးသားမြေအသုံးချမှုမူဝါဒ (၂၀၁၆)၊ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄)၊ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း(၂၀၁၅)၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည် အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် (၂၀၁၅)၊ အမျိုးသား သောက်သုံးရေ စံချိန်စံညွှန်းများ (၂၀၁၄) အစရှိသည် တို့ဖြစ်ပါသည်။

ပတ်ဝန်းကျင်နှင့်ဆိုင်သည့် ဥပဒေနှင့်နည်းဥပဒေများကိုအောက်တွင်ဖော်ပြထားပါသည်။

- မြန်မာအမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာမူဝါဒ (၂၀၁၉)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄)
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း (၂၀၁၅)
- အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် (၂၀၁၅) တို့ဖြစ်ပါသည်။

အဆိုပြုစီမံကိန်းတွင်ပါဝင်သည့် မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်နှင့် ဘရိုက်ဘလူးဝါးတားအပြည်ပြည်ဆိုင်ရာကော်ပိုရေးရှင်းကုမ္ပဏီလီမိတက်တို့ ပူးပေါင်းဆောင်ရွက်နေ သောကြောင့် အောက်ဖော်ပြပါ ဥပဒေနှင့်နည်းဥပဒေများ အကျုံးဝင်လျက် ရှိပါသည်။

- မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုဥပဒေ (၂၀၁၆)
- မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုနည်းဥပဒေ (၂၀၁၇) တို့ဖြစ်ပါသည်။

အဆိုပြုစီမံကိန်းသည် ရေပေးဝေရေးစီမံကိန်းဖြစ်သည့် အားလျော်စွာ အောက်တွင်ဖော်ပြမည့် ရေအရင်းအမြစ်နှင့်ဆိုင်သည့် ဥပဒေနှင့်နည်းဥပဒေများ အကျုံးဝင်လျက် ရှိပါသည်။

- မြန်မာနိုင်ငံအမျိုးသားရေအရင်းအမြစ်ဆိုင်ရာမူဝါဒ (၂၀၁၄)
 - ရေအရင်းအမြစ်နှင့် မြစ်၊ ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆)
 - မြန်မာနိုင်ငံအမျိုးသားသောက်သုံးရေစံချိန်စံညွှန်းများ (၂၀၁၄)
 - မြေအောက်ရေအက်ဥပဒေ (၁၉၃၀)
- တို့ဖြစ်ကြပါသည်။

အဆိုပြုစီမံကိန်းကို အကောင်အထည်ဖော်ဆောင်ရွက်သည့်အခါ လုပ်သားများကို အသုံးပြုမည် ဖြစ်သောကြောင့် အောက်ဖော်ပြပါ ဥပဒေနှင့်နည်းဥပဒေများ အကျုံးဝင်လျက် ရှိပါသည်။

- အလုပ်သမားအဖွဲ့အစည်းဥပဒေ (၂၀၁၁)
- အလုပ်သမားရေးရာအငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ (၂၀၁၂)
- အလုပ်အကိုင်နှင့်ကျွမ်းကျင်မှုဖွံ့ဖြိုးတိုးတတ်ရေးဥပဒေ (၂၀၁၃)
- ၂၀၁၃ ခုနှစ်၊ အနည်းဆုံးအခကြေးငွေဥပဒေ
- ၂၀၁၆ ခုနှစ်၊ အခကြေးငွေပေးချေရေးဥပဒေ
- အလုပ်သမားလျော်ကြေးအက်ဥပဒေ (၁၉၂၃)
- ခွင့်နှင့်အလုပ်ပိတ်ရက်များအက်ဥပဒေ (၁၉၅၁)
- လူမှုဖူလုံရေးဥပဒေ (၂၀၁၂)

အဆိုပြုစီမံကိန်းသည် မြိတ်ခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီးတွင် တည်ရှိနေသောကြောင့် တနင်္သာရီ တိုင်းဒေသကြီး စည်ပင်သာယာရေးဥပဒေကို လိုက်နာကျင့်သုံးရမည်ဖြစ်ပါသည်။ လုပ်သားများ၏ ဘေးအန္တရာယ်ကင်းရှင်းစေရေးအတွက် လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့်ကျန်းမာရေး ဆိုင်ရာ ဥပဒေကို လိုက်နာကျင့်သုံးရမည်ဖြစ်ပါသည်။ အခြားသော ဥပဒေများမှာ

- ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ်မှတားဆီးကာကွယ်ရေးဥပဒေ (၂၀၁၃)
- လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့်ကျန်းမာရေးဆိုင်ရာဥပဒေ (၂၀၁၉)

စီမံကိန်းအဆိုပြုသူသည် စီမံကိန်းကို အကောင်အထည်ဖော်ရာတွင် မြေယာအသုံးပြုမှုနှင့် ပိုက်လိုင်း ချိန်ညှိခြင်းများအတွက် အောက်ဖော်ပြပါ ဥပဒေများကို လိုက်နာရမည်ဖြစ်ပါသည်။

- အမျိုးသားမြေအသုံးချမှုမူဝါဒ (၂၀၁၆)
- လယ်ယာမြေဥပဒေကိုပြန်လည်ပြင်ဆင်သည့်ဥပဒေ (၂၀၂၀)

- မြေလွတ်၊ မြေလပ်နှင့် မြေရိုင်းများ စီမံခန့်ခွဲရေးဥပဒေ (၂၀၁၈)
- အမြန်လမ်းမကြီးများဥပဒေ (၂၀၁၅)

ကျန်းမာရေးကဏ္ဍအတွက် အောက်ဖော်ပြပါဥပဒေများကို လိုက်နာရမည်ဖြစ်ပါသည်။

- ပြည်သူ့ကျန်းမာရေးဥပဒေ (၁၉၇၂)
- ကူးစက်ရောဂါများကာကွယ်နှိမ်နင်းရေးဥပဒေ (၁၉၉၅)

အဆိုပြုစီမံကိန်းသည် အောက်ဖော်ပြပါ ဥပဒေများ၊ နည်းဥပဒေများ၊ လုပ်ထုံးလုပ်နည်းများ၊ လမ်းညွှန်ချက်များနှင့် အကျုံးဝင်လျက်ရှိပါသည်။

- ၁။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)
- ၂။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄)
- ၃။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးနည်းလုပ်နည်း (၂၀၁၅)
- ၄။ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးထုတ်လွှတ်မှုလမ်းညွှန်ချက် (၂၀၁၅)
- ၅။ တိုင်းရင်းသားလူမျိုးများ၏အခွင့်အရေးကာကွယ်စောင့်ရှောက်သည့်ဥပဒေ (၂၀၁၅)
- ၆။ မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုဥပဒေ (၂၀၁၆)
- ၇။ မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုနည်းဥပဒေများ (၂၀၁၇)
- ၈။ ပုဂ္ဂလိကစက်မှုလုပ်ငန်းဥပဒေ (၁၉၉၀)
- ၉။ ပြည်သူ့ကျန်းမာရေးဥပဒေ (၁၉၇၂)
- ၁၀။ ကူးစက်ရောဂါများကာကွယ်နှိမ်နင်းရေးဥပဒေ (၁၉၉၅)
- ၁၁။ ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက်ပစ္စည်းသောက်သုံးမှုထိန်းချုပ်ရေးဥပဒေ (၂၀၁၆)
- ၁၂။ မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ (၂၀၁၅)
- ၁၃။ ယာဉ်အန္တရာယ်ကင်းရှင်းရေးနှင့်မော်တော်ယာဉ်စီမံခန့်ခွဲမှုဥပဒေ (၂၀၂၀) နှင့် မော်တော်ယာဉ် နည်းဥပဒေများ (၁၉၈၇)
- ၁၄။ မြန်မာ့အာမခံလုပ်ငန်းဥပဒေ (၁၉၉၃)
- ၁၅။ အလုပ်သမားအဖွဲ့အစည်းဥပဒေ (၂၀၁၁)
- ၁၆။ အလုပ်သမားရေးရာအငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ (၂၀၁၂)
- ၁၇။ အလုပ်အကိုင်နှင့်ကျွမ်းကျင်မှုဖွံ့ဖြိုးတိုးတတ်ရေးဥပဒေ (၂၀၁၃)
- ၁၈။ အနည်းဆုံးအခကြေးငွေဥပဒေ (၂၀၁၃)
- ၁၉။ အခကြေးငွေပေးချေရေးဥပဒေ (၂၀၁၆)
- ၂၀။ အလုပ်သမားလျော်ကြေးအက်ဥပဒေ (၁၉၅၁)

- ၂၁။ ခွင့်နှင့်အလုပ်ပိတ်ရက်များအက်ဥပဒေ (၁၉၅၁)
 - ၂၂။ လူမှုဖူလုံရေးဥပဒေ (၂၀၁၂)
 - ၂၃။ လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့်ကျန်းမာရေးဆိုင်ရာဥပဒေ (၂၀၁၉)
 - ၂၄။ အလုပ်ရုံများအက်ဥပဒေ (၁၉၅၁)
 - ၂၅။ ရေနံနှင့်ရေနံထွက်ပစ္စည်းဆိုင်ရာဥပဒေ(၂၀၁၇)
 - ၂၆။ ရေနံနည်းဥပဒေများ (၁၉၃၇)
 - ၂၇။ ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆)
 - ၂၈။ ရေချိုငါးလုပ်ငန်းဥပဒေ (၁၉၉၁)
 - ၂၉။ ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများကာကွယ်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၉)
 - ၃၀။ ရှေးဟောင်းဝတ္ထုပစ္စည်းများကာကွယ်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၅)
 - ၃၁။ ရှေးဟောင်းအဆောက်အအုံများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၅)
 - ၃၂။ မြန်မာနိုင်ငံအင်ဂျင်နီယာကောင်စီဥပဒေ (၂၀၁၃)
 - ၃၃။ လယ်ယာမြေဥပဒေ (၂၀၁၂) (လိုအပ်ပါက)
 - ၃၄။ မြေလွတ်၊ မြေလပ်နှင့် မြေရိုင်းများ စီမံခန့်ခွဲရေးဥပဒေ (၂၀၁၂)
 - ၃၅။ သစ်တောဥပဒေ (၂၀၁၈)
 - ၃၆။ ဇီဝမျိုးစုံမျိုးကွဲနှင့်သဘာဝထိန်းသိမ်းရေးနယ်မြေများကာကွယ်စောင့်ရှောက်ခြင်းဆိုင်ရာဥပဒေ (၂၀၁၈)
 - ၃၇။ ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ်မှတားဆီးကာကွယ်ရေးဥပဒေ (၂၀၁၃)
 - ၃၈။ တနင်္သာတိုင်းဒေသကြီးစည်ပင်သာယာရေးဥပဒေ (၂၀၁၇)
 - ၃၉။ မြေအောက်ရေအက်ဥပဒေ (၁၉၃၀)
 - ၄၀။ သဘာဝဘေးအန္တရာယ်ဆိုင်ရာစီမံခန့်ခွဲမှုဥပဒေ (၂၀၁၃)
- ထို့အတူ စီမံကိန်းဖော်ဆောင်သူသည် သက်ဆိုင်သည့် အပြည်ပြည်ဆိုင်ရာလမ်းညွှန်ချက်များ၊ စံများနှင့် မူဝါဒများကိုပါ လိုက်နာဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

စီမံကိန်းဖော်ဆောင်သူသည် ရေသန့်စင်သည့်စက်ရုံဖြင့် ရေသန့်စင်ကာ ရေစုပိတ်စက်များနှင့် ရေပိုက်လိုင်းများ အသုံးပြုပြီး ရေဖြန့်ဖြူးသည့် ကုမ္ပဏီတစ်ခုဖြစ်ပါသည်။ စီမံကိန်းဖော်ဆောင်သူ၏ အရေးကြီးသော ရည်မှန်းချက်များထဲမှတစ်ခုသည် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာလိုအပ်ချက်များနှင့် ဥပဒေများကို လိုက်နာကျင့်သုံးပြီး တာဝန်ယူမှု တာဝန်ခံမှု ပြည့်စုံသည့်အဖွဲ့အစည်းအဖြစ် ရပ်တည် သွားရန် ဖြစ်ပါသည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ဒေသအတွင်းတွင် ရေရှည်တည်တံ့ခိုင်မြဲသော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုစနစ်တစ်ခု ဖြစ်လာစေရေးအတွက် စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အဖွဲ့ကို ကျွမ်းကျင်ပညာရှင်များဖြင့် ဖွဲ့စည်းပြီး စောင့်ကြပ်ကြည့်ရှုမည် ဖြစ်ပါသည်။

ထို့နောက် စီမံကိန်းဖော်ဆောင်သူသည် အဆိုပြုထားသော စီမံကိန်း၏ သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ စွမ်းဆောင်ရည်ကို စဉ်ဆက်မပြတ်မြှင့်တင်ရန် သေချာစွာ စောင့်ကြပ်ကြည့်ရှုမည်ဖြစ်ပါသည်။
(အခန်း ၃ တွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။)

ဘရိတ်ဘလူးဝါးတားအပြည်ပြည်ဆိုင်ရာကော်ပိုရေးရှင်းကုမ္ပဏီလီမိတက်နှင့် မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်တို့သည် အဆိုပြုစီမံကိန်းကို အကောင်အထည်ဖော်လည်ပတ်ရန်အတွက် ဖက်စပ်ကုမ္ပဏီ “BBWI & MCPC Company Limited” အဖြစ် ပူးပေါင်းဆောင်ရွက်ရန်ကတိကဝတ်ပြုခဲ့ကြပါသည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်းအတွက်အဖွဲ့အစည်း နှစ်ခု ပူးပေါင်းပြီး မြန်မာနိုင်ငံတွင်တရားဝင်မှတ်ပုံတင်ထားသည့်ကုမ္ပဏီအသစ်တစ်ခုအဖြစ် ထူထောင်ခဲ့ပါသည်။

အဆိုပြုစီမံကိန်း၏ အဓိကနည်းစနစ်မှာ မြစ်ရေကို စုပ်ယူပြီး စနစ်တကျ သန့်စင်ပြီးနောက် လူထုထံသို့ ဖြန့်ဝေရန်ဖြစ်ပါသည်။ အဆိုပြုစီမံကိန်း၏ လိုအပ်သောအခြေခံအဆောက်အအုံများ၏ တည်နေရာနှင့် မြေအသုံးချမှုဧရိယာများမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

စဉ်	စက်ပစ္စည်းအမျိုးအစား	တည်နေရာ	ဧရိယာ
၁။	မြစ်ရေတင်စက်ရုံ	အရှေ့မော်တုံး (ဇလုံး) ကျေးရွာ၊ တနင်္သာရီမြို့နယ်	၄.၅ ဧက
၂။	မြစ်ရေတင်စက်ရုံ	ဆင်ဒင်/ပြင်ဝန်းကျေးရွာ၊ တနင်္သာရီမြို့နယ်	၂.၉၅ ဧက
၃။	မြစ်ရေတင်စက်ရုံ	တုံးပျောကြီး (မွေ့ရှောင်)ကျေးရွာ၊ မြိတ်မြို့နယ်	၂.၈၄ ဧက
၄။	ရေသန့်စင်စက်ရုံ	မဇောကျေးရွာ၊ မြိတ်မြို့နယ်	၃၀၀ ဧက
၅။	ရေဖြန့်ဝေရေးအတွက် ရေလှောင်ကန်များ	ဒလရှောင်ကျေးရွာ၊ မြိတ်မြို့နယ်	၇.၇၇ ဧက

အဆိုပြုစီမံကိန်းသည် တနင်္သာရီမြစ်အတွင်းမှ ရေကို ရေစုပ်စက်ဖြင့် နေရာ (၃) နေရာတွင် တွန်းတင်ကာ အသုံးပြုမည် ဖြစ်ပါသည်။ ထိုနေရာ (၃) နေရာမှာ အရှေ့မော်တုံး (ဇလုံး)ကျေးရွာ၊ ဆင်ဒင်/ပြင်ဝန်း ကျေးရွာ နှင့် တုံးပျောကြီး (မွေ့ရှောင်)ကျေးရွာတို့ ဖြစ်ကြပြီး ရေတွန်းစက်များမှာ ယေဘုယျအားဖြင့် တစ်နာရီလျှင် ရေကုဗမီတာ ၄၄၀၀ နှုန်းဖြင့် (တစ်ရက်လျှင် ၁ သိန်း ကုဗမီတာ) ကို တွန်းတင်နိုင်မည်ဖြစ်ပြီး အသုံးပြုနိုင်မည့်ကာလကို အောက်ပါဇယားတွင် ဖော်ပြထားပါသည်။

စဉ်	စက်ရုံ	ဝန်အား (ကုမ္ပဏီ/နာရီ)	အသုံးပြုမည့်နာရီ	အသုံးပြုမည့်ကာလ
၁။	အရှေ့မော်တိုး (ဇလုံး)	၄၄၀၀	၂၄ နာရီ	ဖေဖော်ဝါရီလ-ဇွန်လ
၂။	ဆင်ဒင်/ပြင်ဝန်း	၄၄၀၀	၂၄ နာရီ	အောက်တိုဘာလ- ဖေဖော်ဝါရီလ
၃။	တုံးပျောကြီး (မွေ့ရှောင်)	၄၄၀၀	၂၄ နာရီ	ဇွန်လ - အောက်တိုဘာလ

ရေကြမ်းသိုလှောင်ကန်များကို ရေသန့်စင်စက်ရုံတွင်တည်ဆောက်ထားမည်ဖြစ်ပြီး ထိုရေလှောင်ကန်များသည် (၂) လစာအတွက် လုံလောက်စေမည်ဖြစ်သည်။ ထိုသို့ပြုလုပ်ခြင်းမှာ ရေချိုများသည် ဤဒေသအတွင်းတွင် တစ်နှစ်ပတ်လုံးရရှိမည် မဟုတ်သောကြောင့်ဖြစ်ပါသည်။

ပုံမှန်သမားရိုးကျရေသန့်စင်ခြင်းလုပ်ငန်းတွင် အောက်ပါအဆင့်များ ပါဝင်ပါသည်။

၁. အမြန်လည်စနစ်ဖြင့် အနည်အနှစ် စုစည်းစေခြင်း
၂. အနှေးလည်စနစ်ဖြင့် အနည်အနှစ် စုစည်းစေခြင်း
၃. အနည်ကျစေခြင်း
၄. စစ်ထုတ်ခြင်း
၅. ပိုးသတ်ခြင်း
၆. အနည်အနှစ်များကို စွန့်ပစ်ခြင်း စသည်တို့ဖြစ်ပါသည်။

အဆိုပြုစီမံကိန်းပြီးစီးပါက သန့်စင်ပြီးရေများကို မြိတ်မြို့ရှိ ကျေးရွာ (၃) ရွာနှင့် ရပ်ကွက် (၁၁) ရပ်ကွက်အတွင်းရှိ လူဦးရေပေါင်း ၁၈၀,၅၀၀ ခန့်ကိုထောက်ပံ့ပေးနိုင်မည်ဖြစ်သည်။ ဤစီမံကိန်းသည် သန့်စင်ပြီးရေများကို မြို့နယ် စည်ပင်သာယာရေးအဖွဲ့နှင့် ပူးပေါင်း၍ မြို့တွင်းရှိ ရေဖြန့်ဝေရေးပိုက်လိုင်းများမှတစ်ဆင့်ရေဖြန့်ဝေမည်ဖြစ်ပါသည်။ ရေဖြန့်ဝေရေးပိုက်လိုင်းများသည်မြိတ်မြို့၏အမှတ် (၁)နှင့် အမှတ်(၂) မြို့ပတ်လမ်း များနှင့်အပြိုင် တည်ရှိနေပြီးထိုနေရာများမှာ နဂိုတည်ရှိနေသည့် ဖိုက်ဘာကေဘယ်များနှင့်ထိခိုက်မှုအနည်းဆုံးနေရာဖြစ်ပါသည်။ ရေဖြန့်ဝေရေးပိုက်များ၏ အရွယ်အစားများကိုလည်း မြေရရှိမှုအခြေအနေပေါ်မူတည်၍ ဆန်းစစ်ခြင်းလုပ်ငန်းများကို မြို့နယ်စည်ပင်

သာယာရေးအဖွဲ့နှင့်အတူ လုပ်ဆောင်သွားမည်ဖြစ်ပါသည်။ အဆိုပါပိုက်လိုင်းများဖြင့် ရေဖြန့်ဝေမှု များမှာ နေ့စဉ် ကုဗမီတာ ၁ သိန်း ဝန်းကျင်အထိရှိမည်ဖြစ်ပါသည်။

အဆိုပြုစီမံကိန်းသည် သန့်စင်မည့်ရေများ၏ အဓိကအရင်းအမြစ်ကို တနင်္သာရီမြစ်မှ အဓိကထား ရယူမည်ဖြစ်ပြီး နေ့စဉ်အသုံးပြုမည့် မြစ်ရေပမာဏမှာ ကုဗမီတာ ၁ သိန်းဝန်းကျင် ဖြစ်ပါသည်။ ထိုအသုံးပြုမည့်ပမာဏမှာ မြစ်၏သဘာဝရေစီးကြောင်းကို ထိခိုက်မည်မဟုတ်ကြောင်းကို လေ့လာမှု နှင့် စစ်တမ်းကောက်ယူမှုများ ပြုလုပ်၍ သက်သေပြပြီးဖြစ်ပါသည်။

အဆိုပြုစီမံကိန်းကောင်းမွန်စွာ လည်ပတ်နိုင်ရေးအတွက် လျှပ်စစ်ဓာတ်အား ၆ မီဂါဝပ် ခန့် လိုအပ်မည်ဖြစ်ပါသည်။ အဆိုပြုစီမံကိန်းသည် တနင်္သာရီတိုင်းဒေသကြီးတွင်တည်ရှိနေပြီး လျှပ်စစ် ဓာတ်အားမှာ မဟာဓာတ်အားလိုင်းများမှ ရရှိမည်မဟုတ်သောကြောင့် လျှပ်စစ်ဓာတ်အားကို အနာဂတ်တွင် ဇီဝလောင်စာကဲ့သို့သော ပြန်လည်ပြည့်ဖြိုးမြဲစွမ်းအင်ဖြင့် လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်သည့် စက်ရုံ တည်ဆောက်ပြီး လျှပ်စစ်ဓာတ်အား ရယူရန် လျာထားပါသည်။

စီမံကိန်းတည်ဆောက်နေသည့်ကာလအတွင်းတွင် အလုပ်အကိုင်အခွင့်အလမ်းအနေဖြင့် အလုပ် အကိုင် (၂၆၂) နေရာကို ဒေသခံများအတွက် ဖန်တီးပေးနိုင်မည်ဖြစ်ပြီး စီမံကိန်း လည်ပတ်သည့် အချိန်တွင် အလုပ်အကိုင် (၁၃၁) နေရာကို ဖန်တီးပေးနိုင်မည်ဖြစ်ပါသည်။

စီမံကိန်းအဆိုပြုသူသည် အတွေ့အကြုံရှိပြီး ကျွမ်းကျင်သော နိုင်ငံတကာကုမ္ပဏီများနှင့် ပူးပေါင်း၍ အဆိုပြုစီမံကိန်းအတွက် သင့်တော်သည့်တည်နေရာနှင့်နည်းပညာကို အသုံးပြုမည် ဖြစ်ပါသည်။ အချို့သောစီမံကိန်းတည်နေရာများသည် မြေပိုင်ရှင်များ၏ ဆုံးဖြတ်ချက်နှင့် အခြားအကြောင်းအရင်း များကို မူတည်၍ အပြောင်းအလဲရှိနိုင်ပါသည်။ **(အသေးစိတ်ကို အခန်း ၄ တွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။)**

ယခုအစီရင်ခံစာ အခန်း ၅ သည် မြိတ်မြို့နယ်နှင့် တနင်္သာရီမြို့နယ်များရှိ အဆိုပြုစီမံကိန်း၏ အနီး ဝန်းကျင်ဒေသ ပတ်ဝန်းကျင်နှင့်လူမှုစီးပွားရေးအခြေအနေများကို ရရှိကိုးကားနိုင်သော ရှိရင်းစွဲ အချက်အလက်များနှင့် ကွင်းဆင်းလေ့လာမှုများမှ တိုင်းတာစုဆောင်းရရှိလာသော အချက်အလက် များကို အခြေခံပြီး ဖော်ပြထားပါသည်။

စိုစွတ်ရာသီနှင့်ခြောက်သွေ့ရာသီနှစ်ခုလုံးအတွက် နမူနာကောက်ယူသောတည်နေရာများ၊ ကွင်းဆင်း တိုင်းတာမှုများပြုလုပ်သောတည်နေရာများကိုအီးဂတ်ပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှုပတ်ဝန်းကျင် အရည်အသွေးဆန်းစစ်လေ့လာရေးအဖွဲ့မှ ဆန်းစစ်သတ်မှတ်ခဲ့ခြင်းဖြစ်ပါသည်။ အောက်ပါဇယား

တွင် ပတ်ဝန်းကျင်အရည်အသွေးတိုင်းတာခဲ့သောတည်နေရာများနှင့် နမူနာကောက်ယူခဲ့သော တည်နေရာများကို ဖော်ပြထားပါသည်။

လေအရည်အသွေး၊ ဆူညံသံနှင့် တုန်ခါမှု တိုင်းတာသည့်နေရာများ (အမှတ်စဉ် ၂ နေရာသည် ရေသန့်စင်စက်ရုံ တည်နေရာ ပြောင်းလဲမှုကြောင့် ကွာခြားမှု ရှိပါသည်။)	ခြောက်သွေ့ရာသီ	အမှတ်စဉ် ၁ - ပိန္နဲတောင်ကျေးရွာ အမှတ်စဉ် ၂ - ပသောင်းကျေးရွာ အမှတ်စဉ် ၃ - တုံးပျောကြီးကျေးရွာ အမှတ်စဉ် ၄ - ဆင်ဒင်/ပြင်ဝန်းကျေးရွာ အမှတ်စဉ် ၅ - အရှေ့မော်တုံးကျေးရွာ
	စိုစွတ်ရာသီ	အမှတ်စဉ် ၁ - ပိန္နဲတောင်ကျေးရွာ အမှတ်စဉ် ၂ - မဇောကျေးရွာ အမှတ်စဉ် ၃ - တုံးပျောကြီးကျေးရွာ အမှတ်စဉ် ၄ - ဆင်ဒင်/ပြင်ဝန်းကျေးရွာ အမှတ်စဉ် ၅ - အရှေ့မော်တုံးကျေးရွာ
မြေအရည်အသွေး နမူနာ ကောက်ယူသည့် နေရာများ	စိုစွတ်ရာသီ	အမှတ်စဉ် ၁ - ပိန္နဲတောင်ကျေးရွာ အမှတ်စဉ် ၂ - မဇောကျေးရွာ အမှတ်စဉ် ၃ - ပနက်ငယ်ကျေးရွာ
ရေအရည်အသွေး တိုင်းတာမှုနှင့် နမူနာ ကောက်ယူသည့် နေရာများ	စိုစွတ်ရာသီနှင့် ခြောက်သွေ့ရာသီ	တနင်္သာရီမြစ်

လေအရည်အသွေးအတွက် တိုင်းတာခဲ့သော ပါရာမီတာများအားလုံးမှာ အမျိုးသားပတ်ဝန်းကျင် အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ၊ National Ambient Air Quality Standards (NAAQS) and American Conference of Governmental Industrial Hygienists (ACGIH) တို့ အောက်တွင်သာ ရှိပါသည်။

အဆိုပြုစီမံကိန်းသည် လူနေဧရိယာနှင့် မနီးမဝေးတွင်တည်ရှိပါသည်။ ခြောက်သွေ့ရာသီအတွက် ပိန္နဲ တောင်ကျေးရွာ၊ တုံးပျောကြီးကျေးရွာ၊ ဆင်ဒင်/ပြင်ဝန်းကျေးရွာနှင့် အရှေ့မော်တုံးကျေးရွာ

များအတွက် တိုင်းတာခဲ့သော နေ့အချိန် ဆူညံသံရလဒ်များမှာ အမျိုးသားပတ်ဝန်းကျင် အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်ပါ စံချိန်စံညွှန်းများ၏ အောက်တွင်သာ ရှိပါသည်။ သို့သော် ပသောင်းကျေးရွာအတွက်ရလဒ်မှာမူ အမျိုးသားပတ်ဝန်းကျင်အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်ထက် အနည်းငယ်ကျော်လွန်နေပါသည်။ အဆိုပါကျေးရွာများအတွက် တိုင်းတာခဲ့သော ညအချိန်ဆူညံသံရလဒ်များမှာမူ အမျိုးသားပတ်ဝန်းကျင်အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်ထက် အနည်းငယ် ကျော်လွန်နေပါသည်။ အဘယ့်ကြောင့်ဆိုသော် အဆိုပါ ကျေးရွာများတွင် တိုင်းတာခဲ့သောနေရာများအားလုံးမှာ လမ်းမကြီးများအနီး၊ လူနေဧရိယာနှင့် ဘုန်းတော်ကြီးကျောင်းများအနီး တည်ရှိနေသောကြောင့်ဖြစ်ပါသည်။ ထို့အပြင် အဆိုပါ ကျေးရွာများအားလုံးတွင် အသံချဲ့စက်များနှင့်ရုပ်မြင်သံကြားစက်များလည်း အသုံးပြုကြပါသည်။

စိုစွတ်ရာသီအတွက် အဆိုပြုစီမံကိန်းတည်နေရာများဖြစ်သော ပိန္နဲတောင်ကျေးရွာ၊ မဇောကျေးရွာ၊ တုံးပျောကြီးကျေးရွာ၊ ဆင်ဒင်/ပြင်ဝန်းကျေးရွာ၊ နှင့် အရှေ့မော်တုံးကျေးရွာများတွင် နေ့အချိန်နှင့် ညအချိန် ဆူညံသံတိုင်းတာမှုရလဒ်များမှာ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များထက် အနည်းငယ်ကျော်လွန်နေပါသည်။ အဘယ့်ကြောင့်ဆိုသော် ဆူညံသံတိုင်းတာသည့်နေရာများမှာ မြိတ်-ကော့သောင်းအဝေးပြေးလမ်းမကြီးဘေးတွင် တည်ရှိနေသောကြောင့် ဖြစ်ပါသည်။ ထို့ကြောင့် အဆိုပါလမ်းမကြီးတွင် အဝေးပြေးကားကြီးများနှင့် မော်တော်ဆိုင်ကယ်များ ပိုမိုများပြားစွာဖြတ်သန်းသွားလာလျက်ရှိပါသည်။ ဆူညံသံတိုင်းတာခဲ့သည့် နေရာများအားလုံးသည် လမ်းမကြီးများ၊ လူနေအိမ်များနှင့် ဘုန်းတော်ကြီးကျောင်းများ အနီးအနားတွင် တည်ရှိပါသည်။ ထို့အပြင် အဆိုပါကျေးရွာများအားလုံးတွင်အသံချဲ့စက်များနှင့် ရုပ်မြင်သံကြားစက်များလည်း အသုံးပြုပါသည်။

စိုစွတ်ရာသီအတွက် တိုင်းတာရရှိသောတန်ဖိုးများမှာ ခြောက်သွေ့ရာသီတန်ဖိုးများထက် ပိုပါသည်။ အဘယ့်ကြောင့်ဆိုသော် စိုစွတ်ရာသီတွင် မိုးရွာသွန်းသံများနှင့် မိုးခြိမ်းသံများ ဖြစ်ပေါ်သောကြောင့် ဖြစ်ပါသည်။ ထို့အပြင် အဆိုပါကာလသည် ကမ္ဘာ့ကူးစက်ရောဂါ ကိုဗစ် ၁၉ ကူးစက်ပျံ့ပွားနေသော ကာလဖြစ်သောကြောင့် ဒေသဆိုင်ရာတာဝန်ရှိသူများမှ ကူးစက်ရောဂါထိန်းချုပ်ကာကွယ်ရေးနည်းလမ်းများနှင့်အကြံပြုချက်များကို အသံချဲ့စက်များ အသုံးပြုကြေငြာခဲ့ခြင်းများလည်း ရှိပါသည်။ အဆိုပါအချက်များအပြင် ဖြစ်နိုင်ခြေရှိသော နောက်တစ်ချက်မှာ ကျေးရွာများရှိ တချို့အိမ်များသည် ငှက်သိုက်ထုတ်လုပ်ရေးအတွက် ငှက်အော်သံစက်များကို ဖွင့်ထားသောကြောင့်လည်း ပါဝင်နိုင်ပါသည်။

မြန်မာနိုင်ငံတွင် တုန်ခါမှုဆိုင်ရာ ထုတ်ပြန်ထားသော တရားဝင်လမ်းညွှန်ချက်များ မရှိပါ။ ထို့ကြောင့် ဂျပန်တုန်ခါမှုလမ်းညွှန်ချက်များကို ယခုစီမံကိန်း၏ လက်ရှိတုန်ခါမှုရလဒ်များကို ဆန်းစစ် လေ့လာရန် အသုံးပြုထားပါသည်။ အဆိုပါရလဒ်များသည် ဂျပန်တုန်ခါမှုလမ်းညွှန်ချက်များအတွင်း ရှိပါသည်။

ရေနမူနာကောက်ယူသည့် တည်နေရာအားလုံး၏ ရလဒ်များကို အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု)လမ်းညွှန်ချက်များနှင့် ရေအောက်နေ သက်ရှိများ ကာကွယ်ရေး အတွက် ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင် ရေအရည်အသွေး လမ်းညွှန်ချက်များနှင့် နှိုင်းယှဉ်ဖော် ပြထားပါသည်။ ယေဘုယျအားဖြင့် ဆန်းစစ်ထားသော ပါရာမီတာများ၏ ဓါတ်ခွဲခန်းရလဒ်များသည် အမျိုးသားရေ အရည်အသွေး လမ်းညွှန်ချက်များအတွင်း ရှိနေပါသည်။

မြန်မာနိုင်ငံတွင် လက်ရှိအချိန်အထိ မြေဆီလွှာတွင် ပါဝင်သော သတ္တုနှင့်သတ္တုစပ်များ၏ နောက်ခံ တန်ဖိုးများ သတ်မှတ်ခြင်းနှင့် စပ်လျဉ်းသော အစိုးရလမ်းညွှန်ချက်များမရှိသေးပါ။ နိုင်ငံတကာတွင်မူ သဘာဝမြေဆီလွှာတွင် သဘာဝနောက်ခံပါဝင်မှုများသတ်မှတ်ချက်ကို သက်ဆိုင်ရာ အမျိုးသား လမ်းညွှန်ချက်များဖြင့် အသီးသီးအသုံးပြုကြပါသည်။ နောက်ခံပါဝင်မှုများသတ်မှတ်ခြင်းအတွက် အဆင့်ဆင့်ချဉ်းကပ်မှုများတွင် အချက်အလက်များစုဆောင်းခြင်း၊ အဆိုပါအချက်အလက်များကို စနစ်တကျ ခွဲခြမ်းစိတ်ဖြာခြင်းနှင့် နောက်ခံတန်ဖိုးများသတ်မှတ်ခြင်းတို့ ပါဝင်ပါသည်။ ယခု အစီရင်ခံစာတွင် အခြေခံမြေဆီလွှာပါဝင်မှုတန်ဖိုးကောက်ယူခြင်းကို ရှိရင်းစွဲပတ်ဝန်းကျင် အခြေ အနေ၏ မြေဆီလွှာအရည်အသွေးကို သိရှိနားလည်စေရန်အတွက် ရည်ရွယ်ကောက်ယူခဲ့ခြင်း ပါသည်။

ထို့အပြင် ဇီဝမျိုးစုံမျိုးကွဲဆိုင်ရာကွင်းဆင်းလေ့လာကောက်ယူမှုရလဒ်များ၊ လူမှုစီးပွားရေးအခြေအနေ ကွင်းဆင်းလေ့လာကောက်ယူမှုရလဒ်များနှင့် မြို့နယ်ဆိုင်ရာအချက်အလက်များကိုလည်း ယခုအခန်းတွင် အသေးစိတ်တင်ပြထားပါသည်။ **(အသေးစိတ်ကို အခန်း ၅ တွင် ပြည့်စုံစွာ ဖော်ပြ ထားပါသည်။)**

ယခုပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် အဆိုပြုစီမံကိန်းကြောင့် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ၏ သိသာထင်ရှားမှုကို ဆန်းစစ်နိုင်ရန်အလို့ငှာ သင့်လျော်သောချဉ်းကပ်မှုနှင့် နည်းစနစ်ကို အသုံးပြုထားပါသည်။ အဆိုပါဆန်းစစ်မှုတွင် အဆိုပြုစီမံကိန်းဖွံ့ဖြိုးမှုနှင့် ဆက်နွယ် နေသော ပတ်ဝန်းကျင်နှင့် လူမှုရေးအခြေအနေအပေါ် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများကို သုံးသပ်ခြင်း၊ အမျိုးအစားခွဲခြားခြင်းနှင့် ဆန်းစစ်ခြင်းတို့လည်း ပါဝင်ပါသည်။

အဆိုပြုစီမံကိန်း၏ ဖြစ်နိုင်ခြေရှိသော ပတ်ဝန်းကျင်ဆိုင်ရာသက်ရောက်မှုများကို ဆန်းစစ်နိုင်ရန် အတွက် အောက်ဖော်ပြပါ အဆင့်ခွဲခြားခြင်းနည်းစနစ်ကို အသုံးပြုထားပါသည်။ သက်ရောက်မှု တစ်ခုချင်းစီ၏ ရင်းမြစ်ကို ပမာဏ၊ ကြာချိန်၊ ပြင်းအားနှင့် ဖြစ်တန်စွမ်းဟူသော ပါရာမီတာ လေးမျိုးဖြင့် ဆန်းစစ်ထားပါသည်။

ဆန်းစစ်ခြင်း	အဆင့်				
	၁	၂	၃	၄	၅
ပမာဏ (M)	သိသာထင်ရှားမှု မရှိ	လုပ်ငန်းခွင် ပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု အနည်းငယ်ရှိ နှင့် ပြောင်းလဲမှု မရှိ	လုပ်ငန်းခွင် ပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု အလယ် အလတ်နှင့် ပြောင်းလဲမှု အနည်းငယ် ရှိ	လုပ်ငန်းခွင် ပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု မြင့် နှင့် ပြောင်းလဲမှု သိသာ ထင်ရှား	လုပ်ငန်းခွင် ပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု အလွန်မြင့်နှင့် လုံးဝ ပြောင်းလဲမှု ဖြစ်
ကြာချိန် (D)	၀-၁ နှစ်	၂-၅ နှစ်	၆-၁၅ နှစ်	စီမံကိန်း လည်ပတ်ချိန်	ပိတ်သိမ်းပြီး ချိန်ထိ
ပြင်းအား (E)	စီမံကိန်း ဧရိယာ အတွင်းသာ	စီမံကိန်း ဒေသတွင်းသာ	ဒေသတွင်း	နိုင်ငံ အဆင့်	နိုင်ငံတကာ အဆင့်
ဖြစ်တန်စွမ်း (P)	ဖြစ်တန်စွမ်း အလွန်နည်း	ဖြစ်တန်စွမ်း နည်း	ဖြစ်တန်စွမ်း ရှိ	ဖြစ်တန်စွမ်း မြင့်	ဖြစ်တန်စွမ်း သေချာ

သိသာထင်ရှားမှုအမှတ် = (ပမာဏ+ ကြာချိန်+ ပြင်းအား) * ဖြစ်တန်စွမ်း

သက်ရောက်မှုသိသာထင်ရှားခြင်း - တွက်ချက်ရသော သိသာထင်ရှားမှုအမှတ်အပေါ် အခြေခံပြီး သက်ရောက်မှုများ၏ သိသာထင်ရှားမှုကို အောက်ပါအတိုင်း ခွဲခြားသတ်မှတ်နိုင်ပါသည်။

သက်ရောက်မှု သိသာထင်ရှားမှု အမှတ် (SP)	သက်ရောက်မှု အဆင့်
<၁၅	အလွန်နိမ့်
၁၅-၂၉	နိမ့်
၃၀-၄၄	အလယ်အလတ်
၄၅-၅၉	မြင့်
>၆၀	အလွန်မြင့်

သက်ရောက်မှုဆန်းစစ်ခြင်းများကို အဆိုပြုစီမံကိန်းတည်နေရာတစ်ခုစီ၏ အချင်းဝက် မီတာ ၅၀၀ အတွင်း ဆောင်ရွက်ထားပါသည်။

ရေပေးဝေရေးစီမံကိန်းတစ်ခုအနေဖြင့် တည်ဆောက်ရေးနှင့် လည်ပတ်ရေးကာလများ အတွင်း ကောင်းကျိုးဖြစ်ပေါ်စေမှုများနှင့်အတူ သက်ရောက်မှုအချို့ကိုလည်း ဖြစ်ပေါ်စေနိုင်သည့် စီမံကိန်း ဆောင်ရွက်မှုများရှိပါသည်။ ပတ်ဝန်းကျင်၊ ဇီဝမျိုးစုံမျိုးကွဲ၊ လူမှုစီးပွားရေးစသည့် အခြေအနေများကို စီမံကိန်းအကြောင်းအရာနှင့် စီမံကိန်းဧရိယာအနီးဝန်းကျင်တစ်ခုလုံး၏ ပတ်ဝန်းကျင်နှင့်လူမှုရေး အခြေအနေများကို မူတည်ပြီး ခွဲခြားခြင်း၊ ဆန်းစစ်ခြင်းနှင့် သတ်မှတ်ခြင်းများ ဆောင်ရွက် ထားပါသည်။

စီမံကိန်းအကောင်အထည်ဖော်ခြင်းကြောင့် စီမံကိန်းဧရိယာ၏အနီးဝန်းကျင်တွင် ကောင်းကျိုးနှင့် ဆိုးကျိုးသက်ရောက်မှုများ ရှိနိုင်ပါသည်။ ဖြစ်နိုင်ခြေရှိသော ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှု များကို ပတ်ဝန်းကျင်ဆိုင်ရာရှိရင်းစွဲ အချက်အလက်များနှင့် စီမံကိန်းဆောင်ရွက်မှုများကို လေ့လာ ဆန်းစစ်ခြင်းအား အခြေခံပြီး ခွဲခြားဖော်ထုတ်ထားပါသည်။ ဖော်ထုတ်ထားသော သက်ရောက်မှု အများစုကို တန်ဖိုးအကဲဖြတ်ခြင်းနှင့် ဖြစ်တန်စွမ်းဖြင့် အဆင့်သတ်မှတ်ထားပါသည်။ ပတ်ဝန်းကျင် ဆိုင်ရာ ကိစ္စရပ်တစ်ခုချင်းစီကို ၎င်းတို့၏ လက်ရှိအခြေအနေများ၊ တည်ဆောက်ခြင်းနှင့် လည်ပတ်ခြင်းကာလများတွင် ဖြစ်နိုင်သော သက်ရောက်မှုများပေါ် မူတည်ပြီး လေ့လာဆန်းစစ် ဖော်ထုတ်ထားပါသည်။

ယခု ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် အဆိုပြုစီမံကိန်းအတွက် သက်ရောက်မှု ဆန်းစစ်ခြင်းကို ဆောင်ရွက်ထားပါသည်။ အဆိုပြုစီမံကိန်း၏ စီမံကိန်းဆောင်ရွက်မှုအသီးသီးမှ ဖြစ်ပေါ်လာနိုင်သောပတ်ဝန်းကျင်ဆိုင်ရာသက်ရောက်မှုများကိုအောက်ပါအတိုင်းခွဲခြား ထားပါသည်။

(၁) မြေအပေါ်သက်ရောက်မှုများ - မြေရယူခြင်း၊ မြေအသုံးချခြင်း၊ မြေပြိုကျခြင်း

(၂) ပတ်ဝန်းကျင်ရင်းမြစ်များအပေါ်သက်ရောက်မှုများ - လေအရည်အသွေး၊ ဆူညံသံနှင့်တုန်ခါမှု၊ ရေအရည်အသွေး၊ မြေဆီလွှာအရည်အသွေး

(၃) ဂေဟစနစ်ရင်းမြစ်များအပေါ်သက်ရောက်မှုများ - ကာကွယ်ရေးရိယာများ၊ ဇီဝမျိုးစုံမျိုးကွဲများ၊ လေဗေဒ

(၄) လူသားများအပေါ်သက်ရောက်မှုများ - ပြန်လည်နေရာချခြင်း၊ လူနေမှုအဆင့်အတန်းနှင့် အသက်မွေးဝမ်းကျောင်း၊ အမွေအနှစ်၊ မြေရှုခင်း၊ တိုင်းရင်းသားလူနည်းစုများနှင့် ဌာနေအုပ်စုများ၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး

(၅) အမှိုက်စွန့်ပစ်မှု - အစိုင်အခဲစွန့်ပစ်မှု၊ အရည်စွန့်ပစ်မှု၊ ဘေးအန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်း ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများဖော်ထုတ်ခြင်းနှင့် အဆိုပါသက်ရောက်မှုများအတွက် အဆိုပြု လျှော့ချရေးနည်းလမ်းများကို ယခုအခန်းတွင် စီမံကိန်းအဆင့်အလိုက် ပြည့်စုံစွာဖော်ပြထားပါသည်။

(အသေးစိတ်ကို အခန်း ၆ တွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။)

ဆက်စပ်သက်ရောက်မှုများသည် သက်ရောက်မှုတစ်ခု၊ စီမံကိန်းတစ်ခု သို့မဟုတ် လှုပ်ရှားမှုတစ်ခုနှင့် အခြားတည်ရှိနေသော၊ စီစဉ်ထားသော၊ ကျိုးကြောင်းဆီလျော်စွာ မျှော်လင့်ထားသော အနာဂတ်တွင် ဖြစ်ပေါ်လာနိုင်သော အခြေအနေများ ပေါင်းစပ်မိသောကြောင့် ပေါ်ပေါက်လာနိုင်သည့် တစ်ခုပြီး တစ်ခု ဖြစ်သော၊ တိုးမြှင့်လာသော နှင့်/သို့မဟုတ် ပေါင်းစပ်လာနိုင်သော သက်ရောက်မှုများ ဖြစ်ပါ သည်။ လက်တွေ့ကျသော အကြောင်းပြချက်များအရ ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ် သတ်မှတ်ခြင်း နှင့် စီမံခန့်ခွဲခြင်းသည် အကန့်အသတ်ရှိပါသည်။ အဘယ့်ကြောင့်ဆိုသော် သိပ္ပံ နည်းကျစိုးရိမ်ခြင်းများနှင့် သက်ရောက်ခံရသောလူမှုအသိုင်းအဝိုင်း၏ စိုးရိမ်ခြင်းများကြောင့် အဆိုပါ သက်ရောက်မှုများကိုလည်း အရေးကြီးသည်ဟု ယေဘုယျအားဖြင့် သတ်မှတ်ကြပါသည်။

စီမံကိန်းအကြောင်းအရာဖော်ပြချက်အခန်းတွင် ဖော်ပြထားသကဲ့သို့ အဆိုပြုစီမံကိန်း၏ အဓိက တည်နေရာများသည် မြိတ်-တနင်္သာရီ အဝေးပြေးလမ်းတစ်လျှောက် မြိတ်မြို့နယ် နှင့် တနင်္သာရီမြို့နယ်များ၏ ကျေးလက်ဒေသတွင် တည်ရှိပါသည်။ ယေဘုယျအားဖြင့် အဆိုပြု စီမံကိန်း ရေရိယာများအနီးတွင် သိသာထင်ရှားသည့် လက်ရှိ သို့မဟုတ် အတည်ပြုထားသည့် အခြား စီမံကိန်း

ကြီးများ မရှိပါ။ အေးရှားဝေါလ်ဆီအုန်းစက်ရုံသည် အထက်ပါအဝေးပြေးလမ်းဘေးရှိ အနောက် ကုန်းမော်ကျေးရွာတွင် တည်ရှိပါသည်။ သို့သော် ထိုစက်ရုံနှင့်အဆိုပြုစီမံကိန်း တည်နေရာများသည် ကွာဝေးပါသည်။ ထို့ပြင် အခြား ဆက်စပ်နေသောစီမံကိန်းများနှင့် ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်နိုင်ရန် သတင်းအချက်အလက်များမှာလည်း အနည်းငယ်သာ ရှိပါသည်။

ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်းကို အောက်ပါအဆင့်များအတိုင်းဆောင်ရွက်ထားပါသည်။ စီမံကိန်းဧရိယာအတွင်း အဆိုပြုထားသော သို့မဟုတ် မကြာခင်ကအတည်ပြုထားသော်လည်း လည်ပတ်ခြင်း မရှိသေးသော စီမံကိန်းများနှင့် တည်ရှိနေသော်လည်း လည်ပတ်ခြင်းမရှိသေးသော လုပ်ငန်းများအဖြစ် သတ်မှတ်ထားပါသည်။ တည်နေရာအကွာအဝေးအရ မီတာ ၅၀၀ ကို ဆက်စပ် သက်ရောက်မှုဆန်းစစ်ခြင်းအတွက် အသုံးပြုထားပါသည်။ တည်ရှိသောစီမံကိန်းများသည် အဆိုပြု စီမံကိန်းဧရိယာနှင့် ကွာဝေးနေသောအခါ ဆက်စပ်သက်ရောက်မှုများသည်လည်း သိသာထင်ရှားမှု မရှိပါ။

စီမံကိန်းအစပြုခြင်းအတွက် အသုံးပြုထားသောအချိန်ဇယားကိုလည်း သတ်မှတ်ထားပါသည်။ စီမံကိန်းများအတွက် လည်ပတ်မည့်အချိန်ဇယားများသည် ထပ်နေခြင်းမရှိသောကြောင့် ဖြစ်နိုင်ခြေ ရှိသော ဆက်စပ်သက်ရောက်မှုများသည် သိသာထင်ရှားခြင်းမရှိပါ။

ယေဘုယျအားဖြင့် လက်ရှိတည်ရှိနေသော အေးရှားဝေါလ်ဆီအုန်းစက်ရုံနှင့် ဆက်နွယ်နေသည့် အဆိုပြုစီမံကိန်း၏ ဆက်စပ်သက်ရောက်မှုများသည် နိမ့်သောသက်ရောက်မှုအဖြစ် သတ်မှတ်နိုင် ပါသည်။

ထို့အပြင် တနင်္သာရီမြစ်အထက်ဖက်ခြမ်းရှိ တရားမဝင်ရွှေထုတ်လုပ်ရေးလုပ်ငန်းများသည်လည်း မြစ်၏ရေအရည်အသွေးကို သက်ရောက်နိုင်ပါသည်။ အလားတူ မြစ်ကမ်းပါးတစ်လျှောက်ရှိ လူနေ အိမ်ခြေအချို့သည်လည်း စနစ်မကျသော မိလ္လာစနစ်ကို ယခုထက်အသုံးပြုနေသေးပါသည်။ အထက်ပါအချက်များသည် အဆိုပြုစီမံကိန်းအတွက် အခြားဆက်စပ်သက်ရောက်မှုများ ဖြစ်ပါသည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်းအနေဖြင့် ၎င်းတို့ ဖြန့်ဝေမည့်ရေအရည်အသွေးကို စဉ်ဆက်မပြတ် စောင့်ကြပ်ကြည့်ရှုမည့်စနစ်တစ်ရပ် အကောင်အထည်ဖော်သွားရမည်ဖြစ်ပါသည်။ **(အသေးစိတ်ကို အခန်း ၇ တွင် ပြည့်စုံစွာ ဖော်ပြ ထားပါသည်။)**

စီမံကိန်းဧရိယာအတွင်း ရေရှည်တည်တံ့ခိုင်မြဲသောဖွံ့ဖြိုးတိုးတက်မှုကို အာမခံစေနိုင်ရန်အတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်လိုအပ်ပါသည်။ ထို့ကြောင့် သိပ္ပံနည်းကျဆန်းစစ်မှုနှင့် ကျွမ်းကျင်မှု ဆိုင်ရာ အကဲဖြတ်မှုများကို အခြေခံထားသော သက်ရောက်မှုသတ်မှတ်ခြင်းနှင့် အဆင့်သတ်မှတ်ခြင်း

တို့ကို အခန်း (၆) တွင်ဖော်ပြထားပြီးဖြစ်သော်လည်း ယခုအခန်းတွင်စီမံခန့်ခွဲမှုအစီအစဉ် အပြည့် အစုံကို ထပ်မံအလေးထားဖော်ပြထားပါသည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၏ ရည်ရွယ်ချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

- အဆိုပြုစီမံကိန်းအကောင်အထည်ဖော်မှုများကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများကို ခွဲခြားသတ်မှတ်ရန်၊
- အဆိုပါ သက်ရောက်မှုများကို အနည်းဆုံးဖြစ်စေမည့်၊ လျှော့ချနိုင်မည့်၊ စီမံခန့်ခွဲနိုင်မည့် နည်းလမ်း များကို ဖော်ထုတ်တင်ပြရန်၊
- ရေရှည်တည်တံ့ခိုင်မြဲနိုင်မည့်ဖွံ့ဖြိုးတိုးတက်မှုကို တာဝန်ရှိမှု၊ တာဝန်ခံမှုရှိရှိ အကောင်အထည် ဖော်ရန်။

ယခုအခန်းတွင် အဆိုပြုစီမံကိန်းအကောင်အထည်ဖော်မှုများကြောင့် ဆက်နွယ် ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်ဆိုင်ရာသက်ရောက်မှုများကို အဆိုပြုလျှော့ချရေးနည်းလမ်းများ၊ တာဝန်ယူရမည့် အဖွဲ့ အစည်းများနှင့်အတူ အဆိုပြုစီမံကိန်း၏ တည်ဆောက်ရေးနှင့် လည်ပတ်ရေးကာလများအတွက် ဆန်းစစ်ထုတ်ဖော်တင်ပြထားပါသည်။

သဘာဝကြောင့်ဖြစ်စေ၊ လူသားကြောင့်များဖြစ်စေ ပြောင်းလဲနိုင်သော ပြောင်းလဲမှုများအားလုံးကို အချက်အလက်များအနေဖြင့် အစဉ်မှတ်ယူဖော်ပြနိုင်ခြင်းမရှိသောကြောင့် ပတ်ဝန်းကျင်ပြောင်းလဲမှု များကို မှတ်တမ်းတင်နိုင်ရန် ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များကို ပုံမှန်စောင့်ကြပ် ကြည့်ရှုမည့် အစီအစဉ်တစ်ရပ် မဖြစ်မနေလိုအပ်ပါသည်။

ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုခြင်း၏ ရည်ရွယ်ချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

- ထိန်းချုပ်လျှော့ချမည့် နည်းလမ်းများ၏ အသုံးဝင်မှုကို ဆန်းစစ် စစ်ဆေးရန်၊
- လိုအပ်မည့်နည်းလမ်းများကို ထပ်မံထည့်သွင်းဆောင်ရွက်နိုင်ရန်အတွက် ပြောင်းလဲမှုများကို စုံစမ်း ဖော်ထုတ်ရန်၊
- အနာဂတ်စီမံကိန်း၏ ထိခိုက်မှုဆန်းစစ်ခြင်းလေ့လာမှုများအတွက် အချက်အလက်စုစည်းမှု တည်ဆောက်ရန်။

အဆိုပြုပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ထိရောက်စွာအကောင်အထည်ဖော်နိုင်ရန် အမျိုးမျိုး သော စီမံကိန်းနှင့်သက်ဆိုင်သူများ၏ တာဝန်ဝတ္တရားများကို သတ်မှတ်ခွဲခြားထားရန် လိုအပ်

ပါသည်။ အဆိုပါ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို အကောင်အထည်ဖော်ရာတွင် အောက်ပါ အဖွဲ့အစည်းများ ပါဝင်ရန် လိုအပ်ပါသည်။

- BBWI&MCPC ကုမ္ပဏီလီမိတက်
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
- ပတ်ဝန်းကျင်ဆိုင်ရာအကြံပေးတတိယအဖွဲ့အစည်း

ထို့အပြင် ဒေသဆိုင်ရာတာဝန်ရှိသူများ၊ ဒေသခံပြည်သူများ (အထူးသဖြင့် စီမံကိန်းဧရိယာတွင် နေထိုင်သော) နှင့် ပူးပေါင်းဆောင်ရွက်ခြင်းသည်လည်း အဆိုပြုအစီအစဉ်များကို အောင်မြင်စွာ အကောင်အထည် ဖော်နိုင်ရန်အတွက် အထူးအရေးကြီးပါသည်။

အထက်ပါ အချက်များအပြင် စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်အတွက် အဆိုပြုတည်နေရာများ၊ အဆိုပြုပါရာမီတာများ၊ ခန့်မှန်းကုန်ကျငွေများနှင့် တာဝန်ယူရမည့်အဖွဲ့အစည်းများကိုလည်း တည်နေရာပြမြေပုံများနှင့်တကွ ဖော်ပြထားပါသည်။ ထို့အပြင် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်၊ အရေးပေါ်အခြေအနေတုံ့ပြန်ရေးအစီအစဉ်၊ စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲရေးအစီအစဉ်၊ မကျေလည်မှုများဖြေရှင်းရေးယန္တရား၊ နှင့် လူမှုစီးပွားအကျိုးပြု အစီအစဉ် များကိုလည်း ယခုအခန်းတွင် ဖော်ပြထားပါသည်။ **(အသေးစိတ်ကို အခန်း ၈ တွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။)**

ယခုပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်တွင် အဆိုပြုစီမံကိန်းအနေဖြင့် အများပြည်သူနှင့် တွေ့ဆုံပွဲ အခမ်းအနားများကို မြိတ်နှင့်တနင်္သာရီမြို့နယ်များတွင် သက်ဆိုင်ရာ စီမံကိန်းနှင့် ပတ်သက်သူများ၊ စိတ်ပါဝင်စားသူများ၊ ဒေသခံပြည်သူများနှင့် ၂ ကြိမ်ကျင်းပရန် စီစဉ်ခဲ့ပါသည်။ သို့သော်ကမ္ဘာ့ကပ်ရောဂါ ကိုဗစ် ၁၉ ဖြစ်ပွားပျံ့နှံ့မှုအခြေအနေများအရ တနင်္သာရီမြို့နယ်တွင် ကျင်းပ ပြုလုပ်နိုင်ခဲ့ခြင်းမရှိပါ။ ထို့ကြောင့် အဆိုပြုစီမံကိန်းအနေဖြင့် ကမ္ဘာ့ကပ်ရောဂါ ကိုဗစ် ၁၉ ကူးစက် ပျံ့နှံ့မှုအန္တရာယ် လျော့ချနိုင်ရန်အလို့ငှာ အများပြည်သူနှင့်တွေ့ဆုံပွဲအခမ်းအနားကို မြိတ်မြို့နယ် တွင်သာ မြိတ်နှင့်တနင်္သာရီမြို့နယ်လုံးမှ သက်ဆိုင်သူများကို ဖိတ်ကြားခြင်းဖြင့် ကျင်းပ ပြုလုပ်ခဲ့ပါသည်။ ယခုအစီရင်ခံစာတွင် သက်ဆိုင်ရာစီမံကိန်းနှင့်ပတ်သက်ဆက်နွယ်သူများ၏ အမြင် များ၊ ထင်မြင်ယူဆချက်များ၊ နှင့် အကြံပြုချက်များကို ပြည့်စုံစွာတင်ပြနိုင်ရန်အတွက် အများ ပြည်သူနှင့် တွေ့ဆုံပွဲအခမ်းအနားမှ ရလဒ်များနှင့် လူမှုစီးပွားရေးအခြေအနေ စစ်တမ်းကောက်ယူမှု ရလဒ်များကိုပါ ဖော်ပြထားပါသည်။

မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်း ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်၏ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း အခမ်းအနားကို တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်မြို့နယ်ရှိ မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သော ကုမ္ပဏီ လီမိတက်ရုံးချုပ်၊ အစည်းအဝေးခန်းမ၌ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ ၂၁ ရက်နေ့တွင် ကျင်းပပြုလုပ်ခဲ့ ပါသည်။ ဌာနဆိုင်ရာတာဝန်ရှိသူများ၊ အစိုးရမဟုတ်သောအဖွဲ့အစည်းများ၊ သတင်းမီဒီယာများနှင့် စီမံကိန်းဧရိယာရှိ ဒေသခံပြည်သူများကို အစည်းအဝေးမတိုင်ခင်တွင် ဖိတ်ကြားလွှာများ ပေးပို့ ဖိတ်ကြားခဲ့ပါသည်။ အဆိုပါ အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်း အခမ်းအနားသို့ ဌာနဆိုင်ရာတာဝန်ရှိသူများ၊ ကုမ္ပဏီတာဝန်ရှိသူများနှင့် ဒေသခံပြည်သူများအပါအဝင် စုစုပေါင်း ၁၅၉ ယောက် တက်ရောက်ခဲ့ပါသည်။

မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်း ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်၏ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း အခမ်းအနားကို အောက်ပါ အခမ်းအနားအစီအစဉ်များအတိုင်း ကျင်းပပြုလုပ်ခဲ့ပါသည်။

၁။ တက်ရောက်သူများမှတ်တမ်းတင်ခြင်း

၂။ တနင်္သာရီတိုင်းဒေသကြီးအစိုးရ၊ တိုင်းရင်းသားရေးရာဝန်ကြီး ဦးစောမာတင်လူသာမှ အဖွင့် မိန့်ခွန်း ပြောကြားခြင်း

၃။ မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်၊ ဒုတိယအထွေထွေမန်နေဂျာ ဦးကျော်မျိုးပိုင်မှ အဆိုပြုစီမံကိန်းအကြောင်းအရာ အကျဉ်းချုပ်တင်ပြခြင်း

၄။ အီးဂတ်ပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှုကုမ္ပဏီလီမိတက်၊ အုပ်ချုပ်မှုဒါရိုက်တာ ဦးအေးသီဟမှ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းဆိုင်ရာဆောင်ရွက်နေမှုများအား ရှင်းလင်းတင်ပြခြင်း

၅။ တက်ရောက်လာသူများမှ အမြင်ချင်းဖလှယ်ဆွေးနွေးခြင်း၊ သိရှိလိုသည်များကို မေးမြန်းခြင်း၊ အကြံပြုခြင်း

၆။ အခမ်းအနားပြီးဆုံးကြောင်းနှင့် နိဂုံးချုပ်ကျေးဇူးတင်စကားပြောကြားခြင်း။

အဆိုပါအခမ်းအနားတွင် ရှင်းလင်းတင်ပြခဲ့သော ရှင်းလင်းမှုများ၊ အမြင်ဖလှယ်မှုများ၊ မေးခွန်းနှင့် အဖြေများ၊ ဆွေးနွေးမှုများ၊ တက်ရောက်သူစာရင်းများနှင့် ထုတ်ဖော်ကြေငြာမည့်နည်းလမ်းများကို ယခုအစီရင်ခံစာတွင် အသေးစိတ်ဖော်ပြ ထားပါသည်။ (အသေးစိတ်ကို အခန်း ၉ တွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။)

ယေဘုယျအားဖြင့် အဆိုပြုစီမံကိန်းသည် ဒေသဖွံ့ဖြိုးတိုးတက်ရေးအတွက် ကောင်းကျိုးများစွာ ဖန်တီးပေးနိုင်ပါသည်။ မြိတ်မြို့လူဦးရေသည် ၂၀၁၀ ခုနှစ်မတိုင်မီတွင် စက်မှုလုပ်ငန်း ဖွံ့ဖြိုး တိုးတက်လာခြင်းနှင့်မြို့ပြဖွံ့ဖြိုးတိုးတက်လာခြင်းကြောင့် ၃ ဆ အထိ တိုးတက်လာပါသည်။ ဒေသခံ ပြည်သူများ၏ လက်ရှိအဓိကရေအရင်းအမြစ်သည် မြေအောက်ရေဖြစ်ပါသည်။ သို့သော် ပင်လယ်ရေ များ တိုးဝင်ရောနှောလာမှုကြောင့် မြေအောက်ရေ၏ပမာဏနှင့်အရည်အသွေးပိုင်းဆိုင်ရာ ပြောင်းလဲမှုများ ရှိလာပါသည်။ အဆိုပြုစီမံကိန်းသည် တနင်္သာရီမြစ်မှ သဘာဝရေချိုအရင်းအမြစ် များကို အကျိုးရှိစွာအသုံးပြုသွားမည်ဖြစ်ပါသည်။ ဘရိုက်ဘလူးဝါးတားအင်တာနေရှင်နယ် ကုမ္ပဏီ လီမိတက်နှင့် မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်တို့ ပူးပေါင်းဖွဲ့စည်း ထားသည့် BBWI&MCPC ကုမ္ပဏီလီမိတက်သည် မြန်မာနိုင်ငံ၊ တနင်္သာရီဒေသတွင်း အများပြည်သူ အကျိုးပြု သန့်ရှင်းသောရေပေးဝေရေးစီမံကိန်း အကောင်အထည်ဖော်ရေးအတွက် ပူးပေါင်း ဆောင်ရွက်လျက်ရှိပါသည်။ အဆိုပြုစီမံကိန်းသည် သန့်ရှင်းသောရေထုတ်လုပ်ရယူရေး၊ ရေစီမံ ခန့်ခွဲမှုဆိုင်ရာဝန်ဆောင်မှုများနှင့် ပိုက်လိုင်းဖြန့်ဖြူးရေးစနစ်များ ဖွံ့ဖြိုးလာစေရန် ရည်ရွယ်ပါသည်။ အဆိုပြုစီမံကိန်းသည် လူနေဧရိယာများ၊ စည်ပင်သာယာရေးလုပ်ငန်းများနှင့် ရေလုပ်ငန်းနှင့် အစားအစာပြုပြင်ထုတ်လုပ်ရေးလုပ်ငန်းများ စသည့် စက်မှုလုပ်ငန်းများစွာအတွက် အရည်အသွေး မြင့်ရေကို စနစ်တကျဖြန့်ဖြူး ပေးသွားနိုင်ပါမည်။ အဆိုပါရေရှည်တည်တံ့ခိုင်မြဲသော အဆင့်မြင့် ရေပေးဝေရေးစနစ် တိုးတက်ဖွံ့ဖြိုးလာခြင်းသည် မြိတ်ဒေသတွင်း နိုင်ငံတကာနှင့် ပြည်တွင်း ရင်းနှီးမြုပ်နှံမှုများကို ပိုမိုဆွဲဆောင်လာနိုင်မည် ဖြစ်ပါသည်။

အဆိုပြုစီမံကိန်းသည် ဒေသတွင်းသိသာထင်ရှားသော ကောင်းကျိုးများစွာကို ဖြစ်ထွန်းစေနိုင် ပါသည်။ ဒေသခံပြည်သူများအနေဖြင့် စီမံကိန်းဖွံ့ဖြိုးမှုနှင့်ဆက်နွယ်ပြီး အမြဲတမ်းနှင့်ယာယီ အလုပ်အကိုင် အခွင့်အလမ်းများ ရရှိနိုင်ပါသည်။ လူမှုအကျိုးပြုအစီအစဉ်များသည်လည်း စီမံကိန်း ဒေသအတွင်း လူမှုရေးနှင့် စီးပွားရေးဖွံ့ဖြိုးတိုးတက်မှုများကို အထောက်အပံ့ပေးနိုင်ပါသည်။ ဒေသခံ ပြည်သူများနှင့်စီမံကိန်းအကြို ဆွေးနွေးညှိနှိုင်းမှုများအရ ဒေသခံပြည်သူအများစုသည် အဆိုပြု စီမံကိန်းကို ကြိုဆိုကြပြီး ဖြစ်နိုင်သမျှ အမြန်ဆုံးအကောင်အထည်ဖော်နိုင်ရန် ဆန္ဒပြုအားပေး ကြပါသည်။

စီမံကိန်းအဆိုပြုသူအနေဖြင့် ဥပဒေပိုင်းဆိုင်ရာလိုအပ်ချက်များနှင့် ဒေသတာဝန်ရှိသူများ၏ အကြံ ပြုချက်များနှင့်အညီ အခြားလိုအပ်သော လေ့လာဆန်းစစ်မှုများကို ဆောင်ရွက်သွားရပါမည်။ အဆိုပြုစီမံကိန်းအကောင်အထည်ဖော်မှုများကြောင့် ဖြစ်ပေါ်လာနိုင်သော ဒေသခံပြည်သူများ၏ စောဒကတက်မှုများကို ကျေလည်စွာဖြေရှင်းနိုင်ရေးအတွက် မကျေလည်မှုများဖြေရှင်းရေးယန္တရား

ကို ဒေသတာဝန်ရှိသူများနှင့် ပူးပေါင်းဆောင်ရွက်ပြီး တည်ထောင်သွားရပါမည်။ ထို့အပြင် စီမံကိန်း အဆိုပြုသူအနေဖြင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာနှင့် ပတ်ဝန်းကျင် စောင့်ကြပ် ကြည့်ရှုခြင်း အစီရင်ခံစာများအပါအဝင် ပတ်ဝန်းကျင်ဆိုင်ရာအစီရင်ခံစာများကို ပြည်သူလူထုထံ ပွင့်လင်းမြင်သာမှုရှိစွာ ထုတ်ပြန်ကြေငြာသွားရမည်ဖြစ်ပြီး အများပြည်သူ၏ အကြံပြုချက်များနှင့် တုံ့ပြန်မှုများကိုလည်း မှတ်တမ်းတင်ထားရမည်ဖြစ်ပါသည်။

ထို့ကြောင့် အဆိုပြုစီမံကိန်းသည် စီမံကိန်းဧရိယာ၏ ဒေသတွင်းအခြေခံလိုအပ်ချက် ဖြစ်နေသော ကြောင့် တာဝန်ယူမှု၊ တာဝန်ခံမှုရှိရှိ စနစ်တကျအကောင်အထည်ဖော်သင့်ပါသည်။ ထို့အပြင် စီမံကိန်းဧရိယာ၏ အဆိုပြုရေရှည်တည်တံ့ခိုင်မြဲသော အခြေခံအဆောက်အအုံဖွံ့ဖြိုးတိုးတက်မှုသည် ဒေသတွင်း လူမှုရေးနှင့်စီးပွားရေးဆိုင်ရာဖွံ့ဖြိုးတိုးတက်မှုကိုလည်း ဆောင်ကြဉ်းပေးနိုင်မည် ဖြစ်ပါသည်။ (အသေးစိတ်ကို အခန်း ၁၀ တွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။)

မြိတ်ခရိုင်၊ မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာကို အောက်ဖော်ပြပါ Download Link တွင် အလွယ်တကူရယူလေ့လာနိုင်ပါသည်။

[Myeik Water Distribution Project EIA Report Final](#)

Chapter 2. INTRODUCTION

Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI&MCPC) have signed the Memorandum of Understanding (MOU) with Tanintharyi Region Government for Feasibility Study of “**Water Distribution Project to Myeik Township, Myeik District**” on 31st October, 2019. According to this MOU, BBWI&MCPC have the responsibility to prepare Environmental Impact Assessment Study for the development of their proposed project. In addition, BBWI&MCPC officially submitted their Project Proposal to the Environmental Conservation Department to get environmental suggestion. ECD has officially replied that Environmental Impact Assessment will be required for the proposed project. This report is prepared for Environmental Impact Assessment of “**Water Distribution Project to Myeik Township, Myeik District**” by Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI&MCPC) to initiate the required processes under Environmental Impact Assessment Procedure (2015).

Therefore, as required by article (65) of the EIA procedure, the project proponent, Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI&MCPC) have to prepare the Environmental Impact Assessment study according to fulfill the requirement of Environmental Impact Assessment Procedure (2015). This EIA report has to submit Environmental Conservation Department (ECD), Ministry of Natural Resources and Environmental Conservation (MONREC), for review and approval of Environmental Compliance Certificate (ECC) with Myanmar’s Law and regulations.



Figure 2-1 Scale Model of Myeik Water Distribution Project

2.1 The EIA Requirements

According to the Myanmar Environmental Conservation Law (2012), Myanmar Environmental Conservation Rules (2014), Myanmar Environmental Impact Assessment Procedure (2015) and National Environmental Quality (Emission) Guidelines (2015) are

issued by the Ministry of Natural Resources and Environmental Conservation (MONREC). Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI&MCPC) have to prepare Environmental Impact Assessment (EIA) Report for their project implementation and have to submit to the Ministry of Natural Resources and Environmental Conservation (MONREC). On behalf of MONREC, the Environmental Conservation Department (ECD) is responsible for implementing National Environmental Policy, strategy, framework, planning and action plan for the integration of environmental consideration into the national sustainable development processes. Thus, the scoping report for the EIA had been submitted to ECD Head Office on April 2020. After reviewing on this scoping report, ECD suggested some comments on July, 2020 and these comments were revised and resubmitted on November, 2022. The scoping report got Approval on March, 2023.

2.2 EIA Objectives and Processes

The purposes of the Environmental Impact Assessment are

1. To define the study area, time boundaries, project implementation phase, and potential stakeholders
2. To initiate review of the regulations and standards and their context for full EIA project design and completion
3. To make a provisional identification of environmental and social impacts
4. To indicate required baseline data and information, and how it will be obtained
5. To provide an opportunity for consultants, relevant authorities, project proponents interested and affected parties to express their views and concerns regarding the proposal before an EIA proceeds and
6. To identify potentially affected communities and other stakeholders with an interest in the project.

The determination of the significant issues to be assessed for potential significant impacts will be determined through the primary and secondary data. Regarding the collection of primary data, baseline environmental data relating to physical, biological and socioeconomic sources are gathered by visiting to the project site, direct observation, sample survey and discussions with local people and relevant government departments. Data from the government relevant departments, ministries and research institutions are used as secondary data (reference material) in the preparation of the EIA report.

The field studies such as Environmental Quality Measurement, Biodiversity Survey, Socio-economic Survey, Focus Group Discussions, and Public Consultations, have been carried out by the E Guard Environmental Services Study Team, with well-experienced in conducting environmental assessments for industrial plants, infrastructure and development projects in Myanmar. The team conducted preliminary scoping, survey and assessment activities, and report writing. The significance and magnitude of impacts from construction and operation

stage are evaluated. For those impacts requiring mitigation, suitable measures are proposed in this EIA report to reduce impacts to within acceptable limits.

2.3 Structure of the Report

According to EIA Procedure (2015), the structure of EIA should include the followings;

1. Executive Summary
2. Introduction
3. Policy, Legal and Institutional Frame Work
4. Project Description and Alternative Selection
5. Description of the Surrounding Environment
6. Potential Impacts and Mitigation Measures
7. Cumulative Impact Assessment
8. Environmental Management Plan
9. Public Consultation and Disclosure
10. Conclusions and Recommendations

2.4 Identification of Organization for Environmental Impact Assessment (EIA) study

E Guard Environmental Services Co., Ltd., that is one of the leading environmental services in Myanmar, has carried out the scoping study and EIA report preparation for “**Water Distribution Project to Myeik Township, Myeik District**” in line with Myanmar Environmental Conservation Laws and Regulations. The core team members of the EIA study team are listed in Table 2-1 indicating their ECD Transitional Consultant Registration Numbers and the contact address are shown as follows:



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Mobile: +959 797005160

info@eguardservices.com

<http://www.eguardservices.com>

Table 2-1 Members of EIA Study Team

No.	Name	Position	Transitional Consultant Registration Numbers	Responsibilities
E Guard Environmental Services		EIA Organization	00028	
1.	U Aye Thiha	Team Leader	00106	Project Overall Supervision and Management, Natural Resources Management
2.	U Soe Min	Director	00067	Project Overall Supervision, Hydrologist, Water Resources Engineering
3.	Dr. Myint Oo	Advisor	-	Resources Assessment, Internal Review and Consulting
4.	U Si Thu Aung	Consultant	00261	Team Leader, Project Lead Consultant, Impact Assessment, Mitigation Measures, Environmental Engineering, Water Pollution Control, Stakeholders Engagement, EMP and EMoP, CIA
5.	Dr. Phyo Naing Zay	Health Consultant	00100	Health Impact Assessment
6.	Daw Yadanar Swam Htet Kyaw	Senior Consultant	00224	Project Management and compilation of the report
7.	Daw Thein Mwe Khin	Senior Consultant	00104	Social Consultant, Socio-economic Survey Analysis
8.	U Aung Si Thu Thein	Consultant	00281	Natural Resources Management, Ecosystem and Biodiversity, Soil Conservation, Land Use
9.	Daw May Pwint Phoo	Associate Consultant	00369	Urban Environmental Management
10.	Daw Ei Ei Phyoe	Project Assistant	-	Report Preparation, Mitigation Measures, Civil Engineering, Site Visit

11.	Daw Thian Rem Mawi	Project Assistant	-	Report Preparation, Mitigation Measures, Civil Engineering
12.	Daw Hay Marn Hnin	Environmental Specialist	00278	Flora
13.	Daw Htet Shwe Sin Aung	Assistant Consultant	00266	Fauna, Socio-economic Survey
14.	U Aung Moe Oo	Assistant Consultant	00336	Environmental Quality Measurement Team Leader
15.	Daw May Thu Win	Assistant Consultant	00380	Legal Expert
16.	U Than Htike Zaw	Project Assistant	-	Report Preparation, Secondary Data, Environmental Management Plan
17.	U Myo Thu Ya	Project Assistant	-	Social Expert
18.	U Wunna Zaw	Surveyor	-	Environmental Quality Measurement

2.5 Expertise of Study Team Members

E Guard Environmental Services has prepared this EIA report with the following study team members. Their roles and responsibilities in preparing this report are already presented in above Table 2.1.

U Aye Thiha (Managing Director)

Since the establishment of E Guard Environmental Services, U Aye Thiha is working as Managing Director. He got his Bachelor Degree from University of Yezin since 1995. Furthermore, he got his Natural Resources Management Master Degree from Asia Institute of Technology. He also received Master of Business of Administration from Yangon University of Economic in 2018. He also got Diploma in Computer Science from University of Yangon. He managed and implemented numerous projects (including local and foreign funded development as well as investment projects). At E Guard, he is responsible for cost estimation, contracting, staff recruitment, etc.

U Soe Min (Director)

U Soe Min is a civil, water resources and environmental engineer with over 20 years of working experiences for government and private organizations. He holds Bachelor of Civil Engineering from (RIT), Yangon and Master of Environmental Engineering from (AIT), Bangkok, Thailand. He had experiences of local and international practices on construction management; contractual works; environmental equipment sales, services and marketing; and environmental consulting services. As a facilitator, he has facilitated various stakeholders meeting at the levels of union, states & regions, townships, and village tracks engaged accordingly as stipulated in MONREC, ECD's procedures. He has involved in various EIA

projects SHM meetings including special economic zones developments, water way dredging, off-shore oil & gas exploration, hydropower, mining, transportation, ports, building constructions and various industries developments. He had worked for ADB and WB as a National Consultant for environmental safeguard capacity building program. He has been working as a National Environmental Consultant for infrastructure projects funded by ADB and JICA in Myanmar. He involves in several EIA projects representing E Guard as a team leader, an environmental specialist and a civil engineer.

Dr. Myint Oo (Advisor)

Dr. Myint Oo, Rector (Retired) of University of Forestry and Environmental Science, Yezin, Ministry of Natural Resources and Environmental Conservation, worked for the Ministry for 35 years from 1984 to 2019. He obtained M. Sc. and Ph. D. Degrees from Göttingen University, Germany with special reference to tropical forest resources assessment using remotely sensed data and geographic information system. As a government employee he was involved in forest management planning and implementation, organizing and conducting forestry research studies, training, international relation, administration and teaching of forestry and environment-related subjects at the University. After retirement in 2019 he joined E Guard Environmental Services Co. Ltd. as an advisor, attended the training course on ‘Principles of Environmental Impact Assessment Review’ organized by AIT Center in Vietnam, and has been involved in internal review process of EIA studies implemented by project teams of the company, as well as providing advices to project team members.

U Si Thu Aung (Consultant)

U Si Thu Aung is a Consultant at E Guard Environmental Services Co. Ltd. He gained his Civil Engineering Degree from Thanlyin Technological University in 2014. He also pursued his Master Degree in Environmental Engineering at Yangon Technological University in 2018 while he started his career with E-Guard. He is also a Registered Engineer (Water Supply and Sanitation) at Myanmar Engineering Council and holding Transitional Consultant Registration Certificate No. 00261 with Water Pollution Control and Facilitation of Meeting expertises from Environmental Conservation Department. Through his time at E-Guard, he has been involved in the preparation of ESIA, related reports and in negotiation with relevant stakeholders such as Report Writing, Stakeholders Engagement, Secondary Data Collection, Site Investigation, Impact Assessment, Mitigation Measures and Environmental Management Plan, etc. He has worked in Myanmar EIA Field and in a range of different local and international projects about five years. His quest for seeking out new sources and making friends for data collection led to him assist his primary works and provide information to the organization and colleagues. Currently he is working in the organization as a motivated and collaborative team player. His responsibilities for this project are Project Lead Consultant, Impact Assessment, Mitigation Measures, Environmental Engineering, Water Pollution Control, Stakeholders Engagement and others.

Dr. Phyo Naing Zay (Health Consultant)

Dr Phyo Naing Zay was a consultant working on EIA project reporting in E Guard since 2014. He received Bachelor of Medicine and Bachelor of Surgery from University of

Medicine (2), Yangon in 2011, Master of professional Studies in Business Administration from Aldersgate College, Philippine in 2016 and Master of Science (Environmental Management and Planning) from Yangon Technological University, Yangon in 2014. He had experiences in environmental fields including National Master Plan Projects for 6 years.

Daw Yadanar Swam Htet Kyaw (Senior Consultant)

Ms. Yadanar Swam Htet Kyaw is a Senior Consultant, who received Bachelor of Agricultural Science from Yezin Agricultural University in 2014. She also received Master of Science in Natural Resources Management from Asian Institute of Technology, Thailand in 2017. She has experience in environmental fields spanning almost eight years including her master degree thesis, “Villagers’ Assessment of the Impacts of Eucalyptus Plantations in the Mandalay Region of Myanmar”. She is also familiar with conducting reconnaissance surveys, socio-economic surveys and environmental assessment. Furthermore, she got Diploma in Remote Sensing and Geographical Information System from Dagon University and also experienced in carrying out the project paper of “Assessment of Traffic Noise Pollution on Pyay Road from Helda Junction to 8-Mile Junction. She is familiar with not only conducting reconnaissance surveys and socio-economic surveys but also environmental impact assessment and environmental management plan on livestock and aquaculture projects. Her responsibilities include project management and compilation of the report for the project.

Daw Thein Mwe Khin (Senior Consultant)

Daw Thein Mwe Khin is a Senior Consultant, who received her Master Degree in Regional and Rural Development Planning from Asian Institute of Technology in 2019 and Bachelor Degree in Forestry from the University of Forestry in 2013. She worked as a social expert in Yangon Outer Ring Road Construction Project, Hanthawaddy New International Airport Development Project and Wataya Bridge Construction project. She had experience in working as a survey team leader for YCRL Updating Project and Dry Zone Water Supply Project in 2014, 2015 and 2016 respectively. She had her experiences in working as a core team member of the social team who did the preparation of RAP for Construction of Kyarkalay Bypass and 2 Bridges and RAP for Construction of Thaton Bypass and 2 Bridges in 2014. In addition, she has a project leader role in the preparation of four IEE reports for various types of projects, tender preparation, many social surveys, FGDS for various EIA/IEE/EMP projects during around five years of working life in the EIA field. She also studied the socioeconomic impact of rural electrification on the well-being of rural households in central dry zone, Myanmar as her master thesis in 2018. She will be involved as a social expert in this project.

U Aung Si Thu Thein (Consultant)

U Aung Si Thu Thein is a Consultant, who holds Transitional Consultant Certificate No. 00281, described expertise in Ecology and Biodiversity, GIS and Land Use. He received his Bachelor Degree in Forestry from the University of Forestry in September, 2015. He also received Post Graduate Diploma in Geographic Information Systems from the Dagon University in February, 2018. Moreover, he pursued his Master of Science Degree in Natural Resources Management from the Asian Institute of Technology, Thailand in May, 2020. He

has almost six years-experience in preparation of Environmental Management Plan and Initial Environmental Examination Reports for various development projects as a Lead Consultant and in participation many Environmental Impact Assessment and Resettlement Action Plan projects for development projects in Myanmar. On the other hand, he has two years-experience in research conducting with regards to impacts assessment of natural resources management systems on livelihood of local people. Moreover, he has many experiences in communication with clients, government authorities and local people, stakeholder engagements and public consultation meetings conduction and socio-economic survey. His expertises for this project are Natural Resources Management, Ecosystem and Biodiversity, Soil Conservation and Land Use.

Daw May Pwint Phoo (Associate Consultant)

Daw May Pwint Phoo is an Associate Consultant, who had her Engineering Bachelor Degree in Civil at West Yangon Technology University, Yangon, Myanmar and Master Degree in Urban Environmental Management from Asian institute of Technology University, Bangkok, Thailand. She is currently working as an assistant consultant at E Guard Environmental Services Co., Ltd. She had experience in working as project leader in Elite petrochemical project and Myanmar Shwe Nagar Fertilizers production and distribution project.

Daw Ei Ei Phyoe (Project Assistant, Civil Engineer)

Daw Ei Ei Phyoe was working as a Project Assistant at E Guard Environmental Services Co., Ltd. She received Bachelor of Civil Engineering from Technological University (Taunggyi). Now, she is trying to achieve a Diploma in Geographic Information System at University of Yangon (YU). She has more than one year experience in reporting, conduction stakeholder engagement and site visiting. She has completed various trainings regard with environmental management and GIS. She was assisting in report preparation, data analysis and mapping, conduction of stakeholder engagement and information gathering process.

Daw Thian Rem Mawi (Project Assistant, Civil Engineer)

Daw Thian Rem Mawi was currently working as Project Assistant in E Guard Environmental Services Co., Ltd. She received her Bachelor of Degree in Civil Engineering from Taunggyi Technological University in 2018. She and her team did a research paper in her Bachelor Degree thesis, ‘Environmental Management Plan of an office building’. She has experiences on environmental site survey and socio-economic surveys. In addition, she has experience in cooperating with clients and customers and to conduct stakeholder’s engagement and public consultations. She also participates in the activities such as data collection, formatting, giving presentation and prepares public consultation.

Daw Hay Marn Hnin (Environmental Specialist, Flora)

Ms. Hay Marn Hnin was an Environmental Specialist, who received her Bachelor of Science and Master of Science Degree in Botany from the Pathein University at 2014 and 2017. She has almost three-year experiences in participation of biodiversity assessment, surveys and reporting (especially flora) of Environmental Impact Assessment, Environmental Management Plan and Initial Environmental Examination and other monitoring projects.

Moreover, she has experiences in communication with clients, conduction stakeholder engagement and public consultation meeting, socio-economic survey, Resettlement Action Plan (RAP) survey, site visit, impact assessment and reporting for the relevant projects.

Daw Htet Shwe Sin Aung (Assistant Consultant, Fauna)

Daw Htet Shwe Sin Aung is an Assistant Consultant at E Guard Environmental Services Co., Ltd. She graduated in 2017 with a Master of Science specializing in Zoology from Yangon University. She has five years of experience surveying the fauna, writing reports, and performing laboratory work. She is now in charge of surveying fauna species, identifying species, data entry and report writing, gathering information for environmental reports, conducting socioeconomic surveys, collaborating with clients for the projects, including NGOs and local and government agencies, assisting and cooperating in the writing of environmental reports, and providing comment reply for the reports. Her responsibilities are surveying fauna data analyzing and writing report, and socio-economic survey.

U Aung Moe Oo (Assistant Consultant)

U Aung Moe Oo is an Assistant Consultant, who received his Bachelor Degree in Chemical Engineering from Technological University in 2017. He has experiences on environmental site survey and socioeconomic surveys and Data Collection for (air, noise and vibration, water, soil), Data Computing and Analyzing. Another experience is to cooperate with clients and to conduct stakeholder's engagement and public consultations. In this project he assisted data collection for (air, noise and vibration, water, soil), data computing, analyzing and environmental quality reporting.

Daw May Thu Win (Assistant Consultant)

Daw May Thu Win is working as a Legal Analyst in E-Guard Environmental Services Co., Ltd. She obtained her Bachelor degree in Law from East Yangon University (Tarwa) in 2018. She is currently assisting in preparing Laws, Rules, Regulations, Policies, Directions and Notifications used for environmental reports, public consultations and information-gathering processes. As a legal expert, she has the responsibility of Legal study and analysis of this project. She mainly contributes to the Policy, Legal and Institutional Framework Chapter of this EIA study.

U Than Hitke Zaw (Project Assistant)

U Than Htike Zaw is a Project Assistant at E Guard Environmental Services. He is an engineer with a bachelor degree in Civil Engineering from West Yangon Technological University. He is also pursuing his Post Graduate Diploma in Environmental Science at Yangon University. He worked as a Junior Engineer at local mining company and Environmental Engineer at a local based environmental consultancy company in Yangon. He has more than 2 years' experience in site surveying, environmental monitoring, data collection, preparation of reports, report writing and preparing power points.

U Myo Thu Ya (Project Assistant, Social Specialist)

U Myo Thu Ya was a Project Assistant at E Guard Environmental Services. He graduated on January 2019 with the Bachelor of Business Science (Applied Statistics) at the Co-Operative University in Thanlyin Township, Yangon. His research paper for his Bachelor of Business Science in Applied Statistics is “Study on Production and Yield of Paddy and Pea for Kayan Township, Yangon Region”. He has the experience in environmental and social fields more than one year including taken Social Survey and RAP Survey for PAPs and performed Focus Group Discussion with project owner, Government and local people for many projects. He is preparation Questionnaire Form for Social Survey depends on the project and take survey as an interviewer, data entry and data analysis, preparation social section of the reports, and engagement with stakeholders include the project owners, Government and local people.

U Wunna Zaw (Surveyor))

U Wanna Zaw is a matriculate and he has more than five years of surveyor experience. He specializes in instrumentation and field data collection of environmental condition of the site and measuring of environment baseline data.

Chapter 3. OVERVIEW OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

This section reviews the relevant policies, institutional framework and legislations practiced in Myanmar currently including environmental and social related international guidelines. The activities carried out under the proposed project are subjected to these legal requirements.

3.1.1 Relevant National Legislations

This section describes the National Laws and Regulations for the Environmental Protection and Management related and applicable to the proposed project. Among these laws and regulations, the Constitution of the Republic of the Union of Myanmar (2008) is the main concern and governing law for the environmental conservation in Myanmar. The others are the newly introduced National Environmental Policy (2019), the National Land Use Policy (2016), Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedures (2015), National Environmental Quality (Emission) Guidelines (2015), Myanmar National Drinking Water Quality Standards etc.

The following laws and rules are related to the Environment -

- Myanmar National Environmental Policy (2019)
- The Environmental Conservation Law (2012)
- The Environmental Conservation Rules (2014)
- The Environmental Impact Assessment Procedure (2015)
- National Environment Quality (Emission) Guidelines (2015)

Since this project is being carried out in cooperation with Myeik Corporation Public Co., Ltd. and Bright Blue Water International Corporation Co., Ltd. (Thailand). So, the followings law and rules are also included-

- The Myanmar Investment Law (2016)
- The Myanmar Investment Rules (2017)

For water distribution project, the following law and standards are also applicable.

- Myanmar National Water Policy (2014)
- The Conservation of Water Resources and Rivers Law (2006)
- Myanmar National Drinking Water Quality Standards (2014)
- The Underground Water Act (1930)

In implementing the project, the following acts and laws are required for labors-

- The Labor Organization Law (2011)
- The Settlement of Labor Dispute Law (2012)

- The Employment and Skill Development Law (2013)
- The Minimum Wages Law (2013)
- The Payment of Wages Law (2016)
- Workmen’s Compensation Act (1923)
- The Leaves and Holiday Act (1951)
- Social Security Law (2012)

Since the project is located in Tanintharyi Region, Myeik District, the Regional Development law (Tanintharyi Region Development law) is also recommended to use it. For the employee's health and safety, the occupational health and safety law is demand during Construction phase.

- Prevention of Hazard from Chemical and Related Substance Law (2013)
- Occupational Health and Safety Law (2019)
- Natural Disaster Management Law (2013)

For the land use and pipeline alignment, the project proponent has to follow the following laws as well in implementing the project.

- National Land Use Policy (2016)
- Law Amending the Farm Land Law (2020)
- The Administration of Vacant, Virgin and Fallow Land Law (2018)
- Law Amending the Highways Law (2015)

For Health Sector,

- The Public Health Law (1972)
- Law Amending the Prevention and Control of Communicable Diseases Law (2011)

The Applicable Laws and Legal Commitment for Myeik Water Supply Project in Myeik Township, Tanintharyi Region

The project is related to the following laws, rules, procedure and guideline-

1. The Environmental Conservation Law (2012)
2. The Environmental Conservation Rules (2014)
3. Environmental Impact Assessment Procedure (2015)
4. National Environmental Quality (Emission) Quality Guidelines (2015)
5. The Rights of National Races Law (2015)
6. Myanmar Investment Law (2016)
7. Myanmar Investment Rules (2017)

8. Private Industrial Enterprise Law (1990)
9. The Public Health Law (1972)
10. Prevention and Control of Communicable Disease Law (1995)
11. The Control of Smoking and Consumption of Tobacco Product Law (2006)
12. Myanmar Fire Force Law (2015)
13. The Motor Vehicle Law (2015) and Rules (1987)
14. The Myanmar Insurance Law (1993)
15. Labour Organization Law (2011)
16. Settlement of Labour Disputes law (2012)
17. The Development of Employment and Skill Law (2013)
18. Minimum Wages Law (2013)
19. Payment of Wages Law (2016)
20. Workmen's Compensation Act (1923)
21. The Leaves and Holiday Act (1951)
22. Social Security Law (2012)
23. The Occupational Safety and Health Law (2019)
24. Factories Act (1951)
25. The Law relating to Petroleum and products of petroleum (2017)
26. The Petroleum Rules (1937)
27. Conservation of Water Resources and Rivers Law (2006)
28. Freshwater Fisheries Law (1991)
29. The Protection and Preservation of Cultural Heritage Regions Law (2019)
30. The Protection and Preservation of Antique Objects Law (2015)
31. The Protection and Preservation of Ancient Monument Law (2015)
32. Myanmar Engineering Council Law (2014)
33. Farm Land Law (2012)
34. The Administration of Vacant, Fallow and Virgin Land Law (2012)
35. Forest Law (2018)

36. Protection of Biodiversity and Protected Area Law (2018)
37. Prevention of Hazard from Chemical and Related Substances Law (2013)
38. Tanintharyi Region Development Law (2017)
39. The Underground Water Act (1930)
40. The Natural Disaster Management Law (2013)

Legal commitments of related laws for this project

1. The Environmental Conservation Law (2012)

Purpose; to construct a healthy and clean environment and to conserve natural and cultural heritage for the benefit of present and future generations; to maintain the sustainable development through effective management of natural resources and to enable to promote international, regional and bilateral cooperation in the matters of environmental conservation.

- The project proponent has to pay the compensation for damages if the project will cause injuries to environment, under the sub-section (o) of section 7 of said law
- The project proponent has to purify, emit, dispose and keep the polluted materials in line with the stipulated standards, under section 14 of said law
- The project proponent has to install or use the apparatus which can control or help to reduce, manage, control or monitor the impacts on the environment, under section 15 of said law.
- The project proponent has to allow relevant governmental organization or department to inspect whether performing is conformity with the terms and condition included in prior permission, issued by the ministry, or not, under section 24 of said law.
- The project proponent has to comply with the terms and conditions included in prior permission, under section 25 of said law.
- The project proponent has to abide by the stipulations included in the rules, regulation, by-law, order, notification and procedure issued by said law, under section 29.

2. The Environmental Conservation Rules (2014)

- The project proponent has to avoid emit, discharge, or dispose, direct to discharge or dispose the materials which can pollute to environment, or hazardous waste or hazardous material prescribed by notification in the place where directly or indirectly injure to public, under sub- rule (a) of rule 69.
- The project proponent has to avoid performing to damage to ecosystem and the environment generated by said ecosystem, under sub-rule (b) of rule 69.

3. Environment Impact Assessment Procedure (2015)

- The project proponent has to be liable for all adverse impacts caused by doing or omitting of project owner or contractor, sub-contractor, officer, employee, representative or consultant who is appointed or hired to perform on behalf of project owner, under sub-paragraph (a) of paragraph 102.
- The project proponent has to support, after consultation with effected persons by project, relevant governmental organization, governmental department and other related persons to resettlement and rehabilitation for livelihood until the effected persons by the project receiving the stable socio-economy which is not lower than the status in pre-project, under sub-paragraph (b) of paragraph 102.
- The project proponent has to fully implement all commitments of project and conditions included in EMP. Moreover the project proponent has to be liable for contractor and sub-contractor who perform on behalf of him/her have to fully abide by the relevant laws, rules, this procedure, EMP and all conditions, under paragraph 103.
- The project proponent has to be liable and fully & effectively implement all requirements included in ECC, relevant laws and rules, this procedure and standards under rule 104.
- The project proponent has to inform the completed information, after specifying the adverse impacts caused by the project, from time to time, under paragraph 105.
- The project proponent has to continuously monitor all adverse impacts in the pre-construction phrase, construction phrase, operation phrase, suspension phrase, closure phrase and post-closure phrase, moreover has to implement the EMP with

abiding the all conditions included in ECC, relevant laws & rules and this procedure, under paragraph 106.

