#### **MYANMAR ECONOMIC CORPORATION**

#### **OYSTER CULTURE AND PEARL PRODUCTION**

#### ENVIRONMENTAL IMPACT ASSESSMENT

Prepared by



**OLIVE BRIGHT ENVIRONMENTAL SOLUTIONS LIMITED** 

March, 2025

#### **ENDORSEMENT LETTER**

Date: 31st March, 2025

We, Myanmar Economic Corporation (MEC) refer to the captioned Environmental Impact Assessment Report for proposed Oyster Culture and Pearl Production Project, which was prepared and finalized by the third party, Olive Bright Environmental Solutions Limited (OBES). The project will follow and implement in accordance with the EIA Procedure (2015) in order to: a) develop an EIA; b) obtain an ECC; and c) take appropriate actions to mitigate adverse impacts in accordance with the law, the rules, and other applicable laws, especially, Myanmar Environmental Impact Assessment Procedure (2015) issued by the Ministry of Natural Resources and Environmental Conservation (MONREC). The project proponent will comply and implement the following commitments:

- a) the accuracy and completeness of the EIA;
- b) that the EIA has been prepared in strict compliance with applicable laws including this Procedure; and
- c) that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA.

Sincerely,

# **CONSULTANT DECLARATION**

Date: 31st March, 2025

We, Olive Bright Environmental Solutions, a local environmental consultant firm, conducted environmental impact assessment and support the professional implementation services to prepare the EIA and Term of Reference (TOR) for the Myanmar Economic Corporation and in compliance with EIA Procedure and other relevant laws/rules and formally submitted to the Environmental Conservation Department (ECD) for approval.

We shall undertake all the activities of our consultation services confirming that:

- a) the accuracy and completeness of the EIA and Term of Reference (TOR);
- b) the EIA has been prepared in strict compliance with applicable laws including this procedure; and
- c) the Project will at all times comply fully with the commitments, mitigation measures, and Term of Reference (TOR) in the EIA.

Sincerely,

Dr. Lai Lai Win Director (Olive Bright Environmental Solutions Limited)

# TABLE OF CONTENTS

LIST O	F ABI	BREVIATIONS	
အစီရင်	ခံစာဒ	ခကျဉ်းချုပ်	c
Execu	JTIVE	SUMMARY	I
Снарт	fer 1	CONTENT OF THE PROJECT	1
1.1	Int	roduction	1
1.2	ELA	A Requirements	1
1.3	Re	quirement of ESIA	1
1.	3.1	Conceptual Framework	2
1.	3.2	Components of ESIA	2
1.	3.3	Structure of ESIA	3
1.	3.4	Methodology for EISA	3
1.4	Pro	ject Proponent Information	7
1.5	Stu	dy Team for Environmental Studies	7
Снарт	TER 2	OVERVIEW OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK	10
2.1	Int	roduction	10
2.2	The	e Constitution of the Republic of the Union of Myanmar (2008)	10
2.3	Na	tional Environmental Policy	10
2.4	Na	tional Land Use Policy (2016)	11
2.5	Му	ranmar Climate Change Policy (2019)	13
2.6	Th (20	e Order on the Operation of Business Relating to Ozone Depleting Sub 014)	ostances 13
2.7	Re	evant National Legislations and Commitments	14
2.7	7.1	Environmental Conservation Law (2012)	14
2.7	7.2	The Environmental Conservation Rules (2014)	15
2.7	7.3	Environmental Impact Assessment Procedure (2015)	15
2.2	7.4	The Conservation of Water Resources and Rivers Law (2006)	16
2.7	7.5	Conservation of Water Resources and River Rules (2013)	18
2.7	7.6	The Protection of Biodiversity and Protected Areas Law (2018)	18
2.7	7.7	Natural Disaster Management Law (2013)	19
2.7	7.8	The Forest Law (2018)	20

2.7.9	Myanmar Investment law (2016)	20
2.7.10	Myanmar Investment Rules (2017)	23
2.7.11	The Myanmar Insurance Law (1993)	23
2.7.12	The Export and Import Law (2012)	24
2.7.13	The Standardization Law (2014)	24
2.7.14	Tanintharyi Region Fisheries Law (2012)	25
2.7.15	Tanintharyi Region Development Law (2017)	26
2.7.16	The Law Relating to Aquaculture (1989)	27
2.7.17	The Myanmar Pearl Law (1995)	28
2.7.18	The Myanmar Territorial Sea and Maritime Zones Law (2017)	30
2.7.19	Maritime Navigation Treaties Act (1952)	31
2.7.20	The Animal Health and Livestock Development Law (2020)	31
2.7.21	Prevention of Hazard from Chemical and Related Substance Law (2013)	33
2.7.22	Occupational Health and Safety Law (2019)	33
2.7.23	The Explosive Substances Act (1908)	35
2.7.24	Road Safety and Motor Vehicle Management Law (2020)	36
2.7.25	Road Safety and Motor Vehicle Management Rules (2022)	36
2.7.26	The Electricity Law (2014)	38
2.7.27	The Myanmar Fire Brigade Law (2015)	39
2.7.28	Labor Organization Law (2011)	39
2.7.29	The Settlement of Labour Dispute Law (2019)	39
2.7.30	The Employment and Skill Development Law (2013)	40
2.7.31	Minimum Wages Law (2013)	40
2.7.32	The Payment of Wages Law (2016)	41
2.7.33	The Leaves and Holidays Act (1951)	41
2.7.34	Social Security Law (2012)	41
2.7.35	The Workmen Compensation Act (1923)	42
2.7.36	The Farm Land Law (2012)	42
2.7.37	The Law Amending the Farmland Law (2020)	43
2.7.38	The Law Amending the Management of Vacant, Fallow and Virgin Land (2018)	l Law 43
2.7.39	Public Health Law (1972)	43
2.7.40	Prevention and Control of Communicable Disease Law (2011)	44

2.7	.41	The Control of Smoking and Consumption of Tobacco Product Law 2006	44
2.7	.42	The Protection and Preservation of Cultural Heritage Regions Law (2019)	45
2.7	.43	The Protection and Preservation of Antique Objects Law (2015)	45
2.7	.44	The Protection and Preservation of Ancient Monuments Law 2015	45
2.7	.45	The Ethnic Rights Protection Law 2015	47
2.7	.46	The Ethnic Rights Protection Rules (2019)	47
2.8	Inte	rnational Conventions, Agreements and Treaties (signed/ratified by Myan	mar) 48
2.9	Nat	ional Environmental Quality (Emission) Guidelines	49
2.9	.1	Air Emission	49
2.9	.2	Water Quality	50
2.9	.3	National Surface Water Quality Standard (2024)	50
2.9	.4	Noise Level	51
2.10	App	blication of International Guidelines	52
2.1	0.1	IFC EHS Guidelines	52
2.11	Inst	itutional Frameworks	54
СНАРТ	ER 3	PROJECT DESCRIPTION AND ALTERNATIVES	55
3.1	Bac	kground of the project	55
3.2	Proj	ject Description and Location	55
3.3	Pro	duction Process and Technology	56
3.3	.1	Long-Line System for Pearl Culture	56
3.3	.2	Oyster Culture Process	58
3.4	Proj	ject Infrastructures	61
3.4	.1	Additional Construction of Buildings	62
3.5	Res	ource Consumption	63
3.5	.1	Water consumption	63
3.5			_
	.2	Energy consumption	63
3.5	.2 .3	Energy consumption Materials	63 63
3.5 3.5	.2 .3 .4	Energy consumption Materials List of machineries and equipment	63 63 63
3.5 3.5 3.6	.2 .3 .4 Hur	Energy consumption Materials List of machineries and equipment nan Resources Requirement	63 63 63 64
3.5 3.5 3.6 3.7	.2 .3 .4 Hur Was	Energy consumption Materials List of machineries and equipment nan Resources Requirement ste Generation and Management	<ul> <li>63</li> <li>63</li> <li>63</li> <li>64</li> <li>64</li> </ul>

3.8 Fire	e Prevention and Fire Fighting	66
3.8.1	Purpose	66
3.8.2	Fire Prevention Plan	66
3.8.3	Firefighting Plan	66
3.9 Coi	nparison and Selection of Alternatives	66
3.9.1	Technology Alternative	67
3.9.2	No-Go Alternative	70
CHAPTER 4	<b>DESCRIPTION OF THE SURROUNDING ENVIRONMENT</b>	71
4.1 Intr	oduction	71
4.2 Set	ting the Study Limits	71
4.2.1	Scope of the Study Area	71
4.2.2	Setting the Area of Influence (AoI)	71
4.3 Phy	vsical Environment	72
4.3.1	Topography	72
4.3.2	Climate and Rainfall	73
4.3.3	Hydrology	74
4.3.4	Elevation	74
4.3.5	Regional Geology	77
4.3.6	Economic Geology	80
4.3.7	Structural Geology	80
4.3.8	Earthquake Intensity of Myanmar	80
4.3.9	Natural Disaster	81
4.3.10	Baseline Environmental Quality	82
4.4 Eco	logical/ Biological Environment	100
4.4.1	Result of Baseline Study of Ecology and Biodiversity Environment	104
4.5 Soc	io-Economic Conditions	136
4.5.1	Population data	136
4.5.2	Economic and livelihood	137
4.5.3	Land Use	138
4.5.4	Health Status	139
4.5.5	Education Sector	139
4.5.6	Cultural Heritage	139

4	.5.7	Transportation and Communication	139
Снар	PTER 5	POTENTIAL IMPACTS AND MITIGATION MEASURES	140
5.1	Intr	oduction	140
5.2	Me	thodology for the assessment and impact identification	140
5	.2.1	Sensitivity of Receptors	140
5	.2.2	Magnitude Of Impact	141
5	.2.3	Significance of Impacts	141
5	.2.4	Development Phases	142
5	.2.5	Impact Types	143
5.3	Pot	ential Significant Impacts and Potential Mitigation Measures	147
5	.3.1	Potential Significant Impacts on Construction Phase	147
5	.3.2	Potential Significant Impacts on Operation Phase	153
5	.3.3	Positive or Negative	158
5	.3.4	Magnitude	159
5	.3.5	Duration	160
5	.3.6	Reversibility	160
5.4	Soc	ial Environment	160
5.5	Nat	ural Hazard Vulnerability	160
5	5.1	Cyclones	160
5	5.2	Tsunami	162
5	5.3	Potential Mitigation Measures	163
5.6	Cur	nulative Impact Assessment	164
5	.6.1	Methodology	164
5	6.6.2	Assessment Metrix	165
Снар	PTER 6	Environmental Management Plan	167
6.1	Sco	pe of EMP	167
6.2	Pur	pose and Objective of EMP	167
6.3	Pro Re	ject's Environmental, Socio-economic Policies and Commitments, quirements and Institutional Arrangements	Legal 168
6	5.3.1	Legal Requirements	168
6	5.3.2	Responsibilities of Implementation of EMP for Compliance	168
6.4	Env	vironmental Management Plan	170

6.4	.1 ]	Environmental Monitoring Plan	181
6.4	.2	Water Management Plan	185
6.4	.3	Wastewater Management Plan	185
6.4	.4 `	Waste Management Plan	188
6.4	.5	Occupational Health and Safety Plan	190
6.4	.6	Community Health and Safety Plan	193
6.4	.7 ]	Emergency Preparedness and Response Plan	194
6.4	.8	Cooperate Social Responsibilities Plan	198
6.4	.9	Community Grievance Redress Mechanism	199
Снарти	E <b>R 7</b>	PUBLIC CONSULTATION AND DISCLOSURE	203
7.1	Regu	llatory Requirement Of Public Consultation Meeting	203
7.2	Obje	ctives Of Public Consultation Meeting	203
7.3	Meth	odology And Approach	203
7.4	Ident	tification Of Project Stakeholders	204
7.5	Pre-H	Engagement Meeting	204
7.6	Publi	ic Consultation Meetings (PCM)	204
7.6	.1	Summarized Outcomes of PCMs	208
7.7	Disc	losure	215
Снарти	E <b>R 8</b>	CONCLUSION AND RECOMMENDATION	217
8.1	Conc	clusion	217
8.2	Reco	ommendation	218
APPEND	DIX-1	GOVERNMENT LETTERS	220
APPEND	DIX-2	PCM ATTACHMENTS	225
APPEND	DIX-3	24 HR AIR QUALITY RESULTS	265
APPEND	oix-4	WATER QUALITY RESULTS	267
APPEND	0IX-5	SOIL QUALITY RESULTS	271

# LIST OF TABLES

Table 1.1	EIA Study Team	8
Table 2.1	Lists of Convention involvement of Myanmar	48
Table 2.2	Air Emissions (General Guidelines)	49
Table 2.3	Effluent Levels	50
Table 2.4	National Surface Water Quality Standard	50
Table 2.5	Noise Level	52
Table 3.1	Description of the project	56
Table 3.2	Type of building	61
Table 3.3	List of Machineries and Equipment	63
Table 3.4	List of workforces	64
Table 3.5	Summary of Waste Types (Construction waste and office waste)	64
Table 3.6	Operational Waste	65
Table 4.1	Annual Rainfall and Temperature of Kawthaung Township	74
Table 4.2	Natural disaster at Kawthaung Township	81
Table 4.3	Air Quality Survey Period	82
Table 4.4	Air Quality Survey Location	82
Table 4.5	Ambient Air Quality Results	85
Table 4.6	Noise Level Guidelines	88
Table 4.7	Noise Survey Period	88
Table 4.8	Noise Survey Location	88
Table 4.9	Instrument for Noise Survey	90
Table 4.10	Noise Quality Results for NQ-1 and NQ-2	90
Table 4.11	Water Quality Survey Period	91
Table 4.12	Water Quality Sampling Locations	92
Table 4.13	Surface Water Quality Results (SW-1 and SW-2)	94
Table 4.14	Surface Water Quality Results (SW-3 and SW-4)	95
Table 4.15	Soil Survey Period	96
Table 4.16	Soil Sampling Location	97
Table 4.17	Field Equipment for Soil Quality Survey	98
Table 4.18	Soil Survey Results	98
Table 4.19	Location of study sites with exact positions	106
Table 4.20	Classification system, species occurrence and list of phytoplankton (D	iatoms).
	(1,2,3= stations, $+ =$ present, $- =$ absent).	107
Table 4.21	Classification system and species occurrence and list of phytop	lankton
	(dinoflagellates). $(1,2,3 = \text{stations}, + = \text{present}, - = \text{absent}).$	110
Table 4.22	Classification system and list of zooplankton	116
Table 4.23	Species occurrence of zooplankton of present study area.	118
Table 4.24	Species occurrence and list of benthos.	125
Table 4.25	Species compositions and occurrences of Mangroves from Zerdetkyi Isl	and and
	adjacent coastal water	126

Table 4.26	Species composition and occurrence fish	130
Table 4.27	List of fishes from interview data.	131
Table 4.28	Population Data (2019)	136
Table 4.29	Number of Houses and Household Status (2019)	136
Table 4.30	Rate of Population and Ratio of Male and Female	136
Table 4.31	Number of Population of Birth Rate, Mortality and Migration	136
Table 4.32	Percentage of different Races in Kawthaung Township	137
Table 4.33	Occupational Status	137
Table 4.34	Livelihood and Employment Status	138
Table 4.35	Land Use	138
Table 5.1	Sensitivity Criteria	141
Table 5.2	Definition of Magnitude	141
Table 5.3	Impact Assessment	142
Table 5.4	Potential Impacts, Project Activities and Impact Significance of the	Proposed
	Project	144
Table 5.5	Major Cyclone hit Tanintharyi Region (2008-2021)	161
Table 5.6	Assessment Matrix	165
Table 6.1	Organizational Tasks and Responsibility of Implementation Team	169
Table 6.2	Environmental Management Plan	171
Table 6.3	Environmental Monitoring Plan	181
Table 6.4	Monitoring Plan for Wastewater Quality	186
Table 6.5	Monitoring Plan for Waste Generation	189
Table 6.6	Monitoring Plan for Occupational Health and Safety	193
Table 6.7	Monitoring Plan for Community Health and Safety	194
Table 6.8	Monitoring Plan for Community Health and Safety	198
Table 6.9	Corporate Social Responsibility Plan	198
Table 7.1	Meeting Agenda	205
Table 7.2	Attendant List	206
Table 7.3	Comment and Suggestions at Scooping Stage PCM	208
Table 7.4	Comment and Suggestions at EIA Stage PCM	210

# LIST OF FIGURES

Figure 3-1	Location of the proposed project site	56
Figure 3-2	Production Process	59
Figure 3-3	Figure Production Process	60
Figure 3-4	Project Layout Plan	62
Figure 4-1	Area of Influence (AoI) of the Proposed Project	72
Figure 4-2	Location map of Kawthaung Township	73
Figure 4-3	Elevation Map	75
Figure 4-4	Elevation Map of the project Site	76
Figure 4-5	Geological Map of the project Site Geological Succession of the proj	ect site 78
Figure 4-6	Seismic Zone Map of Myanmar	81
Figure 4-7	Air Quality Survey Locations	83
Figure 4-8	Air Quality Survey Point AQ-1	83
Figure 4-9	Air Quality Survey Point AQ-2	84
Figure 4-10	Air Quality Monitoring Station (AQM-09)	84
Figure 4-11	Wind Rose Diagram at AQ-1	86
Figure 4-12	Wind Rose Diagram at AQ-2	87
Figure 4-13	Noise Quality Survey Locations	89
Figure 4-14	Noise Quality Survey Activities	89
Figure 4-15	Digital Sound Level Meter (GM 1356)	90
Figure 4-16	24 Hr Noise Graph for NQ-1 and NQ-2	91
Figure 4-17	Surface Water Quality Survey Locations	92
Figure 4-18	Water Quality Survey Activities at SW-1	93
Figure 4-19	Water Quality Survey Activities at SW-2	93
Figure 4-20	Water Quality Survey Activities at SW-3	93
Figure 4-21	Water Quality Survey Activities at SW-4	94
Figure 4-22	Soil Survey Points	97
Figure 4-23	Soil Survey Activities at SQ	97
Figure 4-24	Forest Cover Area of Project Site	100
Figure 4-25	Myeik Archipelago and Important Biodiversity Areas	101
Figure 4-26	Land Cover Classification for Tanintharyi Region in 2016	102
Figure 4-27	Land Cover Classification for Tanintharyi Region in 2016	103
Figure 4-28	Map shown the survey area and stations of plankton, benthos and	mangrove
		106
Figure 4-29	Phytoplankton Genus and Species	111
Figure 4-30	Phytoplankton Genus and Species	112
Figure 4-31	Phytoplankton Genus and Species	113
Figure 4-32	Dinoflagellates	114
Figure 4-33	Genus wise variations in cell density of phytoplankton	115
Figure 4-34	Fluctuations in cell density of zooplankton	119
Figure 4-35	Zooplankton	120

Figure 4-36	Zooplankton.	121
Figure 4-37	Zooplankton	122
Figure 4-38	Zooplankton	123
Figure 4-39	Recorded benthos	125
Figure 4-40	Mangroves of present study area	129
Figure 5-1	Surrounding Pearl Farm of the project area.	166
Figure 6-1	EHOS Organization Chart	170
Figure 7-1	Public Consultation Meeting of EIA Stage	215

### LIST OF ABBREVIATIONS

Environmental Conservation Department
Environmental Impact Assessment
Environmental Management Plan
Initial Environmental Examination
Environmental Quality
Term of Reference
Ministry of Natural Resources and Environmental Conservation
Stakeholders Meeting
International Finance and Cooperation
World Health Organization
Japan International Cooperation Agency
National Environmental Quality Guideline
Myanmar Economic Corporation

# အစီရင်ခံစာအကျဉ်းချုပ်

# နိဒါန်း

မြန်မာစီးပွားရေးကော်ပိုရေးရှင်းအနေဖြင့် နိုင်ငံတော်၏ စီးပွားရေးမဏ္ဍိုင်အား တစ်ဖက်တစ်လမ်းမှ အထောက်အကူပြုနေသည့် ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်းအား တနင်္သာရီ တိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်းမြို့နယ်ရှိ လျှာကျွန်း(ဇာဒက်ကြီးကျွန်း) နှင့် ကြံ့ချိုကျွန်းရှိ ရေပြင်၊ မြေပြင်ဧရိယာတို့တွင် ဆောင်ရွက်ရန် ရည်ရွယ်ထားရှိသည်။

မြန်မာစီးပွားရေးကော်ပိုရေးရှင်းမှ ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း ဆောင်ရွက်လိုသည့် မြေပြင်၊ ရေပြင်နေရာနှင့် ဧရိယာများမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်-

- (က) လျှာကျွန်း(ဇာဒက်ကြီးကျွန်း)ရှိ မြေပြင်ရေပြင်ဧရိယာ ၁၀,၄၀၁ ဧက
- (ခ) ကြံ့ချိုကျွန်းရှိ မုတ်ကောင်မွေးမြူရန် အရန်နေရာ-၂ ၊ မြေပြင်ရေပြင် ဧရိယာ ၃,၇၁၄ ဧက

ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန (နေပြည်တော်) ၏ ၂၇ ရက်နေ့၊ မေလ၊ ၂၀၂၄ ရက်စွဲပါ စာအမှတ် EIA-၂/၁၆/ပုလဲ (TP) (၂၂၂၂/၂၀၂၄) အတည်ပြုချက်အရ Olive Bright Environmental Solutions Limited မှ Myanmar Economic Corporation (MEC) ကိုယ်စားပြု၍ မြန်မာနိုင်ငံ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်း (၂၀၁၅) နှင့် အညီ ရေးသားပြုစုခဲ့ပါသည်။ နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း အစီရင်ခံစာကို တင်သွင်းခဲ့ပြီး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန (နေပြည်တော်) ၏ ၂၈ ရက်နေ့၊ ဒီဇင်ဘာလ၊၂၀၂၄ ရက်စွဲပါ စာအမှတ် EIA-၂/၁၆/အတည်ပြုပြန်ကြား -SR (၅၃၅၂/၂၀၂၄) ဖြင့် အတည်ပြုချက် ရရှိခဲ့သည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် လိုအပ်သော လေ့လာမှုများကို Olive Bright Environmental Solutions Limited မှ ဆောင်ရွက်ခဲ့ပြီး လေ့လာတွေ့ရှိချက်များကို အခြေခံ၍ စီမံကိန်း တည်ဆောက်ခြင်းကာလ၊ လုပ်ငန်းလည်ပတ်ခြင်းကာလ၊ လုပ်ငန်းဖျက်သိမ်းခြင်းကာလတို့တွင် ဖြစ်ပေါ် လာနိုင်သော သက်ရောက်မှုများ၏ ပမာဏာနှင့် သိသာထင်ရှားမှုများကို ဖော်ပြထားပါသည်။ ထိုသက်ရောက်မှုများ၏ ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ချနိုင်ရန် လိုအပ်သော လျော့ပါးရေး အစီအစဉ်များကို ဤ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် ဖော်ပြထားပါသည်။

#### မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင်

ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် လက်ရှိမြန်မာနိုင်ငံ၌ ကျင့်သုံးလျှက်ရှိသော စီမံကိန်းနှင့် သက်ဆိုင်သည့်မူဝါဒများ၊ အမျိုးသားအဆင့်ဥပဒေများ၊ စီမံကိန်းနှင့် ဆက်နွှယ်နေသော ပတ်ဝန်းကျင်နှင့် လူမှုရေးကဏ္ဍများကိုပါ ဖော်ပြထားပါသည်။ အခြား ပြဌာန်းထားသော ဥပဒေများမှာ

С

အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာမူဝါဒ (၂၀၁၉)၊ အမျိုးသားမြေအသုံးချမှုမူဝါဒ (၂၀၁၆)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)၊ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄)၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) နှင့် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးထုတ်လွှတ်မှု လမ်းညွှန်ချက်များ (၂၀၁၅) အစရှိသည် ဥပဒေနှင့် နည်းဥပဒေတို့လည်းပါဝင်သည်။ ထို့အပြင် စီမံကိန်းနှင့် ဆက်စပ်နေသော နိုင်ငံတကာလုပ်ထုံး လုပ်နည်းများနှင့် လမ်းညွှန်ချက်များကိုလည်း ထည့်သွင်းဖော်ပြထားပါသည်။

#### စီမံကိန်းအကြောင်းအရာဖော်ပြချက်

မြန်မာစီးပွားရေးကော်ပိုရေးရှင်းသည် နိုင်ငံတော်ဖွံ့ဖြိုးတိုးတက်ရေးအတွက် မူဝါဒ လမ်းညွှန်ချက်များနှင့် အညီ ကုန်ထုတ်လုပ်ငန်းများအား ကျယ်ကျယ်ပြန့်ပြန့်ဆောင်ရွက်လျက် ရှိပြီး နိုင်ငံတော်၏ ကျန်းမာရေး၊ ပညာရေး၊ စီးပွားရေး၊ လူမှုရေး၊ ဘာသာ/ သာသနာရေး ၊ လုံခြုံရေး၊ စိုက်ပျိုး/မွေးမြူရေး၊ သတင်းမီဒီယာနှင့် ဆက်သွယ်ရေး၊ ဆောက်လုပ်ရေး စသည့် ကဏ္ဍအသီးသီးအတွက် လိုအပ်ချက်များအား ပံ့ပိုးထောက်ပံ့ ဖြည့်ဆည်း ဆောင်ရွက်ပေးလျက် ရှိပါသည်။

မြန်မာစီးပွားရေးကော်ပိုရေးရှင်းအနေဖြင့် နိုင်ငံတော်၏ စီးပွားရေးမဏ္ဍိုင်အား တစ်ဖက်တစ်လမ်းမှ အထောက်အကူပြုနေသည့် ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်းအား တနင်္သာရီ တိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်းမြို့နယ်ရှိ လျှာကျွန်း(ဇာဒက်ကြီးကျွန်း) နှင့် ကြံ့ချိုကျွန်းရှိ ရေပြင်၊ မြေပြင်ဧရိယာတို့တွင် ဆောင်ရွက်ခွင့်ပြုနိုင်ပါရန် ကာကွယ်ရေးဦးစီးချုပ်ရုံး(ကြည်း)သို့ တင်ပြခဲ့ရာ ခွင့်ပြုမိန့် ရရှိခဲ့ပြီးဖြစ်ပါသည်။

### ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း ဆောင်ရွက်လိုသည့် မြေပြင်ရေပြင်နေရာနှင့် ဧရိယာ

မြန်မာစီးပွားရေးကော်ပိုရေးရှင်းမှ ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း ဆောင်ရွက်လိုသည့် မြေပြင်၊ ရေပြင်နေရာနှင့် ဧရိယာများမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်-

- (က) လျှာကျွန်း(ဇာဒက်ကြီးကျွန်း)ရှိ မြေပြင်ရေပြင်ဧရိယာ ၁၀,၄၀၁ ဧက
- (ခ) ကြံ့ချိုကျွန်းရှိ မုတ်ကောင်မွေးမြူရန် အရန်နေရာ-၂ ၊ မြေပြင်ရေပြင် ဧရိယာ ၃,၇၁၄ ဧက



စီမံကိန်းတည်နေရာပြပုံ

စီမံကိန်းတည်ဆောက်မှုကို ဧရိယာနှစ်နေရာတွင် တည်ဆောက်မည်ဖြစ်သည်။



စီမံကိန်း Layout Plan

#### မွေးမြူခြင်းနှင့်ထုတ်လုပ်မှု နည်းပညာ

မုတ်ကောင် မွေးမြူခြင်းနှင့် ပုလဲထုတ်လုပ်ခြင်းလုပ်ငန်းကို Long Line Pearl Culture မွေးမြူခြင်းနည်းပညာဖြင့် ဆောင်ရွက်မည်ဖြစ်သည်။ ထိုနည်းပညာသည် အရည်အသွေးမြင့်မားသော ပုလဲများကို မွေးထုတ်ပေးနိုင်သောကြောင့် လူကြိုက်များသော နည်းပညာဖြစ်သည်။ ဤနည်းလမ်းသည် မုတ်ကောင်များကို ပင်လယ်ပြင်တွင် ကြိုးများ (longlines) ပေါ်တွင် ချိတ်ဆွဲထားခြင်းဖြင့် မွေးမြူသောနည်းစနစ် ဖြစ်သည်။ Longlines များကို ပင်လယ်ကြမ်းပြင်တွင် ကျောက်ချထားရှိပြီး buoys များဖြင့် ထောက်ပံ့ထားသည်။ ထိုစနစ်သည် မုတ်ကောင်များကို ရေပြင်အတွင်း သတ်မှတ်ထားသည့် အနက်တွင် ထိန်းချုပ်နိုင်သော အနေအထားရှိနိုင်ရန် ခွင့်ပြုသည်။ MEC သည် ယခုတွင် မုတ်ကောင်များကို Longline ၁၀ လိုင်းကို foundations ၄ ခုဖြင့် ထိန်းချုပ်ထားကာ မွေးမြူထားရှိသည်။ ၂၀၂၃-၂၀၂၄ ဘဏ္ဍာရေးနှစ်အတွင်း Longline ၁၆ လိုင်းကို ပြီးစီးမည်ဖြစ်ပြီး၊ ၂၀၂၄-၂၀၂၅ ဘဏ္ဍာရေးနှစ်အတွင်း ထပ်မံ Longline ၁၆ လိုင်းကို ထည့်သွင်းမည်ဖြစ်သည်။

#### အရင်းအမြစ်များ သုံးစွဲခြင်း

ပုလဲမွေးမြူထုတ်လုပ်ခြင်းလုပ်ငန်းသည်တခြားသော ရေအခြေပြုမွေးမြူရေးစနစ်များ (ဥပမာ- ငါးမွေးမြူရေး) နှင့် နှိုင်းယှဉ်လျှင် အရင်းအမြစ်များကို နည်းပါးစွာသာ လိုအပ်သဖြင့် ပိုမိုတည်တံ့နိုင်သော စနစ်ဖြစ်သည်။ မုတ်ကောင်များသည် ရေသန့်စင်နိုင်သော သတ္တဝါများဖြစ်၍ ရေအရည်အသွေးကို ကောင်းမွန်စေနိုင်ပြီး ရေညစ်ညမ်းမှုကို လျော့ချစေနိုင်သည်။ Longline မုတ်ကောင်မွေးမြူရေးစနစ်သည် ပင်လယ်ပြင် ဂေဟဗေဒစနစ်ကို အရင်းခံပြီး ရေချိုနှင့် အခြားအရင်းအမြစ်များ သုံးစွဲမှု နည်းပါးသည်။ ရေသုံးစွဲမှုမှာ ဝန်ထမ်းများ၏ နေထိုင်မှုဆိုင်ရာ သုံးစွဲမှုများနှင့် မုတ်ကောင်ခြင်းများ၊ ပိုက်ကွန်များနှင့် ကြိုးများကို (၂)လ လျှင် တစ်ကြိမ် ဆေးကြောရှင်းလင်းခြင်းတွင် အသုံးပြုမည် ဖြစ်သည်။ ရေချိုကို အဝီစိတွင်းနှင့် အနီးရှိ စမ်းချောင်းမှ ရယူမည်ဖြစ်သည်။ ဝန်ထမ်း ၄၆ ဦးအတွက် တစ်နှစ်လျှင် လိုအပ်သည့် ရေသုံးစွဲမှုမှာ ၁,၁၇၅,၃၀၀ လီတာခန့် ဖြစ်သည်။

စီမံကိန်း၏ စွမ်းအင်အသုံးပြုမှု သည် မွေးမြူရေးလိုင်းများအားထိန်းသိမ်းခြင်း၊ ပုလဲထုတ်လုပ်မှုနှင့် ပုလဲဖော်ရာတွင် အသုံးပြုသော စက်လှေများတွင် အဓိကအားဖြင့် အသုံးပြုသည်။ စီမံကိန်းအတွက် လိုအပ်သည့် လျှပ်စစ်မီးကို ကိုယ်ပိုင်ဓာတ်ဆီ မီးစက်များမှ ရယူမည်ဖြစ်သည်။ လျှပ်စစ်မီးလိုအပ်ချက်မှာ တစ်ရက်လျှင် ၁၀၈ kWh ဖြစ်ပြီး၊ လိုအပ်သည့် ဒီဇယ်ပမာဏမှာ တစ်နေ့လျှင် (၃၁) လီတာဖြစ်သည်။ ဒီဇယ်မီးစက်များနှင့် မော်တာလှေများအတွက် တစ်ရက်လျှင် လိုအပ်သည့် စုစုပေါင်း ဒီဇယ်အသုံးစွဲမှုမှာ ၅၆ လီတာဖြစ်သည်။

စီမံကိန်းအတွက် နည်းပညာ၊ ငွေကြေး၊ ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ဆိုင်ရာ အခြားနည်းလမ်း ရွေးချယ်ခြင်းတို့ကို လေ့လာဆန်းစစ်ထားပါသည်။ အခြားနည်းလမ်းရွေးချယ်ခြင်း ဆိုသည်မှာ မွေးမြူရေးဆိုင်ရာ လုံခြုံစိတ်ချရမှုနှင့် အလုပ်အကိုင်အခွင့်အလမ်းများ ရရှိနိုင်ရန်အတွက် အဆိုပြု တည်နေရာနှင့် နည်ပညာများကို လေ့လာဆန်းစစ်ခြင်း ဖြစ်သည်။ ဤ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အဆင့်တွင် ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေပြုဆန်းစစ်ခြင်းကို ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်အပေါ်တွင် သက်ရောက်မှုများကို ဆန်းစစ်နိုင်ရန် လေ့လာခဲ့ပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေပြုလေ့လာခြင်း တွင်ပါဝင်သော လေအရည်အသွေး၊ မြေအရည်အသွေး၊ ဆူညံမှု၊ ဂေဟဗေဒစနစ်နှင့် လူမှုရေးဆိုင်ရာ စစ်တမ်းကောက်ယူခြင်းများကို အောက်ဖော်ပြပါ ပုံ ရှိ ဧရိယာအတွင်းတွင် တိုင်းတာလေ့လာခဲ့ပါသည်။



Area of Influence (AoI) of the Proposed Project

#### ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ

အခြေခံ ပတ်ဝန်းကျင်အရည်အသွေးဆိုင်ရာ လေ့လာချက်များကို ၁၅ ရက် -၁၇ ရက် ဇူလိုင်လ၊ ၂၀၂၄ ခုနှစ်တွင် တိုင်းတာခဲ့သည်။ လေအရည်အသွေးဆိုင်ရာ တိုင်းတာချက်များကို Air Quality Monitoring Station AQM (09) ဖြင့် Camp & Office နေရာနှင့် ပုလဲမွေးမြူမည့် နေရာတွင် တိုင်းတာခဲ့ပြီး ဖော်ပြပါ ပါရာမီတာများကို တိုင်းတာခဲ့သည်။ Particulate Matters (PM10 and PM2.5)၊ NO2, SO2, TSP, RH, Temperature နှင့် O3. တိုင်းတာရရှိသော ရလဒ်များကို National Environmental Quality (emission) Guideline, 2015 ဖြင့် နှိုင်းယှဉ်ခဲ့ပြီး ရလဒ်များသည် သတ်မှတ်စံချိန်စံညွှန်း အတွင်း တည်ရှိကြောင်း လေ့လာတွေ့ရှိရပါသည်။

ဆူညံသံကို နေ့အချိန်နှင့် ညအချိန်တွင် Camp & Office နေရာနှင့် ပုလဲမွေးမြူမည့် နေရာတွင် တိုင်းတာခဲ့ပြီး တိုင်းတာရရှိသော ရလဒ်များကို National Environmental Quality (emission) Guideline, 2015 ဖြင့် နှိုင်းယှဉ်ခဲ့ပြီး ရလဒ်များသည် သတ်မှတ်စံချိန်စံညွှန်း အတွင်း တည်ရှိကြောင်း လေ့လာတွေ့ရှိသည်။ စီမံကိန်းမှာ eာဒက်ကြီးကျွန်းတွင်တည်ရှိသောကြောင့် လူနေဧရိယာ စံချိန်စံညွှန်းဖြင့် နှိုင်းယှဉ်ခဲ့ပြီး ရလဒ်များသည် သတ်မှတ်စံချိန်စံညွှန်း အတွင်း တည်ရှိကြောင်း လေ့လာတွေ့ရှိရပါသည်။ ရေအရည်အသွေးကို နေရာ (၄) နေရာမှ- eာဒက်ကြီးကျွန်း၏ Upstream of Creek နှင့် Downstream of Creek ၊ လျှာကျွန်း အနီးနှင့်၊ ပုလဲမွေးမြူမည့် နေရာအနီးတွင် ကောက်ယူတိုင်းတာခဲ့သည်။ မြေပေါ်ရေ အရည်းအသွေး တိုင်းတာမှု ရလဒ်များကို National Surface Water Quality Standard, 2024 (Class V) နှင့် နှိုင်းယှဉ် ဖော်ပြထားပါသည်။ ရလဒ်များအရ arsenic, cadmium, lead နှင့် selenium မှအပ ကျန်အရည်အသွေးများသည် သတ်မှတ် စံချိန်စံညွှန်းအတွင်းတွင် တည်ရှိသည်ကို တွေ့ရှိရပါသည်။ မြေအရည်အသွေးကို စီမံကိန်း ဧရိယာအတွင်းတွင် ကောက်ယူခဲ့ပြီး laboratory of Land Use Department of Yangon Region သို့ပို့ဆောင်ဆန်းစစ်ခဲ့ပါသည်။

ဇီဝမျိုးစုံမျိုးကွဲများ လေ့လာရာတွင် စုစုပေါင်း phytoplankton မျိုးစိတ် (၅၈)မျိုးကို လေ့လာတွေ့ရှိခဲ့ပြီး ၎င်းတွင် မျိုးစိတ် (၁၆)မျိုးမှာ dinoflagellates ဖြစ်ပြီး အခြားမျိုးစိတ်များမှာ diatoms ဖြစ်သည်။ လေ့လာခဲ့သော နေရာ (၃) ခုတွင် မျိုးစိတ်တွေ့ရှိမှုများ သိသာသော ပြောင်းလဲမှု မရှိသော်လည်း မျိုးစိတ်ပါဝင်မှုပမာဏမှာ နေရာအလိုက်ပြောင်းလဲမှုရှိသည်။ Zooplankton မျိုးစိတ် (၃၇) မျိုး၊ benthos မျိုးစိတ် (၅)မျိုး၊ ဒီရေတောအပင်မျိုးစိတ် (၂၀)မျိုးနှင့် ငါးမျိုးစိတ် (၁၀) မျိုးကို လက်တွေ့လေ့လာတွေ့ရှိသည်။

#### လေ့လာဆန်းစစ်မှု နည်းလမ်းနှင့် သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း

သိသာထင်ရှားသော ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ရာ၌ သက်ရောက်သော ပမာဏနှင့် လက်ခံသူ ၏ လက်ခံနိုင်စွမ်း စသည်တို့ကို ထည့်သွင်းစဉ်းစားပါသည်။ အဆိုပြု စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာ နိုင်သော သက်ရောက်မှုများကို ဖော်ပြရာ၌ အဆင့် လေးဆင့်ဖြင့် ဖော်ပြထားပါသည်။ ၎င်းတို့မှာ အဓိကထိခိုက်မှု၊ အလယ်အလတ်ထိခိုက်မှု၊ အနည်းငယ်ထိခိုက်မှုနှင့် လျစ်လျူရှု၍ ရသော ထိခိုက်မှုတို့ဖြစ်ပါသည်။ အနည်းငယ်ထိခိုက်မှုနှင့် လျစ်လျူရှု၍ရသော ထိခိုက်မှုတို့အား သိသာ ထင်ရှားသော ထိခိုက်မှုမရှိဟု သတ်မှတ်နိုင်ပြီး အလယ်အလတ်ထိခိုက်မှုနှင့် အဓိကထိခိုက်မှုအား သိသာထင်ရှားသော ထိခိုက်မှုရှိဟု သတ်မှတ်နိုင်ပြီး အလယ်အလတ်ထိခိုက်မှုနှင့် အဓိကထိခိုက်မှုအား သိသာထင်ရှားသော ထိခိုက်မှုရှိဟု

ဖြစ်ပေါ်လာနိုင်သော ထိခိုက်မှုဆန်းစစ်ခြင်းများကို သတ်မှတ်ရာတွင် သက်ရောက်သော ပမာဏ နှင့် လက်ခံသူ၏ လက်ခံနိုင်စွမ်း အစရှိသော ကဏ္ဍအပေါ် မူတည်၍ ဆန်းစစ်သတ်မှတ်သည်။ လက်ခံသူ၏ လက်ခံနိုင်စွမ်းကို သတ်မှတ်ရာ၌ စီမံကိန်းဝန်းကျင်နှင့် ၎င်းနှင့်ဆက်စပ်သော နေရာဒေသရှိ သဘာဝပတ်ဝန်းကျင်၏ အရေးကြီးသော ဝိသေသလက္ခဏာများအပေါ် မူတည်၍ လည်းကောင်း၊ သို့မဟုတ် စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ထိခိုက်မှုအား လက်ခံသူ၏ လက်ခံနိုင်စွမ်းအပေါ် မူတည်၍ လည်းကောင်း သတ်မှတ်ပါသည်။ လက်ခံသူ၏ လက်ခံနိုင်စွမ်းကို သတ်မှတ်ရာ၌ အရမ်းမြင့်၊ မြင့်၊ အလယ်အလတ်၊ နိမ့် နှင့် မရှိသလောက်နိမ့် ဟူ၍ အမျိုးအစား (၅) မျိုးဖြင့် ဖော်ပြထားရှိပါသည်။ သက်ရောက်သောပမာဏာကို သတ်မှတ်ရာတွင် လက်ရှိကျင့်သုံး နေသော လမ်းညွှန်ချက်များ၊ မူဝါဒများ၊ ဥပဒေများနှင့်နှိုင်းယှဉ်၍ သက်ရောက်ခံ၏ ပြန်လည် ဖြည့်တင်းနိုင်စွမ်း၊ သက်ရောက်မှု၏ ကြာမြင့်ချိန် နှင့်

ତ

စီမံကိန်းကြောင့် လက်ရှိပတ်ဝန်းကျင်အပေါ်တွင် ပြောင်းလဲမှုပမာဏ အပေါ်မူတည်၍ သတ်မှတ်ပါသည်။ သက်ရောက်မှု ပမာဏကို မြင့်၊ အလယ်အလတ် ၊ နိမ့် နှင့် မရှိသလောက်နိမ့် ဟူ၍ (၄) မျိုး ခွဲခြားနိုင်ပါသည်။

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများကို စီမံကိန်းအပေါ် မူတည်၍ ဆောက်လုပ်ရေးကာလ သက်ရောက်မှုများနှင့် လုပ်ငန်းလုပ်ဆောင်စဉ်ကာလ သက်ရောက်မှုများဟူ၍ နှစ်မျိုးပိုင်းခြား နိုင်ပါသည်။ ဆောက်လုပ်ရေးကာလ သက်ရောက်မှုများမှာ ယာယီ ဖြစ်ပြီး ဆောက်လုပ်စဉ် အတွင်းသာ တွေ့ရသော ကာလတို သက်ရောက်မှုများဖြစ်သည်။ ၎င်းသက်ရောက်မှုများတွင် စီမံကိန်းနှင့် အခြားဆက်စပ်သော အဆောက်အဦးများ ဆောက်လုပ်ခြင်း၊ လမ်းဖောက်ခြင်း၊ အစရှိသည်တို့ ပါဝင်ပါသည်။ လုပ်ငန်းလုပ်ဆောင်စဉ် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများမှာ ကာလရှည် သက်ရောက်မှုများဖြစ်ပြီး၊ မုတ်ကောင်သားဖောက် မွေးမြူခြင်း၊ မုတ်ကောင်ပြုစု စောင့်ရှောက်ခြင်း၊ ပုလဲမွေးမြူခြင်း နှင့် ပုလဲဖော်ယူခြင်း အစရှိသည်တို့ ပါဝင်ပါသည်။

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှု အဆင့်	ကြွင်းကျန်သက်ရောက်မှု	
ဆောက်လုပ်ရေးကာလ			
မြေယာအသုံးချမှု	Moderate	NA	
ဇီဝမျိုးစုံမျိုးကွဲများနှင့် ၎င်းတို့ နေထိုင်ကျက်စားရာ နေရာများ	Major	Moderate	
ဆုံးရှုံးမှု	Major	moderate	
မြေတိုက်စားမှု	Moderate	Minor	
လေထုညစ်ညမ်းမှု	Moderate	Minor	
ဆူညံမှု	Moderate	Minor	
သယ်ယူပို့ဆောင်ခြင်းနှင့် ကျောက်ချခြင်း	Minor	Negligible	
ပစ္စည်းများ သိုလှောင်ခြင်း	Moderate	Minor	
ဆောက်လုပ်ရေးဆိုင်ရာ စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်ခြင်း	Moderate	Minor	
မိလ္လာအညစ်အကြေးများ စွန့်ပစ်ခြင်း	Moderate	Minor	
အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်ခြင်း	Moderate	Minor	
အပင်စိုက်ပျိုးခြင်းနှင့် မြေယာပြုပြင်ခြင်း	Moderate	Minor	
အလုပ်အကိုင်အခွင့်အလမ်းများ	Positive		
လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့်ကျန်းမာရေး	Moderate	Minor	
လုပ်ငန်းလည်ပတ်ရေးကာလ			
အရင်းအမြစ်များ သုံးစွဲခြင်း	Moderate	Minor	
မိလ္လာအညစ်အကြေးများ စွန့်ပစ်ခြင်း	Moderate	Minor	

#### ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ အကျဉ်းချုပ်

အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်ခြင်း	Moderate	Minor	
မုတ်ကောင် မွေးမြူခြင်းနှင့် ပြုစုကန်များမှ ပင်လယ်ရေ အသွင်းအထုတ် လုပ်ဆောင်ခြင်း	Minor	Negligible	
မုတ်ကောင်များတွင် ကပ်တွယ်နေသော မလိုလားအပ်သည့် အပင်များ သတ္တဝါများအား ရေချိုသုံး၍ ဖယ်ရှားခြင်း	Minor	Negligible	
မွေးမြူမုတ်ကောင်မှ ရေနေဝန်းကျင်သို့ ရောဂါပြန့်ပွားခြင်း	Minor Negligible		
မျိုးစိတ်အသစ်များဝင်ရောက်ခြင်း	Minor	Negligible	
ကျောက်ချခြင်း	Minor	Negligible	
ဆီယိုဖိတ်ခြင်း	Moderate Minor		
သယ်ယူပို့ဆောင်ခြင်း	Negligible		
သဘာဝဘေး အန္တရယ်ကျရောက်ခြင်း Major M			
အလုပ်အကိုင်အခွင့်အလမ်းများ	Pc	ositive	
လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့်ကျန်းမာရေး	Moderate	Minor	

သက်ရောက်မှုများ၊ လျော့ချရေးနည်းလမ်းများ အကျဉ်းချုပ်

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	အချိန်	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း
		ဆောက်လုပ်ရေးကာလ			
ဇီဝမျိုးစုံမျိုးကွဲများနှင့် ၎င်းတို့ နေထိုင်ကျက်စားရာ နေရာများ ဆုံးရှုံးမှု	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်	<ul> <li>မြေယာရှင်းလင်းရာတွင် ဒေသရင်း အပင်မျိုးစိတ်များနှင့် တန်ဖိုးမြင့် မျိုးစိတ်များကို ရှာဖွေ၍ ထိုမျိုးစိတ်များကို ထိန်းသိမ်းခြင်းနှင့် ပြန်လည်စိုက်ပျိုးစေခြင်း။</li> <li>ထိုလုပ်ငန်းစဉ်ကို သင့်တော်သော အစီအစဉ်ဖြင့် အကောင်အထည်ဖော်ဆောင်ခြင်း။</li> <li>မြေယာရှင်းလင်းရာတွင် အပင်ကြီးများကို ဖယ်ရှားခြင်းမှ ရှောင်ကျဉ်ခြင်း။</li> <li>ဆောက်လုပ်ရေး တာဝန်ခံများသည် ပတ်ဝန်းကျင်နှင့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ကို သိရှိလိုက်နာရမည်။</li> </ul>	ဆောက်လုပ်ရေး ကာလ တစ်လျှောက်လုံး	Moderate	MEC
မြေတိုက်စားမှု	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်	<ul> <li>မြေရှင်းလင်းခြင်းကို အမှန်တကယ် အသုံးချသော နေရာများသာ ရှင်းလင်းခြင်း။</li> <li>တူးဖော်ပြီး မြေနေရာများတွင် အပင်များ ပြန်လည် စိုက်ပျိုးခြင်း၊</li> <li>မြေပိုများကို မြေပြိုကျမှု မဖြစ်စေရန် ယာယီ မြေနံရံများ (bund) ပြုလုပ်ပြီး ပင်လယ်ထဲသို့ စီးဝင်မှု တာဆီးခြင်း။</li> <li>ဆောက်လုပ်ရေး ကာလ တစ်လျှောက်လုံးတွင် မိုးရာသီကာလတွင် မြေပိုများထားရှိသော နေရာများကို စောင့်ကြပ်စစ်ဆေးခြင်း။</li> <li>OB စွန့်ပစ်ပစ္စည်းများ ထားရှိသည့် နေရာများကို အပင်များ စိုက်ပျိုးခြင်းဖြင့် မြေတိုက်စားမှုကို ကာကွယ်ခြင်း။</li> </ul>	ဆောက်လုပ်ရေး ကာလ တစ်လျှောက်လုံး	Minor	MEC

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	အချိန်	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း
လေထုညစ်ညမ်းမှု	ဆောက်လုပ်ရေး လုပ်ငန်းခင်	<ul> <li>✓ မြေသားများကို ရေဖြန်းခြင်း။</li> <li>✓ သဲများ၊ မြေကြီးများ၊ ထားရှိသော နေရာကို</li> </ul>	ဆောက်လုပ်ရေး ကာလ	Minor	MEC
	င်ငိုင်ငမ်းနှင	ဖုံးအုပ်ထားရှိခြင်း။	တစ်လျှောက်လုံး		
		✓ ချုံများ၊ အပင်များ တူးဖော်ထားသော နေရာများနှင့်			
		မြေတူးဖောထားသော နေရာများကု မတူးဖောမှ၊ တူးဖော်နေစဉ်နှင့် တူးဖော်ပြီးကာလတွင် ရေဖြန်းခြင်း။			
		🗸 စက်ပစ္စည်းများကို ကောင်းမွန်စွာ ထိန်းသိမ်းခြင်း။			
		✓ ဖုန်မှုန့်ထွက်ရှိစေနိုင်သော ပစ္စည်းများ သယ်ဆောင်သော			
		ယာဉများသည လုပငနးခွငမှ မထွကခွာမှ အဖုံးအကာများ ဖုံးအုပ်ခြင်း။			
		🖌 ဖုန်မှုန့်များ ထွက်ရှိနိုင်သော နေရာများကို ရေဖြန်းခြင်း			
		✔ Over Burden (OB) များကို ရေဖြန်းခြင်း			
ဆူညံမှု	ဆောက်လုပ်ရေး	✓ ဆူညံမှု မြင့်မားသော လုပ်ငန်းဆောင်ရွက်ချက်များကို	ဆောက်လုပ်ရေး	Minor	MEC
	လုပ်ငန်းခွင်	နေ့အပိုင်းတွင်သာ ဆောင်ရွက်ခြင်း၊	ကာလ		
		✓ ဆောက်လုပ်ရေး လုပ်ငန်းများတွင် ဆူညံသံကို	တစ်လျှောက်လုံး		
		အနည်းဆုံးဖြစ်စေရန်၊ စက်များနှင့် အခြားပစ္စည်းများတွင်			
		အသံလျော့ချပစ္စည်းများနှင့် အသံတိတ်စနစ်များ			
		အသုံးပြုခြင်း။.			
		ု ဆူညမှု မြင့မားသော လုပငနးခွင် နေရာရှိ ့ ့ ့ ့ ့			
		အလုပ်သမားများ ကို သကဲဆိုင်သော ကိရိယာများ			
		ဝတ်ဆင်စေခြင်း၊			

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း	
သယ်ယူ၀ို့ဆောင်ခြင်းနှင့် ကျောက်ချခြင်း	Jetty area	<ul> <li>ဆူညံမှုမြင့်မားသော လုပ်ငန်းစဉ်များတွင် အခြားနည်းလမ်းများ အစားထိုး ဆောင်ရွက်ခြင်း၊</li> <li>ဆူညံမှု နည်းသော generator များကို အသုံးပြုခြင်း၊</li> <li>ဆောက်လုပ်ရေးလုပ်ငန်းများကို သားပေါက်ရာသီတွင် ကန့်သတ်ခြင်း။</li> <li>sound barrier များ တပ်ဆင်ခြင်း။</li> <li>gvákegágánágeogácson ပစ္စည်းများ သယ်ဆောင်ရာတွင် ဖိတ်စင်ခြင်းမှ ကာကွယ်ရန် အဖုံးအကာဖြင့် သယ်ယူခြင်း။</li> <li>ဖုန်မှုန့်ထွက်ရှိစေနိုင်သော ပစ္စည်းများ သယ်ဆောင်ရာတွင် ဖိတ်စင်ခြင်းမှ ကာကွယ်ရန် အဖုံးအကာဖြင့် သယ်ယူခြင်း။</li> <li>သယ်ယူပို့ဆောင်ခြင်း အရေအတွက်ကို လျော့ချခြင်း။</li> <li>သယ်ယူပို့ဆောင်ခြင်း အရေအတွက်ကို လျော့ချခြင်း။</li> <li>စက်သုံးဆီများ သယ်ဆောင်ရာတွင် သင့်တော်သော ယာဉ်အမျိုးအစား၊ ကွန်တိန်နာ အမျိုးအစားကို အသုံးပြုခြင်း၊</li> <li>စက်လှေများ ဝင်ထွက်ရာလမ်းကြောင်းများ တွင် သိသာထင်ရှားသော အမှတ်အသားများ ထားရှိခြင်း။</li> <li>စက်လှေအသုံးပြုမှု အကြိမ်အရေအတွက် ကို လျော့ချခြင်းနှင့် သန္တာကျောက်တန်းနေရာများတွင် ကျောက်ချခြင်းကို ရောင်ကျဉ်ခြင်း။</li> </ul>	ဆောက်လုပ်ရေး	Negligible	MEC
ပစ္စည်းများ သိုလှောင်ခြင်း	Storage Warehouse	<ul> <li>✓ ဆောက်လုပ်ရေးသုံးပစ္စည်းများ သိုလှောင်ခြင်းအား</li> <li>စနစ်တကျ ထိန်းချုပ်စီမံခြင်း။</li> <li>✓ သဲ၊ ဘိလပ်မြေ စသည် ကို ရေနုတ်မြောင်းများနှင့်</li> </ul>	ကာလ တစ်လျှောက်လုံး	Minor	MEC

သက်ရောက်မှု	နေရ၁	ခနရာ လျော့ချရေး နည်းလမ်း အချိန် ကြွင်းကျန် သက်ရောက်မှု	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း	
ကာက်လုပ်ကူးနိုင်သ	ကောက်လမ်းက	<ul> <li>မိုးရာသီအတွင်း မျောပါသွားခြင်းမှ ကာကွယ်ရန် ပစ္စည်းများထားရှိသော နေရာများတွင် အကာအကွယ် များဖြင့် တားဆီးခြင်း။</li> <li>စက်သုံးဆီများ ကို သင့်တော်သော ကွန်တိန်နာ အမျိုးအစားများဖြင့် သိုလှောင်ထားခြင်း။</li> <li>စက်သုံးဆီများ ထားရှိသော နေရာများတွင် သင့်လျော်သော ဆိုင်းဘုတ်များ (e.g. 'No Smoking') ထားရှိခြင်း၊</li> </ul>		Minor	MEC
ဆောက်လုပ်ရေးဆိုင်ရာ စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်ခြင်း	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်	<ul> <li>စွန့်ပစ်ပစ္စည်းများ ထားရှိသော နေရာအား သိမ်းဆည်းခြင်းနှင့် စွန့်ပစ်ရာတွင် လေ့လာမှတ်တမ်းတင် လွယ်ကူမည့် နေရာသတ်မှတ်ခြင်း</li> <li>လုပ်ငန်းခွင် ပြင်ဆင်ရာနှင့် ဆောက်လုပ်ရာတွက် စွန့်ပစ်ပစ္စည်း ထွက်ရှိမှု ပမာဏ ကို စီစစ်လျော့ချခြင်း</li> <li>ပြန်လည်အသုံးပြု၍ ရသော စွန့်ပစ်ပစ္စည်းများ (e.g. excavated sand) များကို ရေမြောင်းများနှင့် အဝေးတွင် သိမ်းဆည်း၍ ပြန်လည် အသုံးချခြင်.</li> <li>ပြန်လည်အသုံးချ မရသော စွန့်ပစ်ပစ္စည်း များ ကို သတ်မှတ်ထားသော နေရာတွင် စွန့်ပစ်ခြင်း</li> <li>မြေကြီးများ နှင့် အခြားသော ဆောက်လုပ်ရေး လုပ်ငန်းခွင် ထွက် စွန့်ပစ်ပစ္စည်းများ ကို သတ်မှတ်ထားသော နေရာတွင်သာ စွန့်ပစ်ခြင်း.</li> </ul>	ဆောက်လုပ်ရေး ကာလ တစ်လျှောက်လုံး	Minor	MEC

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း	
		<ul> <li>ဆောက်လုပ်ရေး လုပ်ငန်းမှ ထွက်ရှိသော စွန့်ပစ်ပစ္စည်းမျာ ကို ထွက်ရှိသော နေရာ အရင်းအမြစ်တွင် ခွဲခြားစေခြင်း စွန့်ပစ်ပစ္စည်း အမျိုးအစားအပေါ် မူတည်၍ စွန့်ပစ်ရေ နည်းလမ်းများကို ဆောင်ရွက်ခြင်း</li> <li>ပလတ်စတစ်၊ အမှိုက်များ၊ မှန်၊ အစာအကြွင်းအကျန်များကို လမ်းညွှန်ချက်အတိုင်း ခွဲခြားခြင်း</li> <li>Hazardous waste များကို တိုက်ရိုက်စွန့်ပစ်ခြင်းကို တားမြစ်ခြင်း</li> <li>Hazardous waste များကို စွန့်ပစ်ပစ္စည်း အမျိုးအစား ခွဲခြားမှု နည်းလမ်း၊ သိမ်းဆည့်ခြင်း၊ သယ်ယူပို့ဆောင်ခြင် အစရှိသည်တို့ကို သတ်မှတ်ထားသော လမ်းညွှန်ချက်မျာ အတိုင်း လိုက်နာ၍ စီမံခန့်ခွဲခြင်း</li> </ul>			
အပင်စိုက်ပျိုးခြင်းနှင့် မြေယာပြုပြင်ခြင်း	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်	<ul> <li>Greenbelt စိုက်ပျိုးခြင်း အစီအစဉ်ကို ဖော်ဆောင်ခြင်း။</li> <li>မြေယာပြုပြင်ရာတွင် ဒေသမျိုးရင်း မျိုးစိတ်များက စိုက်ပျိုးခြင်း။</li> <li>မြေယာပြုပြင်ရာတွင် အကိုင်းအခက် ဖြာသော အရိပ် အပင်များ ကို ထည့်သွင်းစိုက်ပျိုးခြင်း။</li> </ul>	ဆောက်လုပ်ရေး ကာလ တစ်လျှောက်လုံး	Minor	MEC
လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေး	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်	<ul> <li>စီမံကိန်း အဆိုပြုသူမှ လုပ်ငန်းခွင် ဘေးအန္တရာယ်</li> <li>ကင်းရှင်းရေး နှင့်ကျန်းမာရေး မူဝါဒ သတ်မှတ်ရေးဆွဲ</li> <li>ဆောင်ရွက်ခြင်း။</li> </ul>	ဆောက်လုပ်ရေး ကာလ တစ်လျှောက်လုံး	Minor	MEC