- The project proponent has to submit, as soon as possible, the failures of his or her responsibility, other implementation, ECC or EMP. If dangerous impact caused by this failure or failure should be known by the Ministry the project proponent has to submit within 24 hours and other than this situation has to submit within 7 days from knowing it, under paragraph 107.
- The project proponent has to submit the monitoring report semiannually or prescribed time by Ministry in line with the schedule of EMP, under paragraph 108.
- The project proponent has to prepare the monitoring report in accord with the rule 109.
- The project proponent has to show this monitoring report in public place such as library, hall and website and office of project for the purpose to know this report by public within 10 days from the date which the report is submitted to the Ministry. Moreover has to give the copy of this report, by email or other way which way agreed with the asked person, to any asked person or organization, under paragraph 110.
- The project proponent has to allow inspector to enter and inspect in working time and if it is needed by Ministry has to allow inspector to enter and inspect in the office and work-place of project and other work-place related to this project in any time, under paragraph 113.
- The project proponent has to allow inspector to immediately enter and inspect in any time if it is emergency or failure to implement the requirements related to social or environment or caused to it, under paragraph 115.
- The project proponent has to allow inspector to inspect the contractor and sub-contractor who implements on behalf of project, under paragraph 117.

4. National Environmental Quality (Emission) Guidelines (2015)

- The project proponent has to emit, discharge or dispose anything in line with the standards stipulated in said guideline.

5. Protection the Rights of National Races Law (2015)

Purpose: To ensure to disclose to resident ethnic nationalities about the project fully, moreover to ensure to cooperate with them. This law focuses the following matters;

Section 5 - The project proponent has to disclose all about the project fully to the residents who are national races.

- The project proponent has to cooperate with the residents who are national races.

6. The Myanmar Investment Law (2016)

Purpose; To ensure the appointing of employees, fulfilling the rights of employees, avoiding any injury to environment, social and cultural heritage, insure the prescribed insurance in line with the above law. This law focuses as follows,

- The project proponent has to register the land lease contract at the specific registration office, under sub-section (d) of section 51 of said law. (if the land lease contract is needed)
- The project proponent has to appoint the nationalities in the various levels of administrative, technical and expert work by the arrangement to develop their expertise, in line with the sub-section (b) of section 51 of said law.
- The project proponent has to appoint the nationalities only in normal work without expertise, in line with the sub-section (c) of section 51 of said law.
- The project proponent has to appoint either foreigner or nationality with the appointment agreement in accord with the law, in line with the sub-section (d) of section 51 of said law.
- The project proponent has to comply with the international best practices, existing laws, rules and procedures to not damage, pollute, and injure to environment, cultural heritage and social, in line with the sub-section (g) of section 65 of said law.
- The project proponent has to close the project after paying the compensation to the employees in accord with the existing laws if violates the appointment agreement or terminate, transfer or suspend the investment or reduce the number of employees, in line with the sub-section (i) of section 65 of said law.

- The project proponent has to pay the wages or salary to the employees in accord with the laws, rules, order and procedures in the suspension period, in line with the sub-section (j) of section 65 of said law.
- The project proponent has to pay the compensation or injured fees to the respected employees or their inheritors if injury in or loss of part of body or death caused by work, in line with the sub-section (k) of section 65 of said law.
- The project proponent has to stipulate the foreign employees to respect the culture and custom and abide by the existing laws, rules, orders, directives, in line with the sub-section (l) of section 65 of said law.
- The project proponent has to abide by labour laws, in line with the sub-section (m) of section 65 of said law.
- The project proponent has to pay the compensation to the injured person for damages if damages of environment or socio-economy is occurred by misuse of project, in line with the sub-section (o) of section 65 of said law.
- The project proponent has to allow to inspect in anywhere of project if Myanmar Investment Commission inform to inspect the project, in line with the sub-section (p) of section 65 of said law.
- The project proponent has to obtain the permission of MIC before EIA process and report back this process to MIC, in line with the sub-section (q) of section 65 of said law.
- The project proponent has to insure the prescribed insurance by rules, under section 73 of said law.

7. The Myanmar Investment Rules (2017)

- The project proponent has to comply with the conditions of the permit issued by MIC and applicable laws when making the investment, under rule 202.
- The project proponent has to fully assist while negotiating with the authority for settling the grievance of the local community which has been affected due to investment, under rule 203.
- The project proponent has to submit the passport, expertise evidence or document of degree and profile to the MIC office for approval if decide to appoint a

foreigner as a senior management, technician expert or consultant according to sub-section (a) of section 51 of Myanmar Investment Law, under rule 206.

- The project proponent has to ensure the relevant insurances under rule 212 for this project. (212)

8. The Private Industrial Enterprise Law (1990)

Purpose: To ensure the compliance with conditions in registration certificate. This law focuses as follows;

- The project proponent has to register for production of TMT bars, under section 4 of said law.
- The project proponent has to abide by the conditions in registration certificate, under sub-section (b) of section 13 of said law.
- The project proponent has to allow inspection by Directorate or Supervisory Body, under sub-section (e) of section 13 of said law.
- The project proponent has to abide by the orders and directives issued by the Ministry and Directorate, under sub-section (f) of section 13 of said law.
- The project proponent has to abide by all existing laws, under sub-section (g) of section 13 of said law.
- The project proponent has to hire the experts and technicians from foreign country with the permission of Ministry, under sub-section (a) of section 15 of said law.

The project proponent has to close the enterprise in accordance with stipulated ways with the permission of Directorate, under sub-section (b) of section 15 of said law.

9. The Public Health Law (1972)

Purpose: To ensure the public health include not only employees but also resident people and cooperation with the authorized person or organization of health department.

- The project owner will cooperate with the authorized person or organization in line with the section 3 and 5 of said law.

Section 3 - The project proponent has to abide by any instruction or stipulation for public health.

Section 5 - The project proponent has to allow any inspection, anytime, anywhere if it is needed.

10. Prevention and Control of Communicable Diseases Law (1995)

Purpose: To ensure the healthy work environment and prevention the communicable diseases by the cooperation with the relevant health department.

- The project proponent has to build the housing in line with the health standards, distribute the healthful drinking water & using water and arrange to systematically discharge the garbage & sewage, under clause (9) of sub-section (a) of section 3 of said law.
- The project proponent has to abide by any instruction or stipulation by Department of health and Ministry of Health, under section 4 of said law.
- The project proponent has to inform promptly to the nearest health department or hospital if the following are occurred; (under section 9)
 - (a) Mass death of animals included in birds or chicken;
 - (b) Mass death of mouse;
 - (c) Suspense of occurring of communicable disease or occurring of communicable disease;
 - (d) Occurring of communicable disease which must be informed.
- The project proponent has to allow any inspection, anytime, anywhere if it is need to inspect by health officer, under section 11 of said law.

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

Purpose: To ensure the creation of smoking area and non-smoking area in the power plant area for health and control of smoking.

- The project proponent has to keep the caption and mark referring that is non-smoking area in the project area under sub-section (a) of section 9 of said law.
- The project proponent has to arrange the specific place for smoking in the project area and keep the caption and mark in accordance with the stipulations under sub-section (b) of section 9 of said law.

- The project proponent has to supervise and carry out the measures so that no one shall smoke at the non-smoking area under sub-section (c) of section 9 of said law.
- The project proponent has to allow the inspection of supervisory body in the power plant area, under sub-section (d) of section 9 of said law.

12. The Myanmar Fire Force Law (2015)

Purpose: To ensure to prevent the fire, to provide the precautionary material and apparatuses, if the fire caused in the project area to be defeated because the project is business in which electricity and any inflammable materials such as petroleum are used. So, the project owner has to institute the specific fire service in line with the above law. This law focuses the following

- The project proponent has to institute the specific fire services if it is needed, under sub-section (a) of section 25.
- The project owner has to provide materials and apparatuses for fire precaution and prevention, Sub-section (b) of section 25.

13. The Safety and Administration of Motor Vehicles law (2020) and Rules (1987)

Purpose: When the construction period and **if it is needed in operation and production period** for the all vehicles.

- The project proponent has to promise that every vehicle has to pass the allowed area only under Sub-section (a) of section 9.
- The project proponent has to register every vehicle in line with the conditions for environmental conservation and safety, standards and norms, stipulated by the Ministry under Sub-section (c) of section 12.
- The project proponent has to promise that every vehicle has to abide by speed rate- stipulated by the Department under Sub-section (r) of section 14.
- The project proponent has to maintain every vehicle in line with the standards stipulated by the Department under Sub-section (a) of section 18.

- The project proponent has to promise that every vehicle has to carry or transport the dangerous goods in line with the stipulations under Sub-section (f) of section 81.

14. The Myanmar Insurance Law (1993)

Purpose: The project can cause the damages to the environment and injuries to public so to ensure the needed insurances are insured at Myanmar Insurance. This law focuses the following matters;

- If the project proponent uses the owned vehicles the project owner has to insure the insurance for injured person under section 15 of said law.
- The project proponent has to insure the insurance to compensate for general damages because the project may cause the damages to the environment and injury to public under section 16 of said law.

15. Labour Organization Law (2011)

Purpose: To ensure protection the rights of the employees, having the good relationships between the employees and employer and enabling to form and carry out the labour organizations systematically and independently.

- The project owner promises to allow the labour organization to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to submit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached under section 17 of said law.
- The project proponent promises to demand the re-appointment of worker who is dismissed by the employer without the conformity with the labour laws under section 18 of said law.
- The project proponent promises to send the representatives to the Conciliation Body in settling a dispute between the employer and the worker under section 19 of said law.
- The project proponent promises the labour organization to participate and discuss in discussing with the government, the employer and the complaining employees in respect of employee's rights or interest contained in the labour laws under section 20 of said law.

- The project proponent promises the labour organization to participate in solving the collective bargains of the employees in accord with the labour laws under section 21 of said law.
- The project proponent promises the labour organization to carry out the holding the meetings, going on strike and other collective activities in line with the procedure, regulation, by-law and directive of relevant Chief Labour Organization under section 22 of said law.

16. The Settlement of Labour Dispute Law, 2012

Purpose: To ensure negotiation and discussion between employees and project proponent, abiding the decision of Tribunal. This law focuses as follows;

- The project proponent has not to absent to negotiation within the stipulated time for complaint, under section 38 of said law.
- The project proponent has not to absent to form the negotiation committee, under section 38-A of said law.
- The project proponent has not to change the existing stipulations for employees within conducting period before Tribunal and has not to **close the work** without reasonable ground, under section 39 of said law.
- The project proponent has to pay the **compensation** decided by Tribunal if violates any act or any omission to damage the interest of labour by reducing of product without efficient cause, under section 51 of said Law.
- The project proponent has to not close the work without negotiation, discussion on dispute in accord with this law, decision by Tribunal, under section 40 of said law.
- The project proponent has to comply with all conditions in the agreement conducted before the mediator.

17. Employment and Skill Development Law (2013)

Purpose: To ensure the job security and to develop the employee's skill with the fund of project owner:

- The project proponent has to appoint employees with the contract in line with the provision of section 5 of said law.

- The project proponent has to carry out the training programs with the policy of Skill Development Body to develop the employment skill of employees who is appointed or will be appointed, under section 14 of said law.
- The project proponent has to monthly pay to the fund, which is fund for development of skill of employees, not less below 0.5 percentage of the total payment to the level of worker supervisor and the workers below such level, under sub-section (a) of section 30 of said law.
- The project proponent has to promise not to deduct from the payment of employees for above mentioned fund, under sub-section (b) of section 30 of said law.

18. The Minimum Wages Law (2013)

Purpose: To ensure the project owner pay the wages not less than prescribed wages and notify obviously these wages in work place, moreover to be inspected.

- The project proponent has to pay the wages in line with section 12 of said law.
- The project proponent has to notify the prescribed wages obviously in work place under sub-section (a) of section 13 of said law.
- The project proponent has to correctly record the lists, schedules, documents and wages and report these to the relevant department and give if these are asked while inspecting, in accord with the stipulations under sub-section (b)(c)(d) of section 13 of said law.
- The project proponent has to allow to be inspected by the inspector, under sub-section (d) and (e) of section 13 and section 18 of said law.
- The project proponent has to allow holiday for medical treatment if the employee' health is not fit to work, under sub-section (f) of section 13 of said law.
- The project proponent has to allow holidays without deducting from the wages if one of parents or one of family dies, under sub-section (g) of section 13 of said law.

19. Payment of Wages Law (2016)

Purpose: To ensure the way of payment and avoiding delay payment to the employees. This law focuses as follows;

- The project proponent has to pay the wages in accord with the section 3 and 4 of said law under section 3 & 4 of said law.
- The project proponent has to submit with the agreements of employees & reasonable ground to department if it is difficult to pay because of force majeure included in natural disaster, under section 5 of said law.
- The project proponent has to abide by the provisions of section 7 to 13 in chapter (3) in respect of deduction from wages.
- The project proponent has to pay the overtime fees, prescribed by law, to the employees who work over working hours, under section 14 of said law.

20. Workmen's Compensation Act (1923)

Purpose: To ensure the compensations to injured employee while implementing in line with the above law and pay the prescribed compensations in various kinds of injury. This law focuses as follow;

Section 13 - The project proponent has to pay the compensation in line with the provisions of said law base on kind of injury and case by case.

21. The Leaves and Holiday Act (1951)

Purpose: The employees can take the leaves and get the holidays legally and to ensure the right to get the holidays and leaves. This law focuses the following matters;
The project proponent has to allow the leaves and holidays in line with the law.

22. Social Security Law (2012)

Purpose: The project proponent has to create the social security for the employees because the project is the business under the Myanmar Citizen Investment Law. To ensure the social security for employees of the project, the project owner has to register to the social security offices and to pay the prescribed fund.

- The project proponent has to register to the respected social security office, under sub-section (a) of section 11 of said law
- The project proponent has to pay the social security fund for at least four types of social security included in sub-section (a) of section 15, under section 15 of said law.

- The project proponent has to pay the fund which has to be paid myself and together with the fund which has to be paid from their salary by the employees. More over the project owner will pay the cost for paying the above mentioned fund only myself under sub-section(b) of section 18 of said law.
- The project proponent has to pay the fund for accidente, under sub-section(b) of section 48 of said law. (but this fund is not related to workmen compensation so if it is needed compensation must be separately paid by the Workmen compensation Act)
- The project proponent has to make correctly and submit the list and record provided in section 75 to respected social security office, under section 75 of said law.

23. Occupational Safety and Health Law (2019)

Purpose: The project will abide by the stipulations under this law for employees to get occupational safety and health. This law focuses as follows:

- The project proponent has to appoint the head for occupational safety and health, and form each committee for occupational safety and health in consideration of women' occupational safety and health, in accord with the stipulations of the Ministry. (section 12)
- The project proponent has to direct the head for occupational safety and health to perform in line with the rules, order, directive and procedure. (section 14)
- The project proponent has to allow the inspection for occupational safety and health by inspectors and abide by their instructions (section 16)
- The project proponent has to allow inspectors for inspection in any place of the project in any time, and looking, copying any document, and taking it as evidence, and taking photos and recording files which cause danger in occupational safety and health, and taking assessment on noise, light, heat, dust, emission or dangerous material with the help of expert, and inquiring any one about getting or causing to get occupational disease in working time, in workplace with the help of relevant doctor. (section 17)
- The project proponent has to abide by the temporary suspension order, for the whole or part of workplace in the project, summoned by inspector with approval of chief-inspector if it is summoned if the inspector thinks injury or occupational

disease or serious injury caused or may be caused in the whole or part of workplace in the project. (section 18)

- The project proponent has to assess the measure of danger in workplace, working process, working apparatus and mechanism, and administer the medical check-up by certified doctor whether employees suffer occupational disease or not. Also has to manage to be safe and healthy environment in workplace based on assessment and medical check-up. (section 26 (a) to (d))
- The project proponent has to sufficiently provide the suitable protected-cloths, apparatus and supporting materials for the employees, free of charge, and direct them to wear and use it. (section 26 (e))
- The project proponent has to manage the preventive measure and emergency responses in the project site. (section 26(f))
- The project proponent has to provide clinic, registered doctor and nurses, medicines and supporting materials for clinic. (section 26 (g))
- The project proponent has to direct the employees, members of committees and managers to attend the occupational safety and health training which is prescribed by the Ministry. (section 26 (h))
- The project proponent has to administer the ways that any employee can promptly inform to any manager or head for occupational safety and health if facing accident in workplace or damages to health or life, and manage the apparatus and mechanism in workplace or working process, or disposal to be safe and healthy. (section 26 (i) &(j))
- The project proponent has to stop the working process immediately, and move the employees promptly, and save and rescue the life and direct the employees to move and work in safe workplaces. (section 26 (k))
- The project proponent has to keep the occupational safety and health instructions, notices, posters, directive- board in project site in line with the stipulations. (section 26 (l))
- The project proponent has to direct any one to follow and perform in accord with the notice when enter and exit the prohibited workplace which may cause danger. (section 26 (m))

- The project proponent has to draw the fire-safety plan, direct to exercise, train the employees to systematically use the apparatus which are used in putting out fire. (section 26 (o))
- The project proponent has to assign the employees within the limited time in dangerous workplace and working process. (section 26 (q))
- The project proponent has liability to bear the total costs for occupational safety and health. (section 26 (r))
- The project proponent has to not dismiss or demote any employee who complaints about injury in working place or any matter causes danger, or damage to health, or performs as member of committee, or stops working in any situation which may cause accident in workplace or may cause out-break of occupational disease. (section 27)
- The project proponent has to inform to the Department when dangerous accident or serious accident is occurred in the project site, and send the report with the medical check-up record of certified doctor when any employee has suffered occupational disease or has poisoned by the working process or using apparatus, in accord with the stipulations. (section 34)
- The project proponent has to avoid myself and direct any one to avoid removing, disappearing, inserting, altering the materials, mechanism, apparatus, placing and documents which are related to inspection when the inspectors are inspecting the accidents in work place, dangerous occurrences, occupational diseases, poisoning in workplace. (section 36).

24. Factories Act (1951)

Purpose: The project will conduct the factory so it is needed to abide by the provision for social welfare, safety and healthy in Factories Act.

The project proponent has to abide by-

- The provisions related to health in chapter (3)
- The provisions related to welfare of employees in chapter (5)

- The provisions related to allowing inspectors to inspect, sending notice, submitting report, assigning the employees in accord with the working time for men, women and children in other chapters

25. The Law relating to Petroleum and Product of Petroleum (2016)

Purpose: The project will carry the oil in any phase and may import it. So, to ensure to take the license for importation, transportation and storage and abide by the stipulations in the license;

- The project proponent has to obtain the license, for importation of the fuel, issued by the Ministry of Commerce and Trade under sub-section (a) of section 7 of said law and abide by the stipulations in the license.
- The project proponent has to abide by the procedure and conditions, which to be safe in transportation and storage, prescribed by the Ministry of Commerce and Trade under sub-section (c) of section 7 of said law.
- The project proponent has to obtain the license for transportation and storage of the fuel under sub-section (a) of section 8 of said law and abide by the stipulations in the license.
- The project proponent has to abide by the procedure and conditions, which to be safe in transportation and storage, prescribed by the Ministry of Electricity and Energy under sub-section (d) of section 8 of said law.
- The project proponent has to transport the fuel by the vehicle or vessel which is licensed by the Ministry of Transportation and Communication under sub-section (a) of section 9 of said law.
- The project proponent has to store the fuel in the tank which is licensed by the Ministry of Natural Resource and Environmental Conservation under sub-section (a) of section 10 of said law.
- The project proponent has to show the notice of danger on the tank or container of fuel under section 11 of said law.

26. The Petroleum Rules (1937)

Purpose; To ensure the project owner has to abide by the stipulations for transportation of oil.

- The project proponent will abide by the provision of chapter (3) of the Petroleum Rules for transportation and the provisions of chapter (4) of said rules for storage.

27. Conservation of Water Resources and Rivers Law (2006)

Purpose: The project proponent will avoid the disposal of stipulated materials into river-creek, will pump the water from the river after receiving the permission of Ministry.

- The project proponent has to avoid any performing to damage to the river, creek and water resource, under sub-section (a) of section 8.
- The project proponent has to avoid the violation of conditions stipulated by the directorate for prevention of water pollution, under sub-section (b) of section 24.
- The project proponent will pump the water from the river after receiving the permission of Ministry under section 30.
- The project proponent will abide by the conditions in the permission for pumping water, under sub-section (a) of section 6.
- The project proponent has to avoid disposing the fuel, chemicals, toxic substances, other substances and explosive substances from the bank to the Hlaing river under sub-section (a) of section 11 of said law.
- The project proponent has to avoid disposing any material, which may damage or change the water way, from the bank to the Hlaing river under section 19 of said law.
- The project proponent has to avoid constructing the toilets, which are not suitable, at the bank under sub-section (a) of section 21 of said law.
- The project proponent has to avoid digging the well or lake and digging the soil without permission of the Directorate under sub-section (b) of section 21 of said law.
- The project proponent has to avoid putting the heavy materials in the bank without permission of the Directorate, under section 22 of said law.
- The project proponent has to avoid the violation of conditions stipulated by the Directorate for prevention of water pollution, under sub-section (b) of section 24 of said law.

28. Freshwater Fisheries Law (1991)

Purpose: According to the sub-section (e) of section 2 of said law, the freshwater area includes any river, creek, pond and water area so the project will be near by the river or creek which is freshwater area the safety of freshwater and aquatics. This law focuses as follow;

- The project proponent has to avoid any water pollution and disturbing to fish & other aquatic lives in any fresh-water such as river, creek under section 40 of said law.

29. The Protection and Preservation of Cultural Heritage Regions Law (2019)

Purpose: To ensure the protection of cultural heritages and the cultural heritage area from the damage by the natural disaster or man-made.

Section 21 (a)(5) - The project proponent has to apply to get the prior permission of local preservation committee for construction of pound **in the heritage region other than world heritage region or national heritage region.**

The project proponent has to apply to get the prior permission of Tanintharyi Regional preservation committee for construction of pound **in world heritage region or national heritage region.**

(It depends on the project site)

Section 22 (c) - The project proponent has to construct the factory in line with the condition in the prior permission.

30. The Protection and Preservation of Antique Objective Law (2015)

Purpose; To ensure the protection of ancient monument and information about it if it was in the project area. This law focuses as follow;

- The project proponent has to inform to the village-tract or ward administrator if any antique objective is found in project area under section 12 of said law.

31. The Protection and Preservation of Ancient Monument Law (2015)

Purpose; To ensure the protection of ancient monument and information about it if it was in the project area. This law focuses as follows;

Section 12 - The project proponent has to report to the village-tract or ward administrators if the project proponent will find any ancient monument under the ground or on the ground or under the water.

Section 15 - The project proponent has to obtain the prior permission of Department of Ancient Research Museum if the project area is in the prescribed area of Ancient monument.

Sub-section (f) of section 20 - The project proponent has to obtain the prior permission, by written, of Department of Ancient Research and National Museum if the project proponent disposes the chemical and solid waste in the Ancient Monument area.

32. The Engineering Council Law (2013)

Purpose; To ensure the safety in technical and engineering work in the project. This law focuses the following;

- The project proponent has to appoint the employees, who obtained the registration certificate issued by the Myanmar Engineering Council, in the technical and engineering work, under section 37 of said law.
- The project proponent has to ensure the employees who are engineers abide to the provisions of Myanmar Engineering Council law, prohibitions included in the rules, order and directive issued under said law, conditions included in the registration certificate issued by the Myanmar engineering council, under section 34 of said law.

33. The Farm Land Law (2012)

Purpose: To ensure the right to use the farm land and sufficient compensation for acquisition of the farm land. This law focuses the following matters;

- The project owner has to abide by the decision of relevant Ministry with the coordination with the Central Administrative Body of the Farmland for paying the compensation if it is needed acquisition farm land, under section 26 of said law.
- The project proponent has to obtain the permission of the Central Administrative Body of Farmland for the land use change from paddy field land to other land use under sub-section (a) of section 30.
- The project proponent has to obtain the permission of the Yangon Region Government with the recommendation of Yangon Region Administrative Body of Farmland for the land use change from farm land other than paddy field land to other land use under sub-section (b) of section 30.

34. Vacant, Virgin and Fallow Land Law (2012)

Purpose: To ensure the project land is clearly get as the project land.

Sub-section (d) of section 10 - The project proponent will ensure to get permitted areas for the project land by the Central Administrative Body on Vacant, Virgin and Fallow Land.

Sub-section (a) of section 19 - The project proponent will promise to return the land if any antique object is found in the project area.

Sub-section (d) of section 19 - The project proponent will promise to return the land if any resource is found in the project

35. Forest Law (2018)

Purpose: to ensure in carrying out the project with the permission of Ministry of Natural Resources and Environmental Conservation if the project land is forest land or forest covered land. This law focuses as follow;

- The project proponent has to obtain the permission of Ministry of Natural Resources and Environmental Conservation before starting the work if the project land is forest land or forest covered under sub- section (a) of section 12.

36. Protection of Biodiversity and Protected Area Law (2018)

Purpose: to ensure abiding by the prohibitions and stipulations to protect biodiversity and protected area

- The project proponent has to avoid entering the prohibited area located in protected area without permission under sub-section (a) of section 35.
- The project proponent has to avoid digging on the land or carrying out any activity in protected area under sub-section (c) of section 35.
- The project proponent has to avoid extracting, collecting or destroying in any manner, any kind of wild or cultivated plant in protected area under sub-section (d) of section 35
- The project proponent has to avoid polluting soil, water and air, damaging a water-course or poisoning water, electrification, using chemical or explosive materials in protected area under sub-section (a) of section 39.
- The project proponent has to avoid possessing or disposing of toxic objectives or mineral wastes in protected area under sub-section (b) of section 39.

37. Prevention of Hazard from Chemical and Related Substances Law (2013)

Purpose; To ensure to use the hazardous chemical and related substances safely and safety for the employees. Moreover, to be safe in carrying the hazardous chemical and related substances and storage place of it. If it is needed to train how to use the safety dresses which provided to the employees with free of charges. insure to compensate for injury to person or damage to environment. The project has to be inspected for safety use of hazardous chemical and related substances before starting the project. This law focuses as follows;

- The project owner will be inspected for the safety and resistance of the machinery and equipment by the respective Supervisory Board and Board of Inspection before starting the business, under sub-section(a) of section 15 of said law
- The project owner will assign the employees, who will serve with the hazardous chemical and substances, to attend the trainings on prevention of hazardous chemical and substances in local or abroad, under sub-section(b) of section 15 of said law
- The project owner will abide by the conditions included in the license, under sub-section(a) of section 16
- The project owner will abide by and assign to the employees who serve in this work to abide by the instructions for safety in using the hazardous chemical and related substances, under sub-section(b) of section 16

- The project owner will arrange the enough safety equipment in the work-place and provide the safety dresses to the employees who serve in this work with free of charge, under sub-section(c)of section 16
- The project owner will train, in work-place my arrangement, the know-how to use the occupational safety equipment, personal protection equipment and safety dresses systemically in the work-place, under sub-Section(d) of section 16
- The project owner will allow the receptive Supervisory Board and Board of Inspection to inspect whether the hazard may be injured to health of human or animal or damaged to environment, under sub-section(e) of section 16
- The project owner will assign the healthy employees who have obtained the recommendation that is fit for this work after taken medical check- up and keep systematically the medical records
s of employees, under sub-section (f) of section 16.
- The project owner will inform the copy of storage permission for hazardous chemical and related substances to the relevant township administrative office, under sub-section (g) of section 16.
- The project owner will obtain the approval with instructions of relevant fire force before starting the work if the project will use the fire hazard substances or explosive substances, under sub-section (h) of section 16.
- The project owner will transport only the limited amount of the chemical and related substance in accord with the prescribed stipulations in local transportation under sub-section (i) of section 16.
- The project owner will insure, in accord with the stipulations, to pay the compensation if the project cause injury to person or animals or damage to environment, under section 17.
- The project owner will abide by the conditions included in the registration certificate. Moreover, will abide by the orders and directives issued by the Central Supervisory Board from time to time, under section 22.
- The project owner will classify the level of hazard to protect it in advance according to the properties of chemical and related substances, under sub-section (a) of section 27.
- The project owner will provide the safety equipment, personal protection equipment to protect and reduce the accident and assign to attend the training to use the equipment systematically, under sub-section(c) of section 27.
- The project owner will transport, possess, store, use and discharge the chemical and related substances in accordance with the stipulations, under sub-section (d) of section 27.
- The project owner will abide by the conditions included in rules, order, notification, directive and procedure which issued under this law, according to section 30.

38. Tanintharyi Region Development Law (2017)

Purpose: To ensure abiding the stipulations for construction, cleaning environment in carrying out the work of project

- The project proponent has to abide by all provisions for construction and cleaning environment.

39. The Underground Water Act (1930)

Purpose: To ensure to obtain the license before sinking the underground water and to abide by the conditions in license.

Section 3- The project owner will obtain the license granted by the water officer for sinking the underground water before sinking water.

Sub-section (a) of Section 6 - The project proponent has to abide by the conditions prescribed by rules.

40. The Natural Disaster Management Law (2013)

Purpose: To implement natural disaster management programs and to coordinate with national and international organizations in carrying out natural disaster management activities; to conserve and restore the environment affected by natural disaster and to provide health, education, social and livelihood programmes in order to bring about better living conditions for victims.

3.1.2 International Guidelines

- 1) IFC EHS Guidelines on Water and Sanitation, 2007
- 2) IFC Guidelines on Occupational, Health and Safety, 2007
- 3) IFC General Environmental, Health and Safety Guidelines, 2007
- 4) JICA Environmental and Social Consideration on Water Supply
- 5) ASEAN Agreement on the Conservation of Nature and Natural Resources (1985)

3.2 Application of International and Domestic Guidelines

The ultimate EIA report will be prepared based on the Myanmar Environmental Impact Assessment Procedure (2015) and International best practice and guidelines. Specifically, the environmental impact assessment for this “Water Distribution Project to Myeik Township, Myeik District” shall be conducted in accordance with not only the National Environmental Guidelines but also International Guidelines and Practices such as WHO standards, and IFC performance indicators.

The following legislations constitute the key components of the legal framework for environmental conservation in Myanmar.

Environmental Conservation Law (2012)

The principal law governing environmental management in Myanmar is the Environmental Conservation Law, which was issued in March 2012. The law stipulates that government bodies be in charge of environmental conservation as well as their relevant roles and responsibilities. It effects on such as water, noise, vibration, and solid waste qualities but does not provide specific standards to be met. It also mentions that any new development project must perform a system of Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) in order to find out whether or not a project or activity to be undertaken by any government department, organization or person may cause a significant impact on the environment or not. In the context of project development, it is important to note that the law adopts the notion of “Polluter Pays Principle” as it implies that the project proponents are responsible for covering all environmental and social costs generated by the project.

Environmental Impact Assessment Procedures (2015)

The objectives of the EIA Guidelines are to provide a common framework for EIA reporting, to present project proponents and their environmental consultants with clear guidance on structure, content, and scope of EIA reports and to ensure that EIA reporting is consistent with legal requirements, good practices, and professional standards. The guidelines pay special attention to providing on preparing easily understandable EIA reports. The procedures also include a clause for public participation in implementing the IEE and EIA. Concrete steps for undertaking the EIA, are stipulated in the EIA procedures.

The project proponent has to be responsible to ensure that the Scoping and the preparation of the TOR for the EIA Report are undertaken in a professional manner and in accordance with this procedure and any applicable guidelines issued or adopted by the Ministry under section-48 of said law.

In scoping stage, the project proponent has to define the study area, area of influence, time boundaries, project phases, and potential stakeholders under sub-section (a) of section 49 of said law.

The project proponent has to start the process of understanding the applicable regulations and standards, and their context for project design and completion of the EIA under sub-section (b) of section 49 of said law.

The project proponent has to provide an opportunity for consultants, relevant authorities, project developers and interested and affected parties to express their views and concerns regarding the proposal before and EIA proceeds under sub-section (e) of section 49 of said law.

The project proponent has to identify potentially affected communities and other stakeholders with and interest in the project under sub-section (g) of section 49 of said law.

As part of the Scoping, the Project Proponent shall ensure that the following public consultation and participation process is carried out under section 50 of said law.

The project proponent has to disclose information about the proposed project to the public and civil society through local media, including by means of the prominent posting of legible sign boards and advertising boards at the project site which are visible to the public under sub-section (a) of section 50 of said law.

The project proponent has to arrange the required complement of consultation meeting as advised by the Ministry, with local communities, potential PAPs, local authorities, community-based organizations, and civil society, and provide appropriate and timely explanations in press conferences and media interviews under sub-section (b) of section 50 of said law.

Based on the Scoping, the project proponent has to prepare the TOR for the EIA investigations in accordance with applicable guidelines issued or adopted by the Ministry under section 52 of said law.

The project proponent has to submit the completed scoping report and TOR to the Department for review and approval under section 53 of said law.

National Environmental Quality (Emission) Guidelines (NEQ (E) G) (2015)

One other policy tool that supports the EIA reviews is the NEQ (E) G, issued by ECD in 2015. The EIA review body scrutinizes project proposals on their plan to comply with the NEQG, which compose of general and industrial specific pollutant maximum-limit guidelines on the air emission and effluents discharges as well as noise limits and exposure limits on transmission activities.

National Environmental Policy (2019)

The vision of newly introduced Myanmar National Environmental Policy to make a clean environment, with healthy and functioning ecosystems, that ensures inclusive development and wellbeing for all people in Myanmar.

The mission of this police is to establish national environmental policy principles for guiding environmental protection and sustainable development and for mainstreaming environmental considerations into all policies, laws, regulations, plans, strategies, programs and projects in Myanmar.

Myanmar National Water Policy (2014)

The goal of the national integrated water resources management policy is to develop, share and manage the water resources of Myanmar in an integrated, holistic and socially inclusive manner, to contribute significantly to the poverty alleviation, to the green growth and sustainable development of the nation, by providing access to water of equitable quantity and safe quality for all social, environmental and economic needs of the present and future generations.

The mission of the policy is to provide various levels of government, which include all Organs of States, Regions and Union Territories, with the most needed overarching national water policy to perform and cooperate with each other in mutual trust and good faith by

implementing such policy and further development of respective rules, regulations, procedure and legislation on their own.

Tanintharyi Region Development Law (2017)

The objectives of this law are as follows;

- (a) To improve the living standards of the towns and villages;
- (b) To fully access and manage all aspects of development tax.
- (c) To be properly used the taxes for urban development activities in accordance with the existing laws and regulations.
- (d) To work towards the belief that all taxes paid by the public are only for the public

The project proponent has to request the landowner to operate the sewage pipe line or pipe through another person's owned land. The project proponent has to pay the landowner for compensation due to operate the sewage pipe line or pipe through another person's owned land. The project proponent has to undertake public and private water supply in a healthy manner.

Myanmar National Drinking Water Quality Standards (2014)

The main objective of this standard is to promote public health, safety and welfare by ensuring quality standards of drinking water. This standard is applicable to drinking water available in Myanmar. This standard is not applicable to bottled drinking water. This standard shall apply to all water works officials, developers and operators of water supply system both government and private entities, all establishments and institutions that supply or serve drinking water, drinking water laboratories, health and sanitation authorities, the general public and all other concerned.

3.3 Authorized Institutional Framework

In the Republic of the Union of Myanmar, the Ministry of Natural Resources and Environmental Conservation (MONREC) was reformed from Ministry of Environmental Conservation and Forestry (MOECAF) in 30th March 2016. It was intended to be a focal point and coordinating agency for the effective environmental management in Myanmar. Environmental Conservation Department was developed in October 2012, under the MOECAF and it becomes the most responsible department for EIA process in Myanmar.

3.4 Ethics of the Project Proponent

The followings are the core ethics of the project proponent.

- BBWI&MCPC Company Limited will follow and observe all of the present laws and regulations of the Union of the Republic of Myanmar.
- BBWI&MCPC Company Limited will respect all kinds of religions, believes, social values, traditions, customs and culture of local people in the project area.
- BBWI&MCPC Company Limited will take responsible for local environment and social values of the project area.

- BBWI&MCPC Company Limited will emphasize common benefit of the local people in the project area.

3.5 Environmental and Social Policy of the Project Proponent

This section describes some key environmental and social policies of the project proponent.

The project proponent is generally water distribution company with water treatment plant, water pumping stations and water pipelines. One of the important goals of the project proponent is to stand as a responsible and ethical organization with compliance of the environmental legislation and requirements.

The project proponent has a plan to constitute the Corporate Social Responsibility Committee (CSR) to formulate, envisage spending 2% of the average net profits of the project made during the preceding financial years on Corporate Social Responsibility (CSR) activities. The project will divide to provide for local education supporting and activities for 0.5 %, for local social activities for 0.5 %, for local health activities for 0.5%, for local environmental activities for 0.2% and for learning center for water supply project for water education for 0.3%.

In order to ensure Environmental Management Program for sustainable environment management in the local area, the project proponent will form an Environment Management Program Team (EMP Team) with specific technicians and operate watching all kinds of purposes for environment management.

Then, the project proponent will ensure to seek continual improvement of the environmental performance of the proposed project.

Chapter 4. PROJECT DESCRIPTION AND ALTERNATIVES

4.1 Background of the Project

Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited have collaborated to develop public utility project (Clean Water Supply) for Myeik Township in Myanmar.

This project aims to develop infrastructures for water production, water management service and pipe water supply system. It can provide high quality tap water for municipalities and many industries especially in fishery and processing food. This sustainable development of pipeline tap water system can encourage more foreign and local investment in Myeik.

BBWI&MCPC have signed the Memorandum of Understanding (MOU) of Feasibility Study for Water Distribution Project to Myeik Township, Myeik District, Tanintharyi Region, with Tanintharyi Region Government, at Dawei City of The Republic of The Union of Myanmar on 31st October, 2019. This estimated 3-year project requires an investment of 2,855 million Baht (about US\$ 87.85 Million). The construction of water treatment plant takes about 6 months. It is expected that the period from the commencement date of the construction of the Project to the first commercial operation date, if without any interruption, should take about 24 months.

Public utility project (Clean Water Supply) for Tanintharyi region will be divided into 2 phases.

The First Phase will provide water supply for the city of Myeik in the amount of 100,000 cubic meters per day. The scope of works is as follows;

- Procure land with a total area of 300-350 acres to construct water treatment plant and clear water tank for this project.
- Lay about 60 kilometers of raw water pipeline and install water pumping system as well as electrical control system from Maw Tone.
- Lay the main water pipes and water distribution pipes to provide water services in the Myeik city area. Install the main water meter to measure the amount of water for trading.

During the first phase, BBWI&MCPC will cooperate to install water supply systems to deliver clean tap water in the amount not less than 100,000 cubic meters per day for Myeik City as well as not less than 2,400 cubic meters per day for Tanintharyi. In addition, the project proponent will use its best effort to develop a clean water supply system for village communities along the raw water pipeline, having regard to their economic, financial, and legal readiness. The project proponent has a plan to provide clean water to villages along the pipeline by small reservoirs, water intake points and/or by small treatment plants based on the size, location, demand, willingness and accessibility of them. After signing the concession

agreement, the water treatment plant can provide at least 40,000 cubic meters per day of tap water for 6-9 months. When the water treatment system fully implements, the plant can deliver 100,000 cubic meters per day within 24 months.

In the second phase, BBWI&MCPC will develop tap water treatment system to support sustainable economic development and growth of Myeik city. The project can deliver clean water supply not less than 300,000 cubic meters per day by upgrading the existing facilities. BBWI&MCPC will provide clean tap water supply system for Tanintharyi Region in Myanmar. This project can be a model of cooperation between public and private sector for public utility business and be expanded into other regions in the future.

4.2 Objectives of the Proposed Project

BBWI&MCPC Company Limited have collaborated to develop public utility project (Clean Water Supply) for Myeik District, Tanintharyi Region in Myanmar. This project aims to develop infrastructures for water production, water management service and pipe supply system. It can provide high quality tap water for municipalities, industrial sector and many industries especially in fishery and food processing. This sustainable development of pipeline tap water system can encourage more investment in Myeik area and it can make better quality of life for all local people in the project area also.

The main objectives of the proposed project are described as follows;

- To prevent water scarcity annually happening in Myeik Township, Myeik District, Tanintharyi Region
- To prevent the impacts of ground water over exploitation
- To prevent the impacts of the loss of surface water resources, and
- To improve the health status of the local people

The core values of the proposed project are that clean tap water can make Myeik Township and local people;

- Healthier with high quality of clean water
- More convince with water supply project
- Cheaper water price can make more saving
- More confidence for a good basic infrastructure of the city
- More investment to bring to the local area
- More tourism attraction to Myeik
- More industries and creating more jobs
- More opportunities for business and other kind of sectors
- More products in local area and increasing export sector
- Better quality of life for all the people in Myeik

4.3 Overview of the Project Proponent

The proposed project will be developed by Myeik Corporation Public Company Limited and Bright Blue Water International Corporation Company Limited.

Myeik Corporation Public Company Limited with Company Registration Certification Number of 114818100 is based at Ward Administration Office Street, Yay Bone Ward, Myeik Township, Myeik District, Tanintharyi Region. MCPC is also one of the biggest groups of the region. MCPC have many experiences in regional infrastructure development projects.

Bright Blue Water International Corporation Company Limited is a Thailand based company with registered address at No.24, Soi Ladprao Wang Hin 82, Ladprao Wang Hin Road, Lap Prao Sub-District, Ladprao District Bangkok Metropolis, Bangkok, Thailand, and is also a well experienced and strengthened group. Currently, BBWI has supplied water distribution in 8 Districts of Thailand such as Chiang Mai, Lamphun, Samut Sakhon, Pathumthani, Chon Buri, Rayong, Phuket, and Nakhon Si Tammarat.

Bright Blue Water International Company Limited aims to develop infrastructure of water production, water management service and pipe supply system for Myeik Township and Tanintharyi Region of Myanmar. Cooperating with Myeik Corporation Public Company Limited in Myanmar, BBWI will provide high quality tap water for municipalities and industrial sectors in Myeik such as fishery and seafood processing factories.

The two organizations made a commitment each other as a collaboration agreement to form joint venture company “**BBWI & MCPC Company Limited**” to operate the project. Therefore, the two organizations have collaborated for the proposed project and have established a new company which is officially registered in Myanmar with Company Registration Certification Number of 127095574 and is based at A 6, Market Garden, Kannar Road, Thar Kay Ta Quarter, Myeik Township, Myeik District, Tanintharyi Region, The Republic of the Union of Myanmar. The followings are the contact details of the proposed project.

Contact Person: U Aung Kyi Myint

Position: Secretary of BBWI&MCPC Company Limited

Contact Number: +95 9 262060592, 9 750487676, 9 750495225

Contact E Mail: bbwi.mcpc@gmail.com

Address: No. A-6, Market Garden, Kannar Road, Thar Kay Ta Quarter, Myeik Township, Myeik District, Tanintharyi Region, The Republic of the Union of Myanmar



Figure 4-1 Company Logo of BBWI&MCPC

The slogan of the proposed project and BBWI&MCPC Company Limited is **“Brighten up the Life of Myanmar People with Clean Water”**.

The visions of the proposed project are that to make very important basic infrastructure for people in Myanmar with good quality of clean and purified water, good health and better life, and to develop industry and economy in Myanmar.

The main target of the proposed project is to be leader for excellent water work services in Myanmar.

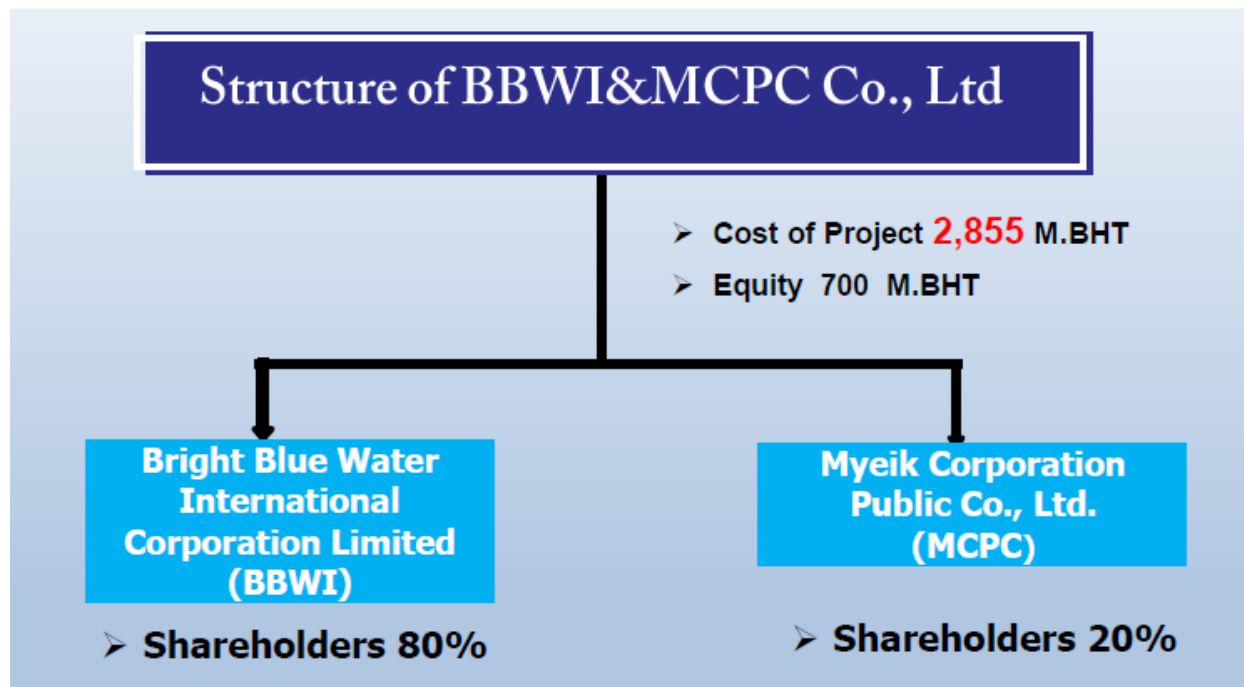


Figure 4-2 Structure of BBWI&MCPC

Board of Directors



Mr. Kanapod Nitsiriphat
Chairman & CEO
BBW & BBWI



U Hla Than
Chairman of Myeik
Cooperation Public
Company Limited (MCPC)



Mr. Pongdith Potchana
Director BBWI&MCPC



Mr. Tanapol Piyaporn
Director BBWI&MCPC



Mr. Polaphat Nitsiriphat
Director BBWI&MCPC



Brighten up the life of Myanmar people with clean water.

Figure 4-3 Board of Directors of BBWI&MCPC

Advisor and Secretary



Mr. Weera Sriwathanatrakoon
Advisor , Former Governor
of Prachuap Khiri Khan
Province



Mr. Aung Kyi Myint
Secretary
BBWI & MCPC Co., Ltd



U Myo Aung
Joint Secretary
BBWI & MCPC Co., Ltd

Figure 4-4 Advisor and Secretary of BBWI&MCPC

Executive Administration Board (EAB)

				
Mr. Kanapod Nitsiriphat Chairman & CEO BBW & BBWI	U Hla Than Chairman of Myeik Corporation Public Company Limited (MCPC)	Mr. Pongdith Potchana Director BBWI&MCPC	Mr. Weera Sriwathanatrakoon Former Governor of Prachuap Khiri Khan Province	Mrs. Rachadaporn Rajchataewindra Master of Business Administration, International Business (English Program)
				
Mr. Tanapol Piyaporn Director BBWI&MCPC	Mr. Polaphat Nitsiriphat Director BBWI&MCPC	Mr. Aung Kyi Myint Advisor Bright Blue Water International Corporation Co., Ltd	Mr. U Kyaw Kyaw Vice Chairman MCPC	U Myo Aung Joint Secretary BBWI & MCPC Co., Ltd
	Brighten up the life of Myanmar people with clean water.			

Figure 4-5 Executive Administration Board of BBWI&MCPC

4.4 Project Implementation Time Frame

The project will be expected to start from 2021 if approval from authorities will get in time. The overall project implementation time will be about three years. The expected project operation duration is 30 years. After 30 years operation, two 10 years extension will be included. After then, the whole project will be transferred to related Municipal Authorities.

Master plan Construction for water supply system at Myeik Province

Item	Description/Working	Pre-Construction plan																				
		Y2022					Y2023				Y2024				Y2025				Y2026			
		Jan	Jul	Aug	Dec	Nov	Dec	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1	Project Approve																					
1.01	MOU with Tanintharyi Region Government, Dawei city of the Republic of The Union of Myanmar																					
1.02	EIA/Feasibility study Public hearing																					
1.03	Started the concession																					
2	Pre-Construction																					
2.01	Level Survey																					
2.02	Master Drawing																					
2.03	Construction Drawing																					
3	Construction																					
A	Station																					
3.01	Intake 1st Raw Water Pump 2,200x2 Set (4,200 m3/Hr.) at Tone Byaw G4 station																					
3.02	Intake 2nd Raw Water Pump 2,200x2 Set (4,200 m3/Hr.) at Sin Din station																					
3.03	Intake 3rd Raw Water Pump 2,200x2 Set (4,200 m3/Hr.) at East Maw Tone station																					
3.04	Water Treatment Plant Pump 2,200x2 Set (4,200 m3/Hr.) & Clear Water Tank 10,000 m3 set Total 30,000 m3 at Ma Zaw station																					
3.05	Clear Water Tank 10,000 m3 x 3 set Total 30,000 m3 at Da La Shuang station (High land)																					
B	Pipeline Work																					
3.06	Main Pipeline work from 3 Intake Station to Ma Zaw station (3.04) DI Pipe Dia. 1000 mm. Distance 43 km.																					
3.07	Main Pipeline work from Ma Zaw station (3.04) to Da La Shuang (High land) (3.05) DI Pipe Dia. 1000 mm. Distance 19 km.																					
3.08	Main Pipeline work from Da La Shuang (High land) (3.05) to Kyauk Phyu Taung (NH 8) DI Pipe Dia. 1000 mm. Distance 9 km.																					
3.09	Sub-Main Pipeline work to In Myeik City Set DI Pipe Dia. 800 mm. Kyauk Phyu Taung (NH 8) to In Myeik City Distance 9 km. 2nd DI Pipe Dia. 800 mm. Myeik Pat (2) Road to In Myeik City Distance 9 km.																					
3.10	Sub-Main Pipeline & Service Pipeline in Myeik City HDPE Pipe Dia. 20" - 630 mm.																					
3.11	Install Prepaid Smart Meter and Testing																					
3.12	HDPE Factory Plant																					
3.13	Commissioning Tests																					

Figure 4-6 Master Plan of Proposed Project

4.5 Process of the Proposed Project

The main concept of the proposed project is to pump river water and to distribute after proper treatment. The locations and land use of the required facilities of the proposed project is as follows;

Table 4-1 Facilities of Proposed Project

Sr.	Type of Facilities	Location	Area
1.	River Water Pumping Station	East Maw Tone (Za Lone) Village, Tanintharyi Township	4.5 Acres
2.	River Water Pumping Station	Sin Din/Pyin Won Village, Tanintharyi Township	2.95 Acres
3.	River Water Pumping Station	Tone Byaw Gyi (Mwae Shaung) Village, Myeik Township	2.84 Acres
4.	Water Treatment Plant	Ma Zaw Village, Myeik Township	300 Acres
5.	Water Storage Tanks for Distribution	Da La Shaung Village, Myeik Township	7.77 Acres

The basic features of the proposed project are presented in next sections.

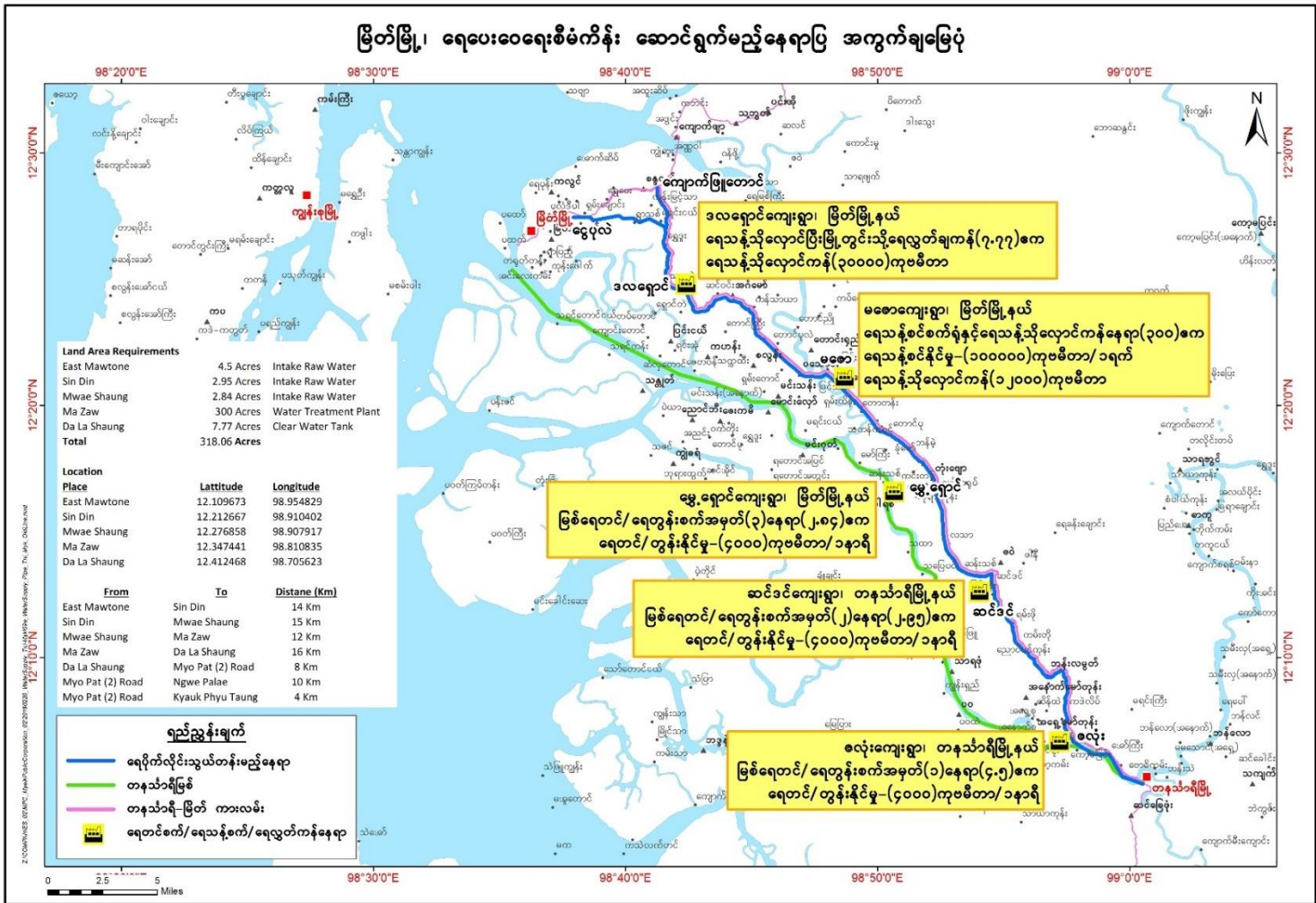


Figure 4-7 Layout Map of Proposed Project

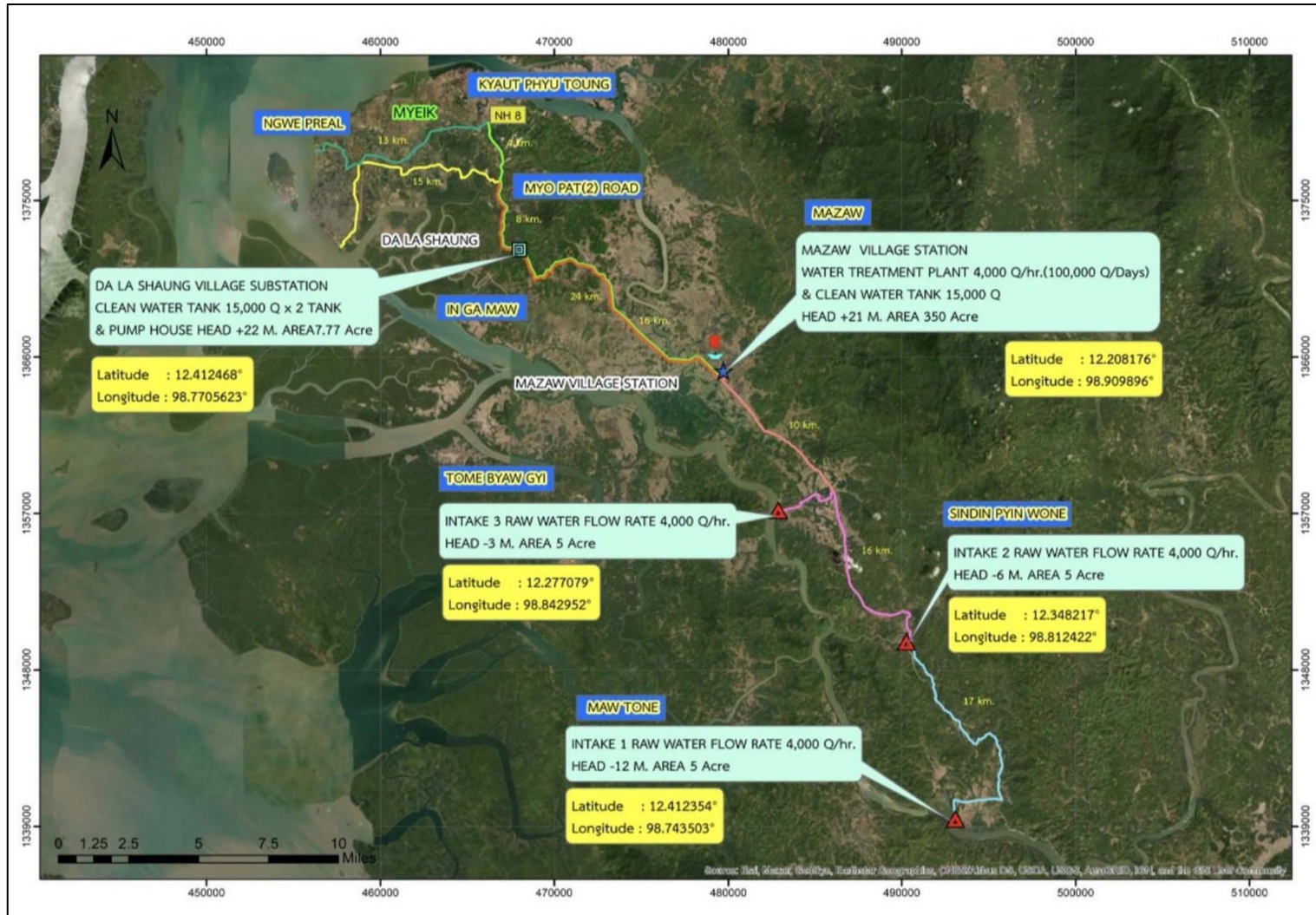


Figure 4-8 Google Earth Map of Proposed Project

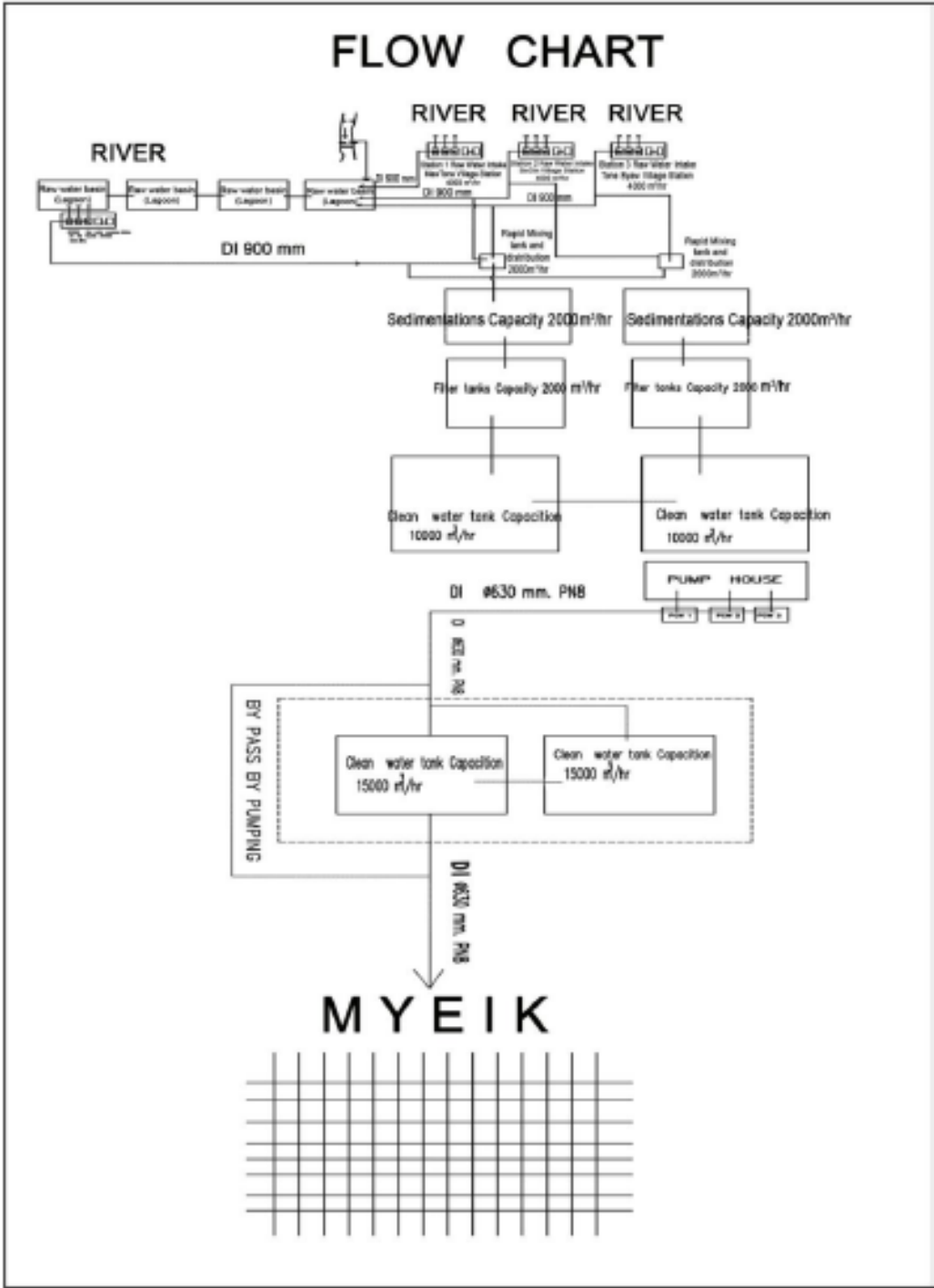


Figure 4-9 Process Flow Chart of Proposed Project

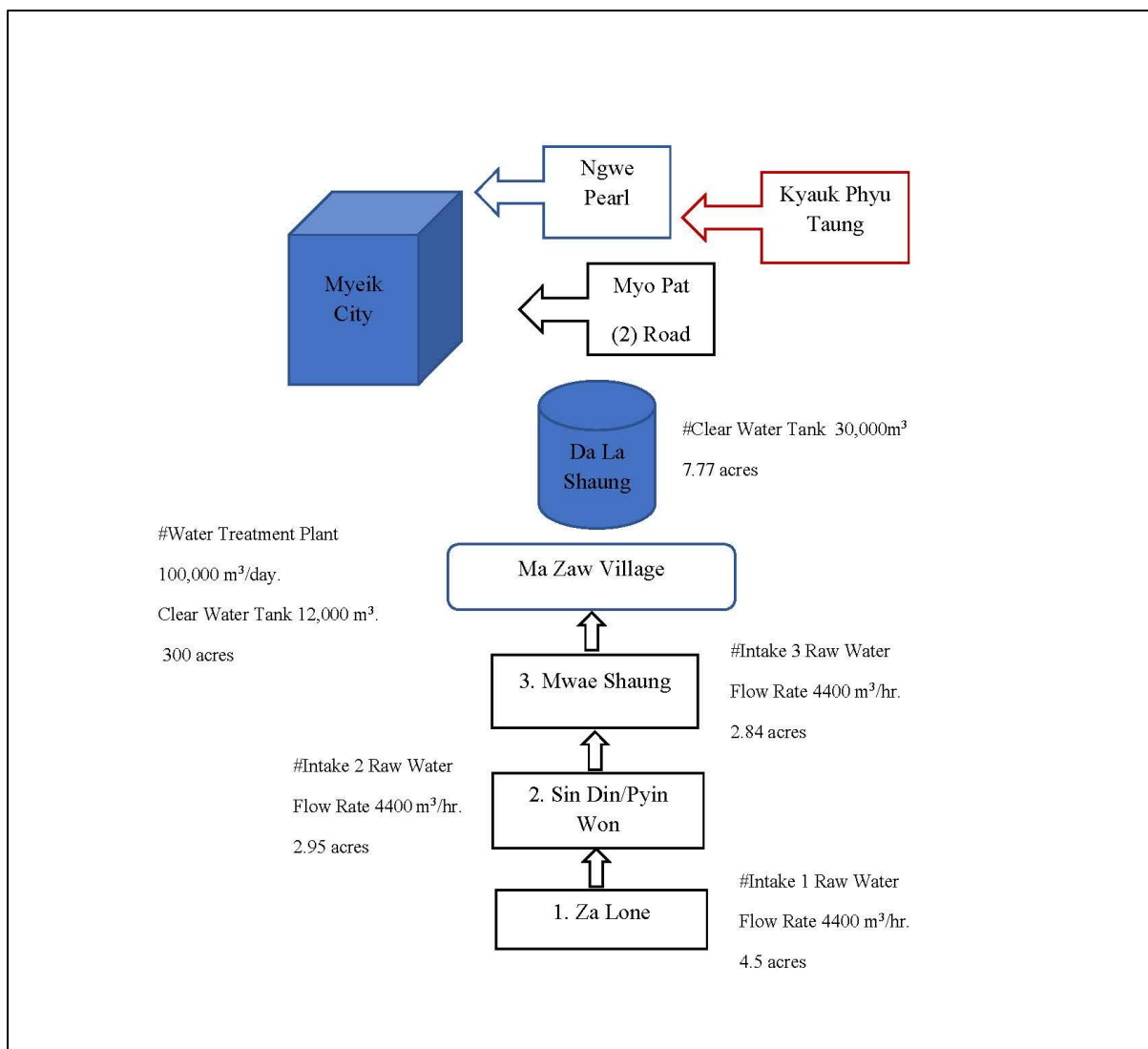


Figure 4-10 Flow Chart of Proposed Project

4.5.1 River Water Pumping

The proposed project will use raw water resources from the Tanintharyi River by conducting raw water pumping stations at three points. The raw water pumping building model is raw water chute system with raw water pumping station. Approximately each station construction area will require about 2 – 5 acres near the Tanintharyi River which is far away from the community areas.

In general, raw water pumping station in East Maw Tone (Za Lone), Sin Din/ Pyin Won and Tone Byaw Gyi (Mwae Shaung) villages can pump 4,400 cubic meters/hour (100,000 cubic meters/day) in which it can be used as freshwater for about 10 months and later for 8 months and the last for 6 months. There are 3 Pumps with 500 Horse Power in each station. The project will use 2 Pumps with 2,200 cubic meters/hour in operation and the last one is standby for emergency use.

The proposed project will run only one pumping station among three stations 24 hours based on best expected weather conditions of the source river.

The following table presents the estimated time schedule and rotation of the water pumping stations.

Table 4-2 Rotation Plan of the Water Pumping Stations

No.	Station	Capacity (m ³ / hour)	Running Hours	Rotation
1	Maw Tone (Za Lone)	4400	24 Hours	February - June
2	Sin Din/ Pyin Won	4400	24 Hours	October - February
3	Tone Byaw Gyi (Mwae Shaung)	4400	24 Hours	June - October

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Figure 4-11 Conceptual Design Layout of River Water Pumping Station

4.5.2 Water Treatment and Storage

High Density Polyethylene (HDPE), combination of metal and plastic pipe, Steel Pipe (SP), and Ductile Iron (DI) Pipe, having a diameter of 700-600 mm, will be used for connecting River Water Pumping Stations and Water Treatment Plant. And the dredging method used in

the water production station is double pipe dredging methods having total distance about 50 kilometers. Therefore, the total length for 2 water pipes is about 100,000 m (100 km).

The raw water ponds will be built at Treatment Plant to cover at least 2 months water consumption because the pumping stations cannot get fresh water the whole year. There are 4 ponds with each area of 40 acres (total 160 acres) with the depth of on ground 5 m and underground 5 m (10 m) for raw water storage of 6,000,000 cubic meters. The total area of about 300 acres will be needed for water treatment plant and raw water ponds.

The detailed drawings of the proposed project are also attached in Appendix IV.

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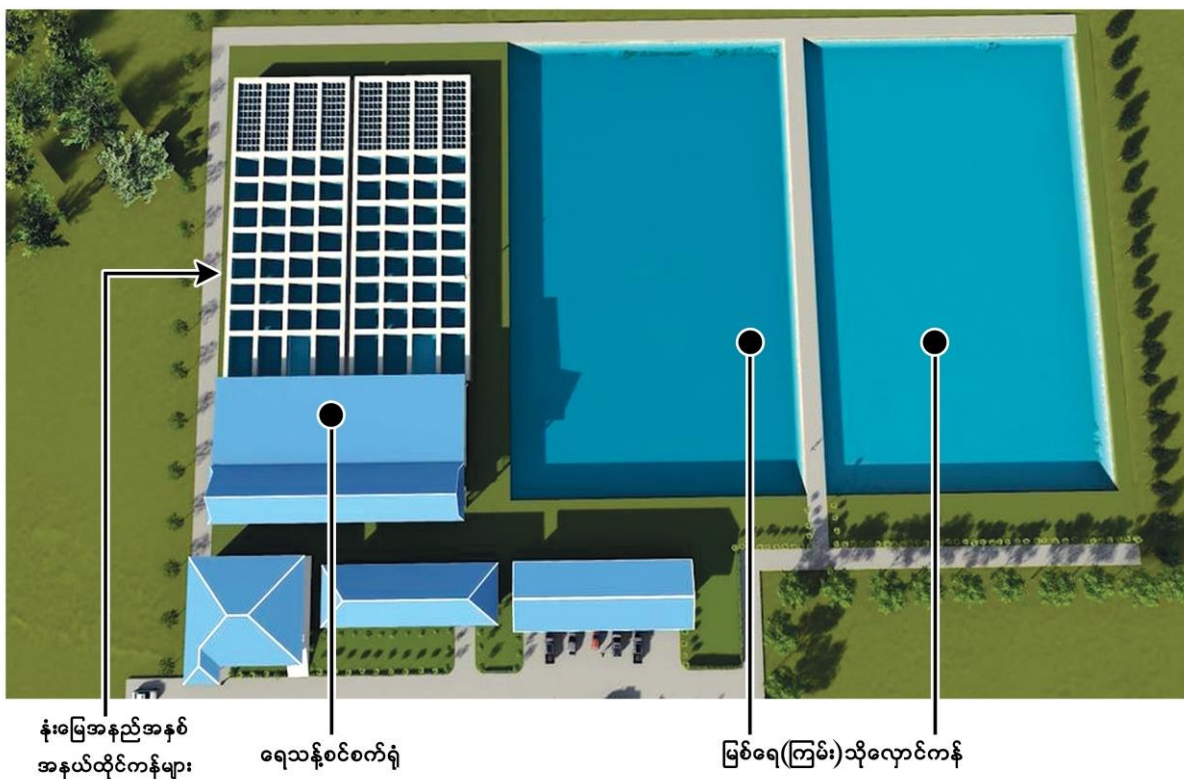


Figure 4-12 Conceptual Design Layout of Water Treatment Plant

The conventional water treatment process consists of;

(1) Fast Agitation or Sediment Formation (Coagulation)

The stored water from the ponds will flow to the concrete tank close to the factory with flow rate of 4,400 cubic meters/ hour. The water quality of concrete tank will be analyzed for Alum (Aluminum Sulfate) calculation. Then dosage of Alum can cause sedimentation of river water. This process can be named as Fast Agitation or Sediment Formation (Coagulation) with Alum or Aluminum Sulfate.

This agitator has special characteristics in which no external energy is needed for stirring and mixing because the Mixer Cone installation is above the opening. Raw water will flow from

the wash side through the opening to the top, bumping into the rich department causing disturbances such as mix water and chemicals together. From which this rich department can adjust the up-down level to adjust the tail distance between the openings. This is usually installed inside the fast-mixing pond and the divides the water.

(2) Slow Agitation or Sediment Consolidation (Flocculation)

Then the Alum treated river water will be circulated slowly in the concrete tank. So that the sediments will add together and Flocculation process will gradually become to the floor of the tanks. Poly Aluminum Chloride (PACl) will be added as a coagulant for this Slow Agitation or Sediment Consolidation (Flocculation) Process.

Sediment aggregation stabilizes colloidal particles that have been destroyed will have more opportunity to touch each other and form a larger particle size. So, the sediment will become heavy enough to precipitate out of the water as well as gravity. This process will occur in the Slow Mixing Tank and the design must cause agitation. Water will flow gently with long enough by controlling the water speed appropriately not too low until the sedimentation inside the tank stirred slowly and not too fast. If not, the sediments can break apart again.

(3) Sedimentation Tanks

There are 4 pairs of sedimentation tanks with sedimentation rate of 1,000 cubic meters/ hour. Rectangle sedimentation tank used in conventional water treatment systems are usually long and narrow in which the water flows in at one end of the tank. It flows along with the length of the tank gardening into the water. The tank may have a wall or Diffusion Wall to help reduce the flow of the water speed and distribute the water to flow into the tank thoroughly throughout the cross-section of the tank. And the water continues to flow horizontally along the tank and straight to the water through at the other side of the tank which controls the water level and the rate of drainage from the tank with a V shaped weir or open channels that are installed along the water receiving. At an appropriate flow velocity, the pellet will move in the direction of the water flow and move into vertical according to the gravity of the earth. Finally, it will fall at the bottom of the tank. Only the clear water flows out into the receiving water tank of the total length. So, the water drain must be enough to allow the water to flow out of the tank at the specified speed. Mechanisms may be installed for sweeping sediment at the bottom of the tank for discharging.

(4) Filtration

After sedimentation and flocculation, the water will pass to Sand Filter to remove the residual sediments. The thickness of the sand filter will be about 0.6-0.75 meter. Quick sand filter system uses sand (specific gravity with 2.65) size which is approximately 0.45-0.65 millimeters, but it is prefer to use 0.62 – 0.68 millimeter since the thickness of the sand layer is around 0.6-0.75 meters as mentioned earlier. The sand layer will be arranged with the grainy sand at the top layer and large granulated sand will be at the bottom if small turbidity particles can pass through the sand filter. As it has been already mentioned above, it is unlikely to get the opportunity to be eliminated by the filter layer because the space between

the grains increases with the depth of the filter layer. In addition, the small sand filter on the top layer causes the sediment to be trapped quickly. Only the top surface of the gray filter sand causes fast clogging and has to wash the sand frequently while the thickness of the deep sand filter is still clean.

(5) Disinfection

Lime will be used for sedimentation and removal of heavy metals and for the suitable pH values. In addition, Chlorine Powder will be added before sand filtration for disinfection purposes.

(6) Water Distribution Tanks

The water will be transported to Water Distribution Tanks of Da La Shaung after treatment and disinfection from Ma Zaw Treatment Plant. The total distance is about 15 kilometers. In this process, 500 HP engines and pumps at Treatment Plant will be used with each pumping rate of 2,200 cubic meters per hour. There are 3 sets of engines and pumps with total power of 1,500 HP. There will be 2 HDPE, SP and DI pipe lines from the treatment plant to the distribution tanks with diameter of 700-600 millimeter. The total length of the pipe lines is about 18,000 meters (18 km). The area of the water distribution pond at Da La Shaung is about 15 acres at elevation of 40-60 m. This can store about 30,000 cubic meters of water. Then the water will be distributed to Myeik with gravity flow.

(7) Clear Water Storage Tanks of Treatment Plant

Tower (Overhead Tank) will be constructed at Water Treatment Plant to provide water consumption of the factory if needed. The 12,000 cubic meter water storage pond will also be built for the storage of treated water from the factory. These clear water tanks serve to reserve water during periods of lower water usage than tap water production rates to swim during the rate of water usage is greater than the production rate. Normally, clear water tanks are designed to have a capacity of approximately 12,000 cubic meters of water at the production station.

(8) Sludge Disposal Lagoons

There will be sludge disposal lagoons to dispose the sediments from each treatment process at the treatment plant. The surface area of these lagoons is approximately about 2,000 - 60,000 m² with 2-10 m depth. The disposed sludge will be reused again in brick production works as a recycle process.

4.5.3 Chemical Management

Coagulant chemical used in sedimentation chemicals (Coagulation) or Coagulant substance is a chemical that can disintegrate into particles that are cationic. When it is added to water, it destroys the stability of Colloids and suspensions in the form of turbidity, color, organic matter etc. Under severe turbulent water conditions in the Rapid Mixing process, sediment is

generated and combined. (Flocculation) FL (Floc) is a large increased weight; it can precipitate in the sedimentation tank. The sediment will react with water more effective.

4.5.4 Sediment Builders that are commonly used for tap water production

- 1) Alum or Aluminum sulfate is one of the most popular coagulants in Thailand because it can be used well with raw water from various sources and is easy to find at a very affordable price.
- 2) Poly Aluminum Chloride (PAC) is sediment that has been used since the 1970s. It is widely used in Japan and some countries in Europe.
- 3) Water chemistry pretreatment is with appropriate acid or alkaline by adding chemicals such as lime to have the right pH causing the metal to precipitate which can be separated from the water.
- 4) Chemicals used to disinfect chlorine powder (CaCl_2) Chlorine content in the range of 60-70%, 1 % of World Health Disinfecting water in both bacteria and viruses. In general, the amount of free chlorine remaining in the water after 30 minutes, not less than 0.5 mg/l, with the water pH not higher than 8 and turbidity not more than 1 NTU.

4.5.5 Chemical Dispensing

(1) Sedimentation system

It is based on the Jaret's test data, capacity, and percentage of chemical solution. To calculate the rate of dispense of each type of chemicals, it is done by adjusting the chemical dispenser according to the calculated quantity measure water quality in production process and other elements. It is required to control the water production system to be able to produce standard water efficiently and continuously.

(2) Filter system

It is done with adding chlorine before filtering. The purpose is to stimulate the sand filter to be Mn-sand as well as eliminate algae and manganese which should control the amount of free chlorine remaining after filtering in the range of 0.5 mg/l. The amount of chlorine added before entering the filter system obtained from testing depends on the demand for chlorine in water.

(3) Disinfection system

Post-Chlorination is the addition of chlorine to the filtered water to eliminate germs in the water after filtering before dispensing services to water users.

Re-chlorination is an intermediate chlorine addition by installing a station for chlorine refilling to maintain the level of residual chlorine to cover all areas of the water supply system.

4.5.6 Pipe Work

1. Raw water pipe means a water pipe that is used to deliver raw water. From water sources to water supply systems or reservoirs.
2. Water supply pipe means a water pipe that is used to supply water with no water distribution on the way.
3. Water Supply pipe means plumbing that service water supply.
4. Main service pipes are the water pipes that are separated from the water distribution pipes to connect with water users' pipes.
5. Service pipe means a water pipe that is separated from the main water distribution pipe or service pipe to a maximum of 2 water users.
6. Internal pipelines refer to pipelines placed in production or distribution stations.

Types of pipes and equipment used in the project are presented as follows;

Table 4-3 Pipes and Equipment

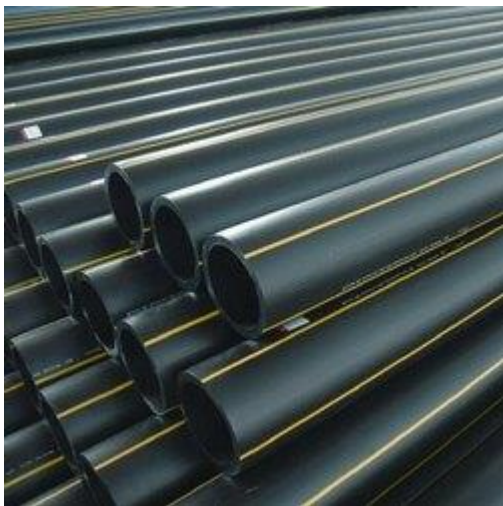
Sr.	Types
1.	STEEL PIPE
2.	POLYVINYL CHLORIDE PIPE
3.	POLYBUTYLENE PIPE
4.	HIGH DENSITY POLYETHYLENE PIPE
5.	CAST IRON PIPE
6.	DUCTILE IRON PIPE
7.	CAST IRON METAL-SEATED GATE VALVE
8.	CAST IRON RUBBER-SEATED GATE VALVE
9.	BUTTERFLY VALVE
10.	BALL VALVES
11.	CHECK VALVE
12.	QUICK-OPENING GATE VALVE
13.	FOOT VALVE
14..	FIRE HYDRANT
15.	AIR VALVE
16.	BLOW OFF



DI Pipe



PB Pipe



HDPE Pipe

Figure 4-13 Examples of Pipe Types

The specifications and information of pumps and generators that will be used in the proposed project are presented in Appendix V.

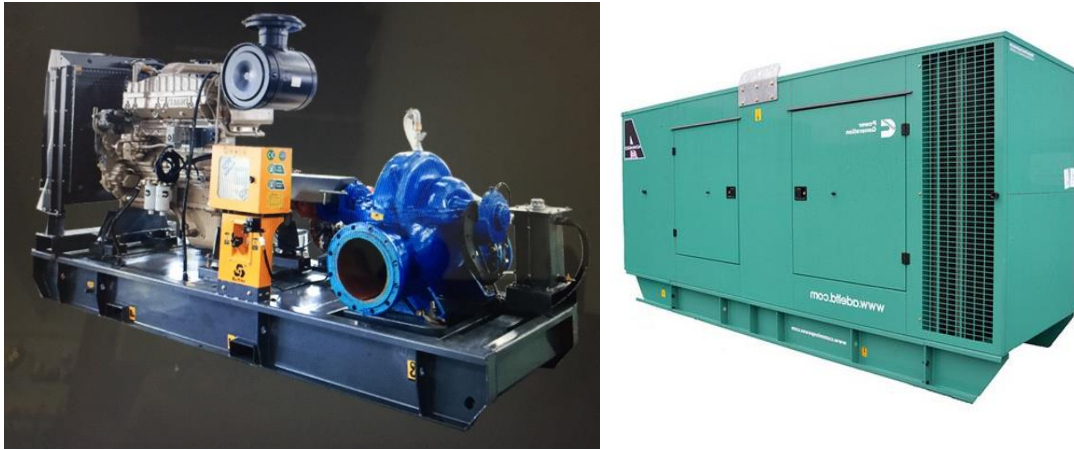


Figure 4-14 Water Pump and Power Generator

4.6 Water Distribution

The proposed project will supply clean and treated water to total population of 180,500 in three village tracts and twelve wards of Myeik City. The project will use small distribution water pipe lines (Service Lines) in City area from Circular (1) and (2) Roads where are minimum potential disturbances to existing fiber cables in collaboration with Township Development Committee. The size of the pipe lines within City area will be assessed based on availability of land also in corporation with Township Development Committee. Daily water distribution is up to 100,000 cubic meters. There will be about 7 kilometers from the water storage tanks of Da La Shaung to Circular (2) Road, 10 kilometers from Circular (2) Road to Ngwe Pearl, and 4 kilometers from Ngwe Pearl (2) Street to Kyauk Phyu Taung.

4.7 Services

The proposed project will plan to provide the following services;

- (a) The proposed project will conduct the supplied water to get International Standards such as ISO.
- (b) Laboratories will be conducted to analyze the supplied water daily for health and safety and for removal of unwanted chemicals and bacteria.
- (c) The supplied water will be distributed with Smart Meter Prepaid System.
- (d) The proposed project will supply the tap water to the door of the customer.
- (e) The price will be the cheapest as much as possible.
- (f) The proposed project will install sufficient Fire Hydrants as a fire emergency response plan in cooperation with Township Fire Service Department and Township Development Committee.



Figure 4-15 Samples of Smart Meters

4.8 Resources Requirement

The proposed project will use Tanintharyi River water for the source of the treated clean water distribution. The project will use maximum 100,000 cubic meter river water daily for the distribution. The surveys and studies have been conducted to ensure to use this amount of water not to affect the environmental flow of the river.

The proposed project will require about 6 MW electricity to operate the overall project activities. The project will consider to implement renewable energy power plant such as Biomass Power Plant for the power requirement of the project because Tanintharyi Region still cannot access electricity from National Grid.

During the construction stage of the Project, it is estimated that 262 positions will be opened for local people followed with 131 positions opened for people with different professional skills in the operation stage of the Project. Details of the job estimated to be created are provided in the below tables.

Table 4-4 Job Requirement for Construction Phase

No.	Organization Chart for Construction	Position
1.	Project Manager	1 Nos
2.	Assistance of Project Manager	1 Nos
3.	Civil Engineer	10 Nos
4.	Electric Engineer	4 Nos
5.	Mechanical Engineer	7 Nos
6.	Environmental Engineer	2 Nos
7.	Labour	200 Nos
8.	Accountant Staff	5 Nos
9.	Administration Staff	11 Nos
10.	Storage Staff	21 Nos
Total		262 Nos

Table 4-5 Job Requirement for Operation Phase

No.	Organization Chart for Production	Position
1.	Manager	1 Nos
2.	Assistance of Manager	2 Nos
3.	Operation & Maintenance Manager	61 Nos
4.	Administration Staff	11 Nos
5.	Service Staff	51 Nos
6.	Accountant Staff	5 Nos
Total		131 Nos

The following table shows the estimated amount of chemical usage which will be required for production rate of 100,000 cubic meter water per day. The storage, handling and usage of these chemicals will be controlled according to the MSDSs of them. The detailed MSDSs are presented in Appendix XII.

Table 4-6 Estimated Amount of Chemical Usage

No.	Description	Kg/day	Kg/month	Kg/year
1.	Chlorine	3,200	96,000	1,168,000
2.	Alum Lump/ Waer/ PAC	200	6,000	73,000
3.	Aluminium Sulphate	44,000	1,320,000	16,060,000

4.9 Project Alternatives

The comparisons between proposed no action alternative and action alternative are described below. The project proponent will use the most suitable site locations and technology for the proposed project in collaboration with high experienced and skillful international company. Some project locations can be changed a little based on the decision of land owners and other reasons. But most of the project locations are the same as described in the scoping report of the proposed project. Water Treatment Plant is proposed to move Ma Zaw Village from Pa Thaug Village because of land available and better access. Then Water Storage Area is also proposed to move Da La Shaung Village from Pannel Taung Village because of land available and better distribution of water.

In addition, the proposed project will consider to conduct potential renewable energy plant for electricity source such as biomass power plant instead of generators because of fuel price and sustainability.

(i) Without Project or No Action Alternative

The proposed project would not be implemented in this alternative. Therefore, any development such as construction and operation activities would not be involved. Since the

situation remains unchanged, the benefits of local and regional economy will be failed, moreover, local people will not be able to get reliable tap water and job opportunities from this implementation.

(ii) **With Project or Action Alternative**

With the implementation of the proposed project, the significant benefits are the improvement of socio-economic benefits. However, there may be impacts of environment due to development activities. The potential environmental impacts are predicted to be localized, short-term, and reversible with implementation of appropriate mitigation measures and by undertaking regular compliance environmental monitoring plan. After attentive deliberation, this proposed project will be implemented.

Chapter 5. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

This chapter describes environmental and socio-economic conditions of surrounding area of proposed project area, Myeik Township and Tanintharyi Township, based on the available secondary information and primary information collected and measured from field surveys.

5.1 Methodology for Environmental Quality Measuring and Monitoring

Baseline environmental parameters and sampling locations were defined according to the objectives for monitoring purposes. Locations for measurement of ambient air quality and noise and vibration level of the project site, sampling and on-site measurement of water quality and soil quality were identified by E Guard Environmental Services Study Team. Air, Noise and Vibration Monitoring locations were selected near the possible receptors of the proposed project activities and alignment because there are no project activities currently. The environmental qualities were measured and followed by comparing with National Environmental Quality (Emission) Guidelines (2015). Environmental Quality Measurements were monitored and sampled for two seasons (Dry Season and Wet Season) except Soil Sampling (only for Wet Season).

5.1.1 Ambient Air Quality

The emissions of dust particles and gases were measured for 24 hours continuously at the selected sites by using the Environmental Perimeter Air Station (EPAS), and EPAS provides direct readings in real time with data-logging capabilities. The monitoring results were compared with National Environmental Quality (Emission) Guideline (NEQG) (2015), National Ambient Air Quality Standards (NAAQS), and American Conference of Governmental Industrial Hygienists (ACGIH).

Table 5-1 Ambient Air Quality Parameters

Ambient Air Quality (5 locations)	
Gas Emission	CO, SO ₂ , NO ₂
Dust Emission	PM ₁₀ , PM _{2.5}

5.1.2 Ambient Noise and Vibration

Noise level LAeq (dBA) and Vibration Level were measured at the selected locations that can reflect the exposure of the nearest local community and sensitive locations. Duration and frequency were measured for 24 hours continuously at the selected site using the Noise Meter. The monitoring procedures, data analysis and interpretation were carried out in accordance with the instrument's manufacture and National Environmental Quality (Emission) Guidelines, World Health Organization (WHO) and International Finance Corporation (IFC guidelines) in order to be in line with Environmental Conservation Department (ECD), Ministry of Natural Resources and Environment Conservation

(MONREC). "National Environmental Quality (Emission) Guidelines" for Myanmar was also presented the value of noise level as LAeq (dBA).

Table 5-2 Noise and Vibration Level Parameters

Noise Monitoring (5 locations)	
Noise Emission	LAeq (dBA) (1hr, 24 hrs.)
Vibration Level	dB (1 hr, 24hrs)

Equipment used to measure ambient air, noise and vibration measurements are shown below Table 5-3.

Table 5-3 Equipment used to measure ambient air, noise and vibration measurement

<p>Davis Vantage Pro2 Wireless Weather Station</p> <p>Provides detailed current weather conditions and expanded forecasts - all at a glance!</p> <p>The Vantage Pro2 uses a frequency-hopping spread spectrum radio from 902 MHz to 928 MHz to transmit and receive data up to 1,000' (300m) line of sight. In addition, the weather station features a bubble level, improved anemometer base, redesigned wind cups, and factory-calibrated wind direction. The integrated sensor suite combines temperature and humidity sensors, rain collector with an aluminum-plated tipping bucket, and anemometer into one package for easy setup. Measure inside and outside temperature and humidity, heat index, barometric pressure, dew point, rainfall, wind direction and speed, and wind chill.</p>	
<p>Haz-Scanner EPAS</p> <p>PM₁₀, PM_{2.5}, NO₂, SO₂, CO, CO₂, Temperature, and Relative Humidity</p>	
<p>Digital Sound Level Meter</p> <p>Noise</p>	

Vibration Level Meter VM-55

Vibration



5.1.3 Water Quality

Water Samples were collected on site with appropriate sampling equipment and procedures. Physical parameters such as pH, electrical conductivity, turbidity, salinity, DO, Temperature of surface were measured on site by portable multi parameter water quality meter. The sampling team has pre-arranged with the labs in Yangon for analysis and logistic arrangement made to reach the preserved samples with unique IDs to the designated labs within 48 hours.

The sampling and survey team has a list of local laboratories providing analytical services for water quality analysis. Up to this date, there are laboratories having accredited certification for water quality testing (environmental analysis) in Myanmar.

The following laboratory has been recognized as a long-term establishment in Myanmar and employed qualified technical staffs and used for analysis of water and parameters shown in Table 5-4.

1. ISO Lab

- No-18, Lanthit Road, Insein Township, Yangon. Tel; 01-540 955, 09-732251575

Table 5-4 Environmental Quality Parameters for Water quality


Water Quality Parameter	
Chemical Parameter	Ammonia, Arsenic, Chlorine, Copper, Cyanide, COD, Iron, Lead
Physical Parameter	Total Suspended Solids

On-site water quality measurements, water samplings are conducted using the following equipment as shown in Table 5-5.

Table 5-5 Equipment for water sampling and onsite measurement

HORIBA U-50, Multipara meter Water Quality Meter
 Multiple sensors allow for the measurement of 11 parameters simultaneously. (pH, pH(mv), ORP, DO, Salinity, TDS, Seawater Specific Gravity, Temperature, Turbidity, Water depth)
 Patented auto-calibration features provide hassle free calibration of pH, dissolved oxygen, conductivity and turbidity. Ultra-sensitive Turbidity Sensors (Models U-50)



<p>Precision has been improved over conventional instruments.</p> <p>Improved stability of the dissolved oxygen sensor has been achieved with a new 3 electrode design for fast response and polar graphic sensor for ease of maintenance. pH and ORP electrodes can be replaced individually to reduce replacement costs.</p>	
<p>Water Sampling Bottle</p>	

5.1.4 Soil Quality

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

The sampling and survey team has a list of local laboratories providing analytical services for soil quality analysis. Up to this date, there are laboratories having accredited certification for soil quality testing (environmental analysis) in Myanmar.

The following laboratory was used for analysis of soil parameters shown in Table 5-6.


1. REM-UAE Laboratory and Consultant Co., Ltd.

- B702 Delta Plaza, Shwegondaing Road, Bahan, Yangon, 11201, Myanmar. Tel; 0973013448, 095144005, 095376382

Table 5-6 Environmental Quality Parameters for Soil Quality

<i>Soil</i>	
Soil Parameter	Chromium, Cadmium, Lead, Arsenic, Iron, Mercury, Cyanide, Zinc, Copper

On-site water quality measurements, water, soil and sediment samplings are conducted using the following equipment as shown in below Table.

<p>Soil Sampler (One Piece Auger)</p> <p>Augers are used for sampling to depths of 8'. These soil augers use snap pins to lock the cross handle, two concentric extendable extension pieces, and the bucket auger together. It is designed for easy transport and storage. Telescoping augers are just 5' 4" long and weigh between 5 to 8 lbs.</p>	
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5.2 Monitoring and Sampling Locations

Locations of sampling sites were identified by E Guard Environmental Quality Team for both seasons (Dry and Wet Season). The following Table shows the locations of monitoring and sampling of Environmental Quality.

Air, Noise and Vibration Quality Monitoring <i>(Point 2 of Dry and Wet season differed because of the updated proposed location of Water Treatment Plant)</i>	Dry Season	Point 1. Pannel Taung Village Point 2. Pa Thaung Village Point 3. Tone Byaw Gyi Village Point 4. Sin Din/Pyin Won Village Point 5. East Maw Tone Village
	Wet Season	Point 1. Pannel Taung Village Point 2. Ma Zaw Village Point 3. Tone Byaw Gyi Village Point 4. Sin Din/Pyin Won Village Point 5. East Maw Tone Village
Soil Quality Sampling	Wet Season	Point 1. Pannel Taung Village Point 2. Ma Zaw Village Point 3. Pa Nat Nge Village
Water Quality Onsite Measurement and Sampling	Dry and Wet Season	Tanintharyi River

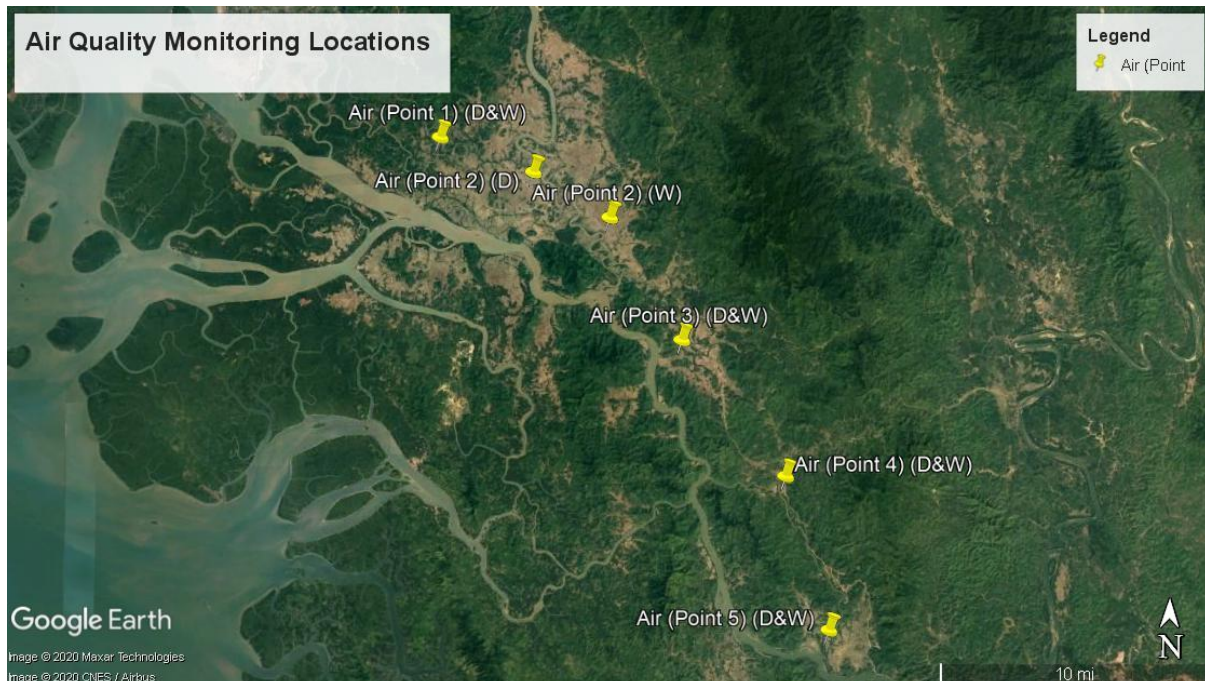


Figure 5-1 Location of Air, Noise and Vibration Monitoring Points for Dry Season and Wet Season



Figure 5-2 Water Quality Sampling Locations for Dry Season and Wet Season



Figure 5-3 Soil Quality Sampling Locations for Wet Season

Table 5-7 Location of Sampling Points

Locations No.	Points	Coordinate	Locations
Ambient Air Quality, Noise and Vibration Monitoring Locations			
1.	Point 1	Lat- 12°23'8.622"N, Long- 98°43'7.381"E	Pannel Taung Village (For Dry and Wet Season)

Locations No.	Points	Coordinate	Locations
2.	Point 2	Lat- 12°22'4.810"N, Long- 98°46'12.100"E	Pa Thaung Village (For Dry Season)
3	Point 2	Lat- 12°20'40.43"N, Long- 98°48'44.08"E	Ma Zaw Village (For Wet Season)
4	Point 3	Lat- 12°16'47.621"N, Long- 98°51'10.377"E	Tone Byaw Gyi (Mwae Shaung) Village (For Dry and Wet Season)
5	Point 4	Lat- 12°12'29.659"N, Long- 98°54'39.441"E	Sin Din/Pyin Won Village (For Dry and Wet Season)
6	Point 5	Lat- 12°07'35.156"N, Long- 98°56'10.527"E	East Maw Tone (Za Lone) Village (For Dry and Wet Season)
River Water Quality Sampling Locations			
1.	SW 1	Lat- 12°16'42.02"N, Long- 98°50'24.36"E	Tanintharyi River
2.	SW 2	Lat- 12°12'30.62"N, Long- 98°54'36.33"E	Tanintharyi River
3.	SW 3	Lat- 12°07'08.51"N, Long- 98°55'59.76"E	Tanintharyi River
Soil Quality Sampling Locations			
1.	Soil 1	Lat- 12°23'53.151"N, Long- 98°42'58.865"E	Pannel Taung Village
2.	Soil 2	Lat- 12°20'52.158"N, Long- 98°48'44.491"E	Ma Zaw Village
3.	Soil 3	Lat- 12°09'32.58"N, Long- 98°57'10.12"E	Pa Nat Nge Village

5.3 Environmental Quality

5.3.1 Ambient Air Quality

24 hours air quality monitoring was done at each selected locations from 11th to 16th January 2020 (for Dry Season) and 18th to 23rd June 2020 (for Wet Season). During this survey, the EPA criteria pollutants PM₁₀, PM_{2.5}, CO, SO₂ and NO₂ were measured. The measured results are compared with National Environmental Quality (Emission) Guidelines (2015) for parameters PM₁₀, PM_{2.5}, SO₂, and NO₂, National Ambient Air Quality Standards (NAAQS) for CO, and American Conference of Governmental Industrial Hygienists (ACGIH) for CO₂.



Figure 5-4 Air Quality Monitoring for Both Season (Wet and Dry Season)

Table 5-8 Observed Ambient Air Quality Results from Selected Points (Dry Season)

Parameters	Observed Value					Guidelines Value	Unit	Averaging Period
	Point 1	Point 2	Point 3	Point 4	Point 5			
PM ₁₀	29.92	25.31	20.95	9.54	12.19	50	µg/m ³	24hrs
PM _{2.5}	15.40	12.79	10.47	5.14	6.92	25	µg/m ³	24hrs
CO ₂	484.55	487.04	489.95	520.71	335.33	5000	ppm	8hrs
CO	0	0	0	0	0	9	ppm	8hrs
SO ₂	0.03	0.03	0	0	0	20	µg/m ³	24hrs
NO ₂	4.54	5.26	12.72	40.07	7.86	200	µg/m ³	1hrs

Table 5-9 Observed Ambient Air Quality Results from Selected Points (Wet Season)

Parameters	Observed Value					Guidelines Value	Unit	Averaging Period
	Point 1	Point 2	Point 3	Point 4	Point 5			
PM ₁₀	9.73	5.20	7.26	5.22	6.60	50	µg/m ³	24hrs
PM _{2.5}	4.96	2.58	3.59	2.89	3.62	25	µg/m ³	24hrs
CO ₂	461.93	465.80	477.91	530.39	490.30	5000	ppm	8hrs
CO	0	0	0	0	0	9	ppm	8hrs
SO ₂	0.05	0	0.01	0.01	0.04	20	µg/m ³	24hrs
NO ₂	3.92	4.92	8.43	5.12	7.49	200	µg/m ³	1hrs

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

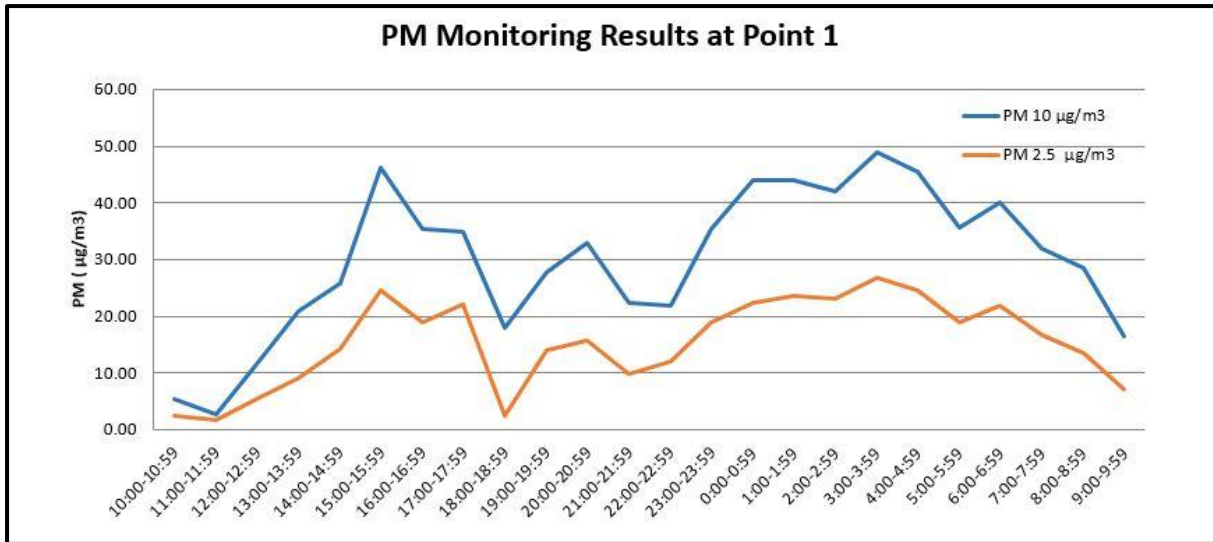


Figure 5-5 PM Monitoring Results at Pannel Taung Village (for Dry Season)

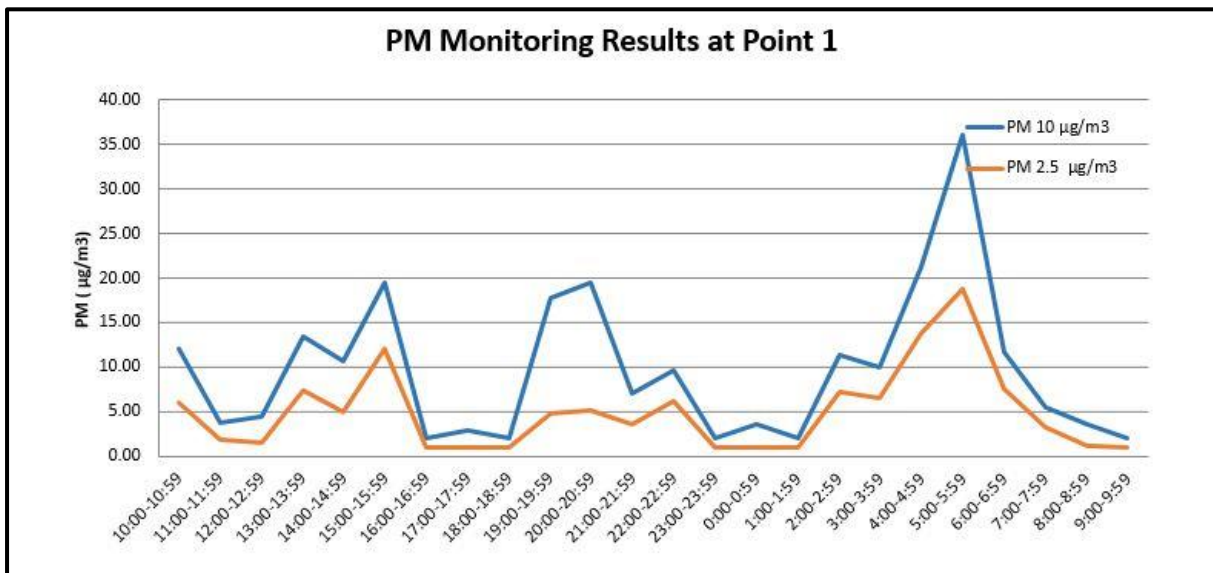


Figure 5-6 PM Monitoring Results at Pannel Taung Village (for Wet Season)

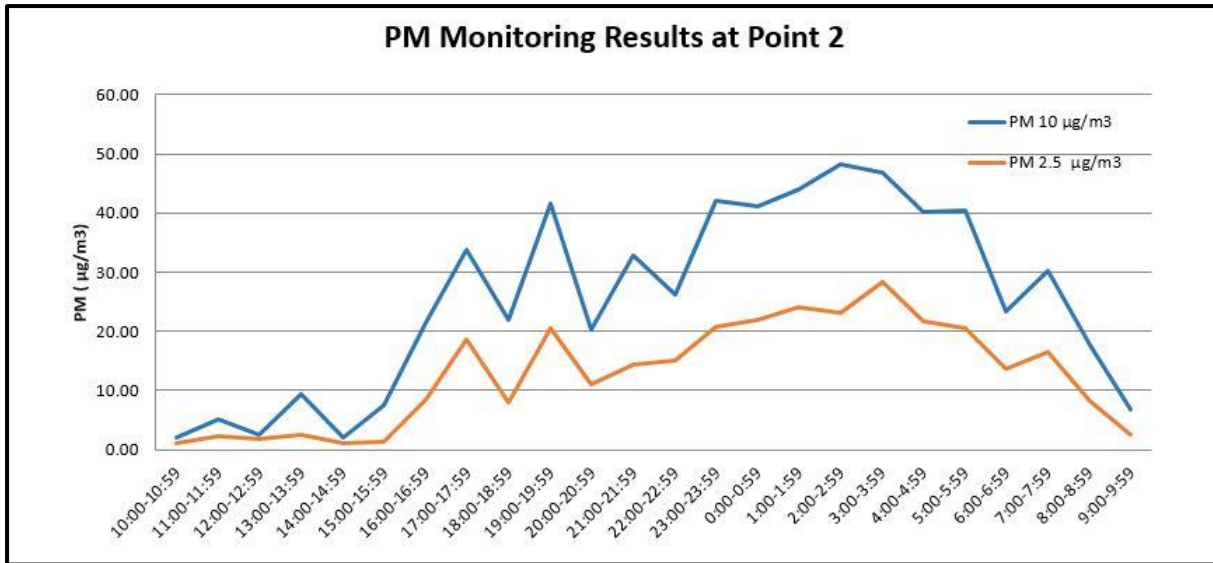


Figure 5-7 PM Monitoring Results at Pa Thaung Village (for Dry Season)

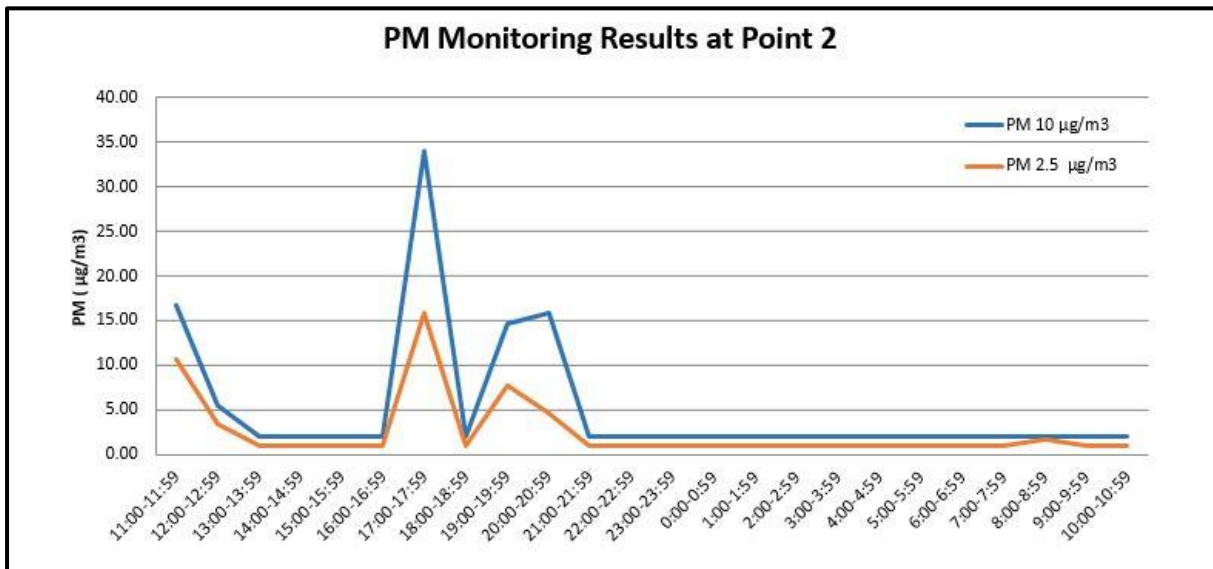


Figure 5-8 PM Monitoring Results at Ma Zaw Village (for Wet Season)

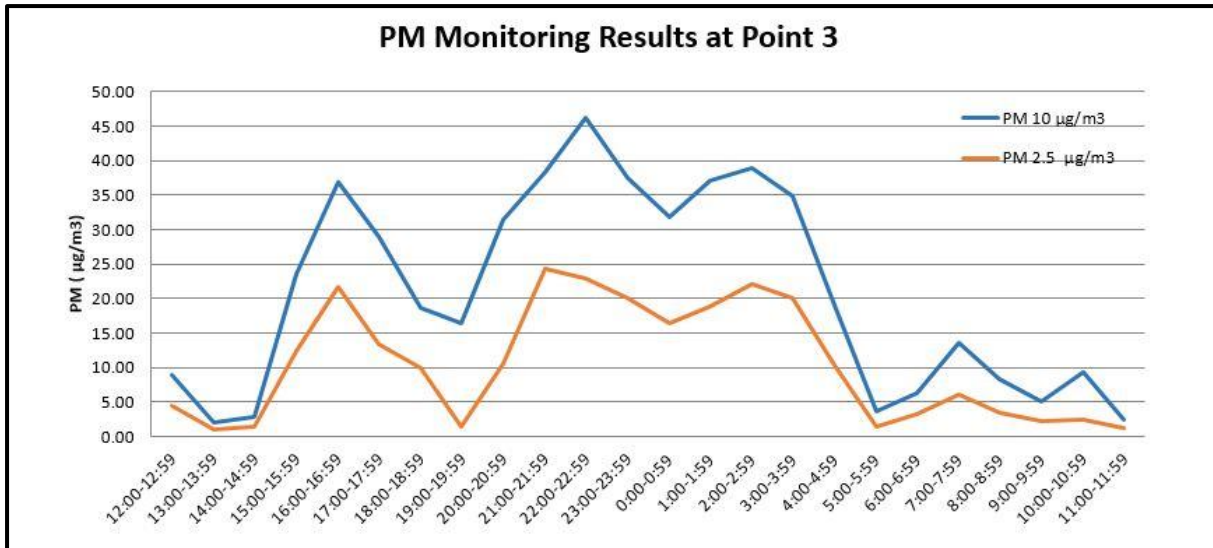


Figure 5-9 PM Monitoring Results at Tone Byaw Gyi Village (for Dry Season)

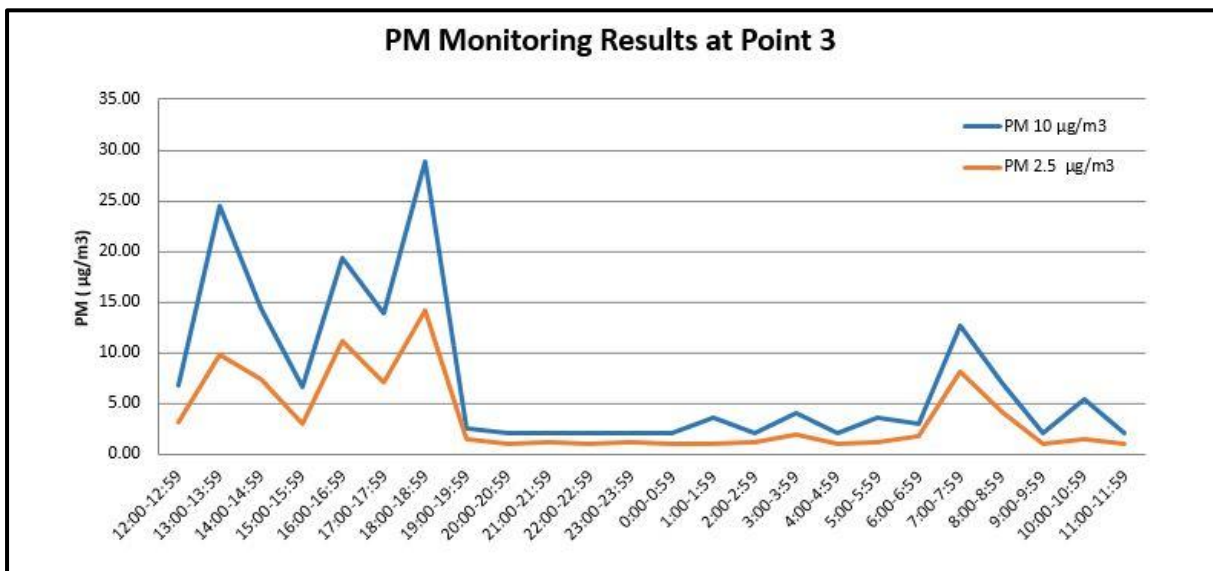


Figure 5-10 PM Monitoring Results at Tone Byaw Gyi Village (for Wet Season)

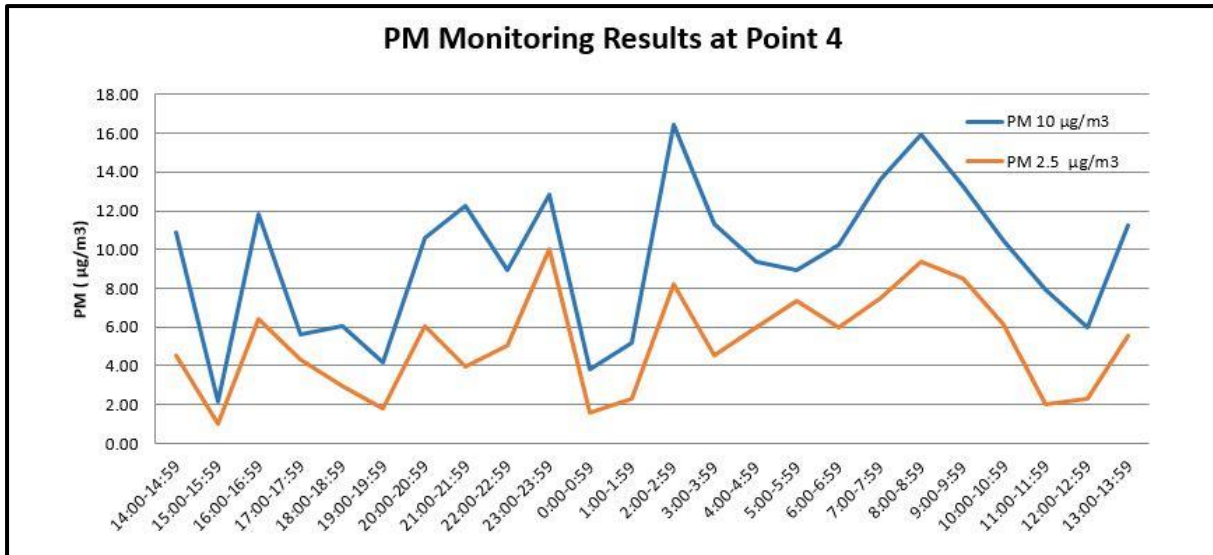


Figure 5-11 PM Monitoring Results at Sin Din/Pyin Won Village (for Dry Season)

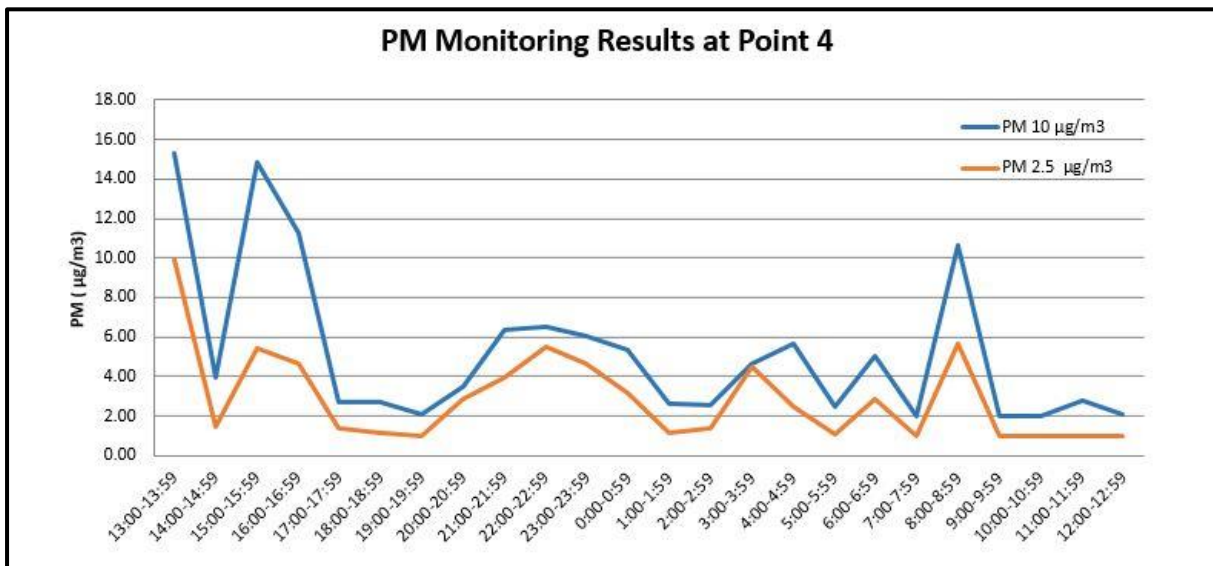


Figure 5-12 PM Monitoring Results at Sin Din Pyin/Won Village (for Wet Season)

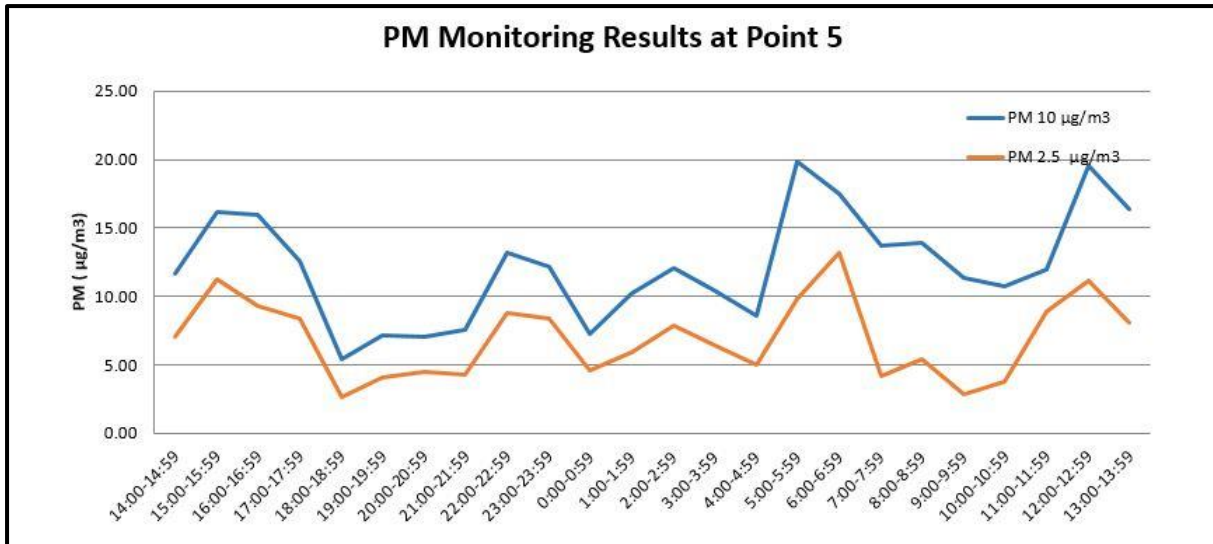


Figure 5-13 PM Monitoring Results at East Maw Tone Village (for Dry Season)

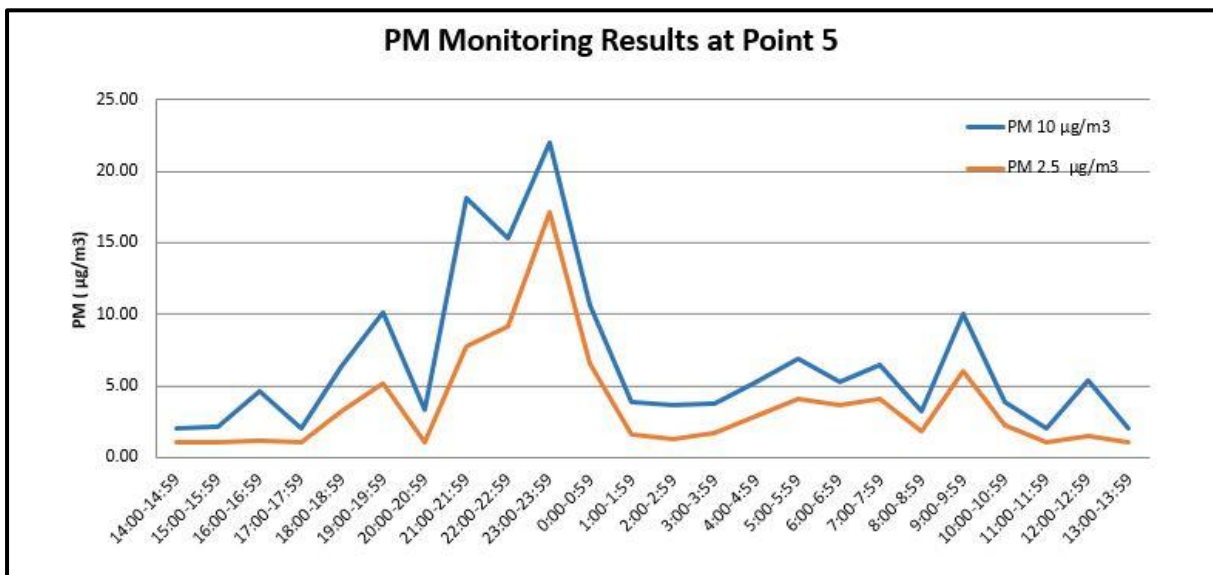


Figure 5-14 Monitoring Results at East Maw Tone Village (for Wet Season)

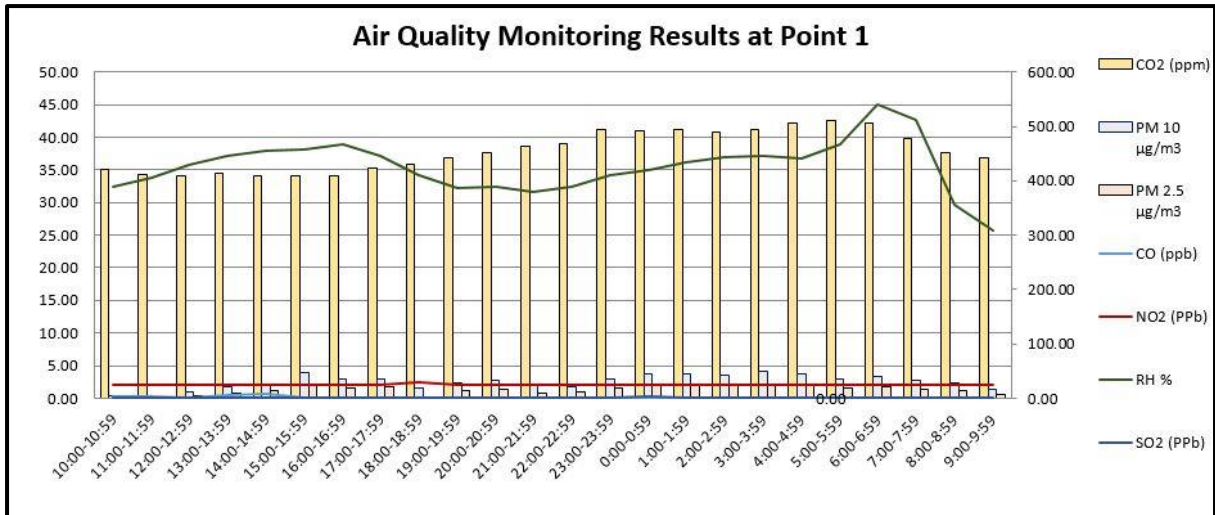


Figure 5-15 Fluctuation of Air Pollutants during diel cycle (Pannel Taung Village for Dry Season)

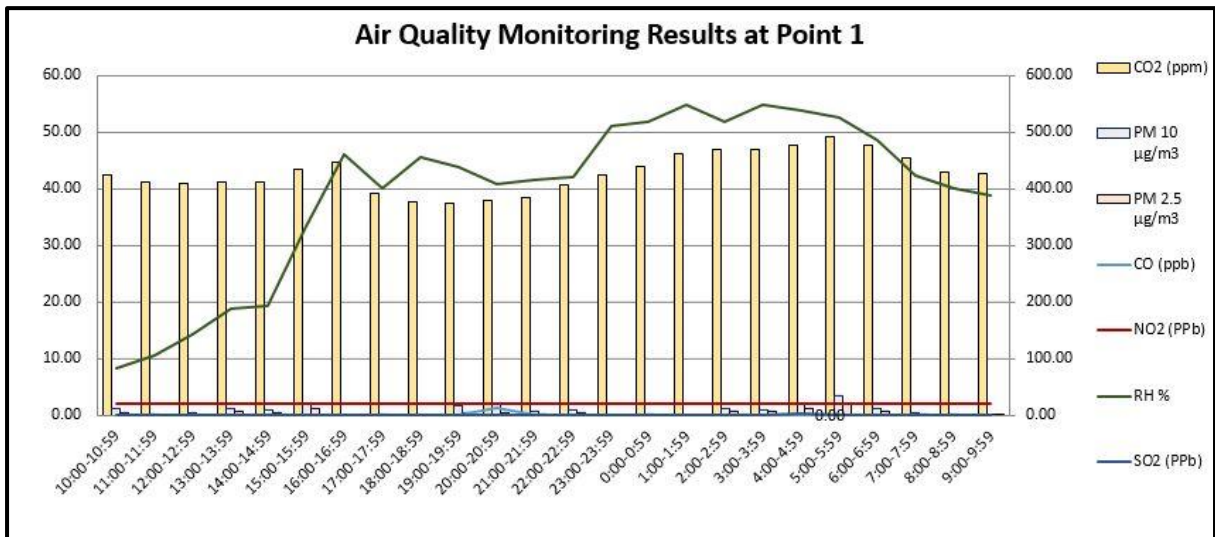


Figure 5-16 Fluctuation of Air Pollutants during diel cycle (Pannel Taung Village for Wet Season)

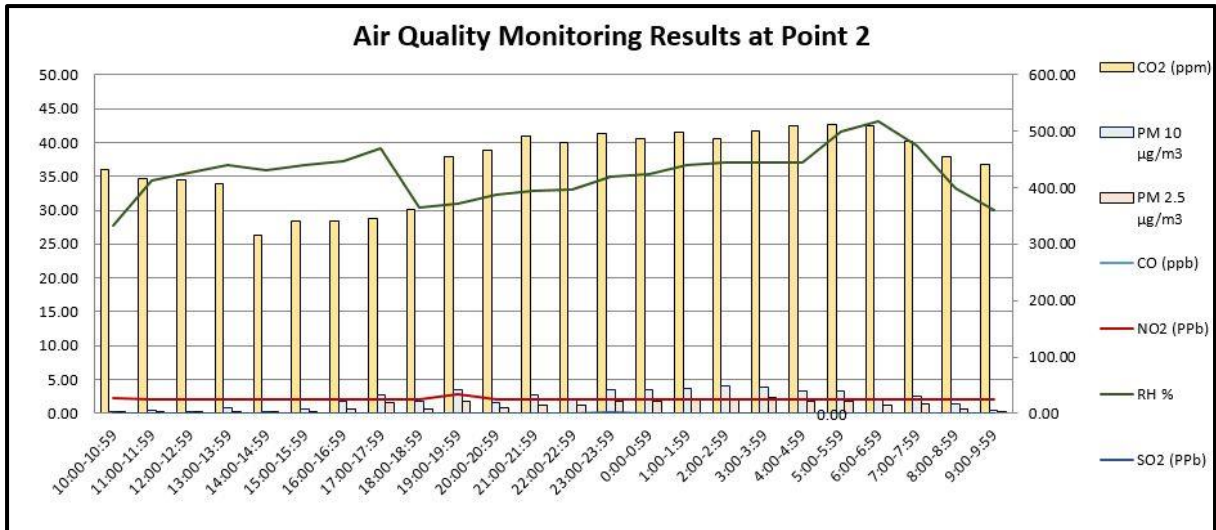


Figure 5-17 Fluctuation of Air Pollutants during diel cycle (Pa Thaung Village for Dry Season)

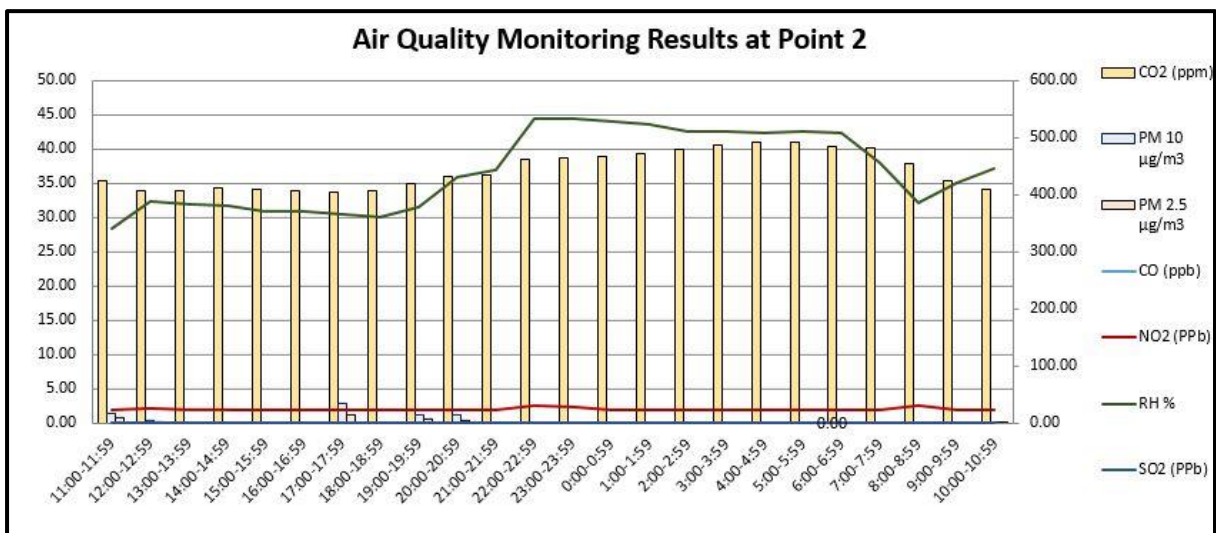


Figure 5-18 Fluctuation of Air Pollutants during diel cycle (Ma Zaw Village for Wet Season)

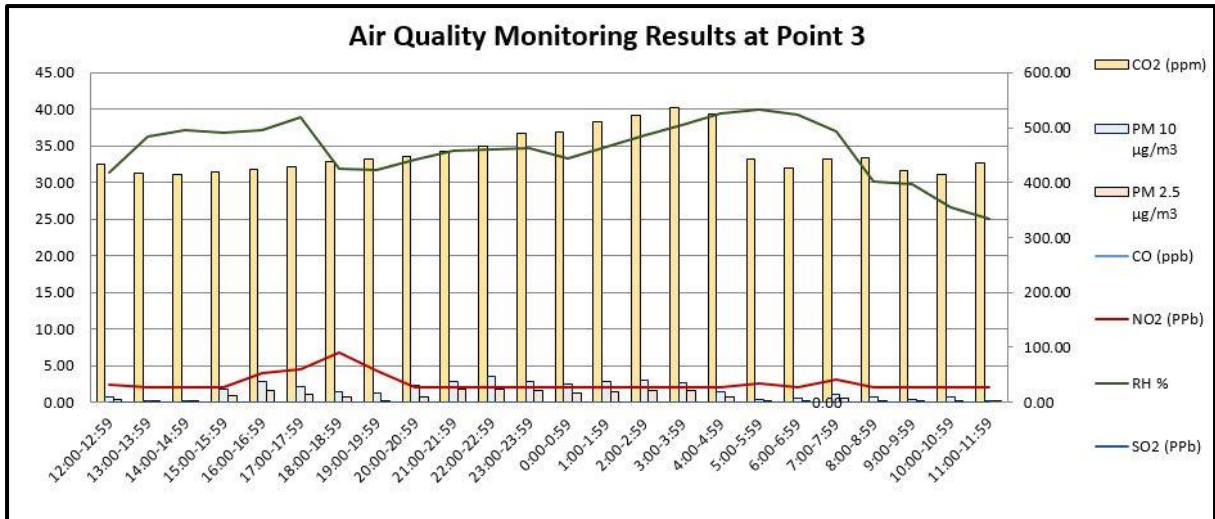


Figure 5-19 Fluctuation of Air Pollutants during diel cycle (Tone Byaw Gyi Village for Dry Season)

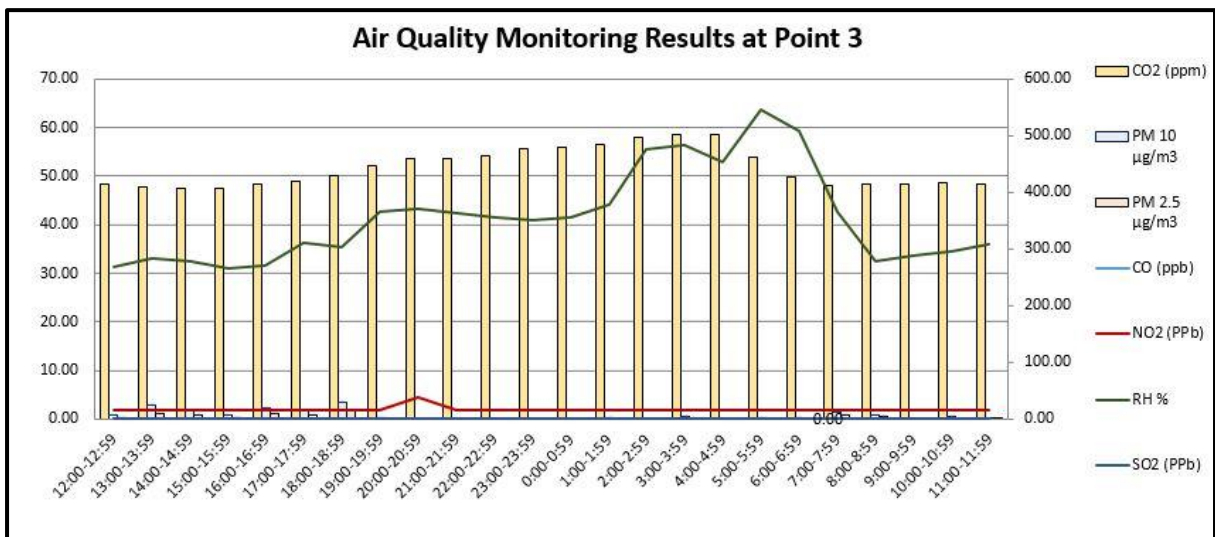


Figure 5-20 Fluctuation of Air Pollutants during diel cycle (Tone Byaw Gyi Village for Wet Season)

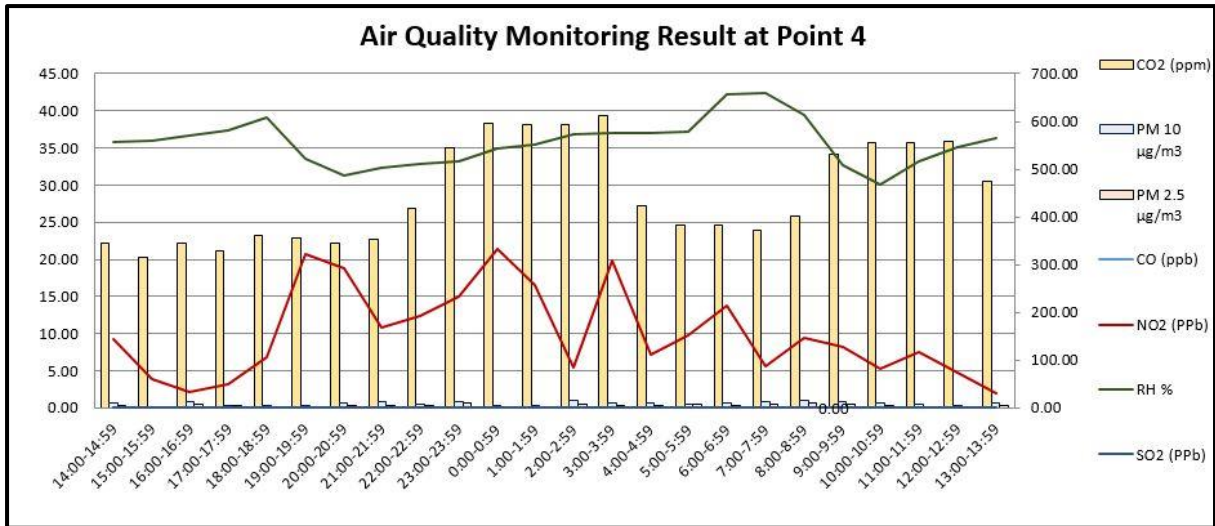


Figure 5-21 Fluctuation of Air Pollutants during diel cycle (Sin Din/Pyin Won Village for Dry Season)

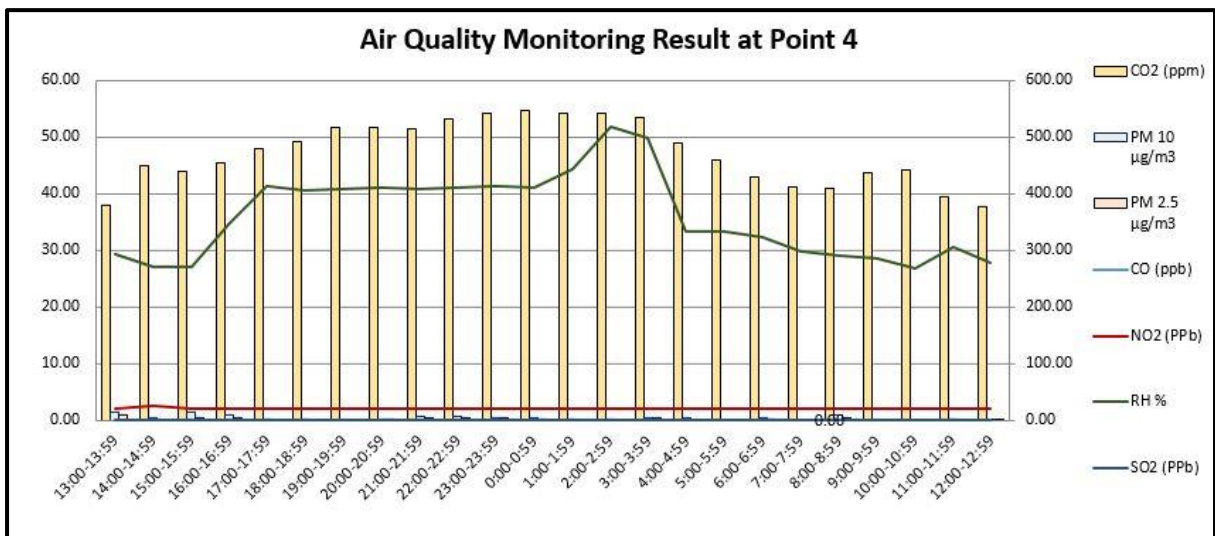


Figure 5-22 Fluctuation of Air Pollutants during diel cycle (Sin Din/Pyin Won Village for Wet Season)

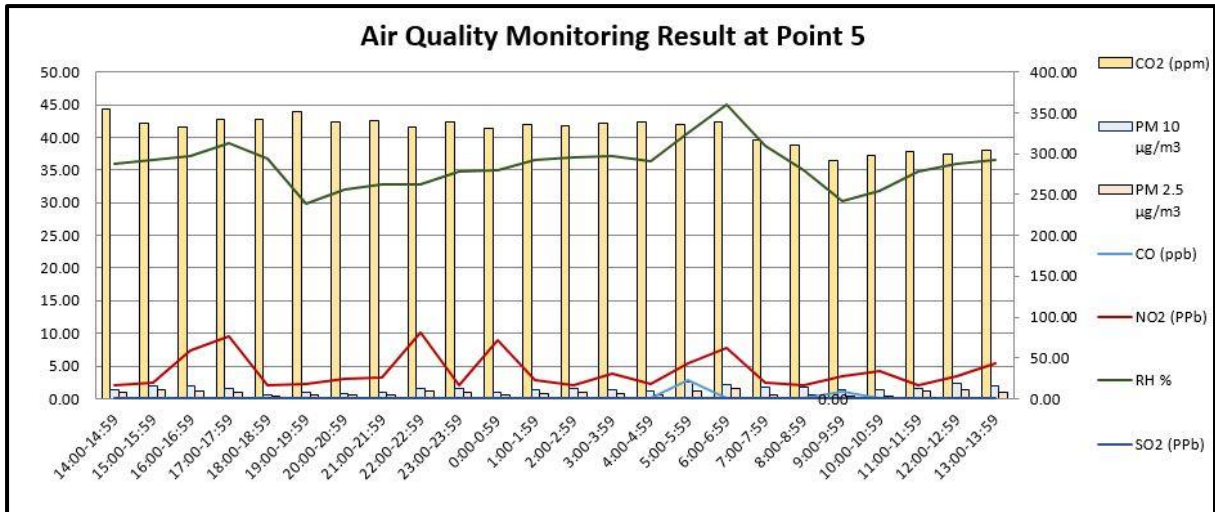


Figure 5-23 Fluctuation of Air Pollutants during diel cycle (East Maw Tone Village for Dry Season)

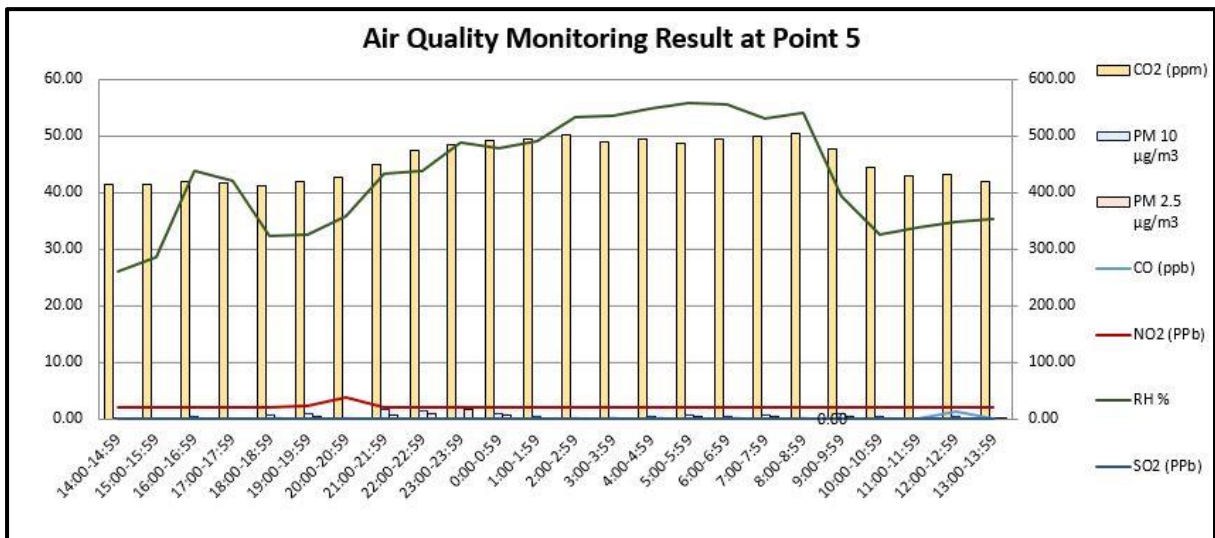


Figure 5-24 Fluctuation of Air Pollutants during diel cycle (East Maw Tone Village for Wet Season)

Table 5-10 Air pollutants emission results at Point 1 (Pannel Taung Village for Dry Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	RH %	SO ₂ (ppb)
11.1.2020	10:00-10:59	Average	420.58	0.32	2.00	5.38	2.35	32.50	0.00
11.1.2020	11:00-11:59	Average	410.82	0.28	2.00	2.73	1.68	33.75	0.00
11.1.2020	12:00-12:59	Average	410.02	0.13	2.00	11.48	5.37	35.85	0.00
11.1.2020	13:00-13:59	Average	414.45	0.45	2.00	20.88	9.17	37.23	0.00
11.1.2020	14:00-14:59	Average	409.28	0.77	2.00	25.73	14.27	37.95	0.00
11.1.2020	15:00-15:59	Average	408.37	0.00	2.00	46.28	24.67	38.20	0.00
11.1.2020	16:00-16:59	Average	410.05	0.00	2.00	35.27	18.85	38.83	0.00
11.1.2020	17:00-17:59	Average	422.48	0.10	2.00	34.97	22.10	37.10	0.00
11.1.2020	18:00-18:59	Average	431.13	0.00	2.42	17.98	2.33	34.10	0.02
11.1.2020	19:00-19:59	Average	441.03	0.00	2.00	27.68	14.07	32.27	0.00
11.1.2020	20:00-20:59	Average	450.98	0.00	2.00	32.92	15.70	32.45	0.00
11.1.2020	21:00-21:59	Average	463.18	0.00	2.00	22.43	9.92	31.63	0.00
11.1.2020	22:00-22:59	Average	468.92	0.00	2.00	21.80	12.02	32.47	0.00
11.1.2020	23:00-23:59	Average	493.78	0.00	2.00	35.48	18.95	34.28	0.00
12.1.2020	0:00-0:59	Average	492.73	0.00	2.00	44.08	22.38	34.88	0.27
12.1.2020	1:00-1:59	Average	494.00	0.00	2.00	43.97	23.48	36.17	0.00
12.1.2020	2:00-2:59	Average	489.20	0.00	2.00	42.12	23.18	36.85	0.00
12.1.2020	3:00-3:59	Average	493.12	0.00	2.00	48.97	26.72	37.13	0.00
12.1.2020	4:00-4:59	Average	505.02	0.00	2.00	45.42	24.48	36.78	0.00
12.1.2020	5:00-5:59	Average	509.98	0.00	2.00	35.70	18.98	38.95	0.02
12.1.2020	6:00-6:59	Average	507.03	0.00	2.00	39.93	21.77	45.05	0.00
12.1.2020	7:00-7:59	Average	478.40	0.00	2.00	31.85	16.70	42.63	0.00
12.1.2020	8:00-8:59	Average	452.22	0.00	2.00	28.43	13.38	29.68	0.00
12.1.2020	9:00-9:59	Average	441.43	0.00	2.00	16.50	7.12	25.75	0.00
Average			454.93	0.09	2.02	29.92	15.40	35.52	0.01
1 hour Minimum			408.37	0.00	2.00	2.73	1.68	25.75	0.00
1 hour Maximum			509.98	0.77	2.42	48.97	26.72	45.05	0.27

Table 5-11 Air pollutants emission results Point 1 (Pannel Taung Village for Wet Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	RH %	SO ₂ (ppb)
18.6.2020	10:00-10:59	Average	423.65	0.00	2.00	11.98	6.02	8.40	0.00
18.6.2020	11:00-11:59	Average	412.87	0.05	2.00	3.72	1.90	10.62	0.00
18.6.2020	12:00-12:59	Average	409.82	0.00	2.00	4.38	1.60	14.28	0.00
18.6.2020	13:00-13:59	Average	411.38	0.00	2.08	13.53	7.45	18.87	0.00
18.6.2020	14:00-14:59	Average	410.97	0.00	2.00	10.62	4.95	19.27	0.00
18.6.2020	15:00-15:59	Average	433.52	0.00	2.00	19.42	12.05	33.45	0.00
18.6.2020	16:00-16:59	Average	446.52	0.00	2.00	2.00	1.00	46.12	0.00
18.6.2020	17:00-17:59	Average	391.60	0.00	2.00	2.82	1.00	39.98	0.00
18.6.2020	18:00-18:59	Average	376.82	0.00	2.00	2.07	1.00	45.60	0.00
18.6.2020	19:00-19:59	Average	374.37	0.00	2.00	17.73	4.85	43.75	0.00
18.6.2020	20:00-20:59	Average	379.65	1.27	2.00	19.48	5.18	40.90	0.00
18.6.2020	21:00-21:59	Average	385.17	0.00	2.00	6.97	3.52	41.63	0.00
18.6.2020	22:00-22:59	Average	406.27	0.00	2.00	9.65	6.20	42.17	0.00
18.6.2020	23:00-23:59	Average	423.88	0.00	2.00	2.00	1.00	50.97	0.00
19.6.2020	0:00-0:59	Average	438.63	0.00	2.00	3.55	1.00	51.82	0.00
19.6.2020	1:00-1:59	Average	462.17	0.00	2.00	2.12	1.00	54.77	0.00
19.6.2020	2:00-2:59	Average	470.52	0.00	2.00	11.43	7.30	51.83	0.00
19.6.2020	3:00-3:59	Average	469.55	0.00	2.00	10.02	6.62	54.72	0.00
19.6.2020	4:00-4:59	Average	476.45	0.00	2.00	21.22	13.73	53.73	0.40
19.6.2020	5:00-5:59	Average	490.97	0.00	2.00	36.02	18.85	52.68	0.00
19.6.2020	6:00-6:59	Average	477.93	0.00	2.00	11.72	7.50	48.67	0.00
19.6.2020	7:00-7:59	Average	454.38	0.00	2.00	5.52	3.27	42.33	0.03
19.6.2020	8:00-8:59	Average	428.92	0.00	2.00	3.57	1.08	40.18	0.00
19.6.2020	9:00-9:59	Average	426.72	0.00	2.00	2.00	1.00	38.87	0.00
Average			428.45	0.05	2.00	9.73	4.96	39.40	0.02
1 hour Minimum			374.37	0.00	2.00	2.00	1.00	8.40	0.00
1 hour Maximum			490.97	1.27	2.08	36.02	18.85	54.77	0.40

Table 5-12 Air pollutants emission results at Point 2 (Pa Thaung Village for Dry Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	RH %	SO ₂ (ppb)
12.1.2020	10:00-10:59	Average	431.40	0.00	2.27	2.02	1.00	27.73	0.00
12.1.2020	11:00-11:59	Average	416.85	0.00	2.00	5.12	2.23	34.33	0.00
12.1.2020	12:00-12:59	Average	412.83	0.00	2.00	2.43	1.77	35.53	0.00
12.1.2020	13:00-13:59	Average	406.05	0.00	2.00	9.37	2.43	36.58	0.00
12.1.2020	14:00-14:59	Average	316.02	0.00	2.00	2.10	1.00	35.88	0.00
12.1.2020	15:00-15:59	Average	340.93	0.00	2.00	7.37	1.35	36.68	0.00
12.1.2020	16:00-16:59	Average	340.48	0.00	2.00	21.35	8.53	37.32	0.00
12.1.2020	17:00-17:59	Average	346.27	0.00	2.00	33.88	18.50	39.18	0.00
12.1.2020	18:00-18:59	Average	362.13	0.00	2.00	21.88	7.88	30.35	0.00
12.1.2020	19:00-19:59	Average	454.17	0.00	2.80	41.65	20.57	30.95	0.00
12.1.2020	20:00-20:59	Average	465.58	0.00	2.00	20.17	11.10	32.22	0.00
12.1.2020	21:00-21:59	Average	492.25	0.00	2.00	32.80	14.37	32.88	0.00
12.1.2020	22:00-22:59	Average	479.33	0.00	2.00	26.30	15.03	33.02	0.00
12.1.2020	23:00-23:59	Average	496.90	0.00	2.00	42.13	20.75	34.88	0.23
13.1.2020	0:00-0:59	Average	485.83	0.00	2.00	41.10	21.98	35.30	0.03
13.1.2020	1:00-1:59	Average	497.67	0.00	2.00	44.07	24.03	36.68	0.00
13.1.2020	2:00-2:59	Average	486.45	0.00	2.00	48.28	23.02	37.03	0.00
13.1.2020	3:00-3:59	Average	500.43	0.00	2.00	46.72	28.28	37.10	0.00
13.1.2020	4:00-4:59	Average	509.58	0.00	2.00	40.23	21.67	36.98	0.02
13.1.2020	5:00-5:59	Average	511.23	0.00	2.00	40.45	20.45	41.62	0.00
13.1.2020	6:00-6:59	Average	508.87	0.00	2.00	23.38	13.67	43.20	0.00
13.1.2020	7:00-7:59	Average	483.02	0.00	2.00	30.33	16.60	39.42	0.00
13.1.2020	8:00-8:59	Average	455.27	0.00	2.00	17.73	8.10	33.22	0.00
13.1.2020	9:00-9:59	Average	441.48	0.00	2.00	6.68	2.53	30.03	0.00
Average			443.38	0.00	2.04	25.31	12.79	35.34	0.01
1 hour Minimum			316.02	0.00	2.00	2.02	1.00	27.73	0.00
1 hour Maximum			511.23	0.00	2.80	48.28	28.28	43.20	0.23

Table 5-13 Air pollutants emission results at Point 2 (Ma Zaw Village for Wet Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	RH %	SO ₂ (ppb)
19.6.2020	11:00-11:59	Average	425.68	0.00	2.00	16.82	10.62	28.48	0.00
19.6.2020	12:00-12:59	Average	407.83	0.00	2.18	5.50	3.50	32.47	0.00
19.6.2020	13:00-13:59	Average	408.43	0.00	2.02	2.00	1.05	31.95	0.00
19.6.2020	14:00-14:59	Average	411.05	0.00	2.07	2.00	1.00	31.72	0.00
19.6.2020	15:00-15:59	Average	410.45	0.00	2.00	2.00	1.00	31.00	0.00
19.6.2020	16:00-16:59	Average	406.18	0.00	2.00	2.00	1.00	30.85	0.00
19.6.2020	17:00-17:59	Average	405.50	0.00	2.00	33.93	15.80	30.52	0.00
19.6.2020	18:00-18:59	Average	408.22	0.00	2.00	2.00	1.00	29.98	0.00
19.6.2020	19:00-19:59	Average	420.07	0.00	2.00	14.60	7.82	31.50	0.00
19.6.2020	20:00-20:59	Average	431.80	0.00	2.00	15.95	4.57	35.85	0.00
19.6.2020	21:00-21:59	Average	435.45	0.00	2.00	2.03	1.00	36.93	0.00
19.6.2020	22:00-22:59	Average	461.23	0.00	2.62	2.00	1.00	44.45	0.00
19.6.2020	23:00-23:59	Average	464.33	0.00	2.42	2.00	1.00	44.42	0.00
20.6.2020	0:00-0:59	Average	467.13	0.00	2.00	2.00	1.00	44.00	0.00
20.6.2020	1:00-1:59	Average	472.80	0.00	2.00	2.00	1.00	43.60	0.00
20.6.2020	2:00-2:59	Average	480.37	0.00	2.00	2.00	1.00	42.55	0.00
20.6.2020	3:00-3:59	Average	487.08	0.00	2.00	2.00	1.00	42.47	0.00
20.6.2020	4:00-4:59	Average	491.58	0.00	2.00	2.00	1.00	42.35	0.00
20.6.2020	5:00-5:59	Average	492.45	0.00	2.00	2.00	1.00	42.57	0.00
20.6.2020	6:00-6:59	Average	485.12	0.00	2.00	2.00	1.00	42.38	0.00
20.6.2020	7:00-7:59	Average	481.63	0.00	2.00	2.00	1.00	38.00	0.00
20.6.2020	8:00-8:59	Average	454.42	0.00	2.53	2.00	1.62	32.27	0.00
20.6.2020	9:00-9:59	Average	425.48	0.00	2.00	2.00	1.00	35.17	0.00
20.6.2020	10:00-10:59	Average	408.65	0.00	2.00	2.00	1.00	37.18	0.00
Average			443.46	0.00	2.08	5.20	2.58	36.78	0.00
1 hour Minimum			405.50	0.00	2.00	2.00	1.00	28.48	0.00

1 hour Maximum	492.45	0.00	2.62	33.93	15.80	44.45	0.00
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Table 5-14 Air pollutants emission results at Point 3 (Tone Byaw Gyi Village for Dry Season)

Date	Time		CO₂ (ppm)	CO (ppb)	NO₂ (ppb)	PM₁₀ µg/m³	PM_{2.5} µg/m³	RH %	SO₂ (ppb)
13.1.2020	12:00-12:59	Average	432.20	0.00	2.33	8.98	4.43	31.38	0.00
13.1.2020	13:00-13:59	Average	416.30	0.00	2.00	2.10	1.03	36.32	0.00
13.1.2020	14:00-14:59	Average	415.40	0.00	2.00	2.93	1.47	37.22	0.00
13.1.2020	15:00-15:59	Average	420.13	0.00	2.00	23.45	12.27	36.72	0.00
13.1.2020	16:00-16:59	Average	424.08	0.00	3.97	36.98	21.63	37.08	0.00
13.1.2020	17:00-17:59	Average	429.63	0.00	4.47	29.05	13.37	38.95	0.00
13.1.2020	18:00-18:59	Average	437.22	0.00	6.77	18.57	9.87	31.87	0.00
13.1.2020	19:00-19:59	Average	442.42	0.00	4.28	16.45	1.50	31.70	0.00
13.1.2020	20:00-20:59	Average	448.37	0.00	2.00	31.45	10.57	33.17	0.00
13.1.2020	21:00-21:59	Average	456.25	0.00	2.00	38.43	24.35	34.33	0.00
13.1.2020	22:00-22:59	Average	465.38	0.00	2.00	46.22	22.87	34.47	0.00
13.1.2020	23:00-23:59	Average	488.85	0.00	2.00	37.48	20.13	34.70	0.00
14.1.2020	0:00-0:59	Average	492.28	0.00	2.00	31.80	16.37	33.32	0.00
14.1.2020	1:00-1:59	Average	511.02	0.00	2.00	37.10	18.90	34.85	0.00
14.1.2020	2:00-2:59	Average	522.17	0.00	2.00	39.02	22.08	36.45	0.00
14.1.2020	3:00-3:59	Average	535.27	0.00	2.00	34.92	20.08	37.85	0.00
14.1.2020	4:00-4:59	Average	523.95	0.00	2.00	19.03	10.40	39.43	0.00
14.1.2020	5:00-5:59	Average	442.20	0.00	2.47	3.58	1.42	39.98	0.00
14.1.2020	6:00-6:59	Average	426.53	0.00	2.00	6.32	3.32	39.18	0.00
14.1.2020	7:00-7:59	Average	442.75	0.00	3.12	13.63	6.05	37.02	0.00
14.1.2020	8:00-8:59	Average	445.57	0.00	2.00	8.40	3.43	30.18	0.00
14.1.2020	9:00-9:59	Average	422.25	0.00	2.00	5.12	2.23	29.70	0.00
14.1.2020	10:00-10:59	Average	414.42	0.00	2.00	9.38	2.43	26.68	0.00
14.1.2020	11:00-11:59	Average	436.45	0.00	2.00	2.37	1.13	25.02	0.00
Average			453.80	0.00	2.56	20.95	10.47	34.48	0.00
1 hour Minimum			414.42	0.00	2.00	2.10	1.03	25.02	0.00

1 hour Maximum	535.27	0.00	6.77	46.22	24.35	39.98	0.00
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Table 5-15 Air pollutants emission results at Point 3 (Tone Byaw Gyi Village for Wet Season)

Date	Time		CO₂ (ppm)	CO (ppb)	NO₂ (ppb)	PM₁₀ µg/m³	PM_{2.5} µg/m³	RH %	SO₂ (ppb)
20.6.2020	12:00-12:59	Average	414.97	0.00	2.00	6.82	3.15	31.42	0.00
20.6.2020	13:00-13:59	Average	408.78	0.00	2.00	24.47	9.77	33.03	0.00
20.6.2020	14:00-14:59	Average	406.35	0.00	2.00	14.30	7.35	32.38	0.00
20.6.2020	15:00-15:59	Average	406.73	0.00	2.00	6.58	2.93	30.92	0.00
20.6.2020	16:00-16:59	Average	414.32	0.00	2.00	19.30	11.15	31.68	0.00
20.6.2020	17:00-17:59	Average	420.52	0.00	2.00	13.87	7.15	36.20	0.00
20.6.2020	18:00-18:59	Average	429.10	0.00	2.00	28.87	14.22	35.43	0.00
20.6.2020	19:00-19:59	Average	448.28	0.00	2.02	2.55	1.43	42.60	0.10
20.6.2020	20:00-20:59	Average	459.07	0.00	4.48	2.00	1.00	43.28	0.00
20.6.2020	21:00-21:59	Average	458.60	0.00	2.00	2.15	1.17	42.28	0.00
20.6.2020	22:00-22:59	Average	464.98	0.00	2.00	2.00	1.00	41.57	0.00
20.6.2020	23:00-23:59	Average	477.50	0.00	2.00	2.00	1.13	41.08	0.00
21.6.2020	0:00-0:59	Average	479.83	0.00	2.00	2.00	1.00	41.45	0.00
21.6.2020	1:00-1:59	Average	484.97	0.00	2.00	3.55	1.03	44.27	0.00
21.6.2020	2:00-2:59	Average	495.93	0.00	2.00	2.00	1.17	55.40	0.00
21.6.2020	3:00-3:59	Average	502.40	0.00	2.00	3.98	2.00	56.28	0.00
21.6.2020	4:00-4:59	Average	503.05	0.00	2.00	2.00	1.00	52.82	0.00
21.6.2020	5:00-5:59	Average	461.93	0.00	2.00	3.60	1.12	63.80	0.00
21.6.2020	6:00-6:59	Average	428.05	0.00	2.00	3.02	1.77	59.43	0.00
21.6.2020	7:00-7:59	Average	412.75	0.00	2.00	12.67	8.08	42.78	0.00
21.6.2020	8:00-8:59	Average	415.02	0.00	2.00	7.05	4.13	32.63	0.00
21.6.2020	9:00-9:59	Average	413.95	0.00	2.00	2.00	1.00	33.63	0.00
21.6.2020	10:00-10:59	Average	418.23	0.00	2.00	5.38	1.45	34.42	0.00
21.6.2020	11:00-11:59	Average	414.85	0.00	2.00	2.00	1.00	35.97	0.00
Average			443.34	0.00	2.10	7.26	3.59	41.45	0.00

1 hour Minimum	406.35	0.00	2.00	2.00	1.00	30.92	0.00
1 hour Maximum	503.05	0.00	4.48	28.87	14.22	63.80	0.10

Table 5-16 Air pollutants emission results at Point 4 (Sin Din/Pyin Won Village for Dry Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	RH %	SO ₂ (ppb)
14.1.2020	14:00-14:59	Average	345.60	0.00	9.33	10.85	4.50	35.88	0.00
14.1.2020	15:00-15:59	Average	316.13	0.00	3.95	2.17	1.00	35.97	0.00
14.1.2020	16:00-16:59	Average	344.18	0.00	2.08	11.80	6.43	36.72	0.00
14.1.2020	17:00-17:59	Average	328.30	0.00	3.13	5.60	4.32	37.38	0.00
14.1.2020	18:00-18:59	Average	361.78	0.00	6.83	6.08	2.93	39.17	0.00
14.1.2020	19:00-19:59	Average	356.38	0.00	20.67	4.15	1.82	33.57	0.00
14.1.2020	20:00-20:59	Average	346.28	0.00	18.73	10.58	6.08	31.23	0.00
14.1.2020	21:00-21:59	Average	352.15	0.00	10.73	12.23	3.93	32.30	0.00
14.1.2020	22:00-22:59	Average	419.27	0.00	12.40	8.90	5.03	32.80	0.00
14.1.2020	23:00-23:59	Average	545.57	0.00	14.95	12.85	10.00	33.27	0.00
15.1.2020	0:00-0:59	Average	596.63	0.00	21.32	3.82	1.57	34.88	0.00
15.1.2020	1:00-1:59	Average	592.45	0.05	16.48	5.22	2.27	35.38	0.00
15.1.2020	2:00-2:59	Average	593.90	0.00	5.38	16.40	8.18	36.77	0.00
15.1.2020	3:00-3:59	Average	611.35	0.00	19.77	11.32	4.53	37.03	0.00
15.1.2020	4:00-4:59	Average	422.43	0.00	7.12	9.38	5.95	37.10	0.00
15.1.2020	5:00-5:59	Average	384.05	0.00	9.82	8.92	7.38	37.15	0.00
15.1.2020	6:00-6:59	Average	382.88	0.00	13.72	10.23	5.97	42.25	0.00
15.1.2020	7:00-7:59	Average	371.90	0.00	5.53	13.62	7.48	42.32	0.00
15.1.2020	8:00-8:59	Average	402.03	0.00	9.47	15.93	9.35	39.43	0.00
15.1.2020	9:00-9:59	Average	530.65	0.00	8.25	13.28	8.53	32.70	0.00
15.1.2020	10:00-10:59	Average	556.58	0.00	5.30	10.48	6.13	30.05	0.00
15.1.2020	11:00-11:59	Average	556.08	0.00	7.60	7.93	2.03	33.15	0.00
15.1.2020	12:00-12:59	Average	557.17	0.00	4.75	6.00	2.30	35.15	0.00
15.1.2020	13:00-13:59	Average	473.97	0.00	2.00	11.23	5.57	36.25	0.00
Average			447.82	0.00	9.97	9.54	5.14	35.75	0.00
1 hour Minimum			316.13	0.00	2.00	2.17	1.00	30.05	0.00
1 hour Maximum			611.35	0.05	21.32	16.40	10.00	42.32	0.00

Table 5-17 Air pollutants emission results at Point 4 (Sin Din/Pyin Won Village for Wet Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	RH %	SO ₂ (ppb)
21.6.2020	13:00-13:59	Average	378.53	0.00	2.00	15.32	9.95	29.38	0.00
21.6.2020	14:00-14:59	Average	448.43	0.00	2.73	3.95	1.47	27.03	0.00
21.6.2020	15:00-15:59	Average	440.85	0.00	2.00	14.88	5.45	27.03	0.00
21.6.2020	16:00-16:59	Average	454.35	0.00	2.00	11.28	4.68	34.88	0.00
21.6.2020	17:00-17:59	Average	479.22	0.00	2.00	2.72	1.37	41.40	0.00
21.6.2020	18:00-18:59	Average	493.03	0.00	2.00	2.70	1.15	40.65	0.00
21.6.2020	19:00-19:59	Average	516.43	0.00	2.00	2.05	1.00	40.80	0.00
21.6.2020	20:00-20:59	Average	518.27	0.00	2.00	3.47	2.88	41.02	0.02
21.6.2020	21:00-21:59	Average	514.68	0.00	2.00	6.37	3.95	40.87	0.00
21.6.2020	22:00-22:59	Average	533.03	0.00	2.00	6.53	5.50	41.00	0.00
21.6.2020	23:00-23:59	Average	540.93	0.00	2.00	6.08	4.67	41.33	0.00
22.6.2020	0:00-0:59	Average	546.22	0.00	2.00	5.33	3.15	41.07	0.00
22.6.2020	1:00-1:59	Average	540.82	0.00	2.00	2.62	1.17	44.32	0.00
22.6.2020	2:00-2:59	Average	542.50	0.00	2.00	2.53	1.37	51.73	0.00
22.6.2020	3:00-3:59	Average	534.85	0.00	2.00	4.68	4.50	49.88	0.00
22.6.2020	4:00-4:59	Average	490.08	0.00	2.00	5.63	2.48	33.32	0.00
22.6.2020	5:00-5:59	Average	458.88	0.00	2.23	2.47	1.03	33.47	0.03
22.6.2020	6:00-6:59	Average	428.75	0.00	2.00	5.07	2.88	32.28	0.00
22.6.2020	7:00-7:59	Average	411.48	0.00	2.08	2.00	1.00	29.75	0.00
22.6.2020	8:00-8:59	Average	410.87	0.00	2.00	10.62	5.67	29.03	0.00
22.6.2020	9:00-9:59	Average	436.63	0.00	2.00	2.00	1.00	28.67	0.00
22.6.2020	10:00-10:59	Average	441.27	0.00	2.00	2.00	1.00	26.90	0.00
22.6.2020	11:00-11:59	Average	393.50	0.00	2.00	2.82	1.00	30.57	0.00
22.6.2020	12:00-12:59	Average	376.83	0.00	2.00	2.07	1.00	27.77	0.00
Average			472.10	0.00	2.04	5.22	2.89	36.01	0.00
1 hour Minimum			376.83	0.00	2.00	2.00	1.00	26.90	0.00
1 hour Maximum			546.22	0.00	2.73	15.32	9.95	51.73	0.03

Table 5-18 Air pollutants emission results at Point 5 (East Maw Tone Village for Dry Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	RH %	SO ₂ (ppb)
15.1.2020	14:00-14:59	Average	354.18	0.00	2.00	11.65	7.10	35.90	0.00
15.1.2020	15:00-15:59	Average	337.13	0.00	2.43	16.13	11.27	36.65	0.00
15.1.2020	16:00-16:59	Average	332.20	0.00	7.38	16.02	9.28	37.10	0.00
15.1.2020	17:00-17:59	Average	341.48	0.00	9.57	12.63	8.37	39.05	0.00
15.1.2020	18:00-18:59	Average	341.73	0.00	2.00	5.42	2.67	36.83	0.00
15.1.2020	19:00-19:59	Average	351.15	0.00	2.33	7.13	4.08	29.90	0.00
15.1.2020	20:00-20:59	Average	339.57	0.00	3.12	7.03	4.50	32.00	0.00
15.1.2020	21:00-21:59	Average	340.30	0.00	3.28	7.60	4.32	32.88	0.00
15.1.2020	22:00-22:59	Average	332.07	0.00	10.10	13.18	8.77	32.77	0.00
15.1.2020	23:00-23:59	Average	339.05	0.00	2.13	12.22	8.38	34.78	0.00
16.1.2020	0:00-0:59	Average	330.42	0.00	9.00	7.22	4.63	35.00	0.00
16.1.2020	1:00-1:59	Average	335.02	0.00	2.82	10.27	5.95	36.62	0.00
16.1.2020	2:00-2:59	Average	334.43	0.00	2.10	12.10	7.92	36.88	0.00
16.1.2020	3:00-3:59	Average	336.88	0.00	3.80	10.40	6.47	37.10	0.00
16.1.2020	4:00-4:59	Average	338.25	0.00	2.18	8.62	5.05	36.43	0.00
16.1.2020	5:00-5:59	Average	336.53	2.93	5.35	19.88	9.82	40.60	0.00
16.1.2020	6:00-6:59	Average	339.73	0.00	7.83	17.53	13.17	45.05	0.00
16.1.2020	7:00-7:59	Average	317.52	0.00	2.43	13.67	4.23	38.63	0.00
16.1.2020	8:00-8:59	Average	311.25	0.00	2.00	13.87	5.40	35.05	0.00
16.1.2020	9:00-9:59	Average	290.92	1.08	3.35	11.37	2.82	30.20	0.00
16.1.2020	10:00-10:59	Average	297.58	0.00	4.13	10.73	3.77	31.88	0.00
16.1.2020	11:00-11:59	Average	302.63	0.00	2.15	11.97	8.85	34.80	0.00
16.1.2020	12:00-12:59	Average	299.45	0.00	3.48	19.52	11.13	35.90	0.00
16.1.2020	13:00-13:59	Average	303.72	0.00	5.35	16.40	8.05	36.53	0.00
Average			328.47	0.17	4.18	12.19	6.92	35.77	0.00
1 hour Minimum			290.92	0.00	2.00	5.42	2.67	29.90	0.00
1 hour Maximum			354.18	2.93	10.10	19.88	13.17	45.05	0.00

Table 5-19 Air pollutants emission results at Point 5 (East Maw Tone Village for Wet Season)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	RH %	SO ₂ (ppb)
22.6.2020	14:00-14:59	Average	414.30	0.00	2.00	2.00	1.00	26.08	0.00
22.6.2020	15:00-15:59	Average	414.00	0.00	2.00	2.15	1.00	28.48	0.00
22.6.2020	16:00-16:59	Average	420.23	0.00	2.05	4.65	1.12	43.73	0.00
22.6.2020	17:00-17:59	Average	418.38	0.00	2.00	2.00	1.00	42.13	0.00
22.6.2020	18:00-18:59	Average	413.18	0.00	2.00	6.38	3.25	32.23	0.00
22.6.2020	19:00-19:59	Average	419.47	0.00	2.32	10.12	5.15	32.57	0.00
22.6.2020	20:00-20:59	Average	426.23	0.00	3.98	3.28	1.00	35.95	0.00
22.6.2020	21:00-21:59	Average	448.65	0.00	2.00	18.15	7.73	43.35	0.00
22.6.2020	22:00-22:59	Average	474.23	0.00	2.00	15.30	9.15	43.93	0.00
22.6.2020	23:00-23:59	Average	484.28	0.00	2.00	22.02	17.20	48.80	0.00
23.6.2020	0:00-0:59	Average	493.23	0.00	2.00	10.65	6.52	47.80	0.00
23.6.2020	1:00-1:59	Average	495.60	0.00	2.00	3.92	1.55	49.18	0.20
23.6.2020	2:00-2:59	Average	502.57	0.00	2.00	3.68	1.30	53.23	0.00
23.6.2020	3:00-3:59	Average	489.58	0.00	2.00	3.72	1.70	53.67	0.13
23.6.2020	4:00-4:59	Average	495.67	0.00	2.00	5.27	2.90	54.83	0.00
23.6.2020	5:00-5:59	Average	487.20	0.00	2.00	6.92	4.13	55.77	0.00
23.6.2020	6:00-6:59	Average	494.37	0.00	2.00	5.28	3.63	55.48	0.00
23.6.2020	7:00-7:59	Average	499.62	0.00	2.00	6.45	4.03	52.98	0.00
23.6.2020	8:00-8:59	Average	504.35	0.00	2.00	3.20	1.77	54.03	0.00
23.6.2020	9:00-9:59	Average	476.23	0.00	2.00	10.02	6.03	39.23	0.00
23.6.2020	10:00-10:59	Average	444.83	0.00	2.00	3.90	2.23	32.67	0.00
23.6.2020	11:00-11:59	Average	429.48	0.00	2.00	2.00	1.00	33.92	0.00
23.6.2020	12:00-12:59	Average	433.00	1.27	2.00	5.38	1.45	34.77	0.00
23.6.2020	13:00-13:59	Average	420.90	0.00	2.00	2.00	1.00	35.38	0.00
Average			458.32	0.05	2.10	6.60	3.62	42.93	0.01
1 hour Minimum			413.18	0.00	2.00	2.00	1.00	26.08	0.00
1 hour Maximum			504.35	1.27	3.98	22.02	17.20	55.77	0.20

Detail results with one-hour interval of pollutants are shown from Table 5-10 to Table 5-19 . All results are under the Myanmar National Environmental Quality (Emission) Guidelines (2015). So, Water Distribution Project is acceptable for environment.

Table 5-20 Air Emission Levels (Standard)

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

Source: Myanmar National Environmental Quality (Emission) Guidelines, December 2015 & National Ambient Air Quality Standards (NAAQS) and American Conference of Governmental Industrial Hygienists (ACGIH).

As above tables, it can be seen that all parameters measured are within the National Environmental Quality (Emission) Guideline (NEQG), National Ambient Air Quality Standards (NAAQS) and American Conference of Governmental Industrial Hygienists (ACGIH).

5.3.2 Ambient Noise and Vibration

Ambient Noise and Vibration Level for the proposed project was measured with Digital Sound Level Meter and Vibration Meter at the project site. The noise and vibration level measurement are conducted at 5 points: these points are near the air monitoring points on 11th to 16th January 2020 (for Dry Season) and 18th to 23rd June 2020 (for Wet Season). Measuring period is 24 hours continuously. The observed values are described in Table 5-21 to Table 5-30 and the following figures are noise level measurement at the proposed project.



Figure 5-25 Noise and Vibration Level Monitoring for Both Season (Wet and Dry Season)

Table 5-21 Observed Values of Noise Level Measurement at Point 1 (Pannel Taung Village for Dry Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	12.1.2020	7:00:13-7:59:13	54.99	A	Day	52.00
2	12.1.2020	8:00:13-8:59:13	57.83	A	Day	
3	12.1.2020	9:00:13-9:59:13	56.96	A	Day	
4	11.1.2020	10:00:13-10:59:13	45.84	A	Day	
5	11.1.2020	11:00:13-11:59:13	45.41	A	Day	
6	11.1.2020	12:00:13-12:59:13	61.96	A	Day	
7	11.1.2020	13:00:13-13:59:13	51.40	A	Day	
8	11.1.2020	14:00:13-14:59:13	48.26	A	Day	
9	11.1.2020	15:00:13-15:59:13	52.28	A	Day	
10	11.1.2020	16:00:13-16:59:13	54.66	A	Day	
11	11.1.2020	17:00:13-17:59:13	53.22	A	Day	
12	11.1.2020	18:00:13-18:59:13	53.43	A	Day	
13	11.1.2020	19:00:13-19:59:13	50.29	A	Day	
14	11.1.2020	20:00:13-20:59:13	49.21	A	Day	
15	11.1.2020	21:00:13-21:59:13	44.22	A	Day	46.22
16	11.1.2020	22:00:13-22:59:13	43.37	A	Night	
17	11.1.2020	23:00:13-23:59:13	43.26	A	Night	
18	12.1.2020	0:00:13-0:59:13	42.05	A	Night	
19	12.1.2020	1:00:13-1:59:13	43.97	A	Night	
20	12.1.2020	2:00:13-2:59:13	44.73	A	Night	
21	12.1.2020	3:00:13-3:59:13	45.10	A	Night	
22	12.1.2020	4:00:13-4:59:13	47.25	A	Night	

23	12.1.2020	5:00:13-5:59:13	54.44	A	Night
24	12.1.2020	6:00:13-6:59:13	51.81	A	Night
Average			49.83		

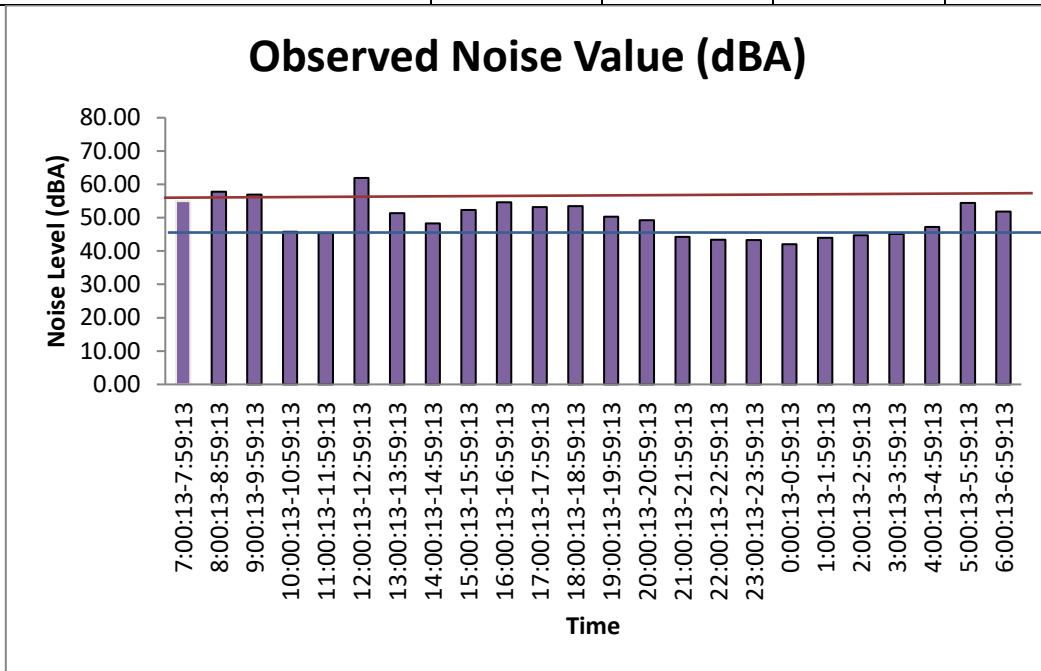


Figure 5-26 Noise Level at Point 1 (Pannel Taung Village for Dry Season)

Table 5-22 Observed Values of Noise Level Measurement at Point 1 (Pannel Taung Village for Wet Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	19.06.2020	7:00:13-7:59:13	69.21	A	Day	65.08
2	19.06.2020	8:00:13-8:59:13	70.23	A	Day	
3	19.06.2020	9:00:13-9:59:13	68.74	A	Day	
4	18.06.2020	10:00:13-10:59:13	54.88	A	Day	
5	18.06.2020	11:00:13-11:59:13	64.35	A	Day	
6	18.06.2020	12:00:13-12:59:13	48.16	A	Day	
7	18.06.2020	13:00:13-13:59:13	47.63	A	Day	
8	18.06.2020	14:00:13-14:59:13	63.92	A	Day	
9	18.06.2020	15:00:13-15:59:13	74.18	A	Day	
10	18.06.2020	16:00:13-16:59:13	70.36	A	Day	
11	18.06.2020	17:00:13-17:59:13	68.93	A	Day	
12	18.06.2020	18:00:13-18:59:13	76.88	A	Day	
13	18.06.2020	19:00:13-19:59:13	72.50	A	Day	

14	18.06.2020	20:00:13-20:59:13	63.33	A	Day	61.42
15	18.06.2020	21:00:13-21:59:13	62.94	A	Day	
16	18.06.2020	22:00:13-22:59:13	63.32	A	Night	
17	18.06.2020	23:00:13-23:59:13	61.32	A	Night	
18	19.06.2020	0:00:13-0:59:13	57.37	A	Night	
19	19.06.2020	1:00:13-1:59:13	54.93	A	Night	
20	19.06.2020	2:00:13-2:59:13	61.89	A	Night	
21	19.06.2020	3:00:13-3:59:13	58.22	A	Night	
22	19.06.2020	4:00:13-4:59:13	60.94	A	Night	
23	19.06.2020	5:00:13-5:59:13	65.11	A	Night	
24	19.06.2020	6:00:13-6:59:13	69.70	A	Night	
Average			63.71			

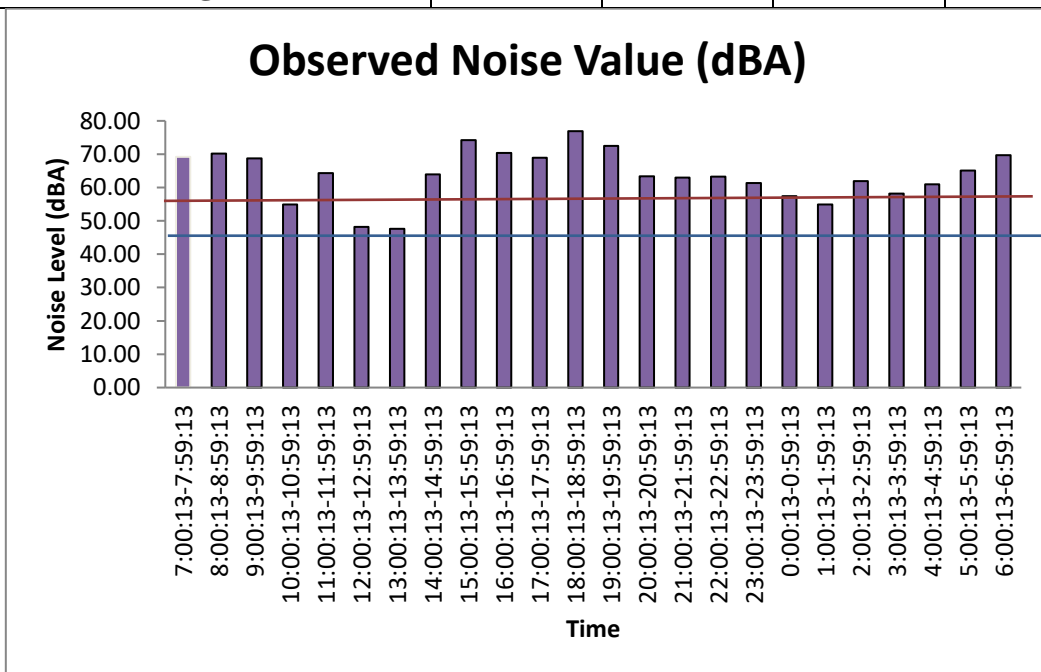


Figure 5-27 Noise Level at Point 1 (Pannel Taung Village for Wet Season)

Table 5-23 Observed Values of Noise Level Measurement at Point 2 (Pa Thaung Village for Dry Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	13.1.2020	7:00:13-7:59:13	63.85	A	Day	61.68
2	13.1.2020	8:00:13-8:59:13	59.00	A	Day	
3	13.1.2020	9:00:13-9:59:13	56.56	A	Day	
4	12.1.2020	10:00:13-10:59:13	61.69	A	Day	
5	12.1.2020	11:00:13-11:59:13	58.98	A	Day	
6	12.1.2020	12:00:13-12:59:13	60.59	A	Day	
7	12.1.2020	13:00:13-13:59:13	62.58	A	Day	
8	12.1.2020	14:00:13-14:59:13	62.31	A	Day	
9	12.1.2020	15:00:13-15:59:13	60.68	A	Day	
10	12.1.2020	16:00:13-16:59:13	64.05	A	Day	
11	12.1.2020	17:00:13-17:59:13	65.10	A	Day	
12	12.1.2020	18:00:13-18:59:13	67.04	A	Day	
13	12.1.2020	19:00:13-19:59:13	62.09	A	Day	
14	12.1.2020	20:00:13-20:59:13	60.31	A	Day	
15	12.1.2020	21:00:13-21:59:13	60.45	A	Day	
16	12.1.2020	22:00:13-22:59:13	58.77	A	Night	60.84
17	12.1.2020	23:00:13-23:59:13	58.11	A	Night	
18	13.1.2020	0:00:13-0:59:13	54.85	A	Night	
19	13.1.2020	1:00:13-1:59:13	57.93	A	Night	
20	13.1.2020	2:00:13-2:59:13	63.48	A	Night	
21	13.1.2020	3:00:13-3:59:13	59.39	A	Night	
22	13.1.2020	4:00:13-4:59:13	60.75	A	Night	
23	13.1.2020	5:00:13-5:59:13	65.97	A	Night	
24	13.1.2020	6:00:13-6:59:13	68.32	A	Night	
Average			61.37			

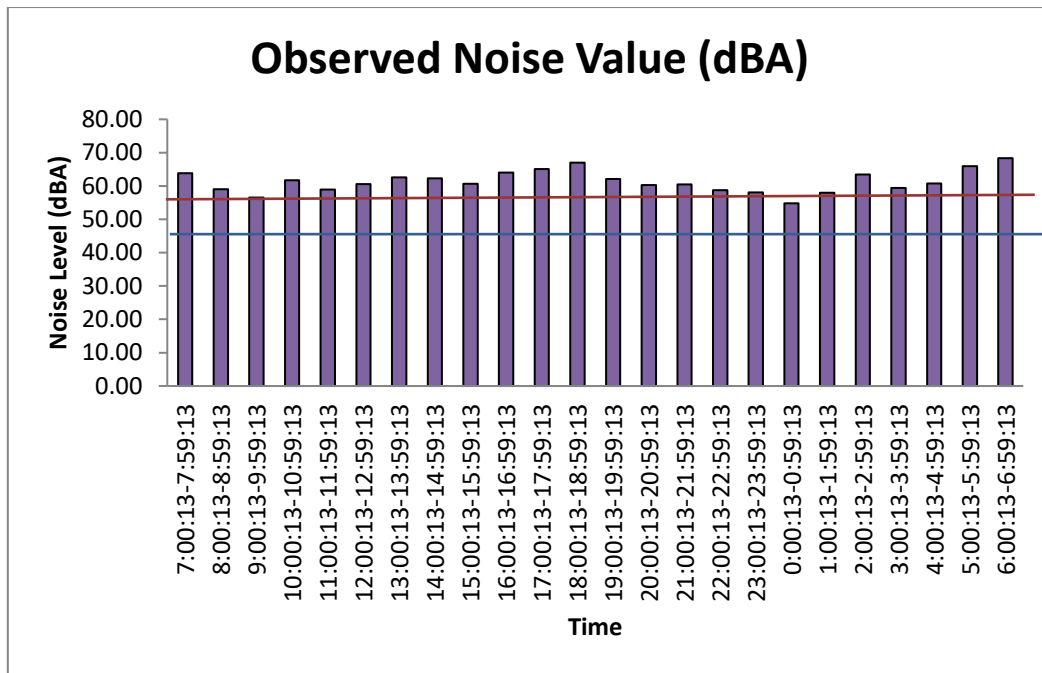


Figure 5-28 Noise Level at Point 2 (Pa Thaug Village for Dry Season)

Table 5-24 Observed Values of Noise Level Measurement at Point 2 (Ma Zaw Village for Wet Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	20.06.2020	7:00:13-7:59:13	59.12	A	Day	58.67
2	20.06.2020	8:00:13-8:59:13	54.87	A	Day	
3	20.06.2020	9:00:13-9:59:13	63.92	A	Day	
4	20.06.2020	10:00:13-10:59:13	56.73	A	Day	
5	19.06.2020	11:00:13-11:59:13	60.26	A	Day	
6	19.06.2020	12:00:13-12:59:13	58.38	A	Day	
7	19.06.2020	13:00:13-13:59:13	61.03	A	Day	
8	19.06.2020	14:00:13-14:59:13	59.37	A	Day	
9	19.06.2020	15:00:13-15:59:13	58.65	A	Day	
10	19.06.2020	16:00:13-16:59:13	58.31	A	Day	
11	19.06.2020	17:00:13-17:59:13	55.44	A	Day	
12	19.06.2020	18:00:13-18:59:13	56.69	A	Day	
13	19.06.2020	19:00:13-19:59:13	60.19	A	Day	
14	19.06.2020	20:00:13-20:59:13	58.64	A	Day	
15	19.06.2020	21:00:13-21:59:13	58.39	A	Day	
16	19.06.2020	22:00:13-22:59:13	58.81	A	Night	57.72

17	19.06.2020	23:00:13-23:59:13	56.97	A	Night	
18	20.06.2020	0:00:13-0:59:13	57.44	A	Night	
19	20.06.2020	1:00:13-1:59:13	56.70	A	Night	
20	20.06.2020	2:00:13-2:59:13	55.60	A	Night	
21	20.06.2020	3:00:13-3:59:13	58.04	A	Night	
22	20.06.2020	4:00:13-4:59:13	61.32	A	Night	
23	20.06.2020	5:00:13-5:59:13	59.10	A	Night	
24	20.06.2020	6:00:13-6:59:13	55.54	A	Night	
Average			58.31			

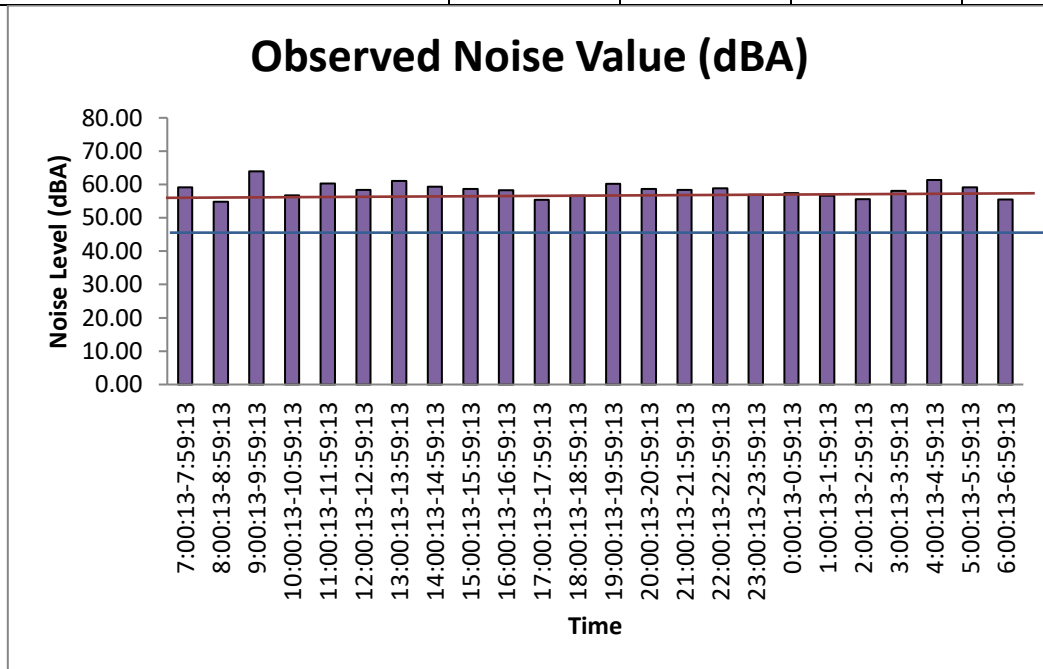


Figure 5-29 Noise Level at Point 2 (Ma Zaw Village for Wet Season)

Table 5-25 Observed Values of Noise Level Measurement at Point 3 (Tone Byaw Gyi Village for Dry Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	14.1.2020	7:00:13-7:59:13	59.77	A	Day	52.29
2	14.1.2020	8:00:13-8:59:13	52.86	A	Day	
3	14.1.2020	9:00:13-9:59:13	49.34	A	Day	
4	14.1.2020	10:00:13-10:59:13	49.25	A	Day	
5	13.1.2020	11:00:13-11:59:13	48.92	A	Day	
6	13.1.2020	12:00:13-12:59:13	51.26	A	Day	
7	13.1.2020	13:00:13-13:59:13	51.59	A	Day	