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	အချိန်	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း
		<ul> <li>လိုအပ်သော လုပ်ငန်းခွင် ကာကွယ်ရေး အသုံးအဆောင်များကို ထောက်ပံ့ခြင်း။</li> <li>လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းရေးနှင့် ကျန်းမာရေး လမ်းညွှန်ချက်များကို သင်တန်းပို့ချခြင်း။</li> <li>လုပ်ငန်းခွင် safety supervisors များ ခန့်အပ်ခြင်း။</li> <li>အလုပ်သမားများအား လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းရေးနှင့် ကျန်းမာရေး လုပ်ငန်းစဉ်များကို လိုက်နာစေရန် ဆောင်ရွက်ခြင်း။</li> <li>အလုပ်သမားများအား လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းရေးနှင့် ကျန်းမာရေး လုပ်ငန်းစဉ်များကို လိုက်နာစေရန် ဆောင်ရွက်ခြင်း။</li> <li>အလုပ်သမားများအား လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းရေးနှင့် ကျန်းမာရေး လုပ်ငန်းစဉ်များကို မလိုက်နာပါက ဒဏ်ရိုက်ခြင်း။</li> <li>ပင်လယ်ပြင်နှင့် နီးကပ်သော လုပ်ငန်းခွင်အတွင်း Life jackets များ ထားရှိ ဝတ်ဆင်စေခြင်းနှင့် buddy system ထားရှိခြင်း။</li> </ul>			
		လုပ်ငန်းလည်ပတ်ရေးကာလ			
အရင်းအမြစ်များ သုံးစွဲခြင်း	လုပ်ငန်းဧရိယာ	<b>ရေသုံးစွဲမှု:</b> <ul> <li>✓ ရေသိုလှောင်ခြင်း အတွက် လုံလောက်သော ကန်များထားရှိခြင်း။</li> <li>✓ မိုးရေစုဆောင်းခြင်းအတွက် လုံလောက်သော ကန်အရွယ်အစားနှင့် အရေအတွက်ထားရှိခြင်း။</li> <li>✓ နေ့စဉ်ရေသုံးစွဲမှုနှင့် လုပ်ငန်းဆောင်ရွက်ရာတွင် ထွက်ရှိသော ရေများကို ပြန်လည်သန့်စင် သုံးစွဲခြင်း။</li> </ul>	လုပ်ငန်းကာလ တစ်လျှောက်လုံး	Minor	MEC

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	အချိန် ကြွင်းကျန် သက်ရောက်မှု		လျော့ချရေး နည်းလမ်း အချိန် ကြွင်းကျန် သက်ရောက်မှု		တာဝန်ရှိအဖွဲ့အစည်း
		<ul> <li>✓ ရေပိုက်များ နှင့် ဆက်စပ်ပစ္စည်းများကို ပုံမှန်စစ်ဆေး ပြင်ဆင်ခြင်း။</li> <li>✓ ရေဆိုးများကို သေချာစွာသန့်စင်ပြီးမှ စွန့်ထုတ်ခြင်း။</li> <li><b>စွမ်းအင်သုံးစွဲမှု:</b></li> <li>✓ ဆိုလာတပ်ဆင်ခြင်း။</li> </ul>					
အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်ခြင်း	လုပ်ငန်းဖရိယာ	<ul> <li>စွန့်ပစ်ပစ္စည်းများကို ခွဲခြားသိမ်းဆည်းခြင်း။</li> <li>မုတ်ကောင်အခွံများကို မြေကြီးပြုပြင်ခြင်းနှင့် ကမ်းရိုးတမ်း တိုက်စားမှု ကာကွယ်ရာတွင် အသုံးချခြင်း။</li> <li>မုတ်ကောင်အခွံများကို ပြုပြင်အသုံးချခြင်းနှင့် မြေဆွေးအဖြစ် အသုံးချခြင်း။</li> <li>မုတ်ကောင်အသေများကို မြေသြဇာအဖြစ် ပြောင်းလဲခြင်း။</li> <li>မုတ်ကောင်အသေများကို မြေသြဇာအဖြစ် ပြောင်းလဲခြင်း။</li> <li>ပလတ်စတစ်ပစ္စည်းများကို ပြန်လည်အသုံးချခြင်း။</li> <li>ပလတ်စတစ်ပစ္စည်းများကို မြေသြဇာအဖြစ် ပြောင်းလဲခြင်း။</li> <li>အာဂွဲဂဲနစ်စွန့်ပစ်ပစ္စည်းများနှင့် မိလ္လာများကို မြေသြဇာအဖြစ် အပင်စိုက်ပျိုးရာတွင် အသုံးချခြင်း။</li> <li>အမှိုက်စွန့်ပစ်ရာ ကျင်းများကို မြေအောက်ရေ ညစ်ညမ်းမှုမဖြစ်စေရန် ကွန်ကရစ် သို့မဟုတ် linen များဖြင့် ခင်းကျင်းခြင်း။</li> <li>ပင်လယ်ရေပြင်ကို ညစ်ညမ်းစေခြင်းမှ ကာကွယ်ရန် ကြိုးများ၊ ပိုက်များနှင့် ဗော်ယာများကို လွတ်ထွက်ခြင်းမှ ကာကွယ်ရန် စနစ်တကျ ထိန်းသိမ်းခြင်း၊</li> <li>မွေးမြူရေး ဧရိယာတစ်ဝိုက်တွင် ပုံမှန်သန့်ရှင်းရေးပြုခြင်း။</li> </ul>	လုပ်ငန်းကာလ တစ်လျှောက်လုံး	Minor	MEC		
မုတ်ကောင် မွေးမြူခြင်းနှင့် ပြုစုကန်များမှ ပင်လယ်ရေ	လုပ်ငန်းဧရိယာ	✓ organic debris ရှင်းလင်းရာတွင် အသုံးပြုသော ရေကို သန့်စင်ပြီးမှ စွန့်ထုတ်ခြင်း။	လုပ်ငန်းကာလ တစ်လျှောက်လုံး	Negligible	MEC		

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	အချိန်	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း
အသွင်းအထုတ်		🖌 UV sterilization or ozone treatment ကို အသုံးပြု၍			
လုပ်ဆောင်ခြင်း		pathogens များကို ဖယ်ရှားခြင်း။			
		🗸 ရေနေအပင်များ ကို အသုံးချ၍ ပိုလျှံသော			
		အာဟာရဓာတ်များကို စုပ်ယူရန် biofiltration စနစ်ကို			
		ဆောင်ရွက်ခြင်း။			
		🗸 closed-loop စနစ်ကို အသုံးပြု၍ ရေများကို			
		လည်ပတ်စေခြင်းဖြင့် ရေလဲလှယ်သော			
		အကြိမ်အရေအတွက် ကို လျော့ချခြင်း။			
		🗸 အနယ်ချကန်များ ထားရှိ၍ ရေဆိုးများကို စွန့်ထုတ်ခြင်း။			
မုတ်ကောင်များတွင်	လုပ်ငန်းဧရိယာ	🗸 ရေလိုအပ်မှု လျော့ချနိုင်ရန် အငန်ဓာတ်နည်းပါးသော	လုပ်ငန်းကာလ	Negligible	MEC
ကပ်တွယ်နေသော		ရေများဖြင့် ရှင်းလင်းခြင်း။	တစ်လျှောက်လုံး		
မလိုလားအပ်သည့် အပင်များ		🗸 မုတ်ကောင်ခြင်းများတွင် biofouling Organism			
သတ္တဝါများအား ရေချိုသုံး၍		များကြီးထွားနှုန်း နှေးစေရန် biodegradable anti-fouling			
ဖယ်ရှားခြင်း		coatings များ သုတ်ခြင်း။			
		<ul> <li>Biofouling အမှိုက်များကို သိမ်းဆည်း၍ မြေဩဇာအဖြစ်</li> </ul>			
		အသုံးချခြင်း။			
		🗸 ရေထုသို့ fouling organisms များ			
		ပြန်လည်ဝင်ရောက်ခြင်းကို ကာကွယ်ရန် ယာယီနေရာများ			
		သတ်မှတ်ထားရှိခြင်း။			
မွေးမြူမုတ်ကောင်မှ	လုပ်ငန်းဧရိယာ	🗸 parasite နှင့် pathogens များသည် ပုလဲမွေးမြူ	လုပ်ငန်းကာလ	Negligible	MEC
ရေနေဝန်းကျင်သို့		ထုတ်လုပ်ခြင်းတွင် သိသာစွာ ထိခိုက်စေနိုင်သော်လည်း 🛛	တစ်လျှောက်လုံး		
ရောဂါပြန့်ပွားခြင်း		ရေနေဝန်းကျင်ကို သိသာထင်ရှားသော ထိခိုက်မှု			
		မဖြစ်စေနိုင်ပါ။			

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	အချိန်	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း
		<ul> <li>မုတ်ကောင်အသစ်များ စတင်ရေချရာတွင် quarantine protocols ထားရှိခြင်း၊</li> <li>Pathogens များ ဝင်ရောက်နေခြင်း ရှိမရှိကို စောလျင်စွာ သိရှိနိုင်ရန် မုတ်ကောင်များကို PCR testing နှင့် microscopic analysis ပြုလုပ်ခြင်း။</li> </ul>			
ကျောက်ချခြင်း	Farm area	<ul> <li>✓ Long-Line များကို ကျောက်ချခြင်း နည်းစနစ်အတွက် လျော့ချခြင်း နည်းလမ်းများ မရှိသော်လည်း၊ ကျောက်ချခြင်း အရေအတွက်နှင့် နည်းလမ်းအရ သိသာထင်ရှားသော ထိခိုက်မှု မရှိပါ။</li> </ul>	လုပ်ငန်းကာလ တစ်လျှောက်လုံး	Negligible	MEC
ဆီယိုဖိတ်ခြင်း	လုပ်ငန်းဧရိယာ	<ul> <li>✓ သယ်ယူပို့ဆောင်ခြင်း အရေအတွက်ကို လျော့ချခြင်း။</li> <li>✓ စက်သုံးဆီများ သယ်ဆောင်ရာတွင် သင့်တော်သော ယာဉ်အမျိုးအစား၊ ကွန်တိန်နာ အမျိုးအစားကို အသုံးပြုခြင်း၊</li> <li>✓ oil spill contingency အစီအစဉ် ထားရှိခြင်း၊</li> </ul>	လုပ်ငန်းကာလ တစ်လျှောက်လုံး	Minor	MEC
သဘာဝဘေး အန္တရယ်ကျရောက်ခြင်း	လုပ်ငန်းဧရိယာ	<ul> <li>သတိပေးချက် ရရှိပြီးပါက long-line များ ကွဲထွက်မျောပါ သွားခြင်း မရှိစေရန် ခိုင်ခံ့မှု စစ်ဆေးခြင်း။</li> <li>Cyclone shelters များသည် မရှိမဖြစ် လိုအပ်ပြီး cyclone shelters များကို လူဦးရေ၊ အလွယ်တကူ ရောက်ရှိနိုင်သော အကွာအဝေး နှင့် ဆက်သွယ်ရေးအခြေအနေ၊ ယခင်က ဆိုင်ကလုန်းမုန်တိုင်း ဝင်ရောက်ခဲ့သည့် နေရာများနှင့် ဧရိယာ၏ မြေမျက်နှာသွင်ပြင် တို့ကို အသေးစိတ် ထည့်သွင်းစဉ်းစား ဆောက်လုပ်ခြင်း။</li> </ul>	လုပ်ငန်းကာလ တစ်လျှောက်လုံး	Moderate	MEC

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း	လျော့ချရေး နည်းလမ်း အချိန် ကြွင်းကျန် တာဝန်ရှိအဖွဲ့ သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း	
လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေး	လုပ်ငန်းဧရိယာ	<ul> <li>သင့်တော်သော flood management အစီအစဉ် ထားရှိခြင်းနှင့် ရေနုတ်မြောင်းစနစ် ထားရှိခြင်း။</li> <li>ဒီရေတောများကို coastal shelterbelt အနေဖြင့် စိုက်ပျိုးခြင်း။</li> <li>တာတမံ သို့မဟုတ် ကမ်းပါးများကို မြှင့်တင်ခြင်း။</li> <li>ထာနာမီနှင့် ပတ်သက်ပြီး အချိန်နှင့်တစ်ပြေးညီ သတင်းရရှိရန် မိုးလေဝသ စနစ်ထားရှိခြင်း။</li> <li>ဝန်ထမ်းများအတွက် အချိန်နှင့်တပြေးညီ ပြန်လည်တုံ့ပြန် ဆောင်ရွက်နိုင်သော အစီအမံများ ထားရှိခြင်း။</li> <li>လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေး အတွက် အကာအကွယ် ပစ္စည်းများ ထောက်ပံ့ခြင်း။</li> <li>အလုပ်သမားများအား ဘေးကင်းရေးဆိုင်ရာ လမ်းညွှန်ချက်များကို အသိပညာပေးခြင်း။</li> </ul>	လုပ်ငန်းကာလ တစ်လျှောက်လုံး	Minor	MEC
		<ul> <li>✓ ပင်လယ်ပြင်နှင့် ဆက်စပ်သော လုပ်ငန်းခွင်တွင် Life jackets များ ထားရှိ ဝတ်ဆင်စေခြင်း။</li> <li>✓ ပြတ်ရှခြင်းများ ကို ကာကွယ်ရန် ရာဘာလက်အိတ်များ ဖိနပ်များ ထောက်ပံ့ခြင်း။</li> <li>✓ ပုလဲဝတ်ဆံသွင်းခြင်းအတွက် Eye protection ကိရိယာများ ထားရှိခြင်း။</li> <li>✓ ရေအောက်လုပ်ငန်းများအတွက် Diving suits နှင့် oxygen tanks များ ထားရှိခြင်း။</li> <li>✓ မီးဘေး၊ သဘာဝဘေးအန္တရာယ်နှင့် ရောဂါဖြစ်ပွားမှု စသည့် အရေးပေါ် အခြေအနေများအတွက်</li> </ul>			

သက်ရောက်မှု	နေရ၁	လျော့ချရေး နည်းလမ်း		အချိန်	ကြွင်းကျန် သက်ရောက်မှု	တာဝန်ရှိအဖွဲ့အစည်း	
		အရေးပေါ် တုံ့ပြန်ရေး သင်ကြားပေးခြင်း။	စီမံချက်ကို	လေ့ကျင့်			

# လူထုတွေ့ဆုံဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်ထုတ်ပြန်ခြင်း

ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်း၏ အပိုဒ် (၆၃) အရ **Myanmar Economic Cooperation** မှ ပုလဲမွေးမြူထုတ်လုပ်ရေး လုပ်ငန်း အတွက် လူထုတွေ့ဆုံဆွေးနွေးခြင်း အခမ်းအနားကို ၂၀၂၅ ခုနှစ်၊ ဖေဖော်ဝါရီလ၊ ၂၈ ရက်နေ့တွင် ဟံသာဝတီခန်းမ၊ အထွေထွေမြို့နယ်အုပ်ချုပ်ရေးမှုးရုံး၊ ကော့သောင်းမြို့၊ တနသာရီတိုင်းဒေသကြီး တွင် ပြုလုပ်ခဲ့သည်။

လူထုတွေ့ဆုံဆွေးနွေးခြင်း အခမ်းအနားတွင် ကော့သောင်းမြို့နယ်မှ သက်ဆိုင်ရာ တာဝန်ရှိသူများ၊ ဒေသခံများ တက်ရောက်ခဲ့သည်။ ဒေသခံများတွင် ကရင်ခြံ ရပ်ကွက်နေ ပြည်သူများ၊ သက်ဆိုင်ရာ တာဝန်ရှိသူများတွင် အစိုးရအဖွဲ့အစည်းမှ တာဝန်ရှိသူများ၊ မြို့နယ်အုပ်ချုပ်ရေးရုံး၊ မြို့နယ်စီမံခန့်ခွဲမှု ကော်မတီဝင်များ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန၊ ပြည်သူ့ကျန်းမာရေးဌာန၊ သစ်တောဌာန၊ စိုက်ပျိုးရေးဦးစီးဌာန၊ ငါးလုပ်ငန်းဦးစီးဌာန၊ မီးသတ်ဌာန တို့မှ တက်ရောက်ခဲ့သည်။ စုစုပေါင်း (၄၁)ဦးတက်ရောက်ခဲ့သည်။

ဆွေးနွေးပွဲတွင်၊ စီမံကိန်းနှင့် ပတ်သတ်သော အချက်အလက်များကို Myanmar Economic Cooperation ၏ Project Manager ဦးဘိုဘိုဟန်မှ ရှင်းလင်းတင်ပြခဲ့ပြီး ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ အချက်အလက်များ၊ ပတ်ဝန်းကျင်အရည်အသွေးနှင့် လေ့လာတွေ့ရှိမှုများကို Olive Bright Environmental Solutions Limited (OBES)၏ Director ဒေါက်တာ လဲ့လဲ့ဝင်းမှ ရှင်းလင်းတင်ပြခဲ့သည်။ ဒေသခံပြည်သူများ၏ ထင်မြင်ယူဆချက်များနှင့် စိုးရိမ်ပူပန်မှုများကို ဆွေးနွေးပွဲတွင် ထုတ်ဖော်တင်ပြ ရှင်းလင်းခဲ့ပြီး၊ စစ်တမ်းများရယူခဲ့သည်။

# နိဂုံးချုပ်

ပုလဲမွေးမြူထုတ်လပ်ခြင်းလုပ်ငန်းသည် သဘာဝပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေရှိသော်လည်း စွန့်ပစ်ပစ္စည်းထွက်ရှိခြင်း၊ စွမ်းအင်လိုအပ်ချက်နှင့် သဘာဝဘေးအန္တရာယ်တို့မှသက်ရောက်မှုများကို ထည့်သွင်းစဉ်းစားရန် လိုအပ်သည်။ ထို့ကြောင့် သင့်လျော်သော စွန့်ပစ်ပစ္စည်းနှင့် စွန့်ပစ်ရေဆိုး စီမံခန့်နွဲမှု အစီအစဉ်ကို ဆောင်ရွက်ရမည်။ စွမ်းအင်လိုအပ်ချက်ကို လျှော့ချရန်၊ လုံလောက်သော မိုးရေသိုလှောင်သည့် ကန်များ ထားရှိရန်နှင့် ပတ်ဝန်းကျင်နှင့် သဟဇာတဖြစ်သော အလင်ပေးစနစ်တို့ကို တပ်ဆင်သင့်သည်။ အဆိုပြ စီမံကိန်းသည် ပင်လယ်ပြင်တွင် တည်ရှိခြင်းကြောင့် သဘာဝဘေး အန္တရာယ်ကျရောက်နိုင်မှု မြင့်မားပြီး သင့်လျော်သော အရေးပေါ် တုံ့ပြန်ရေး အစီအစဉ်ကို ချမှတ်ခြင်းနှင့် cyclone shelters များ ထားရှိရမည်။

ဤ ပတ်ဝန်းကျင် ထိခိုက်မှု လေ့လာဆန်းစစ်ခြင်းတွင် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ပြဿနာများကို ရှင်းလင်းစွာ ဖော်ထုတ်ထားပါသည်။ ဆန်းစစ်ထားသော သက်ရောက်မှုများနှင့် လျော့ချခြင်း အစီအစဉ်များသည် သက်ဆိုင်ရာလမ်းညွှန်ချက်များ၊ စည်းမျဉ်းများနှင့် အညီ ရေးဆွဲထားခြင်း ဖြစ်ပါသည်။

### **EXECUTIVE SUMMARY**

#### Introduction

Myanmar Economic Corporation (MEC), aiming to further assist the nation's economic growth, proposed Oyster Culture and Pearl Production activities in the waters and land areas of Shar Kyunn Island (Zadetgyi Island) and Kyantcho Island, located in Kawthaung Township, Kawthaung District, Tanintharyi Region.

This Environmental Impact Assessment report had prepared by Olive Bright Environmental Solutions Limited on behalf of Myanmar Economic Corporation (MEC) to initiate the required processes under Myanmar Environmental Impact Assessment Procedure (2015). As required by article (53) of the EIA procedure, these documents have to submit to Environmental Conservation Department (ECD), Ministry of Natural Resources and Environmental Conservation (MONREC), for review and approval of environmental compliance with Myanmar's Law and regulations.

According to the Letter EIA-2/16/Pearl (TP) (2222/2024) dated 27<sup>th</sup> May, 2024, Environmental Conservation Department (ECD) (Naypyidaw) has approved to conduct the EIA investigation by Olive Bright Environmental Solutions Limited. The Scoping report was submitted on May 2024 and that scoping report has been approved by Environmental Conservation Department as per the Letter No. EIA-2/16/Approval-SR (5352/2024) dated 28<sup>th</sup> November 2024.

The field studies were carried out by the Olive Bright Environmental Solutions Limited who have experience in conducting environmental impact assessments in Myanmar. The team will conduct survey, assessment activities and also report writing. The significance and magnitude of impacts from During Construction, Operation and decommission were evaluated. For those impacts requiring mitigation, suitable measures were proposed in this EIA report to reduce impacts to within acceptable limits.

#### **Overview of the Policy, Legal and Institutional Framework**

In the EIA, the relevant policies and national laws and legislation are expressed which are currently practiced in Myanmar and environmental and social aspects that are related to the proposed project are reviewed. The others are the National Environmental Policy (2019), the National Land Use Policy, Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedures (2015), National Environmental Quality (Emission) Guidelines (2015). Moreover, the relevant international guidelines and practices are also described.

#### **Project Description**

The proposed project area is located at the coordinate point of latitude 9°56'10.74"N and longitude 98°13'57.90"E. Zerdetgyi Village was located at 11 kilometers far from the project site. The project area is 10,401 acres which was Oyster Culture and Pearl Production farming lands with the lease of maximum period of 30 years. The goal of expanding the Oyster Culture

and Pearl Production business as a new industry for MEC is to increase foreign exchange revenue for the country while creating more local employment opportunities.

MEC's Oyster Culture and Pearl Production business will be carried out in the following areas:

- > Zadetgyi Island: 10,401 acres of land area and waterbody.
- Kyantcho Island: 3,714 acres of reserved land area and waterbody for Oyster Culture and Pearl Production.



Figure: Location of Project Site

The construction works will be established in two areas as construction for office camp and farm area.


Figure: Project Layout Plan

## **Production Process and Technology**

## Long-Line System for Pearl Culture

The proposed oyster culture and pearl production will be applied Long Line Pearl Culture technology, which is a popular method used in Oyster Culture and Pearl Production, particularly for growing high-quality pearls. This method involves the suspension of pearl oysters on ropes or longlines that are anchored in the ocean. Longlines are anchored in the ocean and supported by buoys. Oysters are hung from the longline on individual ropes, nets, or baskets. The system allows the oysters to remain in open water at a controlled depth. MEC had installed 10 lines with four foundations and by the fiscal year 2023-2024, 16 Long Lines will be completed. An additional 16 Long Lines will be installed by the fiscal year 2024-2025.

## **Resource Consumption**

Oyster culture and pearl production have relatively low external inputs, making them more sustainable compared to land-based or fed aquaculture systems like fish farming. Oysters and pearl-producing mollusks filter the water, potentially improving water quality and reducing pollution. Longline oyster culture and pearl production generally involve minimal direct water consumption in terms of freshwater or other external sources. These aquaculture practices rely predominantly on natural seawater ecosystems. As in indirect water consumption relied on the cleaning of cages per 2 months and staff and dormitory consumption. The fresh water will available for nearest creeks. The estimated domestic water usage for 46 staff members was 1,175,300 liters per year. Energy consumption primarily comes from the use of motorboats to monitor, maintain, and harvest the oyster lines. Own generators are used for the electricity supply of the project. There is one generator for required electricity. The estimated daily

electricity requirement was 108 kWh per day and diesel required for electricity generation is 31 liters per day. The total diesel requirement for diesel generators and boat were 56 liters per day.

Alternative analysis compares the technical, financial, environmental and social feasibility of the project, where is applicable. Alternative analysis is the process of analyzing the proposed location and technology to operate the farm safety and to obtain local job opportunities. In the EIA stage, a desktop study and baseline measurement of the effects on the environment and society were conducted on July, 2024. After the Environmental Conservation Department has approved the scoping study, baseline environmental surveys such as air quality, water quality, noise and vibration, pollution sources and social survey were carried out within the area of influence as described in following Figure.



Figure: Area of Influence (AoI) of the Proposed Project

## **Description of the Baseline Condition of Environment**

The EIA provides the general description of the status of the receiving environment in the project area. It also allows for sensitive environmental features and possible receptors of the effects of the proposed project.

The baseline condition of environment and social status are based on the site visit and literature analysis in this EIA report. It also provides the general description of the status of the receiving environment in the project area. The brief overview of environmental features may be positive or negative or cumulative effects by the proposed project.

Baseline environmental quality measurement was conducted on 15<sup>th</sup> -17<sup>th</sup> July, 2024. During the survey, following parameters were measured with adequate devices named Air Quality

Monitoring Station AQM (09) viz; Particulate Matters (PM10 and PM2.5) and gases NO<sub>2</sub>, SO<sub>2</sub>, TSP, RH, Temperature, and O<sub>3</sub> via 24-hour basis at two stations (at camp and office site, at pearl farm area). According to the survey results, the average 24-hour period for PM2.5, PM10 and SO2 concentrations are within the National Environmental Quality (emission) Guideline, 2015. The daily 8-hour maximum ozone level is within the 100  $\mu$ g/m3 standard. The concentration of NO<sub>2</sub> was referred to the one-hour standard in NEQEG (2015). According to the hourly results, the concentration of NO<sub>2</sub> is lower than the applied standard.

For noise and vibration, the daytime and nighttime observed noise values at the project site with Digital Sound Level Meter (GM1356-0/GM1356). The project was located in Zadetkyi Island; therefore, the guideline value was compared with the residential area. The level of ambient noise emission was within the NEQEG guidelines.

Water sample were collected at 4 stations, SW-1, Upstream of Creek (Zardatgyi Island), SW-2, Downstream of Creek (Zardatgyi Island), SW-3, Near Shar Island, SW-4, Near Oyster Farm. The parameters were analyzed in ALARM Ecological laboratory. The surface water quality results SW-1 and SW-2 were monitored and compared with the National Surface Water Quality Standard, 2024 (Class V) and all the quality parameters meet the standard values except arsenic, cadmium, lead and selenium exceed the standard values of parameters for human health.

Soil sample were collected at the project site and chemical analysis for soil quality was tested in the laboratory of Land Use Department of Yangon Region. The soil results were compared with available international guidelines.

The biodiversity survey for both terrestrial and aquatic were conducted on 15<sup>th</sup> -17<sup>th</sup> July 2024. A total of A total of 58 species of phytoplankton were recorded throughout the study period. Among them, 16 species were dinoflagellates and other are diatoms. The species composition of phytoplankton was not too varied because all the three stations are closely related to each other (same water body). However, the concentration of cell densities was fluctuated in spatially. There are 37 species of zooplankton, five species of benthos, 20 species of mangrove and 10 species of fish were recorded during the survey.

## **Expected Potential Environmental and Social Impact**

The approach to the assessment of impact significance has considered the sensitivity of the receiving environment and the magnitude of change. The significance of the potential impacts arising from the proposed development can therefore be reported using a four-point scale, they are Major adverse, Moderate adverse, Minor adverse and Negligible. Potential impacts predicted to be Minor or Negligible are considered to be Not Significant and Potential impacts assessed as being Moderate or Major are considered to be Significant.

While approaching the assessment of potential impacts, there are two supporting categories; sensitivity of receptors and magnitude of impacts. Sensitivity of receptors can be determined according to the relative importance of existing environmental features on or near to the project area, or by the sensitivity of receptors which would potentially be affected by the development. The sensitivity of receptors can be defined in five categories; Very high, High, Medium, Low

and Negligible (see in 5.2.1. Sensitivity of Receptors). Magnitude of impact can be determined by consideration the scale or degree of change the proposed development will have on the existing baseline, the duration and reversibility of the impact and has taken into account relevant legislative or policy standards or guidelines. The magnitude of impacts can be divided into four categories; High, Medium, Low and Negligible (see in 5.2.2. Magnitude of Impact).

Potential impacts have been separated into two main types based on different phases of development, i.e., construction effects and operational (or permanent) impacts. Construction impacts are temporary, short-term impacts that occur during the construction phase only. This will include impacts resulting from construction of the infrastructure of development as well as any impacts resulting from other temporary works such as access tracks, working areas and compounds. Operational impacts are those long-term impacts that will occur as a result of the development, such as nursing the spat, culturing, seeding, harvesting and transportation.