8	13.1.2020	14:00:13-14:59:13	51.15	A	Day	
9	13.1.2020	15:00:13-15:59:13	49.88	A	Day	
10	13.1.2020	16:00:13-16:59:13	52.01	A	Day	
11	13.1.2020	17:00:13-17:59:13	55.43	A	Day	
12	13.1.2020	18:00:13-18:59:13	56.77	A	Day	
13	13.1.2020	19:00:13-19:59:13	54.61	A	Day	
14	13.1.2020	20:00:13-20:59:13	50.37	A	Day	
15	13.1.2020	21:00:13-21:59:13	51.17	A	Day	
16	13.1.2020	22:00:13-22:59:13	49.85	A	Night	53.56
17	13.1.2020	23:00:13-23:59:13	49.02	A	Night	
18	14.1.2020	0:00:13-0:59:13	53.28	A	Night	
19	14.1.2020	1:00:13-1:59:13	53.91	A	Night	
20	14.1.2020	2:00:13-2:59:13	54.58	A	Night	
21	14.1.2020	3:00:13-3:59:13	53.86	A	Night	
22	14.1.2020	4:00:13-4:59:13	57.87	A	Night	
23	14.1.2020	5:00:13-5:59:13	54.82	A	Night	
24	14.1.2020	6:00:13-6:59:13	54.83	A	Night	
Average			52.77			

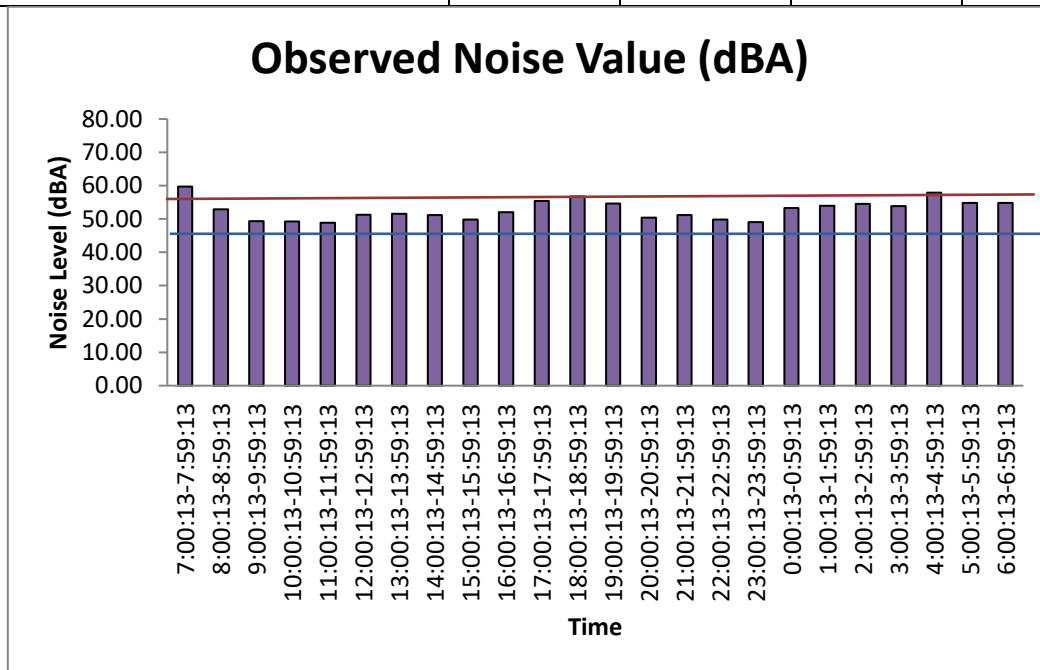


Figure 5-30 Noise Level at Point 3 (Tone Byaw Gyi Village for Dry Season)

Table 5-26 Observed Values of Noise Level Measurement at Point 3 (Tone Byaw Gyi Village for Wet Season)

No.	Date	Time	Observed Mean Value	Weight	Day/Night	Average
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			(Source)			
1	21.06.2020	7:00:13-7:59:13	52.55	A	Day	56.91
2	21.06.2020	8:00:13-8:59:13	56.28	A	Day	
3	21.06.2020	9:00:13-9:59:13	67.79	A	Day	
4	21.06.2020	10:00:13-10:59:13	59.39	A	Day	
5	21.06.2020	11:00:13-11:59:13	59.39	A	Day	
6	20.06.2020	12:00:13-12:59:13	50.39	A	Day	
7	20.06.2020	13:00:13-13:59:13	68.27	A	Day	
8	20.06.2020	14:00:13-14:59:13	49.20	A	Day	
9	20.06.2020	15:00:13-15:59:13	47.07	A	Day	
10	20.06.2020	16:00:13-16:59:13	54.76	A	Day	
11	20.06.2020	17:00:13-17:59:13	51.50	A	Day	
12	20.06.2020	18:00:13-18:59:13	57.72	A	Day	
13	20.06.2020	19:00:13-19:59:13	60.44	A	Day	
14	20.06.2020	20:00:13-20:59:13	59.30	A	Day	
15	20.06.2020	21:00:13-21:59:13	59.54	A	Day	
16	20.06.2020	22:00:13-22:59:13	53.12	A	Night	52.43
17	20.06.2020	23:00:13-23:59:13	49.66	A	Night	
18	21.06.2020	0:00:13-0:59:13	49.77	A	Night	
19	21.06.2020	1:00:13-1:59:13	49.65	A	Night	
20	21.06.2020	2:00:13-2:59:13	48.08	A	Night	
21	21.06.2020	3:00:13-3:59:13	50.61	A	Night	
22	21.06.2020	4:00:13-4:59:13	55.35	A	Night	
23	21.06.2020	5:00:13-5:59:13	61.11	A	Night	
24	21.06.2020	6:00:13-6:59:13	54.53	A	Night	
Average			55.23			

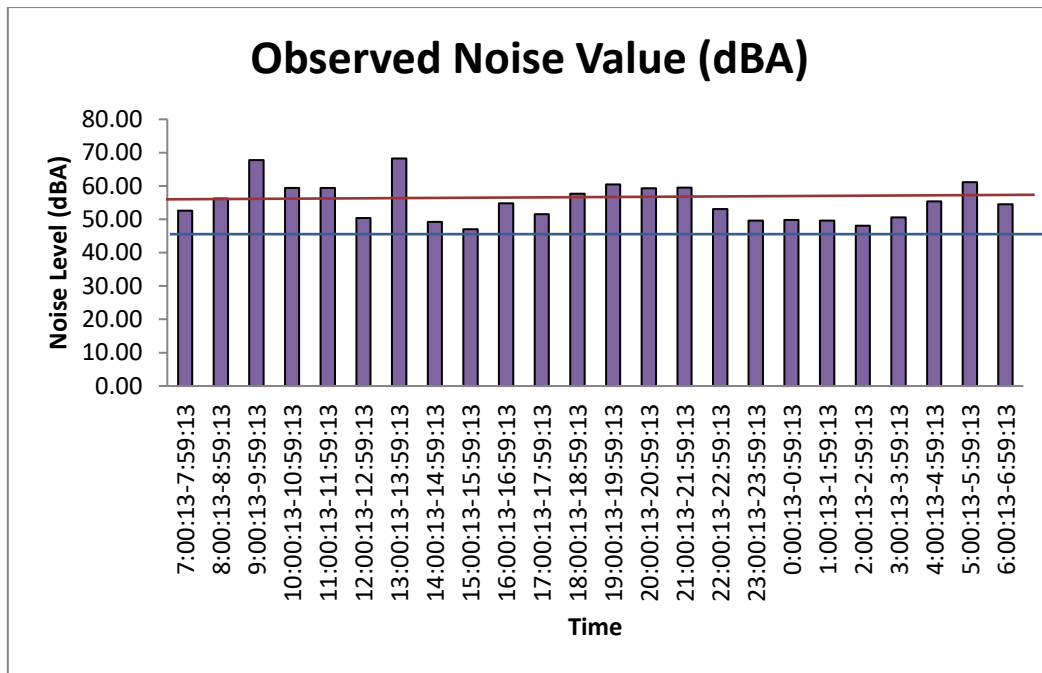


Figure 5-31 Noise Level at Point 3 (Tone Byaw Gyi Village for Wet Season)

Table 5-27 Observed Values of Noise Level Measurement at Point 4 (Sin Din/Pyin Won Village for Dry Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	15.1.2020	7:00:13-7:59:13	50.48	A	Day	52.80
2	15.1.2020	8:00:13-8:59:13	48.15	A	Day	
3	15.1.2020	9:00:13-9:59:13	53.92	A	Day	
4	15.1.2020	10:00:13-10:59:13	51.98	A	Day	
5	15.1.2020	11:00:13-11:59:13	50.53	A	Day	
6	15.1.2020	12:00:13-12:59:13	55.76	A	Day	
7	15.1.2020	13:00:13-13:59:13	46.43	A	Day	
8	14.1.2020	14:00:13-14:59:13	48.03	A	Day	
9	14.1.2020	15:00:13-15:59:13	63.78	A	Day	
10	14.1.2020	16:00:13-16:59:13	68.38	A	Day	
11	14.1.2020	17:00:13-17:59:13	64.01	A	Day	
12	14.1.2020	18:00:13-18:59:13	53.18	A	Day	
13	14.1.2020	19:00:13-19:59:13	46.59	A	Day	
14	14.1.2020	20:00:13-20:59:13	46.38	A	Day	
15	14.1.2020	21:00:13-21:59:13	44.35	A	Day	
16	14.1.2020	22:00:13-22:59:13	42.17	A	Night	48.20

17	14.1.2020	23:00:13-23:59:13	41.03	A	Night	
18	15.1.2020	0:00:13-0:59:13	41.09	A	Night	
19	15.1.2020	1:00:13-1:59:13	44.22	A	Night	
20	15.1.2020	2:00:13-2:59:13	48.08	A	Night	
21	15.1.2020	3:00:13-3:59:13	51.03	A	Night	
22	15.1.2020	4:00:13-4:59:13	58.12	A	Night	
23	15.1.2020	5:00:13-5:59:13	52.78	A	Night	
24	15.1.2020	6:00:13-6:59:13	55.28	A	Night	
Average			51.07			

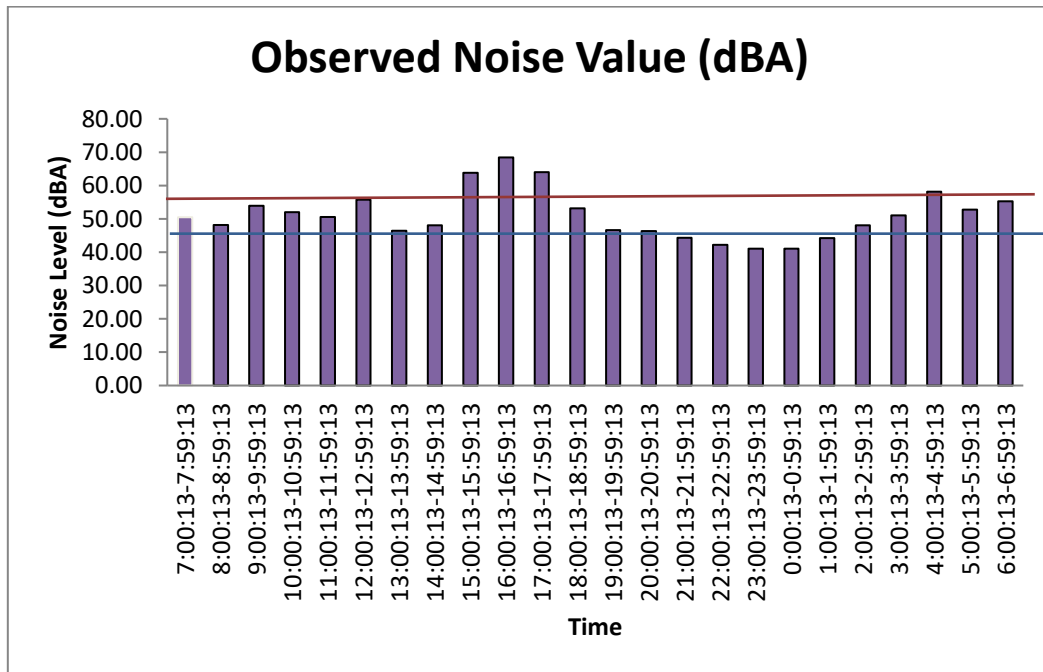


Figure 5-32 Noise Level at Point 4 (Sin Din/Pyin Won Village for Dry Season)

Table 5-28 Observed Values of Noise Level Measurement at Point 4 (Sin Din/Pyin Won Village for Wet Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	22.06.2020	7:00:13-7:59:13	59.79	A	Day	56.41
2	22.06.2020	8:00:13-8:59:13	53.85	A	Day	
3	22.06.2020	9:00:13-9:59:13	58.05	A	Day	
4	22.06.2020	10:00:13-10:59:13	59.79	A	Day	
5	22.06.2020	11:00:13-11:59:13	53.63	A	Day	

6	22.06.2020	12:00:13-12:59:13	57.09	A	Day		
7	21.06.2020	13:00:13-13:59:13	55.82	A	Day		
8	21.06.2020	14:00:13-14:59:13	52.75	A	Day		
9	21.06.2020	15:00:13-15:59:13	54.97	A	Day		
10	21.06.2020	16:00:13-16:59:13	56.50	A	Day		
11	21.06.2020	17:00:13-17:59:13	59.03	A	Day		
12	21.06.2020	18:00:13-18:59:13	56.43	A	Day		
13	21.06.2020	19:00:13-19:59:13	55.73	A	Day		
14	21.06.2020	20:00:13-20:59:13	57.13	A	Day		
15	21.06.2020	21:00:13-21:59:13	55.67	A	Day		
16	21.06.2020	22:00:13-22:59:13	62.77	A	Night		57.45
17	21.06.2020	23:00:13-23:59:13	53.91	A	Night		
18	22.06.2020	0:00:13-0:59:13	54.03	A	Night		
19	22.06.2020	1:00:13-1:59:13	59.72	A	Night		
20	22.06.2020	2:00:13-2:59:13	58.57	A	Night		
21	22.06.2020	3:00:13-3:59:13	51.83	A	Night		
22	22.06.2020	4:00:13-4:59:13	56.86	A	Night		
23	22.06.2020	5:00:13-5:59:13	61.34	A	Night		
24	22.06.2020	6:00:13-6:59:13	58.05	A	Night		
Average			56.80				

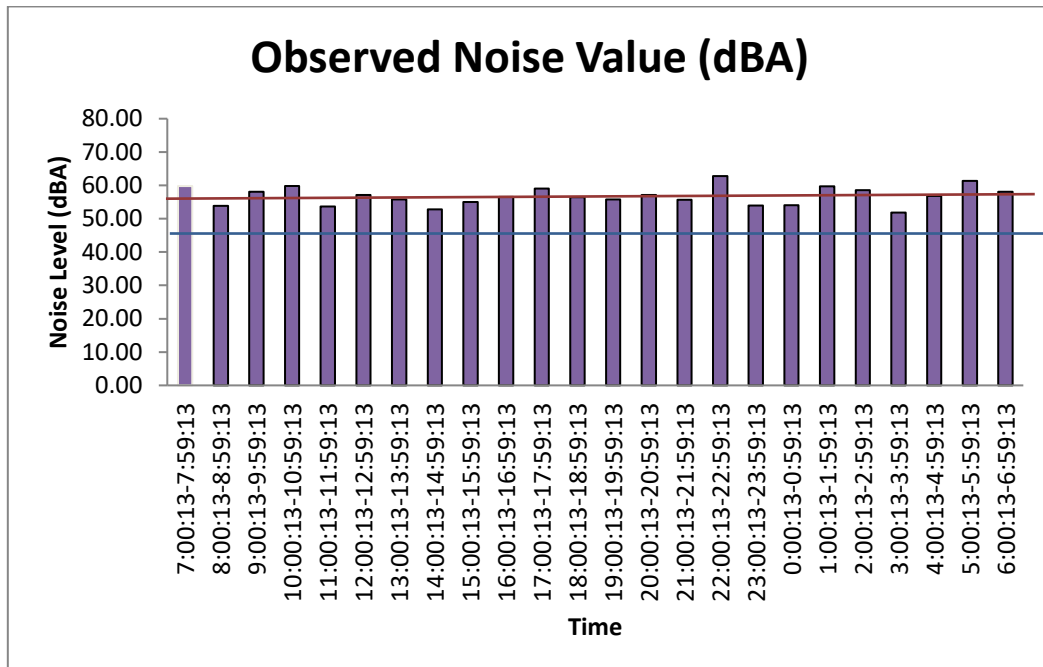


Figure 5-33 Noise Level at Point 4 (Sin Din/Pyin Won Village for Wet Season)

Table 5-29 Observed Values of Noise Level Measurement at Point 5 (East Maw Tone Village for Dry Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	16.1.2020	7:00:13-7:59:13	50.56	A	Day	53.33
2	16.1.2020	8:00:13-8:59:13	51.18	A	Day	
3	16.1.2020	9:00:13-9:59:13	47.85	A	Day	
4	16.1.2020	10:00:13-10:59:13	50.21	A	Day	
5	16.1.2020	11:00:13-11:59:13	51.66	A	Day	
6	16.1.2020	12:00:13-12:59:13	47.53	A	Day	
7	15.1.2020	13:00:13-13:59:13	43.42	A	Day	
8	15.1.2020	14:00:13-14:59:13	48.70	A	Day	
9	15.1.2020	15:00:13-15:59:13	54.50	A	Day	
10	15.1.2020	16:00:13-16:59:13	63.48	A	Day	
11	15.1.2020	17:00:13-17:59:13	60.84	A	Day	
12	15.1.2020	18:00:13-18:59:13	59.57	A	Day	
13	15.1.2020	19:00:13-19:59:13	60.20	A	Day	
14	15.1.2020	20:00:13-20:59:13	58.86	A	Day	
15	15.1.2020	21:00:13-21:59:13	51.41	A	Day	
16	15.1.2020	22:00:13-22:59:13	50.70	A	Night	48.70
17	15.1.2020	23:00:13-23:59:13	48.55	A	Night	
18	16.1.2020	0:00:13-0:59:13	47.73	A	Night	
19	16.1.2020	1:00:13-1:59:13	47.10	A	Night	
20	16.1.2020	2:00:13-2:59:13	47.79	A	Night	
21	16.1.2020	3:00:13-3:59:13	48.53	A	Night	
22	16.1.2020	4:00:13-4:59:13	52.51	A	Night	
23	16.1.2020	5:00:13-5:59:13	47.63	A	Night	
24	16.1.2020	6:00:13-6:59:13	47.75	A	Night	
Average			51.59			

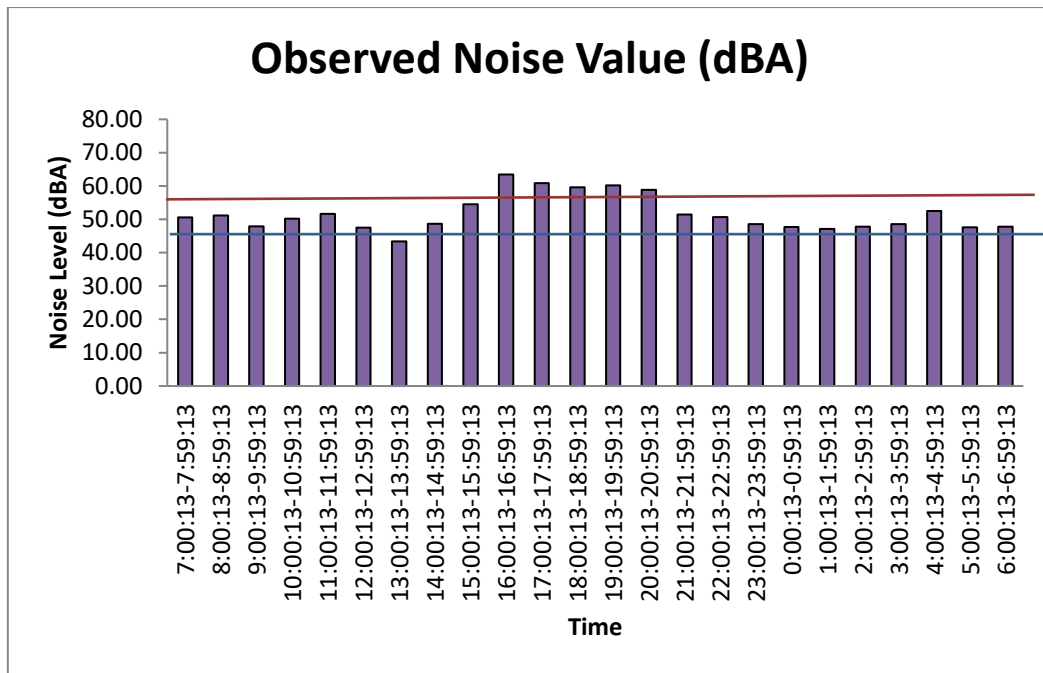


Figure 5-34 Noise Level at Point 5 (East Maw Tone Village for Dry Season)

Table 5-30 Observed Values of Noise Level Measurement at Point 5 (East Maw Tone Village for Wet Season)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	23.06.2020	7:00:13-7:59:13	61.16	A	Day	66.03
2	23.06.2020	8:00:13-8:59:13	61.65	A	Day	
3	23.06.2020	9:00:13-9:59:13	66.64	A	Day	
4	23.06.2020	10:00:13-10:59:13	65.12	A	Day	
5	23.06.2020	11:00:13-11:59:13	63.95	A	Day	
6	23.06.2020	12:00:13-12:59:13	67.07	A	Day	
7	23.06.2020	13:00:13-13:59:13	66.37	A	Day	
8	22.06.2020	14:00:13-14:59:13	68.62	A	Day	
9	22.06.2020	15:00:13-15:59:13	68.53	A	Day	
10	22.06.2020	16:00:13-16:59:13	70.06	A	Day	
11	22.06.2020	17:00:13-17:59:13	68.44	A	Day	
12	22.06.2020	18:00:13-18:59:13	68.12	A	Day	
13	22.06.2020	19:00:13-19:59:13	63.89	A	Day	
14	22.06.2020	20:00:13-20:59:13	65.41	A	Day	
15	22.06.2020	21:00:13-21:59:13	65.40	A	Day	
16	22.06.2020	22:00:13-22:59:13	64.63	A	Night	66.55

17	22.06.2020	23:00:13-23:59:13	66.30	A	Night
18	23.06.2020	0:00:13-0:59:13	74.66	A	Night
19	23.06.2020	1:00:13-1:59:13	72.55	A	Night
20	23.06.2020	2:00:13-2:59:13	63.44	A	Night
21	23.06.2020	3:00:13-3:59:13	67.34	A	Night
22	23.06.2020	4:00:13-4:59:13	65.10	A	Night
23	23.06.2020	5:00:13-5:59:13	63.12	A	Night
24	23.06.2020	6:00:13-6:59:13	61.86	A	Night
Average			66.23		

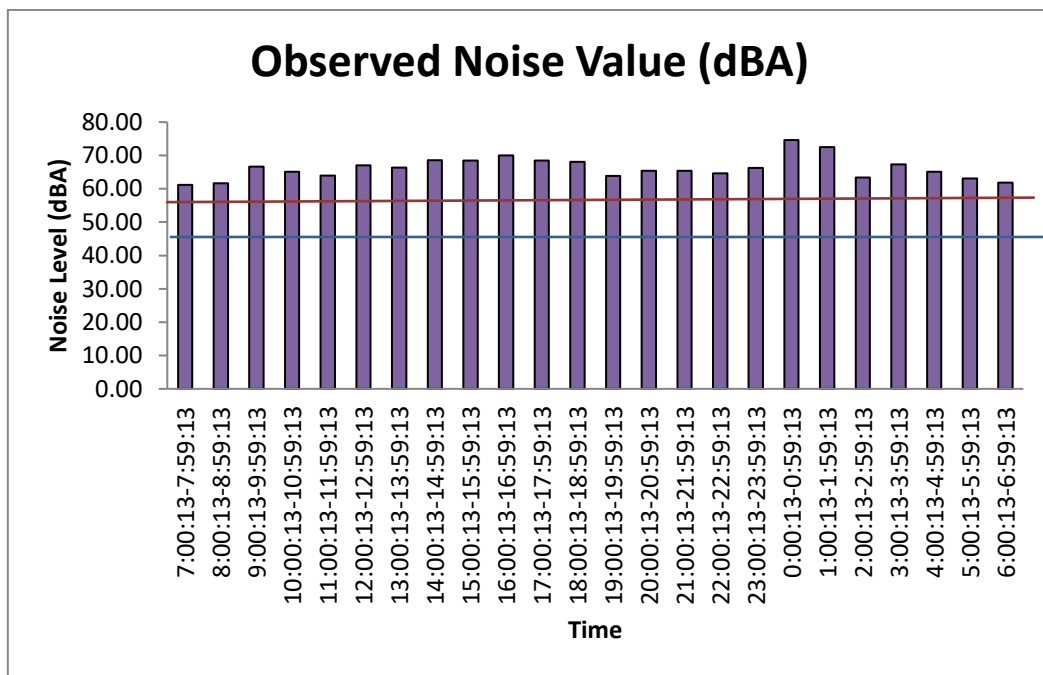


Figure 5-35 Noise Level at Point 5 (East Maw Tone Village for Wet Season)

Table 5-31 Observed Ambient Noise Level Results from Selected Points for Dry Season

Point	Point 1		Point 2		Point 3		Point 4		Point 5	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
	52.00	46.22	61.68	60.84	52.29	53.56	52.80	48.20	53.33	48.70
Guideline Values	55	45	55	45	55	45	55	45	55	45

Table 5-32 Observed Ambient Noise Level Results from Selected Points for Wet Season

Point	Point 1		Point 2		Point 3		Point 4		Point 5	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night

	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
	65.08	61.42	58.67	57.72	56.91	52.43	56.41	57.45	66.03	66.55
Guideline Values	55	45	55	45	55	45	55	45	55	45

The observed values are compared with the National Environmental Quality (Emission) Guidelines as shown in Table 5-31 and Table 5-32 which indicate the separate level for residential and industrial points.

Table 5-33 National Environmental Quality (Emission) Guidelines Values for Noise Level

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

The proposed project is located adjacent to the residential area. For dry season, the observed noise values of the proposed project for daytime at Pannel Taung Village, Tone Byaw Gyi Village, Sin Din/Pyin Won Village, and East Maw Tone Village are under the National Environmental Quality (Emission) Guidelines. But Pa Thaung Village is upper the National Environmental Quality (Emission) Guidelines because noise monitoring location is near Myeik- Kawthaung Highway Road. So, this road is passing through more highway buses and motorcycles. So, Pa Thaung Village is upper the National Environmental Quality (Emission) Guidelines. The observed values of the proposed project for Nighttime at Pannel Taung Village, Pa Thaung Village, Tone Byaw Gyi Village, Sin Din/Pyin Won Village, and East Maw Tone Village are upper the National Environmental Quality (Emission) Guidelines because all monitoring location are near road, residential area and monasteries. In addition, all villages are using Loud Speaker and Television. So, the observed values of the proposed project for Nighttime at Pannel Taung Village, Pa Thaung Village, Tone Byaw Gyi Village, Sin Din/Pyin Won Village, and East Maw Tone Village are upper the National Environmental Quality (Emission) Guidelines.

For wet season, the observed values of the proposed project for daytime and nighttime at Pannel Taung Village, Ma Zaw Village, Tone Byaw Gyi Village, Sin Din/Pyin Won Village, and East Maw Tone Village are upper the National Environmental Quality (Emission) Guidelines because noise monitoring location is near Myeik- Kawthaung Highway Road. So, this road is passing through more highway buses and motorcycles. All monitoring locations are near road, houses and monasteries. In addition, all villages are using Loud Speaker and television. Wet season of observed values are more than Dry season because of raining and thunder clap. In addition, this period is Pandemic Period and the local authorities usually announce Pandemic Control Orders and Suggestions by using Loud Speakers. Another

possible reason is that some houses of the villages use Bird Sound Machines for the purpose of Bird Nest Production.

Table 5-34 Summary of Vibration Survey for Dry Season

Location	X-Lveq (dB)		Y-Lveq (dB)		Z-Lveq (dB)	
	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00
Point 1 (Pannel Taung Village)	44.78	40.56	37.47	35.73	43.71	38.21
Point 2 (Pa Thaung Village)	45.55	38.11	36.88	30.89	42.66	35.46
Point 3 (Tone Byaw Gyi Village)	40.91	36.41	33.42	28.11	38.12	33.25
Point 4 (Sin Din/Pyin Won Village)	40.35	36.49	31.95	27.62	34.08	30.25
Point 5 (East Maw Tone Village)	43.05	36.04	35.29	29.35	40.77	33.23

Table 5-35 Summary of Vibration Survey for Wet Season

Location	X-Lveq (dB)		Y-Lveq (dB)		Z-Lveq (dB)	
	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00
Point 1 (Pannel Taung Village)	41.28	37.56	33.47	30.33	40.31	35.33
Point 2 (Ma Zaw Village)	47.31	40.31	34.58	29.89	41.70	36.66
Point 3 (Tone Byaw Gyi Village)	43.98	37.40	36.73	34.10	37.83	34.93
Point 4 (Sin Din/Pyin Won Village)	37.63	30.49	28.97	26.06	31.08	20.76
Point 5 (East Maw Tone Village)	39.63	37.04	30.89	28.85	36.37	35.33

**Table 5-36 Regulatory Standards for Vibration Emitted from Specified Factories
(Summary)**

Time Area	Day Time	Night Time	Applicable Areas
I	60-65 dB	55-60 dB	Areas where maintenance of quiet is particularly needed to preserve a good living environment and where quiet is needed for as they are used for residential purposes.
II	65-70 dB	60-65 dB	Areas used for commercial and industrial as well as residential purposes where there is a need to preserve the living environment of local residents and areas mainly serving industrial purposes which are in need of measures to prevent the living environment of local residents from deteriorating.

There is still no official released vibration guidelines in Myanmar. Therefore, Japan vibration guidelines are used to analyze the current vibration results of this project. These results are within the Japan vibration guidelines.

5.3.3 Wind Speed and Direction

The following figure describes the wind speed and wind direction of the proposed project site on, 11th to 16th January, 2020 and 18th to 23rd June, 2020 respectively. According to the data, the wind direction is following Figure 5-36 to Figure 5-55.



Figure 5-36 Wind Speed and Wind Direction (Blowing from) at Point 1 (Pannel Taung Village for Dry Season)

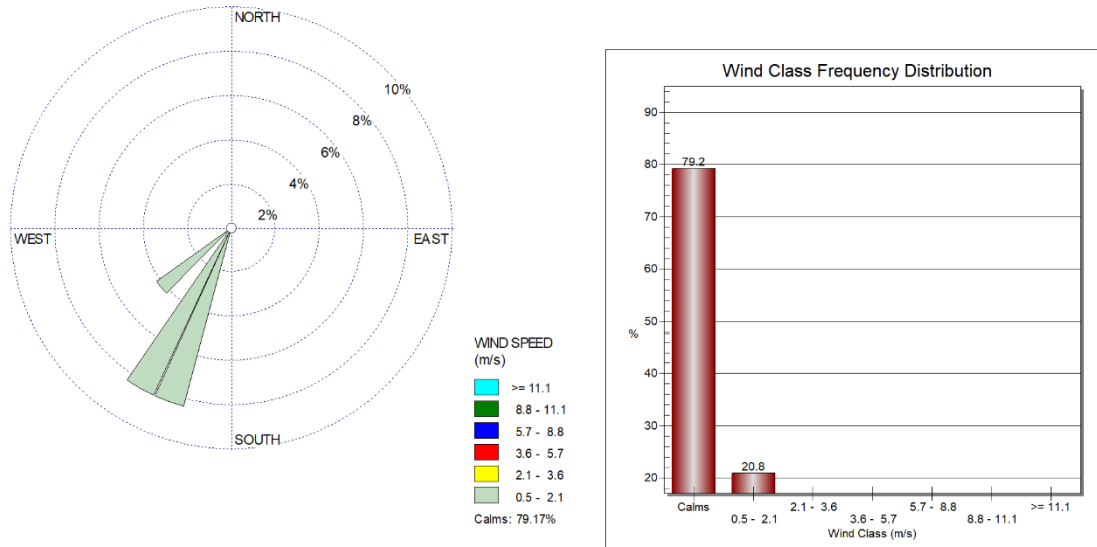


Figure 5-37 Wind Class Frequency Distribution at Point 1 (Pannel Taung Village for Dry Season)



Figure 5-38 Wind Speed and Wind Direction (Blowing from) at Point 1 (Pannel Taung Village for Wet Season)

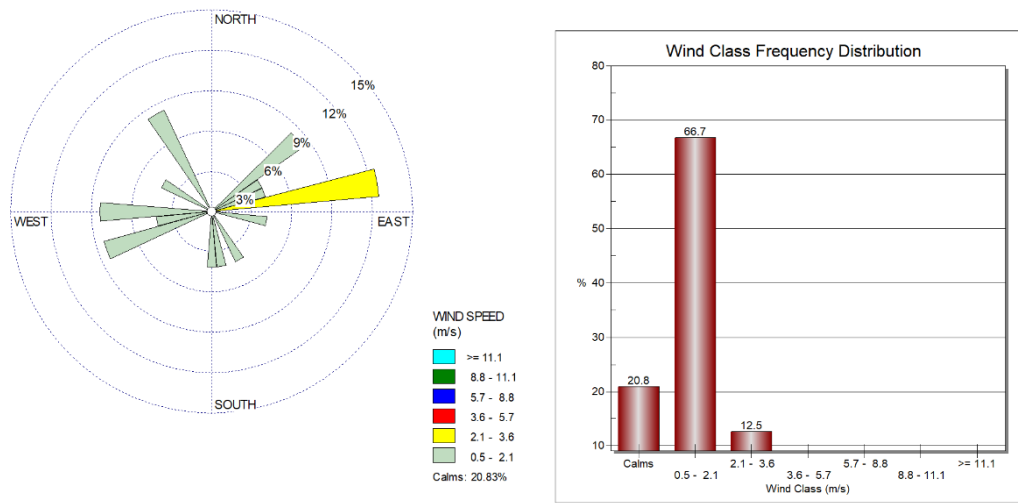


Figure 5-39 Wind Class Frequency Distribution at Point 1 (Pannel Taung Village for Wet Season)



Figure 5-40 Wind Speed and Wind Direction (Blowing from) at Point 2 (Pa Thaung Village for Dry Season)

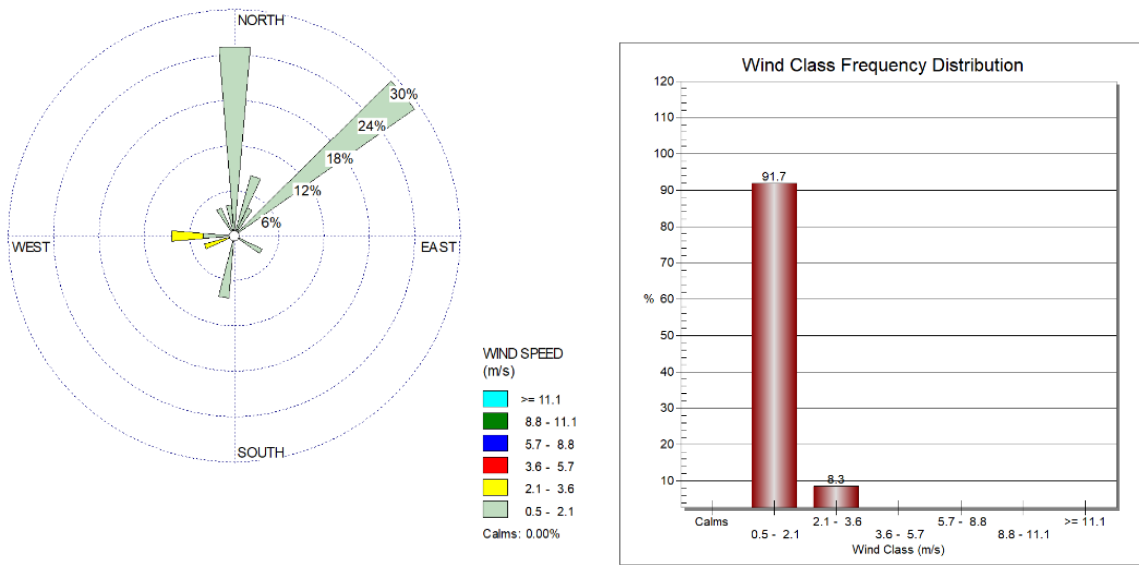


Figure 5-41 Wind Class Frequency Distribution at Point 2 (Pa Thaung Village for Dry Season)



Figure 5-42 Wind Speed and Wind Direction (Blowing from) at Point 2 (Ma Zaw Village for Wet Season)

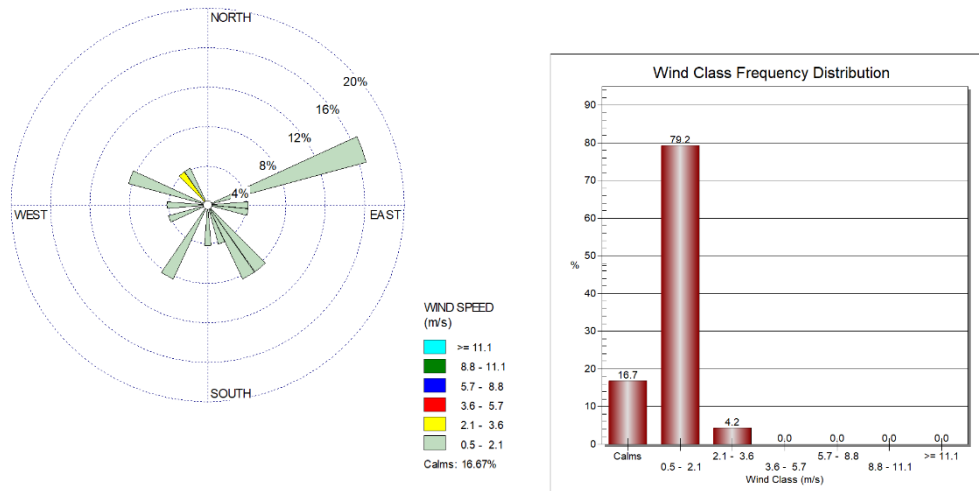


Figure 5-43 Wind Class Frequency Distribution at Point 2 (Ma Zaw Village for Wet Season)



Figure 5-44 Wind Speed and Wind Direction (Blowing from) at Point 3 (Tone Byaw Gyi Village for Dry Season)

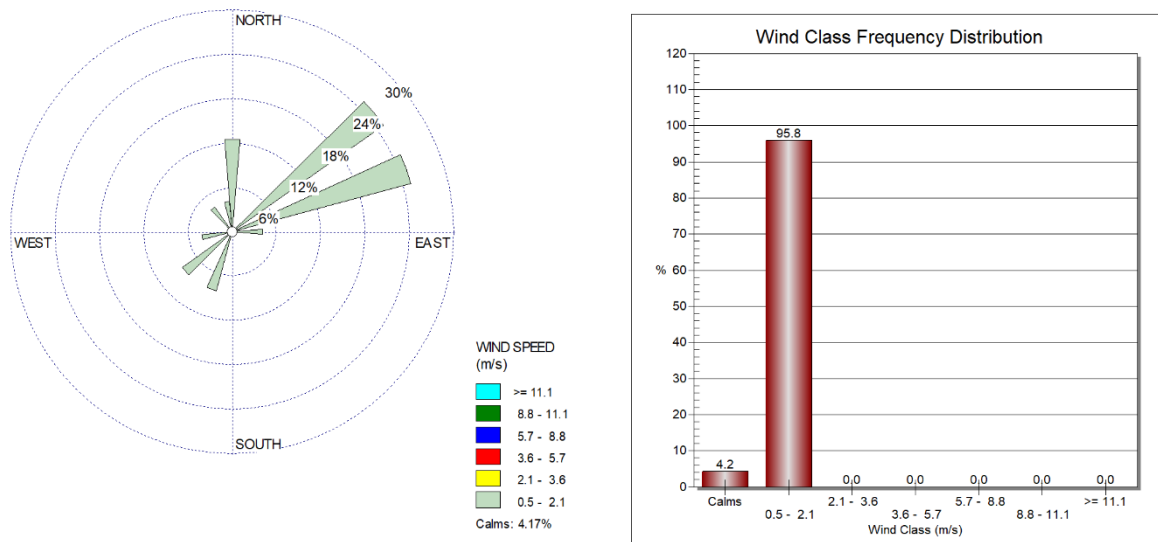


Figure 5-45 Wind Class Frequency at Point 3 (Tone Byaw Gyi Village for Dry Season)



Figure 5-46 Wind Speed and Wind Direction (Blowing from) at Point 3 (Tone Byaw Gyi Village for Wet Season)

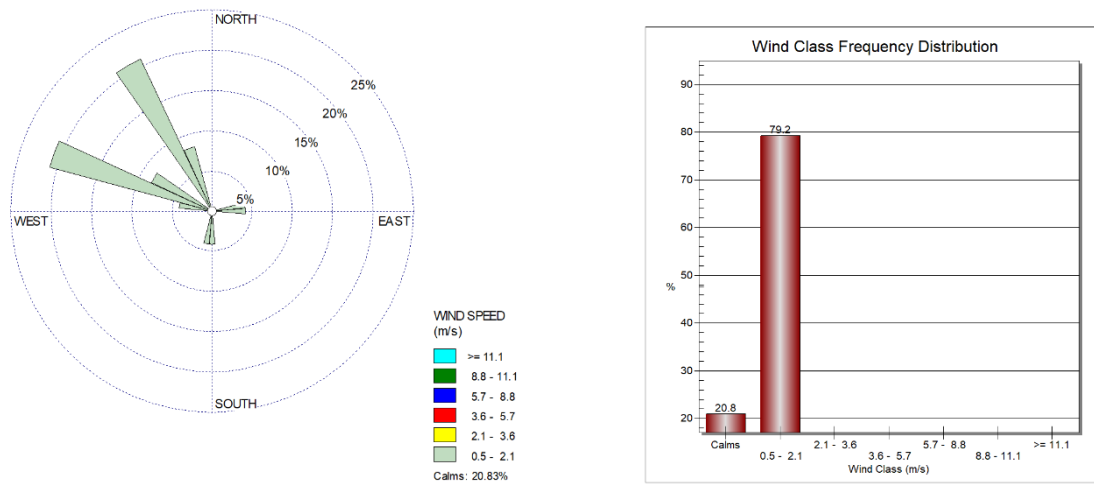


Figure 5-47 Wind Class Frequency Distribution at Point 3 (Tone Byaw Gyi Village for Wet Season)



Figure 5-48 Wind Speed and Wind Direction (Blowing from) at Point 4 (Sin Din/Pyin Won Village for Dry Season)

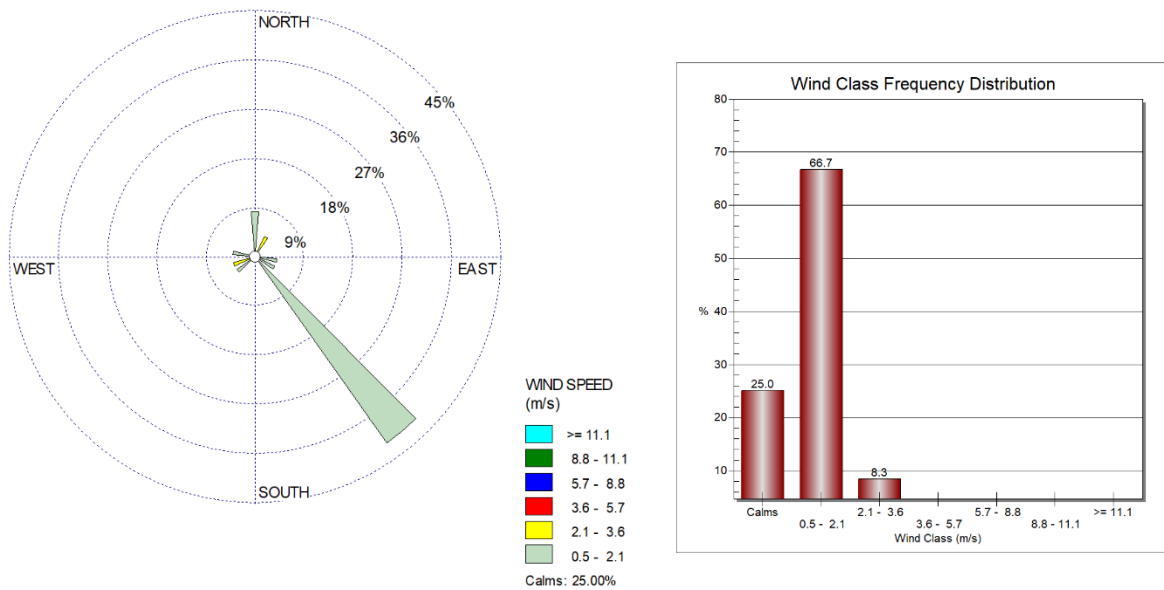


Figure 5-49 Wind Class Frequency Distribution at Point 4 (Sin Din/Pyin Won Village for Dry Season)



Figure 5-50 Wind Speed and Wind Direction (Blowing from) at Point 4 (Sin Din/Pyin Won Village for Wet Season)

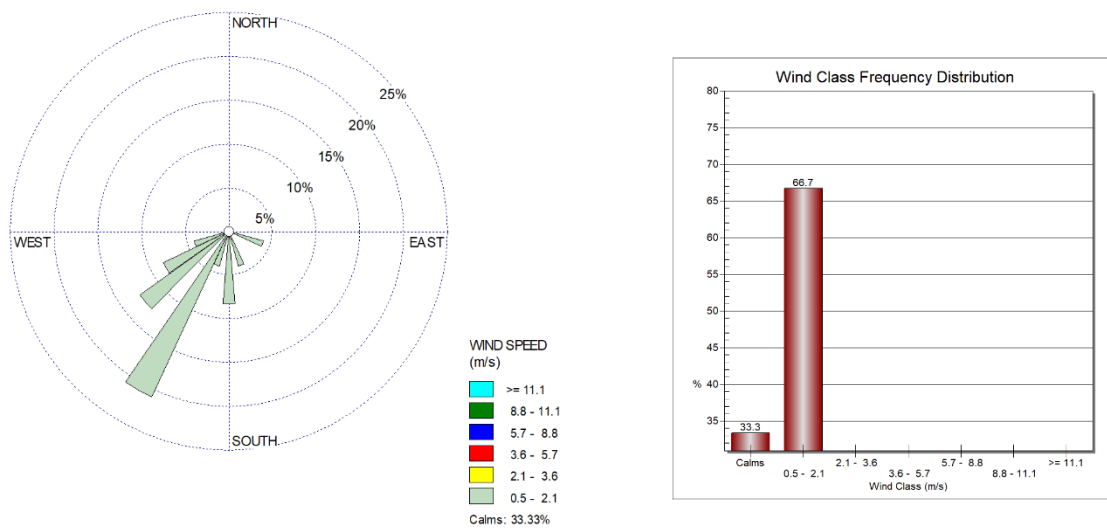


Figure 5-51 Wind Class Frequency Distribution at Point 4 (Sin Din/Pyin Won Village for Wet Season)



Figure 5-52 Wind Speed and Wind Direction (Blowing from) at Point 5 (East Maw Tone Village for Dry Season)

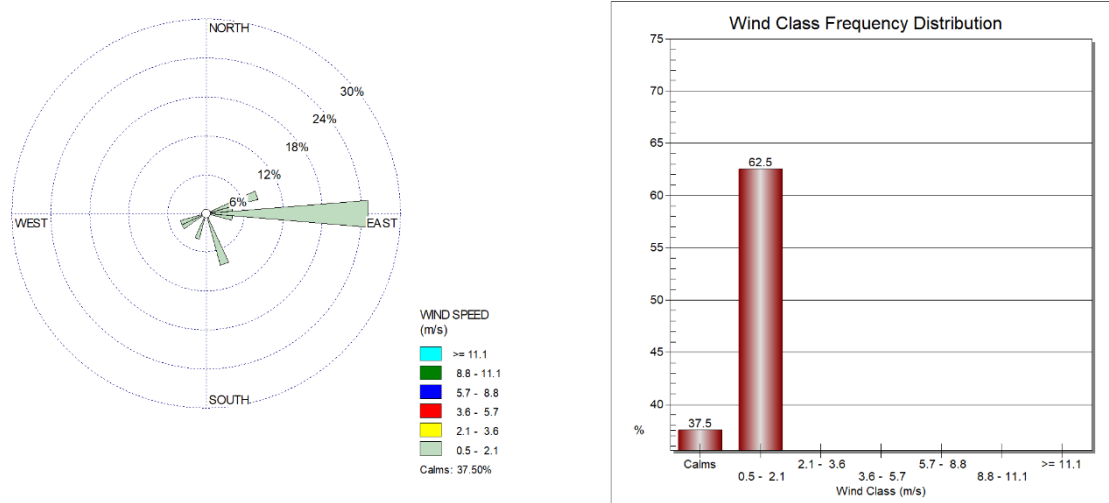


Figure 5-53 Wind Class Frequency Distribution at Point 5 (East Maw Tone Village for Dry Season)



Figure 5-54 Wind Speed and Wind Direction (Blowing from) at Point 5 (East Maw Tone Village for Wet Season)

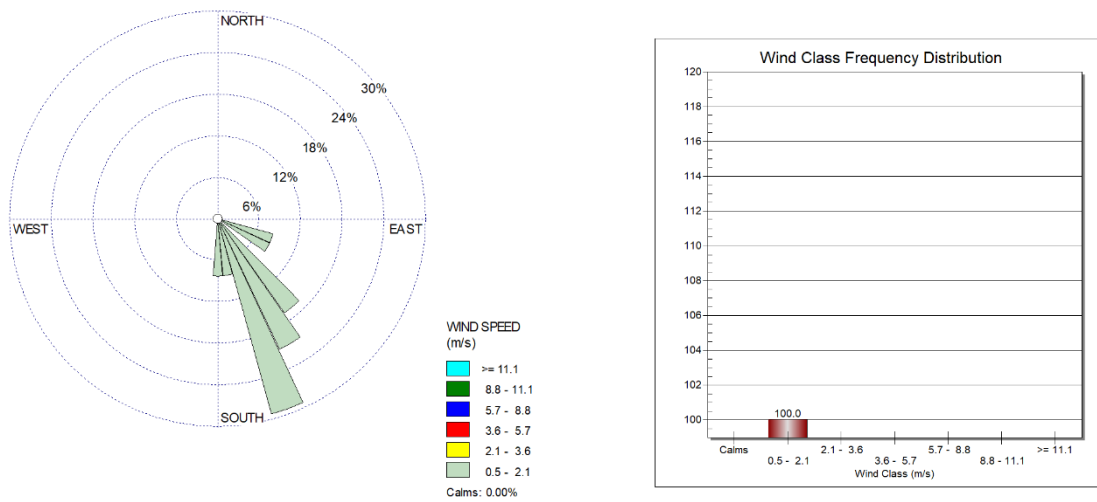


Figure 5-55 Wind Class Frequency Distribution at Point 5 (East Maw Tone Village for Wet Season)

5.3.4 Water Quality Standards

Currently, Myanmar does not have surface water quality standards for major rivers and its tributaries, natural and man-made streams or lakes, ground water, or reservoir water. Environmental Conservation Department is in the process of developing National Ambient Water Quality Standards based on the protection of aquatic life. It is recommended by the environmental specialists to compare the measured water quality results with the standards shown in Table 5-37 below.

Table 5-37 Ambient Water Quality Standards for the Protection of Aquatic Life

Parameter		Unit	Concentration	Reference
Aluminum		mg/l	0.005 (if pH < 6.5) 0.1 (if pH > 6.5)	Australian and New Zealand guidelines for fresh and marine water quality. 2000. Australian and New Zealand Environment Conservation Council. Water Quality Guidelines for the Protection of Aquatic Life. 2016. Canadian Council of Ministers of the Environment. Metal mining technical guidance for environmental effects monitoring. 2012. Environment Canada.
Ammonia		mg/l	0.02	As above
Arsenic		mg/l	0.05	As above
Boron		mg/l	0.5	As above
Cadmium		mg/l	0.0002	As above
Chloride		mg/l	0.86	As above
Chromium (hexavalent)		mg/l	0.01	As above
Chromium (trivalent)		mg/l	0.0089	As above
Coliforms (total)		MPN/100ml	5000	As above
Coliforms (faecal)		MPN/100ml	1000	As above
Color		mg/l	Not significantly higher than seasonally adjusted background value	As above
Copper		mg/l	0.002	As above
Cyanide (free)		mg/l	0.005	As above

Parameter		Unit	Concentration	Reference
Dissolved oxygen		mg/l	6	As above
Ethanol		mg/l	1.4	As above
Fluoride		mg/l	0.2	As above
Iron		mg/l	0.3	As above
Lead		mg/l	0.001	As above
Manganese		mg/l	0.05	As above
Mercury		mg/l	0.0001	As above
Molybdenum		mg/l	0.073	As above
Naphthalene		mg/l	0.016	As above
Nickel		mg/l	0.015	As above
Nitrate		mg/l	5	As above
Nitrite		mg/l	0.06	As above
Oil & grease		-	Substantially absent, no iridescent sheen	As above
pH		-	6.5-9	As above
Phenols		mg/l	0.004	As above
Phosphorus		mg/l	0.15	As above
Selenium (total)		mg/l	0.005	As above
Silver		mg/l	0.0001	As above
Sulphide		mg/l	0.002	As above
Temperature		°C	< 2 increase	As above
Thallium		mg/l	0.004	As above
Total suspended solids		mg/l	10	As above
Tributyltin		mg/l	0.000008	As above
Turbidity		-	< 10% change	As above
Uranium		mg/l	0.015	As above
Zinc		mg/l	0.005	As above

5.3.5 Water Quality

The project proponent is responsible for ensuring the drainage or runoff from the project or its related activities do not deteriorate the existing water quality. Baseline quality of water quality was recorded by on site sampling and laboratory analysis at three selected locations systematically. The field surveys for environmental quality monitoring and sampling were done during 14th January 2020 for dry season and 21st June 2020 for wet season.

Objectives of the sampling and analysis of water quality is to understand the existing water quality at the selected locations and to monitor the impacts before the operation. Some parameters for Dry and Wet Season differed because the conditions and nature of the project were known better during these seasons.

All locations water quality sampling results are shown in Table 5-38 to Table 5-41 and compared with National Environmental Quality (Emission) Guidelines and Ambient Water Quality Standards for the Protection of Aquatic Life. Analyzed water quality results were shown in the tables below comparing with the ambient water quality standards. Generally, most of the lab results of parameters analyzed is within the national water quality standard. Based on the nature of the proposed project, the project will conduct systematic treatment plant to reduce some parameters that exceed the standard values and will monitor the quality of the treated water regularly for the requirement of the project.

Table 5-38 Surface Water Quality of SW 1, SW 2, SW 3 for Dry Season

Parameters	National Environmental Quality (Emission) Guidelines for General	Ambient Water Quality Standards for the Protection of Aquatic Life	SW 1	SW 2	SW 3
Ammonia	10 mg/l				
Arsenic	0.1 mg/l				
Chemical Oxygen Demand (COD)	250 mg/l				
Chlorine	0.2 mg/l				
Copper	0.5 mg/l				
Cyanide	1 mg/l				
Electrical Conductivity (Onsite Results)			422 μ s/cm	319 μ s/cm	209 μ s/cm
Dissolved Oxygen (Onsite Results)		6 mg/l	6.61 mg/l	9.53 mg/l	11.81 mg/l
pH (Onsite Results)	6-9	6.5-9	5.88	7.04	6.39
Temperature (Onsite Results)			29.57°C	29.75°C	30.09°C
Iron	3.5 mg/l				
Lead	0.1 mg/l				
Turbidity (Onsite Results)		< 10% change	167 NTU	74.1 NTU	18 NTU
Total Dissolved Solids (Onsite Results)			258 mg/l	205 mg/l	136 mg/l
Total Suspended Solids	50 mg/l				
Salinity (Onsite Results)			2 ppt	2 ppt	0.1 ppt

Table 5-39 Surface Water Quality of SW 1, SW 2, SW 3 for Wet Season

Parameters	National Environmental Quality (Emission) Guidelines for General	Ambient water quality standards for the protection of aquatic life	SW 1	SW 2	SW 3
Ammonia Nitrogen	10 mg/l		Nil	Nil	Nil
Arsenic	0.1 mg/l		Nil	Nil	Nil
Chemical Oxygen Demand (COD)	250 mg/l		32 mg/l	32 mg/l	32 mg/l
Colour			80 TCU	40 TCU	30 TCU
Chlorine	0.2 mg/l		Nil	Nil	Nil
Copper	0.5 mg/l		Nil	Nil	Nil
Cyanide	1 mg/l		Nil	Nil	Nil
Electrical Conductivity (Onsite Results)			227 μ s/cm	65 μ s/cm	58 μ s/cm
Dissolved Oxygen (Onsite Results)		6 mg/l	6.78 mg/l	6.44 mg/l	8.07 mg/l
pH (Onsite Results)	6-9	6.5-9	6.54	5.86	6.38
Temperature (Onsite Results)			30.05 °C	30.36 °C	30.49 °C
Iron	3.5 mg/l		2.93 mg/l	0.93 mg/l	0.79 mg/l
Lead	0.1 mg/l		Nil	Nil	Nil
Turbidity (Onsite Results)		< 10% change	14.4 NTU	48.0 NTU	35.0 NTU
Total Dissolved Solids (Onsite Results)			148 mg/l	42 mg/l	38 mg/l
Total Suspended Solids	50 mg/l		98 mg/l	45 mg/l	48 mg/l
Total Hardness			32 mg/l	20 mg/l	24 mg/l
Salinity (Onsite Results)			0.1 ppt	0.0 ppt	0.0 ppt

Table 5-40 Ground Water Quality Onsite Measurement for Dry Season

Parameters	Point 1 (Pannel Taung)	Point 2 (Pa Thaung)	Point 3 (Tone Byaw Gyi)	Point 4 (Sin Din/Pyin Won)	Point 5 (East Maw Tone)
Electrical Conductivity (Onsite Results)	510 µs/cm	412 µs/cm	109 µs/cm	215 µs/cm	218 µs/cm
Dissolved Oxygen (Onsite Results)	8.01 mg/l	6.24 mg/l	6.04 mg/l	6.85 mg/l	6.54 mg/l
pH (Onsite Results)	4.65	8.22	5.39	6.45	6.90
Temperature (Onsite Results)	26.48	26.72 °C	28.03 °C	28.01 °C	28.03 °C
Turbidity (Onsite Results)	56.5 NTU	0.0 NTU	9.0 NTU	3.0 NTU	3.8 NTU
Total Dissolved Solids (Onsite Results)	33 mg/l	268 mg/l	71 mg/l	130 mg/l	128 mg/l
Salinity (Onsite Results)	0.0 ppt	0.2 ppt	0.1 ppt	0.1 ppt	0.1 ppt

Table 5-41 Ground Water Quality Onsite Measurement for Wet Season

Parameters	Point 1 (Pannel Taung)	Point 2 (Ma Zaw)	Point 3 (Tone Byaw Gyi)	Point 4 (Sin Din/Pyin Won)	Point 5 (East Maw Tone)
Electrical Conductivity (Onsite Results)	59 µs/cm	218 µs/cm	42 µs/cm	51 µs/cm	129 µs/cm
Dissolved Oxygen (Onsite Results)	5.53 mg/l	5.61 mg/l	4.47 mg/l	3.58 mg/l	3.27 mg/l
pH (Onsite Results)	5.7	5.87	5.14	4.69	5.32
Temperature (Onsite Results)	28.60 °C	29.34 °C	27.98 °C	27.94 °C	27.94 °C
Turbidity (Onsite Results)	11.1 NTU	23.8 NTU	16.6 NTU	18.5 NTU	26.2 NTU
Total Dissolved Solids (Onsite Results)	39 mg/l	1400 mg/l	27 mg/l	33 mg/l	84 mg/l
Salinity (Onsite Results)	0.0 ppt	0.1 ppt	0.0 ppt	0.0 ppt	0.1 ppt

5.3.6 Soil

In Myanmar, there is still no government guideline for determination of background values of metals and metalloids in soil. Internationally, respective national guidelines use definition of natural background concentration in natural soil. The stepwise approach for deriving background values involves collection of data, statistical analysis of the data and determination of the background value. In this project, baseline soil contamination was collected to understand the soil quality of existing conditions Analyzed results are shown in Table 5-42 to Table 5-44.

Table 5-42 Soil analyzed at Point 1

Sample Name	Symbol	Unit	Results
Arsenic	As	mg/kg	2.45
Cadmium	Cd	mg/kg	ND
Chromium	Cr	mg/kg	10.3
Lead	Pb	mg/kg	19
Nickel	Ni	mg/kg	8.75
pH		mg/kg	6.1

Table 5-43 Soil analyzed at Point 2

Sample Name	Symbol	Unit	Results
Arsenic	As	mg/kg	21.9
Cadmium	Cd	mg/kg	ND
Chromium	Cr	mg/kg	15.9
Lead	Pb	mg/kg	10.8
Nickel	Ni	mg/kg	12.0
pH		mg/kg	5.0

Table 5-44 Soil analyzed at Point 3

Sample Name	Symbol	Unit	Results
Arsenic	As	mg/kg	9.9
Cadmium	Cd	mg/kg	ND

Sample Name	Symbol	Unit	Results
Chromium	Cr	mg/kg	11.7
Lead	Pb	mg/kg	16.8
Nickel	Ni	mg/kg	5.23
pH		mg/kg	5.4

5.4 Biodiversity Condition

The proposed project will be established in Myeik Township and Tanintharyi Township and then it will pass through the Tanintharyi River. In the east of the project, there are Tanintharyi National Park which is an Important Bird Area (IBA) and Pyi Gyi Man Daing Corridor which is a Key Biodiversity Areas (KBA). But these two areas are about 6 kilometers far away from the project. Theinkhun Stream key biodiversity area is situated at about 40 kilometers away from the south of the project area.

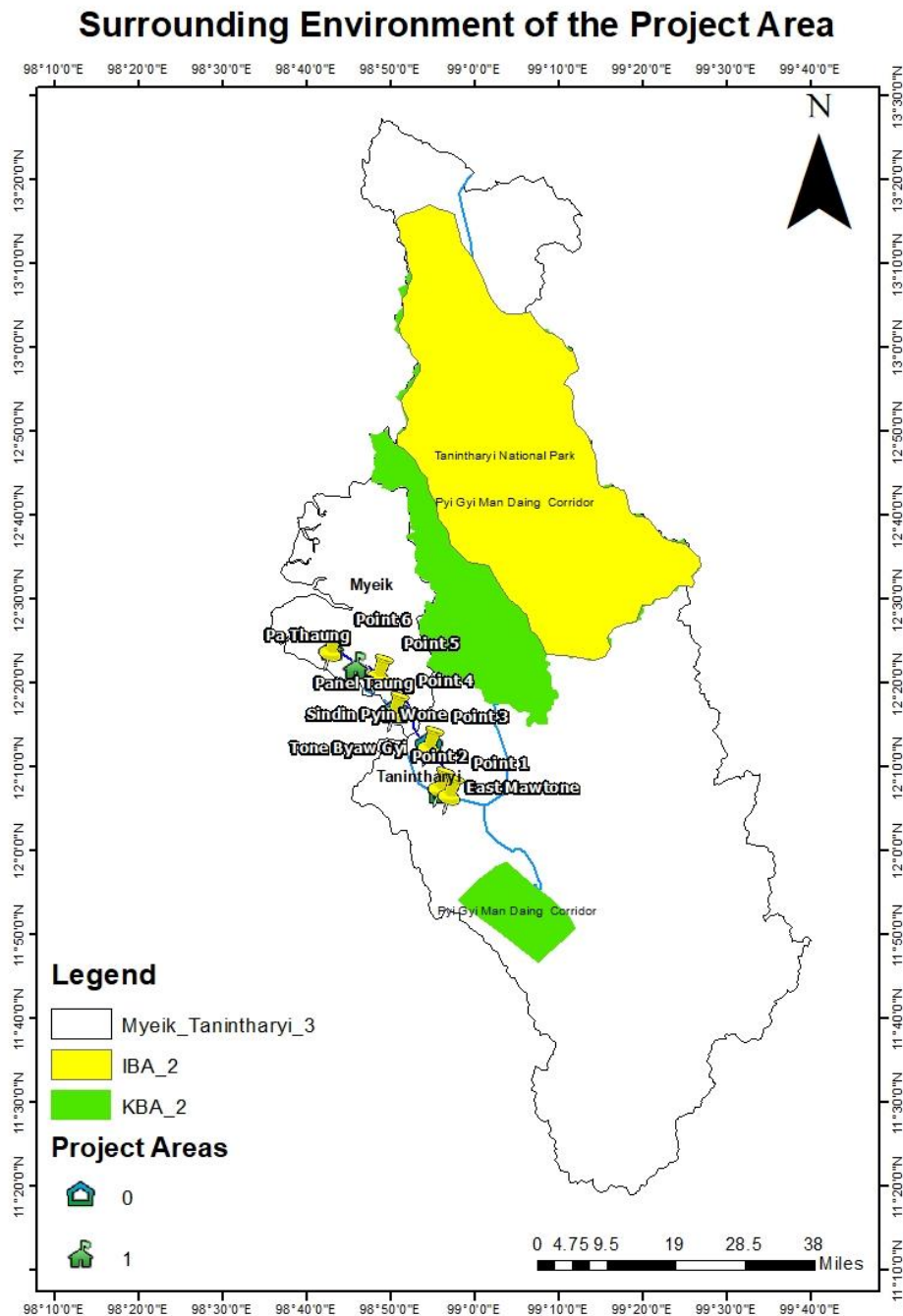


Figure 5-56 Surrounding Environment of project area

5.4.1 Materials and Methods

Biodiversity survey at the project area was carried out by the cooperation of Daw Htet Shwe Sin Aung (Environmental Specialist), Daw Hay Marn Hnin (Environmental Specialist) and Daw Hsu Myat Mon (Project Assistant). It took 5 days long to carry out survey activities at the project area. The survey started form 15th June, 2020 to 20th June, 2020.

The point count method was used to survey the avifauna with the help of binocular and by using camera. The bird list was identified by following after by Kyaw Nyunt Lwin and Khin Ma Ma Thwin (2003) and BANCA (2014). The recorded insects were identified according to the Patrick Hook (2013).

Flora data collected from using transect method which can be considered when surveying an entire study area where is a large area needs to be covered quickly. Specimen collection of trees, shrubs and herbs was also carried out by transect lines along the survey area. And the identification of specimens undertook using taxonomic keys (published in the Checklist of the Trees, Shrubs, Herbs, and Climbers of Myanmar (W. John Kress et al, 2003) and certain related guidebooks, journals and websites), comparison with herbarium specimens, consultation with taxonomic experts and interviewing with local people.

The recorded flora and fauna species of were categorized according to the IUCN (International Union for Conservation of Nature) Red List. The IUCN Red List Categories and Criteria are easily and widely understood system for classifying species at high risk of global extinction. There are (50) flora species and (42) fauna species were recorded. The study points of project area are described in Figure 5-57.



Figure 5-57 Study points at the project area



Figure 5-58 Biodiversity Survey

5.4.2 Fauna

The total (42) species of fauna were recorded during survey at the project area. There were (3) species of mammals, (4) species of reptiles and amphibians, (16) species of birds, (10) species of fishes, (5) species of crustaceans and (4) species of insects respectively. The results included both survey and interview survey. The IUCN status of recorded fauna during survey was described in following tables and Figures.

Table 5-45 Recorded Mammals from proposed project area

No.	Family	Common Name	Scientific Name	IUCN Status
1	Cercopithecidae	Dusky langur	<i>Trachypithecus obscurus</i>	LC
2	Suidae	Wild pig	<i>Sus scrofa</i>	LC
3	Cervidae	Muntjac	<i>Muntiacus feae</i>	DD

Table 5-46 Recorded Reptiles and amphibian from proposed project area

No.	Family	Common Name	Scientific Name	IUCN Status
1	Elapidae	Cobra	<i>Naja sp.</i>	VU
2	Colubridae	Rat Snake	<i>Pantherophis obsoletus</i>	LC
3	Elapidae	Krait	<i>Laticauda sp.</i>	LC
4	Bufonidae	Flat-headed Toad	<i>Ingerophrynus macrotis</i>	LC

Table 5-47 Recorded Birds from proposed project area

No.	Family	Common Name	Scientific Name	IUCN Status
1	Ardeidae	Little Egret	<i>Egretta garzetta</i>	LC
2	Coraciidae	Indian Roller	<i>Coracias benghalensis</i>	LC
3	Sturnidae	Common Myna	<i>Acridotheres tristis</i>	LC
4	Ciconiidae	Asian Openbill	<i>Anastomus oscitans</i>	LC
5	Cisticolidae	Common tailorbird	<i>Orthotomus sutorius</i>	LC
6	Columbidae	Spotted Dove	<i>Spilopelia chinensis</i>	LC
7	Sturnidae	Hill Myna	<i>Gracula religiosa</i>	LC
8	Phalacrocoracidae	Little Cormorant	<i>Phalacrocorax niger</i>	LC
9	Passeridae	Eurasian Tree Sparrow	<i>Passer montanus</i>	LC
10	Corvidae	Large-Billed Crow	<i>Corvus macrorhynchos</i>	LC
11	Anatidae	Fvous Whistling Duck	<i>Dendrocygna bicolor</i>	LC
12	Apodidae	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	LC
13	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	LC
14	Apodidae	Edible-nest Swiftlet	<i>Aerodramus fuciphagus</i>	LC
15	Accipitridae	Brahmany Kite	<i>Haliastur indus</i>	LC

No.	Family	Common Name	Scientific Name	IUCN Status
16	Charadriidae	Red Wattled Lapwing	<i>Vanellus indicus</i>	LC

Table 5-48 Recorded Fish recorded from proposed project area

No.	Family	Common Name	Scientific Name	IUCN Status
1	Sciaenidae	Coitor Croaker	<i>Johninus coiter</i>	LC
2	Cyprinidae	Carplet	<i>Osteobrama alfredianus</i>	-
3	Bagridae	Dwarf catfish	<i>Mystus vittatus</i>	LC
4	No.topterus	Featherback	No.topterus No.topterus	LC
5	Pangasiidae	Yellowtail Catfish	<i>Pangasius Pangasius</i>	LC
6	Anabantidae	Climbing Perch	<i>Anabas testudineus</i>	LC
7	Channidae	Snakehead Murrel	<i>Channa striata</i>	LC
8	Clariidae	Walking catfish	<i>Clariaas batrachus</i>	LC
9	Oxudercidae	Mudskipper	<i>Apocryptes bato</i>	LC
10	Sphyrnidae	Hammer head shark	<i>Eusphyra blochii</i>	EN

Table 5-49 Recorded Crustaceans from the proposed project area

No.	Family	Common Name	Scientific Name	IUCN Status
1	Squillidae	Giant Mantis Shrimp	<i>Harpiosquilla raphidea</i>	-
2	Palaemonidae	Giant freshwater prawn	<i>Macrobrachium rosenbergii</i>	LC
3	Portunidae	Mud Crab	<i>Scylla serrata</i>	-
4	Ocypodidae	Fiddler Crab	<i>Uca sp.</i>	-
5	Littorinidae	Molluscs	<i>Littorina planaxis</i>	-

Table 5-50 Recorded Insects form the proposed project area

No.	Family	Common Name	Scientific Name	IUCN Status
1	Libellulidae	Common Parasol	<i>Neurothemis fulvia</i>	LC
2		Yellow-Striped Flutterer	<i>Rhyothemis phyllis</i>	LC
3		Ground skimmer	<i>Diplacodes trivilis</i>	LC
4	Nymphalidae	Tiger Milkweed Butterflies	<i>Danaus sp.</i>	-



Ingerophrynus macrotis (LC)



Egretta garzetta (LC)



Coracias benghalensis (LC)



Acridotheres tristis (LC)



Anastomus oscitans (LC)



Spilopelia chinensis (LC)



Phalacrocorax niger (LC)



Passer montanus (LC)



Corvus macrorhynchos (LC)



Dendrocygna bicolor (LC)



Cypsiurus balasiensis (LC)



Aerodramus fuciphagus (LC)



Haliastur indus (LC)



Apocryptes bato



Macrobrachium rosenbergii(LC)



Uca sp.



Neurothemis fulvia (LC)



Rhyothemis phyllis (LC)



Diplacodes trivilis (LC)



Danaus sp.

Figure 5-59 Recorded Fauna during survey period

5.4.3 Flora

A total of (50) flora species belonging to (31) families were recorded along the study area, comprising (19) trees, (6) small trees, (10) shrubs, (13) herbs, (1) bamboo and (1) grass. According to conservation status of IUCN, one Vulnerable (VU) species, two Data Deficient (DD) species and fifteen Least Concerned (LC) species were existing in the project area. According to the results of flora survey, recorded plant species have been mentioned with the following table. And also recorded IUCN red list (flora) species described as photos in Figure 5-60.

Table 5-51 Recorded Plant species from proposed project area

No.	Myanmar Name	Common Name	IUCN Red List Category	Scientific Name	Family	Habitat	
1	Warr	Bamboo		<i>Bambusa sp.</i>	Poaceae	Bamboo	
2	Sa Par	Rice		<i>Oryza sativa</i>	Gramineae	Grass	
3	Hsat Thwa Phuu	Fragrant screwpine		<i>Pandanus odoratissimus</i>	Pandanaceae	Herb	
4	Hsu lar na pha	Diamond flower		<i>Oldenlandia corymbosa</i>	Rubiaceae		
5	Htikayone kalay	Sensitive plant	LC	<i>Mimosa pudica</i>	Mimosaceae		
6	Kwan Sar Gamone	Aromatic ginger		<i>Kaempferia galanga</i>	Zingiberaceae		
7	Kyet ka lay	Indian rhododendron		<i>Melastoma malabathricum</i>	Melastomataceae		
8	Marlar phuu	Hidden ginger	DD	<i>Curcuma petiolata</i>	Zingiberaceae		
9	Nanat	Pine apple		<i>Ananas comosus</i>	Bromeliaceae		
10	Nay kyar Ka Lay	Chinese Wedelia		<i>Sphagneticola calendulacea</i>	Asteraceae		
11	Pazun-sar	Sessile joyweed	LC	<i>Alternanthera sessilis</i>	Amaranthaceae		
12	Pein	Wild Taro	LC	<i>Colocasia esculenta</i>	Araceae		
13	Plang taung pwae	Spiral Ginger		<i>Costus speciosus</i>	Zingiberaceae		
14	Si-hna-maung	Indian heliotrope		<i>Heliotropium indium</i>	Boraginaceae		
15	Wa U	Elephant foot yam	LC	<i>Amorphophallus paeoniifolius</i>	Araceae		
16	-	Swamp Palm		<i>Eleiodoxa conferta</i>	Arecaceae		Shrub
17	Khaya	Sea holly	LC	<i>Acanthus ilicifolius</i>	Acanthaceae		
18	Ket Se Nae	Aramine fiber		<i>Urena labata</i>	Malvaceae		

19	Yay Sueboke	Rusty mimosa	LC	<i>Acacia intsia</i>	Mimosaceae		
20	Swel taw	Dwarf White Bauhinia	LC	<i>Bauhinia acuminata</i>	Caesalpiniaceae		
21	Pi law Pi nan	Tapioca		<i>Manihot esculenta</i>	Euphorbiaceae		
22	Pwea kaing	Senna		<i>Cassia alata</i>	Caesalpiniaceae		
23	Bi Sat	Siam weed		<i>Chromolaena odorata</i>	Asteraceae		
24	Nget pyaw	Banana		<i>Musa spp.</i>	Musaceae		
25	Wet lar	Coco-grass	LC	<i>Cyperus rotundus</i>	Cyperaceae		
26	Kun thi	Betel nut		<i>Areca catechu</i>	Palmaceae		Small Tree
27	Min Kut	Mangosteen		<i>Garcinia mangostana</i>	Guttiferae		
28	Shout	Lemon		<i>Citrus medica</i>	Rutaceae		
29	Malaka	Guava	LC	<i>Psidium guajava</i>	Myrtaceae		
30	Kyal kaw	Pummelo		<i>Citrus grandis</i>	Rutaceae		
31	Thaman shaw	Coast cottonwood		<i>Hibiscus tiliaceus</i>	Malvaceae		Tree
32	Yamane	Gamhar	LC	<i>Gmelina arborea</i>	Lamiatae		
33	Kanyin	Keruing	VU	<i>Dipterocarpus alatus</i>	Dipterocarpaceae		
34	Pyinma	Giant crepe-myrtle		<i>Lagerstroemia speciosa</i>	Lythraceae		
35	Mya Yar	Shiral		<i>Grewia microcos</i>	Tiliaceae		
36	Rubber	Pará rubber tree		<i>Hevea brasiliensis</i>	Euphorbiaceae		
37	Ohn	Coconut tree		<i>Cocos nucifera</i>	Arecaceae		
38	Yay Tha Phan	Fig		<i>Ficus glomerata</i>	Moraceae		
39	Duu Yinn	Durine		<i>Durio zibethinus</i>	AnNo.naceae		
40	Peinne	Indian Jack Fruit		<i>Artocarpus heterophyllus</i>	Moraceae		
41	Thayet	Mango	DD	<i>Mangifera indica</i>	Anacardiaceae		
42	Sayo	Toothbrush Tree	LC	<i>Streblus asper</i>	Moraceae		
43	Htan	Toddy palm		<i>Borassus flabellifer</i>	Palmaceae		
44	Thabyu	Elephant apple		<i>Dillinia indica</i>	Dilliniaceae		
45	Thit Kha	Burma mahogany		<i>Pentace bumanica</i>	Tiliaceae		
46	Lamu	Mangrove	LC	<i>Sonneratia caseolaris</i>	Lythraceae		

		apple			
47	Pyinkadoe	Iron wood	LC	<i>Xylocarpus xylocarpa</i>	Mimosaceae
48	Ka dtut	Drooping fig		<i>Ficus cunia</i>	Moraceae
49	Dani	Nipa palm	LC	<i>Nypa fruticans</i>	Arecaceae
50	Se Ohn	Oil palm	LC	<i>Elaeis guineensis</i>	Arecaceae

* (LC) = Least Concerned, (DD) = Data Deficient, (VU) = Vulnerable



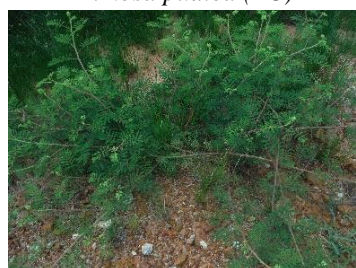
Mimosa pudica (LC)



Colocasia esculenta (LC)



Alternanthera sessilis (LC)



Acacia intsia (LC)



Bauhinia acuminata (LC)



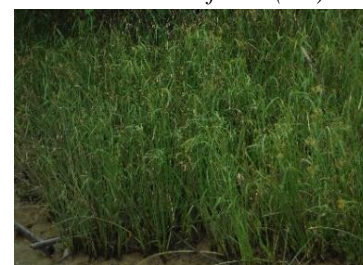
Acanthus ilicifolius (LC)



Psidium guajava (LC)



Gmelina arborea (LC)



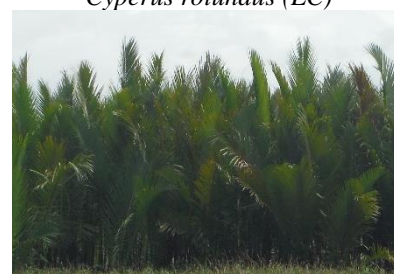
Cyperus rotundus (LC)



Streblus asper (LC)



Sonneratia caseolaris (LC)



Nypa fruticans (LC)



Mangifera indica (DD)



Dipterocarpus alatus (VU)



Curcuma petiolate (DD)



Xylia xylocarpa (LC)



Amorphophallus paeoniifolius (LC)



Elaeis guineensis (LC)

Figure 5-60 Recorded IUCN red list (flora) species in the proposed project area

5.4.4 Surrounding Environment of the Proposed Project

The proposed area will be projected by conducting the Myeik Township and Tanintharyi Township of Myeik District. The project will pass through along near the villages and main road. Agricultural lands as Rubber plantations, Oil palm plantations, Nipa palm plantations Betel nut plantations, Bamboo plantations and Paddy fields can be seen plenty along the alignment. Nattalinn Taung reserved forest is located in the Myeik Township which will be affected by project alignment. The reserved forest area has 6606.81 acres, rubber plantations can be seen mostly. The project will collect mainly water resources from Thanintharyi River and also the surrounding environment of the proposed project described by the following Figure 5-56.



Rubber plantation



Oil palm plantation



Nipa palm plantation



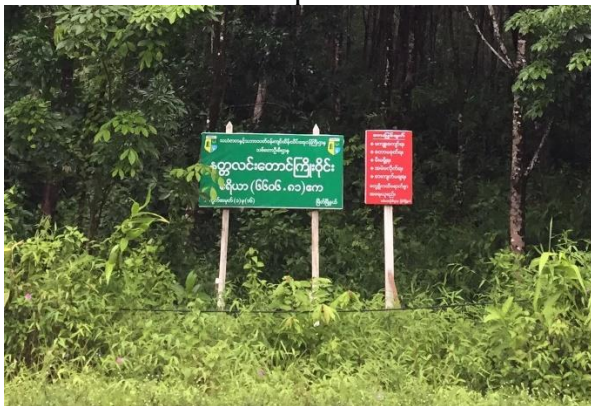
Betel nut plantation



Bamboo plantation



Paddy fields



Nattalinn Taung reserved forest



Thanintharyi River

Figure 5-61 Surrounding environment of the proposed project

5.5 Description of the Socio-Economic Condition of Local People in The Project Area

5.5.1 Methodology and Design for Social Survey

The study used a case study research design with quantitative research method for primary data collection for socio-economic condition of local people living in the project area. The quantitative survey with a questionnaire was conducted to understand the environmental and socio-economic conditions of villagers in three villages in Tanintharyi Township and five villages in Myeik Township, and to study the villagers' behavioral aspects such as perception on the project, satisfaction, and expectations from this project.



Figure 5-62 Socio-Economic Survey

5.5.2 Sample Size for Social Survey

The sample size for the baseline study was calculated by using the following formula;

$$\text{Sample size, } n = \frac{N}{1+Ne^2}$$

Where, n = sample size

N = total population (N= 2,525)

e = error tolerance (here e = 0.05)

The total population is obtained from focus group discussion held in January 2020. When it is calculated by using the above-mentioned formula, the sample size is 345. However, to cover the general household in respective villages, it is planned to collect the baseline data for 15 percent of households in each village in the project area. However, there is a little difference in the number of calculated and actual surveyed households due to time and some circumstances beyond our control.

Table 5-52 Surveyed sample size per each village

Sr.	Township	Village Tract Name	Village Name	Total number of households	Sample households	
					Calculated sample size	Actual sample size
1	Myeik	In Ga Maw	In Ga Maw	401	60	62
2			Pannel Taung	270	41	42
3		Taung Shae	Taung Shae	280	42	43
4		Pa Thaung	Pa Thaung	625	94	72
5		Ma Zaw	Ma Zaw	89	13	37
6		Tone Byaw Gyi	Tone Byaw Gyi	208	31	31
7	Tanintharyi	Za Wae	Za Wae	195	29	28
8		Ban La Mutt	Ban La Mutt	216	32	32
9		East Maw Tone	East Maw Tone	241	36	36
Total				2,525	378	383

Source: E Guard Social Team (June 2020)

5.1.2 Data analysis for social survey

The primary data collected was processed by using IBM SPSS and was analyzed by using descriptive statistics and was described by using basic inferential statistics such as mean, frequency, and cross-tabulations for the general information of the household level factors including type of occupation, gender, and education level of household heads, sources of water for domestic use, drinking and cooking, and perception on the project etc.

5.5.3 Socioeconomic conditions of the households in the project area

5.5.3.1 Gender of respondents

The number of respondents with their gender and village is summarized in the following Table 5-53. As per the results of descriptive analysis, the majority of the total respondents are female and only 26 percentages of the total respondents are male. Similarly, the percentage of female respondents in each village in both townships is found to be higher than that of male respondents.

Table 5-53 Gender of respondents

Gender	Tanintharyi Township						Myeik Township								Total			
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw				Tone Byaw	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	9	32.1	12	37.5	6	16.7	27	26.0	6	14.0	27	37.5	4	10.8	12	38.7	103	26.89
Female	19	67.9	20	62.5	30	83.3	77	74.0	37	86.0	45	62.5	33	89.2	19	61.3	280	73.11
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.2 Gender of household heads

The following Table 5-54 shows the number and percentage of household heads by genders and village name in the project area. It is found that the majority of total household heads are male and only 16 percentages of total interviewed households are female-headed households. In addition, around one-fifth of the households in In Ga Maw Village Tract and Taung Shae Village, Ma Zaw Village, in Myeik Township, are female headed households.

Table 5-54 Gender of household heads

Gender	Tanintharyi Township						Myeik Township								Total			
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw				Tone Byaw	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	27	96.4	27	84.375	29	80.6	81	77.9	34	79.1	64	88.9	29	78.4	28	90.3	319	83.29
Female	1	3.6	5	15.625	7	19.4	23	22.1	9	20.9	8	11.1	8	21.6	3	9.7	64	16.71
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.3 Marital status of household heads

The following Table 5-55 describes the number and percentage of the household heads with their marital status. Around 80 percentages of the total interviewed household heads are married while only mere 0.5 percent of total household heads are divorced households heads. In Tanintharyi Township, the majority of the total interviewed household heads in Za Wae and Ban La Mutt Villages are married household heads while nearly one-fifth of the total interviewed household heads are widowed household heads.

Table 5-55 Marital status of household heads

Marital Status	Tanintharyi Township						Myeik Township								Total			
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw				Tone Byaw	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Single	0	0.0	0	0.0	3	8.3	6	5.8	1	2.3	4	5.6	1	2.7	0	0.0	15	3.9
Married	26	92.9	26	81.3	24	66.7	80	76.9	36	83.7	60	83.3	27	73.0	27	87.1	306	79.9
Widowed	2	7.1	6	18.8	8	22.2	17	16.3	6	14.0	8	11.1	9	24.3	4	12.9	60	15.7
Divorced/ Separated	0	0.0	0	0.0	1	2.8	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.4 Religion of household heads

Table 5-56 mentions the number and percentages of the interviewed household heads, in each village in both Tanintharyi and Myeik Townships, by their religions. The religion of overall interviewed household heads in Tanintharyi Township is Buddhism while that of the over half of the interviewed households in two villages, namely Pa Thaung and Tone Byaw, in Myeik Township is Islam.

Table 5-56 Religion of household heads

Religious By Household Head	Tanintharyi Township						Myeik Township								Total			
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw				Tone Byaw	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Buddhist	28	100	32	100	36	100	104	100	43	100	27	37.5	37	100	8	25.8	315	82.2
Christian	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	7	22.6	7	1.8
Islam	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	45	62.5	0	0.0	16	51.6	61	15.9
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.5 Ethnicity of the household heads

Table 5-57 mentions the number and percentages of the interviewed household heads, in Tanintharyi and Myeik Townships, by their ethnicity. In Tanintharyi Township, the overall household heads in three villages are Burma while the most similar figure is found in four out of five villages in Myeik Township. The mere one percent of total interviewed household heads is Indian and two percent of the total households are Kayin.

Table 5-57 Ethnicity of the household heads

Household Head By Ethnicity	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Burma	28	100	32	100	36	100	104	100	43	100	71	99	37	100	21	68	372	97
Indian	0	0	0	0	0	0	0	0	0	0	1	1	0	0	3	10	4	1
Kayin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	23	7	2
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.6 Educational Attainment of household heads

The number and percentage of the household heads with their educational attainment is described in the following Table 5-58. Around one-fifth of the total household heads finished their high school while only one percentage of the total household heads had No. education at all. In Tanintharyi Township, nearly 40 percent of the surveyed household heads in Ban La Mutt Village finished primary education while that of the household heads in Za We and East Maw Tone Villages finished middle schools. Around one third of the interviewed household heads in In Ga Maw and Tone Byaw Villages finished their primary education while half of the interviewed household heads in Pa Thaung Village in Myeik Township finished the primary education. In addition, half of the households in Taung Shae and Ma Zaw Villages, are those with the household heads who finished their secondary education.

Table 5-58 Educational Attainment of Household Head

Educational Attainment of Household Head	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Primary school (Grade 1-5)	7	25.0	14	43.8	3	8.3	36	34.6	12	27.9	38	52.8	6	16.2	10	32.3	126	32.9

Educational Attainment of Household Head	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Middle school (Grade 6-9)	11	39.3	10	31.3	14	38.9	37	35.6	21	48.8	24	33.3	22	59.5	11	35.5	150	39.2
High school (Grade 10-11)	8	28.6	4	12.5	10	27.8	18	17.3	7	16.3	7	9.7	8	21.6	6	19.4	68	17.8
University Student	1	3.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3
Graduate and above	1	3.6	0	0.0	5	13.9	0	0.0	0	0.0	2	2.8	1	2.7	0	0.0	9	2.3
No. formal school	0	0.0	4	12.5	4	11.1	10	9.6	3	7.0	1	1.4	0	0.0	3	9.7	25	6.5
None	0	0.0	0	0.0	0	0.0	3	2.9	0	0.0	0	0.0	0	0.0	1	3.2	4	1.0
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.7 Health Condition of household heads

Table 5-59 states the number and percentages of the household heads by their health conditions for the interviewed household heads in both Tanintharyi and Myeik Townships. Only 2 household heads with its mere 0.5 percent are disabled in hearing and only 3 household heads can't walk among total household heads. The health conditions of the majority of total household heads are Normal while only 9 percent of the total household heads undergoes some health conditions.

Similarly, the health conditions of the most household heads in Za Wae and East Maw Tone Villages in Tanintharyi Township are Normal while 75 percent of the household heads in Ban La Mutt Village is facing the same figure. In Myeik Township, the same figure is found in over 80 percent of the household heads in In Ga Maw, Taung Shae and Tone Byaw villages. However, around 10 percent of household heads in In Ga Maw, Pa Thaung, Ma Zaw and Tone Byaw Villages in Myeik Township are suffered from other health problems.

Table 5-59 Health Condition of household heads

Health Condition of Household Head	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No.rmal	26	92.9	24	75.0	34	94.4	91	87.5	37	86.0	61	84.7	29	78.4	26	83.9	328	85.6
Elderly (over 65)	0	0.0	1	3.1	1	2.8	2	1.9	1	2.3	3	4.2	3	8.1	2	6.5	13	3.4
Disabled hearing	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
Disabled walking	0	0.0	0	0.0	0	0.0	0	0.0	3	7.0	0	0.0	0	0.0	0	0.0	3	0.8
Other	2	7.1	7	21.9	1	2.8	9	8.7	2	4.7	8	11.1	5	13.5	3	9.7	37	9.7
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.8 Occupation & income source of household heads

Table 5-60 summarizes the occupation and income source of the households interviewed in the project area. The majority of total households with its percentage of 38 percent are farmers, followed by the casual labor with its percentage of 23 percent. The mere one percent of total households earn from working as employees at private organizations while 15 percent of total households run their own business. In Tanintharyi Township, 72 percentages of total households in Ban La Mutt are working as farmers while only 57 percentages of the households in Za Wae and 36 percentages of households in East Maw Tone Villages are getting income from working as farmers.

In Myeik Township, around 50 percentages of households in Ma Zaw and Tone Byaw Villages are getting their main incomes from farm works. However, the highest percentage of the households in In Ga Maw Village Tract and Taung Shae in are working as casual labor followed by farming in both villages. There is No. household working on their own works in Taninthari Township while 7 households in three villages of Myeik Township run their own business.

Table 5-60 Occupation & income source of household heads

Occupation & Income Source of Household Head	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Farmer	16	57.1	23	71.9	13	36.1	25	24.0	13	30.2	19	26.4	20	54.1	15	48.4	144	37.6
Fishermen	1	3.6	0	0.0	0	0.0	4	3.8	2	4.7	7	9.7	0	0.0	0	0.0	14	3.7
Employee (Government)	2	7.1	1	3.1	6	16.7	0	0.0	0	0.0	3	4.2	0	0.0	0	0.0	12	3.1
Employee (Private org)	0	0.0	0	0.0	2	5.6	0	0.0	0	0.0	1	1.4	0	0.0	1	3.2	4	1.0
Casual labour	4	14.3	5	15.6	3	8.3	32	30.8	17	39.5	12	16.7	7	18.9	6	19.4	86	22.5
Own account worker/personal business	5	17.9	0	0.0	5	13.9	14	13.5	4	9.3	18	25.0	4	10.8	6	19.4	56	14.6
Driver (Tricycle/car/taxi,etc)	0	0.0	0	0.0	1	2.8	6	5.8	0	0.0	2	2.8	0	0.0	0	0.0	9	2.3
Oversea worker	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3
Contributing family worker	0	0.0	0	0.0	1	2.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3
Dependent	0	0.0	3	9.4	5	13.9	19	18.3	7	16.3	7	9.7	5	13.5	3	9.7	49	12.8
Other	0	0.0	0	0.0	0	0.0	3	2.9	0	0.0	3	4.2	1	2.7	0	0.0	7	1.8
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.9 Monthly income of households

The number and percentages of interviewed households with their income level in the project townships are shown in the following Table 5-61. The monthly income of the most of the total households in both townships is less than 300,000 MMK and the second highest percentage of total households earn from 300,001 to 500,000 MMK per month. As per the result of the analysis, only mere 1 percent of total households earn more than 1,500,000 monthly.

In Tanintharyi Township, the majority of the households in Ban La Mutt and East Maw Tone Villages are earning less than 300,000 MMK while that in Ban La Mutt Villages are earning more than 300000 -500000 MMK per month. On the other hand, the monthly income of the highest percentages of households in all villages of Myeik Township is found to be less than 300,000 MMK and that of the second highest percentages in all villages are getting from 300,001 to 500,000 MMK per month, resulting the same figure of total households in both townships.

Table 5-61 Monthly incomes of households

Monthly Income (MMK)	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Less than 300,000	7	25.0	19	59.4	23	63.9	50	48.1	19	44.2	31	43.1	36	97.3	20	64.5	205	53.5
300,001 - 500,000	11	39.3	8	25.0	10	27.8	36	34.6	12	27.9	27	37.5	1	2.7	7	22.6	112	29.2
500,001 - 700,000	4	14.3	2	6.3	2	5.6	9	8.7	4	9.3	6	8.3	0	0.0	1	3.2	28	7.3
700,001 - 900,000	2	7.1	3	9.4	0	0.0	6	5.8	2	4.7	2	2.8	0	0.0	1	3.2	16	4.2
900,001 - 1,200,000	1	3.6	0	0.0	0	0.0	3	2.9	3	7.0	2	2.8	0	0.0	1	3.2	10	2.6
1,200,001 - 1,500,000	1	3.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	3.2	2	0.5
More than 1,500,001	0	0.0	0	0.0	1	2.8	0	0.0	1	2.3	2	2.8	0	0.0	0	0.0	4	1.0
No. answer	2	7.1	0	0.0	0	0.0	0	0.0	2	4.7	2	2.8	0	0.0	0	0.0	6	1.6
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.10 Monthly expenditure of households

Table 5-62 describes the number and percentages of interviewed households in Tanintharyi and Myeik Townships with the level of monthly expenditure. The majority of total households in both townships expend less than 300,000 MMK per month followed by the second level of expenditure between 300,001 to 500,000 MMK. The similar figure is found in all villages of both townships.

Table 5-62 Monthly expenditures of households

Monthly Expenditure	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Less than 300,000	12	42.9	23	71.9	29	80.6	63	60.6	20	46.5	44	61.1	26	70.3	21	67.7	238	62.1
300,001 - 500,000	12	42.9	8	25.0	7	19.4	16	15.4	13	30.2	22	30.6	11	29.7	7	22.6	96	25.1
500,001 - 700,000	4	14.3	0	0.0	0	0.0	9	8.7	7	16.3	5	6.9	0	0.0	3	9.7	28	7.3
700,001 - 900,000	0	0.0	1	3.1	0	0.0	3	2.9	1	2.3	0	0.0	0	0.0	0	0.0	5	1.3
900,001 - 1,200,000	0	0.0	0	0.0	0	0.0	0	0.0	1	2.3	1	1.4	0	0.0	0	0.0	2	0.5
No. answer	0	0.0	0	0.0	0	0.0	13	12.5	1	2.3	0	0.0	0	0.0	0	0.0	14	3.7
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.11 Status of difference between current & previous incomes of households

The summary of the difference between the current and previous incomes of the interviewed households is stated in the following Table 5-63. As per the result of analysis, there is difference in the current and past income of the majority of the total households in the project area. There is No. difference of the current and past income of the around half of the households in Ban La Mutt Village in Tanintharyi Township while the income difference is found for the majority of remaining two villages known as Za Wae and East Maw Tone Villages. However, the difference in the past and current income is found in over 60 percentages of households in all villages of Myeik Township.

Table 5-63 Different status between current & previous income of households

Different between current & previous income	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	22	78.6	17	53.1	23	63.9	63	60.6	26	60.5	56	77.8	23	62.2	21	67.7	251	65.5

Different between current & previous income	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No.	5	17.9	15	46.9	13	36.1	41	39.4	14	32.6	12	16.7	12	32.4	9	29.0	121	31.6
No. answer	1	3.6	0	0.0	0	0.0	0	0.0	3	7.0	4	5.6	2	5.4	1	3.2	11	2.9
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.3.12 Income status of households

The increase or decrease of income compared to the past income is summarized in the following Table 5-64 and the majority of total interviewed households in both townships, Tanintharyi and Myeik Townships, decrease their income and the income of second highest number of households are stabled. The income of nearly one quarter of the households in Za Wae Village stables while that of the half of the households in Ban La Mutt and East Maw Towne Villages of Tanintharyi Township faces the same figure. In Myeik Township, the income of around 60 percentage of all households in five villages decrease in comparison with their past income.