Issue	Impact Significance	Residual Impact
Construction Phase	·	·
Loss of land use option	Moderate	NA
Loss of terrestrial habitat and biodiversity	Major	Moderate
Soil erosion	Moderate	Minor
Ambient Air quality	Moderate	Minor
Noise	Moderate	Minor
Transportation and anchoring	Minor	Negligible
Material Storage	Moderate	Minor
Construction waste disposal	Moderate	Minor
Sewage	Moderate	Minor
Solid waste disposal	Moderate	Minor
Replanting and landscaping	Moderate	Minor
Employment	Positi	ve
Occupational Health and Safety	Moderate	Minor
Operation Phase		
Resource consumption	Moderate	Minor
Sewage treatment and disposal	Moderate	Minor
Solid waste disposal	Moderate	Minor
Water circulation from hatchery/nursery pond to aquatic environment	Minor	Negligible
Cleanse the biofouling and boring organisms from pearl oysters	Minor	Negligible
Disease intrusion to the aquatic environment	Minor	Negligible
Introduction of Alien, selectively or genetically engineered species	Minor	Negligible
Anchoring	Minor	Negligible
Oil spills	Moderate	Minor

Table: 1-1 Summary of Significance Impact of the Project

## Oyster Culture and Pearl Production Project, Myanmar Economic Corporation

Transportation	Minor Negligib				
Natural Hazard Vulnerability	Major Modera				
Employment	Positi	ve			
Occupational Health and Safety	Moderate	Minor			

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost MMK	Responsible Person
Construction Phase/	Decommission Pha	ase: This phase that corresponds to any event, proceed the project.	ess, or activity th	at occurs duri	ng the construc	ction/decommission of
Loss of Terrestrial Habitats	All Construction site	<ul> <li>Impact mitigation here seeks to retain and restore as much of the original and natural forested condition of the site.</li> <li>Site clearance should be performed with intensive search and identify the endemic species and biological valuable species.</li> <li>Collect and maintain these plants for the replanting and landscaping purpose.</li> <li>These activities should be guided by an appropriate and approved management plan.</li> <li>Site clearance should be carried out in a manner that retains the large trees.</li> <li>Landscaping should also use native flowering plants to provide habitat and host plants for butterflies.</li> <li>All construction contractors should be aware to the environmental management plan and sensitized to the environmental issues.</li> </ul>	Throughout Construction period	Moderate	Already included in operation cost	MEC
Soil Erosion	All Construction site	<ul> <li>To the greatest extent possible, phase site clearance so as to minimize the area of exposed soil at any given time.</li> <li>Re-cover exposed soils with grass and other appropriate species as soon as possible.</li> <li>Temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten</li> </ul>	Throughout the construction period	Minor	Already included in operation cost	MEC

# Table: Summary of Mitigation Measures and Responsibilities

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		<ul> <li>to erode or result in substantial surface runoff to adjacent marine waters.</li> <li>✓ Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project</li> <li>✓ OB waste dumps will be reclaimed/by planting with trees to bind the loose soil and to prevent soil erosion.</li> </ul>				
Ambient Air Quality	All Construction site	<ul> <li>✓ Exposed ground should be regularly wetted in a manner that effectively keeps down the dust.</li> <li>✓ Stockpiles of fine materials should be wetted or covered up during windy conditions.</li> <li>✓ Workers on the site should be issued with dust masks during dry and windy conditions.</li> <li>✓ The working area for the uprooting of shrubs or vegetation or the removal of boulders or temporary or permanent structures shall be sprayed with water immediately before, during, and immediately after the operation to maintain the entire surface wet.</li> <li>✓ All machinery to be used for construction purposes will be of the high standard and properly maintained.</li> <li>✓ Acoustic laggings and silencers will be used in equipment wherever possible.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost MMK	Responsible Person
		<ul> <li>✓ All loose material either stocked or transported will be provided with suitable covering such as tarpaulin, etc.</li> <li>✓ Water sprinkling will be done at the location where the dust generation is anticipated.</li> <li>✓ Over Burden (OB) waste dumps will be sprayed with water as they are major sources of airborne particulate matter/dust.</li> </ul>				
Noise and Vibration	All Construction sites	<ul> <li>Construction activities that will generate disturbing sounds should be restricted to normal working hours.</li> <li>Workers operating equipment that generates noise should be equipped with noise protection gear.</li> <li>Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs.</li> <li>Construction and decommissioning should avoid breeding season of both terrestrial and marine biodiversity.</li> <li>On the other hand, should install sound barrier system to avoid the disturbance of the biotas.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC
Transportation and Anchoring	Jetty area	<ul> <li>All fine earth materials must be enclosed during transportation to the site to prevent spillage and dusting.</li> <li>To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.</li> </ul>	Throughout Construction period	Negligible	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual	Mitigation Cost	Responsible Person
				impacts	MMK	I CI SUII
		<ul> <li>The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers.</li> <li>Appropriate traffic warning signs, informing road users of a construction site entrance ahead and instructing them to reduce speed.</li> <li>Flagmen should be assigned to control and assists to construction vehicles as they attempt to enter and exit the project site.</li> <li>Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment.</li> </ul>				
Materials Storage	Storage Warehouse	<ul> <li>The stockpiling of construction materials should be properly controlled and managed. fine grained materials (sand, cement, etc.) should be stockpiled away from surface drainage channels and features.</li> <li>Low berms should be placed around the piles and/or tarpaulin used to cover open piles of stored materials to prevent them from being washed away during rainfall.</li> <li>Safe storage areas should be identified and retaining structures put in place prior to the</li> <li>arrival and placement of material.</li> <li>Hazardous chemicals (e.g., fuels) should be properly stored in appropriate containers and these should be safely locked away. Conspicuous warning signs (e.g. 'No</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	<b>Residual</b>	Mitigation Cost	Responsible
				inipacts	MMK	1 (1 5011
		hazardous waste storage and handling facilities.				
Construction Waste Disposal	All construction site	<ul> <li>A site waste management plan should be prepared by the contractor prior to commencement of buildings. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.</li> <li>Preparation and implementation of the plan must be made the responsibility of the building contractor with the system being monitored independently.</li> <li>Special attention should be given to minimizing and reducing the quantities of solid waste produced during site preparation and construction.</li> <li>To reduce organic waste, softer vegetation may be composted onsite and used for soil amendment during landscaping.</li> <li>Vegetation and combustible waste must not be burned on the site.</li> <li>Reusable inorganic waste (e.g. excavated sand) should be stockpiled away from drainage features and used for in filling where necessary.</li> <li>Unusable construction waste, such as damaged pipes, formwork and other construction material, must be disposed of at an approved dumpsite.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		✓ Hazardous waste disposal in or off the construction site will be prohibited. Hazardous waste management systems include waste classification, separation, collection, storage, transfer and disposal in compliance with applicable regulations of the government, if any. Hazardous wastes should be disposed of at a designated site inside or outside the project area as appropriate. The method of disposal needs to follow the best international practices.			MMK	
Solid Waste Disposal	All construction site	<ul> <li>✓ Install barricades, signage, and lighting at construction sites.</li> <li>✓ Train workers on health and safety protocols.</li> <li>✓ Limit pedestrian access near construction zones with clear walkways.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC
Replanting and Landscaping	All construction site	<ul> <li>✓ Install Greenbelt plantation procedure.</li> <li>✓ The landscaping plan should seek to avoid the use of non-native and potentially invasive species. It should include low-maintenance local species and the types of trees and shrubs used for feeding by local bird species.</li> <li>✓ The landscape design should seek to encourage bird life, especially for the endemics, maximize shade and windbreak effect, as well as to hide the roofline of the buildings.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC
Occupational Health and Safety		<ul> <li>✓ Safety policy of the project proponent</li> <li>✓ Provision of safety gadgets to the workers</li> </ul>	Throughout Construction	Minor	Already included in	MEC

-				Residual	Mitigation	Responsible
Issues	Location	Mitigation Measures	Time Frame	impacts	Cost	Person
				impuets	MMK	I CISON
		✓ Raising awareness of safety guidelines to	period		operation	
		the workers			cost	
		<ul> <li>Assignment of safety supervisors at the work site</li> </ul>				
		$\checkmark$ Incentives to workers who obey the safety				
		practices				
		✓ Penalty to workers who disobey the safety				
		practices				
		<ul> <li>✓ Arrangement of morning talks and toolbox meeting</li> </ul>				
		$\checkmark$ Preparation of health and safety matrix				
		✓ Provide Life jackets and train buddy				
		system, provide emergency response				
		training				
		<ul> <li>✓ Clear pathways, anti-slip flooring, proper</li> </ul>				
		footwear				
		<ul> <li>✓ Provide Hearing protection (earplugs),</li> </ul>				
		limit exposure time				
		$\checkmark$ To reduce chemical exposure (paints,				
		preservatives), provide proper ventilation				
		and PPE (gloves, masks)				
	Operation/ S	Service Phase: The main project activities of ope	eration are: Ca	mp area and	Farm area	
Resources	Camp area and	Water Consumption:	Throughout	Minor	Already	MEC
Consumption	Farm area	$\checkmark$ In general, the fresh water consumption of	Operation		included in	
		mariculture is low.	period		operation	
		✓ Provide adequate water storage facilities to			cost	
		ensure adequate supplies for the				
		development.				
		✓ Collect the rain water for domestic and				
		operational uses and increase rainwater				
		collection capacity by installing large				

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		<ul> <li>storage tanks and filtration system for domestic and operational use.</li> <li>✓ Implement a water recycling system for cage cleaning to reduce overall freshwater demand.</li> <li>✓ Conduct regular monitoring of water usage to identify and fix leaks promptly.</li> <li>✓ Wastewater should be carefully managed and treated to ensure it does not contain harmful chemicals or pollutants before it is released back into the environment.</li> <li>✓ Install environmental friendly lighting system.</li> <li>Energy Consumption:</li> <li>✓ Reduce losses in energy distribution.</li> <li>✓ Install solar panels to supplement electricity needs and reduce reliance on diesel generators.</li> </ul>				
Solid Waste Disposal	Camp area, Farm area	<ul> <li>Establish waste separation bins for organic waste, plastics, metals, and hazardous materials.</li> <li>Utilize oyster shells for coastal erosion protection and soil conditioning.</li> <li>Composting or Recycling of Oyster Shells</li> <li>Use of Dead Oysters in Animal Feed or Fertilizer</li> <li>Controlled Removal of Fouling Organisms</li> <li>Recycling or Repurposing Plastic Materials</li> <li>Decompose the organic waste and sewage and use as fertilizer in gardening</li> </ul>	Throughout Operation period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Water Circulation from Hatchery/Nursery	All the proposed operation area	<ul> <li>Apply pits that covered with concrete or linen to avoid the ground water contamination.</li> <li>Secure ropes, nets and buoys properly to prevent from breaking loose and polluting the adjacent marine waterbody.</li> <li>Conduct regular shoreline clean up around the farm area.</li> <li>Install the filtration system to remove organic debris before discharge.</li> <li>Use UV sterilization or ozone treatment to neutralize pathogens.</li> <li>Implement biofiltration systems using aquatic plants or bacterial cultures to absorb excess nutrients.</li> <li>Reduce water exchange frequency by</li> </ul>	Throughout Operation period	Negligible	MMK Already included in operation cost	MEC
Chaming	A11 4b-	<ul> <li>reusing and filtering existing water in a closed-loop system.</li> <li>✓ Install settlement ponds to allow natural sedimentation before effluent is released.</li> </ul>	Through out	Nasliaibh	Alvesder	MEC
Biofouling and Boring Organism	proposed operation area	<ul> <li>Ose low-samily water husning fistead of freshwater immersion to reduce water demand.</li> <li>Adopt biodegradable anti-fouling coatings on oyster cages to slow biofouling growth.</li> <li>Collect and compost biofouling waste to create organic fertilizers.</li> <li>Establish designated disposal zones for fouling organisms to prevent reintroduction into natural waters.</li> </ul>	Operation period	тевийоне	included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Disease Intrusion to Aquatic Environment	All the proposed operation area	<ul> <li>Despite of parasite and pathogens create major damage to the Oyster Culture and Pearl Production and productivity but there is no significant impact to aquatic environment.</li> <li>Implement quarantine protocols for newly introduced oysters.</li> <li>Conduct routine health screenings using PCR testing and microscopic analysis to detect pathogens early.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC
Anchoring	Farm area	<ul> <li>Even though, there is no mitigation for this activity, due to the potential number of anchor systems deployed this must be an assessable activity.</li> <li>However due to the construction of anchors, the deployment systems, the nature of sediments anchoring is regarded as having negligible effect.</li> <li>Furthermore, anchoring in some terrain may be a positive effect by providing habitat and protection (FDA) effect.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC
Transportation and Oil Spills	All the proposed operation area	<ul> <li>To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.</li> <li>Equip vessels with double bottom fuel tanks to reduce spill risks.</li> <li>Implement oil spill contingency plans.</li> </ul>	Throughout Operation period	Minor	Already included in operation cost	MEC
Natural Hazard Vulnerability	All the proposed operation area	<ul> <li>✓ After the alert, check the consistency of long-line or raft culture, not to break and drift away.</li> </ul>	Throughout Operation period	Moderate	Already included in operation cost	MEC

Terrer	Location		Residual	Mitigation	Responsible	
Issues		Mingation Measures	Time Frame	impacts		Person
		<ul> <li>Should install, routine checkup and maintenance plan for operational mechanism and equipment.</li> <li>Cyclone shelters are necessity and for the construction of cyclone shelters, the most appropriate sites should be selected with a detail consideration of the density of population, transportation and communication conditions, distance from areas where the cyclones took landfall in the past and the topography of the area.</li> <li>A proper flood management should be installed. Improve drainage system, raised-platform for flood shelter and elevate shelter on stilts.</li> <li>Improve vegetation cover; create coastal shelterbelt plantations.</li> <li>Raise embankment or levees.</li> <li>Weather station should be established to get proper and on time report about the Tsunamis. (If possible)</li> <li>The proper and timely response plan should be developed and implement in accordance with the plan for employees.</li> </ul>				
Occupational Health and Safety	All the proposed operation area	<ul> <li>Provision of safety gadgets to the workers.</li> <li>Raising awareness of safety guidelines to the workers.</li> <li>Provide Life jackets for all water-related activities.</li> <li>Rubber gloves and boots to prevent cuts and infections.</li> </ul>	Throughout Operation period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost MMK	Responsible Person
		$\checkmark$ Eye protection for pearl nucleation.				
		✓ Ear protection for noisy machinery.				
		✓ Diving suits and oxygen tanks for				
		underwater work.				
		✓ In addition, Emergency Response Plan for				
		emergency cases such as fire, natural				
		disasters and disease outbreak will be				
		conducted and trained.				

#### **Public Consultation and Disclosure**

On 28th February 2025, Myanmar Economic Cooperation has conducted the consultation meeting of the EIA stage for the proposed Oyster Farming and Pearl Production project. Meeting has been carried out at Hantharwaddy Hall, General Administrative Department Office, Kawthaung Township, Tanintharyi Region.

The consultation meeting includes the Administrators from Kawthaung Township, government authorities and local people. As local people, representatives of Kawthaung Township such as merchants have participated at the consultation meeting. As government authorities, Township Administrative Department, Ward Administration Office Members, Environmental Conservation Department, Department of Public Health, Forest Department, Department of Agriculture, Department of Fisheries and Fire Services Department have attended the meeting. A total of 41 attendees were participated.

The project information, infrastructure buildings, water and land use, and implementation process of Oyster Farming and Pearl Production are presented by Project Manager U Bo Bo Hein from Myanmar Economic Cooperation. The Environmental Impact Assessment Process, the existing condition and the findings of environmental quality about the project that have to be undertaken are explained by Director Dr. Lai Lai Win from third party, Olive Bright Environmental Solutions Limited (OBES). Opinions, suggestions and recommendations are discussed at the meeting. Government Authorities, local people, project proponent and third party all participated in the meeting activities. Project proponent discussed with the issues upon the project and third party expressed the works of Environmental Impact Assessments. After the presentation, meeting has carried out based on the issues of local people. All the opinions in the meetings have been recorded.

#### **Conclusion and Recommendation**

Although the nature of Oyster Culture and Pearl Production itself is environmentally friendly, it still needs to consider the effect from waste generation, energy demand and natural disaster. Therefore, the proper waste and wastewater management system should be installed and to minimize the energy demand, provide adequate water storage facilities and install environmentally friendly lighting and heating system. The proposed project is located in the open sea, the natural hazard vulnerability is high and cyclone shelters should be established with the adoption of proper emergency response plan.

The EIA study has clearly identified the environmental and social issues to be investigated in detail. Based on the study, the report covers all the identified issues and mitigation measures which are in line with all applicable guidelines, regulations, Good International Industry Practice (GIIP) and Practical Oyster Farming Guidelines of FAO.

# **Chapter 1 CONTENT OF THE PROJECT**

# 1.1 **INTRODUCTION**

Myanmar Economic Corporation (MEC), aiming to further assist the nation's economic growth, proposed Oyster Culture and Pearl Production activities in the waters and land areas of Shar Kyunn Island (Zadetgyi Island) and Kyantcho Island, located in Kawthaung Township, Kawthaung District, Tanintharyi Region.

This Environmental Impact Assessment report had prepared by Olive Bright Environmental Solutions Limited on behalf of Myanmar Economic Corporation (MEC) to initiate the required processes under Myanmar Environmental Impact Assessment Procedure (2015). As required by article (53) of the EIA procedure, these documents have to submit to Environmental Conservation Department (ECD), Ministry of Natural Resources and Environmental Conservation (MONREC), for review and approval of environmental compliance with Myanmar's Law and regulations.

Environmental Impact Assessment (EIA) is mandated by the Environmental Conservation Law (No. 9/2012). Section 42 (b) of this law allows the Environmental Conservation Committee to establish and implement a system of environmental and social impact assessment. The EIA procedure (2015) provides detailed legal guidance on how the EIA process should work and outlines the responsibilities of government institutions and project proponents as well as the decision-making process surrounding initial environmental examination (IEE) and EIA report and/or environmental management plan (EMP) approval. According to article 55 of the EIA Procedure (2015), it is required to undergo the EIA investigation. The Ministry of Natural Resources and Environmental Conservation issues a certificate in accordance with Notice No. 616/2015. According to that announcement, the project proponent granted Olive Bright Environmental Solutions Limited to implement EIA report and (TOR) for the EIA study.

# 1.2 **EIA REQUIREMENTS**

Environmental Impact Procedure (2015) includes some basic provisions on EIA, including the 'Project Categorization for Initial Environmental Examinations and Environmental Impact Assessments (IEE/EIAs)'. This categorization set out what type of investment requires IEE and EIA. In agriculture, livestock and forestry development, for Oyster raising and Pearl Production the requirements are as follows:

➢ Oyster raising and Pearl Production, for IEE requirement: ≥ 50 ha but < 200 ha, for EIA requirement: ≥ 200 ha.</p>

# 1.3 **REQUIREMENT OF ESIA**

Based on the strong link between environmental sustainability and social economic development, the Ministry of Natural Resources and Environmental Conservation (MONREC) has prescribed that anyone who wants to implement a development project in Myanmar must



first submit an Environmental Impact Assessment (EIA) of the proposed project which must be approved by the Ministry through its Environmental Conservation Department.

The immediate objectives of an EIA are:

- To improve the environmental design of the project;
- To ensure that resources are used appropriately; and
- To identify appropriate measures for mitigating potential impacts of the proposed project.

In addition to these objectives, an EIA also encompasses specific long-term objectives. These objectives include:

- Avoidance of irreversible changes and serious damage to the environment; and
- Safeguarding valued resources, natural and cultural heritage and ecosystems which are invaluable for future generations.

## **1.3.1** Conceptual Framework

The Government of Myanmar is working to achieve sustainable development of the country. The focus will be on three basic areas of development, namely, economic development, environmental development and social development. Economic growth which does not take into account environmental concerns will not prove to be sustainable in the long run. Therefore, sustainable development needs careful integration of environmental, economic and social needs in order to achieve both an increased standard of living in the short term and a net gain of equilibrium among human, natural and economic resources to support future generations in the long term.



# 1.3.2 Components of ESIA



EIA/SIA refers to the systematic assessment of a proposed project, business, service or activity to determine whether it will significantly impact the physical environment and ecosystems, humans and other living beings (including negative health or socioeconomic impacts). The assessment has to measure physical, biological and social impacts in order to gauge the overall impact of a project.

**OBES** 

# **1.3.3** Structure of ESIA

This EIA/SIA report has been prepared through identification of potential impacts and effects caused by the project. At the same time, the report proposes mitigation measures for anticipated negative impacts and prepares an environmental management plan (EMP), a monitoring plan and a social assessment based on public disclosure and stakeholder meetings.

In accordance with the 2015 Environmental Impact Assessment Procedure, the structure of this EIA/SIA report will be as follows.

- 1) Executive Summary (Myanmar and English)
- 2) Chapter 1 Introduction
- 3) Chapter 2 Policy, Legal and Institutional Framework
- 4) Chapter 3 Project Description and Alternative Selection
- 5) Chapter 4 Description of the Surrounding Environment
- 6) Chapter 5 Impact and Risk Assessment and Mitigation Measures
- 7) Chapter 6 Cumulative Impact Assessment
- 8) Chapter 7 Environmental Management Plan
- 9) Chapter 8 Public Consultation and Disclosure

## 1.3.4 Methodology for EISA

In general, the research process for this EISA study essentially involves four stages. These stages are: (1) literature review, (2) preliminary site visit for scoping study, (3) detailed field data collection at project site, and (4) finally, after reviewing and systematic analysis of the data collected, the EIA and SIA reports have been prepared and an Environmental Management Plan and Mitigation Measures developed.





#### **Stage 1: Desktop Study**

In the first stage, desktop study of all relevant information, data and documents was conducted for understanding the scope of the project, its nature and potential impacts. All related past experiences of similar projects in Myanmar and in foreign countries were also studied for research input for the ESIA of the project.

Meanwhile, international standards and technical EIA guidance manuals for the project development were reviewed thoroughly to meet the requirements of study for this project. In particular, applicable laws, regulations and guidelines to which Green Myanmar Economic Corporation (MEC) must abide by in order to receive environmental approval in Myanmar were also reviewed for this study. Then, data collection requirements were identified at this stage. Then, the collected data were analyzed, which formed a major input for the preparation of this ESIA report.



## Stage 2: Preliminary Site Visit and Scoping Study

After the completion of the literature review, OBES's ESIA team commenced on a preliminary study by visiting the project site and surrounding areas. The study team also conducted interviews with key informants, including government officials and stakeholders, in the Project Area and its surroundings. The detailed scope for preparing ESIA for the project was then defined based on information gathered through the site visits and key informant interviews.

## Stage 3: Site Visits and Baseline Data Collection

The field data collection for environmental assessment was conducted as follows:

## i. Physical Component

- ✓ Overview of the study area
- ✓ Climate and Meteorology
- ✓ Topography
- ✓ Geology
- ✓ Hydrology
- ✓ Soil Condition
- ✓ Tectonic Setting
- ✓ Seismology
- $\checkmark$  Air quality
- ✓ Noise and Vibration
- ✓ Water quality
- ✓ Land Use

## ii. Biological Components

- ✓ Flora
- ✓ Fauna
- ✓ Aquatic Ecology

#### iii. Socio-Economic Components

- ✓ Population and Demography
- ✓ Economic Activities
- ✓ Household Income and Cost of Livings
- ✓ Health Conditions
- ✓ Level of Education
- ✓ Cultural Components
- ✓ Religions
- ✓ Ethnicity
- ✓ Visual Components
- ✓ Tourist site, culture and religious properties

In the community near the Project, the socio-economic study was conducted in two formats key informant interviews and stakeholder meetings.

*Key Informant Interviews*: The survey team met with key persons, such as community leaders, community elders, officials, township and ward authorities, etc., to obtain information about the livelihoods available in the project area, employment opportunities, economic and social conditions of the people living in their communities as well as their perceptions about the project development.



*Stakeholder Meetings*: The focus group discussions and stakeholder meetings with community members who are residing in the project area and its surroundings. The main objectives of the exercise are to explore their perceptions and attitudes toward the planned project; the implications of the project on their social life and livelihoods; and probable compensation issues if they have to give their land (housing areas, farmland, other agricultural land, or any other property) for the implementation of the project and they themselves are to be relocated elsewhere.

#### Stage 4: Preparing ESIA Report and Developing EMP

#### Identification of potential impacts due to the project

Potential impacts due to the project were identified and evaluated one by one for the development of planning construction and operation stages with ratings for environmental items (social environment, biological environment, physical environment). In addition to the direct and immediate impacts of the project, the derivative, secondary or cumulative impacts, as well as impacts associated with other projects in the area, were also assessed with regard to environmental and social considerations.

Significance of impacts were evaluated based on environmental quality guidelines, institutional, public and technological recognition.

In the evaluation, criteria prescribed by Ecological Impact Assessment (2008) Guidelines were used.

#### Mitigation measures against anticipated negative impacts

Regarding the anticipated negative impacts, necessary steps were taken to examine the possible mitigation measures to avoid, reduce, minimize or eliminate the impacts.

#### Preparation of Environmental Management Plan (EMP) and Monitoring Plan

The Environmental Management Plan (EMP) was prepared for effectively implementing mitigation measures. The EMP includes various monitoring plans, which are necessary to confirm the significance of the impacts or the effectiveness of the mitigation measures. The concerns and suggestions from public consultations were taken into account in the preparation of the EMP.

The EMP and monitoring plan examined for options for construction and operation stages. Monitoring plan was prepared to be practical, considering the availability and appropriateness of the technology and budget.



### 1.4 **PROJECT PROPONENT INFORMATION**

Project proponent information are described below.

Project Proponent Name	Myanmar Economic Corporation
Address	Shar Kyunn Island (Zadetgyi Island) and Kyantcho Island, located in Kawthaung Township, Kawthaung District, Tanintharyi Region.
Contact person	U Bo Bo Hein
Email	bobohein.navy.mm@gmail.com
Phone number	09442035383

#### 1.5 STUDY TEAM FOR ENVIRONMENTAL STUDIES

Olive Bright Environmental Solutions Limited (OBES) acts as a third-party consultant firm, bringing together professionals and experts from a variety of fields to carry out the Environmental Impact Assessments (EIAs), Initial Environmental Examinations (IEEs), Environmental Management Plans (EMPs), and Environmental Monitoring Reports (EMoPs) regarding the environmental and social impacts of the development projects under the contract agreement of project proponents in accordance with Article 76 of the Environmental Impact Assessment Procedure (2015).

The information of the consultant organization is described in the following.

	Name of Organization:	Olive Bright Environmental Solutions Limited		
	Registration No.	131580223		
	License No.	EIA-CO(A)002/2023		
	Contact Person:	Dr. Lai Lai Win (Director)		
SES	Address:	No.9, Block 36, Nawaday Garden Housing, Yangon - Pathein Road, Hlaing Thar Yar Township, Yangon, Myanmar.		
	Phone No.	+959765479692, +959765638892		
	Email:	obesservices@obcmm.com		
	Website:	www.obcmm.com		

The first stage of the EIA process is a scoping study of EIA report preparation with an emphasis on public involvement and desktop study based on secondary data. Initial site visit for scoping stage of proposed Oyster Culture and Pearl Production project was carried out on 14<sup>th</sup> July, 2024. The purposed of site visit was -



- > to catch up the project team with the project proposal,
- ➢ to familiarize with affected project area, and
- > to begin the environmental and social screening and scoping process.

The members of the EIA team are listed in **Table 1.1** indicating their ECD Registration No. are shown as follows:

			Consultant	
No	Name	Position	Registration	Responsibilities
			Numbers	
1	Dr. Lai Lai Win	Project Management and Team Leading	EIA-C 019/2023	<ul> <li>Water Pollution Prevention, Control, Monitoring and Prediction of Impacts</li> </ul>
				- Ecology and Biodiversity
				- Solid Waste and Hazardous Waste Management
				- Risk Assessment and Hazard Management
2	U Min Min Oo	Consultant	EIA-C 020/2023	- Air Pollution Prevention and Control
				<ul> <li>Meteorology, Air Quality Assessment and Forecast</li> </ul>
3	Daw Myat Thitsar Naing	Consultant	EIA-C 021/2023	- Social Study and Analysis
4	U Myo Thura	Consultant	EIA-C 046/2023	-Geological Assessment
				-Soil Conservation
5	U Khin Maung Win	Consultant	EIA-AC 028/2023	-Water Pollution
				Prevention, Control,
				Monitoring and
				Prediction of Impacts
				-Hydrology, Surface
				Water and Ground Water
				Conservation
				-General Environmental
				Management

Table 1.1EIA Study Team



No	Name	Position	Consultant Registration Numbers	Responsibilities	
6	U Si Yan Hein	Associate Consultant	EIA-AC 026/2023	Geological Assessment	
7	U Kyaw Win Han	Associate Consultant	EIA-AC 027/2023	Air Pollution Monitoring	
8	U Htet Thiha Phone Myint	Associate Consultant	EIA-AC	-Geological Assessment	
			032/2023	-Noise and Vibration	
9	Daw Ei Thet Mon	Associate Consultant	EIA-AC	-Water Pollution	
			017/2023	Prevention, Control, Monitoring and Prediction of Impacts	
				-Solid Waste and Hazardous Waste Management	
10	U Khin Maung Aye	Associate Consultant	EIA-AC 018/2023	-Archaeological and Cultural Heritage	
11	U Soe Paing Hein	Associate Consultant	EIA-AC 019/2023	General Environmental Management	
12	Dr. Phyu Phyu Myint	Associate Consultant	EIA-AC 020/2023	Health Impact Assessment	
13	U Nyunt Oo	Associate Consultant	EIA-AC 036/2023	General Environmental Management	
14	U Kaung Kyaw Htet	Associate Consultant	EIA-AC 049/2023	Risk Assessment and Hazard Management	
15	Dr. Kaung Htet Swan	Supportive Team Member	-	Air Pollution Monitoring	
16	Daw Myint Myint Soe	Supportive Team Member	-	Economic Analysis	



# Chapter 2 OVERVIEW OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

# 2.1 **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 project are subjected to these legal requirements.

This chapter will be the summary of the regulations and legal framework for the proposed project and recommendations to regulatory frameworks that fit with the Myanmar context and requirements will be covered. The project proponent is committed to the existing relevant Myanmar Laws, rules, and regulations. National laws and regulations for environmental protection applicable to the proposed project are compiled and presented in the following.

# 2.2 THE CONSTITUTION OF THE REPUBLIC OF THE UNION OF MYANMAR (2008)

- The Union is the ultimate owner of all lands and all-natural resources above and below the ground, above and beneath the water and in the atmosphere in the Union.
- The Union shall permit citizens right of private property, right of inheritance, right of private initiative and patent in accord with the law.
- The Union guarantees the right to ownership, the use of property and the right to private invention and patent in the conducting of business if it is not contrary to the provisions of this Constitution and the existing laws.
- Every citizen has the duty to assist the Union in preserving and safeguarding the cultural heritage, conserving the environment, striving for the development of human resources, and protecting and preserving the public property.

# 2.3 NATIONAL ENVIRONMENTAL POLICY

The Policy provides long-term guidance for government organizations, civil society, the private sector and development partners on the achievement of environmental protection and sustainable development objectives in Myanmar. This Policy builds on Myanmar's 1994 National Environment Policy, the 1997 Myanmar Agenda 21, the 2009 National Sustainable Development Strategy, the 2008 Constitution of the Republic of the Union of Myanmar, the 2012 Environmental Conservation Law, the 2015 National Comprehensive Development Plan and the 2018 Myanmar Sustainable Development Plan.

## National Environmental Policy Vision and Mission

Vision



A clean environment, with healthy and functioning ecosystem, that ensures includes development and wellbeing for all people in Myanmar.

#### Mission

To establish national environmental policy principle for guiding environmental protection and sustainable development and for mainstreaming environmental consideration into all polices, laws, regulation, plans, strategic, programs and projects in Myanmar.

# 2.4 NATIONAL LAND USE POLICY (2016)

#### **Objectives:**

- To promote sustainable land use management and protection of cultural heritage areas, environment, and natural resources in the interest of all people in the country;
- To strengthen land tenure security for the livelihood's improvement and food security of all people in both urban and rural areas of the country;
- To recognize and protect customary land tenure rights and procedures of the ethnic nationalities;
- To develop transparent, fair, affordable and independent dispute resolution mechanisms in accordance with the rule of law;
- To promote people centered development in land resources and accountable land use administration in order to support the equitable economic development of the country;
- To develop a National Land Law in order to implement the above objectives of the National Land Use Policy.

In Section 7, the guiding principles of the national land use policy are as follows:

- (a) To enhance sustainable land use in development and implementation of policies and legal framework related to land and natural resource management;
- (b) To ensure transparency, responsibility and accountability in land and natural resource governance;
- (c) To promote people's participation and collaboration particularly ethnic nationalities, women and smallholder farmers in decision making related to land and natural resource management;
- (d) To recognize and protect private and communal property rights of citizens as included in the constitution;
- (e) To make effort promoting appropriate international good practices in land and natural resource governance.

In Section 8, the basic principles of the National Land Use Policy are as follows:

(a) To legally recognize and protect legitimate land tenure rights of people, as recognized by the local community, with particular attention to vulnerable groups such as smallholder farmers, the poor, ethnic nationalities and women;



- (b) To strengthen rule of law and good governance, including simplifying procedures, ensuring transparency, and increasing accountability and responsibility;
- (c) To promote effective land information management, including easy public access to information;
- (d) To adopt international best practices such as voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security and human rights standards;
- (e) To promote inclusive public participation and consultation in decision making processes related to land use and land resource management;
- (f) To promote effective market-based solutions, such as formal recognition of land tenure rights or use of new tax mechanisms, to address land management issues such as discouraging land speculation; review and revise the National Land Use Policy to meet changing socioeconomic needs to the country as necessary;
- (g) To develop and implement fair procedures relating to land acquisition, compensation, relocation, rehabilitation, restitution, and reclaiming land tenure and housing rights of internal displaced persons and returning refugees caused by civil war, land confiscation, natural disasters and other causes;
- (h) To ensure easy access to judicial review or other dispute resolution mechanisms that are independent, fair, transparent and affordable;
- (i) To prioritize the interest of public citizens over private companies in land use decision making;
- (j) To ensure equal opportunities for men and women over land resources, tenure rights and participatory decision making;
- (k) permit freedom of crop selection and adoption of cultivation technologies in a way that will not negatively affect the environment;
- To develop law and procedures for addressing the issues of landlessness and affordable housing;
- (m)To decentralize decision making related to land;
- (n) To strictly and transparently enforce contracts related to land in compliance to the law;
- (o) To address the impacts of climate change and natural disasters.

In Section 37, when land acquisition is done for social and economic development, sustainable land use for the future generations shall be taken into consideration.

In Section 38, when managing the relocation, compensation, rehabilitation and restitution related activities that result from land acquisition and allocation, unfair land confiscation or displacement due to the civil war, clear international best practices and human rights standards shall be applied, and participation by township, ward or village tract level stakeholders, civil society, representatives of ethnic nationalities and experts shall be ensured.

In Section 42, the following shall be carried out when resolving land disputes:

- (a) arranging the establishment of special courts that will hear special cases related to land law with specially trained judges and law officers if necessary;
- (b) establishing independent monitoring bodies with participation of all stakeholders and appointing monitors that have no direct interest, to observe settlement of land disputes;



- (c) determining the processes to settles land disputes between businessmen and farmers, or through independent arbitration;
- (d) establishing an independent tripartite arbitration process to settle land disputes, comprised of Government departments, organizations, farmers and privates sectors;
- (e) establishing accurate and clear procedural processes in relevant departments and organizations to improve easy access to, and use of, independent arbitration tribunals, courts and other dispute resolution mechanisms by farmers and other land users in accordance with existing laws.

# 2.5 **MYANMAR CLIMATE CHANGE POLICY (2019)**

#### Vision

Myanmar's vision is to be a climate-resilient, low-carbon society that is sustainable, prosperous and inclusive, for the wellbeing of present and future generations.

## Purpose

The purpose of this Policy is to provide long term direction and guidance to:

- (a) Take and promote climate change action on adaptation and mitigation in Myanmar;
- (b) Integrate climate change adaptation and mitigation considerations into Myanmar's national priorities and across all levels and sectors in an iterative and progressive manner; and
- (c) Take decisions to create and maximize opportunities for sustainable, low carbon, climate resilient development, ensuring benefits for all.

# 2.6 THE ORDER ON THE OPERATION OF BUSINESS RELATING TO OZONE DEPLETING SUBSTANCES (2014)

According to paragraph (3) of this Order, the project proponent commits to apply to import or export the ozone depleting substance or designed product for use of ozone depleting substance for the Ministry with form (1) for import and form (2) for export stating facts completely in accord with stipulations for the necessary endorsement.

According to paragraph (6) of this Order, the project proponent commits to operate the relevant business after receiving and import license or an export license or permit issued by the Ministry of Commerce after receiving the endorsement issued by the Ministry.

According to paragraph (7) of this Order, the project proponent commits to apply the Department assigned by the Ministry with form (5) for application of registration in accord with stipulations.

According to paragraph (11) of this Order, the project proponent commits to report annually relating to actual import or export with the statistics to the Ministry not later 31st January in every year.

According to paragraph (15) of this Order, the project proponent commits the following to-



- (a) To inspected by the Ministry or the Department or the Organization assigned by the Ministry relating to his business.
- (b) To compile the statistics of annual information relating to his business and be inspected by the relevant authority for the statistics.
- (c) To state the registration number issued for his business on the container if he conducts the import, export or he is a manufacture of designed product for use of ozone depleting substance.
- (d) To obligate the conditions containing in the registration certificate issued under this order
- (e) To obligate the order and directive issued by the Ministry occasionally.

According to paragraph (16) of this Order, the project proponent commits to conduct the operation of business relating to ozone depleting substance without a registration certificate issued by the Department assigned by the Ministry under this Order.

According to paragraph (17) of this Order, the project proponent commits to avoid recycling any used ozone depleting substance without the permission of the Ministry.

According to paragraph (18) of this Order, the project proponent commits to avoid destroying any ozone depleting substances or designed products for use of ozone depleting substance other than in a facility that has been stipulated for that purpose by the Ministry.

According to paragraph (21) of this Order, the project proponent commits to cooperate with the Ministry, when necessary, inspection not that uses ozone depleting substance suitably and correctly.

According to paragraph (21) of this Order, the project proponent commits to receive the permission from the Ministry for recycling the used ozone depleting substance.

# 2.7 **RELEVANT NATIONAL LEGISLATIONS AND COMMITMENTS**

The project proponent will comply with all national laws, rules and regulations that related to the project activities. The followings are the list of laws and regulations that applied and commits to follow related to the proposed project.

# 2.7.1 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 section25 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.

## 2.7.2 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.

## 2.7.3 Environmental 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 implement fully 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 preconstruction 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 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.

## 2.7.4 The Conservation of Water Resources and Rivers Law (2006)

**Purpose:** The aims of this law are as follows:

- To conserve and protect the water resources and rivers system for beneficial utilization by the public;
- To smooth and safety waterways navigation along rivers and creeks;
- To contribute to the development of State economy through improving water resources and river system
- To protect environmental impact.

The powers of the Directorate are as follows,

- (a) granting permission after examining the application for permission to carry out the construction of switchback, dockyard, wet dockyard and water-tight dockyard, building of jetty and landing stage and vessel landing by drainage in the river-creek boundary, bank boundary and waterfront boundary;
- (b) permitting, after scrutiny, to pile sand, shingle and other heavy substances within the bank boundary and waterfront boundary;



- (c) issuing recommendation to the relevant government department and organization in respect of application for construction of buildings and bridges in the river-creek boundary, bank boundary and waterway boundary;
- (d) determining of waterway grade, issuing information on opening and closing of waterway and warning on the use of waterway from time to time;
- (e) determining the size of vessel and number of barges to ply along each waterway, and determining of draught;
- (f) choosing site in river for the inland vessels to dock, demarcating of port boundary, and opening and closing thereof;
- (g) issuing recommendation to the relevant government department and organization after scrutiny as to whether or not the waterways of the rivers-creeks can be affected adversely, on the application to grant permit for business of sand suction, sand dredging, sand excavating, rivers shingle suction, panning for gold, gold mineral dredging or extracting resources in river-creek boundary and waterfront boundary;
- (h) issuing notifications prescribing terms and conditions in accordance with the guidance of the Ministry in respect of the navigation of vessels in rivers and creeks for conservation of water resources, rivers and creeks.
- The Project Proponent commits to comply not to carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks under section 8(a) of said law.
- The Project Proponent commits to comply not to dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk under section 11(a) of said law.
- The Project Proponent commits to comply not to catch aquatic creatures within rivercreek boundary, bank boundary or waterfront boundary with poisonous materials or explosives under section 11(b) of said law.
- The Project Proponent commits to comply not to dispose of disposal soil and other materials from panning for gold, gold mineral dredging or resource production in the river and creek, into the river and creek or into the water outlet gully which can flow into the river and creek under section 11(c) of said law.
- The Project Proponent commits to comply not to dispose of any substance into rivercheek that may cause damage to waterway or change of watercourse from the bank or vessel which is playing, vessel which has berthed, anchored, stranded or sunk under section 19 of said law.
- The Project Proponent commits to comply not to drill well or pond or dig earth without the permission of the Directorate of Water Resources and Improvement of River Systems under section 21(b) of said law.
- The Project Proponent commits to avoid piling sand, shingle and other heavy materials for business purpose in the bank area and waterfront area without permission of Directorate of Water Resources and Improvement of River Systems under section 22 of said law.



- The Project Proponent commits to avoid violating the conditions prescribed by the Directorate of Water Resources and Improvement of River Systems so as not to cause water pollution and change of watercourse in rivers and creeks under section 24(b) of said law.
- The Project Proponent commits to comply to carry out only after obtaining the approval of the Ministry of Transport, constructing of drainage, utilizing river water intake, constructing bridges spanning rivers, connecting underground pipe, connecting underground electric power cable, connecting underground telecom cable or digging in rivers and creeks, bank boundary and waterfront boundary, under the requirement of work, shall in order to adversely affect the water resources and rivers and creeks under section 30 of said law.

# 2.7.5 Conservation of Water Resources and River Rules (2013)

Ministry of Transportation enacted Conservation of Water Resources and River Rules on 27th January, 2013. The project proponent must, in accordance with the Rules:

- (a) Construct the toilets far away from the river bank and sewage discharge to septic tank, under sub-rule (c) of rule 8;
- (b) Avoid discharging sewage, engine oil, chemical, poisonous material, hazardous materials and other materials which may cause water pollution, under sub-rule (d) of rule 8; and
- (c) Pay to prevent water pollution and to conserve the environment if water pollution and environmental impact is generated as a result of the project, under rule 9.

# 2.7.6 The Protection of Biodiversity and Protected Areas Law (2018)

The objectives of this Law are as follows,

- To implement biodiversity strategy and policy of the State.
- To implement the Government policy on conservation of protected areas.
- To carry out protection and conservation of wild fauna, wild flora, ecosystems and migratory animals in accordance with International Conventions ratified by the State.
- To regulate trade of wild fauna and wild flora or their parts, derivatives or products;
- To protect geo-physically unique areas, endangered wild fauna and wild flora and their natural habitats.
- To contribute to natural scientific research and environmental education activities.
- To protect wild fauna and wild flora by establishing zoological and botanical gardens.

According to sub-section(a), (c), (d) of section 35, the Project Proponent commits to avoid the following;

- Entering a prohibited area without permission.
- Digging on the land, cultivating or carrying out any activity.
- Extracting, collecting or destroying in any manner, any kind of wild flora or cultivated plant.


According to sub-section (d) of section 39, the project proponent commits to avoid intentionally polluting soil, water or air, damaging a water-course or poisoning or electrifying water, or using chemical or explosive materials in the water within the protected area.

#### 2.7.7 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.

The project proponent has to perform preparatory and preventive measures for natural disaster risks reduction before the natural disaster strikes under sub section (a) (i) of section 13 of said law.

The project proponent has to undertake rehabilitation and reconstruction activities for improving better living standard after the natural disaster strikes and conservation of the environment that has been affected by natural disaster under sub section (a) (iii) of section 13 of said law.

The project proponent has to carry out better improvement on early warning system of natural disaster under sub section (b) of section 14 of said law.

The project proponent has to carry out together with the measures of natural disaster risk reduction in development plans of the State under sub section (d) of section 14 of said law.

Whoever if the area where the natural disaster is likely to strike and preparing the natural disaster risk assessment and drawing emergency plans under sub-section (a) of section 15 of said law.

Whoever if the natural disaster causes or is likely to be caused by any negligent act without examination or by willful action which is known that a disaster is likely to strike, shall be punished with imprisonment for a term not exceeding three years and may also be liable to fine under section 25 of said law.

Whoever interferes, prevents, prohibits, assaults or coerces the department, organization or person assigned by this law to perform any natural disaster management shall, on conviction, be punished with imprisonment for a term not exceeding two years or with fine or with both under section 26 of said law.

Whoever violates any prohibition contained in rules, notifications and orders issued under this law shall, on conviction, be punished with imprisonment for a term not exceeding one year or with fine or with both under section 29 of said law.

Whoever willful failure to comply with any of the directives of the department, organization or person assigned by this law to perform any natural disaster management shall, on conviction,



be punished with imprisonment for a term not exceeding one year or with fine or with both under sub section (a) of section 30 of said law.

#### 2.7.8 The 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.

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.

#### 2.7.9 Myanmar Investment law (2016)

The objectives of this law are as follows:

- (a) To develop responsible investment activities that do not harm the natural and social environment for the benefit of the state and citizens;
- (b) To protect investors and their investment activities in accordance with the law;
- (c) To create employment opportunities for the people;
- (d) To develop human resources;
- (e) To develop high-performance manufacturing, service, and trade sectors;
- (f) To develop technology, agriculture, livestock and the industrial sector;
- (g) To develop various fields of knowledge, including infrastructure, throughout the country.
- (h) To enable citizens to work together with the international community;
- (i) To promote the emergence of businesses and investment activities that meet international standards.

According to section 36 of this law, the project proponent commits to submit a proposal to the Commission and invest after receiving the permit for the following businesses stipulated in the rules,

- (a) investment businesses that are essential to the Union strategy;
- (b) large capital-intensive investment projects;
- (c) projects which are likely to cause a large impact on the environment and the local community;
- (d) investment businesses which use state-owned land and building;
- (e) investment businesses designated by the government, to require the submission of a proposal to the Commission.

When submitting the endorsement application, under section 38 of this law, the project proponent has to be attached all approvals or licenses or permits or similar documents issued by the relevant organizations.

According to section 51 of this law, the project proponent commits to comply the following,



- (a) Appoint any citizen who is a qualified person as senior manager, technical and operational experts, and advisor in his investment within the Union in accordance with the Laws.
- (b) Appoint them to replace, after providing for capacity building programs in order to be able to appoint citizens to different level positions of manager, technical and operational experts, and advisors.
- (c) Appoint only citizens for works which does not require skill.
- (d) Appoint skilled citizen and foreign workers, technicians, and staffs by signing an employment contract between employer and employee in accordance with the labor laws and rules.
- (e) Ensure to obtain the entitlements and rights in the labor law and rules, including minimum wages and salary, leave, holiday, overtime fee, damages, compensation of the workman, social welfare, and other insurance relating to workers in stipulating the rights and duties of employers and employees and the occupational terms and conditions in the employment contract.
- (f) Settle dispute arisen among employers, among workers, between employers and workers and technicians or staff in the investment in accordance with the existing law.

According to section 65 of this law, the project proponent commits to comply the following,

- (a) Respect and comply with the customs, traditions and traditional culture of the ethnic groups in the Union.
- (b) Establish and register a company or sole proprietorship or legal entities or branches of such entities under the Laws in order to invest.
- (c) Abide by the terms and conditions, stipulations of a special license, permit, and business operation certificates issued to them, including the rules, notifications, orders and directives and procedures issued by this Law and the existing laws, terms and conditions of contract and tax obligations.
- (d) Carry out in accordance with the stipulations of the relevant department if it is, by the nature of business or by other need, required to obtain any license or permit from the relevant Union Ministries, government departments and government organizations, or to carry out registration.
- (e) Immediately inform to the Commission if it is found that natural mineral resources or antique objects and treasure trove are not related to the investment permitted above and under the land on which the investor is entitled to lease or use and not included in the original contracts. If the Commission allows, the investor shall continue to carry out the investment in such land, and if not allowed, the investor shall transfer and carry out, by obtaining the permission, at the substituted place which is selected and submitted by him.
- (f) Make any significant alteration of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the Commission.
- (g) Abide by the existing laws, rules, procedures and best standards practiced internationally for his investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage.



- (h) List and keep proper records of books of account and annual financial statements, and necessary financial matters relating to the investments performed by permit or endorsement in accordance with internationally and locally recognized accounting standards.
- (i) Close and discontinue the investment only after payment of compensation to employees in accordance with the existing laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce.
- (j) Pay wages and salaries to employees in accordance with the existing laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason;
- (k) Pay compensation and indemnification in accordance with the existing laws to the relevant employee or his successor for injury, disability, disease and death due to the work;
- (1) Supervise foreign experts, supervisors and their families, who employ in his investment, to abide by the existing laws, rules, orders and directives, and the culture and traditions of Myanmar.
- (m)Respect and comply with the labor laws.
- (n) Have the right to sue and to be sued in accordance with the laws.
- (o) Pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of permissible investment, except from carrying out the measures required to conduct investment in a permit or an endorsement;
- (p) Allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment.
- (q) Take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of the activities of the investments which obtained permit or endorsement of the commission.

According to section 68, the project proponent commits to pay taxes exemptions or reliefs or both for his investment after discontinues the investment.

According to section 70, the project proponent commits to obtained the permission of the Commission for any extension and amendment of the contracts mentioned in section 69.

According to section 71, the project proponent commits to carry out health assessment, cultural heritage impact assessment, environmental impact assessment and social impact assessment according to the type of investment business in accordance with the relevant laws, rules, regulations and procedures.



According to section 72, the project proponent commits to submit and notice to the Commission of any sublease, mortgage, transfer of shares, transfer of business to any person during the investment period.

According to section 73, the project proponent commits to insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entitled to carry out insurance businesses within the Union.

#### 2.7.10 Myanmar Investment Rules (2017)

Section 190, 202, 203, 206, 212, The Project Proponent commits:

- To comply with all terms and conditions in the permit and other applicable laws when the investment is carried out.
- To fully assist while negotiating with the Authority for settling the grievances of the local community that have been affected due to Investments.
- To appoint expert foreigner as senior manager, technical and operational expert or advisor according to subsection (a) of the section 51 of the Law.
- To obtain the permit or tax exemption or relief to insure the relevant insurance out of the following types of the insurance at any insurance business entitled to carry out insurance business within the Union based on the nature of the business: Property and Business Interruption Insurance; Engineering Insurance; Professional Liability Insurance; Bodily Injury Insurance; Marine Insurance; or Workmen Compensation Insurance; Life Insurance; Fire Insurance.

An investor to whom section 65(q) of the law applies shall submit confirmation of its compliance with the applicable requirements of the Environmental Conservation Law, rules and environmental impact assessment procedures to undertake, obtain and implement an initial environmental examination, assessment, certificate and management plan as those requirements are met. The approval of Commission for continuation of the investment shall base on its compliance.

## 2.7.11 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 Myanma 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.



## 2.7.12 The Export and Import Law (2012)

#### Objectives

The objectives of this Law are as follows;

- To enable to implement the economic principles of the State successfully;
- To enable to lay down the policies relating to export and import that support the development of the State:
- To cause the policies relating to export and import of the State and activities are to be in conformity with the international trade standards:
- To cause to be streamlined and speedy in carrying out the matters relating to export and import.
- The project proponent has to commit not to violate the conditions contained in the license according to section 7 of said law.

## 2.7.13 The Standardization Law (2014)

#### **Objectives:**

- To enable to determine Myanmar Standards;
- To enable to support export promotion by promoting quality of production organizations and their products, production processes and service industries;
- To enable to protect consumers and users by guaranteeing that imports and products are not lower than the prescribed standard and are safe and free form health hazards;
- To enable to support protection from impact on environment related to products, production processes and services and conservation of natural resources;
- To enable to protect distribution and import of disqualified goods which do not meet the prescribed standard, goods which are not safe and goods which are endangered to the environment;
- To enable to support in establishing the International Free Trade Area and to enable to reduce technical barrier relating to trade;
- To enable to facilitate technical transfer and technical innovation of the country by applying standards for economic and social development of Myanmar in accord with the Myanmar national development plan.

According to section 9, the project proponent commits to apply quality recommendation to the Ministry of Science and Technology in accord with the stipulations to obtain the accreditation certificate.

According to sub-section (a) of section 14, the project proponent commits to apply to the Ministry of Science and Technology in accord with the stipulations to extend the term of the accreditation certificate.

According to sub-section (a), (b) of section 16, the project proponent commits the following,



- To register at the Department after obtaining the approval of the Council on the standardization mark for each category of quality recommendation for which it may issue.
- To submit the list of businesses to which it has issued quality recommendation to the Department in accord with the stipulations.

According to section 17, the project proponent commits to apply for obtaining quality recommendation to the Ministry of Science and Technology which have obtained the accreditation certificate from the Department.

According to section 19, the project proponent commits to avoid violating any term or condition contained in the relevant recommendation.

If find by the Committee, take any of the following actions,

- (a) warning.
- (b) suspending the quality recommendation for a limited period.
- (c) cancelling the quality recommendation.

According to section 20, the project proponent commits to avoid violates any term or condition contained in the relevant accreditation certificate. If find by the Committee, take any of the following actions,

- (a) warning.
- (b) suspending the accreditation certificate for a limited period.
- (c) cancelling the accreditation certificate.

According to section 20, the project proponent commits to comply with compulsory standards.

#### 2.7.14 Tanintharyi Region Fisheries Law (2012)

According to section 3 of this law, the project proponent commits to pay a fishing gear license fee in accordance with the specified methods, or by submitting an open tender price.

According to section 4 of this law, the project proponent commits to apply the license and operate in accordance with the prescribed procedures for a fish processing, trading, collecting, transporting, and cold storage facility.

According to section 17, the project proponent commits the following;

- (a) Taxes and fees payable shall be paid as determined by the department.
- (b) Must comply with the terms and conditions of the lease or license and any notifications, orders, and instructions issued by the Department from time to time.
- (c) Must comply with the existing laws of the country.
- (d) If assigned by the department, fisheries research activities shall be carried out free of charge.
- (e) Only fish workers registered with the department shall be employed in their business.

According to section 31,32,35,36,37,38,39,40,41 and 42, the project proponent commits the following prohibitions,



- No person shall engage in fishing without a lease or license issued under this law.
- No person shall do the following in any inshore fishery or freshwater fishery:
- Fishing or damage with explosives, poisons, chemicals and similar dangerous materials.
- Fishing with prohibited fishing methods and fishing gear.
- Catching prohibited fish species and sizes.
- Fishing during prohibited times and areas.
- No person shall fail to pay the due tax, tender fee and license fee on the same day after purchasing a property at auction or after being awarded a tender license without obtaining the approval of the Department.
- A person authorized to operate a fishery shall not violate any of the terms and conditions of the lease or license.
- No person shall fail to comply with any notification, order, rule, regulation, instruction, restriction or prohibition issued by the Department from time to time.
- No person shall disturb, damage or pollute fish, other aquatic life and living and nonliving resources in any inshore fishery or freshwater fishery waters.
- No person shall do the following within the pond or the boundaries of the pond:
- Cutting down and burning forests to destroy fish habitats.
- Doing anything that disrupts the flow of water in the lake or damages its natural environment.
- Growing crops.
- No person shall alter the type, volume or flow of water in any pond, stream or canal connected to it, or in any watercourse, without the permission of the Department.
- No person shall, while the Head of Fisheries is inspecting any fishery, conceal fish, fishing gear, other equipment, money, etc., or dispose of them without the permission of the Head of Fisheries.
- No person shall work as a fisher in any fishery operated under this law without a fisher's registration.
- No person shall produce, export, process, store, distribute, or sell the following aquatic products:
- Aquatic products that may be toxic, harmful or harmful to the consumer.
- Water products that have been modified or infused with dyes, raw materials, etc., which are not suitable for human consumption and have been substituted in whole or in part to affect the nature, substance or quality of the water product and cause a hazard.

# 2.7.15 Tanintharyi Region Development Law (2017)

#### Objectives

- To ensure the continuous development of towns and villages and to raise the standard of living;
- To fully collect and manage all municipal development taxes;
- To ensure that the taxes received and urban and village development activities are used systematically in accordance with existing laws and regulations;



• To act with the belief that taxes and fees received from the public are for the public only.

According to sub-section (a) of section 57 of this law, the project proponent commits to comply not to modify or extend any building without the permission of the township development committee.

According to section 60 of this law, the project proponent commits to comply the following;

(a) Not to engage in any work that may be dangerous,

No dangerous work-related material shall be sold or stored.

#### 2.7.16 The Law Relating to Aquaculture (1989)

- The project proponent has to apply for a lease to the Department in the prescribed application form when desiring to carry out aquaculture in the land for aquaculture or in fisheries waters not pertaining to any Government department or in reserved fisheries waters under section 3 of said law.
- The project proponent has to apply for a license to the Department in the prescribed application form when desire to carry out aquaculture under section 4 of said law.
- The project proponent has to apply for a license to the Department in the prescribed application form when wish to hatch fish for sale or a person desiring to breed fish for display on a commercial scale under section 5 of said law.

The project proponent has to-

- (a) carry out aquaculture only after obtaining a license;
- (b) comply with the conditions prescribed by the Department;
- (c) if the fisheries waters or the land in which fish is to be bred pertains to any Government department, the conditions prescribed by such department shall also be complied under section 6 of said law.

The project proponent has to pay duties and fees payable out of the following duties and fees in the manner prescribed by the Department when obtained a lease or a license for aquaculture.

- (a) Lease rent;
- (b) License fee according to section 7.

According to section 29 of The Law Relating to Aquaculture 1989, The project proponent has not done the following;

- Breeding of fish without license;
- Obstructing navigation and flowing of water or polluting the water within the fisheries
- Waters or abetting such acts;
- Importing live fish into the country and exporting live fish out of the country, without
- The prior permission of the Department;
- Breeding of fish prohibited by the Department



According to section 30 of The Law Relating to Aquaculture 1989, the project proponent commits to comply the following,

• Has not contravene any of the conditions prescribed by the Department;

Has not transfer the fisheries pond without the prior permission of the Department.

## 2.7.17 The Myanmar Pearl Law (1995)

#### Objectives

The objectives of this Law are as follows: -

- (a) to implement the policy of the Government relating to pearl production and marketing;
- (b) to encourage and supervise the development of pearl production;
- (c) to protect and conserve water area of oyster fishing grounds from destruction and oysters from extinction;
- (d) to conduct scientific research works relating to pearl production.

According to section 4 of this law, the project proponent commits to apply to the Ministry for a permit for the following activities;

- (a) Foreign investment in the capture and collection of oysters, oyster hatching, oyster care, pearl farming, pearl harvesting or the sale of oyster shells;
- (b) Domestic investment in breeding, caring for, or cultivating pearls or pearls.

Under section 6 of this law, the project proponent commits to apply to the Director General in accordance with the requirements to obtain a permit for the business of catching and collecting sea urchins or selling sea urchin shells with domestic investment.

According to section 8 of this law, the project proponent commits to comply the followings;

- (a) Must comply with the provisions of this law, the rules, procedures, orders and instructions issued under this law;
- (b) The terms and conditions of the permit must be followed.
- (c) The fees specified by the Ministry for the permit shall be paid in Myanmar currency, in foreign currency, or in both Myanmar currency and foreign currency, in accordance with the terms and conditions.

According to section 9 of this law, the project proponent commits apply to the Managing Director in accordance with the stipulations, for permission to register for the following operations,

- (a) utilizing a vessel as an oyster diving vessel;
- (b) working as a pearl culturing technician.

According to section 12 of this law, the project proponent commits to comply the following duties,

(a) Must comply with the provisions of this law, the rules, procedures, orders and instructions issued under this law;



- (b) Must comply with the terms and conditions of the registration certificate.
- (c) The registration fee and other fees specified by the Ministry for the registration certificate shall be paid in Myanmar currency, in foreign currency, or in both Myanmar currency and foreign currency, in accordance with the specifications.

According to section 16 of this law, the project proponent commits to recognize that Pearls grown in naturally occurring oysters found in the territorial sea, contiguous zone, offshore shallow waters and exclusive economic zone of Myanmar shall be deemed to belong to the State.

According to section 17 of this law, the project proponent commits the following responsibilities;

- (a) Implementing the policy on pearl production and trade;
- (b) Supervising and controlling pearl production activities in accordance with this law;
- (c) Providing domestic training and advanced technology training abroad to workers involved in pearl production to gain on-the-job skills;
- (d) Devising and implementing methods to increase the quantity and quality of pearls;
- (e) Devising ways to prevent damage to the waters of the otter nesting grounds;
- (f) To determine, modify, and cancel the designation of otter rookeries and submit it to the Ministry after examining the need for it;
- (g) To devise ways to prevent the extinction of the species and to ensure sufficient availability of the species;
- (h) Implementing scientific research activities related to pearl production;

Liaising and coordinating with relevant government departments, organizations and international organizations in implementing pearl production and trading activities.

According to section 25 and 26 of this law, the project proponent commits to avoid the following operations without obtaining a permit,

- (a) oyster fishing and collecting;
- (b) artificial breeding of oyster;
- (c) oyster rearing;
- (d) pearl culturing;
- (e) pearl harvesting;
- (f) marketing of shell.
- (g) utilizing a vessel as an oyster diving vessel;
- (h) working as a pearl culturing technician.

According to section 27 and 28 of this law, the project proponent commits to avoid the following;

- (a) fishing by upheaval of the soil at the waterbed by using any type of fishing implements with sharp edges, hooks or rakes;
- (b) emitting disposing, spilling or spreading of lubricating oil, fuel oil or other waste substances from a vessel which may cause pollution to the water mass.



- (c) using explosive substances, poisons, chemicals or such other similar dangerous substances;
- (d) keeping on board the vessel substances mentioned in sub-section (a).

#### 2.7.18 The Myanmar Territorial Sea and Maritime Zones Law (2017)

#### Objectives

The objectives of this law are as follows:

- To maintain security, rule of law and peace and order in the territorial sea, contiguous zone, exclusive economic zone and offshore waters in the interests of the State;
- To protect and conserve the natural resources within the territorial sea and marine zones of the State, to systematically and sustainably exploit them, and to conduct research on marine science;
- To protect and preserve the water, air and marine environment within the territorial sea and maritime zones of the State from pollution.

According to section 30, 31 and 32, the project proponent commits the following prohibitions,

#### **Prohibitions**

**30.** No one shall move any objects, including ancient objects and historic objects at the seabed of the continental shelf without the prior permission of the Government.

**31.** No one shall act any of the followings in the exclusive economic zone without the prior permission of the Government:

- (a) exploring;
- (b) exploiting natural resources;
- (c) doing research;
- (d) excavating or drilling for any purpose;
- (e) establishing, maintaining or using artificial island, off-shore terminal, installations and structures.