Table 5-64 Income status of households

Income Status	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Increased	0	0.0	1	3.1	3	8.3	3	2.9	3	7.0	11	15.3	1	2.7	3	9.7	25	6.5
Decreased	22	78.6	16	50.0	20	55.6	62	59.6	24	55.8	46	63.9	22	59.5	18	58.1	230	60.1
Stabled	5	17.9	15	46.9	13	36.1	37	35.6	12	27.9	9	12.5	9	24.3	6	19.4	106	27.7
No. answer	1	3.6	0	0.0	0	0.0	2	1.9	4	9.3	6	8.3	5	13.5	4	12.9	22	5.7
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4 Information related to water sources and usage in the project area

5.5.4.1 Water Source

The status of the water shortage in the last year is shown in Table 5-65. The proportion of total households which faced water shortage is nearly the same with that of the households which did not face water shortage in the last year. The majority of households in Za Wae Village and Ban La Mutt Village in Tanintharyi Township did not face shortage of water in the last year while only half of the households in East Maw Tone Village face that situation. Besides, the majority of households in In Ga Maw Village Tract and Ma Zaw Village did not face shortage of water in the last year while most households in other 3 villages, Taung Shae, Pa Thaung and Tone Byaw Villages faced water shortage in the past year.

Table 5-65 Status of water shortage in the last year

Water shortage in last year	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	3	10.7	7	21.9	17	47.2	36	34.6	33	76.7	44	61.1	17	45.9	21	67.7	178	46.5
No.	25	89.3	25	78.1	19	52.8	68	65.4	10	23.3	27	37.5	20	54.1	10	32.3	204	53.3
No. answer	0	0.0	0	0.0	0	0.0	0	0.0	0	0	1	1.4	0	0.0	0	0.0	1	0.3
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.2 Sea water entering in water source

Table 5-66 describes the status of seawater entering into the water source in the interviewed villages in Tanintharyi and Myeik Townships. As per the results, the highest number of total interviewed households does not face the sea water entering into their water source. However, one quarter of households in Za Wae and over half of the households in East Maw Tone Villages in Tanintharyi Township face sea water entering into their water source. The overall interviewed households in Ban La Mutt Village in Tanintharyi Township and Taung Shae Village in Myeik Township does not undergo seawater entering into their water source. Around one-third of households in Pa Thaung Village face seawater entering into the water sources while the majority of households in remaining three villages in Myeik Township states No. seawater entering into their water source.

Table 5-66 Sea water entering in water source

Sea water entering in water source	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	7	25.0	0	0.0	20	55.6	4	3.8	0	0.0	21	29.2	5	13.5	2	6.5	59	15.4
No.	18	64.3	32	100.0	16	44.4	100	96.2	43	100.0	50	69.4	31	83.3	28	90.3	318	83.0
No. answer	3	10.7	0	0.0	0	0.0	0	0.0	0	0	1	1.4	1	2.7	1	3.2	6	1.6
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.3 Domestic water sources in the wet and dry season

Table 5-67 shows the main sources of domestic water in the wet season in the project area and Table 5.17 states the main sources of the interviewed households in the project area in the dry season. As per the results, the majority of total households in both townships use well as the main source for domestic water usage, followed by the second highest proportion of the total households using spring water in the wet season. In Tanintharyi Township, the highest percentage of the households in Za Wae Village uses well for domestic water usage and it is followed by the percentage of households using spring water for domestic use.

The majority of the households in Ban La Mutt Village use spring water for domestic use while that of households in East Maw Tone Village uses river water for domestic use. The majority of the households in In Ga Maw, Taung Shae and Pa Thaung Villages in Myeik Township use well for their domestic use. However, the majority of households in Ma Zaw and Tone Byaw in Myeik Township use spring water for domestic use in the wet season.

Table 5-67 Domestic water sources in the wet season

Domestic water sources in the wet season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring water	9	32.1	27	84.4	2	5.6	11	10.6	0	0.0	9	12.5	33	89.2	19	61.3	110	28.7
River/stream	0	0.0	0	0.0	17	47.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	17	4.4
Well	19	67.9	5	15.6	16	44.4	93	89.4	43	100.0	63	87.5	1	2.7	12	38.7	252	65.8
Lake	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	8.1	0	0.0	3	0.8
Rain	0	0.0	0	0.0	1	2.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

The summary of main sources of domestic water use in the project area is stated in Table 5-68. The highest proportion of the total interviewed households in Tanintharyi and Myeik Townships also use well, followed by the percentage of households using Spring water for the domestic water usage in the wet season. Similarly, the highest number of households in Za Wae Village in Tanintharyi Township uses well and the smallest percentage of households in Ban La Mutt Village use it. Spring water is the main water source in the dry season for Ban La Mutt Village in Tanintharyi Township and Ma Zaw and Tone Byaw Villages in Myeik Township. The overall households in Taung Shae Village in Myeik Township uses well while only mere 2 percent of the households in Ma Zaw Village use it for water source in the dry season.

Table 5-68 Domestic water sources in the dry season

Domestic water sources in the dry season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring water	8	28.6	27	84.4	1	2.8	11	10.6	0	0.0	9	12.5	33	89.2	19	61.3	108	28.2
River/stream	0	0.0	0	0.0	19	52.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	19	5.0
Well	20	71.4	5	15.6	16	44.4	93	89.4	43	100.0	62	86.1	1	2.7	12	38.7	252	65.8

Domestic water sources in the dry season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lake	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	8.1	0	0.0	3	0.8
Rain	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.4 Water sources for drinking and cooking in the wet and dry season

Table 5-69 summarizes the main water sources for drinking and cooking in the wet season and the figures show that the majority of total households use well for drinking and cooking. The second highest number of total households uses spring water and the third ones use pure water to cook and drink. As per the results of survey data analysis, well is used by the highest number of households in East Maw Tone and Za Wae Villages in Tanintharyi Township, and in three villages, In Ga Maw, Taung Shae and Pa Thaung, in Myeik Township respectively.

However, the majority of households in Ban La Mutt Village in Tanintharyi Township, Ma Zaw and Tone Byaw villages in Myeik Township use spring water to drink and cook in the wet season. Pure water use to cook and drink is found in No. households in Ban La Mutt Village in Tanintharyi Township and Ma Zaw and Tone Byaw villages in Myeik Township. Oppositely, 29 percentages of households in Za Wae Villages in Tanintharyi Township, and around 20 percent of In Ga Maw and Pa Thaung Villages in Myeik Township use pure water to cook and drink in the wet season.

Table 5-69 Water source for drinking and cooking in the wet season

Water sources for drinking and cooking in the wet season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring water	7	25.0	16	50.0	1	2.8	7	6.7	0	0.0	6	8.3	33	89.2	17	54.8	87	22.7
River/stream	0	0.0	0	0.0	3	8.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.8

Water sources for drinking and cooking in the wet season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Well	13	46.4	15	46.9	28	77.8	74	71.2	43	100.0	43	59.7	1	2.7	13	41.9	230	60.1
Lake	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	8.1	0	0.0	3	0.8
Pure water	8	28.6	0	0.0	4	11.1	20	19.2	0	0.0	20	27.9	0	0.0	0	0.0	52	13.6
Rain	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3
Other	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	1	1.4	0	0.0	0	0.0	3	0.8
No. answer	0	0.0	1	3.1	0	0.0	1	1.0	0	0.0	1	1.4	0	0.0	1	3.2	4	1.0
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

Main water sources for cooking and drinking in the dry season in the project area is stated in the following Table 5-70. As per the figures stated, the similar figure is found in the percentages of total households like in the wet season mentioned above. For each village in Taninthari Township, the numbers and percentages of the households is nearly the same as described in above paragraphs except there is a decrease in the use of spring water and increased use of well in Ban La Mutt Village. However, the number and percentages of households with their main source of drinking water and cooking is definitely same as that of households in above mentioned paragraphs of the main sources of water used to drink and cook in the wet season for all villages in Myeik Townships.

Table 5-70 Water sources for drinking and cooking in the dry season

Water sources for drinking and cooking in the dryseason	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring water	6	21.4	14	43.8	1	2.8	7	6.7	0	0.0	6	8.3	33	89.2	17	54.8	84	21.9
River/stream	0	0.0	1	3.1	3	8.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4	1.0
Well	14	50.0	17	53.1	28	77.8	74	71.2	43	100.0	43	59.7	1	2.7	13	41.9	233	60.8

Water sources for drinking and cooking in the dryseason	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lake	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	8.1	0	0.0	3	0.8
Pure water	8	28.6	0	0.0	4	11.1	20	19.2	0	0.0	20	27.9	0	0.0	0	0.0	52	13.6
Rain	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3
Other	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	1	1.4	0	0.0	0	0.0	3	0.8
No. answer	0	0.0	0	3.1	0	0.0	1	1.0	0	0.0	1	1.4	0	0.0	1	3.2	3	0.8
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.5 Water source for agriculture in the wet and dry season

Table 5-71 shows the sources of water for agriculture in the wet season for the interviewed households in the project area. For all interviewed households in both townships, 26 percentages of total households use rain water while a small 0.3 percent of it uses lake as a source of water to do their agricultural works. Most answered households in every villages of Tanintharyi and Myeik Townships also use rain water for agriculture in the wet season. Only three households in Za Wae Village and one household in East Maw Tone Village in Tanintharyi Township use well while eight households In Ga Maw Village Tract, two households in Taung Shae and one household in Pa Thang Villaged in Myeik Toenship use it in the wet season.

Table 5-71 Water source for agriculture in the wet season

Water usage in the wet season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Stream water	1	3.6	2	6.3	0	0.0	2	1.9	1	2.3	0	0.0	2	5.4	5	16.1	13	3.4
River/stream	0	0.0	1	3.1	3	8.3	6	5.8	1	2.3	0	0.0	0	0.0	0	0.0	11	2.9
Well	3	10.7	0	0.0	1	2.8	8	7.7	2	4.7	1	1.4	0	0.0	0	0.0	15	3.9
Lake	1	3.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3

Water usage in the wet season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Rain	13	46.4	14	43.8	11	30.6	10	9.6	11	25.6	20	27.8	12	32.4	9	29.0	100	26.1
No.t applicable	10	35.7	15	46.9	21	58.3	78	75.0	28	65.1	51	70.8	23	62.2	17	54.8	243	63.4
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

Water source for agriculture in the dry season for the interviewed households in the project area is described in Table 5-72. The majority of answered households also use rain like in the wet season and 4.4 percentage of that is using well for agriculture in the dry season. Unlike the figures in the wet season, the data shows that 2 households in Za Wae Villages of Tanintharyi Township use river or stream for agriculture.

Table 5-72 Water sources for agriculture in the dry season

Water sources for agriculture in the dry season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring water	1	3.6	2	6.3	0	0.0	2	1.9	0	0.0	0	0.0	2	5.4	5	16.1	12	3.1
River/stream	2	7.1	1	3.1	4	11.1	6	5.8	0	0.0	0	0.0	0	0.0	0	0.0	13	3.4
Well	2	7.1	0	0.0	1	2.8	8	7.7	2	4.7	4	5.6	0	0.0	0	0.0	17	4.4
Lake	1	3.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3
Rain	13	46.4	12	37.5	9	25.0	4	3.8	0	0.0	15	20.8	12	32.4	9	29.0	74	19.3
No.t applicable	10	35.7	17	53.1	22	61.1	84	80.8	41	95.3	53	73.6	23	62.2	17	54.8	266	69.5
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.6 Water source for livestock in the wet and dry season

The water sources used by the interviewed households for livestock in the project area during the wet season are shown in following Table 5-73. The majority of total answered households use well for livestock and spring water is the second major source of water used for livestock in two project townships.

Table 5-73 Water source for livestock in the wet season

Water source for livestock in the wet season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring water	4	14.3	3	9.4	0	0.0	2	1.9	0	0.0	4	5.6	11	29.7	0	0.0	24	6.3
River/stream	0	0.0	0	0.0	1	2.8	0	0.0	0	0.0	0	0.0	0	0.0	1	3.2	2	0.5
Well	10	25.0	3	9.4	1	2.8	10	9.6	26	60.5	14	19.4	1	2.7	1	3.2	63	16.4
Lake	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	1	0.3
Rain	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	4	5.6	1	2.7	3	9.7	10	2.6
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3
No.t applicable	17	60.7	26	81.3	34	94.4	90	86.5	17	39.5	49	68.1	23	62.2	26	83.9	282	73.6
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

The following Table 5-74 also describes the number and percentage of households with their main sources of water for livestock in Tanintharyi and Myeik Townships. Well is the major water source for the total interviewed households in both townships, followed by the spring water with its percentage of 6.3. The spring water is used by 29.7 percent of households in Ma Zaw Village, Myeik Township and by 14.3 percent of households in Za Wae Village, Tanintharyi Township respectively.

Table 5-74 Water source for livestock in the dry season

Water source for livestock in the dry season	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			

	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring water	4	14.3	3	9.4	0	0.0	2	1.9	0	0.0	4	5.6	11	29.7	0	0.0	24	6.3
River/stream	0	0.0	0	0.0	1	2.8	0	0.0	0	0.0	0	0.0	0	0.0	1	3.2	2	0.5
Well	10	25.0	3	9.4	1	2.8	11	10.6	26	60.5	17	23.6	1	2.7	1	3.2	67	17.5
Lake	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	1	0.3
Rain	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	1	2.7	3	9.7	5	1.3
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3
No.t applicable	17	60.7	26	81.3	34	94.4	91	87.5	17	39.5	49	68.1	23	62.2	26	83.9	283	73.9
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.7 Daily water usage

The daily water usage of the interviewed households in the project area is described in the following Table 5-75 and the majority of total households in Tanintharyi and Myeik Township use less than or equal 100 gallons per day. The second largest proportion of the total interviewed household uses between 101 to 300 gallons a day. The figure is almost similar in Ban La Mutt village in Tanintharyi Township with its percentage of 65.5 and In Ga Maw with its percentage of 66.3, Ma Zaw with its percentage of 67.6 and Taung Shae Villages with its percentages of 65.1 in Myeik Townships. Three quarter of total households in Za Wae Village in Tanintharyi Township uses less than or equal 100 gallons while around half of the households in Pa Thaung and Tone Byaw villages in Myeik townships undergoes the same data.

Table 5-75 Daily water usage

Water usage per day	Tanintharyi Township						Myeik Township								Total			
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw				Tone Byaw	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Less than equal 100 gallons	21	75.0	21	65.5	28	77.8	69	66.3	28	65.1	40	55.6	25	67.6	17	54.8	249	65.0
101-300 gallons	5	17.9	7	21.9	5	13.9	18	17.3	13	30.2	16	22.2	4	10.8	7	22.6	75	19.6
301-500 gallons	1	3.6	0	0.0	0	0.0	3	2.9	1	2.3	3	4.2	0	0.0	0	0.0	8	2.1
501-750 gallons	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	1	1.4	3	8.1	0	0.0	6	1.6
More than 750	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3

Water usage per day	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
gallons																		
No. answer	1	3.6	4	12.5	3	8.3	12	11.5	1	2.3	11	15.3	5	13.5	7	22.6	44	11.5
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.8 Ownership of well

The following Table 5-76 describes the ownership status of well for all interviewed households in the project area and it is found that most households do not own well while only 34 percent have ownership. The majority of households in Za Wae Village in Tanintharyi Township possess their own well while over half of the households in East Maw Tone Village in Tanintharyi Township do not have it. The percentage is nearly equal for households with and without own well in Ban La Mutt Village in Tanintharyi Township and Taung Shae Village in Myeik Township. The highest percentage of households in every villages in Myeik Township does not show the ownership of well.

Table 5-76 Ownership of well

Ownership of well	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	20	71.4	15	46.9	12	33.3	34	32.7	20	46.5	23	31.9	1	2.7	5	16.1	130	33.9
No.	6	21.4	17	53.1	24	66.7	63	60.6	23	53.5	46	63.9	36	97.3	26	83.9	241	62.9
No. answer	2	7.1	0	0.0	0	0.0	7	6.7	0	0.0	3	4.2	0	0.0	0	0.0	12	3.1
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.9 Duration of fetching water in the wet and dry season

The duration of fetching water used by the interviewed households is stated in the following Table 5-77. For both wet and dry seasons, most households in the project area spend less than 10 minutes to fetch water a day. The mere 9 percent of total households takes 11 to 30 minutes to fetch the water daily. In Za Wae Village of Tanintharyi Township, 21.4 percent of households spend half-hour to 1 hour to fetch water a day while the highest numbers of answered households only use less than 10 minutes to fetch water. The percentage of households who spend 11-30 minutes to fetch the water during the wet season in Taung Shae Village is two times higher than that of the households in Pa Thaung Village in Myeik Township.

During dry season, 21.4 percent of households in Za Wae Village of Tanintharyi Township spend half-hour to 1 hour to fetch water a day while the highest numbers of answered households in East Maw Tone Village only use less than 10 minutes to fetch water. The half of households in Taung Shae Village in Myeik Township spends less than 10 minutes to fetch water in the dry season and it is nearly 5 times higher than that of households in Tone Byaw Village in the same Township.

Table 5-77 Duration of fetching water in the wet and dry season

Duration of fetching water	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Wet season																		
Less than equal 10 minutes	5	17.9	4	12.5	8	22.2	14	13.5	23	53.5	6	8.3	0	0.0	3	9.7	62	16.4
11-30 minutes	1	3.6	0	0.0	5	13.9	4	3.8	10	23.3	9	12.5	1	2.7	5	16.1	35	9.1
31-60 minutes	6	21.4	0	0.0	0	0.0	0	0.0	1	2.3	0	0.0	1	2.7	0	0.0	8	2.1
61-90 minutes	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	1	0.3
More than 90 minutes	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3
No.t applicable	16	57.1	28	87.5	23	63.9	86	82.7	9	20.9	56	77.8	34	91.9	23	74.2	275	71.8
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100
Dry season																		
Less than equal	5	17.9	5	15.6	31	86.1	14	13.5	22	51.2	6	8.3	0	0.0	3	9.7	86	22.5

Duration of fetching water	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
10 minutes																		
11-30 minutes	1	3.6	0	0.0	5	13.9	5	4.8	12	27.9	6	8.3	1	2.7	5	16.1	35	9.1
31-60 minutes	6	21.4	0	0.0	0	0.0	0	0.0	1	2.3	3	4.2	1	2.7	0	0.0	11	2.9
61-90 minutes	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	1	0.3
More than 90 minutes	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0	1	0.3
No.t applicable	16	57.1	27	84.4	0	0.0	85	81.7	8	18.6	56	77.8	34	91.9	23	74.2	249	65.0
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.4.10 Frequency of fetching water per day in the wet and dry season

The frequency of fetching water per day for the interviewed households in the project area is summarized in the following table. One quarter of total households fetches water less than or equal 2 times a day in the wet season and mere 0.5 percent of total households in both townships fetches more than 11 times a day. The percentage of households fetching water with less than or equal 2 times during the wet season in Ban La Mutt Village is three times lower than that of households in Za Wae Village in Tanintharyi Township. The percentage of households fetching water with less than or equal 2 times during the wet season in Tone Byaw village is two times higher than that of households in Taung Shae Village in Myeik Township. The similar figure is found in Ma Zaw and In Ga Maw Village Tracts in the same township, Myeik.

In the dry season, most answered households fetch water less than or equal 2 times, followed by the number of households fetch water 3 to 5 times a day. One quarter of households in East Maw Tone Village in Tanintharyi Township fetch water less than or equal 2 times while one-third of households in Pa Thaug Village in Myeik Township fetches water less than or equal 2 times in the dry season.

Table 5-78 Frequency of fetching water per day in the wet and dry season

Frequency of fetching water per day	Tanintharyi Township			Myeik Township					Total
	Za Wae	Ban La Mutt	East Maw Tone	In Ga Maw	Taung Shae	Pa Thaug	Ma Zaw	Tone Byaw	

	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Wet season																		
Less than equal 2 times	15	53.6	6	18.8	9	25.0	16	15.4	17	39.5	25	34.7	3	8.1	6	19.4	97	25.3
3-5 times	0	0.0	0	0.0	1	2.8	17	16.3	9	20.9	5	6.9	1	2.7	2	6.5	35	9.1
6-8 times	1	3.6	0	0.0	1	2.8	1	1.0	2	4.7	0	0.0	0	0.0	0	0.0	5	1.3
9-11 times	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	0	0.0	0	0.0	1	3.2	3	0.8
More than 11 times	0	0.0	0	0.0	0	0.0	0	0.0	2	4.7	0	0.0	0	0.0	0	0.0	2	0.5
No. answer	12	42.9	26	81.3	25	69.4	68	65.4	13	30.2	42	58.3	33	89.2	22	71.0	241	62.9
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100
Dry season																		
Less than equal 2 times	15	53.6	6	18.8	9	25.0	16	15.4	18	41.9	25	34.7	3	8.1	3	9.7	95	24.8
3-5 times	0	0.0	0	0.0	1	2.8	17	16.3	9	20.9	4	5.6	1	2.7	2	6.5	34	8.9
6-8 times	1	3.6	0	0.0	1	2.8	1	1.0	2	4.7	0	0.0	0	0.0	0	0.0	5	1.3
9-11 times	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	1	1.4	0	0.0	1	3.2	4	1.0
More than 11 times	0	0.0	0	0.0	0	0.0	0	0.0	1	2.3	0	0.0	0	0.0	0	0.0	1	0.3
No. answer	12	42.9	26	81.3	25	69.4	68	65.4	13	30.2	42	58.3	33	89.2	25	80.6	244	63.7
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.5 Transportation

5.5.5.1 Type of main transportation

The following Table 5-79 summarizes the main type of transportation used by the interviewed households in the project area and the results show that the majority of households use road as a main transportation channel. Only one percent of total households use river to travel and 6 percent of total households use both road and river for their transportation. The majority of households in two villages namely Za Wae and East Maw Tone Villages in Tanintharyi Township use road for their transportation while around three-quarter of households in Ban La Mutt Village

use it. In Myeik Township, the overall households in Taung Shae and Tone Byaw Villages use road as their main type of transportation. Around 8 percent of the households in In Ga Maw and Ma Zaw Villages in Myeik Township use both road and river for their transportation while 1.4 percent of households in Pa Thaung Village uses only river to travel.

Table 5-79 Type of main transportation

Type of main transportation	Tanintharyi Township						Myeik Township										Myeik Township	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Road	27	96.4	25	78.1	31	86.1	95	91.3	43	100.0	71	98.6	33	89.2	31	100.0	356	93.0
River	0	0.0	0	0.0	2	5.6	0	0.0	0	0.0	1	1.4	1	2.7	0	0.0	4	1.0
Both	1	3.6	7	21.9	3	8.3	9	8.7	0	0.0	0	0.0	3	8.1	0	0.0	23	6.0
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.5.2 Harbor

The following Table 5-80 shows the existence of harbor in surveyed villages in the project area and in Tanintharyi Township, harbor is found in only East Maw Tone Village. However, in Myeik Township, there is one harbor in Pannel Taung Village, In Ga Maw Village Tract as well as one harbor in Ma Zaw Village.

Table 5-80 Harbor

Township	Village Tract	Number of harbor
Tanintharyi Township	Zawae	0
	Ban La Mutt	0
	East Maw Tone	1
Myeik Township	In Ga Maw /Pannel Taung	1
	Taung Shae	0
	Pa Thaung	0
	Ma Zaw	1

	Tone Byaw	0
Total		3

Source: E Guard Social Team (June 2020)

5.5.6 Awareness, Perception, Attitude, Suggestion

5.5.6.1 Awareness of the project

The awareness of the project by the interviewed households in the project townships is summarized in the following table. Around one-third of total households do not know about the project. Most households in Za Wae and Ban La Mutt Villages in Tanintharyi Township also have no awareness of the project while over half of the households in East Maw Tone Villages know about the project. Similarly, the majority of households in In Ga Maw, Taung Shae, Pa Thaung, Ma Zaw, and Tone Byaw Villages have no awareness about the project.

Table 5-81 Awareness of the project

Do you know about this project	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	6	21.4	8	25.0	21	58.3	29	27.9	9	20.9	33	45.8	12	32.4	7	22.6	125	32.6
No.	22	78.6	24	75.0	15	41.7	75	72.1	34	79.1	39	54.2	25	67.6	24	77.4	258	67.4
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.2 Time of awareness of the project

The following table mentions the time of awareness of the project by the interviewed households in the project area. Around 13 percent of total households knew about the project since the last three months, 12 percent aware of the project since the last six months and only 2 percent know since in the last month. 28 percentages of households in East Maw Tone Village in Tanintharyi Township got the project related information since the last six months and one-fifth of the households in the same village heard about the project in the last three months. The percentage of households who are aware of the project in Taung Shae Village in Myeik Township, in the last three months, is two times lower than that of households in Tone Byaw Village in Myeik Township.

Table 5-82 Time of awareness about the project

When did you hear about this project?	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Last month	0	0.0	1	3.1	0	0	3	2.9	1	2.3	3	4.2	0	0.0	0	0.0	8	2.1
About 3 months ago	0	0.0	3	9.4	8	22.2	13	12.5	3	7.0	12	16.7	5	13.5	4	12.9	48	12.5
About 6 months ago	4	14.3	3	9.4	10	27.8	11	10.6	4	9.3	10	13.9	3	8.1	0	0.0	45	11.7
Did No.t hear that	22	78.6	24	75.0	15	41.7	75	72.1	34	79.1	39	54.2	25	67.6	24	77.4	258	67.4
Other	2	7.1	1	3.1	3	8.3	2	1.9	1	2.3	8	11.1	4	10.8	3	9.7	24	6.3
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.3 Source of awareness of the project

Source of awareness of the projects is described in the following table and it shows that 8.1 percent of total households get the project information from public hearing and 10 percent of the total households get the project related information from their neighbor.

Table 5-83 Source of awareness of the project

Where did you	Tanintharyi Township	Myeik Township	Total
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first hear about this project?	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Public meeting	1	3.6	2	6.3	9	25	4	3.8	3	7.0	7	9.7	3	8.1	2	6.5	31	8.1
Village head	1	3.6	1	3.1	2	5.6	6	5.8	3	7.0	8	11.1	2	5.4	2	6.5	25	6.5
Neighbor	1	3.6	1	3.1	7	19.4	11	10.6	2	4.7	8	11.1	4	10.8	3	9.7	37	9.7
Friend/Relative	1	3.6	3	9.4	3	8.3	3	2.9	0	0.0	2	2.8	2	5.4	0	0	14	3.7
Others	2	7.1	1	3.1	0	0	5	4.8	1	2.3	8	11.1	1	2.7	0	0	18	4.7
No.t applicable	22	78.6	24	75.0	15	41.7	75	72.1	34	79.1	39	54.2	25	67.6	24	51.6	258	67.4
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.4 *Opinion about the importance of the project*

The interviewed households' opinion about the importance of the project is summarized in the following Table. The majority of the total households think that the project is important and the second highest percentages think that the project is No.t important. Around 81 percentages of Ban La Mutt and East Maw Tone Villages in Tanintharyi Township think that the project is important. Over 90 percent of the households in In Ga Maw and Pa Thaung Villages also think that the project is important.

Table 5-84 Opinion about the importance of the project

Is this project important for village?	Tanintharyi Township			Myeik Township				Total
	Za Wae	Ban La Mutt	East Maw Tone	In Ga Maw	Taung Shae	Pa Thaung	Ma Zaw	

	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Important	14	50.0	26	81.3	29	80.6	93	89.4	34	79.1	69	95.8	31	83.8	24	77.4	320	83.6
No.t important	12	42.9	3	9.4	4	11.1	8	7.7	1	2.3	0	0.0	1	2.7	2	6.5	31	8.1
No. idea	0	0.0	3	9.4	2	5.6	3	2.9	5	11.6	3	4.2	5	13.5	4	12.9	25	6.5
No. answer	2	7.1	0	0.0	1	2.8	0	0.0	3	7.0	0	0.0	0	0.0	1	3.2	7	1.8
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.5 Opinion on the project's benefit on the local people

The opinion of the respondents on the project's benefit on the local people is shown in the following table and most respondents in Taninthari and Myeik Townships think that the project can benefit the local people. Over 90 percent of respondents in In Ga Maw, Pa Thaung and Tone Byaw Villages in Myeik townships think that the project will be beneficial to the local people. The percentages of respondents who think in the same way in Tanintharyi Township is 71.4 percent in Za Wae, 78.1 percent in Ban La Mutt and 88.9 percent in East Maw Tone Villages respectively.

Table 5-85 Opinion on the project's benefit on the local people

Do you think this project benefit on local people?	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	20	71.4	25	78.1	32	88.9	98	94.2	35	81.4	70	97.2	32	86.5	29	93.5	341	89.0
No.	4	14.3	2	6.3	2	5.6	1	1.0	0	0.0	1	1.4	1	2.7	0	0.0	11	2.9
No. idea	4	14.3	4	12.5	2	5.6	5	4.8	6	14.0	0	0.0	4	10.8	2	6.5	27	7.0
No. answer	0	0.0	1	3.1	0	0.0	0	0.0	2	4.7	1	1.4	0	0.0	0	0.0	4	1.0
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.6 Opinion on the conflict with the local people during the operation of the project

The opinion of the respondents on the conflict with the local people during the operation of the project is summarized in the following Table 5.34. The majority of respondents do not think that there can be a conflict with the local people during the operation of the project while mere 7 percent of total respondents think that it can happen. Only one quarter of the households in Za Wae Village in Tanintharyi Township thinks that there will be a conflict while the highest number of households in the remaining villages in both Tanintharyi and Myeik Township does not think in the same way.

Table 5-86 Opinion on the conflict with the local people during the operation of the project

Can there be conflict with local people in the implementation?	Tanintharyi Township						Myeik Township								Total			
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw				Tone Byaw	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	7	25.0	1	3.1	5	13.9	2	1.9	0	0.0	3	4.2	4	10.8	5	16.1	27	7.0
No.	13	46.4	26	81.3	28	77.8	94	90.4	32	74.4	66	91.7	27	73.0	21	67.7	307	80.2
No. idea	3	10.7	5	15.6	3	8.3	8	7.7	7	16.3	2	2.8	3	8.1	5	16.1	36	9.4
No. answer	5	17.9	0	0.0	0	0.0	0	0.0	4	9.3	1	1.4	3	8.1	0	0.0	13	3.4
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.7 Opinion on the project's effect on local socio-economic concern

Opinions of the respondents on the project's effect on local socio-economic concern is described in the following Table and the results show that the highest number of respondents in both townships does not think that the project can affect the local socio-economic concern. The overall respondents of East Maw Tone Village in Tanintharyi Township think that there will be no effect of the project on the local socio-economic concern.

Table 5-87 Opinion on the project's effect on the local socio-economic concern

Do you think	Tanintharyi Township				Myeik Township								Total	
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this project can effect on your family and local people concern with socioecoNo.mic?	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	2	7.1	1	3.1	0	0.0	3	2.9	1	2.3	1	1.4	0	0.0	1	3.2	9	2.3
No.	22	78.6	30	93.8	36	100.0	98	94.2	36	83.7	68	94.4	34	91.9	22	71.0	346	90.3
No. idea	4	14.3	1	3.1	0	0.0	3	2.9	4	9.3	2	2.8	3	8.1	7	22.6	24	6.3
No. answer	0	0.0	0	0.0	0	0.0	0	0.0	2	4.7	1	1.4	0	0.0	1	3.2	4	1.0
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.8 Opinion on the type of benefits by this project

The opinion of the respondents in the project area on the type of benefits by this project is mentioned in the following table. Among total interviewed respondents, 122 respondents think that the project can provide access to good quality and pure water in a sufficient and convenient manner. Another 8 percent of total respondents also think that the project can provide good quality water with lost cost and time saving to fetch water. In addition, some respondents with its 2.9 percent think that the project can create job opportunities and local development. Moreover, 3.7 percent of total respondents think that the project can favor good health due to getting good quality water. Around 2 percent of respondents think that the project can be beneficial to agriculture and livestock while other remaining 1.6 percent of respondents think that the project can increase the income of local people leading to develop the local economy.

Table 5-88 Opinion on the type of benefit by this project

Type of benefit by this project	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%

Type of benefit by this project	Tanintharyi Township						Myeik Township										Total	
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaug		Ma Zaw		Tone Byaw			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Access good quality & pure water sufficiently & conveniently	11	39.3	5	15.6	17	47.2	20	19.2	21	48.8	23	31.9	7	18.9	18	58.1	122	31.9
Access good quality water with low cost & save time	1	3.6	0	0.0	0	0.0	21	20.2	0	0.0	6	8.3	0	0.0	2	6.5	30	7.8
EcoNo.my & income development	0	0.0	0	0.0	0	0.0	2	1.9	0	0.0	0	0.0	0	0.0	4	12.9	6	1.6
Job opportunity & rural development	0	0.0	3	9.4	4	11.1	0	0.0	0	0.0	1	1.4	3	8.1	0	0.0	11	2.9
Good for health due to get good quality water	0	0.0	1	3.1	6	16.7	3	2.9	0	0.0	0	0.0	4	10.8	0	0.0	14	3.7
Benefit for agriculture & livestock	0	0.0	0	0.0	0	0.0	3	2.9	0	0.0	4	5.6	1	2.7	0	0.0	8	2.1
No. idea	16	57.1	23	71.9	9	25.0	55	52.9	22	51.2	38	52.8	22	59.5	7	22.6	192	50.1
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.9 *Opinion on the disadvantages on the local people by the project*

The opinion on the disadvantages on local people by the project is summarized in the following table and only mere 3.9 percent of total respondents think that the project can create some disadvantages on local community. On the other hand, the majority of the total respondents

think that the project can't create any disadvantages on the local people in the project area. Similarly, the halves of respondents in Za Wae Village in Tanintharyi Township mention that the project cannot create any disadvantages on the local people in the project area while other one-fifth of the remaining respondents do not think in the same way. The percentages of respondents who think the project has no disadvantages on the local community in East Maw Tone and Ban La Mutt Villages in Tanintharyi Township are 91 percent in the first village and 81 percent in the second respectively. In addition, it accounts for 88 percent in Taung Shae Village, 86 percent in Ma Zaw Village and 81 percent in Tone Byaw Village in Myeik Township,

Table 5-89 Opinion on the disadvantages on local people by the project

Do you think this project disadvantages on local people?	Tanintharyi Township						Myeik Township								Total			
	Za Wae		Ban La Mutt		East Maw Tone		In Ga Maw		Taung Shae		Pa Thaung		Ma Zaw				Tone Byaw	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	6	21.4	4	12.5	0	0.0	1	1.0	0	0.0	2	2.8	0	0.0	2	6.5	15	3.9
No.	15	53.6	26	81.3	33	91.7	38	36.5	38	88.4	67	9.1	32	86.5	25	80.6	274	71.5
Don't know	7	25.0	2	6.3	3	8.3	64	61.5	3	7.0	3	4.2	5	13.5	4	12.9	91	23.8
No. answer	0	0.0	0	0.0	0	0.0	1	1.0	2	4.7	0	0.0	0	0.0	0	0.0	3	0.8
Total	28	100	32	100	36	100	104	100	43	100	72	100	37	100	31	100	383	100

Source: E Guard Social Team (June 2020)

5.5.6.10 Opinion on the type of disadvantages by the project

The following table summarizes the opinion of some respondents on the type of disadvantages by the project. The major opinions raised in Za Wae Village in Tanintharyi Township are disadvantages resulted from land affected by the project, inadequate amount of water in the summer, long-term impact of the project, land sliding and affecting land due to the project. The respondents of Ban La Mutt Village in Tanintharyi Township also worry about the land acquisition and pipelines errors.

The opinion of the respondents of In Ga Maw Village Tract includes the argument caused by the project and digging along the alignment of the pipeline. The opinions of the respondents of Pa Thaung Village are concerns about building a dam, availability of regular water and desire to get water for agriculture and that of respondents in Tone Byaw Village is only on land acquisition problems.

Table 5-90 Opinion on the type of disadvantages by the project

Township	Village Tract Name	Type of disadvantages
Tanintharyi Township	Za Wae	1. Disadvantages if land is affected 2. a concern regarding with less amount of water in the summer 3. Long-term impact 4. There may be affected on land and land sliding can also be occurred.
	Ban La Mutt	5. pipelines error (2) 6. Land acquisition problem (2)
	East Maw Tone	7. No. opinion
Myeik Township	In Ga Maw	8. Causing argument 9. Digging along the water pipeline alignment
	Taung Shae	10. No. opinion
	Pa Thaung	11. building dam 12. availability of regular water 13. desire to get water for agriculture
	Ma Zaw	14. No. opinion
	Tone Byaw	15. Land acquisition problem

Source: E Guard Social Team (June 2020)

5.5.6.11 Project related opinions/questions

The following table describes summary of project related questions and opinions obtained from the respondents during household survey. The project related questions are described for each village in the project townships. The questions include those related to the price of water, access in their villages, amount of water, access in summer, and the time when the project is implemented.

Table 5-91 Project related questions

Township	Village	Project related questions
Tanintharyi Township	Za Wae	1. Where is the alignment of the pipelines? Will the pipeline pass through the road?
	Ban La Mutt	2. Can local people get provided water for agriculture?

Township	Village	Project related questions
		3. Can we get water with low price?
	East Maw Tone	4. Can our village get the water?
Myeik Township	In Ga Maw	5. Cannot afford for buying pipe 6. Will it provide for all villages in Tanintharyi Township? 7. Is it provided for the public and private access? 8. When this project will be accomplished? 9. Can this project provide us enough water?
	Taung Shae	10. When we will get water? 11. Is it 24 hour service? Can we access water for every time?
	Pa Thaung	12. Can we access water in summer? 13. How long is it restricted the Tanintharyi River? 14. How much will cost per 1 unit for domestic water? 15. Can our village access water easily? 16. When this project will be implemented?
	Ma Zaw	17. Can we get the information of the project? 18. Will this project have impact on the environment?
	Tone Byaw	19. Is it needed to access the electricity?

Source: E Guard Social Team (June 2020)

5.5.6.12 Suggestions for this project

The summary of suggestions for the project recorded during the interview with respondents is described in the following Table 5-92. It is found that local people want to access good quality water with low and affordable prices for 24 hour, implement the project as soon as possible, access water even in the summer. In addition, some respondents worry about the impacts on the environment due to the implementation of the project and want the proponent to take responsibility for affected land, structures and assets, if needed.

Table 5-92 Suggestions for this project

Township	Village	Suggestions
Tanintharyi Township	Za Wae	<ol style="list-style-type: none"> 1. It is suggested to consider for the easy access in our village. 2. The project is good for socio-economic but it may have some impacts on the environment. 3. It is needed to consult and negotiate with local people.
	Ban La Mutt	<ol style="list-style-type: none"> 4. We want to get good quality water with low price.
	East Maw Tone	<ol style="list-style-type: none"> 5. It is needed to perform to be convenient with village. 6. We would like to get water with good quality as soon as possible. 7. We want to access water in summer. 8. We want to get job opportunity.
Myeik Township	In Ga Maw	<ol style="list-style-type: none"> 9. We would like to get water as soon as possible. 10. It can create benefit for the village. 11. It can provide water with the best quality. 12. It is better to sell water with low price. 13. It is suggested to install small pipe line in the village. 14. We want to implement this project as soon as possible.
	Taung Shae	<ol style="list-style-type: none"> 15. We want to implement this project as soon as possible.
	Pa Thaung	<ol style="list-style-type: none"> 16. It is okay if we can access good quality water. 17. If the village will not be affected, it will be ok. 18. If there is no natural disaster, it will be ok. 19. Our village needs to get electricity & water. 20. We want to implement this project as soon as possible. 21. We want to join pipeline near our village. 22. We also want to access electricity with low price. 23. We want to access water with low cost in our village. 24. We want to access water for using in agriculture & livestock.
	Ma Zaw	<ol style="list-style-type: none"> 25. We want to implement this project as soon as possible. 26. We wish to get water during summer as well.
	Tone Byaw	<ol style="list-style-type: none"> 27. We want to access water for 24 hour.

Township	Village	Suggestions
		28. We want No.t to affect the ecoNo.my of local people. 29. We want to implement this project as soon as possible. 30. We want to access electricity & water. 31. We want the project owner to take accountability for any affected land/structures/assets.

Source: E Guard Social Team (June 2020)

5.5.7 Key Information of each village for Myeik Water Distribution Project

Table 5-93 summarizes the list of villages where Key Informal Interview (KII) was conducted for obtaining key general information of some villages located in Myeik Water Distribution Project Area. KII are conducted in seven villages under five village tracts in Myeik Township and three villages under three village tracts in Tanintharyi Township. The results of KII in each village in Myeik and Tanintharyi Townships, is described in the following tables starting from Table 5-94 to Table 5-103.

Table 5-93 List of villages for Key Informal Interview

Sr.	Township	Name of Village Tract	Village Name
1	Myeik	In Ga Maw	In Ga Maw
2			Pannel Taung
3		Taung Shae	Taung Shae
4		Pa Thaung	Pa Thaung
5			Taung Palae Village
6		Ma Zaw	Ma Zaw
7		Tone Byaw Gyi	Tone Byaw Gyi
8	Tanintharyi	Za Wae	Za Wae
9		Ban La Mutt	Ban La Mutt
10		East Maw Tone	East Maw Tone

Source: E Guard Social Team (June 2020)

5.5.7.1 In Ga Maw Village

Table 5-94 describes the household numbers, house numbers, total population and gender ratio of In Ga Maw Village in Myeik Township. There are 401 households with 390 houses and 25 household heads are female in In Ga Maw Village. Total population is 2,235 with 1,077 males and 1,158 females.

Table 5-94 Population and gender ratio of In Ga Maw Village, Myeik Township

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
In Ga Maw	In Ga Maw	Myeik	401	390	1,077	1,158	2,235	25

Source: E Guard Social Team (June 2020)

The most households of In Ga Maw Village mainly depend on the agriculture especially planting rubber. Some livelihoods are causal labors, fishermen, livestock breeders; own business and motor cycles carry business.

The transportation of this village is road and there is no harbor in In Ga Maw Village. The village has no access to national grid has access to private electricity. In both dry and wet seasons, wells are mainly used for domestic use in this village. However, water is not enough to use in the village during the dry season.

This village has two monasteries, two pagodas and some other religious buildings. Mostly, seasonal flu occurs within the village. There is a rural health center as a basic utility with two assigned medical staff for local people.

For education sector, there is a Basic Education High School in the village. There are 27 teachers who are assigned to teach in the village. The current challenge facing the village is to get access to water.

5.5.7.2 Pannel Taung

The household numbers, numbers of houses, total population and gender ratio of Pannel Taung Village in Myeik Township is described in Table 5-95. There are no households headed by woman in the village.

Table 5-95 Population and gender ratio of Pannel Taung Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Pannel Taung	In Ga Maw	Myeik	238	211	727	679	1,406	0

Source: E Guard Social Team (June 2020)

Agriculture especially planting paddy, rubber and areca catechu is the main livelihood for households in Pannel Taung Village. Among all households' heads, five household heads are livestock breeder especially broiler and pig. The remaining villagers work as casual labors, fishermen, own business and motor cycles carry business.

Road is the major transportation used by the villagers although there is a harbor in the village.

The village doesn't have access to national grid but has accesses to private electricity. Some households also use solar. In the wet and dry season, wells are mainly used in this village and water is enough during two seasons.

This village has only one pagoda and one monastery. However, there are no other religious buildings in this village.

Seasonal flu mostly occurs within the village. There is a rural health center as a basic utility for local people. Only one medical staff is being assigned to provide the required health care service.

As for education, there is a branch of Basic Education Middle School in the village. There are 13 teachers who are assigned to teach in this school. The current challenge found in the village is to get more health-care services.

5.5.7.3 Pa Thaung Village

The number of households and houses, total population and gender ration of Pa Thaung Village in Myeik Township is stated in Table 5-96. The total number of households is 625 where 30 households are headed by female, and number of houses is only 550 in the village. The total population is 3,018 with higher male population of 1,528 and lower number of 1,490 female in the village.

Table 5-96 Population and gender ratio of Pa Thaung Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Pa Thaung	Pa Thaung	Myeik	625	550	1,528	1,490	3,018	30

Source: E Guard Social Team (June 2020)

The majority of households in Pa Thaung Village mainly depend on the agriculture for their livelihoods. Among 625 households, 10 households are livestock breeder especially broiler while 30 households are fishermen. Some villagers are working as casual labors, own account business and carry-service providers using motor cycles.

The transportation of this village is good mainly use by land road and there is no harbor. The village doesn't have national grid but that accesses private electricity. There is also used solar. In dry and wet season, wells are mainly used in this village. Water is not enough during the dry season.

Pa Thaung village has one monastery, one Islam religious school and two Mosques. Seasonal flu mostly occurs within the village. There is a rural health center as a basic utility for local people and only one medical staff is being assigned.

As for education, there is a branch Basic Education High School in the village. There are 47 teachers who are assigned to teach in this school. The current challenges of the village are found in education and access to water.

5.5.7.4 Taung Palae Village

The number of households and houses, total population and gender ration of Taung Palae Village in Myeik Township is stated in Table Table 5-97. Among total households, 20 households are those with female household heads.

Table 5-97 Population and gender ratio of Taung Palae Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Taung Palae	Pa Taung	Myeik	180	155	403	393	796	20

Source: E Guard Social Team (June 2020)

Agriculture especially is the major livelihood for villagers in Taung Palae Village. Only 10 out of 180 households are livestock breeder especially broiler and pig. There are also casual labors, fishermen, own business and motor cycles carry business. The village has no harbor and road is mainly used for transportation in the village. The village has no access to national grid but has access to private electricity.

There are some households using solar for electricity. In the wet season, rain is mainly used in this village. In the dry season, wells are mainly used in the village and the availability of water is not enough to be used by the villagers. Taung Palae Village has two monasteries, one pagoda and one old Buddha statue. Except those, there are no other religious buildings in this village. Like other villages in Myeik Township, seasonal flu is the major health cause of health problems in Taung Palae Village.

There is a rural health care center with four medical staff as a basic utility for local people in the village. As for education, there is a Basic Education Primary School with assigned six teachers, in the village. The current challenges for the village are fund in health sector and access to water.

5.5.7.5 Taung Shae Village

The following table describes the total population with gender ratio and the number of total households and houses in Taung Shae Village.

Table 5-98 Population and gender ratio of Taung Shae Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Taung Shae	Taung Shae	Myeik	280	267	719	705	1,424	10

Source: E Guard Social Team (June 2020)

The highest number of households are working in agriculture especially paddy. Around 18 percent of total households are working on livestock breeding while the livelihood of mere seven percent of total households is fishing. There are also villagers working as casual labors, own business and motor cycles carry business.

The transportation of this village is good and villagers mainly use the land road. There is No. harbor in Taung Shae Village. The village doesn't have access to national grid while some households use solar. In the wet season, rain is mainly used for water source in this village. In the dry season, wells are mainly used in this village. Water is not enough during the dry season.

Two monasteries, one pagoda, two Mosques are found in this village. Seasonal flu is the major health problem in the village. There is a rural health care center as a basic utility for local people and two medical staff is being assigned in it. In addition, there is a Basic Education High School where thirty teachers are teaching. The current challenges for the village are health care sector and access to water.

5.5.7.6 *Tone Byaw Gyi Village*

Total population with gender ratio and total number of households and houses of Tone Byaw Gyi Village is stated in the Table 5-99. Only 14 percent of total households is female headed households.

Table 5-99 Population and gender ratio of Tone Byaw Gyi Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Tone Byaw Gyi	Tone Byaw	Myeik	208	192	528	513	1,033	30

Source: E Guard Social Team (June 2020)

The most households of Tone Byaw Gyi Village mainly do agriculture especially paddy and areca catechu. Around 20 percent of total households are raising livestock such as broiler, pig, cow and goat while only 2 percent of total households are working as fishermen. Other occupations include casual labors, own business and motor cycles carry business.

Road is the main type of transportation used in Tone Byaw Gyi Village and there is no harbor. The village is not able to access national grid. There are some households using solar. In the wet and dry season, wells are mainly used for water source in this village. Water is not enough during the dry season. This village has one monastery and one pagoda. Similarly, other religious buildings are found in this village.

Mostly, season flu occurs within the village. There is a rural health center as a basic utility for local people and two medical staffs are providing the necessary services. As for education, there are two Basic Education Primary Schools with 13 numbers of teachers in the village. The current main challenge for the village is to get access to water.

5.5.7.7 *Ma Zaw Village*

Table 5-100 states the total population with gender and numbers of households and houses in Ma Zaw Village in Myeik Township. It is found that 15 percent of total households are female headed households.

Table 5-100 Population and gender ratio of Ma Zaw Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Ma Zaw	Ma Zaw	Myeik	100	93	200	250	450	15

Source: E Guard Social Team (June 2020)

The majority of total households in Ma Zaw Village depend on livestock raising especially raising pig. The second majority is depending on Agriculture especially planting paddy, rubber and areca catechu and it is followed by fishermen. Other occupations include casual labors, own business and motor cycles carry business.

The transportation of this village is good. The villagers mainly use road although there is a harbor. The village doesn't have access to national grid but some use solar. In the dry and wet season, string water is mainly used as a water source in this village. Water is not enough during the dry season. This village has only two monasteries and no other religious buildings are found in the village.

Seasonal flu mostly occurs in the village. There is a rural health center as a basic utility for local people and two medical staff is being assigned. There is a Basic Education High School in the village. There are 25 numbers of teachers who are assigned in that school. The current challenge for the village is to enable access to electricity.

5.5.7.8 *Za Wae Village*

The total population with gender and numbers of households and houses in Za Wae Village in Tanintharyi Township is mentioned in the following table.

Table 5-101 Population and gender ratio of Za Wae Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Za Wae	Zae Wae	Tanintharyi	195	189	529	501	1030	10

Source: E Guard Social Team (June 2020)

The most households of Za Wae Village mainly do agriculture especially rubber and areca catechu. Other occupations include casual labors, livestock breeder, fishermen, own business and motor cycles carry business. The transportation of this village is good and road is mainly used for transportation. There is No. harbor in Za Wae Village.

The village has no access to national grid but has access to private electricity. There are some households with the use of solar energy. In the dry and wet season, string water is mainly used in this village. The amount of water is not enough during the dry season. The village has one monastery, two pagodas and an old Buddha statue. There are no other religious buildings in this village.

Seasonal flu mostly occurs in the village. There is a rural health center as a basic utility for local people but there is no medical staff. If people in the village get sick, they have to go another village. For educational sector, there is one branch of Basic Education High School with 20 teachers in the village. The current challenges for the village are to enable health care services and access to water.

5.5.7.9 *Ban La Mutt Village*

Table 5-102 describes Population and gender ratio of Ban La Mutt Village together with the number of total houses and households. Among 216 households, 24 households are female headed households.

Table 5-102 Population and gender ratio of Ban La Mutt Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
Ban La Mutt	Ban La Mutt	Taninthar yi	216	192	554	513	1067	24

Source: E Guard Social Team (June 2020)

The majority of households in Ban La Mutt Village mainly depend on agriculture especially areca catechu. Other livelihoods include casual labors, livestock breeder, fishermen, own business and motor cycles carry business. There is no harbor and road are mainly used for transportation in the village.

The village lacks access to national grid but is enable to access private electricity. Some households use solar energy. In the dry and wet season, string water is mainly used for water source in this village and the quantity of water is enough during the two seasons. This village has a monastery and two pagodas. There are no other religious buildings in this village.

Mostly, season flu occurs within the village. There is a rural health center as a basic utility for local people and two medical staff is being assigned. As for education, there is a Basic Education High School in the village. There are 18 numbers of teachers who are assigned to teach the mentioned school in the village. The current challenge of the village is education.

5.5.7.10 East Maw Tone Village

Total Population and gender ratio of East Maw Tone Village together with the number of total houses and households is stated in the following table. Near 8 percent of total households are female headed households.

Table 5-103 Population and gender ratio of East Maw Tone Village

Village Name	Name of Village Tract	Township Name	Number of Households	Number of Houses	Male	Female	Total	Number of Female Household Heads
East Maw Tone	East Maw Tone	Tanintharyi	241	213	535	562	1097	20

Source: E Guard Social Team (June 2020)

Agriculture especially growing paddy, rubber, areca catechu, is the main livelihood for households in Ban La Mutt Village. In addition, 20 out of 241 households are livestock breeders. Other occupations include casual labors, fishermen, own business and motor cycles carry business.

Although there is a harbor in the village, road is mainly used by the villagers as their main type of transportation. The village lacks access to national grid but has access to private electricity. Solar is used by some households in the village. In the dry and wet season, river water and well are mainly used in this village. Water is not enough during the dry season in the village.

The village has a monastery, and a pagoda. There are no other religious buildings in the village. Seasonal flu occurs within the village. There is a rural health center as a basic utility for local people and four medical staffs are being assigned. The village has a Basic Education High School with 50 teachers in the village. The current challenge for the village is to get enough water in the dry season.

5.5.8 Disclosure of Project Information in Urban Area

5.5.8.1 Purpose of Public Meeting

It is important to disclose the information about the project to the local people and to consider the opinions of all stakeholders in the implementation of the proposed project. So, the representatives of MCPC and E Guard team members conducted public meetings to inform the project information in Sandar Wutt Village, Ka Lwin Village and Myeik Thauung Village on 17th June, 2020. The villages are located in the urban area of Myeik Townships. The village tract administrators and some local people attended the public meetings which are held at Village Tract Administrative offices of each village.

The main purposes of public meeting are -

- To explain and inform the project information to local people
- To know perceptions of local people for operation of the project
- To get the views/opinions of local people on the project

5.5.8.2 Results from Public meeting

5.5.8.2.1 Some information of Villages Tracts

Some data of Villages Tracts are asked and collected through the discussion with Village Tract Administrators. The following table shows some data obtained from the above-mentioned public meetings.

Table 5-104 Area, Population and Gender Ratio of Three Village Tracts

Name of Village Tracts	Area (Acre)	Male	Female	Total
Sandar Wutt	4,282	11,192	11,348	22,540
Ka Lwin	6,410	12,241	12,660	24,901
Myeik Thaung	5,352	22,570	22,727	45,297

Source: E Guard's Team

Sandar Wutt Village Tract

Road is mainly used by the villagers as their main type of transportation. The village tract lacks access to national grid but has access to private electricity. Wells are mainly used in this village tract. Water is not enough during the dry season.

This village tract has one pagoda and 81 monasteries. There are also two Hindu religious buildings. There are two rural health centers as a basic utility for local people and four medical staffs are being assigned. As for education, the village tract has a Basic Education High School, a branch Basic Education High School, four Basic Education Post Primary Schools and five Basic Education Primary Schools.

Ka Lwin Village Tract

Road is mainly used by the villagers as their main type of transportation. The village tract lacks access to national grid but has access to private electricity. Wells are mainly used in this village. Water is not enough during the dry season.

This village tract has 5 pagodas and 41 monasteries. There are also a Chinese Communal Temple and two churches. There is a rural health center as a basic utility for local people and two medical staffs are being assigned. As for education, the village tract has a Basic Education High School, a Basic Education middle School, and six Basic Education Primary Schools.

Myeik Thaung Village Tract

Road is mainly used by the villagers as their main type of transportation. The village tract lacks access to national grid but has access to private electricity. Wells are mainly used in this village. Water is not enough during the dry season.

This village tract has 3 pagodas and 63 monasteries and there are no other religious buildings in this village tract. There is a rural health center as a basic utility for local people and one medical staff is being assigned. As for education, the village tract has two Basic Education High Schools, a Basic Education middle School, and two Basic Education Primary Schools.

5.5.8.2.2 Discussion in public meetings

Firstly, the representative of MCPC explained about the distraction of the project and then E Guard explained the information of the environmental and social concerns. After that, the representative of MCPC answered questions of local people. Discussion among local people, MCPC’s representative and EIA consultant during public meetings are mentioned in the following Table.

Table 5-105 Discussion and Response

Discussions	Responses
Local people asked “Will villages along the water pipeline be distributed water?”	MCPC’s representative responded “Yes, we will distribute.
Local people said “If we can’t get water after seeing the water pipeline, it is not convenient.”	MCPC’s representative responded “We will try to prevent that from happening.”
Local People asked “How many is the diameter of the pipe?”	MCPC’s representative responded “The diameter of the pipe is 2 meters.”
Local People asked “Will you compensate for the damage along the water pipeline?”	MCPC’s representative responded “Yes, we will coordinate with the government for compensation case.
Local People said “I hope to get jobs for local people.”	MCPC’s representative responded “We will give jobs priority to local people.”
Local people said “We are welcome this project because of many benefits for local people.”	MCPC’s representative responded “Thank you all coming and meeting with us. We are also trying to be the best.”

5.5.9 Summary for Socio-Economic Condition

In gender of respondents, mostly are female in both townships while the gender of household heads is male but in some villages some household heads are female even it was in few numbers. In marital status of household heads, most are married while there are few widowed and singles and their religions are mostly found to be a Buddhist following up Islam and Christian. Burma is the most common ethnic in both townships while there are few Kayin and Indian people in Tone Byaw village. Most household heads finished their primary and middle school within each of their village and their health status are mostly in normal while over 65 years old people are found to have a health problem. Most source of income and their occupation is farmer second is own account with personal business since their villages are under developing status and the number of both high education and graduates are still only in progressing. Their incomes are ranged from less than three to five hundred thousand and monthly expenditure of each household is mainly less than three hundred thousand. But when

compare with the difference between the previous year and current incomes, most households have faced the same situation with less and irregular incomes. Among many reasons, one of the reasons is due to Covid-19 pandemic which causes their income delay and unprogressive. So, many income situations are decreasing especially in Tanintharyi Township. Main water source used for agriculture in both wet and dry season is rain. So, it can be seen that rain is their main source of water for agriculture but some have to store in a large tank or small lake for saving. For livestock water source in both wet and dry season, water from well is commonly used. Furthermore, for daily water usage, less than 100 gallons is used in almost every single household and some wells are shared with near neighborhoods and relatives while others have their own private well in each compound. For those who shared the same well with neighbors, it took them maximum ten minutes to get water to their homes and mostly round twice in day in both wet and dry seasons. For transportation and communication, ASEAN highway is the main road used for goods transportation and for travelling while there is one harbor in Tanintharyi Township and two harbors in Myeik Township.

Concerns with awareness of this project, most villagers responded as not knowing about this but some have known from their neighborhoods, village head from the last three to six months ago and also from the previous stakeholder meeting held in the scoping stage. And their opinion concerns with the importance of the project for their village are in positive feedback and they also have high hopes that this project will bring good benefits for their livelihoods. For their socio-economic effected from the project, they all think that it will not be a big deal with their business, livelihood, family and as well as local people and a good quality of water is expected. Since there were no projects concerns with this kind of massive water distribution in their villages, the villagers have worries and thought it might have disadvantages such as their land being affected, Tanintharyi River will be dry in the summer time and it might have a long-term impact etc. and the details will be mentioned in report. Most ask questions concerns with the project are whether they get water for agriculture and the time which they will get the water. Suggestions and opinions from the local are demanding the project owner to take accountability for any affected land/structures/assets and job opportunities for youngsters will be created.

5.6 Morphology of Tanintharyi River

Tanintharyi River is one of the biggest rivers of Myanmar which is flowing through Tanintharyi Region, past the town of Tanintharyi and enters the sea at Myeik. The river rises from Tanintharyi Range at an altitude of 2,074 m and it flows into the Andaman Sea. It is running south to north. The terms river morphology and its synonym stream morphology are used to describe the shapes of river channels and how they change in shape and direction over time. The River Morphology can change the physical environment (flow, sediment, etc.) and the ecology in the river. Depending on the river type, mesohabitats commonly extend over a few square meters but may also cover some hundreds of square meters. While microhabitats refer to sites of individual organisms, mesohabitats can be seen as the area, where aquatic communities and/or specific life stages with similar habitat requirements live (spawning sites, juveniles, adults, etc.). River deltas or estuaries feature environments very different from the rest of the river system. Transport capacity is disrupted, and sediment deposition generally constitutes the principal formative process.

Tanintharyi River is providing the ecosystem services to the living hoods. A river system can generate multiple services including provision services, regulatory services and cultural services and supporting services. **Providing Services** are consumption of aquatic organisms for food and medicine, water quality and quantity for consumptive use such as for drinking, domestic use, and agriculture and industrial use and then non-consumptive use such as for generating power and transport/navigation. **Regulatory Services** are maintenance of water quality such as natural filtration and water treatment, buffering of flood flows, erosion control through water/land interactions and flood control infrastructure. **Cultural Services** are recreation like river rafting, kayaking, hiking and fishing, tourism like river viewing, and its existence values which are personal satisfaction from free flowing rivers. **Supporting Services** are like its role in nutrient cycling (maintenance of floodplain fertility), primary production and predator/prey relationships and ecosystem resilience.

The Tanintharyi River, Myeik Township may have so many channels and creeks that we use water in Myeik Water Distribution Project. If we use water from that river, shape of river channel and stream may change because of the pressure of pump and also the current may change direction. Then, changing of current direction may affect erosion as a result erosion leads to deposit in the river bed. And also, some small plants cannot stand at the banks. In the river, there are many aquatic animals such as fishes and shrimps and we can find plants, at the river bank. Many local fishermen conduct fishing for their livelihood in that river. As the river is estuarine, there are rich of diversity for past years but now by climate change and overfishing tend to decrease the rate of fishes get and occurrence of some animals (some birds) in the river. The changing river morphology may lead changing environmental processes and conditions (physical and ecology). If the river's direction changes, the plant species may flow along with the current for example mangrove plants form from the seeds floating in the river so they can dispersal to many places. And then some animal habitats of that river may alter because of river shape and direction. In raining season, the salt water come to the Tanintharyi River and water depletion can occur at the summer. The sediments

(clay, sand and rock) deposition occur sandbars in the river that cause disturbance for transportation, fishing and other livelihood process to local people when water deplete.

Tanintharyi River is a major river of southeastern Myanmar. It flows through the Tanintharyi Region, past the town of Tanintharyi, and enters the sea at Myeik. The river rises from the Tanintharyi Range at an altitude of 2,074 m (6,804 ft), and flows into the Andaman Sea. The region formed by this river is also known as Tanintharyi in Myanmar. It is in a constricted coastal region in southeastern Myanmar, which borders Thailand on the east and the Andaman Sea on the west.

The following table shows the river water velocity, water mass and water flow rate of Tanintharyi River at proposed water pumping stations in October and November 2019 by BBWI survey team.

Table 5-106 Estimated Flow Rate of Tanintharyi River

Sr. No.	Pumping Stations	Velocity (m/s)	Rate (cu-m/s)	Mass (Sq-m/s)	Flow Rate (cu-m/h)
1	East Maw Tone	0.12	335.91	6,000	1,206,000
2	Sin Din/ Pyin Won	0.09	310.00	5,500	1,116,000
3	Tone Byaw Gyi	0.04	290.00	5,400	1,044,000

5.7 Secondary Data for Township Profile

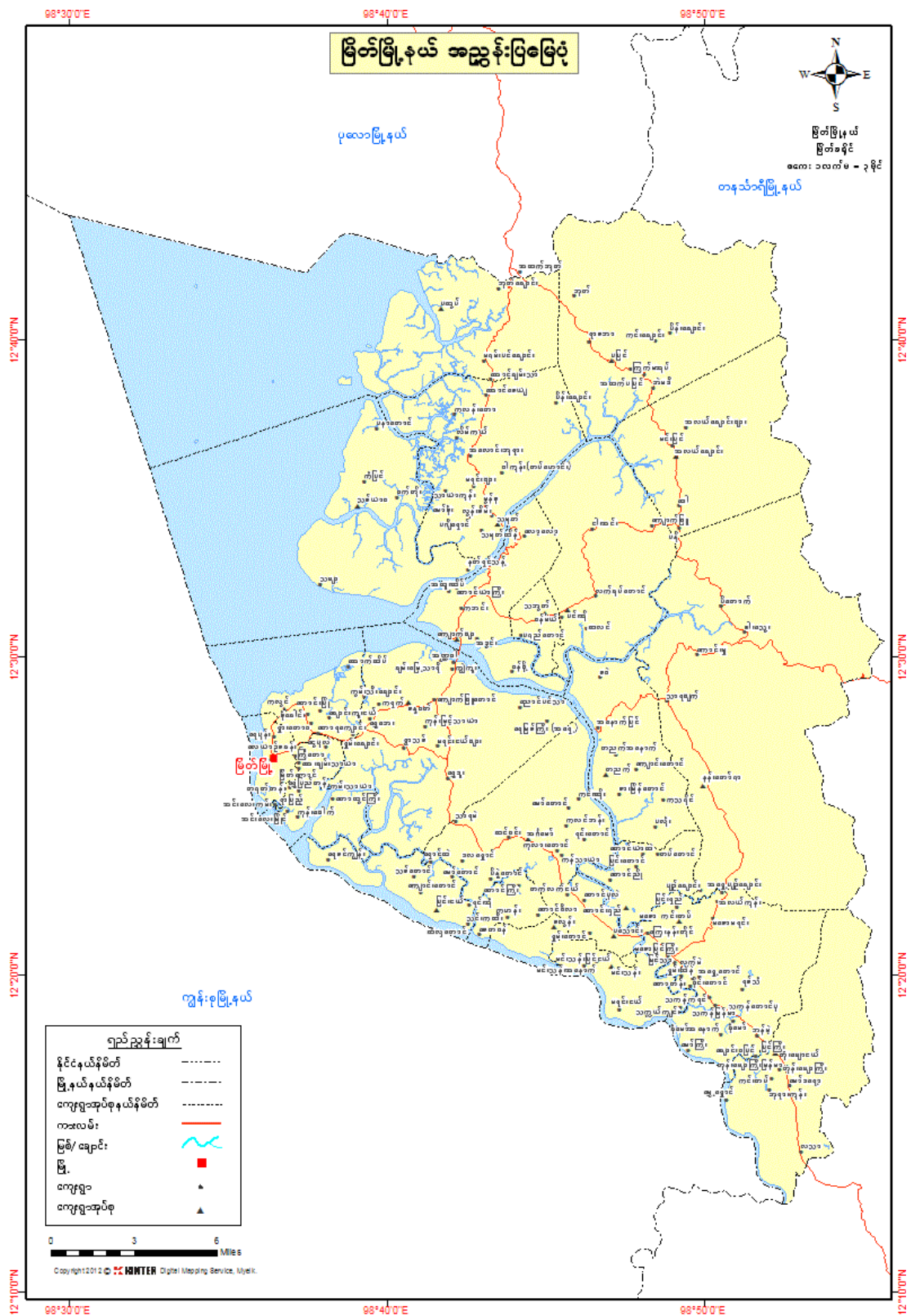
This section presents the general description of the status of the existing environment in the proposed project area. It also allows for identification of sensitive environmental features and possible receptors of the effects of the proposed project. In the Initial EIA study, it is necessary to establish baseline information on the environmental and socio-economic setting of a project area that could receive direct and indirect impacts from the project construction and operation phases. The baseline information of the Myeik Township and Tanintharyi Township were collected from Township Data published by General Administration Department in 2019. These data were collected from October 2018 to September 2019.

The objective of the Initial EIA baseline data collection is to present the general description of the environmental as primary data collection.

5.7.1 Myeik Township

Myeik Township is situated at the coordinate points of North Latitude between 12° 20' and 12° 48', East Longitude between 98° 36' and 98° 58'. The total area of Myeik Township is about 547.45 square miles. The township shares border with Tanintharyi Yoma Hill in the East, Kyun Su Township in the West, Tanintharyi Township in the South and also in the

No.rth with Pa Law Township. The location map of Myeik Township is shown below in **Figure 5-63.**



Source: Myeik Township Profile from General Administration Department (2019, September)

Figure 5-63 Map of Myeik Township

5.7.1.1 Physical Environment

5.7.1.1.1 Climate

Myeik is located between Latitude 12° 20' and 12° 48' north and being situated at the north of Equator. Therefore, Myeik has a tropical Monsoon Climate. Temperatures are very warm throughout the year. According to Myeik Township profile, the highest temperature is 38°C and the lowest temperature is 22°C. The required data of rainfall and temperature from 2015 to September, 2019 are obtained from Myeik Township data as shown in the following table.

Table 5-107 Weather Data for Myeik Township from 2015 to September, 2019

No..	Year	Rainfall		Temperature	
		Rainy Days	Total Rainfall (inches)	Summer (°C)	Winter (°C)
				Highest	Lowest
1.	2015	151	171.34	36.5	18.5
2.	2016	162	146.26	35.5	17.0
3.	2017	134	156.54	36.0	22.0
4.	2018	143	182.91	33.0	16.5
5.	2019 (September)	122	149.37	36.0	20.5

Source: Myeik Township Profile from General Administration Department (2019, September)

5.7.1.1.2 Structural Geology

There are two types of islands in the Myeik Archipelago running parallel to each other in the north-south direction. One is granitic and the other is limestone. The outer islands are generally granitic and the inner ones are made of limestone.

5.7.1.1.3 Topography

Myeik Township is plentiful of plateau and the land surface of Myeik Township is mostly uneven. The sea lies at the west of Myeik Town, Ka Lwin Village, Myeik Taung Village, Sandar Wutt Village Tract, In Ga Maw Village Tract, Ka Han Village Tract, Sa Loon Village Tract, Min Than Village Tract, Pa Thaung Village Tract. Tanintharyi River is at East-South and Kyauk Pyar River is at East-No.rth. Kywe Ku-Kyaukpya Bridge and Pa Thaung- Kyay Nan Tai Bridge are constructed at Kyaukpya River and these bridges are used as National Highway.

5.7.1.1.4 Hydrology

In Myeik Township, there are fewer rivers and all the existing rivers are flowing from North to South. The famous rivers in Myeik Township are Ta Moke River, Kyaukpya River and Tanintharyi River. Ta Moke River has a length of 7 Miles and 2 Furlong, Kyaukpya River is 33 Miles and 7 Furlong long and Tanintharyi River is 254 Miles and 6 Furlong long. Tanintharyi River is flowing South to North from Tanintharyi Township to Myeik Township

and, this river enters the sea at the west of Myeik Township. Estuaries are formed at Tanintharyi River near Myeik Township. Most of water sources in Myeik Township are brackish water and it cannot be used as either drinking water or irrigation water. All these rivers (Ta Moke River, Kyaukpya Rive and Tanintharyi River) can be used for transportation.

5.7.1.1.5 Altitude

The proposed project is located in Myeik Township in Tanintharyi Region which is situated at an elevation of 84 feet (about 25.6 m) above mean sea level.

5.7.1.1.6 Flora

Myeik is located in the Myeik District, Tanintharyi Region where is famous for the rich biodiversity data. There is Taninthayi National Park which is also the KBA and IBA area at the South East, Htaung Pru KBA at the South, Central Tanintharyi Coast KBA at the West of Myeik.

There are many plants that can be seen in Evergreen Forests of Myeik Township. The common plants are Pyin-Ka-Doe, Ka Nyin, Mhan-Thin, Thit-Kha, Taung Payone, Anan, Sakar, Taung Thayet, Kan Zaw, Thapyay, Pyin Ma, Thingan, Thit Hto, Ka Dut, Lay Thayet, and U Ban, etc. Among them, the most common plant is Ka Nyin. Moreover, Byu (Payone), Byu Chay Htauk, La Mu, Ma Da Ma, La Mae, Sea Ohm, Kyan Nan, and Ka Byaung are growing in Tidal Forests. Byu (Payone) are the most common plants. The scientific names of these plants are also presented in Appendix 9.

5.7.1.1.7 Fauna

Wildlife animals living in Myeik Township are Muntjac, Wild boar, Red jungle fowl, Jungle cat, Pangolins, Monkeys and Sambar deer. According to the Myeik Township Data, Red Muntjac *Muntiacus muntjak*, Eurasian Wild Pig *Sus scrofa*, Jungle Cat *Felis chaus*, Pangolin Manis, Sambar *Cervus eldii* and various kinds of monkey can be found in the Myeik Township.

5.7.1.2 Surrounding Environment

5.7.1.2.1 Current Condition of Environment

In Myeik Township, there are a few of rivers, ponds and streams. As the cultivation of rubber and palm oil are slightly increased, virgin land area are decreased in Myeik Township.

5.7.1.2.2 Natural Disaster

Although Myeik Township is a coastal region, there are no serious adverse effects from storm, tsunami, flooding and earthquake. The following table presents the lists that natural disasters occur in Myeik Township from 2018 October to 2019 September.

Table 5-108 Occurrence of Natural Disaster in Myeik Township

No..	Disaster	Occurrence	No. of Death/Lost	No. of Damaged Buildings	Cost of Loss (MMK)
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1.	Storm	-	-	-	-
2.	Tsunami	-	-	-	-
3.	Earthquake	-	-	-	-
4.	Flooding	2	-	4	2.0
5.	Wind Disasters	11	-	43	53.1
6.	Land Slide	6	-	12	67.85
7.	Thunder Storm	2	2	-	-
8.	Fire	2	-	3	1.9
Total		23	2	62	124.85

Source: Myeik Township Profile from General Administration Department (2019, September)

5.7.1.2.3 Population Data

The demographic structure of study area including number of households and population collected at the end of 2018 March are shown in the following tables.

Table 5-109 Population Data

No..	Content	Above 18 years old			Below 18 years old			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	Urban	21200	22001	43201	30025	33959	63984	51225	55960	107185
2.	Rural	34506	34091	68597	54990	55860	110850	89496	89951	179447
Total		55706	56092	111798	85015	89819	174834	140721	145911	286632

Source: Myeik Township Profile from General Administration Department (2019, September)

Table 5-110 House and Household Status

No..	Content	Houses	Households	Wards	Village Tracts	Villages
1	Urban	16428	21755	12	-	-
2	Rural	31071	37361	-	22	143
Total		47499	59116	12	22	143

Source: Myeik Township Profile from General Administration Department (2019, September)

5.7.1.2.4 Ethnicity and Religion

The ethnic composition of residing in the study area is also shown in Table 5.28. Most of the people who lived in the Myeik Township are Burma. Religious status can also be seen in the following tables.

Table 5-111 Races of Myeik Township

No..	Race	Number of Occupant	Township Population	Percentage of Township Population (%)
1.	Kachin	18	286632	0.006%
2.	Kayah	1	286632	0.001%
3.	Kayin	9824	286632	3.427%
4.	Chin	39	286632	0.014%
5..	Mon	1304	286632	0.455%
6.	Burma	265796	286632	92.731%
7.	Rakhine	1093	286632	0.381%
8.	Shan	38	286632	0.013%
9.	Others	8519	286632	2.972%
Total		286632	286632	100%

Source: Myeik Township Profile from General Administration Department (2019, September)

Table 5-112 Religion Status

No..	Religion	Population
1.	Buddhism	247980
2.	Christianity	9691
3.	Hinduism	1986
4.	Islam	26935
5.	Others	40
Total		286632

Source: Myeik Township Profile from General Administration Department (2019, September)

5.7.1.2.5 Culture and Heritage

Moreover, there are some cultural heritage buildings in Myeik Township. These are 86 pagodas, 339 monasteries, 83 nunneries and 30 community halls. In addition, Old Commissioner's House that Maurice Collis lived, is one of the historical sites of Myeik.

5.7.1.2.6 Economy and Livelihood

Myeik Township is located in Tanintaryi Region and it is a Business Center township. The local people mainly occupy agriculture, fisheries and trading. The main products in Myeik Township are marine products, rubber, cashew-nut, betel nut and bird-nest, and these are mostly exported to Yangon District. The economic status of workable person and unemployment status are shown in below the following tables.

Table 5-113 Occupational status

No..	Township	Number of Workable Persons	Current Employed Persons	Unemployment Persons	Percentage of Unemployment Persons
1.	Myeik	174834	69855	104979	60.04

Source: Myeik Township from General Administration Department (2019, September)

Table 5-114 Livelihood and Employment Status

No..	Types of Employment	No. of Person
1.	Government Staff	4972
2.	Services	6240
3.	Agriculture	679
4.	Livestock	714
5.	Food Industry	3461
6.	Industrial	1495
7.	Fishing	9512
8.	Casual Labors	17580
9.	Others	25202
Total		69855

Source: Myeik Township Profile from General Administration Department (2019, September)

5.7.1.2.7 Education Status

In higher education sector, there are 1 institute and 3 Universities in Myeik Township. In basic education sector, there are 17 high schools, 9 sub-high schools, 9 middle schools, 15 sub-middle schools, 20 post-primary, 77 primary schools, 21 pre-schools and 9 monastery-based schools. And the township also has 36 libraries for public.

5.7.1.2.8 Health Status

In Myeik Township, there are one 200-Bedded Public Hospital, one Children Hospital, and 5 Private Hospitals. In addition, there are 5 public clinics, 5 private clinics, 6 rural health care centers and 25 sub rural health care centers in this township.

5.7.1.2.9 Secondary Information from Public Health Rural Public Health Center, Myeik District (2019)

The following results are obtained from Public Health Department of Myeik District by E Guard Study Team.

Table 5-115 List of number of township health center staff in each township

Sr.	Township	Doctor			Medical Officer			Township Senior Nurse			Assistant Medical Officer		
		Permit	Occupy	Vacant	Permit	Occupy	Vacant	Permit	Occupy	Vacant	Permit	Occupy	Vacant
1.	Myeik (Township + District)	35	7	28	2	2	0	2	2	0	19	8	11
2.	Tanintharyi	6	0	6	1	0	1	1	1	0	9	4	5
Total		41	7	34	3	2	1	3	3	0	28	12	16

Table 5-116 Number of staffs at Health Center

Sr.	Township	Female Nurse			Public Health Supervisor - 1			Midwives			Public Health Supervisor - 2		
		Permit	Occupy	Vacant	Permit	Occupy	Vacant	Permit	Occupy	Vacant	Permit	Occupy	Vacant
1.	Myeik (Township + District)	11	4	7	7	1	6	50	49	1	41	38	3

2.	Tanintharyi	9	3	6	6	0	6	36	35	1	36	36	0
Total		20	7	13	13	1	12	86	84	2	77	74	3

Table 5-117 Number of volunteer staff

Sr.	Township	Female Nurse			Public Health Supervisor - 1			Midwives			Public Health Supervisor - 2		
		Permit	Occupy	Vacant	Permit	Occupy	Vacant	Permit	Occupy	Vacant	Permit	Occupy	Vacant
1.	Myeik (Township + District)	11	4	7	7	1	6	50	49	1	41	38	3
2.	Tanintharyi	9	3	6	6	0	6	36	35	1	36	36	0
Total		20	7	13	13	1	12	86	54	2	77	74	3

Table 5-118 2019 Censuses of Rural Population and Housing (HC)

Sr.	Content	Myeik	Tanintharyi	Total
1.	Urban	116,249	6,564	122,813
2.	Rural	177,120	108,578	285,698
Total		293,369	115,142	408,511
3.	Children under 1 year old	5,946	2,711	8,657
4.	Children under 5 years old	26,188	13,249	39,437
5.	Children under 15 years old	73,323	38,319	111,642
6.	Women between (15-45) years old	75,496	25,438	100,934
7.	Estimated pregnant women	6,092	3,279	9,371

Table 5-119 Percentage of Rural Population

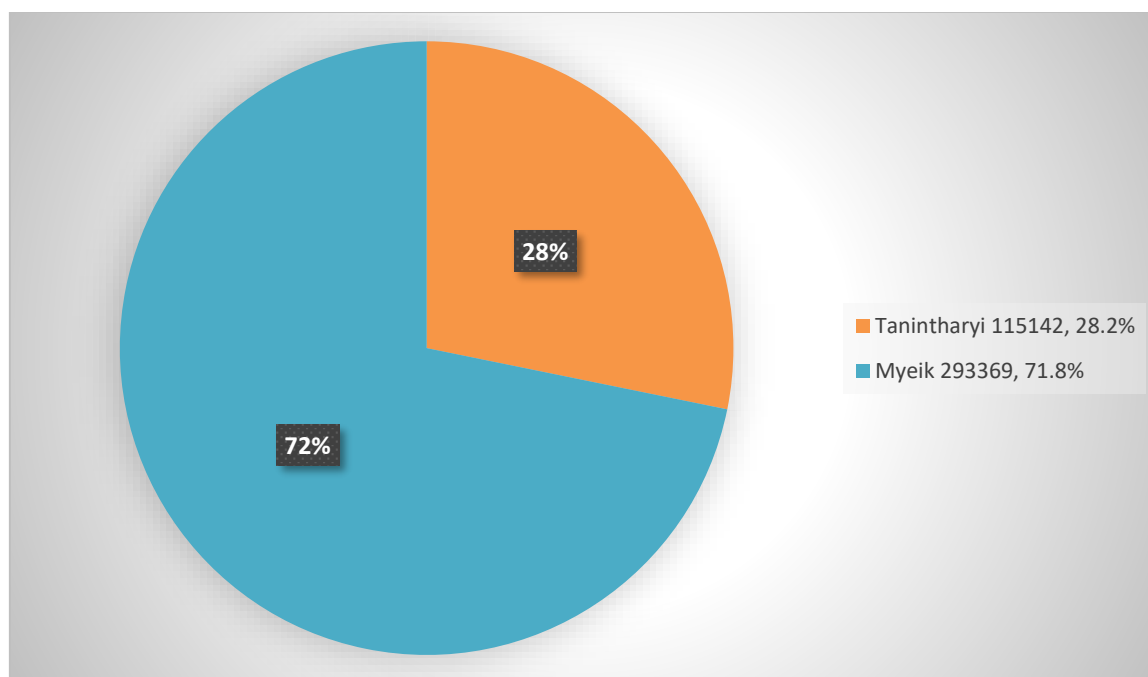


Table 5-120 Rural Health Center/Sub Center (2019)

Sr.	Name of Center	Myeik	Tanintharyi	Total
1.	Rural Health Center	6	4	10

2.	Maternal and Child Welfare	1	1	2
3.	Rural Health Subcenter	25	22	47

Table 5-121 List of Maternity Health Center Open at Rural Health Center/Sub Center

Sr.	Center	Myeik			Tanintharyi			Total		
		Total	Maternity	No Maternity	Total	Maternity	No Maternity	Total	Maternity	No Maternity
1.	Rural Health Care Center	6	6	0	4	4	0	10	10	0
2.	Rural Health Care Sub Center	25	14	11	22	20	2	47	34	13
Total		31	20	11	26	24	2	57	44	13

Table 5-122 Total number of each block, village, households and families (2019)

Sr.	Total number of each Category	Myeik	Tanintharyi	Total
1.	No of blocks	12	2	14
2.	No of village tracts	22	21	43
3.	No of villages	147	176	323
4.	No of households	56,361	21,881	78,242
5.	No of families	51,352	22,915	74,267

Table 5-123 List of Patients Form Initial Health Center and Transfers Yearly

Sr.	Types of Action	2015	2016	2017	2018	2019
1.	Total General Patients	214,648	209,724	180,675	172,331	153,478
2.	Total Transfer Patients	2,370	2,408	4,060	3,777	3,974

Table 5-124 Percentage of General Patient Yearly

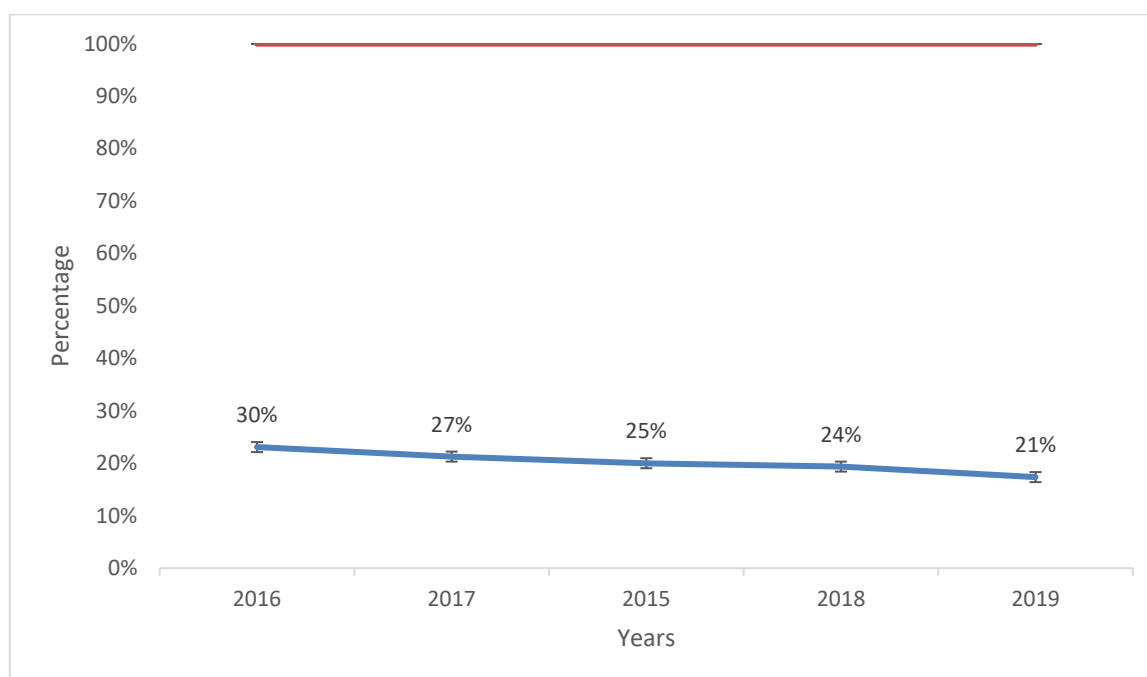


Table 5-125 List of Patients Form Initial Health Care and Transfers of General Patients Rurally

Sr.	Category	Myeik	Tanintharyi	Myeik District
1.	No of General Patient (New)	41,861	34,858	153,478
2.	Percentage of General New Patients	14%	30%	21%
3.	Frequency of General Patients (New + Old)	73,989	62,387	271,675
4.	Transferred Patients	1,171	1,021	3,974
5.	Percentage of Transferred Patients	1%	1%	1%

Table 5-126 Number of Current Midwives working at Rural Health Center

Sr.	Name of Rural Health Center	Name of Rural Health Subcenter	Total No. of Midwife
1.	Inn Ga Maw RHC	Inn Ga Maw M/C	6
		Pannel Taung S/C	6
		Kywal Kuu S/C	1
		Yay Myit Kyee S/C	0
		Sandar Wutt S/C	2
		Shan Chaung S/C	3
2.	Khone Maw	Khone Maw S/C	4
		Ma Zaw S/C	5
		Taung Shay S/C	5
		Ta Nyat S/C	5
		Nan Taw Yar Ta Nyat S/C	3
		Tone Byaw S/C	5
3.	Min Taan RHC	Min Taan S/C	2
		Pa Taung S/C	3
		Ka Haan S/C	4
		Pyin Nge S/C	2
4.	Myeik Taung RHC	Myeik Taung M/C	1
		Inn Lay Kan S/C	1
		Inn Lay Myaing S/C	1
		Shwe Pyi Tan S/C	0
		Ka Lwin S/C	1

Table 5-127 Current Public Health Staffs, Midwives and Assistant Midwives

Sr.	Rural Health Main Center /SubCenter	MW	AMW	PHS
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1.	Inn Ga Maw M/C	2	6	1
2.	Pannel Taung S/C	1	5	1
3.	Kywal Kuu S/C	1	1	1
4.	Shan Chaung S/C	1	4	1
5.	Khone Maw S/C	2	2	2
6.	Ma Zaw S/C	1	5	1
7.	Taung Shay S/C	1	5	1
8.	Ta Nyat S/C	1	6	1
9.	Tone Byaw S/C	1	7	1
10.	Pa Taung S/C	1	4	1
11.	Myeik Taung S/C	2	0	2
12.	Ka Lwin S/C	1	0	1

5.7.1.2.10 Land Use

The usages of land according to types of land are shown in the following table.

Table 5-128 Land Use

Sr.	Type of Land	Land Use Distribution by Acre
1	Net Agriculture Land	88487
2	Vacant Land	790
3	Pasture Land	10879
4	Industrial Land	172
5	Urban Land	7652
6	Village Land	1545
7	Other Land	83401
8	Protected Reserved Forest/ Reserved Forest Land	75111
9	Wild Forest	39389
10	Uncultivated Land	42941

Total	350367
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Source: Myeik Township Profile from General Administration Department (2019, September)

5.7.1.2.11 Transportation and Communication

As Myeik Township locates at the junction of roadways, waterways and airways, the transportation and communication in Myeik Township is in good conditions.

5.7.1.2.12 Current Water Supply System

This section describes current water supply system of Myeik Township based on Myeik Township Profile from General Administration Department and Myeik Township Census Report from Department of Population.

The following table shows the conditions of water distribution by Myeik Township Development Committee.

Table 5-129 Drinking Water Distribution

No.	Location	Type	Daily Distribution	Distributed Households
1	Yay Bone Quarter	Tube Well	32,000	270
2	Nout Le Quarter	Tube Well	12,100	110
3	Myeik Taung Village	Tube Well	6,000	36
4	Myeik Taung Quarter	Tube Well	56,000	430
5	Kan Gyi Quarter	Tube Well	25,000	180
Total			131,100	1,026

Source: Myeik Township Profile from General Administration Department (2019, September)

The following tables show the main sources of water for drinking and non-drinking use.

Table 5-130 Main Sources of Drinking Water

No.	Main Source of Drinking Water	Number of Households	Percent
1	Tap Water/ Piped	11,228	20.7
2	Tube Well, Borehole	5,842	10.7
3	Protected Well/ Spring	12,737	23.4
4	Bottled/ Purified Water	16,362	30.1
Total Improved Water Sources		46,169	84.9
1	Unprotected Well/ Spring	5,062	9.3
2	Pool/ Pond/ Lake	114	0.2
3	River/ Stream/ Canal	558	1.0
4	Waterfall/ Rain Water	885	1.7
5	Other	1,561	2.9
Total Unimproved Water Sources		8,180	15.1

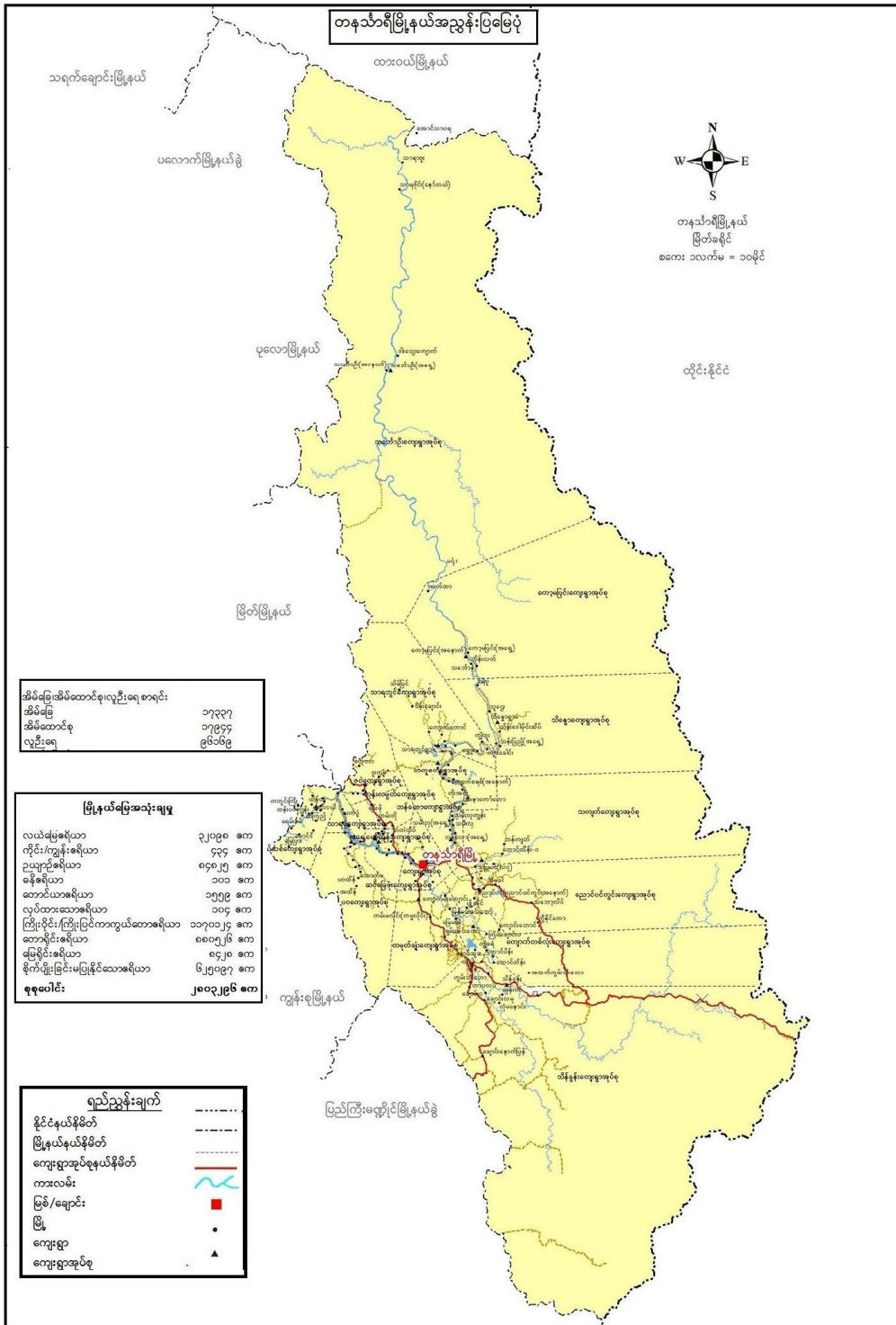
Table 5-131 Main Sources of Non-drinking Water

No.	Main Source of Water for Non-drinking Use	Number of Households	Percent
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1	Tap Water/ Piped	21,432	39.4
2	Tube Well, Borehole	7,931	14.6
3	Protected Well/ Spring	15,576	28.7
4	Unprotected Well/ Spring	5,383	9.9
5	Pool/ Pond/ Lake	201	0/4
6	River/ Stream/ Canal	774	1.4
7	Waterfall/ Rain Water	884	1.6
8	Bottled/ Purified Water	83	0.2
9	Other	2,085	3.8
Total		54,349	100

5.7.2 Tanintharyi Township

Tanintharyi Township is situated at the coordinate points of North Latitude between 90° and 100°, East Longitude between 10° and 14°, and relies on the 12° Longitude. The total area of Tanintharyi Township is about 4380.05 square miles. The township shares border with Thailand in the East, Boke Pyin Township in the South, Kyun Su Township, Pu Law Township, Myeik Township in the West, Dawei Township, Myitthar Township in the North. The project location map is shown below in **Figure 5-64**.



Source: Tanintharyi Township Profile from General Administration Department (2019, September)

Figure 5-64 Map of Tanintharyi Township

5.7.2.1 Physical Environment

5.7.2.1.1 Climate

Tanintharyi Township has a tropical Monsoon Climate. Temperatures are very warm throughout the year. According to Tanintharyi Township profile, the highest temperature is 36.5°C and the lowest temperature is 14.5°C. Alert Water Level of Tanintharyi River is 17 feet and Danger Water Level is 24 feet. The required data of rainfall and temperature from 2015 to 2019 (September) are obtained from Tanintharyi Township data as shown in the following table.

Table 5-132 Weather Data for Tanintharyi Township from 2015 to 2019, September

No..	Year	Rainfall		Temperature	
		Rainy Days	Total Rainfall (inches)	Summer (°C)	Winter (°C)
				Highest	Lowest
1.	2015	131	166.41	36.5	18.5
2.	2016	148	113.52	35.5	17
3.	2017	141	104.15	38	22
4.	2018	163	149.290	36	19
5.	2019 (Sep)	124	121.5	36 (estimate)	19

Source: Tanintharyi Township Profile from General Administration Department (2019, September)

4.1.1.1.1 Topography

Tanintharyi Township is plentiful of plateau and the land surface of Tanintharyi Township is mostly covered with forests.

4.1.1.1.2 Hydrology

In Tanintharyi Township, there are plenty of rivers and all the existing rivers are flowing from North to South. The length of Tanintharyi River is (270) miles and it originated from confluence of Ban Chaung and Kamouk Twe Chaung of near Myitthar Town, Dawei township, Dawei District and finally it flow into the Andaman Sea near Myeik City. Tanintharyi River supervises fresh water for drinking and agriculture purposes. Sometimes, especially in summer, only canoes and small boats can use the river for transport while ships can't because the level of river water is significantly dropped to 8 feet in Tanintharyi River.

4.1.1.1.3 Altitude

Tanintharyi Township is situated at an elevation of 50 feet (about 15.24 m) above mean sea level.

4.1.1.1.4 Natural Regeneration

The common plants in Tanintharyi Township are Pyin-Ka-Doe, Thingan, Ka Nyin, Pyin Ma, Thapyay, U Ban, Kaung Mu, Atook, Thin Mo, A Kyaw, Kyan Yaw, Karaway, Karamak and Taung Than Gyi.

4.1.1.1.5 Wildlife Animals

Wildlife animals living in Tanintharyi Township are elephants, tiger, leopard, lion, wild pig, bear, rabbit, tortoise, rhiNo.ceros, gaur, wild buffalo, sambar, deer, wild deer, mountain goat, muntjac, wild dog, hog-badger, wild cat, pangolin, large Indian civet and various kinds of monkey.

5.7.2.2 Surrounding Environment

5.7.2.2.1 Current Condition of Environment

The current environmental condition of Tanintharyi Township is about 64.33% of land area is covered by the forest and all this area is for the purpose of reserved forest area.

5.7.2.2.2 Natural Disaster

Although Tanintharyi Township lies in inland region, flooding occurs annually. Most of villages are situated along the river bank and usually suffer flooding due to heavy rain during the rainy season. But in 2013- 2014 fiscal year, dam, water pumping station and 2 floodgates are constructed with funding for Natural Disaster Protection which can reduce the flooding of this area. And also in 2018- 2019 fiscal year, Irrigation and Water Utilization Management Department implemented 2 floodgates for Tanintharyi City. Occurrences of Natural disaster in Tanintharyi Township from 2018 October to 2019 September are as follows,

Table 5-133 Occurrence of Natural Disaster in Taninthatyi Township

No..	Disaster	Occurrence	No.. of Death/Lost	No.. of Damaged Buildings	Cost of Loss (MMK-Million)
1.	Storm	-	-	-	-
2.	Tsunami	-	-	-	-
3.	Earthquake	-	-	-	-
4.	Flooding	2	2	-	-
5.	Fire	12	-	18	10.26
7.	Thunder Storm	1	-	2	0.04
8.	Wind Disasters	25	-	42	10.92
Total		40	2	62	21.22

Source: Tanintharyi Township Profile from General Administration Department (2019, September)

5.7.2.2.3 Population Data

The demographic structure of study area including number of households and population collected are shown in the following tables.

Table 5-134 Population Data

No..	Content	Above 18 years old			Below 18 years old			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total

1.	Tanintharyi City	2246	2465	4911	845	781	1626	3291	3246	6537
2.	Maw Thaug Town	1762	1710	3472	768	867	1645	2530	2577	5107
3.	Rural	37332	36210	73542	20971	20029	41000	58303	56239	114542
Total		41540	40385	81925	22584	21677	44261	64124	62062	126186

Source: Tanintharyi Township Profile from General Administration Department (2019, September)

Table 5-135 House and Household Status

No..	Content	Houses	Households	Wards	Village Tracts	Villages
1.	Tanintharyi City	1141	1174	2		
2.	Maw Thaug Town	867	900	3		
3.	Rural	18608	22378	-	21	177
Total		20616	20963	7	21	177

Source: Tanintharyi Township Profile from General Administration Department (2019, September)

5.7.2.2.4 Ethnicity and Religion

The ethnic composition of residing in the study area is also shown in the following table. Most of the people who lived in the Tanintharyi Township are Burma. Religious status can also be seen in below tables.

Table 5-136 Races of Tanintharyi Township

No..	Race	Number of Occupant	Township Population	Percentage of Township Population (%)
1.	Kachin	-	-	-
2.	Kayah	-	-	-
3.	Kayin	14002	126186	11.1
4.	Chin	2	126186	0.001
5..	Mon	1023	126186	0.81
6.	Burma	109022	126186	86.4
7.	Rakhine	90	126186	0.07
8.	Shan	2022	126186	1.6
9.	Chinese	1	126186	0.001
10.	Others	126186	126186	0.02
Total		126186	126186	

Source: Tanintharyi Township Profile from General Administration Department (2019, September)

Table 5-137 Religion Status

No..	Religion	Population
1.	Buddhism	106170
2.	Christianity	12890
3.	Hinduism	181
4.	Islam	6944
5.	Others	1
Total		126186

Source: Tanintharyi Township Profile from General Administration Department (2019, September)

5.7.2.2.5 Economy and Livelihood

Tanintaryi Township is located in hilly region and less development in economy. Local people living in township rely on the gardening. Transportation from Tanintharyi Township to Myeik/ Kaw Thaug can be accessible both roadways and waterways. Main products are betel nut, rubber and plam oil and most are imported to Myeik City.

5.7.2.2.6 Land Use

The usages of land according to types of land are shown in the following table.

Table 5-138 Land Use

Sr.	Type of Land	Land Use Distribution by Acre
1	Net Agriculture Land	120430
2	Vacant Land	104
3	Pasture Land	823
4	Industrial Land	-
5	Urban Land	159
6	Village Land	705
7	Other Land	460661
8	Protected Reserved Forest/ Reserved Forest Land	1170124
9	Wild Forest	879113
10	Wild Land	8428

Sr.	Type of Land	Land Use Distribution by Acre
11	Uncultivated Land	162749
Total		2803296

Source: Myeik Township Profile from General Administration Department (2019, September)

Chapter 6. POTENTIAL IMPACTS AND MITIGATION MEASURES

6.1. Introduction

In this EIA report, in order to assess the significance of the potential impacts of the proposed project, the appropriate approach and methodology are used. It also provides the consideration, preliminary identification and assessment of likely impacts on the environment and social status associated with the proposed project development. There will be two categories for assessment in the report, and these are physical environment assessment and socio-economic environment assessment.

6.2. Methodology for the Assessment and Impacts Identification

Reviewing of baseline environmental information and identification of the potential significant impacts that may be affected by the development of the project (construction and operation phases) have been prepared according to the nature and scope of the project type, and site survey. Detail studies of environmental and social impacts are investigated in EIA stage. Moreover, based on impacts' nature, potential and magnitude, the anticipated impacts can be categorized as positive impacts, negative impacts, and cumulative impacts.

This impact assessment is executed based on attention to the magnitude, duration, extent and frequency of activities which are going to be carried out and characteristics of the project site. This assessment is qualitative and the significance of each impact is classified into 5 categories in overall.

In order to assess the environmental impacts of the project, the following Ranking Scale Methodology is applied. Each source of impact is assessed by four parameters, magnitude, duration, extent and probability and each assess point have 5 scales as mentioned below:

Table 6-1 Impact Assessment Parameters and Its Scale

Assessment	Scale				
	1	2	3	4	5
Magnitude (M)	Insignificant	Small and will have no effect on working environment	Moderate and will result in minor changes on working environment	High and will result in significant changes on working environment	Very high and will result in permanent changes on working environment
Duration (D)	0-1 year	2-5 year	6-15 year	Life of operation	Post Closure
Extent (E)	Limited to the	Limited to the	Limited to	National	International

Assessment	Scale				
	1	2	3	4	5
	site	local area	the region		
Probability (P)	Very improbable	Improbable	Probable	Highly probable	Definite

Then, **Significant Point (SP) = (Magnitude + Duration + Extent) * Probability**

Impact Significance: Based on calculated significant point, impact significance can be categorized as follows:

Explanation

Significant Point (SP) = (Magnitude + Duration + Extent) * Probability

Impact Significance Significant Point (SP)	Impact Significance
<15	Very Low
15-29	Low
30-44	Moderate
45-59	High
>60	Very high

Impact assessments are implemented within 500-meter radius of each proposed project locations. The location and area of influence can be seen as follows.

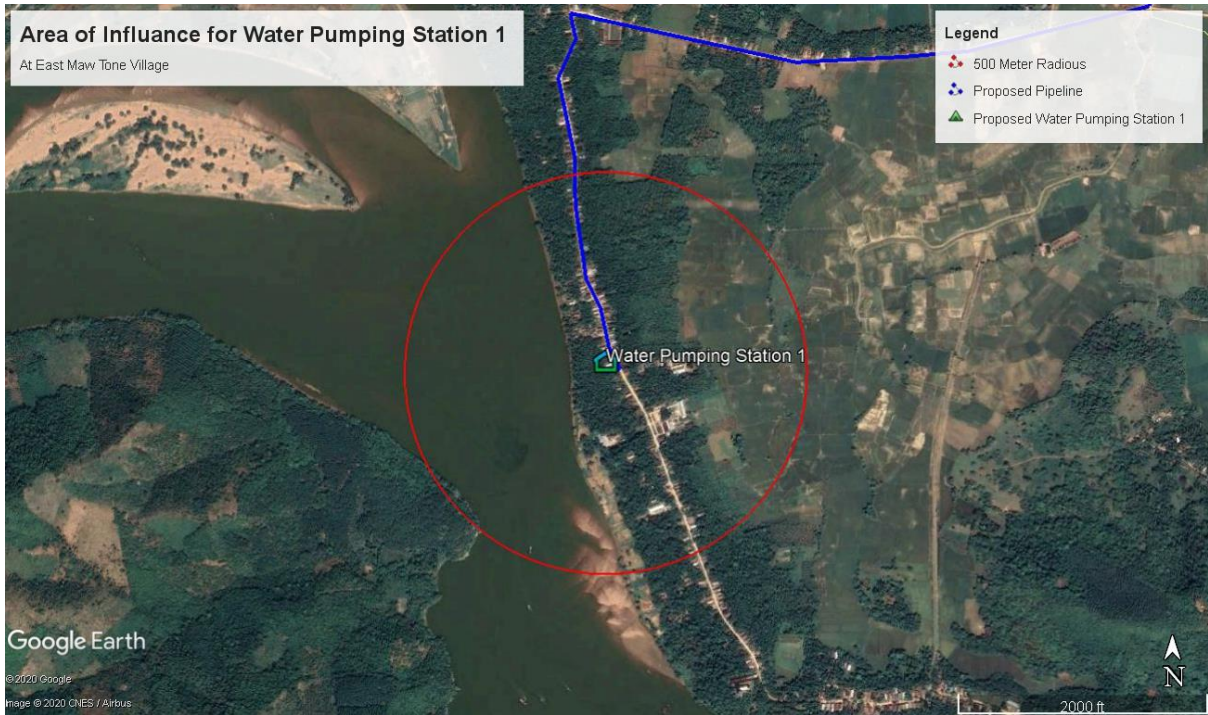


Figure 6-1 Area of Influence (AOI) for Water Pumping Station-I at East Maw Tone Village

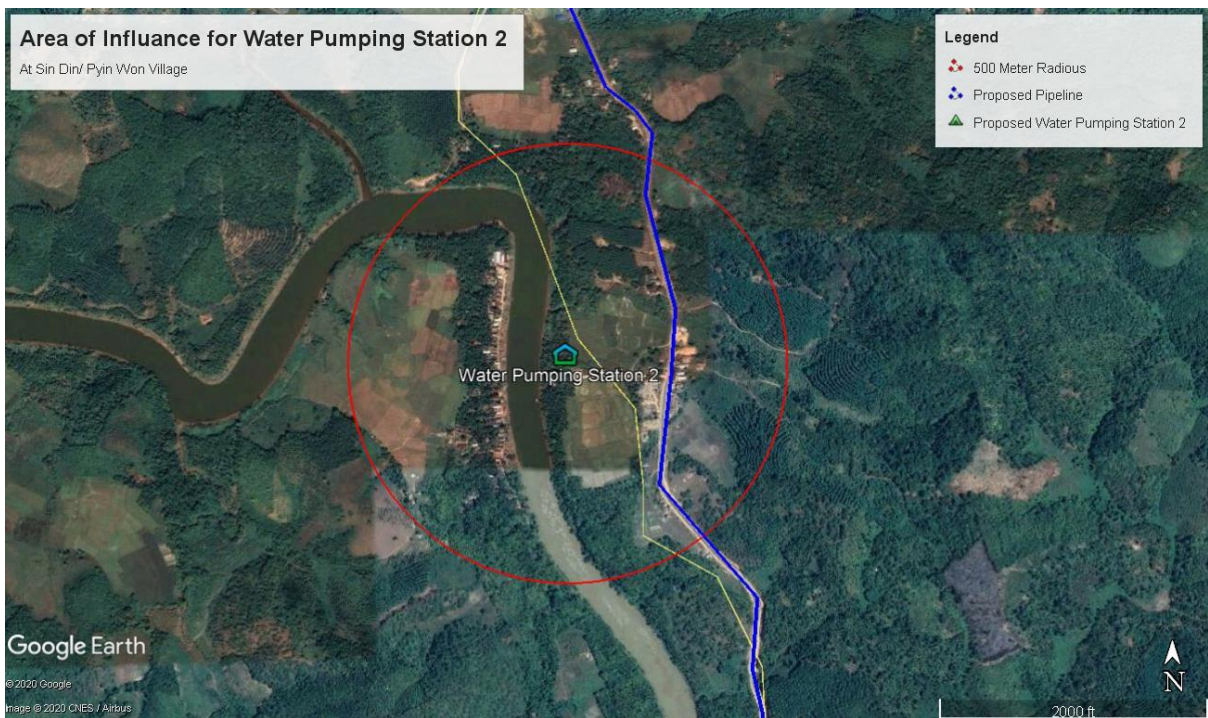


Figure 6-2 Area of Influence (AOI) for Water Pumping Station-II at Sin Din/ Pyin Woon Village



Figure 6-3 Area of Influence (AOI) for Water Pumping Station-III at Tone Byaw Gyi Village

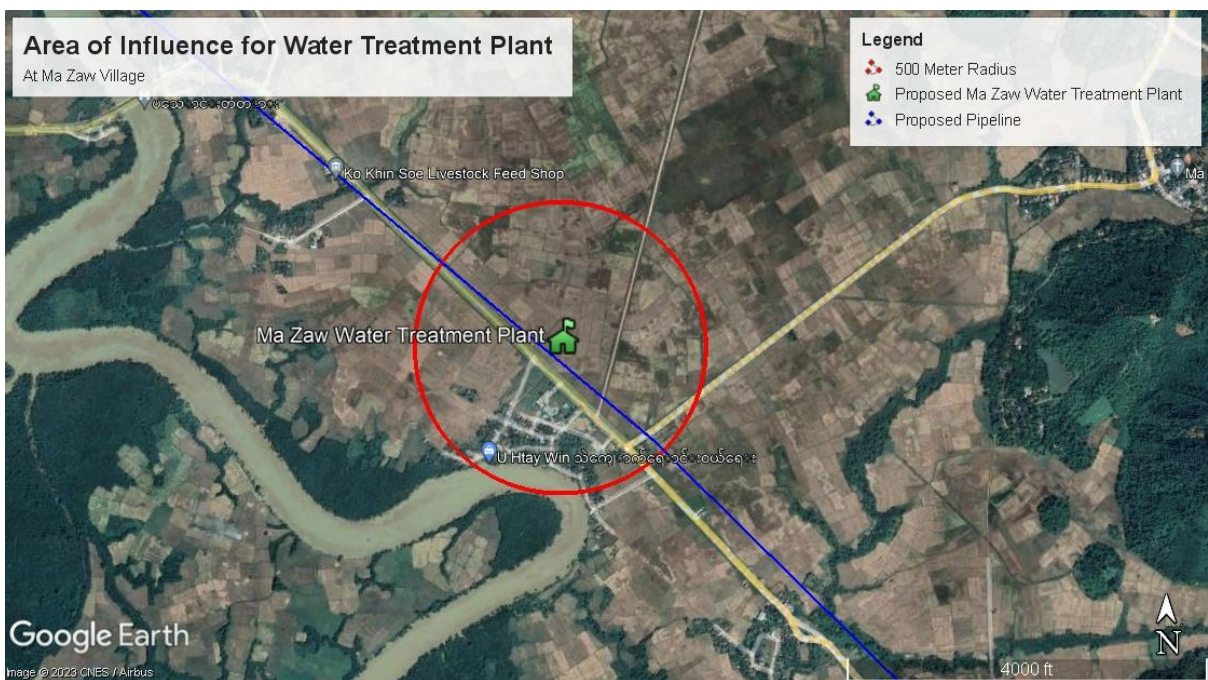


Figure 6-4 Area of Influence (AOI) for Water Treatment Plant at Ma Zaw Village



Figure 6-5 Area of Influence (AOI) for Treated Water Storage Tank at Da La Shaung Village

6.3. Impact Assessment

As a water supply project, there are many activities that may cause negative impacts along with positive impacts during both construction and operation phases. The factors such as environment, biodiversity, socio-economic are identified, assessed and described based on the project and overall environmental and social conditions in the surrounding area.

Scoping Matrix Method (Ranking Scale Method) has been used to present the impact assessment for the project. The professional judgment of the EIA Study Team has also been used as an essential tool. The reports of similar projects of the suitable sources are also considered for this section.

There may be some positive and negative impacts in the surrounding environment of the proposed project due to the implementation of the project. The possible environmental impacts are identified based on the analysis of environmental baseline information and project activities. Most of the identified impacts have been quantified to the extent possible on the value judgment. Each of the environmental issues has been examined in terms of their current conditions, likely impacts during construction and operation phases.

In this EIA study, impact assessment for the proposed project is conducted. The potential environmental impacts from various project activities of the proposed project can be categorized as follows:

- (vi) Impacts on Land: Land Acquisition, Land Use, Land Subsidence
- (vii) Impacts on Environmental Resources: Air Quality, Noise and Vibration, Water Quality, Soil Quality
- (viii) Impacts on Ecological Resources: Protected Areas, Biodiversity, Hydrology

- (ix) Impacts on Human: Resettlement, Living Conditions and Livelihood, Heritage, Landscape, Ethnic Minorities and Indigenous People, Occupational Health and Safety
- (x) Waste Disposal: Solid Waste, Liquid Waste, Hazardous Waste

Potential environmental impacts which can affect both humans and ecological are described using scoping matrix (ranking scale) according to their nature and intensity which are shown in the following table.

Table 6-2 Potential Project Activities and its Impacts Significance for Water Distribution Project

Item	Impacts	Potential Project Activities and Concerns	Magnitude	Duration	Extent	Probability	Result Score	Significance
Construction Phase								
1	Land Acquisition	<ul style="list-style-type: none"> • Project Sites Selection 	4	2	2	3	24	Low
2	Land Use	<ul style="list-style-type: none"> • Permanent Project Buildings • Underground Pipe Lines 	4	4	2	3	30	Moderate
3	Air Quality	<ul style="list-style-type: none"> • Dust Production • Generators • Workers Activities such as cooking 	4	2	2	3	24	Low
4	Noise and Vibration	<ul style="list-style-type: none"> • Vehicles • Loading and Unloading of Construction Materials • Machines 	4	2	2	3	24	Low
5	Water Quality	<ul style="list-style-type: none"> • Fuel Leakage • Waste Disposal 	4	4	2	3	30	Moderate
6	Soil Quality	<ul style="list-style-type: none"> • Fuel Leakage • Vegetative Clearance • Top Soil Removal 	4	4	2	3	30	Moderate
7	Protected Areas	<ul style="list-style-type: none"> • Project Sites Selection 	4	4	2	2	20	Low
8	Biodiversity	<ul style="list-style-type: none"> • Land Use Change 	4	4	2	3	30	Moderate

Item	Impacts	Potential Project Activities and Concerns	Magnitude	Duration	Extent	Probability	Result Score	Significance
		<ul style="list-style-type: none"> Permanent Building 						
9	Living Conditions and Livelihood	<ul style="list-style-type: none"> Temporary Job Opportunities Servicing Construction Workers 	-	-	-	-	-	Positive
10	Heritage	<ul style="list-style-type: none"> Project Sites Selection 	4	4	2	2	20	Low
11	Land Scape	<ul style="list-style-type: none"> Permanent Project Infrastructure Construction Camps 	4	2	2	3	24	Low
12	Occupational Health and Safety	<ul style="list-style-type: none"> Work Accidents Traffic Related Accidents Personal Hygiene and Awareness Transmitted Diseases Forced Labor and Child Labor Problem 	4	5	2	3	33	Moderate
13	Community Health and Safety	<ul style="list-style-type: none"> Road Accidents Transmitted Diseases Conflict with Migrant Workers 	4	5	2	3	33	Moderate
14	Solid Waste	<ul style="list-style-type: none"> Construction Wastes Wastes from Worker Camps 	4	4	2	4	40	Moderate
15	Liquid Waste	<ul style="list-style-type: none"> Construction Water Consumption Improper Toilets 	4	4	2	4	40	Moderate

Item	Impacts	Potential Project Activities and Concerns	Magnitude	Duration	Extent	Probability	Result Score	Significance
16	Hazardous Waste	<ul style="list-style-type: none"> • Construction Chemicals • Paints 	4	4	2	3	30	Moderate
17	Resources Consumption	<ul style="list-style-type: none"> • Water • Electricity • Manpower 	3	4	2	4	36	Moderate
Operation Phase								
1	Land Subsidence	<ul style="list-style-type: none"> • Over Usage of River Water 	4	5	2	3	33	Moderate
2	Air Quality	<ul style="list-style-type: none"> • Water Pumping • Generators • Treatment Plant 	4	4	2	3	30	Moderate
3	Noise and Vibration	<ul style="list-style-type: none"> • Machines and Generators • Vehicles 	3	4	2	4	36	Moderate
4	Water Quality	<ul style="list-style-type: none"> • Fuel Leakage • Sludge Disposal • Domestic Activities 	4	4	2	3	30	Moderate
5	Soil Quality	<ul style="list-style-type: none"> • Fuel and Chemical Handling • Sludge Disposal • Vegetative Soil Excavation 	4	4	2	3	30	Moderate
6	Biodiversity	<ul style="list-style-type: none"> • Project Infrastructure • Human Activities 	4	4	2	3	30	Moderate

Item	Impacts	Potential Project Activities and Concerns	Magnitude	Duration	Extent	Probability	Result Score	Significance
7	Hydrology	<ul style="list-style-type: none"> • Pumping River Water 	4	4	2	4	40	Moderate
8	Living Conditions and Livelihood	<ul style="list-style-type: none"> • Land Use Change • Job Opportunities • Good Quality Water 	-	-	-	-	-	Positive
9	Occupational Health and Safety	<ul style="list-style-type: none"> • Operational Accidents • Transmitted Diseases • Forced Labor and Child Labor Problem 	4	5	2	3	33	Moderate
10	Community Health and Safety	<ul style="list-style-type: none"> • Water Quality • Security and Safety • Conflict with Migrant Workers 	4	5	2	3	33	Moderate
11	Solid Waste	<ul style="list-style-type: none"> • Sludge • Domestic Waste 	4	4	2	3	30	Moderate
12	Liquid Waste	<ul style="list-style-type: none"> • Treatment Process • Domestic Wastewater 	4	4	2	3	30	Moderate
13	Hazardous Waste	<ul style="list-style-type: none"> • Chemical Usage • Sludge Disposal • Fuel Leakage 	4	4	2	3	30	Moderate
14	Resource Consumption	<ul style="list-style-type: none"> • Usage of River Water and Electricity 	3	4	2	4	36	Moderate
15	Increase of Water	<ul style="list-style-type: none"> • Easy access of Water 	3	5	3	3	33	Moderate

Item	Impacts	Potential Project Activities and Concerns	Magnitude	Duration	Extent	Probability	Result Score	Significance
	Consumption	<ul style="list-style-type: none"> • Leading to over drainage and wastewater 						

6.4. Potential Impacts

6.4.1 Potential Impacts for Construction Phase

This section considers the assessment aspects of impacts from construction phase including construction activities of project structures, machine installation and so on.

1) Land Acquisition

Selection of site locations for river water pumping stations, water treatment plant, water storage tanks and pipe line may affect land ownership problems. If the project area will need to use living area or current business area of local people, compensation rate will be one impact.

2) Land Use

Land use purpose can be changed by implementing project activities. Agricultural land may be changed to industrial land because of project development. Underground Pipe Lines activities will change the existing land conditions.

3) Air Quality

Construction activities and transportation vehicles may cause dust production and may lead to air pollution. If the construction activities will use generators for electricity, and construction worker will use traditional cooking ways, these aspects may also lead to air pollution problems to near areas.

4) Noise and Vibration

Noise and vibration impacts can be affected by transportation vehicles and construction activities mainly. Loading and unloading of construction materials, machines such as generators and welding equipment, are other potential sources of these impacts.

5) Water Quality

As river water pumping stations are designed near the river, water quality can be affected by developing the project. Leakage of fuels from vehicles and machines, improper management of domestic and construction wastes storage and disposal may also affect water quality.

6) Soil Quality

Fuel leakage from vehicles and machines can cause soil erosion. Vegetation clearance and topsoil removal will expose to soils in the affected area, and surface runoff would tend to increase the turbidity of water.

7) Protected Areas

If the project site locations are near or at natural protected areas, the impact should be considered.

8) Biodiversity

Because of project implementation and development, the existing biodiversity including flora and fauna may be affected.

9) Living Conditions and Livelihood

Living conditions of local people and livelihood may change because of project construction activities. Local people can get more temporary job opportunities such as construction related works and servicing works to project workers.

10) Heritage

If there are some heritage sites and buildings near the project alignment, this impact will have to be considered.

11) Landscape

Due to project development activities, the existing landscape of the project area may change.

12) Occupational Health and Safety

In construction phase of the proposed project, health and safety matters of employee are considered as an important factor. Employee can gain injuries from work accidents and also from traffic accidents. Personal hygiene and awareness problems are also needed to consider. The proposed project proponent and the contractors will need to make sure to avoid Child and Forced Labor. Also transmitted diseases from migrant workers may be a problem.

13) Community Health and Safety

Transportation vehicles can affect local traffic congestion and may lead to road accidents. Temporary worker groups can lead to transmitted diseases between them and to nearest community. Conflict may become between local community and migrant workers because of cultural and manners difference.

14) Solid Waste

Construction wastes and domestic wastes from worker camps should be handled with proper waste management system. If not, solid waste handling can be one of the impacts.

15) Liquid Waste

Water consumption from construction activities and worker camps may become one of the impacts if not being disposed properly. The improper use of toilets by workers can lead to unhealthy condition.

16) Hazardous Waste

Transfer, usage, handling and disposal of construction chemicals will be managed with proper plan. If not, impact from hazardous chemicals may lead to negative effect.

17) Resources Consumption

The resources such as water, electricity and manpower will be used during construction phase. Over usage and greedy usage of resources can affect natural balance system.

6.4.2 Potential Impacts for Operation Phase

Aspects of potential impacts of the proposed project for operation phase are considered as follows;

1) Land Subsidence

Over usage of river water by pumping stations may cause to land subsidence problem.

2) Air Quality

Operation of water pumping stations, water treatment plant and use of generators for electricity may lead to air quality impact.

3) Noise and Vibration

Operation of machines and generators from project stations, and transportation vehicles may cause to noise and vibration nuisance to community.

4) Water Quality

Fuel leakage, chemical handling and water disposal from project activities and domestic purposes may affect water quality. Improper solid waste disposal should also be considered.

5) Soil Quality

In operation stage, improper fuel and chemical storage and handling, sludge from water treatment plant and excavation of vegetative top soil by laying Pipe Lines may lead to soil erosion.

6) Biodiversity

Permanent buildings, land use change, and project and human activities may affect the existing biodiversity of the project area.

7) Hydrology

Based on the nature of the proposed project, the project will use river water and will implement pumping stations near the river, so the hydrology of the project area may be one of the impacts.

8) Living Conditions and Livelihood

As the land use changes, the livelihood of some local people can change. The local people can get skillful trainings for permanent job opportunities related to the project. In addition, the local people can access good quality of tap water for better living conditions.

9) Occupational Health and Safety

In operation stage, the employee working in project sites, especially in water treatment plant, may experience in health and safety cases. Trained and skillful workers should be assigned in dangerous work places and regular proper supervision is also a requirement.

10) Community Health and Safety

After project implementation, most of the local people have to use the tap water supplied by the proposed project. Therefore, the quality of tap water should be maintained and monitored regularly to avoid water related health problems of the supplied area. In addition, the security and safety of the water treatment plant and water storage tanks is very important for the project development.

11) Solid Waste

Sludge from water treatment process and domestic waste from permanent worker residence may lead to solid waste problem if proper waste management will not be conducted.

12) Liquid Waste

Water disposal from water treatment plant and domestic wastewater from permanent workers may produce liquid waste.

13) Hazardous Waste

Chemical storage and usage for water treatment plant, sludge disposal and fuel leakage may lead to hazardous waste production.

14) Resources Consumption

Because of river water pumping and distribution activities, the project will use suitable amount of river water and electricity.

15) Increase of Water Consumption

After the project development, the local people can get clean water easier. This phenomenon can lead to over usage of water in Myeik Area than current usage. So, the current drainage system cannot be sufficient for the increase volume.

6.5. Impacts Mitigation Measures

In this section, proposed mitigation measures for the potential impacts of the proposed project are mentioned. More detailed mitigation measures will be discussed in CEMP and Monitoring stage if required.

6.5.1 Proposed Mitigation Measures for Construction Phase

1) Land Acquisition

The proposed project will use underground pipe line for water pumping and distribution. So, the land acquisition for this part will not affect seriously. For the land needed for river water pumping stations, water treatment plant, water storage tanks and some parts of water distribution channels (if needed), the project proponent will discuss and negotiate with regional authorities, local people and related land owners for the overall project development. Then the project proponent will arrange legally for the transfer of required land including existing plantation with suitable and agreed compensation rates. Moreover, the proposed project will design the project sites away from residences and business areas of local people as priority. The project locations are designed away from the residences of the local people. Therefore, resettlement process will not be needed.

2) Land Use

The proposed project will remove top soil layer for laying underground pipe lines and then fill up and cover again above pipe lines with them. Therefore, the local people can still use their land without serious effects. The project proponent will make sure to operate in responsible manners and to avoid the damage and destruction of the properties of local people.

3) Air Quality

To prevent this impact, the proposed project will cover project sites and make watering regularly to reduce dust production especially from transportation vehicles and construction activities. In addition, the project proponent will provide and train construction workers to use required PPEs such as masks in working areas. Moreover, the vehicles and machines will be checked and maintained regularly to reduce air pollution.

4) Noise and Vibration

The project proponent will implement project activities during normal working time as possible to prevent noise and vibration nuisance to local community. The noise shall be reduced when operating by machines such as generators by installing noise covers and using ecofriendly types. The construction workers will use PPEs such as ear plugs and ear muffs for working conditions that can produce noise and vibration exceeding standard values. Regular maintenance of the vehicles and machines will also be conducted.

5) Water Quality

Proper water quality management measures will be conducted during construction phase, for disposal and consumption. The sufficient number of temporary toilets for workers will be provided with suitable septic management. Usage of fuels and chemicals during construction will be controlled by well- trained supervisors to prevent leakage and spillage to the natural water bodies.

6) Soil Quality

Storage, transfer and usage of fuels and chemicals will be handled with skillful supervisors to prevent spillage and leakage. Whenever excavation is done, vegetation and top soil layer will be covered back carefully.

7) Protected Areas

The project proponent will design project locations away from protected areas so that this impact will not affect.

8) Biodiversity

The existing biodiversity of the project area will be investigated and recorded in details. Then proper mitigation measures will be conducted to maintain it. The project proponent will share required knowledges and 'Do and Don'ts' to the contractors.

9) Living Conditions and Livelihood

The project will employ local people in construction activities. Then the local people can get job opportunities and capacity building programs to involve in this project development. Moreover, the local people can earn extra income related to the construction activities of the proposed project.

10) Heritage

The proposed project will not implement construction activities that can affect heritage sites near the project alignment. And then there are no such sites near project main construction activities.

11) Landscape

The project proponent will cover construction sites. Then if required, proper landscape development such as mini gardens and plantation will be made.

12) Occupational Health and Safety

The project proponent will assign EHS Officer for educating, training, checking and monitoring for environment, health, and safety construction workers. The required PPEs will be provided to workers. The sufficient number of temporary toilets and personal hygiene materials will also be provided in working areas. The Standard Operation Procedures, the signs and signals for safety issues will be conducted.

13) Community Health and Safety

To prevent accidents related with construction activities, the project proponent will conduct required discussions, signboards and notices to local people near project sites.

14) Solid Waste

Proper solid waste management measures will be conducted in cooperation with Local Municipal Authorities. Construction wastes and domestic wastes from workers will be stored separately and disposed by appropriate methods. The project proponent will provide Dust Bins with proper labels at required points.

15) Liquid Waste

Water consumption will be controlled with suitable methods such as using 3Rs. Drainage channels for construction sites will be conducted properly. If required, required treatment methods will be implemented.

16) Hazardous Waste

Standard Operation Procedure for hazardous waste management will be performed. The hazardous waste will be handled and disposed in line with guidelines and standards.

17) Resources Consumption

To reduce resources usage, educational measures such as 3Rs Plan will be conducted.

6.5.2 Proposed Mitigation Measures for Operation Phase

1) Land Subsidence

To prevent land subsidence, care and exact estimation, technical skills, continuous monitoring, and valid data sources should be conducted during the operation process.

2) Air Quality

In operation phase, regular maintenance of machines and vehicles will be performed. Moreover, to reduce smoke production, the proposed project will choose environmentally friendly machines as much as possible.

3) Noise and Vibration

In operation areas, suitable covers and barriers should be installed where noise and vibration production can occur exceed than standard values. In addition, modern machineries with low noise production will be favored to use.

4) Water Quality

Proper water consumption and disposal measures will be performed. Improper disposal of solid wastes to natural water bodies will be extremely prohibited with monitoring and educating. Moreover, the supplied water quality of the proposed project will be monitored, measured and maintained to meet project requirements.

5) Soil Quality

The project proponent will not make activities and disposal that can affect soil quality of the project area. Soil quality will be monitored at regular frequency near the water treatment plant to prevent unexpected impacts.

6) Biodiversity

The ecosystem of the project area will be monitored and compared with that before project development.

7) Hydrology

The hydrology of Tanintharyi River will be assessed and monitored regularly because the proposed project will pump this river water. Required human and equipment resources will be assigned to maintain the river morphology of this river. The conditions of the river will be checked and analyzed the whole year. Therefore, river bank subsidence and the change of water flow can be prevented.

8) Living Conditions and Livelihood

Local people can get permanent job opportunities and related business chances because of project development. The project proponent will consider assigning suitable local people in the project operation phases. In addition, the local people can get sufficient and healthy water supply at cheaper prices after project implementation. CSR programs from the project proponent will be provided for local development activities especially in education and health care sectors.

9) Occupational Health and Safety

The project proponent will provide required trainings and equipment to permanent workers in operation stage. The experienced, well-trained and skillful workers will be assigned in potentially dangerous working areas. The project proponent will also provide sufficient PPEs to required workers. Then the EHS Team will be assigned to conduct this measure. Chemical Management System will also be performed especially in water treatment plant. Required signs and signals, SOPs and MSDSs will also be provided. In addition, Emergency Response Plan for emergency cases such as fire and natural disasters will be conducted and trained.

10) Community Health and Safety

The quality of supplied water will be monitored and analyzed daily so that the local people can use safe and healthy water for domestic and drinking purposes. The high security for water treatment plant and water storage tanks will be conducted to make sure community health and safety.

11) Solid Waste

Proper waste management system for operation and domestic wastes (office wastes and employee residence wastes) will be conducted. Final waste disposal method will be performed in cooperation with Local Municipal Authorities. The Dust Bins will be provided at required points in both operation and domestic area. Education programs about wastes handling will be performed at some briefings to employee.

12) Liquid Waste

Proper waste water management measures will be conducted. Reduce water consumption and good drainage system will also be possible measures. In addition, direct discharge of waste water to natural water bodies will be seriously prohibited.

13) Hazardous Waste

SOP for hazardous waste management will also be implemented. The sludge of water treatment plant will be reused in brick production.

14) Resources Consumption

In operation phase, the project will use river water for distribution. But this water is from one of the renewable sources, so this impact cannot affect seriously. To prevent the unnecessary usage of resources, proper mitigation measures will be conducted such as: Switching off the lights when it is unnecessary, use energy saving machines and equipment as much as possible, etc.

15) Increase of Water Consumption

To cover the increase volume of water usage, the project proponent will cooperate with the local municipal authorities to update the current drainage system, if necessary, as one of CSR activities.

Chapter 7. CUMULATIVE IMPACT ASSESSMENT

In reference to the scope for a cumulative impact assessment, IFC's Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets and Performance Standards specify that:

Cumulative impacts are those that result from the successive, incremental, and or combined effects of an action, project, or activity when added to other existing, planned, and reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important because of scientific concerns and concerns of affected communities.

Risks and impacts will be analyzed in the context of the project's area of influence. This area of influence encompasses area potentially impacted by cumulative impacts from further planned development of the project. Any existing project or condition, and other project related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken, and areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location” (IFC, 2006).

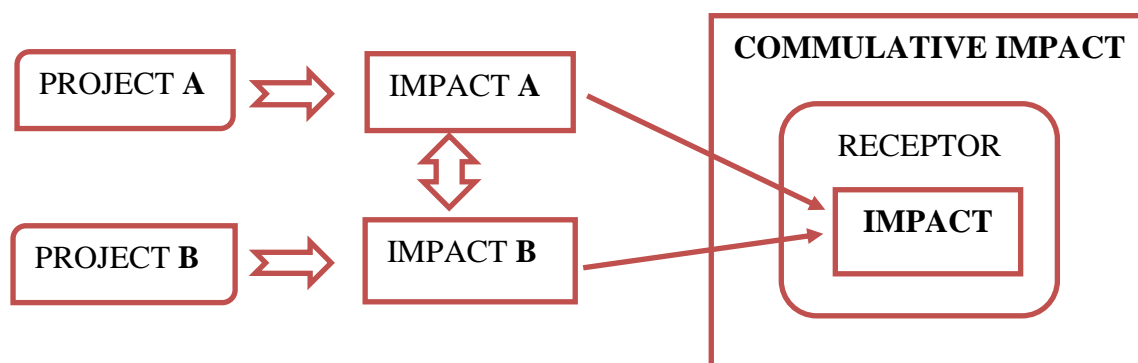


Figure 7.1 Flow Chart of Cumulative Impact

7.1 Cumulative Impact

This section deals with Cumulative effects of the proposed project and other associated impacts in relation to development will be described in this section. During the impact assessment, evaluation of potential cumulative impacts plays an integral part. The main activities of the proposed project are situated in rural area of Myeik and Tanintharyi Townships along Myeik to Tanintharyi Express Way mentioned in Project Description Section. Generally, there is no significant existing or approved project near the proposed project area. Asia World Palm Oil Factory is situated at West Kone Maw Village beside of this express way. But the distance of this factory and the proposed project activities are far away (About 5 km). The information available to assess cumulative impact of other related projects is minimal.

Therefore, the following cumulative impact and mitigation measures were prepared based on the limited information available and surrounding environmental conditions of the project site.

7.2 Methodology

The cumulative assessment has been performed based on the following steps: Projects that are either proposed or recently approved but not yet operational and located either are identified within the area of the proposed project activities. The spatial boundary of 500 m will be used for the cumulative impacts. Where existing projects are located away from each other cumulative impacts are likely to be less significant.

The temporary boundary (time-frame) to be used for the initiation of the project is defined. Where the operation schedule for projects is not overlapping, the potential cumulative impacts are likely to be less significant.

The proposed project will establish five main project activities along the project alignment. Therefore, the study team has considered mainly on Asia World Palm Oil Factory for Cumulative Impact Assessment. The palm oil production owned by Asia World Edible Oil Co., Ltd. that is located at the Plot No. 288, West Kone Maw village, Myeik Township, Tanintharyi Region. It is adjacent to Myeik Pyidaungsu Road (Express Way) connecting Myeik and Tanintharyi. The operation has started since 2010 and produced crude palm oil. The total land area of palm oil production is 0.78 acres within the total area of 5394.88 acres of land including the oil palm plantation. The palm oil production compound is surrounded by the palm trees with a total area of 4,100 acres. The oil palm plantation operation has been started since 1999. The oil palm plantation is a source of raw material for production of crude palm oil.

The significance of the cumulative impacts upon the environment is identified on the basis of the significance criteria defined.

7.2.1 Assessment Matrix

The assessment matrix that has been used for the cumulative impact assessment of the project is presented in Table (7.1).

Table 7-1 Cumulative Impact Assessment Matrix

Aspect	Relevance Factor		
	Low	Medium	High
Probability	1	2	3
Duration	1	2	3
Magnitude	1	2	3

Aspect	Relevance Factor		
	Low	Medium	High
Sensitivity	1	2	3

The relevance factors have been used to determine impacts in the table on the basis of professional judgments, past experiences with similar development projects. Impacts significance criteria used for the cumulative impact assessment are detailed in Table 7-2.

Table 7-2 Cumulative Impact Significance Criteria

Impact Significance	Sum of Relevance Factors	Consequence
Low	4---6	✓ Negative impact may occur but can be managed if the proponent implements standard environmental management practices. Special approval conditions unlikely to be necessary. Monitoring to be part of a general monitoring program
Medium	7---9	✓ Mitigation measures likely to be necessary and specific management practices to be applied. Specific approval conditions are likely. Target monitoring program required.
High	10---12	✓ Alternative actions should be considered and/or mitigation measures applied to demonstrate improvement. May require collaboration with other proponents/parties to monitor and manage impacts. Specific approval conditions required. Target monitoring program necessary.

7.3 Environmental Values

- i) Noise Level may be increased by combining construction and operation activities of the proposed project and transportation vehicles.
- ii) Wastewater discharge on surface and groundwater contamination may be increased from cumulative construction and operation of project activities.
- iii) Potential Road accidents and Traffic Congestion may be increased by transportation activities of the proposed project.
- iv) Positive impacts of socio-economic, social infrastructure and livelihoods will arise due to the regional development.

All of anticipated cumulative impacts relate with proposed project development can be reduced and enhanced by using recommended mitigation measures in below;

- ✓ Implement the environmental policy on noise pollution effectively
- ✓ Implement collaborative HSE policy
- ✓ Properly treat effluents from all project activities to minimize the cumulative impact of the wastewater on nearest water bodies mainly Tanintharyi River etc.
- ✓ Regular sampling of wastewater has to be taken from the suitable project activities and the effluent levels need to be compliance with the National Environmental Quality (Emission) Guidelines.

7.4 Project's Contribution to Potential Cumulative Impacts

The cumulative assessment defined the spatial and temporal boundary for assessment and review impact significance based on "Cumulative Impact Assessment Matrix" and "Cumulative Impact Significance Criteria" mentioned in below table (7.3) and (7.4) and considering the impacts from the activities of proposed project.

Table 7-3 Cumulative Impact Assessment Matrix

Existing Project	Air	Noise/Vibration	Wastewater	Road Accident	Socio-Economic
Asia World Palm Oil Factory	N	N	N	Y	Y

Table 7-4 Cumulative Assessment (Myeik Water Distribution Project)

Aspect	Air Quality	Noise/Vibration	Waste-water	Road Accident	Socio-economic
Probability of Impact	1	1	1	1	2
Duration of	1	1	1	1	2

Aspect	Air Quality	Noise/ Vibration	Waste-water	Road Accident	Socio-economic
Impact					
Magnitude/ Intensity	1	1	1	1	2
Sensitivity of receiving impact	1	1	1	1	2
Total	4	4	4	4	8
Impact Significance	Low	Low	Low	Low	Medium (Positive)

(Y – Yes, N - No)

Generally, the cumulative impact of the proposed project associated with the existing Asia World Palm Oil Factory has been considered as low cumulative impact.

In addition, the illegal gold mines in the upstream of Tanintharyi River may impact the river water quality. Also, some households along the river bank are still using unsystematic toilets on River Bank. These facts are other potential cumulative impacts for the proposed project. Therefore, the proposed project will conduct continuous monitoring system for their supplied tap water quality.

Chapter 8. ENVIRONMENTAL MANAGEMENT PLAN

8.1 Introduction

The Environment Management Plan (EMP) is required to ensure sustainable development in the area of the project site. Hence, an all-encompassing plan is envisaged in this Chapter, even though the identification and quantification of impacts based on scientific matrix and professional judgment have been presented in Chapter 6.

The objectives of the EMP are as follows;

- To identify the possible environmental impacts of the operation activities
- To develop measures to minimize, mitigate, and manage these impacts, and
- To implement sustainable development with responsibility and accountability.

Since all the data cannot bring out all variations induced by the natural or human activities, regular monitoring program of the environmental parameters is essential to take into account the changes in the environment.

The objective of monitoring is:

- To check or assess the efficacy of the controlling measures
- To detect deviations in order to initiate necessary measures
- To establish a database for Impact Assessment Studies for new projects.

Responsibilities for EMP

The responsibilities are required to identify to establish the development and effective implementation of the EMP. The environmental management practices, procedures, and responsibilities defined herein to get full compliance with the existing national environmental policy, laws, rules, and regulations. A suitable amount of budget for implementing EMP will be funded by the project proponent and extra amount will be added if the estimated budget is not sufficient because of the practical conditions.

In order to implement this EMP effectively, it will be necessary to define the responsibilities of various stakeholders. The following entities should be involved in the implementation of this EMP:

- BBWI&MCPC
- Environmental Conservation Department, ECD
- Third-Party Environmental Consultant

In addition, collaboration with regional authorities and local people especially living in project area is very important to conduct the proposed plans successfully.

8.2 Environmental Management Plan

Table 8-1 Environmental Management Plan for Myeik Water Distribution Project

No.	Potential Environmental Impact	Project Activities	Proposed Mitigation Measures and Enhancement	
			Measures	Responsible Party
Construction Phase				
1.	Land Acquisition	<ul style="list-style-type: none"> • Selection of site locations • Land ownership problems 	<ul style="list-style-type: none"> • Discuss and negotiate with regional authorities, local people and related land owners • Arrange legally for the transfer of required land including existing plantation with suitable and agreed compensation rates • Design the project sites away from residences and business areas of local people as priority. 	<ul style="list-style-type: none"> • Project Proponent and Contractors
2.	Land Use	<ul style="list-style-type: none"> • Implementing project activities • Project development 	<ul style="list-style-type: none"> • The removed top soil layer will be recovered again • Ensure the properties of local people are not destroyed. 	<ul style="list-style-type: none"> • Project Proponent and Contractors
3.	Air Quality	<ul style="list-style-type: none"> • Transportation vehicle • Construction activities 	<ul style="list-style-type: none"> • Daily inspection to ensure spraying water along the traffic routes using water bowser for spraying to suppress dust generated due to vehicles carrying construction materials. 	<ul style="list-style-type: none"> • Project Proponent and Contractors

		(generators, workers activities)	<ul style="list-style-type: none"> • Daily monitoring to ensure smooth traffic flow along the highway road • Optimize the number of trips by heavy duty vehicles on the road by proper planning • Daily control the consumption of fossil fuels (diesel, petrol) • Control vehicle speed in the premises of the project site • Monitor energy use during construction period • Develop maintenance program of vehicles and follow up properly. • Provide the construction workers safety PPEs 	
4.	Noise and Vibration	<ul style="list-style-type: none"> • Transportation vehicles and construction activities • Loading and unloading construction materials • Generators and welding equipment 	<ul style="list-style-type: none"> • Conduct periodic noise measurement to find out the location of noisy areas and put signage where necessary • Provide PPEs (ear plugs, ear muffs) particularly hearing protection devices for those working in noisy areas • Avoid operating heavy machinery from 7 p.m. to 7 a.m. • Ensure material delivery between 7 a.m. and 7 p.m. 	<ul style="list-style-type: none"> • Project Proponent and Contractors
5.	Water Quality	<ul style="list-style-type: none"> • Leakage of fuels from vehicles and 	<ul style="list-style-type: none"> • Conduct proper water management for disposal and consumption • Provide sufficient number of temporary or mobile toilets for workers with suitable septic management 	<ul style="list-style-type: none"> • Project Proponent and Contractors

		<p>machines</p> <ul style="list-style-type: none"> • Improper management of domestics and construction wastes storage and disposal 	<ul style="list-style-type: none"> • Control the usage of fuels and construction chemicals by well trained supervisions. • Extremely prohibit waste disposal to natural water bodies by knowledge sharing and monitoring 	
6.	Soil Quality	<ul style="list-style-type: none"> • Fuel leakage from vehicles and machinces • Vegetation clearance and top soil removal, and • Increase of turbidity of water due to surface runoff 	<ul style="list-style-type: none"> • Handle storage, transfer and usage of fuels and construction chemicals with skillful supervisors • Conduct vegetation clearing properly not to expose the soil in high steep areas and recover them again with care. • Design the channels and ditches for proper drainage of water, particularly during the rainy season • Prevent water from infiltrating into the overburden during heavy rains and subsequent increase in pore pressure. • Prevent this situation by reducing infiltration and allowing excess water to move down without hinderance, which involves maintenance of natural drainage channels particularly in steep slopes. 	<ul style="list-style-type: none"> • Project Proponent and Contractors
7.	Protected Areas	<ul style="list-style-type: none"> • If the project is located near or at natural protected areas 	<ul style="list-style-type: none"> • Design project locations far away from protected areas 	<ul style="list-style-type: none"> • Project Proponent and Contractors

8.	Biodiversity	<ul style="list-style-type: none"> Project implementation and development, biodiversity including flora and fauna may be affected. 	<ul style="list-style-type: none"> Investigate and record the details existing biodiversity Conduct the mitigation measures properly in order to maintain. Share knowledge and educate construction workers 	<ul style="list-style-type: none"> Project Proponent and Contractors
9.	Living Conditions and Livelihood	<ul style="list-style-type: none"> Change of living conditions due to project construction activities. 	<ul style="list-style-type: none"> Assign the local people priority for construction activities in order to get capacity building programs to involve in project development Extra business activities related to the construction activities will be earned. 	<ul style="list-style-type: none"> Project Proponent and Contractors
10.	Heritage	<ul style="list-style-type: none"> Heritage sites and building near the project alignment 	<ul style="list-style-type: none"> Study and recover any cultural heritage if there is 	<ul style="list-style-type: none"> Project Proponent and Contractors
11.	Landscape	<ul style="list-style-type: none"> Change of project area due to project development activities 	<ul style="list-style-type: none"> Cover construction sites Conduct and develop proper landscape such as mini gardens 	<ul style="list-style-type: none"> Project Proponent and Contractors

12.	Occupational Health and Safety	<ul style="list-style-type: none"> • Injuries from work accidents and from traffic accidents. • Personal hygiene and awareness problems 	<ul style="list-style-type: none"> • Assign EHS officer for educating, training, checking and monitoring for health and safety of construction workers. • Provide required PPEs to workers • Provide significant number of temporary or mobile toilets and personal hygiene materials in working areas • Conduct the Standard Operation Procedures, signs and signals for safety issues 	<ul style="list-style-type: none"> • Project Proponent and Contractors
13.	Community Health and Safety	<ul style="list-style-type: none"> • Transportation vehicles can affect local traffic congestion and may lead to road accidents • Dispersion of transmitted diseases from temporary worker groups 	<ul style="list-style-type: none"> • Conduct required discussions, signboards and notices to local people living near project sites in order to prevent accidents related with construction activities 	<ul style="list-style-type: none"> • Project Proponent and Contractors
14.	Solid Waste	<ul style="list-style-type: none"> • Construction wastes and domestic wastes from 	<ul style="list-style-type: none"> • Conduct proper solid waste management measures in cooperation with Local Municipal Authorities. • Store and dispose separately the construction wastes and domestic wastes 	<ul style="list-style-type: none"> • Project Proponent and Contractors

		worker camps	<p>from workers by appropriate methods</p> <ul style="list-style-type: none"> • Provide sufficient dust bins with proper labels at required place and locations 	
15.	Liquid Waste	<ul style="list-style-type: none"> • Water consumption from construction activities and worker camps 	<ul style="list-style-type: none"> • Control water consumption using suitable methods such as reduce, reuse and recycle method • Properly conduct drainage channels for construction sites and implement treatment method if necessary 	<ul style="list-style-type: none"> • Project Proponent and Contractors
16.	Hazardous Waste	<ul style="list-style-type: none"> • Transfer, usage, handling and disposal of construction chemicals 	<ul style="list-style-type: none"> • Perform standard operation procedure for hazardous waste management • Handle and dispose hazardous waste in accordance with guidelines and standards 	<ul style="list-style-type: none"> • Project Proponent and Contractors
17.	Resources Consumption	<ul style="list-style-type: none"> • Water, electricity and manpower use during construction phase. 	<ul style="list-style-type: none"> • Conduct educational measures such as 3 R plan to reduce resources usage 	<ul style="list-style-type: none"> • Project Proponent and Contractors
Operation Phase/Utilization Phase				
1.	Land	<ul style="list-style-type: none"> • Over usage of 	<ul style="list-style-type: none"> • Conduct exact estimation, technical skills, continuous monitoring and 	<ul style="list-style-type: none"> • Project

	subsidence	river water	valid data sources during operation process to prevent land subsidence	Proponent
2.	Air Quality	<ul style="list-style-type: none"> • Operation of water pumping stations, water treatment plant and • Use of generators for electricity 	<ul style="list-style-type: none"> • Regular maintenance of machines and vehicles • Choose environmentally friendly machines to reduce smoke production as much as possible. 	<ul style="list-style-type: none"> • Project Proponent
3.	Noise and Vibration	<ul style="list-style-type: none"> • Operation of machines and generators from project stations • Transportation vehicles 	<ul style="list-style-type: none"> • Install suitable covers and barriers where noise and vibration production can occur which is exceed than standard values • Modern machineries with low noise production are favored to use 	<ul style="list-style-type: none"> • Project Proponent
4.	Water Quality	<ul style="list-style-type: none"> • Fuel leakage, chemical handling and • Water disposal from project activities and domestic 	<ul style="list-style-type: none"> • Perform proper water consumption and disposal measures • Prohibit improper disposal of solid wastes to natural water bodies with monitoring and educating • The supplied water has to be monitored, measured and maintained to meet project requirements 	<ul style="list-style-type: none"> • Project Proponent

		<p>purposes</p> <ul style="list-style-type: none"> • Improper solid waste disposal 		
5.	Soil Quality	<ul style="list-style-type: none"> • Improper fuel and chemical storage and handling • Sludge from water treatment plant and absence of vegetative top soil 	<ul style="list-style-type: none"> • Avoid activities and disposal that can affect soil quality around the project site • Monitor regularly and frequently near the water treatment plant 	<ul style="list-style-type: none"> • Project Proponent
6.	Biodiversity	<ul style="list-style-type: none"> • Permanent buildings and land use change due to the existence of project and human activities 	<ul style="list-style-type: none"> • Monitor and compare the ecosystem before and after the existence of the project 	<ul style="list-style-type: none"> • Project Proponent
7.	Hydrology	<ul style="list-style-type: none"> • Usage of river water by pumping 	<ul style="list-style-type: none"> • Assess the hydrology of Tanintharyi river regularly • Assign required manpower and equipment resources in order to maintain the river's morphology 	<ul style="list-style-type: none"> • Project Proponent

		stations	<ul style="list-style-type: none"> • Check and analyze the river’s conditions for the whole year in order to prevent the river bank subsidence and the change of water flow 	
8.	Living Conditions and Livelihood	<ul style="list-style-type: none"> • Job opportunities • Access good quality of tap water for better living conditions 	<ul style="list-style-type: none"> • Local people can get permanent job opportunities and related business chances • Favourably assign suitable local people • Provide CSR programs in order to work together for local development activities especially in education and health care sectors 	<ul style="list-style-type: none"> • Project Proponent
9.	Occupational Health and Safety	<ul style="list-style-type: none"> • Employee experience in health and safety • Well trained workers are assigned in special cases and proper supervision is provided. 	<ul style="list-style-type: none"> • Provide required trainings and equipment for permanent workers • Assign experienced, well-trained and skillful workers in potentially dangerous working areas • Provided sufficient PPEs for the required and assigned workers • Provide required signs and signals, SOPs and MSDSs and perform chemical management system especially in water treatment plant • Conduct and provide a training such as Emergency Response Plan for emergency cases such as fire and natural disasters 	<ul style="list-style-type: none"> • Project Proponent
10.	Community Health and Safety	<ul style="list-style-type: none"> • Tap water quality will be maintained and monitored regularly to 	<ul style="list-style-type: none"> • Monitor and analyze the quality of supplied water daily for the local people in order to use safe and healthy water for domestic and drinking purpose • Conduct the high security for water treatment plant and water storage 	<ul style="list-style-type: none"> • Project Proponent

		<p>avoid health issues concerns with consumption of water</p> <ul style="list-style-type: none"> • The security and safety of the water treatment plant and water storage tanks 	tanks to ensure community health and safety	
11.	Solid Waste	<ul style="list-style-type: none"> • Sludge from water treatment process and domestic waste from permanent workers' residence 	<ul style="list-style-type: none"> • Conduct proper waste management system for operation and domestic wastes (e.g., office wastes and employe residence wastes) • Perform the final waste disposal method in cooperation with Local Municipal Authorities • Provide dust bins at required place both in site and domestic area • Perform education programs concerns with wastes handling to employees at some briefings 	<ul style="list-style-type: none"> • Project Proponent
12.	Liquid Waste	<ul style="list-style-type: none"> • Water disposal from water treatment plant and domestice wastewater from 	<ul style="list-style-type: none"> • Conduct proper wastewater management measures • Reduce water consumption and provide good drainage system • Strongly prohibit direct discharge of wastewater to natural water bodies 	<ul style="list-style-type: none"> • Project Proponent

		permanent workers		
13.	Hazardous Waste	<ul style="list-style-type: none"> • Chemical storage and usage for water treatment plan • Sludge disposal and fuel leakage 	<ul style="list-style-type: none"> • Implement SOP for hazardous waste management • Reuse the sludge from water treatment plant in brick production 	<ul style="list-style-type: none"> • Project Proponent
14.	Resources Consumption	<ul style="list-style-type: none"> • Use of river water and for electricity 	<ul style="list-style-type: none"> • Conduct proper resource maintenances by doing such as using auto switch off lights • Use energy saving machines and equipment as much as possible 	<ul style="list-style-type: none"> • Project Proponent
15.	Increase of Water Consumption	<ul style="list-style-type: none"> • Easy access of Clean Water 	<ul style="list-style-type: none"> • Conduct Resources Saving Campaign to Public • Corporate with Local Authorities to update current drainage system if necessary 	<ul style="list-style-type: none"> • Local Municipal Authorities and Project Proponent

8.3 Environmental Monitoring Plan

Table 8-2 Environmental Monitoring Plan for Myeik Water Distribution Project

Item	Environmental Concerns	Parameters	Frequency	Locations	Estimated Cost (US\$)	Responsible Party
Construction Phase						
1.	Ambient Air Quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂ , Wind Direction	One Time	5 Points Near Project Sites	3500	Project Proponent and Contractor
2.	Noise and Vibration Level	Equivalent Noise Level dB(A) and Vibration Level	One Time	5 Points Near Project Sites	2500	Project Proponent and Contractor
3.	Water Quality	River Water (pH, Colour, Turbidity, Total Hardness, Total Suspended Solids, Lead, Arsenic, Chlorine, Ammonia, Nitrogen, COD, Cyanide, Copper, EC, DO, Temperature, Total Dissolved Solids, Salinity) Ground Water on Site (pH, Temperature, EC, TDS, DO, Turbidity, Salinity)	One Time	3 Points for River Water and 5 Points for Ground Water Near Project Sites	3000	Project Proponent and Contractor
4.	Soil Quality	pH, Arsenic, Cadmium, Chromium,	One Time	3 Points Near	1500	Project Proponent and

		Lead, Nickel		Project Sites		Contractor
5.	Odor	Odor Quality	One Time	5 Points Near Project Sites	500	Project Proponent and Contractor
6.	Waste disposal	Type and Amount	Weekly	Disposal Points	50	Project Proponent and Contractor
7.	Biodiversity	Flora and Fauna	One Time	Near Project Sites and Alignment	2000	Project Proponent
Operation Phase						
1.	Ambient Air Quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂ , Wind Direction	Once a Year	5 Points Near Project Sites	3500	Project Proponent
2.	Noise and Vibration Level	Equivalent Noise Level dB(A) and Vibration Level	Once a Year	5 Points Near Project Sites	2500	Project Proponent
3.	Water Quality	River Water (pH, Colour, Turbidity, Total Hardness, Total Suspended Solids, Lead, Arsenic, Chlorine, Ammonia, Nitrogen, COD, Cyanide, Copper, EC, DO, Temperature, Total Dissolved Solids, Salinity) Ground Water on Site (pH, Temperature, EC, TDS, DO,	Twice a Year	3 Points for River Water and 5 Points for Ground Water Near Project Sites	6000	Project Proponent

		Turbidity, Salinity)				
4.	Soil Quality	pH, Arsenic, Cadmium, Chromium, Lead, Nickel	Once a Year	3 Points Near Project Sites	1500	Project Proponent
5.	Odor	Odor Quality	Once a Year	5 Points Near Project Sites	500	Project Proponent
6.	Waste disposal	Type and Amount	Weekly	Disposal Points	50	Project Proponent
7.	Biodiversity	Flora and Fauna	Once in Three Years	Near Project Sites and Alignment	2000	Project Proponent
Capacity Building during Construction and Operation Phases						
1.	Environmental Staff	-	As required	At Project Sites	1000	Project Proponent and Contractor
2.	Awareness Training	Environmental Regulations, EMP and EMoP, Knowledge Sharing, Toolbox Meetings, etc.	As required	At Project Sites	1000	Project Proponent and Contractor

The calculation of estimated budget in environmental monitoring plan can be varied according to project conditions and currency situations. The extra amount of budget will be added if there would be extra charges in estimated cost for some situations.

8.4 Proposed Monitoring Locations and Points

The following table shows the proposed monitoring locations and points for the proposed project. The locations are considered based on the locations where the baseline environmental quality measurements conducted and the potential receptor points of the nearest residential areas. However, some proposed locations can be changed in actual monitoring process because of the conditions of the project and ground conditions. If there will be any changes, these points will be mentioned in Monitoring Report with explanations and reasons.

Table 8-3 Proposed Location Points for Monitoring

Location No.	Points	Coordinate	Locations
Ambient Air Quality, Noise and Vibration Monitoring Locations			
1	ANV 1	Lat-12°24' 44.8848"N, Long-98°42'20.2428"E	Da La Shaung Village
2	ANV 2	Lat- 12°20'40.43"N, Long- 98°48'44.08"E	Ma Zaw Village
3	ANV 3	Lat- 12°16'47.621"N, Long- 98°51'10.377"E	Tone Byaw Gyi Village
4	ANV 4	Lat- 12°12'29.659"N, Long- 98°54'39.441"E	Sin Din/Pyin Won Village
5	ANV 5	Lat- 12°07'35.156"N, Long- 98°56'10.527"E	East Maw Tone Village
River Water Quality Monitoring Locations			
1.	Water 1	Lat- 12°16'42.02"N, Long- 98°50'24.36"E	Tanintharyi River
2.	Water 2	Lat- 12°12'30.62"N, Long- 98°54'36.33"E	Tanintharyi River
3.	Water 3	Lat- 12°07'08.51"N, Long- 98°55'59.76"E	Tanintharyi River
Soil Quality Monitoring Locations			
1.	Soil 1	Lat-12° 24' 44.8848"N, Long-98°42'20.2428"E	Da La Shaung Village
2.	Soil 2	Lat- 12°20'52.158"N, Long- 98°48'44.491"E	Ma Zaw Village
3.	Soil 3	Lat- 12°09'32.58"N, Long- 98°57'10.12"E	Pa Nat Nge Village

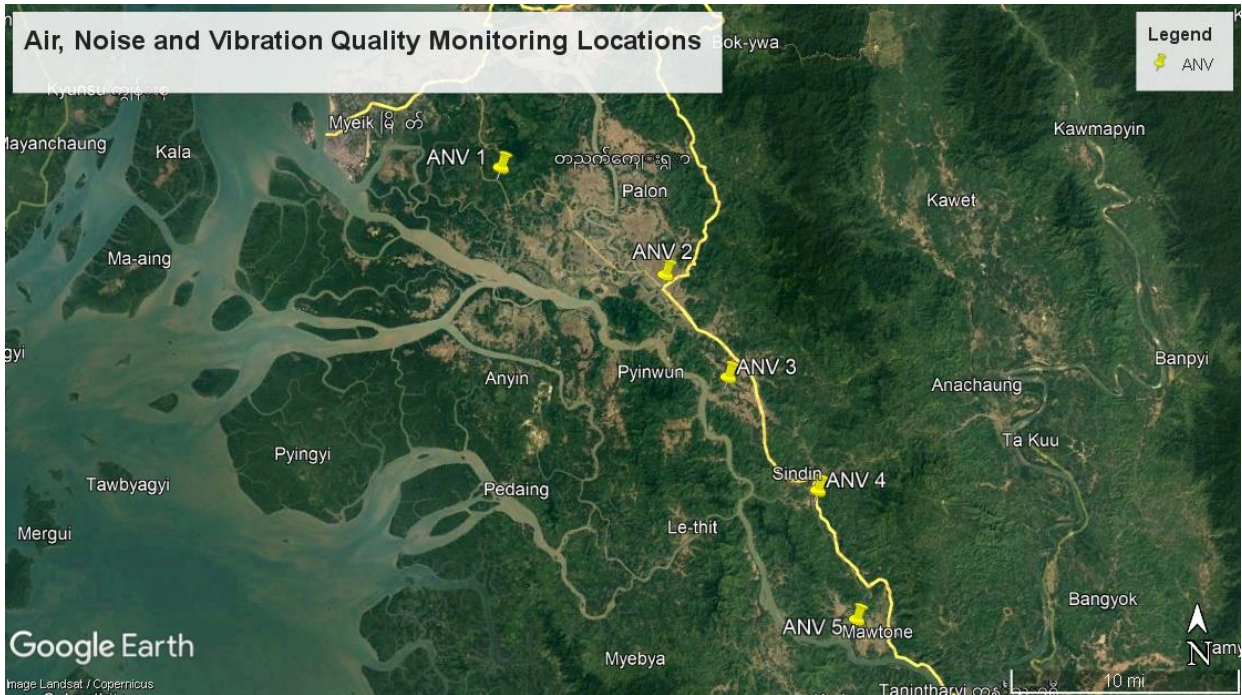


Figure 8-1 Proposed Location Points for Air, Noise and Vibration Quality Monitoring



Figure 8-2 Proposed Location Points for Water Quality Monitoring



Figure 8-3 Proposed Location Points for Soil Sampling

8.5 Monitoring Parameters

The monitoring parameters were selected based on impacts identified in the construction and operation phases. The parameters determined will reflect the effectiveness of the mitigation measures and general environmental performance of the project. Monitoring of the parameters will be carried out at the various stages of the project as follows:

Construction Phase: To establish the baseline pollution levels that exist during the construction activities

Operation Phase: To determine the impacts that might arise from the operation activities.

8.6 Occupational Health and Safety Plan

This occupational health and safety plan is intended to implement during the construction and operation phases of the project. It aims to provide maximum safe and sound working environment for the workers on site. This plan will include the following aspects:

- Health Care Services for Employees
- Personnel Protective Equipment

Health Care Services for Employees

1. Perform pre-medical checkup for employees at the time of employment if required
2. Provide annual medical checkup for all workers who are exposed to chemicals and hazardous materials
3. Provide appropriate first aid facilities at the plant
4. Organize first aid training for all employees

5. Monitor respiratory hazards like dusts produced due to project construction and operation facilities
6. Appoint medical officer to take care of any kind of sickness at worksite and treatment of employees.
7. Physical injuries may occur during the construction and operation activities so that relevant sign boards, notices, and SOPs will be prepared.
8. Provide social security system for all employees with compliance to Myanmar Social Security Law.

Personnel Protective Equipment (PPE)

- Excavators, dumpers, dozers and other automated equipment for construction that requires an operator should be equipped with air-conditioned, dust proof and sound proof cabs if possible
- Use of personnel breathing protection (e.g., masks should be provided).
- Workers may be exposed to excessive noise levels during construction and operation phases. Noisy area should be identified at the project site and posted with sign boards to give warning to wear appropriate PPE.
- Provide sufficient and efficient PPEs to all required workers.

8.7 Emergency Response Plan

This plan is intended to assist emergency response plan for operations of the project. An emergency situation is defined as unforeseen event that has a potential to cause environmental damage such as fires, landslide, soil erosion, water pollution, oil/chemical spillage or accidents such as disrupt or shutdown of operations and physical equipment damage or environment.

The following steps will be necessary for developing an emergency plan:

- Establish a management team. There should be a competent leader for developing a response plan.
- Identify hazards, probability and assess potential impacts for construction and laying pipeline operations.

Listing an inventory of emergencies occurred:

- Existing facilities
- Area adjacent to the facility
- The community closed by

In addition, the followings need to be considered for the construction project activities and digging and laying pipeline;

- Fire
- Oil/ Chemical Spill and leaks
- Water pollution and water quality degradation
- Mobile equipment

- Working at heights
- Others

The following factors also are considered;

- Extreme weather such as heavy rain
- Explosive
- Road accidents
- Land slides
- Floods

Develop training programs and assign the team leader to be responsible for managing the emergency training program. The training plan should include such as use of fire extinguishers, evacuation drills, disaster exercises, first aid and CPR.

Training matrix should be prepared so as to meet the following requirements:

- Who will do the training?
- Whom are to be trained?
- What types of training is required for all employees?
- What kind of training is required for specialist employees?
- What kind of training is required for contractors and their employees?
- What orientation is required for observers and visitors?
- Training and knowledge sharing for the nearby communities
- How to evaluate training and re-training interval
- The method of storing and location of training records

Effective communication is essential for reporting emergencies to first response teams, employees, neighborhood and the community. An Emergency Response Organization Chart should be prepared for effective communication especially during the crisis.

In order to alert the people about the crisis a loud open-air horn or siren may be effective for most people. However, for those operators inside cabs or mobile vehicles may not hear the warning if they have air conditioning running at the same time. An alert on all working radio frequencies is effective if possible. There should be a dedicated muster point and all employees should know that they should assemble at the muster point when the alarm is sounded.

Developing an Emergency Response Plan

The followings are the excerpts of the Emergency Response Plan for BBWI&MCPC.

Planning Team

1. EHS Manager
2. EHS Assistants

Emergency Phone Numbers

1. Fire Services Department
2. Hospital

3. Ambulance
4. Environmental Conservation Department
5. General Administration Department
6. Security Forces

Emergency Training

Training should be organized for emergency procedures and firefighting. An emergency evacuation program should be held at least once a year during the operation phase.

Evacuation Plan

In the event of an emergency requiring employee's evacuation

- Notify Project Proponent office by phone and/or in person
- The office will sound the alarm and notify all employees to evacuate the worksite
- All employees will assemble at the MUSTERING POINT in front of the project area

Firefighting Plan

The procedure for firefighting is as follows:

- In the event of fire emergency, notify the office and evacuate
- If you discover a fire in an early stage, notify the office by phone, fight with a fire extinguisher but when in doubt evacuate.
- Provide efficient number of fire extinguishers and regular check
- Train and educate how to use and maintain validate fire extinguishers with the help of Fire Services Department
- Organize firefighting team with relevant employess
- For any fire which could not be fought with a fire extinguisher, contact Myeik Township Fire Services Department, if required.

Incident and Injury Plan

- First aid kits are to be located at the construction sites, generator set and each company vehicle
- For minor injuries employees are authorized to use first aid kits
- For serious injuries contact Myiek Township Public Hospital and at least a 24/7 vehicle will be ready for emergency
- Record and monitor all Incident and Accident cases

8.8 Waste Management Plan

The main objectives of waste management plan are to properly manage the removal, transport, storage and final destination of these in a way that won't result in significant negative impacts on the environment. In order to mange this, BBWI & MCPC have to follow the Waste Management Principles in line with the Environmental Impact Assessment Procedures (2015) and any existing laws and regualtions issued in the Union of the Republic

of Myanmar such as limiting the types of waste, categories, amount of waste (liquid, solid, emissions) generated, methods and system of collection, storage, handling, transport, treatment, disposal and recycling or disposal of wastes. In line with EIA Procedure, the project proponent is responsible for generation of wastes, storage and management of these wastes.

The Waste Management Plan shall attempt to minimize waste production by applying the principles of reducing the use of materials, reusing materials whenever possible, recycling materials and recovering value from used materials.

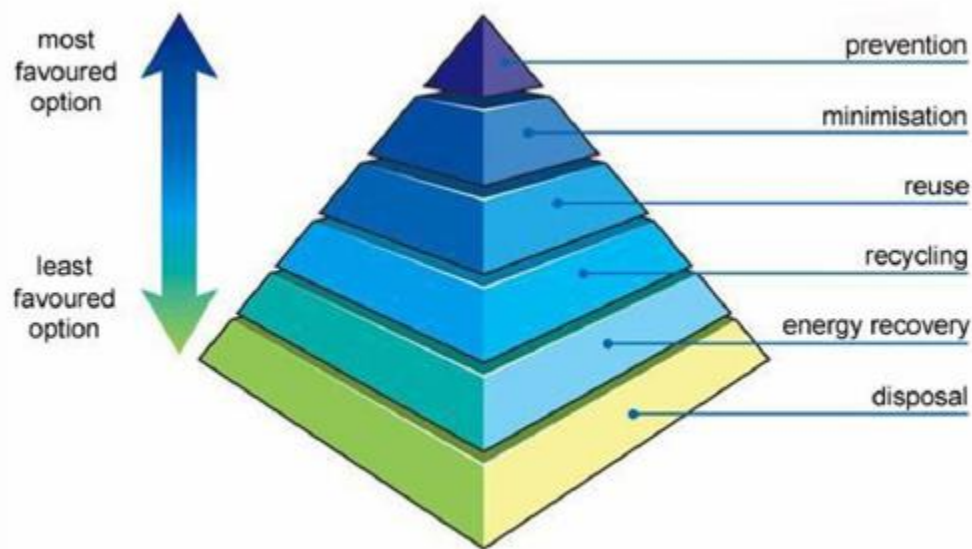


Figure 8-4 Typical Waste Management Hierarchy

Prevention: The process of waste prevention at source of waste generated. Waste prevention is not recycling.

Minimization: The process of reducing the amount of waste produced

Reuse: The process of reapplying wastes without transforming them

Recycle: The process of reusing a waste after being subjected to transformation

Energy Recovery: Not feasible to be carried out since this project is not raw material production

Disposal: The process of sending waste to landfill is a last step.

Waste Collection and Storage

Domestic wastes are collected in separated garbage bins and placed near office, dormitories, accommodation for visitors, project sites, kitchen and other mess. Hazardous wastes from the project sites should be collected in metal drums and for oily waste, it should be collected in metal bin with containments. Fuel storage will be made at a dedicated tank with a capacity in gallons.

Various wastes will be generated during the development and operation of digging. Throughout the alignment of the pipelines, it is necessary that the wastes are handled, stored and managed in a safe and environmentally friendly manner. The final disposal site will be selected at the dedicated site disposal area collaboration with Township Development Committee.

The project proponent will ensure that different types of waste are collected, segregated and disposed them at appropriate waste disposal facilities available at the site, with the intension of adopting **Best Practicable Environmental Option (BPEO)** with least impact on the environment. In order to develop BPEO guidance it is necessary to address the waste management activities involved and gain an appreciation of the range of waste streams and the processes generating these wastes.

Table 8.2 Segregated Waste Streams and Disposal Method

Waste Stream	Description	Handling Method	Disposal Method
Domestic Wastes (Organic and Non-Organic)	Organic and non-organic waste such as garbage, rubbish or food scraps Paper/Plastics bags/ Plastic bottles/Glass	Placed in animal-proof sealed waste containers	Domestic non-hazardous waste will be disposed of at site facility. Composting for food waste
Sewage	All human excreta and associated products (Black water)	A series of septic tank system will be used	Septic tanks will be used until it is full and when full a new one will be constructed and/or removing with the help of TDC
Contaminated soil (if generated)	Soil contaminated with diesel oil or other spill materials (most likely at the diesel storage area)	Collect contaminated soil and place in line facility or drum	Placed in a dedicated lined landfill at site.
Waste oils (if generated)	Used waste oil is stored in drums	Waste oil collected drums and recycle by local waste handler	Reuse or recycle by the waste handler
Batteries (if generated)	Used batteries from vehicles and heavy machineries	Temporary stored at project site	Battery recycling at local battery dealers
Wastewater	Surface water runoff can generate a wastewater	Construction of proper drainage	However, the quantity will be

Waste Stream	Description	Handling Method	Disposal Method
management	discharge high in suspended solids, particularly during the rainy season.	systems and regular maintenance	relatively small and very limited. Proper monitoring of wastewater will be necessary.
Solid waste management	Housekeeping waste, construction waste, wood, cardboard, plastics, metal, glass, paper, printer cartridges	Provide containers or bags for collection of waste and stored at the temporary waste storage area at the site.	Segregate the waste into recyclable and non-recyclable waste. For recyclable waste contact local waste dealer. For non-recyclable waste placed in the lined landfill at the site.
Sludge waste management	Sediments from each treatment process at the treatment plant	Lagoons for sludge disposal	Reuse again in brick production works as a recycle process

8.9 Grievance Redress Mechanism (GRM)

The purpose of the Grievance Redress Mechanism (GRM) is to provide an accessible, rapid and effective response to concerned stakeholders. The Projects Proponent, **BBWI&MCPC**, will response to concerns and grievances of project- affected parties related to the environmental and social performance of Water Distribution Project in a timely manner. Village committees will be comprised of village heads and some villagers in each affected village to complain to the Project Proponent concerning with project.

The project-affected persons can complain their concerns and grievances concerned with project implementation through both **formal and informal systems** to project proponents and local authorities. Once outreach and engagement have begun, **designated staff or project manager at the site or local level and Village Committee** should be empowered to receive grievances and take initial steps in responding to them. The staff who received the grievances should provide a timely communication back to the complaints that their grievances have been received, will be logged and reviewed for eligibility and if eligible, will generate an organization response. If the complained person is **not satisfied** the solved response through the **grievance committee level**, they can be submitted their concerns or problems, concerned with project, to higher responsible authorities and decided by the **court** in legal system.

The following chart shows the steps of Grievance Redress Mechanism (GRM) for upcoming problems concerning with construction and operation of Myeik Water Distribution Project.

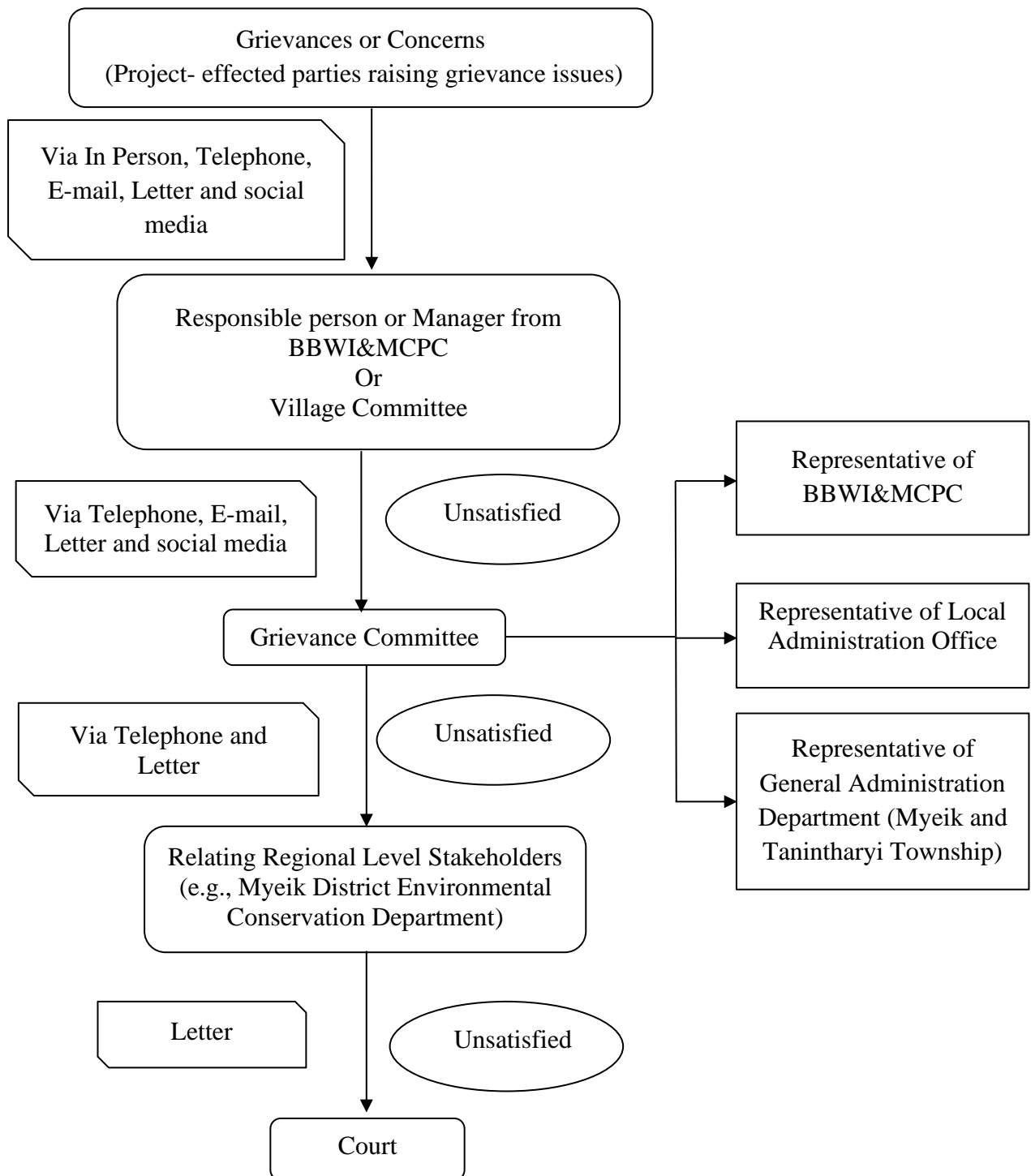


Figure 8-5 Grievance Redress Mechanism

8.10 Cooperate Social Responsibility (CSR) Plan

The project proponent, BBWI&MCPC will plan a CSR Plan for the proposed project. The proposed project will provide a learning center for information and knowledge of local

people and students. The proposed project will create job opportunities and offering for relevant local people. Then, the proposed project will conduct and implement an Environmental Management and Monitoring Plan (mentioned in this study) to maintain existing environmental system of the project area in compliance with the approval and suggestions of the governing authority, Environmental Conservation Department. In addition, the proposed project will provide social welfare system for the employees.

Generally, the proposed project will share 2% of the net profit for CSR Program. The CSR Distribution Committee will be organized by the representatives of government authorities, project proponent, local authorities and local heads. The proposed project will hire a third-party environmental consultant to monitor, maintain and record of the environmental conditions of the project area.

Table 8-4 Tentative CSR Distribution Plan

No.	Sector	Responsibility	Time Frame	Estimated Amount of Net Profit (%)
1	Health	BBWI&MCPC	Annually	0.5
2	Education	BBWI&MCPC	Annually	0.5
3	Social	BBWI&MCPC	Annually	0.5
4	Environment	BBWI&MCPC	Annually	0.2
5	Water Education	BBWI&MCPC	Annually	0.3
Total Annual CSR Plan				2.00

Chapter 9. PUBLIC CONSULTATION AND DISCLOSURE

In this EIA Stage, the proposed project planned to conduct Public Consultations two times in Myeik and Tanintharyi Townships with relevant stakeholders, interested parties and local people. But the Public Consultation at Taninthayi Township could not be held because of the conditions of World Pandemic COVID 19. Therefore, the proposed project conducted Public Consultation at only Myeik Township by inviting relevant stakeholders from both Myeik and Tanintharyi Townships in order to reduce the risk of Pandemic. In this report, the results of Public Consultation at Myeik Twonship the results and conditions of Socio-Economic Survey are presented to cover the opinions, expressions and suggestions of the stakehoders.

9.1 Requirements of Public Consultation

According to the Myanmar Environmental Impact Assessment Procedure (2015), Public Consultation is one of the required processes to perform the EIA study.

As part of the EIA investigation, the Project Proponent shall ensure that the following public consultation and participation process is carried out:

- a) Timely disclosure of all relevant information about the proposed project and its likely Adverse Impacts to the public and society through local and national media, the website(s) of the project or project proponent, at public places such as libraries and community halls and on sign boards at the project site visible to the public and provide appropriate and timely explanations in press conferences and media interviews;
- b) Arrange consultation meetings at national, regional, state, Nay Pyi Taw Union Territory and local levels, with PAPs, authorities, community-based organizations and civil society;
- c) Consultations with concerned government organizaions including the Ministry (MONREC), the concerned sector ministry, regional government authorities and others; and
- d) Field visits for the Ministry and concerned government organizations.

9.2 Objectives of Public Consultation

- a) To disclose the proposed project information such as objectives, plans, potential impacts, proposed mitigation measures, and implementation schedule;
- b) To inform and discuss about the processes of environmental impact assesement;
- c) To report the actural results of environmental quality measurement;
- d) To present the socio-econmic survey results of the local people; and
- e) To collect the suggestions and expressions of the relevant stakeholders and to consider them in project implementation.

9.3 Stakeholders/ Participants List

With those purposes, the Public Consultation was held on 21st December, 2022, at MCPC Head Office Meeting Hall, Myeik Township, Tanintharyi Region. The government officials, NGOs, media and local people (from the project area) were invited by Invitation Card before the meeting.

The Public Consultation was held in the following agenda;

1. Registration
2. Opening Remarks by **Reginal Minister of Ethnic Affairs, U Saw Martin Luthar**
3. Explanation of Brief Description of the Proposed Project by **MCPC Deputy General Manager, U Kyaw Myo Paing**
4. Presentation of EIA Part by **E Guard Environmental Services Managing Director, U Aye Thiha**
5. Exchange Opinions, Questions and Answers
6. Closing Remarks



Figure 9-1 Speech and Presentations of PC

The following table shows the attendees of Public Consultation.

Categories	Number of Participants
Government Officials	20
Companies	23
Local People	116
Total	159



Figure 9-2 PC Attendees

9.4 Outcomes of Public Consultation

After Opening Speech by U Saw Martin Luthar, Regional Minister, Ministry of Ethnic, Tanintharyi Regional Government, U Kyaw Myo Paing, Vice General Manager, MCPC, explained a brief description of the Myeik Water Distribution Project. Then U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd, explained a brief description of Environmental Impact Assessment to compliance laws and regulations promulgated by the Myanmar Government. He also explained environmental quality measurement results, social survey analysis results, biodiversity survey analysis results and the conditions of EIA steps.

Questions and Suggestions by Attendees

U Tun Aung, Local People, Ma Zaw Village – Heard that 2% of the project benefits will be used for the CSR Plan. The construction materials arrived at the village to build a crematorium by the project owner. He would like to know about the plan for Education and Health for the village as CSR. He also would like to know about the water that will be treated at the water treatment plant will be used as drinking water or used for irrigation.

U Kyaw Myo Paing, Deputy General Manager, MCPC – answered that there will be a plan for CSR from 2% of project benefits. CSR plan will be used for the project-affected villages in all Health, Social and Education sectors and the MCPC will negotiate with local people about this matter in detail. The construction of the crematorium at Mazaww Village was started as it is needed in the village. There are plans to use it for Health, Education and Religious sectors in future. He continues that for treated wastewater, it is needed thorough inspection by the consultants to be able to use it as drinking water or irrigation because there may be some impacts by wastewater.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd – answered that treated water can be used as drinking water and all the water from the water treatment plant will be treated. The only waste obtained was sediment. It cannot be used as Irrigation water but it will be in future after the negotiation with BBWI and MCPC.

U Than Soe, Local People, Ingamaw Village – said he thanked and appreciated the project. He continued that he wants to know whether there are impacts on crops and vegetation grown by local people due to the pipeline layouts for water distribution. If so, he wants to know how to compensate to them. He also wants to know whether this water distribution will include all the villages in the township or not and if included, the prices are the same or not.

U Kyaw Myo Paing, Deputy General Manager, MCPC – answered that the pipelines for water distribution will be constructed underground so mostly, they will not impact these crops and vegetation. There will be some temporary impact and if so, MCPC will do negotiate with the local people. This project will also distribute to all of the villages that are within reach in the township at the given price which will be reasonable for all.

U Than Myint, Local People, Mazaw Village – said that my village is in the arid region. They are happy about the project but with some worries. He would like to know how the project will handle if there are impacts on the environment and how they can give suggestions and they want to know the contact person of the project.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd – answered that the fact there are worries for the project is pretty usual. We conduct EIA for the possibilities of impacts on the project but there can be unexpected matters. There will be organizations for the project and local people before the start of the project to negotiate the grievance and compensation. If someone from the project breaks a rule and affects to locals, the responsibilities are on the project owner. The relevant organization will collaborate if

something happens and there will be GRM Plan. The project is selected in the way of minimum impacts.

U Win Aye, Assistant Director, Forest Department, Myeik District – this project is valuable for regional development. He said that this EIA prepared by E Guard includes Construction Phase and Operation Phase. He wants to know about dust mitigation measures for the air quality in Operation Phase as only very few are described in the report. He asked about the water quality of the Tanintharyi River condition in the Wet Season. He wants to know about the first stage water collecting pond and how many tons will be collected in a month and how to be disposed of.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd – answered that the process of the water collecting pond is to collect sediments and collected sediments are needed to be disposed of. The disposed sediment will be used for other projects as borrow soil and the issue of how to dispose of the rest is needed to be considered. The sedimentation depends on weather conditions and in the Wet Season, there will be more water volume and sediments.

U Kyi Lwin, Assistant Director, Environmental Conservation Department, Myeik District – said this project is good for regional development. The impacts of this project are minimal. All medium impacts can be mitigated to be reduced. He said to the locals not to worry about the project. He wants MCPC to measure the water quality of the Tanintharyi River. He suggested it to be compared with National Drinking Water Guidelines and WHO Guidelines as he only saw it with NEQEG Guidelines. He also wants to know if there are any cumulative impacts of sand dragging and if there are any impacts to worry about.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd – answered we already measured the water quality of Tanintharyi River for the EIA report. There was a measurement in the previous FS report as water quality is important for this project. The condition of the river can be changed according to the weather condition. We measured 3 points as the main locations for the project. In the wet season, freshwater volume is more than in the dry season. There are many points measured in FS Report. But now only heavy minerals are measured. We can compare it with both National Drinking Water Quality Guidelines and WHO Guidelines. The quality of the water will be compared with the standard of tap water. If there is a high sedimentation rate, there will be sand dragging to make way for water. We considered the cumulative impacts from other projects near the current project area and the sedimentation of the river.

U Myint Soe, Deputy Director, Department of Agricultural Land Management and Statistics – asked how the land for the pipelines of this project will be selected, which is allowed on this selected land and how to manage this land.

U Kyaw Myo Paing, Deputy General Manager, MCPC – answered that the selection of this land was finished. It is specifically prioritized to have no impact on the locals due to the layout of pipelines for this project. If any negative effect happens to the locals, the project

will compensate the locals in accordance with the guidelines.

U Min Min Htun, Staff Officer, Irrigation Department, Myeik District – said that the irrigation department will inform to the responsible company about the concerns of the locals for their farmlands. There is a compensation rate set by the Nation for each crop.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd – said that E Guard has many experiences in compensation not only for this project but also for other projects. Some projects need to conduct not only EIA but also RAP Report and the relevant company, in this case, MCPC, take responsibility.



Figure 9-3 Questions and Suggestions by Attendees

9.5 Disclosure of EIA Report

The Environmental Impact Assessment (EIA) report is submitted to ECD/MONREC by the project proponent (BBWI&MCPC), it was described as follows: “Once the EIA report has been submitted to ECD/MONERC, BBWI&MCPC plans to make the report available to interested parties and the general public within a month of its submission at the office of BBWI&MCPC, E Guard Environmental Services’ office and website and ECD Myeik District Office”.

In accordance with the above statement and with Article 65 of the EIA Procedure (2015), BBWI&MCPC will disclose the EIA report to the public in order to make sure that all concerned agencies, local people, and any other interested persons could understand the study

and review the report that includes information on the expected impacts of, and EMP (i.e., planned mitigation measures and monitoring plan) that is applied to, the project.

In concrete, BBWI&MCPC will make printed documents of the EIA report and suggestion form available at the following offices. In addition, BBWI&MCPC will inform the submission of EIA report and disclose the available platforms for both hard copies and soft copies via relevant communication channels.

1. Environmental Conservation Department (ECD), Myeik District Office
2. BBWI&MCPC Co., Ltd., Myeik Office
3. E Guard Environmental Services Co., Ltd., Yangon Office

The EIA report is also available to download at the website already presented in Executive Summary and the suggestions can also send via emails of bbwi.mcpc@gmail.com and info@eguardservices.com.

Chapter 10. CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

Generally, the proposed project can create good benefits to the development of local area. Myeik population has been growing three times than before 2010 because of urbanization and industrialization. The current main water source of the local people is ground water. But the quality and quantity of ground water has changed because of sea water intrusion. The proposed project will use natural source of fresh water from Tanintharyi River effectively. Bright Blue Water International Corporation Company Limited and Myeik Corporation Public Company Limited (BBWI & MCPC) have collaborated to develop public utility project (Clean Water Supply) for Tanintharyi Region in Myanmar. This project aims to develop infrastructures for water production, water management service and pipe supply system. It can provide high quality tap water for municipalities, and many industries especially in fishery and processing food. This sustainable development of pipeline tap water system can encourage more foreign and local investment in Myeik.

During construction and operation activities of the proposed project, there may be some negative impacts. Potential impact assessment and proposed mitigation measures are already presented in this EIA Report. Moreover, continuous monitoring system will help to maintain the sustainable development of the proposed project. On the other hand, the proposed project has significant positive effects to the local area. The local people can also gain permanent and temporary job opportunities related to project development. CSR Programs will help the social and economic development of the project area. Based on preliminary discussions with local people, most of the people welcome and wish to develop the proposed project as soon as possible.

In addition, the engineers and members of the operation team of the proposed project are full of experiences and excellent skills in the sector of water supply and distribution projects in Thailand and they can bring those experiences and skills to the proposed project in Myeik. They can provide the best service for water distribution system in Myeik also. They have got the best technology for planning, implementing, operating, managing, and controlling system of the proposed project.

The environmental and social issues to be investigated have been clearly identified in this EIA study. The Terms of Reference for this EIA study covers all the identified issues and mitigation measures which are in line with all applicable guidelines, laws and regulations presented in the approved Scoping Report.

The proposed project will be implemented with responsibilities and accountabilities on environmental and social issues. Therefore, the sustainable project development can be achieved for both the project proponent and the project area including local people.

10.2 Recommendations

The project proponent should make required further studies and investigations to meet the legal requirements and the suggestions of regional authorities. The Grievance Redress Mechanism should be established in collaboration with local communities to satisfy the

complaints for the proposed project activities of the local people. In addition, the project proponent should disclose Environmental Reports including EIA and Monitoring Reports to the public for transparency and collect suggestions and feedbacks of the public.

Therefore, the proposed project should be implemented to fulfill the basic requirement of the project area. Moreover, this sustainable infrastructure improvement of the project area can also achieve social and economic development of the region.