**32.** No one shall act any of the followings in the continental shelf without the prior permission of the Government:

- (a) exploring;
- (b) exploiting natural resources;
- (c) doing research;
- (d) searching, excavating or drilling for any purpose;
- (e) establishing, maintaining or using artificial island, off-shore terminal, installations and structures;
- (f) extending or maintaining submarine cables and pipelines.



## 2.7.19 Maritime Navigation Treaties Act (1952)

The project proponent commits to comply with the provision under Maritime Navigation Treaties Act (1952).

#### 2.7.20 The Animal Health and Livestock Development Law (2020)

The objectives of this Law are as follows;

- To ensure the development of animal health and livestock production, veterinary services, manufacturing of quality animal feed, veterinary medicinal products and animal equipment and animal products, research and awareness activities.
- To ensure production and distribution of nutritious, safe and quality animals and animal products for the sufficiency of domestic consumption and importation or exportation.
- To ensure cooperation and collaboration among Government Departments, Government Organizations, other institutions, International Government Departments and Organizations for conservation of animal genetic resources and obtaining good quality breeds.
- To prevent and surveil infectious and zoonotic diseases, and to take systematic response and control measures when they occur.
- To promote cooperation among livestock production, processing, distribution and marketing of animals and animal products.
- To protect willful cruelty to animals in accordance with law.
- To provide financial and technical assistance, and good quality breeds for livestock production development and to ensure that livestock farming and livestock production are carried out in farms and on livestock farmland systematically and to promote market access.

According to section 18, the project proponent commits to comply the following;

- To comply with the terms and conditions of the permit;
- To accept the inspection of the Department;
- To inform promptly the Department of the occurrence of suspicious infectious animal disease in the worksite, if it is found.
- To strictly comply with the instructions of the Department after informing under subsection (c).

According to section 19, the project proponent commits to apply for a permit to the respective Township Veterinary Officer in accordance with the stipulations.

According to section 21, the project proponent commits to comply the following,

- To comply with the terms and conditions of the permit, if he or she is a permit holder.
- To accept the inspection of the Department.
- To inform promptly the Department and the Administrator of the relevant Township, Ward or Village Tract of the occurrence of infectious animal disease in his or her livestock, if it occurs.



- To strictly comply with the instructions of the Department after informing under subsection (c).
- To breed livestock in accordance with good animal husbandry practice and good manufacturing practice.
- To keep, transport or distribute animals and animal products in accordance with the ways and means prescribed by the Department.
- To carry out slaughtering process in accordance with the stipulations prescribed by the Department.
- To follow this Law and rules, orders, directives and procedures issued under this Law in relation to livestock production.

According to section 26, the project proponent commits to apply for the recommendation certificate to the Director General in accordance with stipulations before applying for an export or import licence or a permit to the relevant government department.

According to section 34, the project proponent commits to promptly report to the Township Veterinary Office and relevant Administrator of Township, Ward or Village Tract, when suspects that from the project of livestock are infected, die due to any infectious animal disease.

According to section 36, the project proponent commits to avoid the following, in respect of the protection from cruelty to animals.

- (a) Animals not be loaded up and forced to tow in excess of the specified weight of load.
- (b) Animals not be treated with willful cruelty or shall not be forced to work excessively hard.
- (c) Animals not be deprived of its any part of organ unnecessarily
- (d) Farmers not willfully deprive his animals of food and drink.
- (e) Livestock not be willfully left untreated when it is got disease or injured.
- (f) He infected or injured animals shall not be released into a public place.
- (g) Farmers not willfully keep his animals at an unsafe place where there is not enough space and safe animal shed.
- (h) Animals not be bred without precautionary measures for infectious animal disease.
- (i) Animals not be transported crowdedly and uncomfortably.

According to section 42, the project proponent commits to avoid the following prohibitions,

- Operate commercial livestock farming;
- To provide any veterinary service;
- Establish slaughterhouse or engage in slaughtering;
- Domestically produce, process, or distribute animals, animal products, or genetically modified organisms, or animal feed, animal equipment or veterinary medicinal products which are not related to fishery;
- Export or import animals, animal products, genetically modified organisms, animal feed, livestock equipment or veterinary medicinal products;
- Domestically transport animals, animal products or genetically modified organisms which are not related to fishery.



According to section 45, the project proponent commits the following,

- (a) Fail again to comply with the orders and directives issued by the Department in relation to prevention or control of infectious animal disease;
- (b) Fail to report promptly to the Department, relevant government department and organization, if he suspects that infectious animal disease is occurred;
- (c) Fail to report to the Veterinary Office and relevant Administrator of Township, Ward or Village Tract, if the signs of infectious animal disease are found in the dead animal.
- (d) According to sub-section (a) of section 46, the project proponent commits to avoid acting as a community animal health worker without a recognition certificate.

# 2.7.21 Prevention of Hazard from Chemical and Related Substance Law (2013)

#### **Objectives:**

- To ensure to use the hazardous chemical and related substances safely and safety for the employees. Moreover, safety 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.
- Project proponent has to 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 has to 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 proponent has to abide by the conditions included in the license under sub-section (a) of section 16 of said law.

## 2.7.22 Occupational Health and Safety Law (2019)

**Purpose:** To effectively implement measures related to safety and health in every industry and to set occupational safety and health standards.

- The project proponent has to provide adequate and relevant personal protective equipment to workers free of charge and make them wear it during work so as not to expose workers to any serious occupational diseases or hazards under sub-section (e) of section 26 of said law.
- The project proponent has to arrange and display occupational safety and health instructions, warning signs, notices, posters, and signboards under sub-section (1) of section 26 of said law.



- The worker shall wear or use at all times any protective clothes, equipment and tools provided by the employer for the purpose of safety and health under sub-section (a) of section 30 of said law.
- The worker shall proper and systematic use any equipment and tools, machines, any parts of the machines, vehicles, electricity and other substances being used at the workplace under sub-section (d) of section 30 of said law.
- The worker shall take reasonable care for the safety and health of himself/ herself and of other persons who may be affected by his/ her acts or omissions at work under subsection (e) of section 30 of said law.
- The project proponent has to appoint a person in-charge for occupational safety and health according to the type of industries to closely supervise the safety and health of the workers in accordance with the specifications of the Ministry under sub-section (a) of section 12 of said law.
- The project proponent has to establish each Occupational Safety and Health Committee comprising equal number of employers and workers' representatives according to the types of industry without lessening the number of workers prescribed by the Ministry to be safe and healthy workplace, in accordance with the specifications of the Ministry. In establishing the Committee, occupational safety and health matters for female workers shall be considered according to the nature of work under sub-section (b) of section 12 of said law.
- The project proponent has to allow the inspectors to inspect the workplace under this Law for occupational safety and health, instruct the respective employer on the facts to be observed, and report to the chief inspector, according to section 16.

According to section 17, inspectors are entitled to:

- (a) Enter, inspect and examine any workplace applicable to this Law without a warrant by showing their identity cards at any time;
- (b) Inspect and copy all records, books, and documents relating to the workplace and process, and seize any of them as exhibits, if necessary;
- (c) Take photographs and video records of the workplace situations and processes which may be harmful to the occupational safety and health;
- (d) Assess and record the amount of impact and time on the workplace environment, due to noise, illumination, temperature, dust, fume and hazardous materials, with the assistance of an expert on the respective subjects, if necessary;
- (e) Inquire any person working at the workplace during working hours about contracting occupational diseases or potential situations with the assistance of a certified doctor;
- (f) Ask the responsible person from hospitals and medical clinics to confidentially send the medical report of a worker who is receiving medical treatment for injuring in a workplace accident or suffering from an occupational disease or information about death or the autopsy report requested with the form prescribed by the Department, according to section 17.

The inspectors shall issue a temporary order to the employer for work stoppage partially or wholly with the approval of the chief inspector and inform the relevant departments, if



necessary, if any occupational accident, disease, dangerous occurrence or major accident happens or is likely to happen due to any of the following facts:

- (a) Impropriety to work continuously due to the unsafe workplace conditions, unsafe acts of workers, the existence of hazardous material and machinery at the workplace, or parts of machinery or laying out of machinery at the workplace, and working practices;
- (b) Impropriety to work continuously due to violation of or failure to comply with any provision of this Law;
- (c) Assumption to be harmful to workers at the workplace due to any act of negligence and carelessness or omission by any person;
- (d) Necessity to evacuate workers for safety due to the imminent danger situation of the occupational injury, according to section 18 of said law.
- (e) The project proponent commits to comply not to dismiss or suspend any worker due to one of the following reasons under section 27 of said law.
- (f) Before obtaining the medical report of a registered doctor for being injury in the workplace or the medical report of a certified doctor for contracting occupational disease;
- (g) Complaint about a matter of unsafe or health risk;
- (h) Undertaking the functions and duties of the Occupational Safety and Health Committee;
- (i) No longer working at the imminent danger situation or situation to be contracted the occupational disease.

According to section 34, the project proponent has liable when the following happens are occurred;

- (a) Inform the Department in case of an occupational accident, dangerous occurrence and major accident;
- (b) Submit a report with the medical report of the certified doctor to the Department, in case of any worker contracted any of the prescribed occupational diseases or being or likely to be occupational poisoning due to any material or process.
- (c) According to section 36, the project proponent has to all the inspectors to investigate the occupational accident, dangerous occurrence, occupational disease, and occupational poisoning if they become aware of.

## 2.7.23 The Explosive Substances Act (1908)

According to section (3) (4) (5) of this law, the project proponent commits to avoid the following;

- Unlawfully and maliciously causes by any explosive substance an explosion of a nature likely to endanger life, causing serious injury to property.
- Do any act with intent to cause by an explosive substance to endanger life, to cause serious injury to property.
- Making in possession or under control any explosive substance



• Knowingly make in possession or under control any explosive substance, under such circumstances as to give rise to a reasonable suspicion.

## 2.7.24 Road Safety and Motor Vehicle Management Law (2020)

#### **Objectives:**

The objectives of this Law are as follows;

- To ensure that motor vehicles are registered after inspecting them in accordance with Law;
- To issue the driving license to drivers after examining them whether or not they meet the prescribed qualifications in accordance with the types of motor vehicles;
- To reduce air, water, land and noise pollution caused by motor vehicles;
- To manage systematically the reduction of the road accidents caused by motor vehicles;
- To inspect and monitor the motor vehicles for road safety in accordance with the stipulations;
- To utilize Intelligent Transport System effectively for traffic congestion reduction and road safety;
- To reduce loss of lives, socio-economic losses and risk of injury due to road accidents, and to ensure convenience and safety of road users;
- To transport dangerous goods safely.

The project has to comply with the restrictions and restrictions on the use of domestic vehicles by the Ministry of Transport and Communications with the approval of the Union Government under sub-section (a) of section 9 of said law.

The project proponent has to comply with safety, environmental regulation, standards and regulations regarding the initial registration of vehicles issued by the Ministry under subsection (c) of section 12 of said law.

The project proponent has to drive at the speed limit set by the Road Transport Directorate to ensure the safe movement of vehicles on public roads under sub-section (r) of section 14 of said law.

The project proponent has to maintain the vehicles in accordance with the standards set by the Department so that it can be driven safely under sub-section (a) of section 18 of said law.

The project proponent has to abide not to carry or transport hazardous materials in public places in accordance with the regulations under sub-section (g) of section 81 of said law.

## 2.7.25 Road Safety and Motor Vehicle Management Rules (2022)

According to articles 252 of Road Safety and Motor Vehicle Management Rules, the project proponent commits to use the vehicle as a commercial vehicle unless it has obtained the relevant business license issued under the Ministry of Transport and Communications of the Union Government, which is not registered as a rental vehicle.



According to articles 253 of Road Safety and Motor Vehicle Management Rules, the project proponent commits not to carry more than the number of passengers or weight of cargo specified by the Department.

According to articles 254 of Road Safety and Motor Vehicle Management Rules, the project proponent commits to comply with the following,

- (a) To operate only in accordance with the provisions of the relevant business license issued under the Road Transport Business Law.
- (a) Passenger vehicles must stop at designated stops to allow passengers to board and alight. Do not obstruct the movement of other vehicles
- (b) If there is a passenger vehicle stopped at a stop sign, the vehicle coming from behind must stop at least four feet (1.22 meters) away from the vehicle in front.
- (c) Do not stop parallel to a passenger vehicle stopped at a stop sign.

According to articles 256 of Road Safety and Motor Vehicle Management Rules, the project proponent commits to instruct the drivers to take the names and license numbers, or both the driver and the assistant must be clearly displayed in the driver's compartment.

According to articles 261 of Road Safety and Motor Vehicle Management Rules, the project proponent commits to -

- (a) Goods shall be loaded inside the vehicle.
- (b) Goods carried in the vehicle shall not be spilled onto the public road.

According to articles 262 of Road Safety and Motor Vehicle Management Rules, the project proponent commits to-

- Comply with the Prevention of Hazard from Chemical and Related Substances Law, Rules and Regulations.
- Have a valid rental vehicle registration certificate and a relevant business license issued under Road Safety and Motor Vehicle Management law, as well as a complete certificate issued by the relevant government department or government body for the right to transport dangerous goods.
- The vehicle carrying dangerous goods shall be equipped with Vehicle Marking, Container Marking and Tank Marking to clearly identify it as a vehicle, and must be equipped with packaging, labeling, loading and unloading as specified by the Department.
- In the event of an accident while transporting hazardous goods, the necessary safety equipment and measures to be taken must be fully prepared in advance as specified by the Department.

According to articles 269 of Road Safety and Motor Vehicle Management Rules, the project proponent commits to equip with a ready-to-use spare tire, a toolbox with tools for repairing equipment, a fire extinguisher, a hammer or axe for breaking emergency exit windows, a crowbar, a warning triangle, and a first aid kit.



According to articles 271 of Road Safety and Motor Vehicle Management Rules, the project proponent commits to must apply to the relevant registration officer for changing the registered name or address.

#### 2.7.26 The Electricity Law (2014)

#### **Objectives:**

To ensure the compliance with the conditions of permission for productions of electricity, abiding by any stipulation, implementing with the best practices and paying compensation in line with above law.

This law focuses as follows;

- The project proponent commits to comply implement the project with the best practices to reduce the damages on the environment, health and socio-economy, also will pay compensation for the damages and will pay the fund for environmental conservation, under sub- section (b) of section 10 of said law.
- The project proponent has to take the certificate of electric safety, issued by the chiefinspector, before the commencement of power generation, under section 18 of said law.
- According to section 20 of this law, the project proponent commits to abide by the rules, regulations, bye-laws, notifications, orders, directives and procedures issued by the Ministry in carrying out the electrical business contained in the permit.
- The project proponent has to be liable for damages to any person or enterprise by failure to abide by the quality standards or rules, regulation, by-law, order and directive issued under said law according to sub-section (a) of section 21 of said law
- The project proponent has to be liable for damages to any person or enterprise by negligence of project owner according to sub-section (a) of section22 of said law.
- According to section 24 of this law, the project proponent commits to pay compensation for damages or losses due to negligence of any electric power user, in accord with the method prescribed by the Ministry for the value of damage or loss must be paid.
- The project owner has to comply with the permission for electric searching and generation, under sub-section (a) and (b) of section 26 of said law.
- The project proponent has to inform promptly to chief-inspector and head officer of related office while occurring of accident in electricity generation, under section 27 of said law.
- The project proponent has to comply with the standards, rules and procedure. Moreover, will allow the inspection by respected governmental department and organization if it is necessary, under section 40 of said law.
- The project proponent commits to pay the compensation to anyone who is injured or caused to death in electric shock or fire caused by the negligence or omitting of the project owner or representative of project owner, under section 68 of said law.



## 2.7.27 The Myanmar Fire Brigade Law (2015)

#### **Objectives:**

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.

The project proponent has to institute the specific fire services and provide materials and apparatuses for fire precaution and prevention in accord with the directive of the Department of Fire Services according to section 25.

## 2.7.28 Labor 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 to 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 summit 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.

## 2.7.29 The Settlement of Labour Dispute Law (2019)

**Purpose:** To ensure negotiation and discussion between employees and project proponent, abiding the decision of Tribunal.



- The project proponent has to not absent to negotiation within the stipulated time for complaint, under section 38 of said law.
- The project proponent has not to change the existing stipulations for employees within conducting period before Tribunal, under section 39 of said law.
- The project proponent has not to 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 pay the compensation decided by Tribunal if violates any act or any omission to damage the interest of labor by reducing of product without efficient cause, under section 51 of said Law.

## 2.7.30 The 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.

## 2.7.31 Minimum Wages Law (2013)

**Purpose:** To ensure the project owner pay the wages not less than prescribed wages and notify obviously this wage 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 record correctly the lists, schedules, documents, and wages, 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 section13 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.



## 2.7.32 The Payment of Wages Law (2016)

**Objectives:** To ensure the way of payment and avoiding delay payment to the employees.

The project proponent has to;

- Pay wages to the workers employing in his business in local currency or foreign currencies stipulated by the Central Bank of Myanmar, paid in cash or cheque or deposit into the bank account of the worker with the agreement between the employer and the worker under sub-section (a) of section 3 of said law.
- If the worker is conscripted under the Public Military Service Law, the (60) days of wages must be paid as a special right under sub- section (c) of section 3 of said law.
- Pay wages at the end of the work or at the time agreed to pay to the worker for hourly, daily, weekly or other part time work, or temporary or piece work under sub-section (a) of section 4 of said law.
- No exceed one month than the period agreed with the worker under sub-section (a) to pay wages work under sub-section (b) of section 4 of said law.
- Pay the due wages within two working days from the date of termination, when the worker is terminated work under sub-section (d) of section 4 of said law.
- Pay the wages at the end of the period for payment of wages when the worker resigns on his own volition by sending prior written notice of resignation work under subsection (e) of section 4 of said law.
- Pay the due wages to a legal heir within two working days after the decease when the worker is decease work under sub-section (f) of section 4 of said law.
- If an employer occurs difficulties, including natural disaster, any unexpected condition to make payment under sub-section (c) of the Section 4, the employer may submit that which date has been altered for the payment of wages with the consent of the workers to the Department on reasonable ground under section 5 of said law.
- The project proponent has to the right to enjoy overtime wages of worker stipulated by the law when worker works over time.
- The project proponent has to abide by the provisions of section 7 to 13 in chapter (3) in respect of deduction from wages.

# 2.7.33 The Leaves and Holidays 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.

## 2.7.34 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 subsection (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. Moreover, 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 accidence, 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.

# 2.7.35 The Workmen Compensation Act (1923)

#### Section 3, 13;

The Project Proponent commits to comply the stipulations:

- For the payment by certain classes of employers to their workmen of compensation for injury by accident.
- For the liability for compensation of employer's, amount of compensation, compensation to be paid when due and penalty for default, method of calculating wages, review, commutation of half-monthly payments, payment of a lump sum amount, distribution of compensation, compensation not to be assigned, attached or charged, notice and claim, power to require from employers statements regarding fatal accidents, reports of fatal accidents and serious bodily injuries, medical examination, contracting, remedies of employer against stranger, compensation to be first charge on assets transferred by employer, special provisions relating to masters and seamen.
- For any updating for revising the monetary amount as per the amendment law.
- 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;

• 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.

In Construction phase, the occupational health and safety is essential.

## 2.7.36 The Farm Land Law (2012)

According to section 30, the project proponent commits the following, in respect of application to use the farm land by other means for the interests of the public,



- (a) the Central Administrative Body of the Farm Land may permit to use the farm land by other means with the recommendation of the Region or State Administrative Body of the Farm Land.
- (b) The relevant Region or State Government Organization shall permit to use the farm land by other means except low land with the recommendation of the Region or State Administrative Body of the Farm Land.

## 2.7.37 The Law Amending the Farmland Law (2020)

The Pyidaungsu Hluttaw was enacts this law on 14 Feb 2020.

According to section 9 of this law, the project proponent commits to obey concerned with the farmland, the order made by the various levels of the relevant Administrative Body of Farmland in accordance with the law.

According to section 9 of this law, the project proponent commits to comply not to directly or indirectly sell, mortgage, lease, exchange, or gift the right to use the farmland in whole or part to or with any foreigner or any organization in which the foreigner is included, without permission of the Union Government.

According to section 17 of this law, the project proponent commits to pay taxes levied under any existing law, and these taxes shall be recovered as arrears of land revenue in accordance with law.

# 2.7.38 The Law Amending the Management of Vacant, Fallow and Virgin Land Law (2018)

The Pyidaungsu Hluttaw was enacts this law on 11 Sep 2018.

According to section 8 of this law, the project proponent commits to apply to the relevant Management Committee in accordance with the stipulations, for agriculture, livestock breeding and related businesses.

According to sub-section (b) (ii) of section 20 the project proponent commits to acknowledge that such vacant, fallow and virgin lands will be confiscated and they will be evicted from the lands in accordance with the prescribed means if they do not apply under clause (i) or do not obtain a permit despite applying for a permit.

# **2.7.39 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.

#### 2.7.40 Prevention and Control of Communicable Disease Law (2011)

**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 and 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.

According to section 9 of this law, the project proponent has to inform promptly to the nearest health department or hospital if the following are occurred;

- (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, this 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.

# 2.7.41 The Control of Smoking and Consumption of Tobacco Product Law 2006

The objectives of this Law are as follows,

- (a) To convince the public that health can be adversely affected due to smoking and consumption of tobacco product and to cause refraining from the use of the same;
- (b) To protect from the danger which affects public health adversely by creating tobacco smoke-free environment;
- (c) To obtain a healthy living style of the public including child and youth by preventing the habit of smoking and consumption of tobacco product;
- (d) To uplift the health, economy and social standard of the public through control of smoking and consumption of tobacco product;
- (e) To implement measures in conformity with the international convention ratified by Myanmar to control smoking and consumption of tobacco product;

According to section 9 of The Control and Consumption of Tobacco Product Law, the general manager of the project must to stand by the followings,

(a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in section 6 in accordance with the stipulations;



- (b) arrange the specific place where smoking is allowed as mentioned in section 7 and keep the caption and mark also referring that it is a specific place where smoking is allowed, in accordance with the stipulations;
- (c) supervise and carry out measures so that no one shall smoke at the non-smoking area;
- (d) accept the inspection when the supervisory body comes to the place for which he is responsible.

# 2.7.42 The Protection and Preservation of Cultural Heritage Regions Law (2019)

#### **Objectives:**

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

According to section 21(b), the project proponent has to adhere to the provisions of the existing laws, and apply to the Region or State Preservation Committee if it is within the world heritage region or national level cultural heritage region, and apply to the Regional Preservation Committee if it is within the respective cultural heritage region apart from the world heritage region or national level cultural heritage region for obtaining the prior permission that there is no impact on cultural heritages in accordance with the stipulations:

In the buffer area:

- (a) Constructing roads, renovating and extending wharfs, parking lots, rail tracks, railway station, stadium, sports grounds, buildings and bridges;
- (b) Conducting and erecting pylons, underground works, underground electric power lines, high voltage power lines, transformer stations, lamp posts and gas pipelines;
- (c) Arranging the flights of helicopter, hot air balloons and gliders;
- (d) Constructing theatres such as the entertainment building, accommodation facilities, recreation centers, riding and race camps and infrastructures.

The project proponent commits to;

- (d) Apply to get the prior permission of Directorate of Ancient-Research to build the road, bridge or dam in the cultural heritage area
- (e) Promise not to build the building which is not in line with the stipulations prescribed by the Ministry of Culture in the cultural heritage area.

## 2.7.43 The Protection and Preservation of Antique Objects Law (2015)

According to Section 12, the project Proponent commits to comply the stipulation for person who finds any object which has no owner or custodian, needs to inform the relevant Ward or village-tract administrator if he knows or it seems reasonable to assume that the said object is an antique object.

#### 2.7.44 The Protection and Preservation of Ancient Monuments Law 2015

The objectives of this Law are as follows:



- (a) To implement the policy of protection and preservation for the perpetuation of ancient monuments,
- (b) To protect and preserve ancient monuments so as not to deteriorate due to natural disaster or man-made destruction;
- (c) To uplift hereditary pride and to cause dynamism of patriotic spirit by protecting and preserving ancient monuments;
- (d) To have public awareness of the high value of ancient monuments;
- (e) To protect and preserve ancient monuments from destruction;
- (f) To search and maintain ancient monuments;
- (g) To carry out in respect of protection and preservation of ancient monuments in conformity with the International Convention and Regional Agreement ratified by the State.

According to section 12, 15 sub-sections (f) of section (20), project proponent commits to comply the stipulations:

For a person who finds an ancient monument over one hundred years old under the water or above ground to promptly inform the relevant Ward or Village-Tract Administrative Office.

To apply prior permission from the Department before implementing,

- (a) Extending towns, wards and villages;
- (b) Constructing or extending or repairing new buildings including hotels, factories and residential buildings or fencing or extending a fence;
- (c) Digging to search petroleum, natural gas, gem or mineral, piping petroleum and natural gas, constructing factories, connecting national grid, constructing communication tower, constructing or extending infrastructures such as road, bridge, airfield, irrigation and embankment;
- (d) Connecting underground electric cable, communication cable and other underground works;
- (e) Digging or extending wells, lakes, cannels and ponds;
- (f) Gold sieving, digging, burning bricks, digging well, lake, creek, ditch, gully, pit digging, refilling, levelling, mining, quarry, gravel digging and unearth sand, removing the mounds and hills which can damage the physical feature of the land;
- (g) Placing and fencing ancient monuments in a private compound and area;
- (h) Constructing a building which is not consistent with the terms and conditions stipulated according to the region by the Ministry near and at the surrounding of an ancient monument.

For prohibitions not to damage to an ancient monument within the specified area of an ancient monument without a written prior permission by carrying out.

Project proponent commits for conducting survey and cooperate with the Department of Archaeology and National Museum if ancient objects and monuments are found at underground and surface of land and sea throughout lifespan of the project.



## 2.7.45 The Ethnic Rights Protection Law 2015

The objectives of this Law are as follows;

- To obtain equal citizen's rights for all ethnic groups.
- To live eternally together with amicable relations among ethnic groups on the basic of genuine Union Spirit.
- To preserve and develop language, literature, fine art, culture, custom, national character and historical heritage of ethnic groups.
- To promote solidarity, mutual amity and respect, and mutual assistance among ethnic groups,
- To promote socio-economic development including education, health, economy, transport and communication, so forth, of less-developed ethnic groups.
- To fully obtain the rights prescribed in the Constitution by ethnic groups.

According to section 5, the project proponent commits to comply the matters of projects completely inform, coordinated and performed with the relevant local ethnic groups in the case of development works, major projects, businesses and extraction of natural resources.

#### 2.7.46 The Ethnic Rights Protection Rules (2019)

According to article (a), (b), (C), (d) of rule 20, the project proponent has to -

- (a) The advantages and disadvantages of the project must be fully and accurately explained in advance using languages and methods that the local people who are settled in the area where the project will be implemented can understand.
- (b) The policy directions of the Myanmar Sustainable Development Plan (MSDP); strategies; It must be carried out in accordance with the procedures.
- (c) In order to find out whether there is any impact on the environment and socio-economic life in the area, environmental impact analysis and socio-economic development impact analysis shall be carried out in accordance with the guidelines of the relevant department.
- (d) In all stages of the environmental impact assessment and socio-economic development impact assessment process, discussions and negotiations with indigenous peoples shall be carried out in an open manner.

The project proponent has to compliance with rule 20 shall be reported to the Ministry in full and submitted to the ministry before the project commences, according to article (a) of rule 21 of said law.

The project proponent has to submit the plan to the Ministry, after the implementation of the project, according to article (b) of section rule 21.



# 2.8 INTERNATIONAL CONVENTIONS, AGREEMENTS AND TREATIES (SIGNED/RATIFIED BY MYANMAR)

The following are the International Conventions, Agreements, and Treaties signed and ratified by Myanmar related to the marine Oyster Culture and Pearl Production project.

No.	Name of the Convention	Year of Ratification
1.	Vienna Convention for Protection of the Ozone Layer)	1985,1993
2.	Basel Convention	1989, 2015
3.	London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London	1990, 1993
4.	United Nations Framework Convention on Climate Change (UNFCCC), New York	1992,1994
5.	Stockholm Convention on Persistent Organic Pollutions (POPs)	2001,2004

Table 2.1Lists of Convention involvement of Myanmar

**1**. **Convention on Protection of Ozone Layer:** The project proponent must protect the Ozone layer by phasing out the production of numerous substances that are responsible for Ozone depletion.

**2**. **Basel Convention:** The project proponent has to minimize the generation of toxic waste and to ensure the environmental sound management as closely as possible to the source of generation.

**3.** Convention on Protection of Ozone Layer: The project proponent must protect the Ozone layer by phasing out the production of numerous substances that are responsible for Ozone depletion.

**4. United Nations Framework Convention on Climate Change (UNFCCC):** The proponent has to reduce their Green House Gas (GHG) emissions in line with the agreement made at the UNFCCC.

**5. Persistent Organic Pollutants (POP):** The proponent has to avoid using persistent organic pollutants (POP) that are resistant to environmental degradation through chemical, biological, and photolytic processes. Such POPs include pesticides, solvents, pharmaceuticals, and industrial chemicals.



## 2.9 NATIONAL ENVIRONMENTAL QUALITY (EMISSION) GUIDELINES

Emission guideline and target values of ambient air quality, air emission, wastewater and noise levels were set in the National Environmental Quality (Emission) Guideline (NEQEG) on 29<sup>th</sup> December 2015 by MONREC.

#### 2.9.1 Air Emission

Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:

- a. emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines<sup>1</sup> for the most common pollutants as summarized below; and
- b. emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards (i.e., not exceeding 25 percent of the applicable air quality standards) to allow additional, future sustainable development in the same air shed.

Industry-specific guidelines summarized hereinafter shall be applied by all projects to ensure that air emissions conform to good industry practice.

Parameter	Averaging Period	Guideline Value μg/m <sup>3</sup>
Nitrogon diavida	1-year	40
Nillogen uloxide	1-hour	200
Ozone	8-hour daily maximum	100
Derticulate metter DM10 <sup>a</sup>	1-year	20
	24-hour	50
Derticulate metter DM2 5 <sup>b</sup>	1-year	10
Farticulate matter FW12.3	24-hour	25
Sulfur dioxido	24-hour	20
Sultur dioxide	10-minute	500

 Table 2.2
 Air Emissions (General Guidelines)

<sup>&</sup>lt;sup>1</sup> Air quality guidelines global update. 2005. World Health Organization.



## 2.9.2 Water Quality

#### 2.9.2.1 Aquaculture<sup>2</sup>

This guideline applies to semi-intensive and intensive commercial aquaculture production of aquatic species, including crustaceans, mollusks, seaweeds and finfish.

Parameter	Unit	Guideline Value
5-day Biochemical oxygen demand	mg/l	50
Active ingredients / Antibiotics	To be determine	d on a case specific basis
Chemical oxygen demand	mg/l	250
Oil and grease	mg/l	10
pH	S.U. <sup>a</sup>	6-9
Temperature increase	°C	<3 <sup>b</sup>
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

Table 2.3Effluent Levels

#### 2.9.3 National Surface Water Quality Standard (2024)

To conserve surface water quality for the protection of human health, aquatic life and the living environment, the following standard values of parameters for river water quality must be checked in National Surface Water Quality Standard (2024).

Table 2.4         National Surface Water Quality Star	dard
---	------

No.	Parameter	Unit	Class V
For l	For Human Health		
1.	Boron	mg/L	2.4
2.	Cyanide	mg/L	0.07
3.	Fluoride	mg/L	1.5
4.	Nitrate nitrogen	mg/L	10
5.	Nitrite nitrogen	mg/L	1
6.	Benzene	mg/L	0.01
7.	Phenol	mg/L	0.05

<sup>&</sup>lt;sup>2</sup> Environmental, health, and safety guidelines for aquaculture. 2007. International Finance Corporation, World Bank Group.



No.	Parameter	Unit	Class V
8.	Polychlorinated Biphenyls (PCB)	μg/L	0.5
9.	Arsenic	mg/L	0.05
10.	Cadmium	mg/L	0.003
11.	Chromium (Hexavalent)	mg/L	0.05
12.	Lead	mg/L	0.01
13.	Mercury	mg/L	0.001
14.	Nickel	mg/L	0.07
15.	Selenium	mg/L	0.04
For l	Environmental Conservation		l
1.	Total Suspended Solids	mg/L	150
2.	BOD	mg/L	30
3.	COD	mg/L	100
4.	DO	mg/L	>2
5.	рН	S. U	-
6.	Ammonium nitrogen	mg/L	0.9
7.	Oil & Grease	-	No noticeably seen
8.	Escherichia coli (E. coli)	MPN/100mL (or) CFU/100 mL	-
9.	Copper	mg/L	-

## 2.9.4 Noise Level

Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception. Noise impacts should not exceed the levels presented below, or result in a maximum increase in background levels of 3 dBA at the nearest receptor location off-site.



	One Hour LAeq (dBA)	
Receptor	Daytime (7:00 - 22:00) (10:00 – 22:00 for public holidays)	Nighttime (22:00-7:00) (22:00-10:00 for public holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

## 2.10 **APPLICATION OF INTERNATIONAL GUIDELINES**

Based on the Myanmar environmental guidelines and International best practices, the ultimate EIA report will be developed. Specifically, the environmental impact assessment for this project will follow not only the domestic guidelines such as the Environmental Conservation Law and Rules of the Government of the Republic of the Union of Myanmar but also international guidelines such as IFC EHS guidelines for environmental and social considerations.

#### 2.10.1 IFC EHS Guidelines

The EHS Guidelines by International Finance Cooperation (IFC) are technical reference documents with general and industry–specific examples of Good International Industry practice (GIIP), as defined in IFC's Performance Standard 3: Resources Efficiency and Pollution Prevention. The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology.

There are two kinds of guidelines, General EHS Guidelines and Industry Sector Guidelines. The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors in the following section: (1) Environment, (2) Occupational Health and Safety, (3) Community Health and Safety and (4) Construction and Decommissioning. The contents of the Community Health and Safety section is described below.

Contents	<b>Brief Description</b>
Water Quality and Availability	Drinking water sources should at all times be protected so that they meet or exceed applicable national acceptability standards or in their absence the current edition of WHO Guidelines for Drinking-Water Quality.
	Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future



increases in demand. The overall target should be the availability of 100 liters per person per day.

- Structural Safety of Reduction of potential hazards is best accomplished during the design Project phase when the structural design, layout and site modifications can be adapted more easily. The following issues should be considered and incorporated as appropriate into the planning, siting, and design phases of a project (1) inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure (2) incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire, and (3) application of locally regulated or internationally recognized building codes, standards and regulations, and mitigation measures.
- Traffic Safety Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents.
- Transport ofProjects should have procedures in place that ensure compliance withHazardouslocal laws and international requirements applicable to the transportMaterialsof hazardous materials.
- Disease Prevention Recommended interventions against the communicable diseases at the project level include (1) providing surveillance and active screening and treatment of workers, (2) preventing illness among workers in local communities by undertaking health awareness and education initiatives, training health workers in disease treatment and conducting immunization programs for workers, and (3) providing treatment through standard case management in on-site or community health care facilities.

Emergency All projects should have an Emergency preparedness and Response Plan that is commensurate with the risks of the facility and that includes the following basic elements: (1) Administration (policy, purpose, distribution, definitions, etc.) (2) Organization of emergency areas (command centers, medical stations, etc. (3) Roles and responsibilities, (4) Communication systems, (5) Emergency response



procedures, (6) Emergency resources, (7) Training and updating, (8) Checklists (role and action list and equipment checklist), and (9) Business Continuity and Contingency.

#### 2.11 INSTITUTIONAL FRAMEWORKS

A number of institutions will have a regulatory and monitoring mandate directly or indirectly under their respective pieces of legislation. However, the following will be the key institutions whose requirements will need to be complied with.

- Ministry of Natural Resources and Environmental Conservation
- Environmental Conservation Department
- General Administration Department

Myanmar Economic Corporation (MEC) takes on the responsibility for developing, reviewing, updating, and properly implementing the environmental management plan during construction, operation and decommissioning phases.


# Chapter 3 PROJECT DESCRIPTION AND ALTERNATIVES

## 3.1 **BACKGROUND OF THE PROJECT**

The Myanmar Economic Corporation (MEC) operates a wide range of production activities in alignment with the nation's development policies. It supports various sectors such as healthcare, education, economy, social affairs, religion, security, agriculture, livestock, media and communications, and construction, addressing the needs of each sector.

MEC, aiming to further assist the nation's economic growth, proposed Oyster Culture and Pearl Production activities in the waters and land areas of Shar Kyunn Island (Zadetgyi Island), and Kyantcho Island, located in Kawthaung Township, Kawthaung District, Tanintharyi Region. This proposal was submitted to the Office of the Commander-in-Chief (Army) and was approved. The goal of expanding the Oyster Culture and Pearl Production business as a new industry for MEC is to increase foreign exchange revenue for the country while creating more local employment opportunities.

# 3.2 **PROJECT DESCRIPTION AND LOCATION**

MEC's Oyster Culture and Pearl Production business will be carried out in the following areas:

- Zadetgyi Island: 10,401 acres of land area and waterbody.
- Kyantcho Island: 3,714 acres of reserved land area and waterbody for Oyster Culture and Pearl Production.

The proposed project area is located at the coordinate point of latitude 9°56'10.74"N and longitude 98°13'57.90"E. Zerdetgyi Village was located at 11 kilometers far from the project site. The project area is 10,401 acres which was Oyster Culture and Pearl Production farming lands with the lease of maximum period of 30 years. The goal of expanding the Oyster Culture and Pearl Production business as a new industry for MEC is to increase foreign exchange revenue for the country while creating more local employment opportunities.





Figure 3-1	Location	of the	proposed	project	site
0			1 1	1 0	

Table 3.1	Description	of the	nroiect
Tuble 5.1	Description	0j ine	projeci

Project	Oyster Culture and Pearl Production
Investor name	Myanmar Economic Corporation
Citizenship	Myanmar
Types of business	Oyster Culture and Pearl Production
Project site address	Shar Kyunn Island (Zadetgyi Island) and Kyantcho Island, located in Kawthaung Township, Kawthaung District, Tanintharyi Region.
Investment Amount	5 billion kyat
Investment Type	100% local investment
Contact person	U Bo Bo Hein
Email	bobohein.navy.mm@gmail.com
Phone number	09442035383

### 3.3 **PRODUCTION PROCESS AND TECHNOLOGY**

### 3.3.1 Long-Line System for Pearl Culture

Pearl culture involves various methods of cultivating pearls from oysters or mollusks, generally, there are a total of 6 differences pearl culture methods each having distinct advantages and disadvantages.



Long Line Pearl Culture is a popular method used in Oyster Culture and Pearl Production, particularly for growing high-quality pearls. This method involves the suspension of pearl oysters on ropes or longlines that are anchored in the ocean. Longlines are anchored in the ocean and supported by buoys. Oysters are hung from the longline on individual ropes, nets, or baskets. The system allows the oysters to remain in open water at a controlled depth.

### 3.3.1.1 Installation of Long Line Systems

- Site Selection: To choose a suitable location that offers favorable water conditions for oyster growth is important. The following Key factors were considered into site selection.
  - **Water Depth:** The site should have sufficient depth (at least 5-20 meters) for suspending longlines.
  - Water Quality: Clean, nutrient-rich water with minimal pollutants is essential.
  - **Current and Wave Conditions:** Moderate water flow is preferred for oxygen and nutrient supply. However, strong currents and high waves should be avoided to prevent damage.
  - **Protection from Predators and Weather:** Sites sheltered from storms, strong winds, and predators are ideal.
- Anchor Installation: Longlines typically range from 100 to 500 meters in length. The anchor should be secure both ends of the longline to the seabed. The anchors will hold the longline in place against water currents and waves. There are two common types of anchors:
  - Screw Anchors: Drilled into the seabed for strong grip.
  - Concrete Blocks: Used as heavy weights to hold the line in place. Anchors must be heavy and strong enough to hold the entire structure, considering the weight of the oysters and the buoyancy forces.
- Buoy and Longline Setup:
  - Attach Floats/Buoys: Place floating buoys along the longline at regular intervals. These buoys provide buoyancy to keep the line and oysters suspended in the water column. The spacing between buoys will depend on the weight of the oysters and environmental factors, usually 10-20 meters apart.
  - **Connect the Longline:** The longline, usually made from polypropylene ropes, is secured between the two anchors. The rope is tied to the buoys to keep it floating at the desired depth. The depth can be adjusted based on environmental conditions such as sunlight and nutrient availability.

### Hanging the Oyster Baskets:

- **Prepare Oyster Baskets or Lantern Nets:** Oysters are placed in mesh baskets or lantern nets that allow water to flow freely around them. These containers protect the oysters from predators while still exposing them to plankton and other nutrients in the water.
- Hang the Oyster Containers: Attach the baskets or nets to the longline using smaller ropes at intervals of 1-2 meters. Each basket typically holds multiple oysters, and the spacing ensures proper water flow and feeding for each oyster.



## > Adjusting and Monitoring the Longline:

- **Control the Depth of the Oysters:** Adjust the height of the longline in the water column. The ideal depth depends on water temperature, salinity, and plankton concentration. In many cases, oysters are suspended 5-10 meters below the surface to avoid extreme temperatures and predator threats.
- **Monitor for Biofouling:** Regularly check the longline and oyster baskets for biofouling- the accumulation of algae, barnacles, and other organisms. Fouling can block water flow and reduce the oysters' ability to feed. Periodically clean the ropes, buoys, and baskets to prevent this.

## > Maintenance and Operation:

- **Regular Cleaning:** Clean the oyster baskets and longline ropes every few weeks to remove any buildup of biofouling. Failure to clean can lead to reduced oyster growth and poor water circulation.
- **Inspect for Damage:** Check for wear and tear in the ropes, buoys, and anchors. Replace or repair any damaged components to avoid system failure.
- **Rotate the Oysters:** Rotate the oysters or move the longline if there are changes in water conditions (e.g., temperature or nutrient levels) to ensure optimal growing conditions.

# **3.3.2 Oyster Culture Process**

## **3.3.2.1** Species Description

Pinctada maxima is distinguished externally by its light fawn color and by having no trace of radial markings. However, in some specimens the umbonal region is colored green, dark brown or purple (Jameson 1901). The nacre has a clear, rich luster which at the distal border can have a golden or silver band of varying width. This gives the species its common name of gold lip or silver lip. The tropical pearl oysters Pinctada maxima (White south sea pearl) are suspension feeders of major economic importance. P. maxima habitats are generally characterized by high terrigenous sediment and nutrient inputs, and productivity levels. It is distributed within the central Indo-Pacific region, bounded by the Bay of Bengal to the west, Solomon Islands to the east, the Philippines to the north, and northern Australia to the south.

Temperature plays the most important role on Pinctada species distribution. Cold water reduces the heart rate, slows growth rates, hinders reproductive development and renders pearl oysters more vulnerable to infection. Depth affects growth of pearl oysters. P. maxima taken from 73 to 82 m were "of smaller size and less growth" (George 1978).

- ✓ Spat collection or Hatchery Spawning
- ✓ Long line set up with spats for resting (15 days)
- $\checkmark$  After resting for 15 days, dropped at freshwater and reposted in marine water
- ✓ After resting for 30 days, choose oyster larvae from the collectors and transfer to (2.0) Bu Net
- ✓ Check the condition of oyster larvae
- ✓ After 30 days, transfer to triangle net



- ✓ Cleaning biofouling and boring organisms from oyster larvae, 1 time per 2 months
- ✓ After 180 days transfer to (10) pocket bag
- $\checkmark$  When aged 1 year old, check the size and weight to choose for the operated oyster
- $\checkmark$  Seeding the oyster
- ✓ Within 3-6 months, perform x-rays checking
- ✓ After 2 years, pearl harvesting.



Figure 3-2 Production Process









The MEC chose the site location near the Shar Kyun as an ideal location for pearl culture as the consideration of above-mentioned key factors with favorable conditions of water depth, water quality and the surrounding waterbody of the Shar Kyun was semi-enclosed waterbody which can be prevented the strong currents and high waves. The MEC will be implemented as following plan:

- 1. 10 lines have been installed with four foundations.
- 2. By the fiscal year 2023-2024, 16 Long Lines will be completed.
- 3. An additional 16 Long Lines will be installed by the fiscal year 2024-2025.

## 3.3.2.2 Collection and Cultivation of Pearl Oysters

- 1. MEC has already begun cultivating 12,700 oysters: 10,000 from Myanmar Pearl, 1,500 from Myanmar Atlantic Company, and 1,200 from Pyi Phyo Tun Company.
- 2. In November 2023, another 7,300 oysters will be cultivated: 3,500 from Myanmar Atlantic and 3,800 from Pyi Phyo Tun Company.

# **3.3.2.3** Breeding of Oysters

A hatchery is being built to ensure the breeding of oysters, which will be completed during the fiscal year 2023-2024. Full-scale breeding will begin in 2024, and MEC aims to produce 100,000 pearls annually by 2028.

### **3.3.2.4** Seeding Oysters

Of the 12,700 oysters already cultivated, 11,000 will be seeded, and the remaining 1,700 will be used for silbo processing. Future oysters will be seeded in a timely manner.

### 3.3.2.5 Harvesting of Pearls

The 11,000 oysters seeded will be harvested for pearls starting in July 2025. Future oysters will be harvested according to schedule.

# 3.4 **PROJECT INFRASTRUCTURES**

The following infrastructure were already established.

Building	Number	Condition
Jetty bridge	1	Completed
Hatchery	1	Completed
Water pumping station	1	Completed
Shell sorting station	1	Completed
Eight-room, two-story staff quarters	1	Completed
Eight-room, two-story women's dormitory	1	Completed

Table 3.2Type of building



Office	1	(Under construction)
Surgical facility	1	(Under construction)

### 3.4.1 Additional Construction of Buildings

The following buildings will be additionally constructed:

- 1. Shell Sorting Station
- 2. Workshop
- 3. Material Storage
- 4. Eight-room, Two-story Men's Dormitory
- 5. Dining Hall for 128 People
- 6. Vehicle Garage
- 7. Fuel Storage Facility
- 8. Power Generator Station
- 9. Medical Clinic
- 10. Water Purification Plant
- 11. Food Storage
- 12. Library and Convenience Store



Figure 3-4 Project Layout Plan



# 3.5 **RESOURCE CONSUMPTION**

Oyster culture and pearl production have relatively low external inputs, making them more sustainable compared to land-based or fed aquaculture systems like fish farming. Oysters and pearl-producing mollusks filter the water, potentially improving water quality and reducing pollution.

# **3.5.1** Water consumption

Longline oyster culture and pearl production generally involve minimal direct water consumption in terms of freshwater or other external sources. These aquaculture practices rely predominantly on natural seawater ecosystems. As in indirect water consumption relied on the cleaning of cages per 2 months and staff and dormitory consumption. The fresh water will available for nearest creeks. The estimated domestic water usage for 46 staff members was 1,175,300 liters per year.

## **3.5.2** Energy consumption

Energy consumption primarily comes from the use of motorboats to monitor, maintain, and harvest the oyster lines. Own generators are used for the electricity supply of the project. There is one generator for required electricity. The estimated daily electricity requirement was 108 kWh per day and diesel required for electricity generation is 31 liters per day. The total diesel requirement for diesel generators and boat were 56 liters per day.

## 3.5.3 Materials

The basic materials used in the oyster culture and pearl production were;

- 1. Ropes and Lines and nets
- 2. Cages, Baskets, or Bags
- 3. Buoys and Floats
- 4. Anchors
- 5. Spat (Seed) Oysters
- 6. Shell Nuclei
- 7. Surgical Equipment
- 8. Cages or Trays

# 3.5.4 List of machineries and equipment

The machineries and equipment that are used in process are listed in following Table.

No	Name of Machinery and Equipment	Total Number of Equipment
1	Excavator	1 unit
2	Light Vehicles	2 unit
3	Truck	1 unit
4	Boat	3 unit

Table 3.3List of Machineries and Equipment



# 3.6 HUMAN RESOURCES REQUIREMENT

There are a total of 46 members, including laborers, at the project site. The work is divided into two 8-hour shifts.

No.	Position	No. of Staff
1	Aquaculture Manager	1
2	Boat Operator	2
3	Workshop Supervisor	1
4	Spawn Keeper	2
5	Breeder / Cultivator	2
6	Nucleus Technician (Pearl Grafting Specialist)	2
7	Oyster Caretaker	3
8	Diver (Pearl Farming Diver)	4
9	Maintenance Technician	2
10	Sailor	2
11	Labor	25

Table 3.4List of workforces

# 3.7 WASTE GENERATION AND MANAGEMENT

The waste generation can be categorized in 4 categories for the proposed project, they were construction waste, office waste, domestic waste from dormitory and operational waste.

Table 3.5Summary of Waste Types (Construction waste and office waste)

Category	Construction Waste	Office Waste
Primary Matariala	Concrete, wood, metals, plastics, glass,	Paper, cardboard, plastics, e-waste,
Materials	drywall	food waste
Common Waste	Broken concrete, excess wood, metal	Paper documents, plastic bottles,
	scrap, packaging	food packaging
Hazardous	Paints, solvents, adhesives, asbestos	Cleaning supplies, printer cartridges,
Waste		batteries
Recyclable	Metals, wood, plastic, glass, gypsum	Paper, plastics, e-waste, ink
Waste		cartridges



# 3.7.1 Waste Management

- **Construction Waste:** Recycle materials like metal, plastic, and concrete. Reuse wood and compost organic waste from landscaping. Implement careful planning to minimize material overuse and manage hazardous waste properly.
- Office Waste: Implement recycling programs for paper, plastics, and e-waste. Reduce paper usage through digital systems, compost food waste, and use refillable ink cartridges. Properly dispose of hazardous office supplies.

Type of Waste	Definition
Biological Waste	<ul> <li>Dead or Damaged Oysters: Not all oysters survive the nucleation process (surgical implantation of the shell nucleus), and some may die due to disease, stress, or predation. Dead oysters can accumulate in the environment, leading to organic waste.</li> <li>Shell Waste: After harvesting the pearls, the shells of the oysters may be discarded. These shells represent a significant portion of biological waste.</li> </ul>
Equipment Waste (Ropes, Nets)	<ul> <li>Discarded Ropes, Cages, and Nets: Over time, the ropes, nets, and cages used in Oyster Culture and Pearl Production degrade due to exposure to seawater, UV radiation, and marine growth. These materials, typically made from plastic or synthetic fibers, eventually need to be replaced and become solid waste.</li> <li>Plastic Debris: Components such as buoys, floats, and other plastic equipment can also break down and contribute to plastic waste in marine environments.</li> </ul>
Fouling Organisms	• Fouling Organisms: As part of routine maintenance, biofouling organisms (e.g., algae, barnacles, and other marine life that attach to the oysters, cages, and equipment) are removed and become waste.
Processing Waste	<ul> <li>Non-Pearl-Producing Oysters: Not all oysters produce high-quality pearls. Some oysters may not produce pearls at all or produce low-quality pearls, leading to excess biological waste during processing.</li> <li>Packaging Waste: The packaging of pearls for shipment and sale (including plastic, paper, or Styrofoam materials) can generate waste, particularly when large volumes are handled.</li> </ul>

Table 3.6	Operational	Waste
1 0000 010	oper entremen	11 01010

### 3.7.1.1 Managing Biological Waste

- ✓ Composting or Recycling of Oyster Shells
- ✓ Use of Dead Oysters in Animal Feed or Fertilizer
- ✓ Controlled Removal of Fouling Organisms:



### 3.7.1.2 Managing Waste from Equipment

- ✓ Recycling or Repurposing Plastic Materials
- ✓ Use of Biodegradable Materials

### 3.7.1.3 Managing Wastewater

### • Water Recycling Systems:

- In cases where water is used for cleaning or processing, **recycling systems** should be installed to treat and reuse water. This reduces the overall water footprint of the Oyster Culture and Pearl Production process.
- Wastewater should be carefully managed and treated to ensure it does not contain harmful chemicals or pollutants before it is released back into the environment.

## 3.8 **FIRE PREVENTION AND FIRE FIGHTING**

### 3.8.1 Purpose

- To protect the unnecessary loss and damage by fire
- To establish the systematical firefighting system

## **3.8.2** Fire Prevention Plan

- Prohibit the flammable materials
- Clean flammable waste and materials at the Villas
- Apply Storing, refilling and discharging of the fuel, oil and lubricant with systematic procedure
- Supply fire extinguisher, fire hose and water storage tank

# **3.8.3** Firefighting Plan

- Strategically install fire extinguisher, fire hose and buckets at villas, buildings and other necessary places
- Install smoke detectors, heat detectors and fire alarm
- Occupy fire alarming procedure and system
- Set up the first priority materials to be firefighting
- Occupy the fire security by daily
- Strategically install the emergency exist and stairways

### 3.9 COMPARISON AND SELECTION OF ALTERNATIVES

Alternative, in relation to the proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

- $\checkmark$  The property to which or location it is proposed to undertake the activity
- $\checkmark$  The design or layout of the activity
- $\checkmark$  The technology to be used in the activity



- $\checkmark$  The operational aspects of the activity and
- $\checkmark$  The option of not implementing the activity

The assessment of alternatives should, as a minimum, include the following:

- $\checkmark$  The consideration of the no-go alternative as a baseline scenario
- $\checkmark$  A comparison of the reasonable and feasible alternatives and
- $\checkmark$  Providing a methodology for the elimination of an alternative

Alternatives are different means of meeting the general purpose and need of a proposed activity. The comparison of alternatives is then considered to help determine the best method of achieving the projects. Objectives while minimizing environmental impacts. Alternatives to be considered in the study:

- ✓ Technology Alternative
- ✓ No-Go Alternative

## **3.9.1** Technology Alternative

Technology alternatives for pearl farms are diverse and can be implemented at various scales, addressing different aspects of the operation. Pearl farms can be designed in various layouts and systems, each with its own advantages and disadvantages, depending on the size of the operation, budget, climate, and animal welfare considerations.

### **3.9.1.1** Free-Foot Culture (Bottom Culture)

This is a traditional method where pearl oysters are grown on the seabed in their natural environment, either free or in cages.

Process:

- Oysters are placed on the ocean floor or in cages that rest on the seabed.
- The natural environment of the seabed provides oysters with plankton and nutrients.
- The oysters remain in their natural habitat until they are ready for harvest.

Advantages:

- Natural Environment: Oysters live in their most natural environment, which may result in better health and pearl quality.
- Minimal Maintenance: Less frequent cleaning and inspection are required compared to other methods.
- Lower Setup Cost: Basic equipment is needed, which reduces the initial investment.

Disadvantages:

- Vulnerability to Predators and Pollution: Oysters are more exposed to predators (e.g., crabs, starfish) and pollutants from the ocean.
- Environmental Risks: The oysters are more prone to natural disasters (e.g., storms) and environmental degradation (e.g., overfishing or coastal pollution).



• Access Difficulty: Harvesting and monitoring are more difficult because the oysters are on the seabed.

### 3.9.1.2 Raft Culture

In raft culture, pearl oysters are suspended from floating rafts anchored in the ocean.

Process:

- A floating raft is anchored in shallow water.
- Oysters are suspended from the raft in nets or baskets, typically at varying depths.
- The oysters feed on plankton naturally available in the water.

Advantages:

- Control Over Depth: Farmers can adjust the depth of the oysters to optimize conditions like temperature and plankton availability.
- Ease of Maintenance: The oysters are easily accessible for regular cleaning, inspections, and repairs.
- Protection from Predators: Suspending oysters in nets or cages provides some protection from seabed predators.

Disadvantages:

- High Initial Investment: Rafts and the equipment required for anchoring and suspending oysters can be costly.
- Ongoing Maintenance: Regular cleaning of the nets and rafts is necessary to prevent fouling and ensure good water circulation.
- Vulnerability to Storms: Floating rafts can be damaged or destroyed in strong storms or rough seas.

#### 3.9.1.3 Longline Culture

Longline culture involves suspending pearl oysters from long ropes or cables that stretch across the water and are anchored to the seabed.

Process:

- Longlines are anchored in the ocean and supported by buoys.
- Oysters are hung from the longline on individual ropes, nets, or baskets.
- The system allows the oysters to remain in open water at a controlled depth.

Advantages:

- Scalability: Longline culture can cover large areas of water and support a high number of oysters.
- Efficient Use of Space: Multiple oysters can be suspended in different layers along the longline.
- Accessibility: Oysters are easily accessible for cleaning, inspections, and harvest.



Disadvantages:

- Initial Setup Costs: Similar to raft culture, setting up longline systems can be expensive.
- Fouling Issues: Longlines and oyster baskets need regular cleaning to prevent biofouling (e.g., algae, barnacles).
- Exposure to Weather: Longlines are vulnerable to storms, rough seas, and ocean currents.

### **3.9.1.4** Hatchery Method

The hatchery method involves cultivating pearl oysters in a controlled environment before releasing them into the ocean.

Process:

- Oysters are bred in hatcheries under controlled conditions (temperature, food, and water quality) until they reach a certain size.
- Once they mature, they are seeded and placed in the ocean for further growth.

### Advantages:

- Controlled Breeding: Farmers can select the best oysters for breeding, increasing the chance of producing high-quality pearls.
- Disease Management: Oysters raised in hatcheries are less likely to be exposed to diseases or parasites.
- Faster Growth: Controlled conditions often result in faster oyster growth.

Disadvantages:

- High Costs: Setting up and maintaining a hatchery requires significant investment in infrastructure and technology.
- Labor Intensive: Hatcheries require constant monitoring and care by skilled staff.
- Limited Scalability: Hatcheries are limited by space and resource availability compared to open-ocean methods.

### 3.9.1.5 Recirculating Aquaculture Systems (RAS)

This method uses closed systems where water is continuously filtered and recirculated, providing a highly controlled environment for pearl oyster farming.

Process:

- Oysters are placed in tanks where the water is constantly recirculated, cleaned, and enriched with nutrients.
- Temperature, salinity, and other water quality parameters are controlled to mimic natural conditions.

Advantages:



- Complete Control: Farmers have full control over water quality, temperature, and food supply.
- Environmental Benefits: Minimal interaction with natural ecosystems reduces environmental damage and eliminates risks from predators or pollutants.
- Disease Prevention: Closed systems greatly reduce the risk of diseases and parasites.

Disadvantages:

- Extremely High Costs: Building and maintaining RAS systems is very expensive.
- Energy Intensive: Continuous filtration and water circulation require significant energy consumption.
- Smaller Scale: RAS systems are generally smaller than open-ocean methods, limiting scalability.

### **3.9.1.6** The Preferred Alternatives

Longline Pearl Culture is a popular method used in Oyster Culture and Pearl Production, particularly for growing high-quality pearls. Longline oyster culture and pearl production generally involve minimal direct water consumption in terms of freshwater or other external sources. Because of its vertical farming method this makes efficient use of the water space compared to seabed-based farming and better nutrients access and least disturbance to the seabed and it has flexibility on location. As for the commercial breeding, the longline culture was cost efficient, high yield potential and low operation cost.

### 3.9.2 No-Go Alternative

It means that the proposed project would not be implemented. Without any development activities, the situation remains unchanged because this alternative does not involve any preconstruction, construction, operation and decommissioning activities and as a result, there will be no impacts on the environment. Social impacts related to the project are not expected and no financial costs associated with implementation of this proposed project would be necessary. However, this kind of situation will not be able to accommodate the increasing demand along with the economic growth in Myanmar. People will not be able to benefit from the expected increases in jobs or the secondary socioeconomic benefits accrued from the project implementation as follows:

- If there is no project, the market price of pearl will fluctuate.
- If there is no foreign investment in Myanmar, there will be deficit in foreign currency.
- No job opportunities would have created for local people if the project had not existed.
- If there are no more project implementations, the community will not be able to experience in development of this area.



# Chapter 4 DESCRIPTION OF THE SURROUNDING ENVIRONMENT

# 4.1 **INTRODUCTION**

This section presents the general description of the status of the existing environment in the project area. It also allows for identification of sensitive environmental features and possible receptors of the effects of the proposed project. In the 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 implementation. The baseline information of the Kawthaung Township was collected from Township Data published by General Administration Department in 2019.

# 4.2 SETTING THE STUDY LIMITS

# 4.2.1 Scope of the Study Area

The study area for the Oyster Culture and Pearl Production project encompasses the specific geographical region where the farm will be situated, along with its immediate surroundings. Key components of the study area include:

**Pearl Farm Infrastructure:** The project will be established two differents establishment that the main office and Oyster Culture and Pearl Production area. The facilities includes Jetty bridge, Hatchery, Water pumping station, Shell sorting station, Eight-room, two-story staff quarters, Eight-room, two-story women's dormitory, Office, Workshop, Material Storage, Eight-room, Two-story Men's Dormitory, Dining Hall for 128 People, Vehicle Garage, Fuel Storage Facility, Power Generator Station, Medical Clinic, Water Purification Plant, Food Storage, Library and Convenience Store. The Oyster Culture and Pearl Production included 32 Long-Lines. The central area covers 10,401 acres of land area and waterbody at Zadetgyi Island and Kyantcho Island: 3,714 acres of reserved land area and waterbody for Oyster Culture and Pearl Production.