Annex

Annex I. Presentations of Public Consultation



BBWI & MCPC Co., Ltd

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မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်း

၁။ စီမံကိန်းအကြောင်းအရာ

- တနင်္သာရီမြစ်မှ ရေချိုများကို စုပုံယူ၍ မြိတ်မြို့သို့ ပို့ကမ်းပေးခြင်း ပို့လွှတ်သွားမည်။
- WHO Guidelines နှင့်အညီ ပြုပြင်သန့်စင်ထုတ်လုပ် သွားမည်။
- မြိတ်မြို့ပေါ်လူထုနှင့် ရေသန့်ပို့ကမ်းတစ်လျှောက် ကျေးရွာလူထုသို့ သန့်စင်သောရေကို ဖြန့်ဖြူးရောင်းချပေးသွားမည်။
- ဈေးနှုန်းချိုသာစွာ ဖြန့်ဖြူးရောင်းချပေးသွားမည်။

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- ပြန်လည်ဖြည့်တင်းနိုင်ချေ နည်းပါးလာသည့် မြေအောက်ရေ သုံးစွဲမှု လျှော့ချရန်၊
- ဒေသ၏ အဖိုးတန် ရေချိုသယံဇာတ ရင်းမြစ်ကြီးဖြစ်သည့် တနင်္သာရီမြစ်မှ ရေချိုများကို ဒေသအတွက် အကျိုးရှိအောင် အသုံးပြုရန်၊
- ကျန်းမာရေးနှင့်ညီညွတ်စွာ ထုတ်လုပ်ဖြန့်ဖြူးပေးမည့်ရေကို ဒေသခံများအနေဖြင့် ဈေးနှုန်းချိုသာစွာ သုံးစွဲရန်၊
- ဒေသ၏ ရေထွက်ကုန်များ အရည်အသွေးမြင့်လာပြီး နိုင်ငံတကာဈေးကွက်တွင် ပိုမိုယှဉ်ပြိုင်လာနိုင်ကာ ပြည်ပမှ ရင်းနှီးမြှုပ်နှံမှုလုပ်ငန်းများ ဝင်ရောက်လာ နိုင်ရန်၊
- ဒေသခံလူထုအတွက် လူမှုဖိုးပေးဘဝအခြေအနေများ ပိုမိုဖွံ့ဖြိုးလာရန်။

၃

၃။ စီမံကိန်းလုပ်ငန်းများတည်နေရာ



၄

၄။ စီမံကိန်းလုပ်ငန်းရပ်များ

- တနင်္သာရီမြစ်ကမ်းနံဘေးရေတင်စက်ရုံ (၃)ရုံမှ ရေချိုများကို ပိုက်လိုင်းဖြင့် သွယ်တန်း၍ ဖြတ်မြို့၊ မစောကျေးရွာရှိ ရေသန့်စင် စက်ရုံသို့ ပို့လွှတ်ပါမည်။
- မစောကျေးရွာရှိ ရေသန့်စင်စက်ရုံတွင် မြစ်ရေ (ရေကြမ်း) များကို WHO Guidelines နှင့်အညီ ပြုပြင်သန့်စင်ထုတ်လုပ်ပါမည်။
- သန့်စင်ပြီးရေများကို ဒလရှောင်ရွာရှိ ရေလွှတ်ကန်သို့ ပို့လွှတ် သွားပါမည်။
- ဒလရှောင်ရေလွှတ်ကန်မှ ရေချိုများကို ဖြတ်မြို့အတွင်းသို့ Gravity flow ဖြင့် ပို့လွှတ်သွားပါမည်။
- ဖြတ်မြို့အတွင်းသို့ ကျောက်ဖြူတောင်ပိုက်လိုင်းနှင့် မြို့ပတ်(၂) လမ်း ပိုက်လိုင်းကြီးများမှတစ်ဆင့် ပို့လွှတ်သွားမည်။
- သုံးစွဲသူအိမ်ရှေ့အရောက် Smart Meter စနစ်ဖြင့် ဖြန့်ဖြူးရောင်းချပေးသွားပါ မည်။

၆

၅။ ရင်းနှီးမြှုပ်နှံမှုပမာဏနှင့် လုပ်ငန်းတည်ဆောက်ရေးကာလ

- စီမံကိန်းတစ်ရပ်လုံးအတွက် ရင်းနှီးမြှုပ်နှံမှုပမာဏမှာ တတ် (၂၈၅၅) သန်း၊ အမေရိကန်ဒေါ်လာ အားဖြင့် USD (87.85) သန်းဖြစ်သည်။
- ဖြတ်မြို့နယ်အတွက် တစ်ရက်လျှင် ရေသန့် ကုဗမီတာ (၁၀၀၀၀၀) နှုန်း ထုတ်လုပ်ဖြန့်ဖြူး ပေးသွားမည်။
- စီမံကိန်းကို (၃) နှစ်အတွင်း အကောင်အထည်ဖော်ဆောင်ရွက်သွားမည်။

၆

၆။ ရေသန့်စင်မှုလုပ်ငန်းအစီအစဉ်



၇

၇။ CSR လုပ်ငန်း

- စီမံကိန်းအကျိုးအမြတ်၏ (၂ %) ကို စီမံကိန်းဆောင်ရွက်ရာဒေသများ၏ ကျန်းမာရေး၊ ပညာရေး၊ လူမှုရေးနှင့် ဖွံ့ဖြိုးရေးလုပ်ငန်းများတွင် အသုံးပြုသွားမည်။
- CSR ရန်ပုံငွေ ခွဲဝေအသုံးချရေးကော်မတီတွင် အစိုးရဘက်ဆိုင်ရာအုပ်ချုပ်ရေး အဖွဲ့အစည်းများ၊ အခြားဌာနဆိုင်ရာများ၊ သက်ဆိုင်ရာဒေသကိုယ်စားလှယ်များ၊ ရပ်မိရပ်ဖ များပါဝင်မည်။
- CSR လုပ်ငန်းတွင် စီမံကိန်းကြောင့် ပတ်ဝန်းကျင်ထိခိုက်မှုမရှိစေရေးအတွက် တတိယ အဖွဲ့အစည်း ငှားရမ်း၍ ပတ်ဝန်းကျင်အခြေအနေအကဲဖြတ်စောင့်ကြည့်ရေး လုပ်ငန်း များပါဝင်မည်။

၈

စ။ နိဂုံး

- မြတ်ဒေသသည် ပင်လယ်ရေသယ်စာတပေါများပြီး ဒေသခံအများစုသည် ရေလုပ်ငန်းဖြင့် အဓိကဝင်ငွေရရှိနေကြသည်။
- ရေထွက်ပစ္စည်း ပြုပြင်ထုတ်လုပ်ရေးလုပ်ငန်းများတွင် စက်မှုလုပ်ငန်းသုံးရေကို ဈေးနှုန်းကြီးမြင့်စွာ သုံးစွဲနေရသဖြင့် ပြည်ပသို့ ကုန်ပစ္စည်းတင်ပို့ရာတွင် နိုင်ငံတကာဈေးကွက်၌ ယှဉ်ပြိုင်နိုင်စွမ်း နည်းပါးနေပါသည်။
- ဈေးနှုန်းချိုသာစွာသုံးစွဲခွင့်ရရှိမည့် လူထုသောက်သုံးရေမှာလည်း ကျန်းမာရေးနှင့်ညီညွတ်မှု ရှိသည်အပြင် စက်မှုလုပ်ငန်းသုံးရေကိုလည်း လိုသလောက်ရရှိနိုင်သဖြင့် ပြည်ပမှ ရင်းနှီးမြှုပ်နှံမှုလုပ်ငန်းများ ဝင်ရောက်လာနိုင်ရန် အဆင်သင့် ဖြစ်နေပါမည်။
- ဒေသခံလူထုအတွက် အလုပ်အကိုင်အခွင့်အလမ်း တိုးပွားမည်ဖြစ်ပြီး လူမှုစီးပွားဘဝ အခြေအနေများ ယခင်ကထက် တိုးတက်လာပါမည်။
- ပုဂ္ဂလိကအကျိုးအမြတ်ထက် အများအကျိုးပြုစီမံကိန်းကြီးဖြစ်ပါသည်။





BBWI&MCPC Company Limited
မြိတ်ခရိုင်၊ မြိတ်မြို့၊ ရေပေးဝေရေးစီမံကိန်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာ (EIA)
အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့်
သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း အခမ်းအနား
(Public Consultation)

၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်၊ ဗုဒ္ဓဟူးနေ့

မြိတ်အများပိုင်ရုံး၊ မြိတ်မြို့။



ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ
 လုပ်ငန်းစဉ်များအား တတိယအဖွဲ့အစည်းမှ
 ရှင်းလင်းတင်ပြခြင်း



- စီမံကိန်းဆိုင်ရာဖော်ပြချက် (စီမံကိန်းအဆိုပြုသူမှ တင်ပြပြီး)
- EIA ဆောင်ရွက်ရန်လိုအပ်ချက်များ
- အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့်သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း အခမ်းအနားကျင်းပရခြင်း၏ ရည်ရွယ်ချက်များ
- EIA ဆောင်ရွက်ခဲ့သည့်အဖွဲ့အစည်း



- ဥပဒေ၊ နည်းဥပဒေဆိုင်ရာ မူဘောင်နှင့်ကန့်သတ်ချက်များ
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းစဉ်များ
- စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သည့်ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာသက်ရောက်နိုင်မှုများ၏ တွေ့ရှိချက်များနှင့် လျှော့ချရေးအစီအစဉ်များ
- ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာထိခိုက်မှုဆန်းစစ်ခြင်းတွင် လေ့လာသည့်အကြောင်းအရာများ
- EIA လေ့လာမှုအချိန်ဇယား



EIA ဆောင်ရွက်ရန်လိုအပ်ချက်များ



ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေနှင့် လုပ်ထုံးလုပ်နည်းများ

- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂ ခုနှစ်) နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄ ခုနှစ်) အရ စီမံကိန်းများကို စိစစ်ရာတွင် စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်မည့် ပတ်ဝန်းကျင် နှင့် လူမှုရေးဆိုင်ရာ မလိုလားအပ်သည့် ထိခိုက်မှုများ ရှိ/မရှိ နှင့် ထိခိုက်မှုများရှိခဲ့ပါကလည်း သိသာထင်ရှားမှုရှိ (သို့) ပြင်းထန်သောထိခိုက်မှု ရှိ/မရှိ စသည်ဖြင့် စနစ်တကျဆန်းစစ်နိုင်ရန်ရည်ရွယ်၍ ပြုလုပ်ခြင်း ဖြစ်ပါသည်။
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုသည်မှာ ပတ်ဝန်းကျင်ဆိုင်ရာလေ့လာမှုများအပြင် လူမှုရေးရာ သက်ရောက်မှုအားထည့်သွင်း၍ ပတ်ဝန်းကျင်နှင့်လူမှုရေးထိခိုက်မှုဆန်းစစ်ခြင်းကို ဆောင်ရွက်သွားခြင်း ဖြစ်ပါသည်။



EIA ဆောင်ရွက်ရန်လိုအပ်ချက်များ



- မြတ်မြို့ရေပေးဝေရေးစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာ ရေးဆွဲတင်ပြရန် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ၂၀၂၀ ပြည့်နှစ်၊ မတ်လ (၂၀) ရက်နေ့တွင် စာအမှတ် အီးအိုင်အေ - ၁/၆ (၇၀၉/၂၀၂၀) ဖြင့် သဘောထားမှတ်ချက်ပေး ညွှန်ကြားခဲ့ပါသည်။



EIA အစီရင်ခံစာတွင်ပါဝင်ရမည့်အချက်များ



ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ(၂၀၁၅) ၊ အပိုဒ် (၆၂) အရ

- (က) အကျဉ်းချုပ်အစီရင်ခံစာ၊
- (ခ) နိဒါန်း၊
- (ဂ) မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာမူဘောင်၊
- (ဃ) စီမံကိန်းအကြောင်းအရာဖော်ပြချက်နှင့် အခြားနည်းရွေးချယ်ခြင်း၊
- (င) အနီးပတ်ဝန်းကျင်အကြောင်းအရာများဖော်ပြချက်၊
- (စ) ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုနှင့်ဘေးအန္တရာယ်ရှိမှုဆန်းစစ်ခြင်းနှင့် လျော့နည်းစေရေး လုပ်ငန်းများ၊
- (ဆ) ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်း၊
- (ဇ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၊
- (ဈ) အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း။



အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား ကျင်းပခြင်း၏ ရည်ရွယ်ချက်



ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း (၂၀၁၅) ၊ အပိုဒ် (၆၃-၅) အရ

- ✓ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် စုံစမ်းစစ်ဆေးခြင်း (EIA Investigation) များ ဆောင်ရွက်ရာတွင် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်းစသည့် အများပြည်သူနှင့်ပူးပေါင်းပါဝင်မှု လုပ်ငန်းစဉ်များ ဆောင်ရွက်ပြီးမှသာ အစီရင်ခံစာများ တင်ပြရန်ဖြစ်ပါသည်။



အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား ကျင်းပရခြင်း၏ ရည်ရွယ်ချက်



- (၁) စီမံကိန်းအချက်အလက်များဖြစ်သော ရည်ရွယ်ချက်၊ အစီအစဉ်၊ ထိခိုက်သက်ရောက်နိုင်မှု အခြေအနေများ၊ သက်ရောက်မှုအား လျော့ချနိုင်မည့် နည်းလမ်းများနှင့် ဆောင်ရွက်မည့် အချိန်ဇယား စသည်တို့အား အသိပေးရန်၊
- (၂) ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းစဉ်များကို အများပြည်သူအား အသိပေးဆွေးနွေးတင်ပြရန်၊
- (၃) တိုင်းတာရရှိထားသော ပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး ရလဒ်အဖြေများအား မှန်ကန်စွာတင်ပြရန်၊
- (၄) ကောက်ယူရရှိထားသော ဒေသခံများ၏ လူမှုစီးပွားဆိုင်ရာ အခြေအနေများကို ဖော်ထုတ်တင်ပြရန်၊
- (၅) စီမံကိန်းရေးဆွဲစဉ်ကာလအတွင်း စီမံကိန်းနှင့်သက်ဆိုင်သူများထံမှ အကြံဉာဏ်ရယူရန်၊ လူထုတွေ့ဆုံပွဲမှ ရရှိသော အကြံဉာဏ်များအား စီမံကိန်းရေးဆွဲရာတွင် ထည့်သွင်းစဉ်းစားရန်၊



ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆောင်ရွက်မည့် တတိယအဖွဲ့အစည်း နှင့် စိစစ်ခွင့်ပြုသည့် အစိုးရအဖွဲ့အစည်း



ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆောင်ရွက်မည့် တတိယအဖွဲ့အစည်း နှင့် စိစစ်ခွင့်ပြုသည့် အစိုးရအဖွဲ့အစည်း



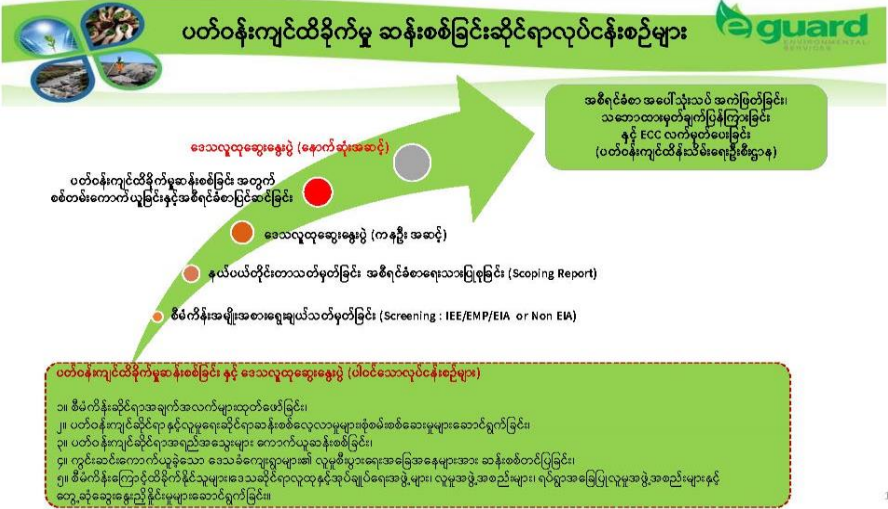
- အီးဂတ်ပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှု တတိယအဖွဲ့အစည်းသည် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ် အမှတ် (၀၀၂၈/၂၀၁၇) ရရှိထားသည့် အဖွဲ့အစည်းတစ်ခု ဖြစ်ပါသည်။
- ခြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းကို အီးဂတ်ပတ်ဝန်းကျင် ဆိုင်ရာဝန်ဆောင်မှုတတိယအဖွဲ့အစည်းမှဆောင်ရွက်ခြင်းကို ကန့်ကွက်ရန်မရှိပါကြောင်းနှင့် အတည် ပြုပါကြောင်းကိုလည်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ၂၀၂၀ ပြည့်နှစ်၊ မေလ (၁၃) ရက်နေ့ တွင် စာအမှတ် အီးအိုင်အေ - ၁/၇ (၁၀၂၈/၂၀၂၀) ဖြင့် ပြန်ကြားခဲ့ပြီးဖြစ်ပါသည်။



ဥပဒေ၊ နည်းဥပဒေဆိုင်ရာမူဘောင်နှင့် ကန့်သတ်ချက်



- ဖွဲ့စည်းပုံအခြေခံဥပဒေ (၂၀၀၈)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄)
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း (၂၀၁၅)
- အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) ထို့အပြင် စီမံကိန်းနှင့်ပတ်သက်သော ပြည်ထောင်စုအဆင့်နှင့် တိုင်းဒေသကြီးအဆင့် အခြားဥပဒေ၊ နည်းဥပဒေ နှင့် လုပ်ထုံးလုပ်နည်းများ၊ သက်ဆိုင်ရာနိုင်ငံတကာစံချိန်စံညွှန်းများ ကိုလည်း လိုက်နာဆောင်ရွက်ရပါသည်။



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ပတ်ဝန်းကျင်အရည်အသွေးများ တိုင်းတာစစ်ဆေးခြင်း

eguard ENVIRONMENTAL SERVICES

- ပတ်ဝန်းကျင်အရည်အသွေးတိုင်းတာမှုများ**
- ☑ ပတ်ဝန်းကျင် အရည်အသွေးတိုင်းတာမှုများမှာ-
 - (၁) ပိန္နဲတောင်/ဒလရှောင်ကျေးရွာ
 - (၂) ပသောင်းကျေးရွာ/ မဇောကျေးရွာ
 - (၃) တုံးဗျောကြီး/မွေ့ရှောင်ကျေးရွာ
 - (၄) ဆင်ဒင်/ပြင်ဝန်းကျေးရွာ
 - (၅) အရှေ့ဖော်တုန်းကျေးရွာ
 - ☑ တိုင်းတာဆန်းစစ်ခဲ့သော ပတ်ဝန်းကျင်အရည်အသွေးများမှာ-
 - ▶ ရေ
 - ▶ လေ
 - ▶ မြေ
 - ▶ ဆူညံသံ
 - ▶ တုန်ခါမှု
 - ☑ ရရှိလာသောရလဒ်များကို အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅)၊ တခြားသောနိုင်ငံတကာစံချိန်စံညွှန်းများ နှင့် နှိုင်းယှဉ်ဖော်ပြထားပါသည်။

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ဆူညံသံအဆင့်တိုင်းတာခြင်း
(ခြောက်သွေ့ရာသီ)



Point	Point 1		Point 2		Point 3		Point 4		Point 5	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Observed Value (dBA)	52.00	46.22	61.68	60.84	52.29	53.56	52.80	48.20	53.33	48.70
Guideline Values (dBA)	55	45	55	45	55	45	55	45	55	45

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ဆူညံသံအဆင့်တိုင်းတာခြင်း
(စိုစွတ်ရာသီ)



Point	Point 1		Point 2		Point 3		Point 4		Point 5	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Observed Value (dBA)	65.08	61.42	58.67	57.72	56.91	52.43	56.41	57.45	66.03	66.55
Guideline Values (dBA)	55	45	55	45	55	45	55	45	55	45

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တုန်ခါမှုအဆင့်တိုင်းတာခြင်း
(ခြောက်သွေ့ရာသီ)



Location	X-Lveq (dB)		Y-Lveq (dB)		Z-Lveq (dB)	
	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00
Point 1	44.78	40.56	37.47	35.73	43.71	38.21
Point 2	45.55	38.11	36.88	30.89	42.66	35.46
Point 3	40.91	36.41	33.42	28.11	38.12	33.25
Point 4	40.35	36.49	31.95	27.62	34.08	30.25
Point 5	43.05	36.04	35.29	29.35	40.77	33.23

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တုန်ခါမှုအဆင့်တိုင်းတာခြင်း
(စိုစွတ်ရာသီ)



Location	X-Lveq (dB)		Y-Lveq (dB)		Z-Lveq (dB)	
	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00	Day Time 7:00-22:00	Night Time 22:00-7:00
Point 1	41.28	37.56	33.47	30.33	40.31	35.33
Point 2	47.31	40.31	34.58	29.89	41.70	36.66
Point 3	43.98	37.40	36.73	34.10	37.83	34.93
Point 4	37.63	30.49	28.97	26.06	31.08	20.76
Point 5	39.63	37.04	30.89	28.85	36.37	35.33

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တနင်္သာရီမြစ်ရေ နမူနာကောက်ယူခဲ့သည့် နေရာများ 



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ရေနမူနာကောက်ယူခြင်း၊ ကွင်းဆင်းတိုင်းတာခြင်း 



တနင်္သာရီမြစ်ရေအရည်အသွေး ဓာတ်ခွဲခန်းရလဒ်များ (ခြောက်သွေ့ရာသီ) 

Parameters	SW 1	SW 2	SW 3	National Environmental Quality (Emission) Guidelines for General	Ambient water quality standards for the protection of aquatic life
Ammonia				10 mg/l	
Arsenic				0.1 mg/l	
Chemical Oxygen Demand (COD)				250 mg/l	
Chlorine				0.2 mg/l	
Copper				0.5 mg/l	
Cyanide				1 mg/l	
Electrical Conductivity(Onsite Results)	422 μ s/cm	313 μ s/cm	209 μ s/cm		
Dissolved Oxygen (Onsite Results)	6.61 mg/l	9.53 mg/l	11.81 mg/l		6 mg/l
pH (Onsite Results)	5.88	7.04	6.39	6-9	6.5-9
Temperature (Onsite Results)	29.57°C	29.75°C	30.09°C		
Iron				3.5 mg/l	
Lead				0.1 mg/l	
Turbidity (Onsite Results)	167 NTU	74.1 NTU	18 NTU		< 10% change
Total Dissolved Solids (Onsite Results)	258 mg/l	205 mg/l	136 mg/l		
Total Suspended Solids				50 mg/l	
Salinity (Onsite Results)	2 ppt	2 ppt	0.1 ppt		

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တနင်္သာရီမြစ်ရေအရည်အသွေး ဓာတ်ခွဲခန်းရလဒ်များ (စိုစွတ်ရာသီ) 

Parameters	SW 1	SW 2	SW 3	National Environmental Quality (Emission) Guidelines for General	Ambient water quality standards for the protection of aquatic life
Ammonia Nitrogen	Nil	Nil	Nil	10 mg/l	
Arsenic	Nil	Nil	Nil	0.1 mg/l	
Chemical Oxygen Demand (COD)	32 mg/l	32 mg/l	32 mg/l	250 mg/l	
Color	88 TCU	40 TCU	30 TCU		
Chlorine	Nil	Nil	Nil	0.2 mg/l	
Copper	Nil	Nil	Nil	0.5 mg/l	
Cyanide	Nil	Nil	Nil	1 mg/l	
Electrical Conductivity(Onsite Results)	227 μ s/cm	65 μ s/cm	58 μ s/cm		
Dissolved Oxygen (Onsite Results)	6.78 mg/l	6.44 mg/l	8.07 mg/l		6 mg/l
pH (Onsite Results)	6.54	5.86	6.38	6-9	6.5-9
Temperature (Onsite Results)	30.05 °C	30.36 °C	30.49 °C		
Iron	2.93 mg/l	0.83 mg/l	0.79 mg/l	3.5 mg/l	
Lead	Nil	Nil	Nil	0.1 mg/l	
Turbidity (Onsite Results)	14.4 NTU	48.0 NTU	35.0 NTU		< 10% change
Total Dissolved Solids (Onsite Results)	148 mg/l	42 mg/l	38 mg/l		
Total Suspended Solids	98 mg/l	45 mg/l	49 mg/l	50 mg/l	
Total Hardness	32 mg/l	20 mg/l	24 mg/l		
Salinity (Onsite Results)	0.1 ppt	0.0 ppt	0.0 ppt		

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ရေအရည်အသွေး ကွင်းဆင်းတိုင်းတာမှုရလဒ်များ (ခြောက်သွေ့ရာသီ) 

Parameters	Point 1 (Pannel Taung)	Point 2 (Pa Thaung)	Point 3 (Tone Byaw Gyi)	Point 4 (Sin Din/Pyin Won)	Point 5 (East Maw Tone)
Electrical Conductivity(Onsite Results)	510 $\mu\text{s}/\text{cm}$	412 $\mu\text{s}/\text{cm}$	109 $\mu\text{s}/\text{cm}$	215 $\mu\text{s}/\text{cm}$	218 $\mu\text{s}/\text{cm}$
Dissolved Oxygen (Onsite Results)	8.01 mg/l	6.24 mg/l	6.04 mg/l	6.85 mg/l	6.54 mg/l
pH (Onsite Results)	4.65	8.22	5.39	6.45	6.90
Temperature (Onsite Results)	26.48	26.72 °C	28.03 °C	28.01 °C	28.03 °C
Turbidity (Onsite Results)	56.5 NTU	0.0 NTU	9.0 NTU	3.0 NTU	3.8 NTU
Total Dissolved Solids (Onsite Results)	33 mg/l	268 mg/l	71 mg/l	130 mg/l	128 mg/l
Salinity (Onsite Results)	0.0 ppt	0.2 ppt	0.1 ppt	0.1 ppt	0.1 ppt

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ရေအရည်အသွေး ကွင်းဆင်းတိုင်းတာမှုရလဒ်များ (ခြောက်သွေ့ရာသီ) 

Parameters	Point 1 (Pannel Taung)	Point 2 (Ma Zaw)	Point 3 (Tone Byaw Gyi)	Point 4 (Sin Din/ Pyin Won)	Point 5 (East Maw Tone)
Electrical Conductivity(Onsite Results)	59 $\mu\text{s}/\text{cm}$	218 $\mu\text{s}/\text{cm}$	42 $\mu\text{s}/\text{cm}$	51 $\mu\text{s}/\text{cm}$	129 $\mu\text{s}/\text{cm}$
Dissolved Oxygen (Onsite Results)	5.53 mg/l	5.61 mg/l	4.47 mg/l	3.58 mg/l	3.27 mg/l
pH (Onsite Results)	5.7	5.87	5.14	4.69	5.32
Temperature (Onsite Results)	28.60 °C	29.34 °C	27.98 °C	27.94 °C	27.94 °C
Turbidity (Onsite Results)	11.1 NTU	23.8 NTU	16.6 NTU	18.5 NTU	26.2 NTU
Total Dissolved Solids (Onsite Results)	39 mg/l	1400 mg/l	27 mg/l	33 mg/l	84 mg/l
Salinity (Onsite Results)	0.0 ppt	0.1 ppt	0.0 ppt	0.0 ppt	0.1 ppt

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မြေနမူနာကောက်ယူခြင်း 



- Measured Parameters**
- ✓ Arsenic
 - ✓ Cadmium
 - ✓ Chromium
 - ✓ Lead
 - ✓ Nickel
 - ✓ pH

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မြေနမူနာကောက်ယူခြင်း 

Parameters	Symbol	Unit	Observed Values		
			Pannel Taung Village	Ma Zaw Village	Ban La Mout Village
Arsenic	As	mg/kg	2.45	21.9	9.9
Cadmium	Cd	mg/kg	ND	ND	ND
Chromium	Cr	mg/kg	10.3	15.9	11.7
Lead	Pb	mg/kg	19	10.8	16.8
Nickel	Ni	mg/kg	8.75	12.0	5.23
pH		mg/kg	6.1	5.0	5.4

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စီမံကိန်းအနီးဝန်းကျင်ရှိ ကျေးရွာများ၏ လူမှုစီးပွားအခြေအနေများအား စစ်တမ်းကောက်ယူခြင်း



လူမှုစီးပွား စစ်တမ်းကောက်ယူခဲ့သော အခြေအနေ

မြို့နယ်များ	ကျေးရွာအမည်	ကျေးရွာရှိ အိမ်ခြေများ	စစ်တမ်းကောက်ယူခဲ့သော အိမ်ခြေများ
မြိတ်	အင်္ဂမော်	၄၀၁	၆၂
	ပိန္နဲတောင်	၂၇၀	၄၂
	တောင်ရှည်	၂၈၀	၄၃
	ပသောင်း	၆၂၅	၇၂
	မစော	၈၉	၃၇
တနင်္သာရီ	တုံးပျော်ကြီး	၂၀၈	၃၀
	စင်	၁၉၅	၂၈
	ဘန်းလမွတ်	၂၁၆	၃၂
	အရှေ့မော်တုံး	၂၄၁	၃၆
စုစုပေါင်း		၂၅၂၅	၃၈၃

- ❑ ကျေးရွာများသို့ ၂၀၂၀ ခုနှစ်၊ ဇွန်လ၊ ၁၁ ရက်မှ ၁၈ ရက်နေ့ အထိ ကွင်းဆင်းကာ ကျေးရွာတာဝန်ရှိသူများ၊ ရပ်မိရပ်ဖများနှင့် တွေ့ဆုံဆွေးနွေးကာ လူမှု-စီးပွားစစ်တမ်း ကောက်ယူခဲ့ပါသည်။
- ❑ စစ်တမ်းကောက်ယူမည့်အိမ်ခြေပမာဏကိုလည်း ကျေးရွာအိမ်ခြေများပေါ်မူတည်၍ ကွဲလွဲမှုရာခိုင်နှုန်း (၅%) ဖြင့်တွက်ချက်ပြီး ကောက်ယူခဲ့ပါသည်။
- ❑ ထို့အပြင် Covid 19 ရောဂါပြန့်ပွားစဉ်ကာလတွင် Social-distancing စည်းမျဉ်းစည်းကမ်းများနှင့် ကိုက်ညီစေရန် အီးဂတ်မှတာဝန်ရှိသူအနည်းငယ်ခန့်နှင့် ဒေသခံ ကျောင်းသူကျောင်းသားများဖြင့် လူမှုစစ်တမ်း ကောက်ယူခဲ့ပါသည်။

လူမှုစီးပွား စစ်တမ်းကောက်ယူခဲ့သော အခြေအနေ

- ❑ အဆိုပါကောက်ယူဆွေးနွေးမှုများအပြင် ၂၀၂၀ ခုနှစ်၊ ဇွန်လ ၁၇ ရက်နေ့ တွင် မြိတ်မြို့ပေါ်ရှိ စန္ဒဝတီကျေးရွာအုပ်စု၊ ကလောင်ကျေးရွာအုပ်စု၊ နှင့် မြိတ်တောင်ကျေးရွာအုပ်စုများသို့ ကွင်းဆင်းကာ ကျေးရွာအုပ်စုတာဝန်ရှိသူများ၊ ရပ်မိရပ်ဖများနှင့် တွေ့ဆုံဆွေးနွေးကာ လူမှု-စီးပွားရေး အခြေအနေများနှင့် စီမံကိန်းအပေါ် ဒေသခံများ၏ ကနဦး သဘောထားမှတ်ချက်များကို ဆွေးနွေးခဲ့ပါသည်။
- ❑ ထို့အပြင် မြိတ်ခရိုင်၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ ပြည်သူ့ကျန်းမာရေးဦးစီးဌာန၊ သစ်တောဦးစီးဌာန၊ စိုက်ပျိုးရေးဌာနများနှင့် မြိတ်အခြေစိုက် နိုင်ငံတကာ အစိုးရမဟုတ်သော အဖွဲ့အစည်း (FFI) စသည်တို့မှ တာဝန်ရှိသူများနှင့်လည်း တွေ့ဆုံဆွေးနွေးမှုများ ပြုလုပ်ခဲ့ပါသည်။

သက်ဆိုင်ရာကျေးရွာအုပ်ချုပ်ရေးမှူးများနှင့် တိုင်ပင်ဆွေးနွေးခြင်း



လူမှုစီးပွား စစ်တမ်းကောက်ယူမှု မှတ်တမ်းဓာတ်ပုံများ 



လူမှုစီးပွား စစ်တမ်းကောက်ယူမှု ရလဒ်များ 

- ✦ ဖြေဆိုသူအများစုမှာအမျိုးသမီးများပြီး အမျိုးသမီးဦးစီးသော အိမ်ထောင်စုအနည်းငယ်ခန့်ရှိသည်။
- ✦ အိမ်ထောင်ဦးစီးအများစုမှာ မူလတန်းနှင့် အလယ်တန်းပညာ ပြီးမြောက်ကြသည်။
- ✦ ဗမာလူမျိုးများအများဆုံးနေထိုင်ကြပြီး ကရင်လူမျိုးများလည်းအနည်းငယ်နေထိုင်ကြသည်။
- ✦ ဗုဒ္ဓဘာသာဝင်အများစုဖြစ်ပြီး အစ္စလာမ်ဘာသာဝင်များ၊ ဟိန္ဒူဘာသာဝင်နှင့် ခရစ်ယာန်ဘာသာဝင်များလဲနိတင်းနေထိုင်ကြသည်။

လူမှုစီးပွား စစ်တမ်းကောက်ယူမှု ရလဒ်များ 

- ✦ အဓိကစီးပွားရေးလုပ်ငန်းမှာ လယ်ယာစိုက်ပျိုးရေး နှင့် ဥယျာဉ်ခြံစိုက်ပျိုးရေးဖြစ်ပြီး ကိုယ်ပိုင်စီးပွားရေးလုပ်ငန်းကိုလည်း လုပ်ကိုင်ကြသည်။
- ✦ အိမ်ထောင်စုများ၏ဝင်ငွေအားဖြင့် တလလျှင် ၃၀၀,၀၀၀ မှ ၅၀၀,၀၀၀ ကြားရှိပြီး အသုံးစရိတ်မှာ တလလျှင် ၃၀၀,၀၀၀ အောက်ရှိသည်။
- ✦ စိုက်ပျိုးရေးအတွက်မိုးရေကို စုဆောင်းပြီးအဓိကအသုံးပြုကြပြီး မွေးမြူရေးအတွက် ရွာရှိအများပိုင်ရေတွင်းများကိုအသုံးပြုကြသည်။
- ✦ အိမ်ထောင်စုများ၏နေစဉ်ရေအသုံးပြုမှုမှာ ဂါလန် (၁၀၀) ခန့်ရှိပြီး အိမ်အနီးအနားရှိရေတွင်းများမှ ခပ်ယူအသုံးပြုကြသည်။
- ✦ လမ်းပန်းဆက်သွယ်ရေးမှာကားလမ်းကို အဓိကအသုံးပြုကြပြီး အချို့ကျေးရွာတွင်လှေဆိပ်ငယ်များလည်းရှိကြသည်။

လူမှုစီးပွား စစ်တမ်းကောက်ယူမှု ရလဒ်များ 

- ✦ အများစုသော စစ်တမ်းဖြေဆိုသူဒေသခံများသည် အဆိုပြုစီမံကိန်းအပေါ် ကောင်းမွန်စွာ လက်ခံကြုံဆိုကြသည့် အပြင် အမြန်ဆုံး အကောင်အထည်ဖော်စေလိုပါသည်။
- ✦ ဒေသခံများအနေဖြင့် ရေကောင်းရေသန့်ကို သင့်လျော်သော ဈေးနှုန်းဖြင့် လုံလုံလောက်လောက် အသုံးပြုချင်ကြပါသည်။
- ✦ ဒေသခံများအနေဖြင့် သိလိုသော အချက်များကိုလည်း မေးမြန်းခဲ့ကြပြီး အဆိုပါအချက်များကို စစ်တမ်းကောက်ယူသော အဖွဲ့မှ သေချာစွာ မှတ်တမ်းတင်ပြုစုပြီး စီမံကိန်းအဆိုပြုသူများထံ တင်ပြကာ ညှိနှိုင်း ဆောင်ရွက်ခြင်းများ ပြုလုပ်ခဲ့ပါသည်။
- ✦ ယေဘုယျမေးခွန်းအချို့မှာ စီမံကိန်းပြီးစီးမည့်အချိန်၊ ရေဈေးနှုန်း၊ မြေနေရာအသုံးပြုမှု၊ ဒေသလူမှုစီးပွားအခွင့်အလမ်း၊ စိုက်ပျိုးရေး ပိုက်လိုင်းကြောင်းဖြတ်သန်းရာ ကျေးရွာများ ရေရရှိနိုင်မှု အခြေအနေ၊ သဘာဝပတ်ဝန်းကျင်နှင့် တနင်္သာရီမြစ်အပေါ် ထိခိုက်မှု ရှိမရှိ အခြေအနေများ စသည်တို့ ဖြစ်ပါသည်။



အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးပွဲများ



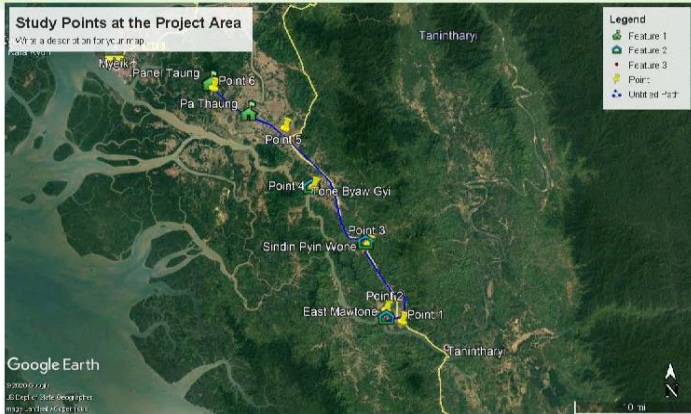
- နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း လုပ်ငန်းစဉ်အတွက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးပွဲကို ၂၀၂၀ ခုနှစ်၊ ဖေဖော်ဝါရီလ ၇ ရက်နေ့တွင် ဖြတ်မြို့၊ ပုလဲရတနာခန်းမတွင် ကျင်းပခဲ့ပါသည်။
- အဆိုပါဆွေးနွေးပွဲသို့ ဌာနဆိုင်ရာတာဝန်ရှိသူများ၊ ကုမ္ပဏီအဖွဲ့အစည်းများ၊ ဒေသခံ ပြည်သူများ၊ သတင်းမီဒီယာများနှင့် စိတ်ပါဝင်စားသူ ၄၀၀ ခန့် တက်ရောက်ဆွေးနွေးခဲ့ပါသည်။
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်အတွက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးပွဲများကို ဖြတ်မြို့နှင့် တနင်္သာရီမြို့နယ်များတွင် ကျင်းပပြုလုပ်ရန် လျာထားသော်လည်း လက်ရှိအချိန်တွင် ကမ္ဘာ့ကပ်ရောဂါ COVID 19 ကူးစက်ပြန့်ပွားနေမှုအခြေအနေများအပေါ် မူတည်ကာ ဖြတ်မြို့တွင်သာ စုစည်းကျင်းပရခြင်းဖြစ်ပါသည်။



ဝေမျိုးစုံမျိုးကွဲဆိုင်ရာလေ့လာဆန်းစစ်ခြင်း



ဝေမျိုးစုံမျိုးကွဲများအား လေ့လာခဲ့သောနေရာများ



ဝေမျိုးစုံမျိုးကွဲများအားလေ့လာကောက်ယူခြင်း





**စီမံကိန်းအနီးဝန်းကျင်ဒေသ၏
ဖီဝမျိုးစုံမျိုးကွဲများအားလေ့လာခြင်း**



- ☑ ဖီဝမျိုးစုံမျိုးကွဲများ စစ်တမ်းကောက်ယူမှုကို ၂၀၂၀ ဇွန်လ ၁၅ ရက်မှ ၂၀ ရက်နေ့အထိ ကွင်းဆင်းလေ့လာခဲ့သည်။
- ☑ မြိတ်မြို့ ရေပေးဝေရေးစီမံကိန်း၏ လျာထားတည်နေရာအနီးဝန်းကျင်နှင့် ပိုက်လိုင်းတလျှောက်တွင် စစ်တမ်းကောက်ယူခဲ့သည်။
- ☑ စစ်တမ်းကောက်ယူမှုတွင် တွေ့ရှိခဲ့ရသော အပင်နှင့်သတ္တဝါတို့၏ ဖီဝမျိုးစုံမျိုးကွဲများကိုစာရင်းကောက်ယူခဲ့သည်။
- ☑ အပင်မျိုးစိတ်ပေါင်း (၅၀) နှင့် သတ္တဝါမျိုးစိတ်ပေါင်း (၄၂) မျိုး တို့ကို မှတ်တမ်းတင်ကောက်ယူရရှိခဲ့သည်။
- ☑ ကောက်ယူရရှိထားသော မျိုးစိတ်များကို International Union for Conservation of Nature (IUCN) Red List နှင့် နှိုင်းယှဉ်ဖော်ပြထားပါသည်။



ကောက်ယူခဲ့သော အပင်နှင့်အကောင်မျိုးစိတ်အချို့



**ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ
(စီမံကိန်းတည်ဆောက်ဆဲကာလ)**



စဉ်	သက်ရောက်မှု၊ အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁။	<ul style="list-style-type: none"> မြေအသုံးချမှု စီမံကိန်းတည်နေရာရွေးချယ်ခြင်း ယာယီအဆောက်အအုံတည်ဆောက်ခြင်း မြေအောက်ပိုက်လိုင်းများတူးဖော်ခြင်း 	အနည်းငယ်/ အသင့်အတင့်	<ul style="list-style-type: none"> ဒေသတွင်းတာဝန်ရှိသူများ၊ ဒေသခံပြည်သူများ၊ သက်ဆိုင်ရာမြေပိုင်ရှင်များနှင့် ဆွေးနွေးညှိနှိုင်းခြင်း သီးပင်စားပင်များ အပါအဝင် လိုအပ်သော မြေနေရာအချို့အား ဥပဒေနှင့်အညီ သင့်လျော်သော လျော်ကြေးပမာဏဖြင့် လွှဲပြောင်းအသုံးပြုခြင်း စီမံကိန်းတည်နေရာအား လူနေအိမ်ခြေများ၊ စီးပွားရေးနေရာများမှထောင့်တွင် ဦးစားပေးရွေးချယ်ခြင်း ဒေသခံပြည်သူများ၏ ပိုင်ဆိုင်မှုများအား ထိခိုက်စေခြင်းမှ ရှောင်ကြဉ်ခြင်း တာဝန်ယူမှု၊ တာဝန်ခံမှုရှိရှိ ဆောင်ရွက်ခြင်း



**ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ
(စီမံကိန်းတည်ဆောက်ဆဲကာလ)**



စဉ်	သက်ရောက်မှု၊ အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၂။	<ul style="list-style-type: none"> လေအရည်အသွေး အမှန်အမှားထွက်ရှိခြင်း မီးစက်မှုထွက်ရှိခြင်း စားဖိုဆောင်မှု ထွက်ရှိခြင်း 	အနည်းငယ်	<ul style="list-style-type: none"> တည်ဆောက်ရေး လုပ်ငန်းများနှင့် မော်တော်ယာဉ်များ သယ်ယူပို့ဆောင်ခြင်းမှ အမှန်အမှားထွက်ရှိခြင်းအား လျော့ချရန် ရေဖြန်းခြင်း၊ လုပ်ဆောင်စေခြင်း။ လုပ်ငန်းစဉ်အတွင်း လုပ်သားများအား PPE များ ဝတ်ဆင်စေခြင်း။ မော်တော်ယာဉ်များနှင့် စက်ယန္တရားများအား ပုံမှန်ထိန်းသိမ်းစစ်ဆေးခြင်း
၃။	<ul style="list-style-type: none"> ဆူညံသံနှင့်တူနိမ့်မှု မော်တော်ယာဉ်များ တည်ဆောက်ရေးစက်ယန္တရားများ ကူနိုတင်/ ကုန်ချပြုလုပ်ခြင်း စက်ယန္တရားများ 	အနည်းငယ်	<ul style="list-style-type: none"> လုပ်ငန်းများအား နေ့အချိန်တွင်သာ ဦးစားပေးဆောင်ရွက်ခြင်း စက်ယန္တရားများ အသံထွက်ရှိခြင်းအား လျော့ချခြင်း လုပ်သားများအား အသံကာကွယ်ယာများ ဝတ်ဆင်စေခြင်း မော်တော်ယာဉ်များနှင့် စက်ယန္တရားများအား ပုံမှန်စစ်ဆေးခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းတည်ဆောက်ဆဲကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၄။	ရေအရည်အသွေး • လောင်စာဆီယိုမိတ်ကျခြင်း • အမှိုက်များစွန့်ပစ်ခြင်း	အသင့်အတင့်	<ul style="list-style-type: none"> သင့်လျော်သော မိလ္လာစနစ်များ တည်ဆောက်ပေးခြင်း မြစ်၊ ချောင်း၊ အင်းအိုင်များအတွင်း တည်ဆောက်ရေးလုပ်ငန်းများ လောင်စာများနှင့် မိလ္လာစနစ်များ ယိုမိတ်မကျစေရန် ကြိုတင်ဆောင်ရွက်ခြင်း ပညာပေးခြင်း
၅။	မြေအရည်အသွေး • လောင်စာဆီယိုမိတ်ကျခြင်း • သီးပင်စားပင်များရှင်းလင်းခြင်း • အပေါ်ယံမြေဆီလွှာပယ်ရှားခြင်း	အသင့်အတင့်	<ul style="list-style-type: none"> လောင်စာဆီနှင့် မိလ္လာစနစ်များ မြေပြင်ပေါ်ယိုမိတ်ကျခြင်းမရှိစေရန် တာဝန်ရှိသူများမှ စောင့်ကြပ်စေခြင်း မြေတွာဆစ်ခြင်းဆောင်ရွက်လျှင် သီးပင်စားပင်များနှင့် အပေါ်ယံမြေဆီလွှာအား ပြန်လည်ဖုံးအုပ်စေခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းတည်ဆောက်ဆဲကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၆။	ကာကွယ်တောများ • စီမံကိန်းစရိတ်ယူဆွေးနွေးခြင်း	အနည်းငယ်	• စီမံကိန်းတည်ဆောက်ရေးအား ကာကွယ်တောများနှင့်အညီအောင်မြင်စွာ ရွေးချယ်ခြင်း
၇။	စီမံကိန်းစရိတ်ကျင့်မှုများ • မြေအသွေးချွေးပြောင်းလဲခြင်း • ယာယီအဆောက်အအုံများတည်ဆောက်ခြင်း	အသင့်အတင့်	<ul style="list-style-type: none"> လက်ရှိစီမံကိန်းစရိတ်ကျင့်မှုများအား အသေးစိတ်မှတ်တမ်းများ ထားရှိစေခြင်း ဖြစ်နိုင်ခြေရှိသော လျော့ချရေးနည်းလမ်းများအား ထည့်သွင်းဆောင်ရွက်စေခြင်း
၈။	လူနေမှုအခြေအနေနှင့် အသက်မွေးဝမ်းကြောင်း • ယာယီအလုပ်အကိုင်အခွင့်အလမ်းများရရှိခြင်း • တည်ဆောက်ရေးလုပ်ငန်းများ အလုပ်အကိုင်ရရှိခြင်း	ကောင်းကျိုး	<ul style="list-style-type: none"> အလုပ်အကိုင်အခွင့်အလမ်းများရရှိခြင်း တည်ဆောက်ရေးလုပ်ငန်းများကြောင့် အပိုင်ဝင်ငွေရရှိခြင်း
၉။	ယဉ်ကျေးမှုအမွေအနှစ်များ • စီမံကိန်းတည်ဆောက်ရေးချွေးနွေးခြင်း	အနည်းငယ်	• စီမံကိန်းတည်ဆောက်ရေးအား ယဉ်ကျေးမှုအမွေအနှစ်များနှင့်အညီအောင်မြင်စွာ ရွေးချယ်ခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းတည်ဆောက်ဆဲကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁၀။	မြေယာရှင်း • ယာယီအဆောက်အအုံတည်ဆောက်ခြင်း • တည်ဆောက်ရေးလုပ်ငန်းများ၏ ယာယီတံများ	အနည်းငယ်	<ul style="list-style-type: none"> ဆောက်လုပ်ရေး လုပ်ငန်းခွင်များအား ကာကွယ်ခြင်း လိုအပ်ပါက ဥယျာဉ်ငယ်များနှင့် အပင်များ စိုက်ပျိုးပေးခြင်း
၁၁။	လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး • မတော်တဆထိခိုက်မှုဖြစ်ပွားခြင်း • ယာယီအသွေးအလှူကြောင့် မတော်တဆထိခိုက်မှုဖြစ်ပွားခြင်း • တစ်ကိုယ်ရည်သန့်ရှင်းရေးနှင့် အသိပညာပေးခြင်း • ကူးစက်ရောဂါပျံ့နှံ့ခြင်း • အတင်းအကျပ် ခိုင်းစေခြင်းနှင့် ကလေးလုပ်သားများ ခိုင်းစေခြင်း	အသင့်အတင့်	<ul style="list-style-type: none"> ပညာပေးခြင်း၊ လေ့ကျင့်ပေးခြင်း၊ စောင့်ကြပ်ကြည့်ရှုပေးခြင်း တစ်ကိုယ်ရည်သန့်ရှင်းရေးပစ္စည်းများ ထောက်ပံ့ခြင်း ယာယီအိမ်သာများ လုံလောက်စွာ ထားရှိပေးခြင်း သတိပေးဆိုင်းဘုတ်များ ထားရှိခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းတည်ဆောက်ဆဲကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁၂။	ဒေသတွင်းကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး • လမ်းခရီးမတော်တဆဖြစ်ပွားနိုင်ခြင်း • ကူးစက်ရောဂါပျံ့နှံ့ခြင်း • ပြောင်းရွှေ့လုပ်သားများနှင့် အငြင်းပွားမှုများ ဖြစ်ပွားနိုင်ခြင်း	အသင့်အတင့်	<ul style="list-style-type: none"> လိုအပ်သော ဆေးကုသမှုများ ဆောင်ရွက်ခြင်း သတိပေးဆိုင်းဘုတ်များ ထားရှိခြင်း ထုတ်ပြန်ချက်များ ဆောင်ရွက်ခြင်း
၁၃။	စွန့်ပစ်အစိုင်အခဲများ • တည်ဆောက်ရေးမှ ထွက်ရှိသည့် စွန့်ပစ်အစိုင်အခဲများ • လုပ်သားတန်းလျားများမှ ထွက်ရှိသည့် စွန့်ပစ်အစိုင်အခဲများ	အသင့်အတင့်	<ul style="list-style-type: none"> စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှုစနစ် အကောင်အထည်ဖော်ခြင်း ဒေသတွင်း စည်ပင်သာယာရေးအဖွဲ့များနှင့် ပူးပေါင်းဆောင်ရွက်ခြင်း အမှိုက်ပုံးများ ထားရှိပေးခြင်း အသိပညာပေးခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းတည်ဆောက်ဆဲကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁၄။	<ul style="list-style-type: none"> စွန့်ပစ်အရည် တည်ဆောက်ရေးလုပ်ငန်းများ၌ ရေအသုံးပြုမှုများ စနစ်တကျတည်ဆောက်ထားခြင်းမရှိသော အိမ်သားများ 	အသင့်အတင့်	<ul style="list-style-type: none"> စွန့်ပစ်အရည် စီမံခန့်ခွဲမှုစနစ် အကောင်အထည်ဖော်ခြင်း ရေမြှုပ်နှံမှုလျော့ချခြင်း လိုအပ်ပါက ရေသန့်စင်မှုစနစ် တပ်ဆင်ခြင်း
၁၅။	<ul style="list-style-type: none"> အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများ တည်ဆောက်ရေးသုံး ဓါတုပစ္စည်းများ အိမ်သတ်ဆေးများ 	အသင့်အတင့်	<ul style="list-style-type: none"> အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှုစနစ် အကောင်အထည်ဖော်ခြင်း စီမံခန့်ခွဲမှု သတ်မှတ်ချက်များနှင့်အညီ ကိုင်တွယ်အသုံးပြုခြင်း
၁၆။	<ul style="list-style-type: none"> အရင်းအမြစ်များ ရေအရင်းအမြစ် လျှပ်စစ် လုပ်သား 	အသင့်အတင့်	<ul style="list-style-type: none"> ရေနှင့်လျှပ်စစ်စီးကို စနစ်တကျသုံးစွဲခြင်း စွမ်းအင်စွေတာသော စက်ပစ္စည်းနှင့် ကိရိယာများကို ဦးစားပေးအသုံးပြုခြင်း အသိပညာပေးခြင်း စောင့်ကြပ်ကြည့်ရှုခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းလည်ပတ်သည့်ကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁။	<ul style="list-style-type: none"> မြေပြိုခြင်း မြစ်ရေအေးအလွန်အကျွံသုံးစွဲခြင်း 	အသင့်အတင့်	<ul style="list-style-type: none"> စနစ်တကျနှင့် အတိအကျတွက်ချက်ခြင်း ကျွမ်းကျင်ပညာရှင်များဖြင့် အဆက်မပြတ် စောင့်ကြပ်ကြည့်ရှုခြင်း ခိုင်လုံသော အချက်အလက်များ ကောက်ယူခြင်း
၂။	<ul style="list-style-type: none"> လေအရည်အသွေး ရေတင်ခြင်း မီးစက်အသုံးပြုခြင်း ရေသန့်စင်စက် 	အသင့်အတင့်	<ul style="list-style-type: none"> စက်ယန္တရားများနှင့် ဖော်တော်ယာဉ်များအား စနစ်တကျ ထိန်းသိမ်းခြင်း အငွေ့လျှော့ချခြင်း ပတ်ဝန်းကျင်နှင့် ကိုက်ညီသော စက်ယန္တရားများအား အတက်နိုင်ဆုံး ရွေးချယ်အသုံးပြုခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းလည်ပတ်သည့်ကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၃။	<ul style="list-style-type: none"> ဆည်သုံးစွဲ တွန့်ခဲမှု စက်ယန္တရားများနှင့် မီးစက်များ လုပ်ငန်းသုံးဖော်တော်ယာဉ်များ 	အသင့်အတင့်	<ul style="list-style-type: none"> သင့်တော်သော အပုံးအကာများ တပ်ဆင်ခြင်း ဆည်သံလျော့နည်းသော ခေတ်မှီစက် ကိရိယာများ အသုံးပြုခြင်း
၄။	<ul style="list-style-type: none"> ရေအရည်အသွေး ဆီယိုမိတ်ခြင်း နှိပ်မှုစွန့်ပစ်ခြင်း အိမ်တွင်းရေအသုံးချခြင်း 	အသင့်အတင့်	<ul style="list-style-type: none"> သင့်တော်သော ရေသုံးစွဲခြင်းနှင့် စွန့်ပစ်ခြင်းဆိုင်ရာစနစ်များ အကောင်အထည်ဖော်ခြင်း ရေအရင်းအမြစ်များအတွင်းသို့ အမှိုက်စွန့်ပစ်မှုအား တင်းကြပ်စွာတားမြစ်ခြင်း စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ပညာပေးခြင်း ဖြန့်ဝေပေးမည့် ရေအရည်အသွေးအား စဉ်ဆက်မပြတ် စောင့်ကြပ်ကြည့်ရှု ထိန်းသိမ်းခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ (စီမံကိန်းလည်ပတ်သည့်ကာလ)

စဉ်	သက်ရောက်မှု အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၅။	<ul style="list-style-type: none"> မြေဆီလွှာအရည်အသွေး ဆီနှင့် ဓာတုပစ္စည်းအသုံးပြုခြင်းများ အနည်အနှစ်များစွန့်ပစ်ခြင်း သဘာဝပေါက်ပင်ရှိသော မြေဆီလွှာထုတ်ယူခြင်း 	အသင့်အတင့်	<ul style="list-style-type: none"> မြေအရည်အသွေးအား သက်ရောက်နိုင်သော ဆောင်ရွက်မှုများဖြင့်လျှော့ခြင်း ရေသန့်စင်စက်ရုံအမှိုက်ရှိ မြေအရည်အသွေးအား ပုံမှန်စောင့်ကြပ်ကြည့်ရှုခြင်း
၆။	<ul style="list-style-type: none"> စီမံကိန်းရုံးများ စီမံကိန်းရှိ အခြေခံအဆောက်အအုံများ လူများမှ ဆောင်ရွက်မှုများ 	အသင့်အတင့်	<ul style="list-style-type: none"> စီမံကိန်းစရိတ်အတွင်းရှိ ဂေဟစနစ်အား စောင့်ကြပ်ကြည့်ရှုခြင်း
၇။	<ul style="list-style-type: none"> ဇလပေး မြစ်ရေတင်ခြင်း 	အသင့်အတင့်	<ul style="list-style-type: none"> တနင်္သာရီမြစ်ဇလပေးအား စနစ်တကျ ဆန်းစစ်စောင့်ကြပ်ကြည့်ရှုခြင်း ပညာရှင်များနှင့် စက်ကိရိယာများအသုံးပြုခြင်း မြစ်အခြေအနေအား တစ်နှစ်ပတ်လုံး ဆန်းစစ်သုံးသပ်ခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ
(စီမံကိန်းလည်ပတ်သည့်ကာလ)

စဉ်	သက်ရောက်မှု၊ အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၈။	လူနေမှုအခြေအနေနှင့် အသက်မွေးဝမ်းကျောင်း • မြေအသုံးချမှု ပြောင်းလဲသွားခြင်း • အလုပ်အကိုင်အခွင့်အလမ်းများ • ရေအရည်အသွေးကောင်းရရှိခြင်း	ကောင်းကျိုး	• အမြဲတမ်းအလုပ်အကိုင်နှင့် စီးပွားရေး အခွင့်အလမ်းများရရှိခြင်း • သန့်ရှင်းသောရေအား သက်သာသော ဈေးနှုန်းဖြင့်လိုလောက်စွာ ရရှိခြင်း • နံ့မြီးရေအကူအညီများရရှိခြင်း
၉။	လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး • လုပ်ငန်းခွင်မတော်တဆမှုများ • ကူးစက်ရောဂါများ • အတင်းအကြပ်ပိုင်းစေခြင်းနှင့် ကလေး လုပ်သားပြဿနာများ	အသင့်အတင့်	• လိုအပ်သော သင်တန်းနှင့် ပစ္စည်းများ ထောက်ပံ့ခြင်း • အန္တရာယ်ရှိသောနေရာများတွင် ကွမ်းကျင် လုပ်သားများကိုသာ ခန့်အပ်ခြင်း • တစ်ကိုယ်ရေသုံး ကာကွယ်ရေးပစ္စည်းများ ထောက်ပံ့ခြင်း • သတိပေးဆိုင်ဘုတ်များ ထားရှိခြင်း • အရေးပေါ်တုံ့ပြန်ရေးအစီအစဉ်များ ရေးဆွဲ ပြင်ဆင်ထားခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ
(စီမံကိန်းလည်ပတ်သည့်ကာလ)

စဉ်	သက်ရောက်မှု၊ အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁၀။	ဒေသတွင်း ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး • ရေအရည်အသွေး • လုံခြုံရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး • ရွှေ့ပြောင်းလုပ်သားများနှင့် အခြင်းပေးမှုများ ပြစ်ပွားခြင်း	အသင့်အတင့်	• ပြန်စေပေးမည့် ရေအရည်အသွေးအား စဉ်ဆက်မပြတ် စောင့်ကြည့်ကြည့်ရှု ထိန်းသိမ်းခြင်း • ရေသန့်စင်စက်ရုံနှင့် ရေသိုလှောင်ကန်များ အား လုံခြုံရေးတင်ကြပ်စွာထားခြင်း
၁၁။	အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများ • အနည်အနှစ်များ • အိမ်တွင်းစွန့်ပစ်အမှိုက်များ	အသင့်အတင့်	• စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှုစနစ် အကောင်အထည်ဖော်ခြင်း • ဒေသတွင်း စည်ပင်သာယာရေးအဖွဲ့များ နှင့် ပူးပေါင်းဆောင်ရွက်ခြင်း • အမှိုက်ပုံးများ ထားရှိခြင်း • ပညာပေးခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ
(စီမံကိန်းလည်ပတ်သည့်ကာလ)

စဉ်	သက်ရောက်မှု၊ အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁၂။	စွန့်ပစ်အရည် • ရေသန့်စင်ခြင်းလုပ်ငန်းများ • အိမ်တွင်းစွန့်ပစ်ရေများ	အသင့်အတင့်	• စွန့်ပစ်အရည် စီမံခန့်ခွဲမှုစနစ် အကောင်အထည်ဖော်ခြင်း • ရေပြုန်းတီးမှုလျော့ချခြင်း • ကောင်းမွန်သော ရေနုတ်ပြောင်းစနစ် ထားရှိခြင်း • ရေအရင်းအမြစ်များအတွင်းသို့ အမှိုက် စွန့်ပစ်မှုအား တင်းကြပ်စွာ တားမြစ်ခြင်း
၁၃။	အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများ • ဓာတုပစ္စည်းများသုံးစွဲခြင်း • အနည်အနှစ်များစွန့်ပစ်ခြင်း • ဆီယိုမီတီခြင်းများ	အသင့်အတင့်	• အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းများ စီမံ ခန့်ခွဲမှုစနစ် အကောင်အထည်ဖော်ခြင်း • အနည်အနှစ်များအား အုတ်ထုတ်လုပ်ငန်း တွင် ပြန်လည်အသုံးပြုခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာဆန်းစစ်မှုများ
(စီမံကိန်းလည်ပတ်သည့်ကာလ)

စဉ်	သက်ရောက်မှု၊ အရင်းအမြစ်နှင့် ဆောင်ရွက်မှုများ	သက်ရောက်မှု အဆင့်	ထိခိုက်မှုလျော့ချရေးနည်းလမ်းများ
၁၄။	အရင်းအမြစ် သုံးစွဲခြင်း • မြစ်ရေအသုံးပြုခြင်းနှင့် လျှပ်စစ်ဓာတ်သုံးစွဲခြင်း	အသင့်အတင့်	• ရေနှင့်လျှပ်စစ်ဓာတ် စနစ်တကျ သုံးစွဲခြင်း • စွမ်းအင်ချွေတာသော စက်ပစ္စည်းနှင့် ကိရိယာများကို ဦးစားပေးအသုံးပြုခြင်း • ပညာပေးခြင်း • စောင့်ကြည့်ကြည့်ရှုခြင်း



EIA တွင်လေ့လာသည့်အကြောင်းအရာများ



အမျိုးအစား	လေ့လာသည့်ကိစ္စရပ်များ	လေ့လာဆန်းစစ်သည့်နည်းလမ်းများ
ပတ်ဝန်းကျင် အရည်အသွေးညစ်ညမ်းမှု ထိန်းချုပ်ခြင်း	<ul style="list-style-type: none"> လေအရည်အသွေး။ ရေအရည်အသွေး။ စွန့်ပစ်ပစ္စည်း။ မြေထုညစ်ညမ်းမှု။ ဆည်သံ နှင့် တုန်ခါမှု။ ဆိုးရွားသောအနံ့အသက်များ ထွက်ရှိမှု။ ဓါတုပစ္စည်း စီမံခန့်ခွဲမှု။ 	<ul style="list-style-type: none"> လေထုအရည်အသွေးကိုင်းတာမှုများ (ဖုန်ပါဝင်မှု၊ ဓာတ်ငွေ့ပါဝင်မှု)။ မြစ်ရေ၊ မြေပေါ်ရေ၊ မြေအောက်ရေနမူနာကောက်ယူခြင်းနှင့်စစ်ဆေးခြင်း။ စီမံကိန်း၏အမှိုက်စွန့်ပစ်မှုစနစ်အားလေ့လာသုံးသပ်ခြင်း။ မြေနမူနာကောက်ယူခြင်းနှင့်စစ်ဆေးခြင်း။ သက်ဆိုင်ရာတာဝန်ရှိသူများနှင့် မေးမြန်းဆွေးနွေးခြင်း။ သက်ဆိုင်သူများနှင့် တွေ့ဆုံပွဲများပြုလုပ်ခြင်း။ ယာဉ်သွားလာမှုများ နှင့်ဆည်သံများအားလေ့လာဆန်းစစ်ခြင်း။ ပြဋ္ဌာန်းထားသောပစ္စည်း၊ နည်းပညာပစ္စည်းများနှင့် ညီညွတ်ခြင်း ရှိ/မရှိ ပြန်လည် သုံးသပ်ခြင်း။

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EIA တွင်လေ့လာသည့်အကြောင်းအရာများ



အမျိုးအစား	လေ့လာသည့် ကိစ္စရပ်များ	လေ့လာဆန်းစစ်သည့်နည်းလမ်းများ
လူမှုပတ်ဝန်းကျင်	<ul style="list-style-type: none"> ဒေသခံများ၏ဘဝအခြေအနေအထားနှင့် ပတ်သက်သည့် ကိစ္စရပ်များ။ လူမှုပတ်ဝန်းကျင်နှင့်အသက်မွေးဝမ်းကျောင်း ကိစ္စရပ်များ။ မြေအသုံးချမှုနှင့် ဒေသတွင်းအရင်းအမြစ်များသုံးစွဲမှု။ ရေရရှိနိုင်မှုနှင့်သုံးစွဲမှု။ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေးဆိုင်ရာ ကိစ္စရပ်များ။ လူထုကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေးဆိုင်ရာ ကိစ္စရပ်များ။ ယဉ်ကျေးမှုအမွေအနှစ်များ အမြင်အာရုံပညာ ကျန်းမာရေးဆိုင်ရာအခြေခံအချက်အလက် 	<ul style="list-style-type: none"> ဒေသဆိုင်ရာအချက်အလက်များအားကိုးကားသုံးသပ်ခြင်း။ လူမှုစစ်တမ်းများနှင့် လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များအား ပြန်လည်သုံးသပ်ခြင်း။ အလုပ်သမားဥပဒေများအား ပြန်လည်သုံးသပ်ခြင်းနှင့် လက်ရှိကျင့်သုံး လျက်ရှိသော အလုပ်အကိုင်ခန့်ထားမှုနည်းလမ်းများ။ ဒေသခံပြည်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း။ သဘာဝအရင်းအမြစ်အသုံးချမှု အခြေအနေအထားကိုကွင်းဆင်းလေ့လာသုံးသပ်ခြင်း။ ကျွမ်းကျင်ပညာရှင်များနှင့် တွေ့ဆုံမေးမြန်းခြင်း။ သက်ဆိုင်ရာအဖွဲ့အစည်းများအချက်အလက်အကူအညီရယူခြင်း နမူနာကောက်ယူလေ့လာခြင်း

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EIA တွင်လေ့လာသည့်အကြောင်းအရာများ



အမျိုးအစား	လေ့လာသည့် ကိစ္စရပ်များ	လေ့လာဆန်းစစ်သည့်နည်းလမ်းများ
အပင်နှင့် စီမံချိန်းမျိုးကွဲများ	<ul style="list-style-type: none"> အပင်မျိုးစုံမျိုးကွဲများလေ့လာခြင်း။ တိရစ္ဆာန် မျိုးကွဲများလေ့လာခြင်း။ 	<ul style="list-style-type: none"> (IUCN Red List Categories) ကမ္ဘာလုံးဆိုင်ရာ မျိုးစေ့စုံစနစ် အန္တရာယ်ရှိသော မျိုးစေ့စုံစနစ်များ အဆင့်သတ်မှတ်ခြင်း။ ပြဋ္ဌာန်းထားသောပစ္စည်း နည်းပညာပစ္စည်းများနှင့် ညီညွတ်ခြင်း ရှိ/မရှိ ပြန်လည် သုံးသပ်ခြင်း။
အခြားကဏ္ဍများ	<ul style="list-style-type: none"> မြေမျက်နှာသွင်ပြင် နှင့် တူမိဗေဒ။ မိုးလေဝသနှင့်ဓာတ်ဆေးဓာတ်။ သဘာဝဘေးအန္တရာယ်ကျရောက်နိုင်မှု အခြေအထုတ်။ စုပေါင်းသက်ရောက်နိုင်မှုအခြေအနေ။ ကြွင်းကျန် သက်ရောက်နိုင်မှုအခြေအနေ။ 	<ul style="list-style-type: none"> သက်ဆိုင်ရာ ဥပဒေ ပြဋ္ဌာန်းချက်များနှင့် သက်ဆိုင်ရာမြေပုံများအား ကိုက်ညီစေခြင်း။ သက်ဆိုင်ရာအဖွဲ့အစည်းများမှအချက်အလက်များ ရယူခြင်း။ ISO Standard များနှင့်အညီ စဉ်ဆက်မပြတ် ထိန်းကွပ် စောင့်ကြည့်ခြင်း။

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ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် အချိန်ဇယား



အစီအစဉ်	ဝဇမလပတ်				ဒုတိယလပတ်				တတိယလပတ်				တော့ဗ္ဗလပတ်				ဝဇ္ဇမလပတ်			
	၁	၂	၃	၄	၁	၂	၃	၄	၁	၂	၃	၄	၁	၂	၃	၄	၁	၂	၃	၄
၁။ စစ်တမ်းအခြေအနေကို ပြင်ဆင်ခြင်းနှင့် စီမံကိန်းဆိုင်ရာအချက်အလက်များ စုစည်းလေ့လာခြင်း။	■																			
၂။ စီမံကိန်းအခြေအနေကို ကွင်းဆင်းလေ့လာခြင်း။		■																		
၃။ ပတ်ဝန်းကျင်အရင်းအမြစ်ဆိုင်ရာ စစ်တမ်းကောက်ယူခြင်း။			■																	
၄။ လူမှုဆိုင်ရာ စစ်တမ်းကောက်ယူခြင်း။				■																
၅။ စီမံချိန်းမျိုးကွဲဆိုင်ရာ စစ်တမ်းကောက်ယူခြင်း။					■	■	■	■												
၆။ စစ်တမ်းကောက်ယူသည့် အချက်အလက်များကို စိစစ်ခြင်း။													■	■	■	■				
၇။ EIA အစီရင်ခံစာ မူတည်ပြင်ဆင်ခြင်း။									■	■	■	■								
၈။ EIA အစီရင်ခံစာအား အများပြည်သူ သို့ ထုတ်ပြန်ခြင်း နှင့် လူထုဆွေးနွေးပွဲနှင့် ကျွေးမြှုပ်ပွဲအသီးသီးစီစဉ်ခြင်း။																				
၉။ EIA အစီရင်ခံစာ မူတည်ပြင်ဆင်ခြင်း။													■	■	■	■				
၁၀။ EIA အစီရင်ခံစာအား အပြီးသတ်ပြင်ဆင်ခြင်း။																				
၁၁။ EIA အစီရင်ခံစာအား EOD သို့ထုတ်ပြန်ခြင်း။																				
၁၂။ ECD မှ အစီရင်ခံစာအား စိစစ်ခြင်း။																				

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စီမံကိန်းနှင့် ပတ်သက်၍ သိရှိမေးမြန်းလိုပါက



အမည်	ဦးအောင်ကြည်မြင့်
ရာထူး	အတွင်းရေးမှူး (BBWI&MCPC Company Limited)
ဖုန်းနံပါတ်	09-262060592
အီးမေးလ်	bbwi.mcpc@gmail.com

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EIA နှင့်ပတ်သက်၍ သိရှိမေးမြန်းလိုပါက



အမည်	ဦးအေးသီဟ
ရာထူး	အုပ်ချုပ်မှုဒါရိုက်တာ (အီးဂတ်ပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှု)
ဖုန်းနံပါတ်	09-2042233
အီးမေးလ်	ayethiha@eguardservices.com

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ယခုရှင်းလင်းတင်ပြခဲ့သော Presentation ဖိုင်အား အောက်ပါ Website Link မှ လည်းကောင်း၊ QR Code Scanner ဖြင့် လည်းကောင်း အလွယ်တကူ ရယူလေ့လာနိုင်ပါသည်။

<https://1drv.ms/f/s!Ag4PEnBR3AHR9DbliABvN2ssgR2>



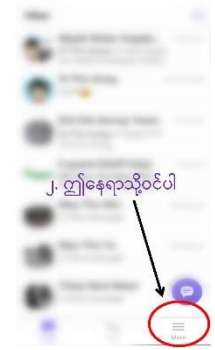
67



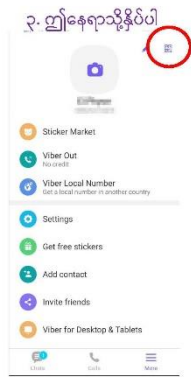
Powerpoint Presentation အားDownload လုပ်နည်း



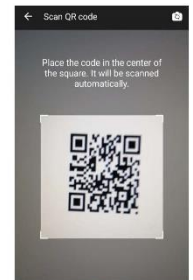
၁. Viber App သို့ဝင်ပါ



၂. ဤနေရာသို့ဝင်ပါ



၃. ဤနေရာသို့နှိပ်ပါ



၄. ပေးထားသောQR code အားScan ၍ Download ရယူနိုင်ပါပြီ

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Annex II. Attendance List of Public Consultation

ပြိတ်ကော်ပိုရေးရှင်းအများစုနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဆောင်ရွက်ထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြသူများစာရင်း။

ပုဂ္ဂလိကကုမ္ပဏီ/လုပ်ငန်းများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	ရာထူး	ကုမ္ပဏီ/လုပ်ငန်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးပျိုငမာင်	အတွင်းရေးမှူး	MCPD	၀၅-၄၃၃၅၁၇၄၃၀	
၂။	ဦးအိတ်အိတ်	အတွင်းရေးမှူး	BBWI & MCPC	၀၅-၄၂၂၁၇၇၀၁	
၃။	ဒေါ်အေးစိုးအောင်	ရုံးကိုင်	BBWI & MCPC	၀၅-၈၈၇၇၇၀၆၁၅	
၄။	ဒေါ်ဇော်စာပျို	စုစုပေါင်း	BBWI & MCPC	၀၅-၇၅၀၇၅၅၅၅၅	
၅။	ဦးစောအောင်	တွဲဖက် M.D.	mepe	၀၅-၇၇၇၆၇၆၆၆	
၆။	ဦးအောင်	အထွေထွေ	"	၀၅-၄၂၂၁၇၇၀၁	
၇။	ဦးအောင်	အထွေထွေ	BBWI & MCPC Co., Ltd	၀၅-၄၂၂၁၇၇၀၁	
၈။	ဒေါ်အေးအောင်	ရုံးကိုင်	BBWI & MCPC Co., Ltd	၀၅-၄၂၂၁၇၇၀၁	
၉။	ဦးအောင်	အထွေထွေ (၄)	MCPD	၀၅-၄၃၀၀၆၆၆၆	
၁၀။	ဦးအောင်	အထွေထွေ	MCPD	၀၅-၄၀၀၄၀၃၃၃	

ပြိတ်ကော်ပိုရေးရှင်းအများစုနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဆောင်ရွက်ထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြသူများစာရင်း။

ပုဂ္ဂလိကကုမ္ပဏီ/လုပ်ငန်းများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	ရာထူး	ကုမ္ပဏီ/လုပ်ငန်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးအောင်	အထွေထွေ	MCPD		
၂။	ဦးအောင်	စီမံကိန်း	MCPD		
၃။	ဦးအောင်	။	mepe		
၄။	ဦးအောင်	။	MCPD		
၅။	ဦးအောင်	။	MCPD		
၆။	ဦးအောင်	ဒု-ဥက္ကဋ္ဌ (၁)	MCPD		
၇။	ဦးအောင်	စီမံကိန်း	MCPD		
၈။	ဦးအောင်	ဥက္ကဋ္ဌ	MCPD		
၉။					
၁၀။					

မြိတ်ကော်ပိုရေးရှင်းအများစုနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုရန်အတွက်

ရုပ်ပုံဖော်ပြခြင်းအခမ်းအနား ပုဂ္ဂလိကကုမ္ပဏီ/လုပ်ငန်းများ

၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးကျွန်းမြင့်	ဖွဲ့စည်း	၅၆၇ (MPC)	၀၇-၅၀၈၃၀၀၅	
၂။	ဦးကျော်သူ	အိမ်ထောင်ရေး	၈/၁၀ ဆွေရွာ (MPC)	၀၇၂၅၀၂၄၅၅၃၃	
၃။	ဦးကျော်စွာ	တားဝပ်ကမ်းလှံ	စာရင်းကိုင် (MPC)	၀၇၄၃၃၇၄၃၀၃	
၄။	ဦးမြတ်စွာ	အောင်မြင်လှိုင်	မြို့နယ် (MPC)	၀၇၃၅၅၅၄၃၇၅	
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					

မြိတ်ကော်ပိုရေးရှင်းအများစုနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုရန်အတွက်

ပုဂ္ဂလိကကုမ္ပဏီ/လုပ်ငန်းများ

၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	ရပ်ကွက်	ကုမ္ပဏီ/လုပ်ငန်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးဝင်းလက်	ခရိုင်က	MCPC		
၂။					
၃။					
၄။					
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					

မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုရန်အတွက်

လူမှုရေးအသင်းအဖွဲ့များ (NGOs/INGOs) ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	ရာထူး	အဖွဲ့အစည်း	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦး ဝိန့်ဇွန်	ဒု.ဇာနည်	အဖွဲ့ဝင်	၀၇၃၄၀၂၄၆၇၅၄	
၂။	ဦးကျော်စွာ	အဖွဲ့ဝင်		၀၇၇၃၂၅၄၃၅၄	
၃။					
၄။					
၅။					
၆။					
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မြိတ်ကော်ပိုရေးရှင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုရန်အတွက်

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးစိုးဦး	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၆၇၇၂၃ ၄၆၇	
၂။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၃။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၄။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၅။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၆။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၇။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၈။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၉။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	
၁၀။	ဦးကျော်စွာ	ဗဟိုဌာန	အစိုးရဌာန	၀၇ ၂၅၅၅၀၇၀၆၅	

မြိတ်ကော်ပိုရေးရှင်းအများစုနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့မှပေါင်းစည်းထားသည့် BBW&MPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုရန်အတွက်

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးပိုင်စော	S - ၈	ဆရာတော်၊ ဘီ.၅၂	၀၇-၄၅၅၅၅၇၂၆၅	
၂။	ဦးစောဖျံ	S၀	၂၀၇၂၁	၀၇-၉၅၅၅၅၅၂၅၅	
၃။	ဦးကျော်စော	N/စ ဦးစီးဌာန	N/စ/၂၀၇၂၁	၀၇-၅၅၅၅၅၅၅၅	
၄။	ဦးဖြိုးလွင်	ဦးစီးအဖွဲ့ (ရန်ကင်းဌာန)	မြိတ်မြို့နယ်၊ ဝမ်းသာတန်း ရပ်ကွက်၊ ဦးစီးဌာန	၀၇-၄၅၅၅၅၅၅၅	
၅။	ဦးစောဖျံ	ဦးစီး (၁၃၄/၅)	၁၃၄/၅၅၅၅	၀၇-၅၅၅၅၅၅၅၅	
၆။	ဒေါ်အေးအေး	ဦးစီးအဖွဲ့	ဒီပဲယင်း	၀၇-၄၅၅၅၅၅၅၅	
၇။	ဒေါ်အေးအေး	ဦးစီးအဖွဲ့	ပုသိမ်၊ ဝမ်းသာတန်း	၀၇-၄၅၅၅၅၅၅၅	
၈။					
၉။					
၁၀။					

မြိတ်ကော်ပိုရေးရှင်းအများစုနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့မှပေါင်းစည်းထားသည့် BBW&MPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုရန်အတွက်

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးကျော်စော	P/၀. ခရီး၊ ဌာန၊ ၂၀၇၂၁		၀၇-၄၅၅၅၅၅၅၅	
၂။					
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၁၀။					

မြတ်တော်ရိုရှေ့ရင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဆွဲစည်းထားသည့် BBW&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးစနစ်ဖန်တီးမှုနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်သွားစေရင်း။

ရုပ်စီရင်ဖဒေသခံပြည်သူများ

၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦး သန်းမြတ်စိုး	လွှဲ: ၆၅၀	လယ်	၀၉-၇၆၂၁၂၇၅၅၃	
၂။					
၃။					
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၈။					
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၁၀။					

မြတ်တော်ရိုရှေ့ရင်းအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဆွဲစည်းထားသည့် BBW&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးစနစ်ဖန်တီးမှုနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်သွားစေရင်း။

ရုပ်စီရင်ဖဒေသခံပြည်သူများ

၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦး အောင်အောင်	ကမ်းတန်း	လယ်		
၂။	ဦး သန်းမြတ်စိုး	လယ်တန်း	လယ်	၀၉-၇၆၀၉၂၄၅	
၃။	ဦးအောင်အောင်	ကမ်းတန်း	လယ်	၀၇၄၅၄၅၅၇၈	
၄။	ဒေါ်မြသန်းစိန်	ပေါင်တန်း	လယ်	၁၆၀	
၅။	U Aung Mye	ကမ်းတန်း	လယ်	၀၉၇၆၂၅၅၇၅၅၅	
၆။	စိုး ဒေါ်လှညွှတ်သူ	ပေါင်တန်း	လယ်	၀၉-၄၃၆၇၇၀၆၈	
၇။					
၈။					
၉။					
၁၀။					

ပြန်ကော့ရိုလေ့မှူးအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCP Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရုပ်မိရုပ်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	မောင်လွင်	၁၁၂၂ (ခ)	လေ့လာ		
၂။	ဦးဖွဲ့လှိုင်	ကုန်းပုံ	ရောင်းဝယ်	၀၉၄၂၃၅၃၉၅၇	
၃။	ဦးအေးမင်း	အိမ်ထောင်	-	၀၉၄၂၀၀၅၅၀၉	
၄။	ဦးအောင်	အိမ်ထောင်	လေ့လာ	၀၉၇၇၅၅၇၀၀	
၅။	ဦးစံလှိုင်	အိမ်ထောင်	လေ့လာ	၀၉၉၆၇၄၇၅၀၁၇	
၆။	ဦးအောင်	အိမ်ထောင်	လေ့လာ	၀၉၉၆၀၈၈၅၅၅၅	
၇။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉-၉၅၃၄၄၉၃၅၀	
၈။	ဦးအောင်	အိမ်ထောင်	လေ့လာ	၀၉၉၆၀၁၉၉၀၀၅	
၉။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉၉၆၀၁၉၉၀၀၅	
၁၀။					

ပြန်ကော့ရိုလေ့မှူးအများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCP Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရုပ်မိရုပ်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉-၈၅၇၆၆၆	
၂။	ဦးအောင်	အိမ်ထောင်	လေ့လာ	၀၉၄၅၀၆၇၀၅၅	
၃။	ဦးအောင်	အိမ်ထောင်	လေ့လာ	၀၉၇၅၀၅၅၅၅၅	
၄။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉၉၅၀၅၅၅၅၅	
၅။	ဦးအောင်	အိမ်ထောင်	လေ့လာ	၀၉၄၀၅၅၅၅၅	
၆။	ဦးအောင်	အိမ်ထောင်	လေ့လာ	၀၉၆၅၅၅၅၅၅၅	
၇။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉-၈၈၀၅၉၀၅၅	
၈။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉-၄၀၅၀၅၅၅၅	
၉။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉-၄၅၀၅၅၅၅၅	
၁၀။	ဒေါ်အေးအေး	အိမ်ထောင်	လေ့လာ	၀၉၄၅၅၅၅၅၅၅	

မြိတ်ကော့ဘီရော့ရှင်းအများနှင့်သက်ဆိုင်သောကျမှထီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBW&MPCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးစေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရုပ်စီရင်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦး စာသင်းတင်	မစောကင်းတပ်	လယ်	၈၅၅	
၂။	ဦး ဖုစို	"	"	"	
၃။	ဦးကျောင်းရှေး	ဘုန်းမဲ	"	၀၅၄၅၅၆၄၀၀၈	
၄။	ဦးလွင်စွန်း	ပင်လယ်ဘုရား	လယ်	၀၅၄၂၈၇၆၆၇၇၂	
၅။	ဦးခင်စို	"	"	၀၅၄၂၇၅၇၇၇၇	
၆။	ဦးအောင်	၅၂၂ / ၅၆၈	ကျွေးမွေးရေး	၀၅-၄၅၂၀၅၈၅၇၇	
၇။	ဦးအောင်စွန်း	၅၆၈၊ ပင်လယ်ဘုရား	ကျွေးမွေးရေး	၀၅၄၂၈၆၆၃၀၅၅	
၈။	ဦးအောင်အောင်	၅၆၈၊ ပင်လယ်ဘုရား	လယ်	၀၅၂၆၆၆၆၆၆၆	
၉။	ဦးစိုးစိုး	ပင်လယ်ဘုရား	လယ်	၀၅-၂၆၆၆၆၆၆၆	
၁၀။	ဦးစိုးစိုး	ပင်လယ်ဘုရား	လယ်	၀၅-၂၆၆၆၆၆၆၆	

မြိတ်ကော့ဘီရော့ရှင်းအများနှင့်သက်ဆိုင်သောကျမှထီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBW&MPCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးစေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရုပ်စီရင်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ကိုဦး	မြိတ်ကော့ဘီရော့ရှင်း	စတင်ပျက်	၀၅၂၂၂၂၂၂၂၂	
၂။	ကိုဦး	"	"	၀၅၂၅၅၅၅၅၅၅	
၃။	ဦးစင်စင်	မစောကင်းတပ်	လယ်	၀၅၂၆၄၂၆၃၆၄	
၄။	ဦးစင်စင်	ပင်လယ်ဘုရား	လယ်	၀၅၂၆၂၇၀၆၈၅	
၅။	ဦးကျောင်းရှေး	ပင်လယ်ဘုရား	လယ်		
၆။	ဦးစိုးစိုး	"	"		
၇။	ဦးစိုးစိုး	ပင်လယ်ဘုရား	လယ်	၀၅၂၆၆၆၆၆၆၆	
၈။	ဦးစိုးစိုး	ပင်လယ်	လယ်	၀၅၅၅၅၅၅၅၅၅	
၉။	ဦးစိုးစိုး	ပင်လယ်	လယ်	၀၅၂၇၃၇၀၆၈၅	
၁၀။	ဦးစိုးစိုး	ပင်လယ်	"	၀၅၂၆၇၁၀၅၇၂	

မြိတ်ကော်ပိုရေးရှင်းအများစုသက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဆွဲစည်းထားသည့် BBW&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရုပ်စီရပ်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးဝင်းဦး	ကျ. ၈၅၇	လုပ်သား	၀၉-၂၅၆၆၄၄၂၇	
၂။	ဦးကျော်စွာ	မြောက်	လယ်	၀၉၄၂၇၄၈၈၈၇၇	
၃။	ဒေါ်ဖြူ	မြောက်	လယ်		
၄။	ဒေါ်နှင်းဂျီ	မြောက်	လယ်	၀၉၄၇၈၇၃၃၉၈	ah
၅။	ဒေါ်အိမ်အောင်	မြောက်	လယ်	၀၉၂၆၂၂၂၈၇၅	
၆။	ဒေါ်အောင်အောင်	မြောက်	လယ်		
၇။	ဒေါ်အောင်အောင်	မြောက်	လယ်	၀၉၂၅၃၄၆၃၇၅	
၈။	ဒေါ်အောင်အောင်	မြောက်	လယ်		
၉။	ဒေါ်အောင်အောင်	မြောက်	လယ်	၀၉၂၅၃၄၆၃၇၅	
၁၀။	ဒေါ်အောင်အောင်	မြောက်	လယ်	၀၉၄၂၇၄၈၈၈၇၇	

မြိတ်ကော်ပိုရေးရှင်းအများစုသက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဆွဲစည်းထားသည့် BBW&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရုပ်စီရပ်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးဖြူစွာ	မြောက်	လယ်		
၂။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၃။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၄။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၅။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၆။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၇။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၈။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၉။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		
၁၀။	ဒေါ်အိမ်အောင်	မြောက်	လယ်		

မြိတ်ကော်ပိုရေးရှင်းအများစုသက်ဆိုင်သောတုမ္မလီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ဝတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရပ်မိရပ်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးပန်းဇွဲ	၁၂၆			ဦးဇွဲ
၂။	ဦးစွန်းစွန်း	၁၂၆(၈၈၆)			✓
၃။	ဦးလှအိန်				
၄။	ဦးစောသန်း	မကွေး/စောတန်း			ဇော်
၅။	ဦးလှဝင်း	၂၆ စောတန်း			✓
၆။	ဦးစောစော	၁၂၆	လယ်		၃၅
၇။	ဦးကျော်	မကွေးကြီး	ကူးစမ်း	၀၉၇၀၂၅၂၀၉၂၅၃	✓
၈။	ဦးကျော် သွင်စော	မန္တလေးတိုင်း	စိုက်ပျိုးရေး	၀၉၄၄၄၇၄၂၂၂၄	✓
၉။	ဦးစောဇော်		လယ်	၀၉ -	✓
၁၀။	ဦးအောင်	၁၀၆ ကျေးရွာ	လယ်	၀၉၇၇၈၇၀၉၇၀၄၄	✓

မြိတ်ကော်ပိုရေးရှင်းအများစုသက်ဆိုင်သောတုမ္မလီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဖွဲ့စည်းထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်မြိတ်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် မြိတ်မြို့ရေပေးဝေရေးစီမံကိန်းနှင့်သက်ဆိုင်သည့် ဝတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရပ်မိရပ်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

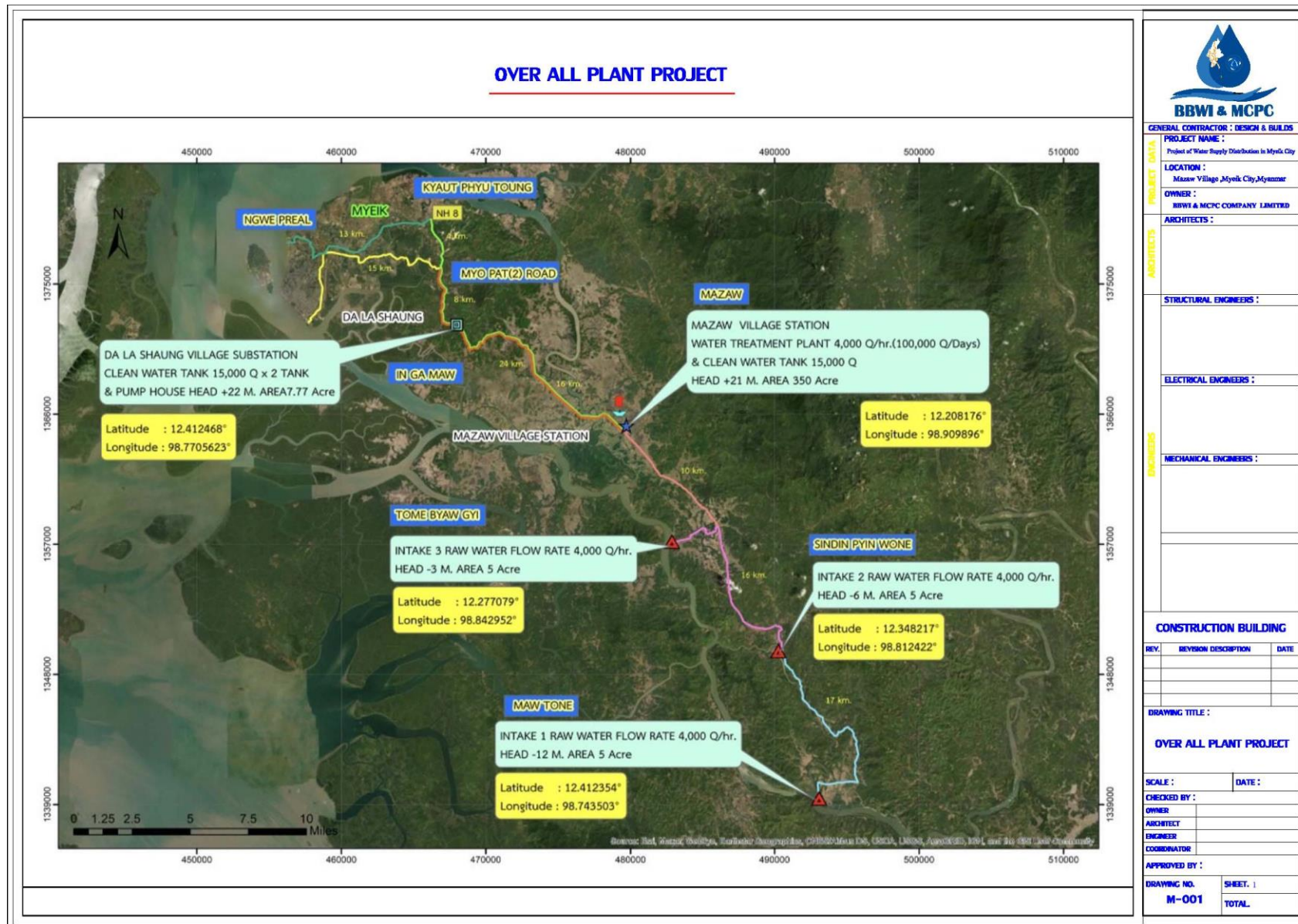
စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးအောင်အောင်	ကျေးရွာ	ယာဉ်မောင်း	၀၉၄၅၅၅၅၅၅၅၅	✓
၂။	ဦးကျော်	မကွေး/ကျော်	ဒါရိုက်တာ	၀၉ - ၄ ၂၂၂၂၂၂၂၂	✓
၃။	ဦးကျော်	ကျေးရွာ	မြေလုပ်ငန်း	၀၉ - ၂၅၅၅၅၅၅၅၅	ကျော်
၄။	ဦးကျော်	ကျေးရွာ	ကျေးဝယ်	၀၉ - ၇၈၅၅၀၄၂၅	ကျော်
၅။	ဦးကျော်	ကျေးရွာ	ကျေးဝယ်	၀၉ - ၂၅၅၅၅၅၅၅၅	ကျော်
၆။	ဦးကျော်	ကျေးရွာ	ကျေးဝယ်	၀၉ - ၂၅၅၅၅၅၅၅၅	ကျော်
၇။	ဦးကျော်	ကျေးရွာ	ကျေးဝယ်	၀၉ - ၆၅၅၅၅၅၅၅၅	ကျော်
၈။	ဦးကျော်	ကျေးရွာ	ကျေးဝယ်	၀၉ - ၈၅၅၅၅၅၅၅၅	ကျော်
၉။	ဦးကျော်	ကျေးရွာ	ကျေးဝယ်	၀၉ - ၂၅၅၅၅၅၅၅၅	ကျော်
၁၀။	ဦးကျော်	ကျေးရွာ	ကျေးဝယ်	၀၉၇၇၅၀၂၅၅၅၅	ကျော်

ပြည်ထောင်စုရေရှင်းဆေးရုံနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် နှင့် Bright Blue Water International Corporation Company Limited တို့ပူးပေါင်းဆွဲစည်းထားသည့် BBWI&MCPC Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ တနင်္သာရီမြို့နယ်နှင့်ပြည်မြို့နယ်တို့တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ပြည်မြို့ရေပေးစနစ်ဖွဲ့စည်းသက်ဆိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) လုပ်ငန်းစဉ်လုပ်ဆောင်နေမှုများနှင့် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအခမ်းအနား (Public Consultation) သို့ တက်ရောက်ကြည့်ရှုသူများစာရင်း။

ရုပ်စီရင်ဖဒေသခံပြည်သူများ ၂၀၂၂ ခုနှစ်၊ ဒီဇင်ဘာလ (၂၁) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	မမြင့် မြတ်ထွန်း	ရှမ်းချောင်း	ကျောင်းဆရာ	၀၇-၇၄၇၉၃၇၅၂၅	<i>[Signature]</i>
၂။	မအိမ်ပူဦး	မြစ်မ	စာရေးဆရာ	၀၇-၇၈၅၈၈၇၇၇၉	<i>[Signature]</i>
၃။	ဖခင်ဦးစွာ	ရေဖုန်း	စားရောင်း	၀၇-၂၅၀၇၇၁၇၆	<i>[Signature]</i>
၄။	မခိုင် နိုင်စော	မြစ်လတ်	Online shop	၀၇-၉၃၈၅၄၇၇၈၀၅	<i>[Signature]</i>
၅။	မောင်ဦးစိုးမင်း	သစ်တောရပ်	AMC Training Centre	၀၇-၇၅၇၅၇၇၈၅	<i>[Signature]</i>
၆။	မအေးစိန်စွန်း	ကျွန်းစောက်ရပ်	စာရေးဆရာ	၀၇-၉၂၂၂၂၂၂၂	<i>[Signature]</i>
၇။	မအေးစိန်စွန်း	ပါရမီ	စာရေးဆရာ	၀၇-၅၆၄၁၅၇၈	<i>[Signature]</i>
၈။	ဦးကျော်စွန်း	ကျောက်	ယာဉ်မောင်း	၀၇-၄၂၂၂၂၂၂၂	<i>[Signature]</i>
၉။	မအေးစိန်စွန်း	ကျောက်	စာရေးဆရာ	၀၇-၅၆၄၁၅၇၈	<i>[Signature]</i>
၁၀။	မအေးစိန်စွန်း	ကျောက်	စာရေးဆရာ	၀၇-၅၆၄၁၅၇၈	<i>[Signature]</i>

Annex III. Project Location



BBWI & MCPC

GENERAL CONTRACTOR : DESIGN & BUILD

PROJECT NAME :
Project of Water Supply Distribution in Myeik City

LOCATION :
Mazaw Village ,Myeik City,Myanmar

OWNER :
BBWI & MCPC COMPANY LIMITED

ARCHITECTS :

STRUCTURAL ENGINEERS :

ELECTRICAL ENGINEERS :

MECHANICAL ENGINEERS :

CONSTRUCTION BUILDING

REV.	REVISION DESCRIPTION	DATE

DRAWING TITLE :

OVER ALL PLANT PROJECT

SCALE : _____ **DATE :** _____

CHECKED BY :

OWNER : _____

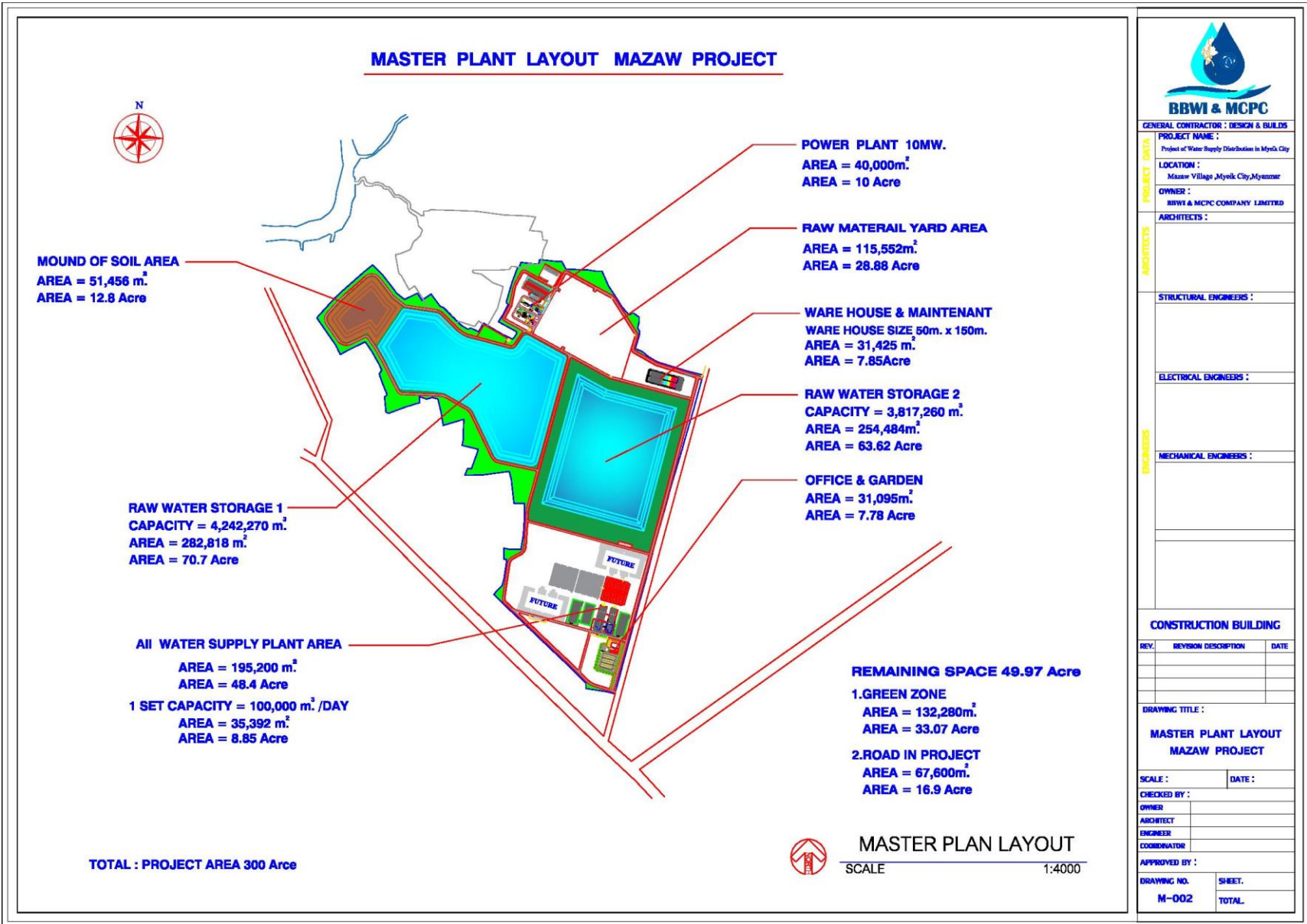
ARCHITECT : _____

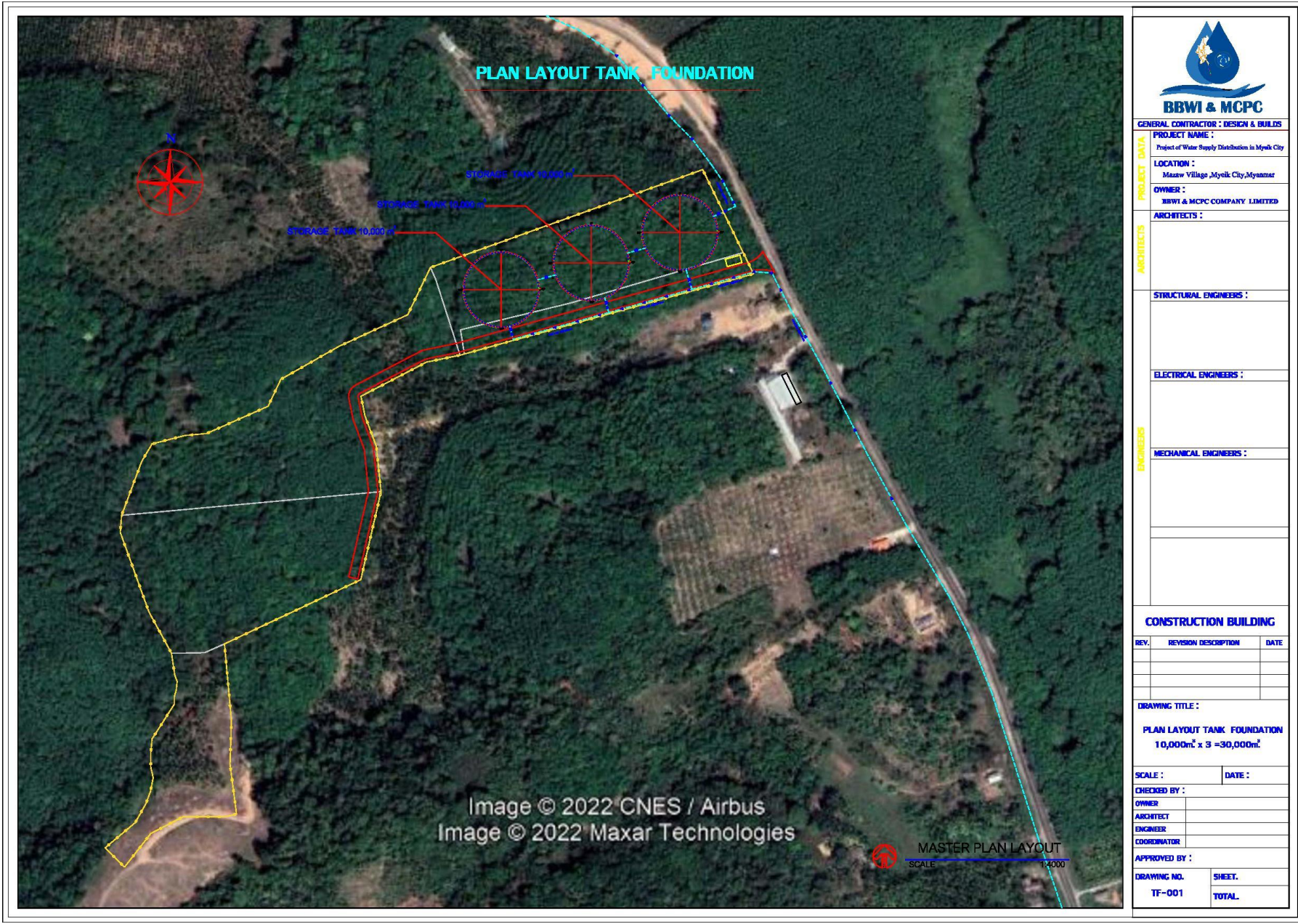
ENGINEER : _____

COORDINATOR : _____

APPROVED BY : _____

DRAWING NO. M-001	SHEET. 1 TOTAL
------------------------------------	---------------------------------





GENERAL CONTRACTOR : DESIGN & BUILD

PROJECT NAME :
Project of Water Supply Distribution in Myitk City

LOCATION :
Maxaw Village ,Myitk City, Myanmar

OWNER :
BBWI & MCPC COMPANY LIMITED

ARCHITECTS :

ARCHITECTS :

STRUCTURAL ENGINEERS :

STRUCTURAL ENGINEERS :

ELECTRICAL ENGINEERS :

ELECTRICAL ENGINEERS :

MECHANICAL ENGINEERS :

MECHANICAL ENGINEERS :

MECHANICAL ENGINEERS :

CONSTRUCTION BUILDING

REV.	REVISION DESCRIPTION	DATE

DRAWING TITLE :

**PLAN LAYOUT TANK FOUNDATION
10,000m³ x 3 =30,000m³**

SCALE : **DATE :**

CHECKED BY :

OWNER

ARCHITECT

ENGINEER

COORDINATOR

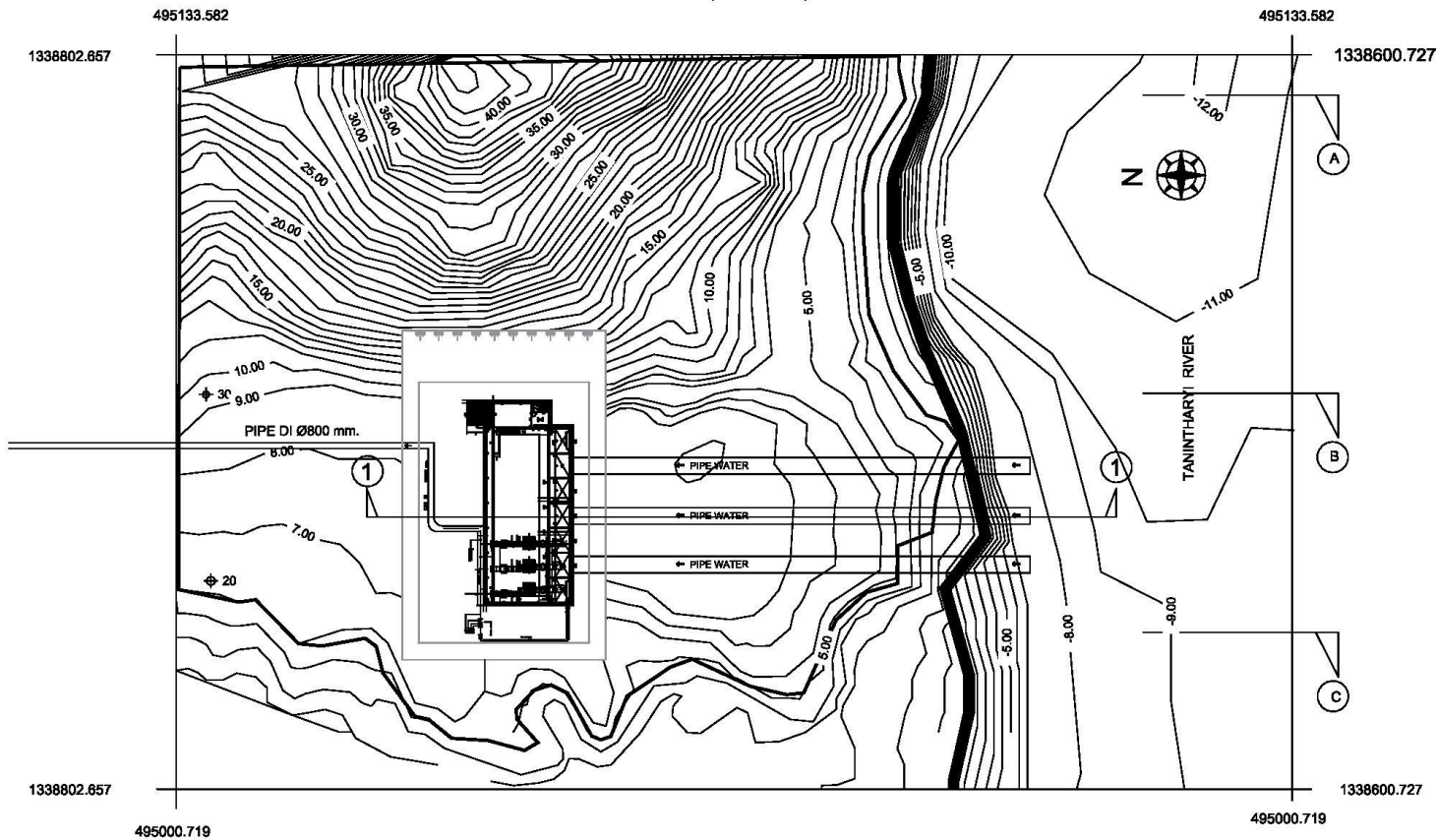
APPROVED BY :

DRAWING NO. **SHEET.**






TF-001 **TOTAL**

MAW TONE RAW WATER STATION PLAN LAYOUT

MAWTONE(ZALONE) TOPO MAP



Coordinate System - WGS 84
 Map Elevations are expressed in meter and reduced to Chart Datum.
 Tidal Information from River Survey.
 Water Level 1.75m at 16.April.2022-8:00am

-  Border Line
-  Major Contour
-  Minor Contour
-  Low Tide Level
-  Station Point



GENERAL CONTRACTOR : DESIGN & BUILDS

PROJECT NAME :
 Project of Water Supply Distribution in Myittha City

LOCATION :
 Mawaw Village ,Myittha City,Myanmar

OWNER :
 BBWI & MCPC COMPANY LIMITED

ARCHITECTS :

ARCHITECTS :

STRUCTURAL ENGINEERS :

STRUCTURAL ENGINEERS :

ELECTRICAL ENGINEERS :

ELECTRICAL ENGINEERS :

MECHANICAL ENGINEERS :

MECHANICAL ENGINEERS :

MECHANICAL ENGINEERS :

CONSTRUCTION BUILDING

REV.	REVISION DESCRIPTION	DATE

DRAWING TITLE :

MAW TONE
 RAW WATER STATION PLAN LAYOUT

SCALE : DATE :

CHECKED BY :

OWNER :

ARCHITECT :

ENGINEER :

COORDINATOR :

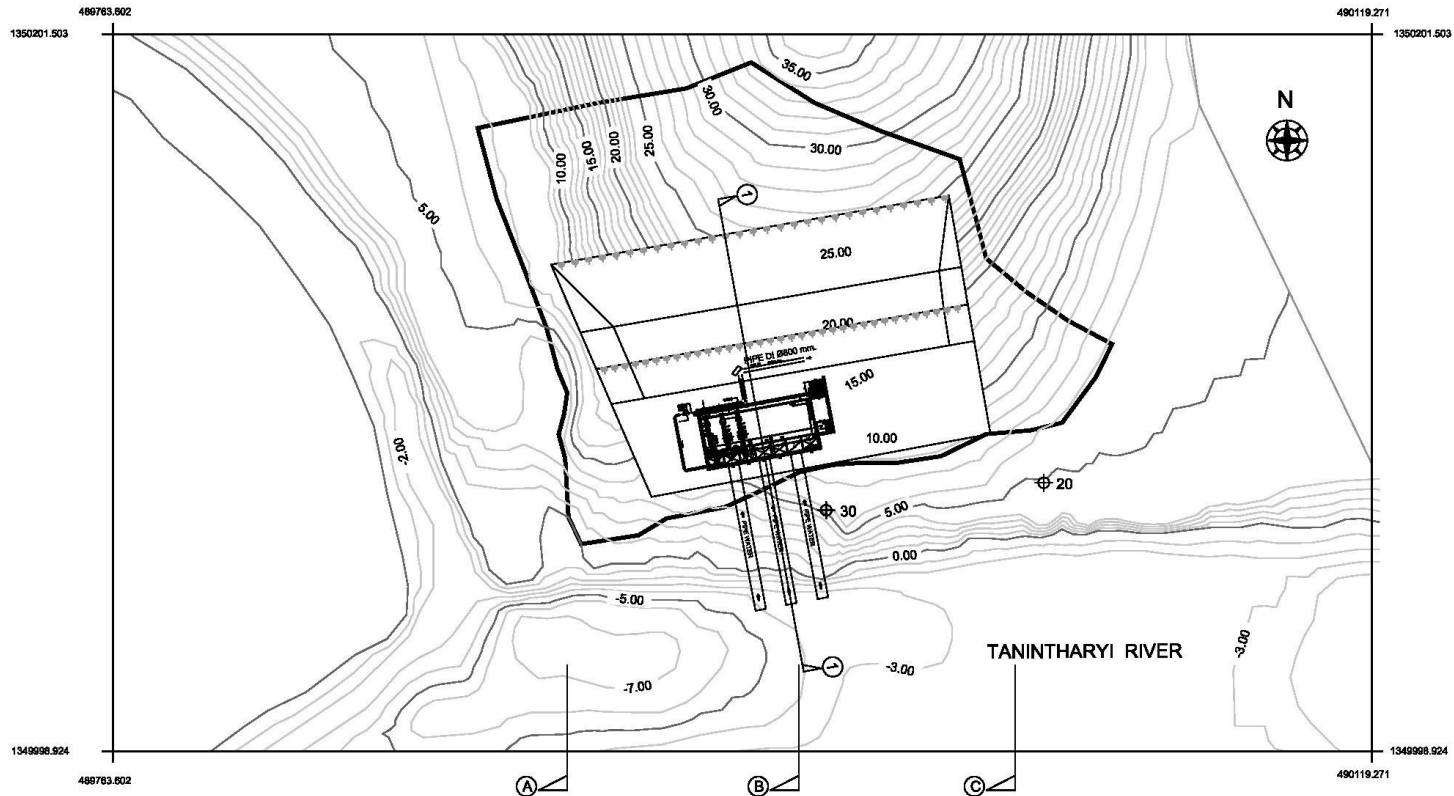
APPROVED BY :

DRAWING NO. SHEET. 3

RW1-001 TOTAL.

SIN DIN RAW WATER STATION PLAN LAYOUT

SIN-DIN TOPO MAP








Coordinate System - WGS 84

Map Elevations are expressed in meter and reduced to Chart Datum.

Tidal Information from River Survey.

Water Level -0.2m at 18.April.2022-8:30am

-  Border Line
-  Major Contour
-  Minor Contour
-  Low Tide Level
-  Station Point



GENERAL CONTRACTOR : DESIGN & BUILDS

PROJECT NAME :

Project of Water Supply Distribution in Myitka City

LOCATION :

Manaw Village ,Myitka City,Myanmar

OWNER :

BBWI & MCPC COMPANY LIMITED

ARCHITECTS :

STRUCTURAL ENGINEERS :

ELECTRICAL ENGINEERS :

MECHANICAL ENGINEERS :

ENGINEERS :

CONSTRUCTION BUILDING

REV.	REVISION DESCRIPTION	DATE

DRAWING TITLE :

SIN DIN

RAW WATER STATION PLAN LAYOUT

SCALE : DATE :

CHECKED BY :

OWNER :

ARCHITECT :

ENGINEER :

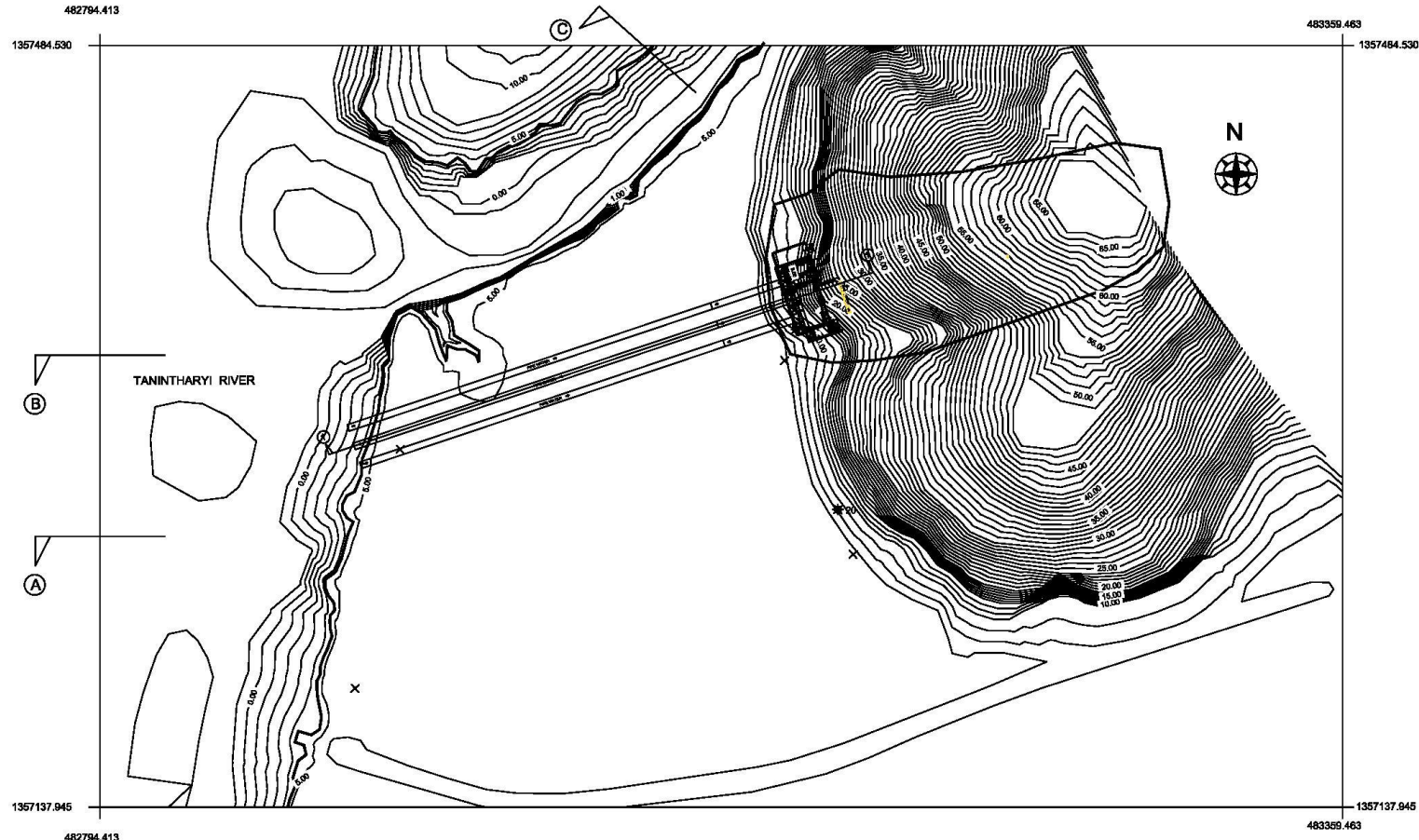
COORDINATOR :

APPROVED BY :


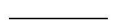



DRAWING NO. SHEET. 5

RW2-001 TOTAL.

TONE BYAW GYI RAW WATER STATION PLAN LAYOUT
TONE BYAW TOPO MAP



Coordinate System - WGS 84
 Map Elevations are expressed in meter and reduced to Chart Datum.
 Tidal Information from River Survey.
 Water Level 4.46m at 18.April.2022-11:30am

-  Border Line
-  Major Contour
-  Minor Contour
-  Low Tide Level
-  Station Point



GENERAL CONTRACTOR : DESIGN & BUILDS

PROJECT NAME :
Project of Water Supply Distribution in Myeik City

PROJECT DATA

PROJECT NAME :
Project of Water Supply Distribution in Myeik City

LOCATION :
Maazaw Village ,Myeik City,Myanmar

OWNER :
BBWI & MCPC COMPANY LIMITED

ARCHITECTS :

ARCHITECTS

STRUCTURAL ENGINEERS :

STRUCTURAL ENGINEERS :

ELECTRICAL ENGINEERS :

ELECTRICAL ENGINEERS :

MECHANICAL ENGINEERS :

MECHANICAL ENGINEERS :

CONSTRUCTION BUILDING

REV.	REVISION DESCRIPTION	DATE

DRAWING TITLE :

**TONE BYAW GYI
RAW WATER STATION PLAN LAYOUT**

SCALE : **DATE :**

CHECKED BY :

OWNER _____

ARCHITECT _____

ENGINEER _____

COORDINATOR _____

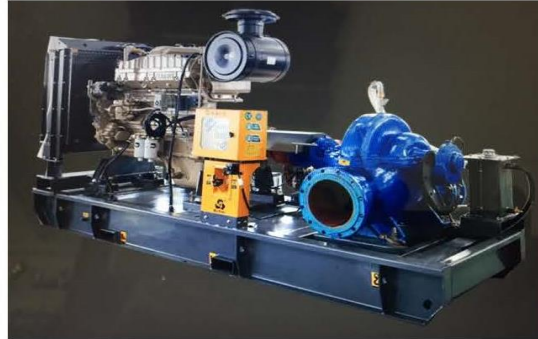
APPROVED BY :

DRAWING NO. **SHEET. 7**

RW3-001 **TOTAL.**

Annex V. List and Type of Machinerics

Ma Soi Station



ตารางแสดงรายการเครื่องสูบน้ำและเครื่องต้นกำลัง(Spec. Of Water Pump and Power Generator)	
ชนิด(Type)	PR12 SINGLE OR SUCTION CENTRFUGAL PUMP
อัตราการสูบ(ลบ.ม./ชม..)(Pumping Rate)M3/h	2200
แรงสูบส่ง Heat (m)≥	60
ประสิทธิภาพไม่น้อยกว่า(%) Effucieny(%)	80
NPSHRไม่เกิน (ม.) Net Positive Suction Head (m)	5
ความเร็วรอบ≤(RPM) speed (RPM)	1,500
ขับเคลื่อนโดย (Tranmission)	Diesel Engine 500 Hp



เครื่องกำเนิดไฟฟ้า(Generator)ใช้กับสำนักงานและระบบจ่ายสารเคมี	
เครื่องยนต์ (engine)	Cummins Diesel Engine 500 KVA
อัลเทอเนเตอร์ (Alternator)	LEEGA (สามารถเปลี่ยนเป็น STAMFORD OR LEROY SOMER)

ทำงานต่อเนื่อง (KVA Prime)	100
----------------------------	-----

Dosing System	
เครื่องจ่ายสารละลายสารส้มเข้มข้น 10%ALUMINA DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายปูนขาว 4% LIME DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายคลอรีน CHLORINE DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
AIR BLOWER	



VAVLE	
BUTTERFLY VALVE (m.m)	100-700
FLEXBLE COUPLING (m.m)	100-700
AIR VALVE (m.m)	25-15
CHECK VALVE (m.m)	100-700

Mow Tone Station



ตารางแสดงรายการเครื่องสูบน้ำและเครื่องต้นกำลัง(Spec. Of Water Pump and Power Generator)	
ชนิด(Type)	PR12 SINGLE OR SUCTION CENTRFUGAL PUMP
อัตราสูบ(ลบ.ม./ชม..)(Pumping Rate)M3/h	2200
แรงสูบส่ง Heat (m)≥	60
ประสิทธิภาพไม่น้อยกว่า(%) Effucieny(%)	80
NPSHRไม่เกิน (ม.) Net Positive Suction Head (m)	5
ความเร็วรอบ≤(RPM) speed (RPM)	1,500
ขับเคลื่อนโดย (Tranmission)	Diesel Engine 500 Hp



เครื่องกำเนิดไฟฟ้า(Generator)ใช้กับสำนักงานและระบบจ่ายสารเคมี	
เครื่องยนต์ (engine)	Cummins Diesel Engine 500 KVA
อัลเตอเนเตอร์ (Alternator)	LEEGA (สามารถเปลี่ยนเป็น STAMFORD OR LEROY SOMER)
ทำงานต่อเนื่อง (KVA Prime)	100

Dosing System	
เครื่องจ่ายสารละลายสารส้มเข้มข้น 10%ALUMINA DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายปูนขาว 4% LIME DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายคลอรีน CHLORINE DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
AIR BLOWER	



VAVLE	
BUTTERFLY VALVE (m.m)	100-700
FLEXBLE COUPLING (m.m)	100-700
AIR VALVE (m.m)	25-15
CHECK VALVE (m.m)	100-700

Sindin Pyin Wone Station



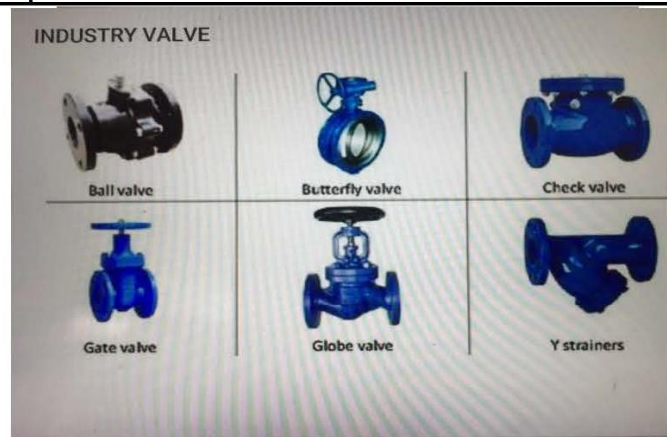
ตารางแสดงรายการเครื่องสูบน้ำและเครื่องต้นกำลัง(Spce. Of Water Pump and Power Generator)	
ชนิด(Type)	PR12 SINGLE OR SUCTION CENTRFUGAL PUMP
อัตราการสูบ(ลบ.ม./ชม..)(Pumping Rate)M3/h	2200
แรงสูบส่ง Heat (m)≥	60
ประสิทธิภาพไม่น้อยกว่า(%) Effucieny(%)	80
NPSHRไม่เกิน (ม.) Net Positive Suction Head (m)	5
ความเร็วรอบ≤(RPM) speed (RPM)	1,500
ขับเคลื่อนโดย (Tranmission)	Diesel Engine 500 Hp



เครื่องกำเนิดไฟฟ้า(Generator)ใช้กับสำนักงานและระบบจ่ายสารเคมี	
เครื่องยนต์ (engine)	Cummins Diesel Engine 500 KVA
อัลเตอเนเตอร์ (Alternator)	LEEGA (สามารถเปลี่ยนเป็น STAMFORD OR LEROY SOMER)

ทำงานต่อเนื่อง (KVA Prime)	100
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Dosing System	
เครื่องจ่ายสารละลายสารส้มเข้มข้น 10%ALUMINA DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายปูนขาว 4% LIME DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายคลอรีน CHLORINE DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
AIR BLOWER	



VAVLE	
BUTTERFLY VALVE (m.m)	100-700
FLEXBLE COUPLING (m.m)	100-700
AIR VALVE (m.m)	25-15
CHECK VALVE (m.m)	100-700

Tone Byan Gyi Station



ตารางแสดงรายการเครื่องสูบน้ำและเครื่องต้นกำลัง(Spec. Of Water Pump and Power Generator)	
ชนิด(Type)	PR12 SINGLE OR SUCTION CENTRFUGAL PUMP
อัตราการสูบ(ลบ.ม./ชม..)(Pumping Rate)M3/h	2200
แรงสูบส่ง Heat (m)≥	60
ประสิทธิภาพไม่น้อยกว่า(%) Effucieny(%)	80
NPSHRไม่เกิน (ม.) Net Positive Suction Head (m)	5
ความเร็วรอบ≤(RPM) speed (RPM)	1,500
ขับเคลื่อนโดย (Tranmission)	Diesel Engine 500 Hp



เครื่องกำเนิดไฟฟ้า(Generator)ใช้กับสำนักงานและระบบจ่ายสารเคมี	
เครื่องยนต์ (engine)	Cummins Diesel Engine 500 KVA
อัลเทอเนเตอร์ (Alternator)	LEEGA (สามารถเปลี่ยนเป็น STAMFORD OR LEROY SOMER)

ทำงานต่อเนื่อง (KVA Prime)	100
----------------------------	-----

Dosing System	
เครื่องจ่ายสารละลายสารส้มเข้มข้น 10%ALUMINA DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายปูนขาว 4% LIME DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
เครื่องจ่ายสารละลายคลอรีน CHLORINE DISPENSER	MECHANICAL DIAPHRAGM TYPE SINGLE HEAD
AIR BLOWER	



VAVLE	
BUTTERFLY VALVE (m.m)	100-700
FLEXBLE COUPLING (m.m)	100-700
AIR VALVE (m.m)	25-15
CHECK VALVE (m.m)	100-700

Annex VI. Scientific Names of Species

Myanmar Name	Scientific Name
Pyinkado	<i>Xylia xylocarpa</i>
Kanyin	<i>Dipterocarpus alatus</i>
Byue Chay Htoug (a pho)	<i>Rhizophora apiculata</i>
Byue Chay Htoug (a ma)	<i>Rhizophora mucronata</i>
Lamu	<i>Sonneratia caesolaris</i>
Byue	<i>Bruguiera spp.</i>
Ma da ma	<i>Ceriop decandra</i>
Thamyae	<i>Avicennia spp.</i>
Pinlal Ohn	<i>Xylocarpus granatum</i>
Kya na	<i>Xylocarpus moluccensis</i>
Anan	<i>Fagraea fragrans</i>
Saga	<i>Michelia champaca</i>
Taung-thayet	<i>Irvingia oliveri</i>
Kanzaw	<i>Madhuca longifolia</i>
Thabye	<i>Eugenia bracteolata</i>
Pyin-ma	<i>Lagerstroemia reginae</i>
Thingan	<i>Hopea odorata</i>
Ka-dut	<i>Ficus cunia</i>
U-ban	<i>Shorea farinosa</i>

Annex VII. Water Sampling Results at Dry Season



LABORATORY



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 Effective Date - 01-12-2012
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WATER QUALITY TEST RESULTS FORM

Client _____	Water Supply Project (Myeik)
Nature of Water _____	River Water (Point - 1)
Location _____	Myeik
Date and Time of collection _____	14.1.2020
Date and Time of arrival at Laboratory _____	15.1.2020
Date and Time of commencing examination _____	16.1.2020
Date and Time of completing _____	18.1.2020

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

pH		6.5 - 8.5
Colour (True)	TCU	15 TCU
Turbidity	NTU	5 NTU
Conductivity	micro S/cm	
Total Hardness	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness	mg/l as CaCO ₃	
Magnesium Hardness	mg/l as CaCO ₃	
Total Alkalinity	mg/l as CaCO ₃	
Phenolphthalein Alkalinity	mg/l as CaCO ₃	
Carbonate (CaCO ₃)	mg/l as CaCO ₃	
Bicarbonate (HCO ₃)	mg/l as CaCO ₃	
Iron	4.12 mg/l	0.3 mg/l
Chloride (as CL)	mg/l	250 mg/l
Sodium chloride (as NaCL)	mg/l	
Sulphate (as SO ₄)	mg/l	500 mg/l
Total Solids	mg/l	1500 mg/l
Total Suspended Solids	158 mg/l	
Total Dissolved Solids	mg/l	1000 mg/l
Manganese	mg/l	0.05 mg/l
Phosphate	mg/l	
Phenolphthalein Acidity	mg/l	
Methyl Orange Acidity	mg/l	
Salinity	ppt	

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

Tested by
 Signature: Zaw Hein Oe
 Name: B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by
 Signature: Soe Thit
 Name: B.E (Civil) 1980,
Technical Officer
 ISO TECH Laboratory

W0120 390

WATER QUALITY TEST RESULTS FORM

Client _____ Water Supply Project (Myeik)
 Nature of Water _____ River Water (Point - 1)
 Location _____ Myeik
 Date and Time of collection _____ 14.1.2020
 Date and Time of arrival at Laboratory _____ 15.1.2020
 Date and Time of commencing examination _____ 16.1.2020
 Date and Time of completing _____ 18.1.2020


Results of Water Analysis

**WHO Drinking Water Guideline
 (Geneva - 1993)**


Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)	Nil	mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate (N.NO ₃)		mg/l	50 mg/l
Chlorine (Residual)	Nil	mg/l	
Ammonia Nitrogen (NH ₃)	Nil	mg/l	
Ammonium Nitrogen (NH ₄)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	64	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)	Nil	mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature: 
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by

Signature: 
 Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
 ISO TECH Laboratory

Laboratory Technical Consultant: U Saw Christopher Maung
 B.Sc Engg: (Civil), Dip S.E.(Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
 Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

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 Effective Date - 01-12-2012
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WATER QUALITY TEST RESULTS FORM

Client _____ Water Supply Project (Myeik)
 Nature of Water _____ River Water (Point - 2)
 Location _____ Myeik
 Date and Time of collection _____ 14.1.2020
 Date and Time of arrival at Laboratory _____ 15.1.2020
 Date and Time of commencing examination _____ 16.1.2020
 Date and Time of completing _____ 18.1.2020

Results of Water Analysis

**WHO Drinking Water Guideline
 (Geneva - 1993)**

pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	1.08	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	66	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

Tested by
 Signature: Zaw Hein Oo
 Name: B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by
 Signature: See Thu
 Name: B.E (Civil) 1986,
Technical Officer
 ISO TECH Laboratory

W0120 391

WATER QUALITY TEST RESULTS FORM

Client _____ Water Supply Project (Myeik)
 Nature of Water _____ River Water (Point - 2)
 Location _____ Myeik
 Date and Time of collection _____ 14.1.2020
 Date and Time of arrival at Laboratory _____ 15.1.2020
 Date and Time of commencing examination _____ 16.1.2020
 Date and Time of completing _____ 18.1.2020


Results of Water Analysis

**WHO Drinking Water Guideline
 (Geneva - 1993)**


Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)	Nil	mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate (N.NO ₃)		mg/l	50 mg/l
Chlorine (Residual)	Nil	mg/l	
Ammonia Nitrogen (NH ₃)	Nil	mg/l	
Ammonium Nitrogen (NH ₄)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	64	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)	Nil	mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature: 
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by

Signature: 
 Name: See Thit
B.E (Civil) 1980,
Technical Officer
 ISO TECH Laboratory

Laboratory Technical Consultant: U Saw Christopher Maung
 B.Sc Engg; (Civil), Dip S.E(Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
 Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

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WATER QUALITY TEST RESULTS FORM

Client Water Supply Project (Myeik)
 Nature of Water River Water (Point - 3)
 Location Myeik
 Date and Time of collection 14.1.2020
 Date and Time of arrival at Laboratory 15.1.2020
 Date and Time of commencing examination 16.1.2020
 Date and Time of completing 18.1.2020

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	0.58	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	35	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

Tested by

Signature: Zaw Hein Oo
 Name: B.Sc (Chemistry)
 Sr. Chemist
 ISO TECH Laboratory

Approved by

Signature: Soe Thit
 Name: B.E (Civil) 1980
 Technical Officer
 ISO TECH Laboratory



LABORATORY



Laboratory Technical Consultant: U Saw Christopher Maung
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WATER QUALITY TEST RESULTS FORM

Client _____	Water Supply Project (Myeik) _____
Nature of Water _____	River Water (Point - 3) _____
Location _____	Myeik _____
Date and Time of collection _____	14.1.2020 _____
Date and Time of arrival at Laboratory _____	15.1.2020 _____
Date and Time of commencing examination _____	16.1.2020 _____
Date and Time of completing _____	18.1.2020 _____


Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)


Temperature (°C)	°C	
Fluoride (F)	mg/l	1.5 mg/l
Lead (as Pb)	Nil mg/l	0.01 mg/l
Arsenic (As)	Nil mg/l	0.01 mg/l
Nitrate (N.NO ₃)	mg/l	50 mg/l
Chlorine (Residual)	Nil mg/l	
Ammonia Nitrogen (NH ₃)	Nil mg/l	
Ammonium Nitrogen (NH ₄)	mg/l	
Dissolved Oxygen (DO)	mg/l	
Chemical Oxygen Demand (COD)	32 mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	mg/l	
Cyanide (CN)	Nil mg/l	0.07 mg/l
Zinc (Zn)	mg/l	3 mg/l
Copper (Cu)	Nil mg/l	2 mg/l
Silica (Si)	mg/l	

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

Tested by

Signature: 
 Name: Zaw Hein Oo
B.Sc (Chemistry)
 Sr. Chemist
 ISO TECH Laboratory

Approved by

Signature: 
 Name: Soe Thit
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 Technical Officer
 ISO TECH Laboratory

Annex VIII. Water Sampling Results at Wet Season



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WTL-RE-001
 Issue Date - 01-12-2012
 Effective Date - 01-12-2012
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WATER QUALITY TEST RESULTS FORM

Client _____	Myeik Water Distribution
Nature of Water _____	Surface Water (Point - 1)
Location _____	Myeik, Tanintharyi River.
Date and Time of collection _____	21.6.2020
Date and Time of arrival at Laboratory _____	22.6.2020
Date and Time of commencing examination _____	23.6.2020
Date and Time of completing _____	25.6.2020

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

Parameter	Unit	Limit
Temperature (°C)	°C	
Fluoride (F)	mg/l	1.5 mg/l
Lead (as Pb)	Nil mg/l	0.01 mg/l
Arsenic (As)	Nil mg/l	0.01 mg/l
Nitrate (N.NO ₃)	mg/l	50 mg/l
Chlorine (Residual)	Nil mg/l	
Ammonia Nitrogen (NH ₃)	Nil mg/l	
Ammonium Nitrogen (NH ₄)	mg/l	
Dissolved Oxygen (DO)	mg/l	
Chemical Oxygen Demand (COD)	32 mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	mg/l	
Cyanide (CN)	Nil mg/l	0.07 mg/l
Zinc (Zn)	mg/l	3 mg/l
Copper (Cu)	Nil mg/l	2 mg/l
Silica (Si)	mg/l	

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

Tested by

Signature: *Hein*
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature: *Soe Thit*
 Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

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No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
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WTL-RE-001
 Issue Date - 01-12-2012
 Effective Date - 01-12-2012
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W0620 704

WATER QUALITY TEST RESULTS FORM

Client _____ Myeik Water Distribution
 Nature of Water _____ Surface Water (Point - 1)
 Location _____ Myeik, Tanintharyi River.
 Date and Time of collection _____ 21.6.2020
 Date and Time of arrival at Laboratory _____ 22.6.2020
 Date and Time of commencing examination _____ 23.6.2020
 Date and Time of completing _____ 25.6.2020

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

pH			6.5 - 8.5
Colour (True)	80	TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	32	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	2.93	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	98	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

Tested by
 Signature: *Hein*
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
 Signature: *Soe Thit*
 Name: Soe Thit
B.B (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
 Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



LABORATORY



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0620 705

WATER QUALITY TEST RESULTS FORM

Client _____ Myeik Water Distribution
 Nature of Water _____ Surface Water (Point - 2)
 Location _____ Myeik, Tanintharyi River.
 Date and Time of collection _____ 21.6.2020
 Date and Time of arrival at Laboratory _____ 22.6.2020
 Date and Time of commencing examination _____ 23.6.2020
 Date and Time of completing _____ 25.6.2020

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

Temperature (°C)	°C	
Fluoride (F)	mg/l	1.5 mg/l
Lead (as Pb)	Nil mg/l	0.01 mg/l
Arsenic (As)	Nil mg/l	0.01 mg/l
Nitrate (N.NO ₃)	mg/l	50 mg/l
Chlorine (Residual)	Nil mg/l	
Ammonia Nitrogen (NH ₃)	Nil mg/l	
Ammonium Nitrogen (NH ₄)	mg/l	
Dissolved Oxygen (DO)	mg/l	
Chemical Oxygen Demand (COD)	32 mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	mg/l	
Cyanide (CN)	Nil mg/l	0.07 mg/l
Zinc (Zn)	mg/l	3 mg/l
Copper (Cu)	Nil mg/l	2 mg/l
Silica (Si)	mg/l	

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

Tested by

Signature: *Hein*
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by

Signature: *Soe Thit*
 Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
 ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

W0620 705

WATER QUALITY TEST RESULTS FORM

Client Myeik Water Distribution
 Nature of Water Surface Water (Point - 2)
 Location Myeik, Tanintharyi River.
 Date and Time of collection 21.6.2020
 Date and Time of arrival at Laboratory 22.6.2020
 Date and Time of commencing examination 23.6.2020
 Date and Time of completing 25.6.2020

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

pH			6.5 - 8.5
Colour (True)	40	TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	20	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	0.93	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	45	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

Tested by
 Signature: *Hein*
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by
 Signature: *Soe Thit*
 Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
 ISO TECH Laboratory

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No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
 Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



LABORATORY



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

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WATER QUALITY TEST RESULTS FORM

Client _____ Myeik Water Distribution
 Nature of Water _____ Surface Water (Point - 3)
 Location _____ Myeik, Tanintharyi River.
 Date and Time of collection _____ 21.6.2020
 Date and Time of arrival at Laboratory _____ 22.6.2020
 Date and Time of commencing examination _____ 23.6.2020
 Date and Time of completing _____ 25.6.2020

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

Parameter	Result	Unit	Guideline
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)	Nil	mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate (N.NO ₃)		mg/l	50 mg/l
Chlorine (Residual)	Nil	mg/l	
Ammonia Nitrogen (NH ₃)	Nil	mg/l	
Ammonium Nitrogen (NH ₄)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)	Nil	mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature: Heinz
 Name: Zaw Hein Oo
B.Sc (Chemistry)
 St. Chemist
 ISO TECH Laboratory

Approved by

Signature: Soe Thit
 Name: Soe Thit
B.E (Civil) 1980,
 Technical Officer
 ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

W0620 706

WATER QUALITY TEST RESULTS FORM

Client Myeik Water Distribution
 Nature of Water Surface Water (Point - 3)
 Location Myeik, Tanintharyi River.
 Date and Time of collection 21.6.2020
 Date and Time of arrival at Laboratory 22.6.2020
 Date and Time of commencing examination 23.6.2020
 Date and Time of completing 25.6.2020

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

pH			6.5 - 8.5
Colour (True)	30	TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	24	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	0.79	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	48	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

Tested by
 Signature: Hein
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by
 Signature: Soe Thit
 Name: B.E (Civil) 1980,
Technical Officer
 ISO TECH Laboratory

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No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
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LABORATORY



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E.(Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0120 392

WATER QUALITY TEST RESULTS FORM

Client _____ Water Supply Project (Myeik)

Nature of Water _____ River Water (Point - 3)

Location _____ Myeik

Date and Time of collection _____ 14.1.2020

Date and Time of arrival at Laboratory _____ 15.1.2020

Date and Time of commencing examination _____ 16.1.2020

Date and Time of completing _____ 18.1.2020

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)	Nil	mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate (N.NO ₃)		mg/l	50 mg/l
Chlorine (Residual)	Nil	mg/l	
Ammonia Nitrogen (NH ₃)	Nil	mg/l	
Ammonium Nitrogen (NH ₄)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)	Nil	mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature:
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
 ISO TECH Laboratory

Approved by

Signature:
 Name: Soe Thit
B.E (Civil) 1986,
Technical Officer
 ISO TECH Laboratory

Annex IX. Soil Quality Results



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

ANALYSIS REPORT

PROJECT NAME	: MEIK WATER DISTRIBUTION	RECEIVED DATE	: JUNE 30, 2020
CUSTOMER NAME	: REM-UAE LABORATORY AND CONSULTANT CO.,LTD.	ANALYTICAL DATE	: JUNE 30 - JULY 13, 2020
ADDRESS	: B-702 DELTA PLAZA, SHWEGONDAING ROAD BAHAN YANGON MYANMAR	REPORT NO.	: 2020-U44817
CONTACT INFORMATION	: TEL : +959 799855808 e-mail : toetoehtlaing@rem-uaeconsultant.com	WORK NO.	: 2020-004462
SAMPLING SOURCE	: -	ANALYSIS NO.	: T20A3928-0001
SAMPLE TYPE	: SOIL		
SAMPLING DATE	: -		
SAMPLING TIME	: -		
SAMPLING METHOD	: -		
SAMPLING BY	: CUSTOMER		
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	
			P-1 T20A3928-0001	DETECTION LIMIT
pH (1:1)	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	6.1 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	2.45	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	0.300
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	10.3	0.500
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	19.0	1.55
NICKEL (Ni)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	8.75	1.00
SAMPLE CONDITION			BROWN SOIL	

ND : NON-DETECTABLE.

SAMPLE (S) ANALYSED ON AS RECEIVED BASIS. RESULT (S) REPORTED ON A DRY WEIGHT BASIS.

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

Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JULY 17, 2020



- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL .
- REPORTED ANALYSIS REFERS TO SUBMITTED SAMPLE ONLY.

1/1





ANALYSIS REPORT

PROJECT NAME : MEIK WATER DISTRIBUTION
CUSTOMER NAME : REM-UAE LABORATORY AND CONSULTANT CO.,LTD.
ADDRESS : B-702 DELTA PLAZA, SHWEGONDAING ROAD BAHAN YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : toetoehtlaing@rem-uaeconsultant.com
SAMPLING SOURCE : -
SAMPLE TYPE : SOIL **RECEIVED DATE** : JUNE 30, 2020
SAMPLING DATE : - **ANALYTICAL DATE** : JUNE 30 - JULY 13, 2020
SAMPLING TIME : - **REPORT NO.** : 2020-U44819
SAMPLING METHOD : - **WORK NO.** : 2020-004462
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T20A928-0002
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			P-2 T20A928-0002	
pH (1:1)	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	5.0 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	219	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	0.300
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	15.9	0.500
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	10.8	1.55
NICKEL (Ni)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	12.0	1.00
SAMPLE CONDITION			BROWN SOIL	

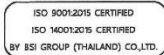
ND : NON-DETECTABLE.
 SAMPLE (S) ANALYSED ON AS RECEIVED BASIS. RESULT (S) REPORTED ON A DRY WEIGHT BASIS.

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Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
 LABORATORY SUPERVISOR

JULY 17, 2020



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ANALYSIS REPORT

PROJECT NAME : MEIK WATER DISTRIBUTION
CUSTOMER NAME : REM-UAE LABORATORY AND CONSULTANT CO.,LTD.
ADDRESS : B-702 DELTA PLAZA, SHWEGONDAING ROAD BAHAN YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : toetoehlaing@rem-uaeconsultant.com
SAMPLING SOURCE : -
SAMPLE TYPE : SOIL
SAMPLING DATE : -
SAMPLING TIME : -
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

RECEIVED DATE : JUNE 30, 2020
ANALYTICAL DATE : JUNE 30 - JULY 13, 2020
REPORT NO. : 2020-U44821
WORK NO. : 2020-004462
ANALYSIS NO. : T20A3928-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			P-3 T20A3928-0003	
pH (1:1)	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	5.4 (25°C)	-
METALS				
ARSENIC (As)	mg/kg	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	9.90	0.100
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	0.300
CHROMIUM (Cr)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	11.7	0.500
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	16.8	1.55
NICKEL (Ni)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	5.23	1.00
SAMPLE CONDITION			BROWN SOIL	

ND : NON-DETECTABLE.

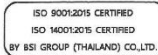
SAMPLE (S) ANALYSED ON AS RECEIVED BASIS. RESULT (S) REPORTED ON A DRY WEIGHT BASIS.

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Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
 LABORATORY SUPERVISOR

JULY 17, 2020



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Annex X. Certificate of Incorporation of BBWI&MCPC



**ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်
Certificate of Incorporation**

BBWI & MCPC COMPANY LIMITED
Company Registration No. 127095574

မြန်မာနိုင်ငံကုမ္ပဏီများဥပဒေ၂၀၁၇ အရ
BBWI & MCPC COMPANY LIMITED
အား ၂၀၂၀ ခုနှစ် ဩဂုတ်လ ၂၁ ရက်နေ့တွင်
အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ
အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့်ပြုလိုက်သည်။


This is to certify that
BBWI & MCPC COMPANY LIMITED
was incorporated under the Myanmar Companies Law 2017 on 21 August
2020 as a Private Company Limited by Shares.

ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ
Registrar of Companies


ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန
Directorate of Investment and Company Administration



Annex XI. TCR Certificate of E Guard



REPUBLIC OF THE UNION OF MYANMAR
 Ministry of Natural Resources and Environmental Conservation
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
 (ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)



No. 10028 Date 15.03.2018

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.


(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယ်စာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

<p>(a) Name of Organization (အဖွဲ့အစည်းအမည်)</p> <p>(b) Name of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏အမည်)</p> <p>(c) Citizenship of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏နိုင်ငံသား)</p> <p>(d) Identity Card /Passport Number of the representative person in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)</p> <p>(e) Address of organization (ဆက်သွယ်ရန်လိပ်စာ)</p> <p>(f) Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)</p> <p>(g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်)</p>	<p>E Guard Environmental Services Co., Ltd.</p> <p>U Aye Thiha</p> <p>Myanmar</p> <p>12/ MRK (Naing) 069784</p> <p>No. 99, Mya Kan Thar Lane, Nyein Chan Yay Street, 10 Miles, Pyay Road, Saw Bwar Gyi Gone, Insein Township, Yangon. info@eguardservices.com, 09448001676</p> <p>Organization</p> <p>31 March 2018</p>
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EXTENSION
 သက်တမ်းတိုးခြင်း

The **VALIDITY** of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
 ဤလက်မှတ်အား (၀-၄-၂၀၁၈) မှတ်ပုံတင် (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်အထိ တိုးမြှင့်သည်။

See No. 12.7.2018
 For Director General
 (Soe Naing, Director)
 Environmental Conservation Department



Director General
 Environmental Conservation Department
 Ministry of Natural Resources and Environmental Conservation

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control
2. Ecology and Biodiversity
3. Facilitation of Meeting
4. Geology and Soil
5. Ground Water and Hydrology
6. Land Use
7. Legal Analysis
8. Modeling for Water Quality
9. Noise and Vibration
10. Risk Assessment and Hazard Management
11. Socio-Economy
12. Water Pollution Control
13. Waste Management
14. Agriculture, RAP
15. Food Technology
16. Health Impact Assessment
17. Marine and Microbiology, Water Quality
18. RS & GIS
19. Water Quality

EXTENSION (သက်တမ်းတိုးပွင့်ခြင်း)
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (30.6.2023)
ဤလက်မှတ်အား (၁-၁-၂၀၂၃) ရက်နေ့မှ (၃၀-၆-၂၀၂၃) ရက်နေ့အထိ (၆)လသက်တမ်းတိုးပွင့်သည်။
Sa Aung Thu
For Director General
(Sa Aung Thu, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးပွင့်ခြင်း)
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား (၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂) ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးပွင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးပွင့်ခြင်း)
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား (၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁) ရက်နေ့အထိ (၆)လသက်တမ်းတိုးပွင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးပွင့်ခြင်း)
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁-၁၂-၂၀၁၉) ရက်နေ့အထိ (၉)လသက်တမ်းတိုးပွင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးပွင့်ခြင်း)
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား (၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀) ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးပွင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးပွင့်ခြင်း)
The VALIDITY of this certificate is extended for six months from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား (၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁) ရက်နေ့အထိ (၆)လသက်တမ်းတိုးပွင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

(၁.၁.၂၀၂၃) မှ (၃၀.၆.၂၀၂၃) အထိ သက်တမ်းတိုးရန် ပါဝင်သည့် E GUARD
 ENVIRONMENTAL SERVICES Company Limited အဖွဲ့တွင် ပါဝင်သည့် အဖွဲ့ဝင်စာရင်း

သက်တမ်းတိုးထုတ်ပေးသည့် ရက်စွဲ။ ၃၁-၁-၂၀၂၃

No.	Members	Remarks
1.	U Aye Thiha	အထောက်အထားတင်ပြနိုင်
2.	U Soe Min	အထောက်အထားတင်ပြနိုင်
3.	U Tin Aung Moe	အထောက်အထားတင်ပြနိုင်
4.	U Saw Win	အထောက်အထားတင်ပြနိုင်
5.	Daw Yin Mar Swe Hlaing	အထောက်အထားတင်ပြနိုင်
6.	Dr. Shwe Sin Ko Ko	အထောက်အထားတင်ပြနိုင်
7.	Dr. Phyo Naing Zay	အထောက်အထားတင်ပြနိုင်
8.	Daw Thein Mwe Khin	အထောက်အထားတင်ပြနိုင်
9.	U Aung Myint Myat	အထောက်အထားတင်ပြနိုင်
10.	U Zin Ko Ko Oo	အထောက်အထားတင်ပြနိုင်
11.	Daw Yadanar Swam Htet Kyaw	အထောက်အထားတင်ပြနိုင်
12.	Dr. Khaing Ye Mya	အထောက်အထားတင်ပြနိုင်
13.	U Than Aye	အထောက်အထားတင်ပြနိုင်
14.	Dr.Borthwick Ian	အထောက်အထားတင်ပြနိုင်
15.	Ms. Lazerevn Inna	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
16.	Daw Jaint Yadanar	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
17.	Daw Saw Zar Chi	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
18.	Daw Me Me Maw	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
20.	Daw Yu Wai Yan Thein Tan	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
21.	Daw Lae Win Khine	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
22.	Daw Nyo Nyo Lwin	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
23.	Daw Khin May Lwin	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
24.	Daw Thet Mue Khin	ကုမ္ပဏီမှ ထုတ်ပယ်ထား
25.	Daw Mon Mon Khaing	ကုမ္ပဏီမှ ထုတ်ပယ်ထား




စည်းကမ်းချက်များ

- ၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-
 - (က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ။
 - (ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်ခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
 - (ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်။
 - (ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိပါက ကြားကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုး ပြောင်းလဲရမည်။
 - (င) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာတုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မပျက်မကွက် အကြောင်းကြားရမည်။
 - (စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်။
 - (ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်စုံတစ်ရာ ပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်ခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
- ၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်။
- ၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်ခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
- ၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များကိုသာ တင်ပြရမည်။
- ၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ဖျက်ပြယ်မည် ဖြစ်သည်။

Annex XII. Material Safety Data Sheets

	BBWI & MCPC Co.,LTD	Document No. : BBWI-MCPC-01
	Safety Data Sheet (SDS)	Revised : 00
	10% SODIUM HYPOCHLORITE	Effective date : 31/3/2023
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1. Chemical Product and Company Identified

PRODUCT NAME : SODIUM HYPO CHLORITE 10%
COMMON NAMES : SODIUM HYPO CHLORITE SOLUTION
 ; Antiformin, B-K liquid; Carrel- dakin solution ; Chlorox ;
 Chlorox ; Clorox ; Dakins solution ; Deosan ; Hychlorite ; Javex ;
 Klorocin ; Milton ; Neo-cleaner ; Neoseptal CL ; Parozone ; Purin B
 ; Sodium Chloride Oxide ; Sodium oxychloride ; Surchlor
GENERAL USE : BLEACHING AGENT ; DESINFECTANT ; WATER TREATMENT ;
 DEODORIZER, SOURCE OF AVAILABLE CHLORINE

COMPANY : BBWI & MCPC CO.,LTD
 A 6, Market Granden, Kannar Road, Thar Kay Ta Quarter, Myeik
 Township, Myeik District, Tanintharyi Region, Myanmar

2. Composition and Information on Ingredients

CAS No. : 7681-52-9
EC No. : 231-668-3
UN No. : 1791
Impurities and additives are stable : None

Ingredients	CAS No.	% W/W
Sodium Hypochlorite	7681-52-9	10
Water	7732-18-5	90


3. Hazard Identification

GHS Classification:

Skin Corrosion/ irritation	Category 1A-1C
Serious eye damage/ Eye irritation	Category 1

Potential Acute Health Effects

Specific target organ toxicity from single exposure.

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(Nervous system Respiratory) Category 1
 Specific target organ toxicity from repeat exposure.
 (liver Odor Respiratory) Category 1

Hazard pictograms:



Signal word : HAZZARD

Hazard statement

Repeated or prolonged contact with skin may cause dermatitis.
 Causes severe burns and eye damage.
 Dangerous for aquatic organisms.

Hazard statements:


Should be advised only before use.
 Avoid contact with skin.
 Full suite, Rubber / Nitrite glove, Eyeglasses, Safety shoes or Boots
 The area should be well ventilated.
 Do not discharge into the environment or water.

Other hazards which do not result in classification : Not available

4. First Aid Measure

Measures required by the route of exposure

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If Breathing is difficult, give oxygen. Get medical attention immediately.
 Eye Contact : Check for and remove any contact lenses. In case of contact, immediately Flush eyes with plenty of water for at least 15 minutes, Cold water may be Used. Get medical attention immediately.

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Skin Contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the Irritated skin with an emollient. Cold water may be used. Wash clothing Before reuse, Thoroughly clean shoes before reuse, Get medical attention Immediately.

Ingestion : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight Clothing such as a collar, tie, belt or waistband, Get medical attention if Symptoms appear.

Symptoms / Significant Effects

Respiratory : Cough, sore throat, shortness of breath, laryngitis, headache, nausea and Vomiting may be fatal

Eyes : Red eyes, burning eyes.

Skin : Red skin, burn skin

Inhalation : Burns, abdominal pain, nausea, vomiting, shock, unconsciousness.

Medical Considerations : Immediate medical attention and specific care should be taken : lung x-ray.

5. Fire Fighting Measures

Suitable extinguishers media : Water spray, Carbon dioxide, Foam and Dry Powder

Unsuitable extinguishers media : Not applicable

Specific hazards arising from chemicals : Not flammable In case of fire, gases and vapors are Generated. Corrosive, including chlorine.

Special protective equipment and precautions for firefighters:


Chemical protection suit wearing mask, including eye protect and boots. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA)

6. Accidental release Measure

Personal precaution : Evacuate area

: Do not inhale substance

: Do not inhale vapors

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Personal protection : Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact Containers and nearby storage areas.

Environmental precaution : Prevent spillage from entering drain

Method and materials for containment and cleaning up :

: Wear full protective equipment

: Filter respirator with filter

: Wearing Goggles

: Ventilate area of exhaust gas.

: Use plastic contaminated loading equipment

: Prepare bags and plastic buckets (with lid)

Put a plastic bag in the bag and put it into a plastic bucket "Accidental Chemicals" disposed of as required.

7. Handling and Storage

Handling

Avoid prolonged contact with substance. Provide adequate ventilation in the work area.

Storage

Keep container tightly closed. Keep in a well-ventilated place. Store in a cool, dry and well-ventilated place away from heat, light, acid and reducing agents

8. Exposure Control / Personal Protection

Exposure Limits:

OSHA PEL : 1 ppm.as Cl₂, STEL : 3 ppm.as Cl₂

NIOSH ๒๓๓๕๐๒๓

ACGIH TL V: 0.5 ppm.as Cl₂, TWA : 0.5 ppm.as Cl₂


AIHA WEEL : 2 mg/m³, 15 minute TWA as Cl₂

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection

Respiratory : Wear protective vapor mask.

Eye / Face : Safety glasses or eyewear or face shield.

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Hands : Nitrite or rubber gloves

Body : Full suit



Instruction : Change contaminated clothing.

: Wash hands and face after working with substance. Before eating smoke or toilet

: Do not eat drink or smoke in workplace

9. Physical and Chemical Properties

Appearance

Odor : Yellow to greenish liquid

Odor threshold : Pungent

pH : 0.77 ppm

Melting point/ freezing point : 10.8-13.0

: -19.4 °C

Initial boiling point and boiling rang : 111 °C

Specific gravity : 1.19

Flash point : Non Flammable

Vapor : Not available

Flammability : Non Flammable

Upper / lower flammability (% v/v) :

Lower : Not available

Upper: Not available

Vapor pressure : 1.6 kPa, Temp. 20 °C 12.5% available chlorine

Vapor Density (Air = 1) : 2.61


Relationship density (Water = 1) : 1.20, Temp. 20 °C 12.28% available chlorine

Solubility : Easily soluble in cold water.

Coefficient of solubility in n-octanol layer on water. (Log Kow) : Not available

Decomposition temperature : Not available

Viscosity : 2.6 cP, Temp. 20°C (15% available chlorine)

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10. Stability and Reactivity

Reaction : Reacts violently or explodes with strong acids. (Hydrochloric Acid, Nitric Acid Acid compounds (Aluminium Chloride, Ferric Chloride, Alum) Acid-based cleaning Compounds (Brick, concrete cleaners) Ammonia compounds (Ammonium Chloride, Ammonium Hydroxide, Quaternary Ammonium salts) Will release chlorine gas and Other toxic gases. Reacts violently with organic substances (Solution, fuel, alcohol, Insecticide and glycols). Amines, Organic Polymer **cause** Chlorine, Chlorinated Organic compounds and explosives. React with the reducing agent (Sodium Bisulfite, Sodium Thiosulfate) to heat.

Stability : The product is stable

Special remarks on reactivity : Will not occur

Conditions of Instability : Heat, Air, Decomposes into oxygen,

Polymerization : Hydrogen Peroxide, Reducing agent, Metal (Copper Nickel Cobalt and Iron) do not use equipment made with Stainless Steel, Aluminum, Carbon Steel It will give oxygen To make the container tear,

Hazardous decomposition products : Chlorine, Oxygen

11. Toxicological Information

Respiratory contact : Burning, Itching, Coughing, Shortness of breath

Skin contact : Burning, Itching, Redness, inflammation upon expose tissue.

Skin Absorption : Not available

Eyes contact : Eyes burns, Watering eyes

Ingestion : Nausea, Vomiting, Diarrhea, burning, serve pain

Symptoms of Exposure : Corrosive eyes Skin and respiratory tract Make pneumonia, muscle Spasms


Acute toxic : Corrosive eyes Skin and respiratory tract Make pneumonia

Acute oral toxicity : LD50 (Oral, Rat) : >5000 mg/kg

Acute respiration toxicity : LC50 (Rat) : >10, 5000 mg/ m³ (Guinea pig)

Acute oral toxicity : LD50 (Dermal, rabbit): >10,000 mg /kg

Chronic Effects : Causes skin irritation. Bronchitis As a result, sputum coughs frequently.

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12. Ecological Information

Fish toxicity	: Clupea harengus LC50: 0.065 mg/L/96 hours
Crustacean Toxicity	: Daphnia magna EC50: 0.032 mg/L/48 hours
Algal Toxicity	: Gracilaria tenuistipitata Red algae EC50: 46 mg/L-96 hours
Long residue and biodegradability	: rapid biodegradation.
Potential for bioaccumulation	: No
Mobility in soil	: Not available
Other adverse effect	: Not available

13. Disposal Consideration

Waste Disposal : Contact a licensed waste disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Air Purifier Observe local laws and regulations


Disposing of contaminated containers: Dispose of in accordance with official regulations. Containers That have been contaminated by chemicals are handled the same way as chemicals.

14. Transport Information

UN number	: 1791
Correct name in UN Transportation	: HYPOCHLORITE SOLUTION
Hazard Class for Transportation	: 8
Packing group	: II
Marine pollutant	: Not available
Transport in bulk	: Tank L4BN (+)
Special precaution for user	: No data available

15. Regulatory Information

Product name	: Sodium Hypochlorite
INTERNATIONAL REGULATION CANADA	: No control from WHMIS.
U.S. Inventory	: TCSA 8 (b)


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NFPA RATING

Health	3
Fire	0
Reactivity	1
Special hazard	-

16. Other Information

The information provided in this document will facilitate accurate safety information. In terms of Storage, transportation and hazards to workers.

 BBWI & MCPC	BBWI & MCPC Co.,LTD	Document No. : BBWI-MCPC-02
	Safety Data Sheet (SDS)	Revised : 00
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10% Poly Aluminum Chloride	Page : 1/6	

1. Chemical Product and Company profile

Product Name : POLY ALUMINIUM CHLORIDE 10%
 Chemical Name : POLY ALUMINIUM CHLORIDE SOLUTION
 Synonyms/Generic names : PAC Solution, PACL, Poly aluminium Chloride Hydroxide Sulfate, Aluminium Chloride Hydroxide Sulfate, Aluminium hydroxychlorosulfate

Chemical Formula : Al_2O_3

Identified uses : Treatment of drinking water, has received approval by the European Committee for Standardization. Treatment of waste water.

Company : A 6, Market Carden, Kannar Road, Thar Kay Ta Quarter, Myeik Township, Myeik District, Tanintharyi Region, Myanmar

2. Composition and Information on Ingredients

Ingredients	CAS number	% W/ W
Poly aluminum	39290-78-3	9-10
Water	7732-18-5	89-90

EC No. 254-400-7

Composition Comments

The product is formed by the action of hydrochloric and sulfuric acids on aluminium trihydroxide, to give a solution in water. Total aluminium content is 5.3%(10% as Al_2O_3); total strength as PAC is about 25%


Utilization

The turbidity . For the production of tap water and clean water for domestic and industrial use.

Turbidity In wastewater treatment

The precipitate separates the substance from the water, such as the paper and pulp industry.

Used in the chemical and cosmetic industries.

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3. Hazard Identification

Classification of the substance or mixture

Classification (EC 1272/2008)

Physical and Chemical Hazards	Met. Corr. 1 – H290
Human health	Eye Irritation. 2- H319
Environment	Not classified.
Classification (67/548/EEC)	Xi; R36.

Hazard pictograms:



Signal word : Warning

Hazard Statements

H290	May be corrosive to metals.
H319	Causes serious eye irritation

Precautionary Statements

P280	Wear protective gloves/ protective clothing/eye protection/ face protection. P264 Wash contaminated skin thoroughly after handling.
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.


4. First Aid Measures

Inhalation : Remove victim immediately from source of exposure. Keep the affected person warm and at Rest. Get prompt medical attention..

Skin Contact : Remove affected person from source of contamination. Remove contaminated clothing. Wash Skin with soap and water. Get medical attention if irritation persists after washing.

Eyes : Remove victim immediately from source of exposure. Make sure to remove any contact lenses From the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids.
Get medical attention immediately. Continue to rinse.

Ingestion : NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Rinse mouth thoroughly. Get medical attention immediately!

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5. Fire Fighting Measures

Suitable extinguishers media : This product is not flammable. Use fire-extinguishing media appropriate for Surrounding materials. Water spray, Carbon dioxide, foam, Dry Chemical

Hazardous combustion products Fire or high temperatures create:

Corrosive gases/ fumes of: Hydrogen chloride (HCl). Sulphurous gases (Sox).

Protective equipment : Self- Contained Breathing Apparatus (SCBA) Full protective equipment

6. Accidental Release Measure

Personal precaution : Evacuate personal to safe areas.

Environmental precaution : Do not pour into surface water or drainage system.

Avoid discharge into water courses or onto the ground. Contain spillages with sand, earth or any suitable adsorbent material.

Methods and material for containment and cleaning up

Stop leak if possible without risk. Dam and absorb spillages with sand, earth or other non-combustible material.

Shovel into dry containers.

Cover and move the containers. Flush the area with water.

7. Handling and Storage

Precautions for safe and handing

Avoid spilling, skin and eye contact. Water full protective clothing for prolonged exposure and /or high concentrations. Eye wash facilities and emergency shower must be available when handling this product.

Conditions for safe storage, including any incompatibilities

Use storage tank made of: Suitable plastic material. Plastic lined steel drum.

8. Exposure Controls/ Personal Protection

Personal Protection equipment


Eye / Face protect : Goggles and face shield

Skin protect : Resistant gloves or Rubber gloves and boots, pants and coats, depending on the level of exposure.

Respiratory protect : Use a full face respirator with respirator cartridges.

Body protect : Proper protect clothing

Hygienic Practice : Always wash hands the before smoking, eating, drinking or using the toilet. Wash contaminated clothing prior to reuse.

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PPE




9. คุณสมบัติทางกายภาพและทางเคมี (Physical and Chemical Properties)

Appearance	: Liquid
Color	: Pale Yellow or Straw
Odor	: Almost Odorless
Density	: 1.2050 ± 0.003 (H ₂ O=1)
Vapour pressure (mm.Hg)	: 30mm Hg (O°C), HCL 1.3 mm Hg (AIR=1)
Flammability (°C)	: Not available
Melting point (°C)	: Below – 25 °C
pH	: 1,8-2.5
Solubility	Miscible with water Dilute solutions hydrolyse to precipitate Al(OH) ₃
Coefficient of diffusion in water/ oil;	> 1

10. Stability and Reactivity

Chemical Stability	: Stable under normal condition and pressure.
Possibility of hazardous reaction	: No reaction.
Air	: No reaction.
Materials to Avoid	: Avoid contact with chlorites, hypochlorites, and sulfites Incompatible with other aluminium salts and iron salts. Special care must be taken Regarding mixing with products previously used in order to avoid gel formation or precipitation.
Acids	: With hydrochloric acid or sulphuric acid bulk precipitation of solid Occur

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11. Toxicological Information

Basis / Alkalis : Bulk precipitation occurs with evolution of heat.
 Skin/ Eye : Causes Irritation
 Skin absorption : Repeated skin exposure may cause Dermatitis
 Ingestion : Irritation of mucous membrane brought into direct contact.
 Toxicity : Acute oral toxicity in mice 34.5g/kg.

12. Ecological Information

Persistence and degradability : Hydrolyses when diluted in water, forming $Al(OH)_3$
 Bio-accumulative potential : The product is not bio-accumulating.
 Other adverse effects : Product is acidic, and will reduce the pH of water courses and drains, and cause damage to flora and fauna. It should not be allowed to Enter controlled waters in large quantities – in such causes the National Rivers Authority should be contacted.

13. Disposal Considerations


Do not dispose directly into rivers or drains.
 Small spills may be neutralized with sodium carbonate, lime, or calcium carbonate, and flushed to sewer.
 Large amounts of aluminium salts should be contained, and then be neutralized with a weak alkali solution. The resulting suspension (mainly alumina) may be regarded as neutral waste and disposal should be in accordance with local or state or national legislation.

14. Transport Information

Correct name in UN Transportation : Poly Aluminium Chloride
 UN number : 3264
 Hazard Class for Transportation : 8
 Packing group : II

15. Regulatory Information

Notification of the Ministry of Industry Re: Transport of hazardous substances by land, 2003
 Notification of the Ministry of Interior on Safety in Working Environment (Chemical), 1977
 Notification of the Ministry of Interior on Safety in Working with Hazardous Chemicals, 2534

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Announcement of the Department of Industrial Works, Manual on Preservation on Preservation of Chemicals and Hazardous Substances, 2550

NFPA Rating

Health, Flammability, Reactivity : 1,0,0

Personal Protection / Special:

16. Other Information

The information provided in this document will facilitate accurate safety information. In terms of storage, transportation and hazards to workers.



Chemifloc Ltd.

SAFETY DATA SHEET Aluminium Sulphate Solution

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II

Section 1: Identification of the substance and of the company/undertaking

Identification of the substance or mixture

Product Name: Aluminium Sulphate Solution
Chemical Name: Aluminium Sulphate
Registration Number: 01-2119531538-36
Synonyms: Liquid Alum
Date of first issue: 17 January 2011
Version number: 06
Revision date: 24-08-2016
Supersedes date: 04-03-2016

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

Identified uses Use of aluminium salts in the treatment of raw water in the supply of either potable water or industrial process water
Use of aluminium salts to treat waste water and in sludge treatment at waste water treatment plants (WWTPs)

Uses advised against None

Details of the supplier of the safety data sheet

Manufacturer: Chemifloc Ltd
Smithstown, Shannon,
Co. Clare,
Rep. of Ireland.
Tel: 00353 61 708699
Fax: 00353 61 708698
e-mail: info@chemifloc.ie

**Emergency Telephone Number: National Poisons Information Centre,
00353 1 8379964**

Section 2: Hazards Identification

Classification of the substance

The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classificatory applies.

Classification according to Regulation (EC) no 1272/2008 as amended

Health hazards

Serious eye damage/eye irritation Category 2 H318 – Causes serious eye damage

Hazard summary

Physical hazards Not classified for physical hazards.

Health hazards Damaging to eyes. Occupational exposure to the substance may cause adverse health effects

Environmental hazards Not classified for hazards to the environment.

Specific hazards Not available

Main symptoms Not available.

Label elements
Label according to Regulation (EC) No. 1272/2008 as amended
Contains: Aluminium Sulphate



Signal word Danger
Hazard statements H318 - Causes serious eye damage
H290 Corrosive to metals only applies if pH <2

Precautionary statements

Prevention P280 – Wear eye/face protection
P264 - Wash hands thoroughly after handling.
Response P305+351+338 – IF IN EYES: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
P337+313 - If eye irritation persists: Get medical advice/attention.

Hazardous components which must be listed on the label:

10043-01-3 Aluminium Sulphate
Further information The product is classified and labeled in accordance with EC directives or respective national laws.
Other hazards: None.

Section 3: Composition/Information on Ingredients

Substance

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	INDEX No.	Notes
Aluminium Sulphate	20-30	10043-01-3	01-2119531538-36	-	#
Water	70-80	233-135-0 7732-18-5			

Classification: CLP: Eye Dam, 1;H318
Composition comments The full text for all H-phrases is displayed in section 16.

Section 4: First Aid Measures

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. No hazards which require special first aid measures.

Description of first aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Immediately flush skin with plenty of water. Get medical attention if irritation develops or persists.

Eye contact Important! Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If possible use lukewarm water. Consult a physician. Do not rub the eyes, mechanical irritation. Continue rinsing eyes during transport to hospital.

Ingestion If ingestion of a large amount does occur, seek medical attention. Rinse mouth with water.

Most important symptoms and effects, both acute and delayed Corrosive effects, May cause irreversible eye damage.

Indication of any immediate medical attention and special treatment needed Rinse with plenty of water.

Section 5: Firefighting measures

General fire hazards	Non-combustible, substance itself does not burn.
Extinguishing media	
Suitable extinguishing media	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing Media	None known.
Special hazards arising from the substance or mixture	The product itself does not burn. No unusual fire or explosion hazards noted. May decompose upon heating to produce corrosive and/or toxic fumes. Sulphur Oxides (SOx).
Advice for firefighters	
Special protective equipment for firefighters	Wear self-contained breathing apparatus and protective clothing.
Special firefighting procedures	No unusual fire or explosion hazards noted.

Section 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures	
For non-emergency personnel	Keep unnecessary personnel away. Local authorities should be advised if significant spillages cannot be contained. Stay upwind.
For emergency responders	Not available.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not contaminate water.
Methods and material for containment and cleaning up	Should not be released into the environment. Prevent entry into waterways, sewers, basements or confined areas. Large Spills: Dike the spilled material, where this is possible. Soak up with inert absorbent material. Cover with plastic sheet to prevent spreading. Absorb spillage to prevent material damage. Absorb in vermiculite, dry sand or earth and place into containers. Sweep up or gather material and place in appropriate container for disposal. Following product recovery, flush area with water. After removal flush contaminated area thoroughly with water. Clean up in accordance with all applicable regulations. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste. After removal flush contaminated area thoroughly with water. This material and its container must be disposed of as hazardous waste. For waste disposal, see Section 13.
Reference to other sections	Not available.

Section 7: Handling and storage

Precautions for safe handling	Avoid contact with eyes. Avoid prolonged exposure. Wash hands thoroughly after handling. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.
Conditions for safe storage, including any incompatibilities	Keep container tightly closed. Keep only in the original container. Store in corrosive resistant/container with a resistant inner liner. Keep out of the reach of children. Store in rubber lined mildsteel or plastic tanks. Avoid freezing. Keep away from incompatible materials.
Materials for packaging:	Suitable material: plastic (PE, PP, PVC), fiberglass-reinforced polyester, epoxy-coated concrete, titanium, acidproof or rubber-coated steel.
Materials to avoid:	Bases, non-acid proof metals (for example aluminium, copper and iron), Avoid contact with unalloyed steel or galvanized surfaces.
Other data:	Stable under recommended storage conditions.
Specific end use(s)	The specified uses for this material are shown in section 1 of this document.

Section 8: Exposure controls / personal protection

Control parameters

Occupational exposure limits

Ireland
United Kingdom

Components	Type	Value	Form
Aluminium sulphate (10043-01-3)	TWA	2 mg/m ³	Soluble aluminium salts

Biological limit values No biological exposure limits noted for the ingredient(s).
Recommended monitoring procedures Not available.

DNEL

Components	Type	Route	Value	Form
Aluminium Sulphate (10043-01-3)	Consumer	Oral	3.4 mg/kg bw/day	Long term Systemic effects
	Industry	Inhalation	20.2 mg/m ³	Long term Systemic effects

PNEC

Components	Type	Route	Value	Form
Aluminium Sulphate (10043-01-3)	Not applicable	STP	20 mg/l	
		Water	0.3 µg/l	Freshwater
		Water	0.03 µg/l	Marine water

Exposure Controls

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Good general ventilation should be sufficient to control airborne levels. Local exhaust is suggested for use, where possible, in enclosed or confined spaces. Ventilation should effectively remove and prevent build up of any aerosols or mists generated from the handling of the product.

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

Individual protection measures, such as personal protective equipment.

General information Eye wash fountain is recommended.

Eye/face protection Wear eye face protection. (EN166)

Skin protection

- **Hand protection** Wear protective gloves. Chemical resistant gloves made of butyl rubber or nitrile rubber category III according to EN 374.
- **Other** Normal work clothing (long sleeved shirts and long pants) is recommended.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Thermal Hazards Not available

Hygiene measures	Avoid contact with eyes. Handle in accordance with good industrial hygiene and safety practices.
Environmental exposure controls	Not available.

Section 9: Physical and chemical properties

General information (Appearance, odour)

Physical State	Aqueous solution
Colour	Clear
Odour	Not significant

Important health safety and environmental information

pH	2.0 – 2.5
Melting point/range	< -15 °C (< 5 °F)
Boiling point / range	not applicable, In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.
Flash point	not applicable, In accordance with column 2 of REACH Annex VII, the study does not need to be conducted., inorganic compound
Flammability (solid, gas)	does not sustain combustion.
Explosive properties	
- Lower explosive limit	not applicable
- Upper explosive limit	
Vapour Pressure	not applicable, In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.
Density	1.32 g/cm ³
Solubility(ies)	
- Water solubility	miscible
Partition coefficient (n-octanol/water)	not applicable, inorganic compound.
Thermal Decomposition	650°C
Other information	Crystallisation Point: -7°C for a typical solution of aluminium content of 42.4 g/kg of solution

Section 10: Stability and reactivity

Reactivity	Can corrode base metals in the presence of water.
Chemical stability	Stable under recommended storage conditions.
Possibility of hazardous reactions	Corrodes metals under influence of moisture.
Conditions to avoid	Reacts violently with strong alkaline substances. This product may react with reducing agents. Do not mix with other chemicals.
Incompatible materials	Bases, non-acid proof metals (for example aluminium, copper and iron) Avoid contact with unalloyed steel or galvanized surfaces.
Hazardous decomposition products	sulphur oxides (SO _x)
Thermal decomposition	650°C.

Section 11: Toxicological information

General information	Not available.
Information on likely routes of exposure	
Ingestion	Not applicable.
Inhalation	Not applicable.
Skin contact	Not applicable.
Eye contact	Causes serious eye irritation.
Symptoms	Irritation, redness, blurred vision.

Information on toxicological effects

Acute toxicity Not classified.

Components	Test results
Aluminium Sulphate (10043-01-3)	Acute Dermal LD50 Rat > 5000 mg/kg Acute Inhalation LC50 Rat > 5000 mg/m ³ 4.00 hours Acute Oral LD50 Rat: 2000-5000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Not classified.
Serious eye damage/eye irritation	Causes serious eye damage. Dust in the eyes will cause irritation.
Respiratory sensitization	Not classified.
Skin sensitisation	Not classified.
Germ cell mutagenicity	Not classified.
Carcinogenicity	Not classified.
Reproductive toxicity	Not classified.
Specific target organ Toxicity – single exposure	Not classified.
Specific target organ Toxicity – repeated exposure	Not classified.
Aspiration hazard	Not classified
Mixture versus substance Information	Not known
Other information	None known.

Section 12: Ecological information**Toxicity**

Components	Test results
Aluminium Sulphate (10043-01-3)	NOEC Brook trout (<i>Salvelinus fontinalia</i>): 13µg/l 60.00 days dissolved Al LC50 Brown trout (<i>Salmo trutta</i>): 15µg/l 42.00 days dissolved Al EC50 Daphnia: 212 – 1260 µg/l 48.00 hours dissolved Al EC50 Daphnia: > 200 mg/l 48.00 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability	The product solely consists of inorganic compounds which are not biodegradable.
Bioaccumulative potential	Not assigned.
Mobility	Not assigned.
Environmental fate – Partition coefficient	Not applicable.
Mobility in soil	Not assigned.
Results of PBT and vPvB assessment	None known.
Other adverse effects	None known.

Section 13: Disposal considerations

Residual waste	Not available
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal.
EU waste code	Not available.
Disposal methods/information	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not dispose of waste into sewer. Dispose of contents/container in accordance with local/regional/international regulations.

Section 14: Transport information

RID/ADR:

UN Number: 3264
UN Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminium Sulphate Solution)
Transport hazard class(es) 8
Subsidiary class(es) 8
Packing group III
Environmental hazards No
Labels required 8
Special precautions for user Not available.
IATA

UN Number: 3264
UN Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminium Sulphate Solution)
Transport hazard class(es) 8
Subsidiary class(es) 8
Packing group III
Environmental hazards No
Labels required 8
Special precautions for user Not available.
IMDG

UN number UN3264
UN proper shipping name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminium Sulphate Solution)
Transport hazard class(es) 8
Subsidiary class(es) 8
Packing group III
Marine pollutant No
EmS No. F-A, S-B
Special precautions for user Not available.



ADR



IMDG



IATA

Section 15: Regulatory information

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

EU Regulations

Regulation (EC) No. 2037/2000 on substances that deplete the ozone layer, Annex I
Not listed.

Regulation (EC) No. 2037/2000 on substances that deplete the ozone layer, Annex II
Not listed.

Regulation (EC) No. 850/2004 on persistent organic pollutants, Annex I

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3

Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V

Not listed.

Commission Decision 2000/479/EC on the implementation of a European pollutant emission register (EPER)

Not listed.

Regulation (EC) No. 1907/2006, Article 59(1). Candidate List

Not listed.

National regulations Not available.

Other regulations Prepared in accordance with Annex II of the REACH Regulation (EC) 1907/2006 as amended by Commission Regulation (EU) 453/2010, and with CLP Regulation (EC) 1272/2008.

Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for the components of this mixture.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances(PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

Section 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H318	Causes serious eye damage.
H290	Corrosive to metals only applies if pH <2

Training advice Not available

Further information

Disclaimer.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revised sections Changes made to this document since the previous revision can be found in section(s), 1, 2, 9, 16.

Issue date: 24-08-2017
Revision date: 24-08-2017
Print date: 24-08-2017

Annex XIII. Commitment Letter of E Guard



E GUARD ENVIRONMENTAL SERVICES

No. 145 (A2-3), Thiri Mingalar Street (သီရိမင်္ဂလာ လမ်းဆွယ်),
Ward No. (4), 8 Mile-Pyay Road, Mayangone Township, 11062, Yang
the Republic of the Union of Myanmar
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www.eguardservices.com; info@eguardservices.com



Commitment to follow and compliance with Environmental Conservation Law, Rules, Environmental Impact Assessment Procedure, National Environmental Quality (Emission) Guidelines, Relevant Environmental Standards and Mitigation Measures stated in the Environmental Impact Assessment (EIA) Report

With regards to the above matter, we, E Guard Environmental Services Co., Ltd. have prepared the Environmental Impact Assessment (EIA) Report for Myeik Water Distribution Project. Our company strongly commits that this EIA report has been prepared by following Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedure (2015), National Environmental Quality (Emission) Guidelines (2015) and relevant environmental standards through successful implementation of mitigation measures and environmental monitoring plan stated in the Environmental Impact Assessment (EIA) Report.

U Aye Thiha

Managing Director

E Guard Environmental Services Co., Ltd.



www.facebook.com/EGuardmm/

*Annex XIV. Commitment Letters of
BBWI&MCPC*

BBWI & MCPC COMPANY LIMITED

A 6, Market Garden, Kannar Road, Thar Kay Ta Quarter, Myeik Township, Myeik District,
Tanintharyi Region, The Republic of the Union of Myanmar
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Commitment for Environmental Protection

Subject: Presentation of Performance Conditions to protect Environmental Pollution

With regard to the above matter, we, BBWI&MCPC Company Limited, has carried on works associated with water distribution and piping system to distribute water to Myeik District. For our project operation, we have strongly promised to carry out environmental management plan to reduce environmental pollution by providing sufficient toilets in certain places, trash bags and cans in working areas, cleaning working areas every day, taking enough good drainage system for cleaning and avoid from clotting and smells, systematically discharging wastewater from the project. Solid waste from working areas has been controlled by systematic solid waste management system. We are entirely responsible for the above plans.

We also have committed to reduce noise pollution from water treatment plant and pumping stations for the peace of surrounding areas. Moreover, other pledges that provide of first aid kits, personal protective equipment, and good sanitary system for health of workers and staff and planting trees to reduce bad odors, are also included.



Mr. Kanapod Nitsiriphat

Managing Director

BBWI & MCPC CO., LTD

BBWI & MCPC

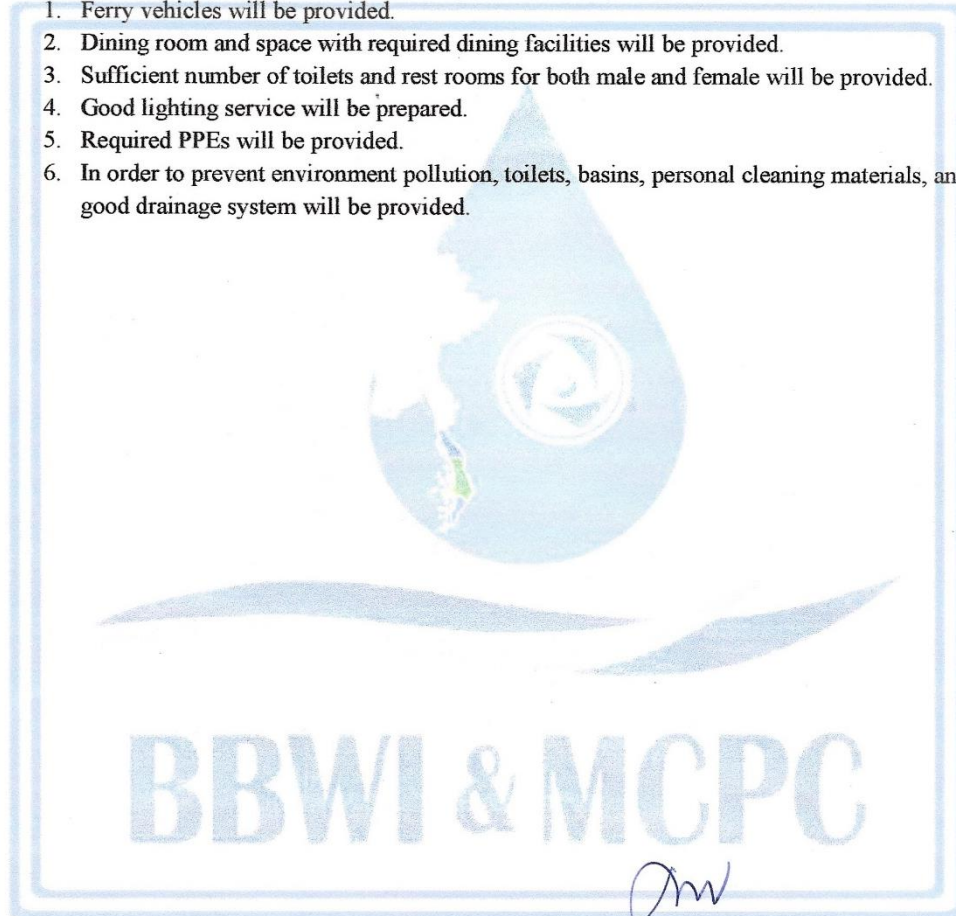
BBWI & MCPC COMPANY LIMITED

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Good Workspace and Worker Welfare Program

Water Distribution to Myeik Township, Myeik District Project of BBWI&MCPC Company Limited will prepare the following works for better workspace and worker welfare program.

1. Ferry vehicles will be provided.
2. Dining room and space with required dining facilities will be provided.
3. Sufficient number of toilets and rest rooms for both male and female will be provided.
4. Good lighting service will be prepared.
5. Required PPEs will be provided.
6. In order to prevent environment pollution, toilets, basins, personal cleaning materials, and good drainage system will be provided.



Mr. Kanapod Nitsiriphat

Managing Director

BBWI & MCPCCO., LTD

BBWI & MCPC COMPANY LIMITED

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Commitment for Income Tax

Subject: Undertaking to pay tax

With regard to the above matter, we, BBWI&MCPC Company Limited, would like to admit that the income tax of the appointed staff with the salary of above amount presented in Income Tax Law, will be cut off from the staff's salary under fixed rate and will be paid to the state.



A handwritten signature in black ink, appearing to be 'Om'.

Mr. Kanapod Nitsiriphat
Managing Director
BBWI & MCPC CO., LTD

BBWI & MCPC

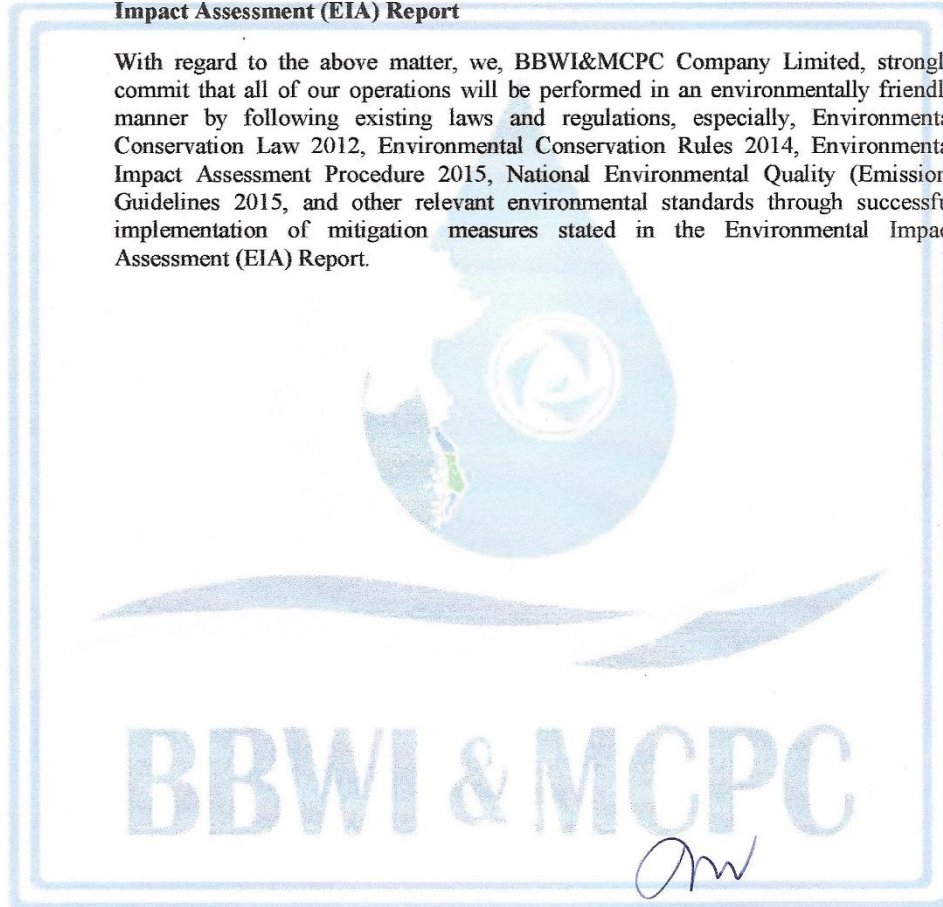
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Commitment to follow Legal Frameworks

Subject: Commitment to follow legal frameworks including Environmental Conservation Law, Rules, Procedure, Guidelines, and Standards stated in Environmental Impact Assessment (EIA) Report

With regard to the above matter, we, BBWI&MCPC Company Limited, strongly commit that all of our operations will be performed in an environmentally friendly manner by following existing laws and regulations, especially, Environmental Conservation Law 2012, Environmental Conservation Rules 2014, Environmental Impact Assessment Procedure 2015, National Environmental Quality (Emission) Guidelines 2015, and other relevant environmental standards through successful implementation of mitigation measures stated in the Environmental Impact Assessment (EIA) Report.



Mr. Kanapod Nitsiriphat
Managing Director
BBWI & MCPC CO., LTD

BBWI & MCPC COMPANY LIMITED

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FIRE SECURITY MANAGEMENT

1. Aim and Objection

BBWI&MCPC Company Limited attends to make advance prevent not to become other losses about fire hazards.

2. Location

Project Locations and Alignment

3. Work Duties

Must to be abided to overcome implement the aim and objection

- (a) Fire Hazard Prevention
- (b) Fire Die Out Works
- (c) Resettlement and Reestablishment Works

(a) Fire Hazard Prevention

Prevention works are the most of base and most of yield result, must be accurately abided the following instructions and to be abided the added instructions under time and conditions.

- (1) Conditions on fire to be removed and prohibited.
- (2) Within project, must always be cleaned a throw away materials, dustbin weed grass on fire.
- (3) The fuel oil must be stored systematically, supplying, using, and throwing away under fixed controlled method.
- (4) Within project, must be written dangerous noticed letter and hanged up "No Smoking", "Be Careful" "Use Electricity Systematically", etc. Must be done special notice on oil storage tank and other easy on fire storage place.
- (5) Electricity must be used and fixed under directions and methods of Myanmar Electrical Enterprise.
- (6) Must be fixed underground rings and diverted thunder bolt at buildings.
- (7) Must be written and fixed the office used materials in priority marks.
- (8) Form the fire prevention, fire extinguish team and will be taught training for fire emergency.
- (9) Have fire extinguishers, fire extinguish pipe tabs and water tank.

(b) Advance Works for Fire Extinguish

Prevention for fire control and if fire, must be abided the works systematically as follows;

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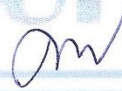
- (1) Have fire extinguish boxes, water baskets, sand baskets, fire hang and flat at every building and required place.
- (2) Must be fixed automatic fire alarm system and warning iron roads.
- (3) Must be fixed fire warning system.
- (4) If fire, must be fixed priority extinguish.
- (5) Must be assigned the daily duty the fire security team or staff.
- (6) If fire, must be done urgent the followings,
 - (a) Ring the warning bell
 - (b) Inform to Myanmar Fire Services Department that the Fire Extinguishing Motored Vehicles come and fight quickly
 - (c) Transfer the priority property to fire free space
 - (d) Fire Extinguishing

(c) Resettlement and Reestablishment Works

If on fire, made the emergency transfer the person and materials, if injury and lost, report to duty supervisors and will be done, placing, carry to clinic, hospital and medical take care, help and support.



BBWI & MCPC



Mr. Kanapod Nitsiriphat
Managing Director
BBWI & MCPC CO., LTD

BBWI & MCPC COMPANY LIMITED

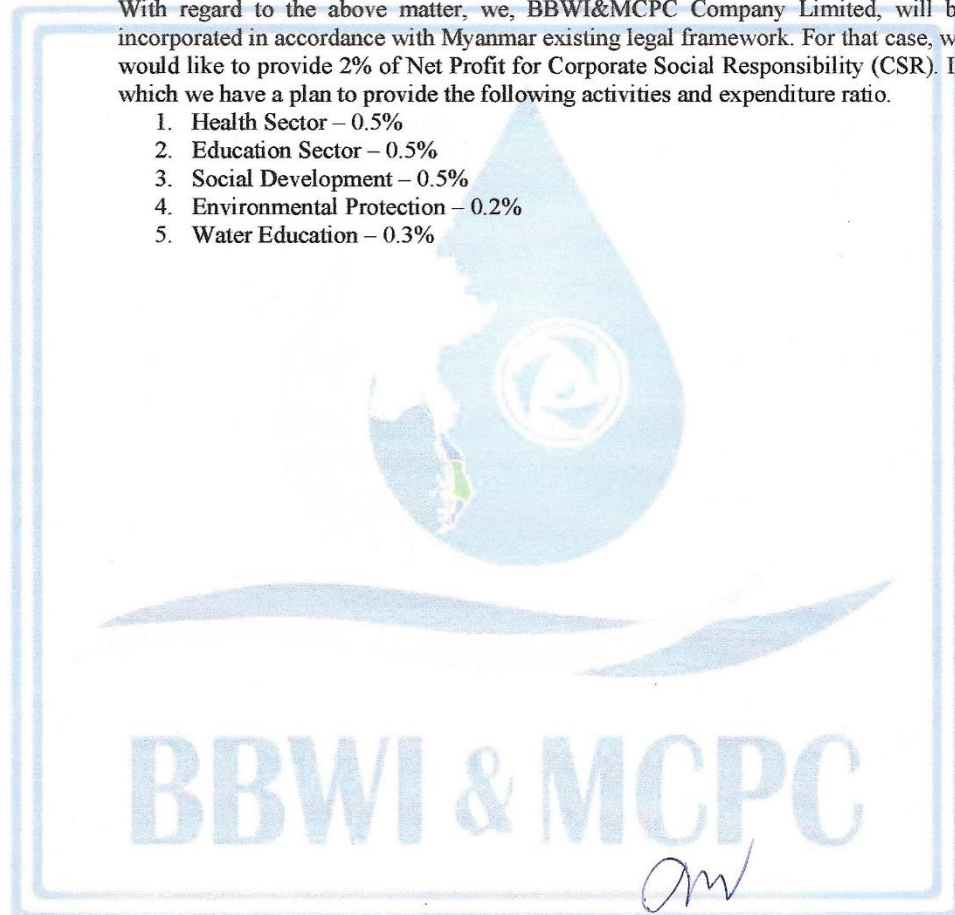
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Commitment for CSR Plan

Subject: Undertaking to Corporate Social Responsibility (CSR)

With regard to the above matter, we, BBWI&MCPC Company Limited, will be incorporated in accordance with Myanmar existing legal framework. For that case, we would like to provide 2% of Net Profit for Corporate Social Responsibility (CSR). In which we have a plan to provide the following activities and expenditure ratio.

1. Health Sector – 0.5%
2. Education Sector – 0.5%
3. Social Development – 0.5%
4. Environmental Protection – 0.2%
5. Water Education – 0.3%



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Commitment for EMP

Subject: Commitment for Environmental Management Plan

With regard to the above matter, we, BBWI&MCPC Company Limited, strongly commit that the EMP for our project is comprehensive and completed. We abide by Rules and Regulations of Myanmar, including Myanmar Environmental Impact Assessment Procedure (2015) during the preparation of EIA Report.



Mr. Kanapod Nitsiriphat
Managing Director
BBWI&MCPC CO., LTD



BBWI & MCPC