**Environmental Features:** The current condition of the project area was surrounded by forest area and waterbody.

**Socioeconomic:** The nearest village was Zerdetkyi Village which is 11 kilometers far from the project area. There was no commercial establishment and villages within 3 kilometers from the project area.

# 4.2.2 Setting the Area of Influence (AoI)

# 4.2.2.1 Spatial Boundary

The proposed project is located at Zadetkyi Island, Kawthaung Township, Kawthaung District, Tanintharyi Regioin. The establishment of the Area of Influence (AoI) for the project is intended to ensure that the Environmental Impact Assessment (EIA) focuses on those issues that are important for design, decision making and stakeholder interest. This project covers the activities associated with construction, operation and decommissioning of the oyster farm project.



An AoI of 3 km from the project site boundary has been established for proposed project. The AoI for a particular resource/receptor may vary depending on the nature of the change caused by the project activities and the type of effect being considered, but in each case, it is defined to include all the area within which it is likely that impacts could result.



Figure 4-1 Area of Influence (AoI) of the Proposed Project

# 4.2.2.2 Temporal Boundary

In the construction and operation phase, the environmental impacts are expected to occur on the air quality, water quality, noise, waste and biodiversity due to construction and operation of the project. The socio-economic positive changes are expected to occur during the construction and operational period. Thus, the temporal boundaries will be considered into the construction, operation and decommissioning phases to examine their impact on the environment.

# 4.3 **PHYSICAL ENVIRONMENT**

# 4.3.1 Topography

Kawthaung township is located at coordinate point of North Latitude between 09° 58′ and 10° 55′, East Longitude between 96° 27′ and 98° 56′ E and it has 24 miles from East to West and 64 miles from South to North. The total area of Kawthaung township is about 1038.99 square mile. The township shares borders with Thailand, Ranaung Township in the east, Andaman Sea in the west, Par Chan River and Andaman Sea in the south and Boat Pyin township in the north. Kawthaung Township is plentiful of hills and mountainous. The most distinct river is Par Chan River. In Kawthaung Township, there are 93 islands and 20 inhibited island and 73 uninhibited islands.





Source: General Administrative Department, Kawthaung Township (2019)

Figure 4-2 Location map of Kawthaung Township

# 4.3.2 Climate and Rainfall

Kautthaung District has a tropical monsoon climate (Köppen climate classification Am). Temperatures are very warm throughout the year. There is a short winter dry season (December–January) and a long-wet season (February–November), with particularly heavy rain falling from May to September. Torrential rain falls from May to September, with over 500 mm (about 20 in) falls in each month.



Temperatures are comfortably warm throughout the year, although the winter months (December–February) are milder and nights can be quite cool. The average annual high temperature is 30.24°C and average annual low temperature is 23.33°C.

The average annual rainfall of the area is 3,958 mm. The driest month is January with very low precipitation, only about 16 mm. Most precipitation falls in August, with an average of 713 mm. The warmest month of the year is April with an average high temperature of 33 °C.

In January, the average low temperature accounts 22.1°C and it is the coldest month of whole year round. The difference in precipitation between the driest month and the wettest month is about 697 mm. The average high temperature varies during the year only by 4°C. The best time of the year to visit the area is from December to February (Source: NOAA, 1961-1990).

Kawthaung township has a balanced temperature and tropical characteristic. According to Township profile, the highest temperature is 95.7°C and the lowest temperature is 70.3°C. The required data of rainfall and temperature from 2015 to 2019 are obtained from Kawthaung Township data are shown in the following Table.

No.	Year	Rainfall		Temperature	
		Running Day	Total Rainfall (Inches)	Highest °C	Lowest °C
1.	2015	146	158.23	38.7	17.5
2.	2016	167	128.04	40.5	17.0
3.	2017	170	173.44	36.5	16.0
4.	2018	167	162.58	37.7	16.8
5.	2019	117	138.75	37.7	15.8

 Table 4.1
 Annual Rainfall and Temperature of Kawthaung Township

Source: General Administrative Department, Kawthaung Township (2019)

# 4.3.3 Hydrology

There are many rivers and streams in Kawthaung township and all the existing rivers are flowing from South to North. Par Chan River is the most famous in township and it is flow near Kawthaung Township from South to North.

### 4.3.4 Elevation

Kawthaung Township is 154 feet above average mean sea level. The highest mountain is 1199 Mountain and its mean sea level is 1199 feet and the lowest part of the township is Thri Myaing Ward.





Figure 4-3 Elevation Map





*Figure 4-4 Elevation Map of the project Site* 



# 4.3.5 Regional Geology

The project site is generally considered to be the southern part of the easternmost geotectonic belt of Myanmar, which is referred to either as the Shan-Tanintharyi massif or simply as the Eastern Highlands Province (EHP). Rau's (1930) report on the geology of the Mergui district is the most comprehensive one on the geology of the region. This region is composed of north- south trending, narrow, mountainous, coastal stretch of the mainland part of Myanmar and the broad submarine Myeik (Mergui) terrace, the highest parts of which emerge from the sea as more than 900 islands of the Mergui Archipelago.

Locally, the Mergui Group is un-conformably underlain by gneisses and crystalline schist's of probable Precambrian or Early Paleozoic age, and overlain un-conformably by patches of limestone of Late Permian age, referred to as the Moulmein Limestone. Non-marine red sandstone, shale and conglomerate of possible Jurassic age overlie un-conformably the older rocks in the region. The Mergui Group is also intruded by granitoids of Late Mesozoic and Early Tertiary age. Nature of the rocks that compose the submarine Mergui terrace is not known definitely. However, based on the rocks exposed on the islands of the Mergui Archipelago and considering that fact that the Mergui terrace belongs to the same geotectonic belt as the Tanintharyi Ranges, the rocks of the Mergui terrace could very well be comparable to those exposed in the EHP. The geological map and succession of project site is shown in Figure (4.4).



Figure 4-5 Geological Map of the project Site Geological Succession of the project site



### MERGUI GROUP

Variably deformed clastic sedimentary strata consisting dominantly of pebbly mudstone (diamictite) and pebbly sandstone and minor pyroclastic rocks, regionally metamorphosed to phyllites, argillites and quartzite's, which are widely exposed throughout the Tanintharyi region, were referred to as the Mergui Group.

#### MOULMEIN LIMESTONE

Small isolated outliers of massive, fine grained, grey limestone of Late Permian age, referred to as the Maulmein Limestone, are widely scattered as masses rising as isolated islands of the Mergui Archipelago or precipitous rugged hills on the Tanintharyi mainland. Whatever they occur the Moulmein Limestone characteristically forms rugged, craggy topography with no thick vegetation cover. The Moulmein Limestone in the Tanintharyi Region is the southern extension of the Permian Limestone of the Mawlamyine area.

### CONTINENTAL RED-BEDS

Small isolated outliers of continental red-beds consisting of purple to pinkish sandstone, shale and conglomerate crop out on several islands such as the Pataw, Pahtet, Gladys, Kyaunzauk and the Thitya islands near Myeik (Mergui). The red-beds contain grains of fresh feldspar and pebbles of quartzite and slate indicating local derivation from quartzite and slates of the Mergui Group and granites which surround the red-bed outliers.

### TERTIARY STRATA

Small belts or basins of poorly consolidated non-marine sandstone, conglomerate and shale, presumably of late Tertiary age, locally containing small amounts of oil shale and lignitic coal occur in the valleys of the Lenya, Tanintharyi, Theinkun and the Pakchan Rivers. In contrast to the underlying steeply dipping Mergui strata, the Tertiary rocks dip only at low angles. The regional geological data indicate that the Tertiary deposits once covered more extensively in the Tanintharyi region.

#### QUATERNARY DEPOSITS

Quaternary deposits of the Tanintharyi Region are important as they contain placer tin locally. They are generally divided into the older alluvium and the newer alluvium. The older alluvium is restrict to the larger valleys such as those of the Tanintharyi, Lenya, and the Pakchan Rivers, as river terrace materials and along the coastal areas as the raised marine terraces, whereas the newer alluvium occurs in all valleys and along the coastal as tidal flats. Locally the older alluvium is reported to be up to 60 ft in thickness in some localities and some of them are a good source of placer tin in the Region.



## **IGNEOUS ROCKS**

Igneous rocks of the Tanintharyi Region include both intrusive and extrusive varieties. The intrusive granitoids are by far the most important and are widespread in the region. The crop out in three N-S trending belts of stocks to batholiths –along the Thai-Myanmar border on the east, another along the central range of hills, and the last through the isolated islands such as Parkar, Trotter, Domal, and High Islands on the west. Tin-tungsten mineralization was primarily associated with the intrusion of these granitoid rocks.

The extrusive igneous rocks of the Tanintharyi Region include the olivine basalts of the Medaw Island at the mouth of the Lenya River, the dacites near Talobusa village and volcanic rocks on the northeast coastal area of King Island west of Mergui. Mafic alkaline basaltic dikes also occur locally.

# 4.3.6 Economic Geology

The most important economic minerals of the project site are those of tin and tungsten which primarily occur in quartz veins traversing both granitoids and country rocks and especially in the quartz vein in the vicinity of the contact between the granitoids and country rocks. Primary tin and tungsten minerals also occur, dissiminated in tourmaline-muscovite pegamatite dikes and in the greisens. Fortunately, placer tin which is easier to locate occurs quite widespread throughout the Tanintharyi Region.

Currently available geological data indicate that the project area represents one of the few areas of the world where a considerable reserve of tin and tungsten still remain untapped. Nature, however, is not totally in our favor, for she concealed the deposits under a thick soil cover and a dense tropical rain forest which hamper the geological observations and accessibility.

# 4.3.7 Structural Geology

The structural geology of Myanmar is not complex. The one of the major active fault is Sagaing Fault. It controls the structural geology. It passes through just east of Bago and enters western Gulf of Martaban. In the north-east part of the project site, the anticlinal ridge is located in the Thanlyin area. In the eastern part of this project, there has Kyauktan fault. The axis of the anticline is trending in the NW– SE direction. On that anticline, there have three numbers of oblique minor faults.

# 4.3.8 Earthquake Intensity of Myanmar

The project site is located in a zone of low seismicity zone (I) according to the seismic zone map of Myanmar 2005 (Figure 4.5).





Figure 4-6 Seismic Zone Map of Myanmar

(Revised by Dr. Maung Thein, U Thint Lwin Swe and Dr. Sone Han (December 2005)).

### 4.3.9 Natural Disaster

Natural disaster that occurred in Kawthaung township at the end of September 2019, are as follows:

No.	Type of disaster	Frequency	No. of Depth/Lost	No. of damaged building	Losses (Million)
1	Strom	-	-	-	-
2	Tsunami	-	-	-	-
3	Earthquake	-	-	-	-
4	Flood	3	-	1	100,000

Table 4.2Natural disaster at Kawthaung Township



5	Fire	2	-	2	-
6	Wind hazard	14	-	26	10,394,500
7	Landslide	4	-	9	3,500,000

Source: General Administrative Department, Kawthaung Township (2020)

# 4.3.10 Baseline Environmental Quality

#### 4.3.10.1 Air Quality

### 4.3.10.1.1 Survey Item

The survey area of the air quality parameters was determined by referring environmental quality standard in National Environmental Quality (Emission) Guidelines 2015, were announced on 29<sup>th</sup> December 2015.

### 4.3.10.1.2 Survey Period

Air quality monitoring was conducted 24 hours during  $15^{\text{th}}$  July –  $17^{\text{th}}$  July, 2024. The measurement duration is shown the following table.

	z , ,	
Sampling Point	Period	Remark
AQ-1	15 <sup>th</sup> – 16 <sup>th</sup> July, 2024	Air and noise station is some leastion
AQ-2	16 <sup>th</sup> – 17 <sup>th</sup> July, 2024	Air and noise station is same location.

Table 4.3Air Quality Survey Period

#### 4.3.10.1.3 Survey Location

There are two locations for air quality monitoring were conducted around the project site within 3 km areas of interest.

Table 4.4Air Quality Survey Location

Sampling Point Coordinates		Description of Sampling Point		
AQ-1	9°57'24.84"N 98°13'48.09"E	Camp & Office		
AQ-2	9°56'3.30"N 98°13'46.73"E	Shar Island, near oyster farm		



Figure 4-7 Air Quality Survey Locations

# <u>AQ-1</u>

The air quality station AQ-1 was surveyed at Zadetkyi Island. It was measured at the camp and office of the project site, and knowing the ambient level of the air quality around the project site. The survey activities of AQ-1 are shown in *Figure 4-8*.





Figure 4-8 Air Quality Survey Point AQ-1

# <u>AQ-2</u>

AQ-2 was surveyed at shar island which was located near the oyster farm. It was measured because it is located within 3 kilometers of the project area, being the closest island to the oyster farm, and to understand the ambient level of air quality. The survey activities of AQ-2 are shown in the *Figure 4-9*.







Figure 4-9 Air Quality Survey Point AQ-2

## 4.3.10.1.4 Survey Method

AQM-09 air quality monitoring system is used to measure the gases (SO<sub>2</sub>, NO<sub>2</sub>, O<sub>3</sub>, etc.) and particulate matter PM<sub>10</sub>, PM<sub>2.5</sub> and TSP. Meteorological parameters such as temperature, humidity, wind speed and wind direction can measure at the same time. This monitoring system, along with gas sensors, can detect maximum, minimum, and time-weighted average levels continuously per second up to the duration concerned (e.g., 1 day) with high sensitivity (ppb &  $\mu$ g/m<sup>3</sup> level).



Figure 4-10 Air Quality Monitoring Station (AQM-09)

### 4.3.10.1.5 Survey Results

The average values of ambient gaseous levels of all air quality monitoring for 24 hours show in Table 4.5. According to the survey results, the average 24-hour period for  $PM_{2.5}$ ,  $PM_{10}$  and  $SO_2$  concentrations are within the National Environmental Quality (emission) Guideline, 2015. The daily 8-hour maximum ozone level is within the 100 µg/m<sup>3</sup> standard. The concentration of NO<sub>2</sub> was referred



to the one-hour standard in NEQEG (2015). According to the hourly results, the concentration of  $NO_2$  is lower than the applied standard.

Sampling No.	Ozone (8- hours)	NO <sub>2</sub> (1-hour)	SO <sub>2</sub> (24- hour)	PM <sub>2.5</sub> (24- hour)	PM <sub>10</sub> (24- hour)	TSP (24- hour)	RH	Temp (°C)
	$\mu g/m^3$	µg/m <sup>3</sup>	$\mu g/m^3$	µg/m <sup>3</sup>	µg/m <sup>3</sup>	$\mu g/m^3$	%	Deg. C
AQ-1	12.38	13.82	3.13	4.07	9.82	14.35	82.39	26
AQ-2	11.71	14.16	2.66	5.02	13.54	20.43	82.67	25.93
NEQEG, 2015	100	200	20	25	50	-	-	-

Table 4.5Ambient Air Quality Results

# 4.3.10.1.6 Wind Speed and Direction

According the air quality measurement at the point AQ-1, the average wind speed at 2.23 m/s prevailed, with a maximum of 3.87 m/s and a minimum of 0.85 m/s. The wind consistently blew from SW and NW direction. The average humidity was 82.39 % and air pressure at 1012.84 hPa. The wind rose diagram of the AQ-1 is shown below.



Figure 4-11 Wind Rose Diagram at AQ-1

According to the wind rose diagram, average wind speed of air quality monitoring station AQ-2 is 1.56 m/s and calm winds is 0% during survey period. Dominant prevailing wind direction are blowing from SW and NW direction. The air pressure was 1012.8 hPa and the humidity was 82.67% on average. The wind rose diagram of the AQ-2 is shown in following figure.





Figure 4-12 Wind Rose Diagram at AQ-2

#### 4.3.10.2 Noise

#### 4.3.10.2.1 Survey Item

The survey area of the noise level was determined by referring Myanmar National Environmental Quality (Emission) Guidelines, were announced on 29<sup>th</sup> December 2015.



	One Hour LAeq (dBA) <sup>a</sup>			
Receptor	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		

Table 4.6Noise Level Guidelines

### 4.3.10.2.2 Survey Period

Noise levels were monitored 24 hours from  $15^{th} - 17^{th}$  July, 2024. The measurement duration is shown in the following table.

Table 4.7Noise Survey Period

Sampling Point	Period	Remark           Air and noise station is same location.		
NQ-1	15 <sup>th</sup> – 16 <sup>th</sup> July, 2024	Air and noise station is some leastion		
NQ-2	16 <sup>th</sup> – 17 <sup>th</sup> July, 2024	Air and noise station is same location.		

### 4.3.10.2.3 Survey Location

There are four locations for noise level monitoring were conducted around the project site within 3 km areas of interest.

Table 4.8Noise Survey Location

Sampling Point Coordinates		Description of Sampling Point		
<b>NQ-1</b> 9°57'24.84"N 98°13'48.09"E		Camp & Office		
NQ-2	9°56'3.30"N 98°13'46.73"E	Shar Island, near oyster farm		





Figure 4-13 Noise Quality Survey Locations



Noise Quality Monitoring Point (NQ-1)



Noise Quality Monitoring Point (NQ-2)



# 4.3.10.2.4 Survey Method

Sampling and monitoring of surrounding sound were conducted by using following instrument for 24 hours/1-day measurement. The instrumentation used for noise quality survey is shown in the following figure. Noise meter was set up to record the log as ten minutes intervals during an hour for one consecutive day. Day time and night time was calculated by using the following array formula in the excel sheet. This formula is firstly used for hourly LAeq and then for the 24 hours LAeq.



Instrumentation	Description
Sound level meter	Digital Sound Level Meter (GM1356-0/GM1356)

Table 4.9Instrument for Noise Survey





Figure 4-15 Digital Sound Level Meter (GM 1356)

#### 4.3.10.2.5 Survey Result

The average noise quality in the project site area is presented in *Table 4.10*. The results obtained from the Noise Level measurements are compared with the National Environmental Quality (Emission) Guidelines (NEQEG, 2015).

Table 4.10Noise Quality Results for NQ-1 and NQ-2

NEQEG (2015) Values			Results				Pomark	
Industrial		Resid	lential	N	Q-1	NQ-2		Kemark
Day	Night	Day	Night	Day	Night	Day	Night	The project was located in Zadetkyi
70	70	55	45	50.13	38.73	45.29	42.02	compared with the residential area.




*Figure 4-16* 24 *Hr Noise Graph for NQ-1 and NQ-2* 

Noise quality measurements at point NQ-1 and NQ-2 were conducted at the project site from  $15^{\text{th}} - 17^{\text{th}}$  July, 2024. Based on the averages calculated, the noise levels recorded during both daytime and nighttime periods are well within below the National Environmental Quality (Emission) Guidelines 2015 (Residential), indicating that the noise levels are acceptable and do not exceed the permissible limits.

4.3.10.3 Surface Water Quality

## 4.3.10.3.1 Survey Item

Parameters for water quality survey are determined to cover the parameters of environmental standards of Myanmar. The results of surface water quality measurements will be compared with the National Surface Water Quality Standard, 2024. The parameters will be analyzed in ALARM Ecological laboratory.

# 4.3.10.3.2 Survey Period

Water quality sampling was conducted on 17th July, 2024.

Table 4.11Water Quality Survey Period

Sample ID	Period
SW-1	
SW-2	
SW-3	1 /" July, 2024
SW-4	



### 4.3.10.3.3 Survey Location

There are four locations for water quality sampling were conducted around the project site within 3 km areas of interest.

Sampling Point Coordinate		Description of Sampling Points		
SW-1	9°57'27.16"N 98°13'48.45"E	Upstream of Creek (Zardatgyi Island)		
SW-2 9°57'23.25"N 98°13'50.47"E		Downstream of Creek (Zardatgyi Island)		
SW-3	9°56'18.91"N 98°13'50.17"E	Near Shar Island		
SW-4	9°55'33.69"N 98°14'6.50"E	Near Oyster Farm		

Table 4.12Water Quality Sampling Locations



Figure 4-17 Surface Water Quality Survey Locations





Figure 4-18 Water Quality Survey Activities at SW-1





*Figure 4-19 Water Quality Survey Activities at SW-2* 





Figure 4-20 Water Quality Survey Activities at SW-3







Figure 4-21 Water Quality Survey Activities at SW-4

## 4.3.10.3.4 Survey Method

Water samples were collected in plastic and sterilized glass sample containers. All sampling was in strict accordance with recognized standard procedures. The parameters as pH, temperature including the odor and color in visual analyzing were measured at each site concurrently with sample collection. All samples were kept in iced boxes and were transported to the laboratory within 24 hours.

## 4.3.10.3.5 Survey Results

## 4.3.10.3.6 Laboratory Analysis Result

The water samples sent to ALARM Ecological Laboratory. Surface water quality results were compared with National Surface Water Quality Standard, 2024 (Class V). Most of the water results are lower than the applicable guidelines. Laboratory analysis results for surface water is attached in Appendix-B.

No-	Parameters	Unit	SW-1	SW-2	National Surface Water Quality Standard, 2024 (Class V)
1	Total Suspended Solids	mg/L	<5	<5	150
2	BOD	mg/L	2.7	2.6	30
3	COD (Cr)	mg/L	18	12	100
4	Oil and Grease	mg/L	Nil	2	No noticeably seen
5	Boron	mg/L	< 0.05	< 0.05	2.4
6	Cyanide	mg/L	0.006	0.007	0.07
7	Fluoride	mg/L	< 0.1	< 0.1	1.5
8	рН	mg/L	6.1	5.9	-
9	Ammonia Nitrogen	mg/L	0.06	0.1	-

Table 4.13Surface Water Quality Results (SW-1 and SW-2)



No-	Parameters	Unit	SW-1	SW-2	National Surface Water Quality Standard, 2024 (Class V)
10	Nitrate Nitrogen	mg/L	0.9	1	10
11	Nitrite Nitrogen	mg/L	0.009	0.008	1
12	Dissolved Oxygen	mg/L	8.6	8.7	> 2
13	Arsenic	mg/L	<0.1	<0.1	0.05
14	Cadmium	mg/L	< 0.05	< 0.05	0.003
15	Hexavalent Chromium	mg/L	< 0.05	< 0.05	0.05
16	Copper	mg/L	< 0.05	< 0.05	-
17	Lead	mg/L	< 0.05	< 0.05	0.01
18	Nickel	mg/L	< 0.05	< 0.05	0.07
19	Selenium	mg/L	<0.1	<0.1	0.04
20	E Coli	IPN/100m	< 0.3	0.74	-

"-"=No Reference Standard

The surface water quality results SW-1 and SW-2 were monitored and compared with the National Surface Water Quality Standard, 2024 (Class V) and all the quality parameters meet the standard values except arsenic, cadmium, lead and selenium exceed the standard values of parameters for human health.

Table 4.14	Surface	Water	Quality	Results	(SW-3	and SW-4)
------------	---------	-------	---------	---------	-------	-----------

No.	Parameter	SW-3	SW-4	Unit	National Surface Water Quality Standard, 2024 (Class V)	ASEAN Marine Water Quality Criteria
1	рН	8.1	8.1	<b>S</b> . U	-	-
2	Temperature	25.6	25.6	°C	-	Increase not more than 2°C above the maximum ambient temperature.
3	Oil and Grease	6	3	mg/l	No noticeably seen	0.14
4	Total Nitrogen	29	< 2	mg/l	-	-
5	Total Suspended Solids	6	< 5	mg/l	150	Permissible 10% maximum increase over



No.	Parameter	SW-3	SW-4	Unit	National Surface Water Quality Standard, 2024 (Class V)	ASEAN Marine Water Quality Criteria
						seasonal average concentration.
6	Biological Oxygen Demand	160	230	mg/l	30	-
7	Chemical Oxygen Demand	620	600	mg/l	100	-
8	Total Phosphorus	0.9	0.5	mg/l	-	-
9	Total Coliform Bacteria	< 0.3	< 0.3	mg/l	-	-

"-"=No Reference Standard

The surface water quality results SW-3 and SW-4 were monitored and compared with the National Surface Water Quality Standard, 2024 (Class V). All the quality parameters meet the National Surface Water Quality Standard, 2024 (Class V) values except BOD and COD of SW-3 and SW-4 exceed the standard values.

### 4.3.10.4 Soil

### 4.3.10.4.1 Soil Baseline Survey

Parameters for soil quality survey are determined to cover the parameters of existing available environmental standards. Soil sample was taken by the manual hand auger.

### 4.3.10.4.2 Survey Period

Soil quality survey was conducted on 17<sup>th</sup> July, 2024 at project site.

Table 4.15Soil Survey Period

Sample ID	Period
SQ	17 <sup>th</sup> July, 2024

### 4.3.10.4.3 Survey Location

There is one location for soil sampling were conducted around the project site within 3 km areas of interest.



Table 4.16	Soil Sampling Location
------------	------------------------

Sample ID	Sample ID Latitude		Description of Sampling Point	
SQ	9°57'24.21"N	98°13'49.02"E	Within the project site	



Figure 4-22 Soil Survey Points

# <u>SQ</u>

The soil sample was taken at the project area. When the soil samples collected, three locations as the triangle shape were taken by composite sampling method. The top soil was removed 00-30cm and taken from 30-50 cm.





Figure 4-23 Soil Survey Activities at SQ



# 4.3.10.4.4 Survey Method

For soil sampling, the standard environmental sampler (soil auger) was applied. The sampler is a stainless-steel tube that is sharpened on one end and fitted with a long, T-shaped handle. This tube is approximately three inches inside diameter. In order to refrain from contamination, about 00-30 cm of top soil was removed by the sampler before sampling. Most of samples were taken and collected from 30-50 cm depth. During sample collection, wear the glove, rinse glove and soil auger with clean water. Then sample was taken and collected in cleaned plastic bag. Field equipment used on site also show in the *Table 4.17*.

Equipment	Originate Country	Model
Soil Auger (Hand held)		
	U. S. A	AMS



## 4.3.10.4.5 Survey Results

Chemical analysis for soil quality was tested in the laboratory of Land Use Department of Yangon Region. The soil results were compared with available international guidelines. The soil results were within the guidelines and laboratory analysis results is attached in Appendix-C.

Table 4.18Soil Survey Results

No	Parameter	Unit	Result	Guidelines		
1.0	i ui unictor	Cint	itesuit	Japan	Thailand	Vietnam
1	pН	-	4.47	-	-	-
2	Zinc (Zn)	ppm	0.2316	150	-	300
3	Copper (Cu)	ppm	0.082	125	-	100
4	Lead (Pb)	ppm	2.72	150	750	300
5	Iron (Fe)	ppm	97.27	-	-	-
6	Manganese (Mn)	ppm	2.156	-	-	-
7	Boron (B)	ppm	5.26	-	-	-
8	Cadmium (Cd)	ppm	ND	-	-	-



9	Nickle (Ni)	ppm	ND	-	-	-
10	Chromium (Cr)	ppm	ND	-	-	-

Remark: ND: Not Detected

Source: Japan: Ministry of Environment, Government of Japan (2002), "Regulation for Implementing the Law on Soil Contamination Countermeasures"

Thailand: Notification of National Environmental Board No.25, B.E. Thailand (2004), "other purpose"

Vietnam: QCVN 03:2008/BTNMT, Applied "industrial land", Vietnam.



## 4.4 ECOLOGICAL/ BIOLOGICAL ENVIRONMENT

The proposed project area is located at the coordinate point of latitude 9°56'10.74"N and longitude 98°13'57.90"E. The proposed Oyster Culture and Pearl Production activities will be developed in the waters and land areas of Shar Kyunn Island (Zadetgyi Island), and Kyantcho Island, located in Kawthaung Township, Kawthaung District, Tanintharyi Region. According to the Fauna & Flora International (FFI), (Howard, 2018), the following figure indicates that the highlighting critical and core ecosystem areas and other sensitive areas in Myeik Archipelago and surrounding coast. The project area is covered by buffer zone for sensitive ecosystem (BZ) to protect and sustainably manage coastal and marine resources.



Figure 4-24 Forest Cover Area of Project Site



\*Source: Fauna & Flora International (FFI), (Howard, 2018)

Figure 4-25 Myeik Archipelago and Important Biodiversity Areas



Tanintharyi is the southernmost administrative region of Myanmar and covers over 43,000 km2 between the Andaman Sea to the west and Thailand to the east. The region experiences a tropical monsoon climate with a distinct wet season, from May to October, followed by an extended dry season. Although forests in much of the region are broadleaf evergreen, certain areas contain mixtures or mosaics of evergreen and deciduous tree species. The group forests in Tanintharyi into one of four major ecological types: (1) mangrove forest; (2) lowland evergreen forest; (3) upland evergreen forest; and (4) mixed deciduous forest.<sup>3</sup>



\*Source: (Connette et al., 2016)



<sup>&</sup>lt;sup>3</sup> Connette et al., 2016



Figure 4-27 Land Cover Classification for Tanintharyi Region in 2016

The current forest coverage of the Kawthaung township is (66.66%). Among them, (47.09%) of forest areas are reserved forest and (1.56%) are protected public forest. According to the township data of Kawthaung township, most of the forest types are evergreen forests and mangrove forests.



## 4.4.1 Result of Baseline Study of Ecology and Biodiversity Environment

The present survey was conducted to study the biodiversity of proposed oyster culture and pearl production project and adjacent areas. Which is located in eastern part of Zerdetgyi Island and near Kyant Cho Island, Taninthayi Region, Myanmar.

Understanding of phytoplankton biodiversity in our oceans is essential for the following reasons. The ocean's food web depends crucially upon plankton (Rassoulzadegan and Sheldon, 1986; Dolan et al., 1995; Thingstad et al., 1998), they are functional base of all marine ecosystems. Phytoplankton are microscopic, autotrophic, unicellular plants which are responsible for the 95% primary productivity of the sea (Nielsen, 1975). They are primary producers in the sea which form the base of food chain. The ocean's primary production is estimated to be some  $48 \times 10-15$  tones carbon annually (Field et al., 1998). Phytoplankton are responsible for some 46% of the planetary photosynthesis. This process is resulted the reduction of carbon dioxide. Moreover, dinoflagellates produced dimethyl sulfonioproprionate which is converted to dimethyl sulphide a volatile compound that is important in cloud formation over the ocean (Burkill and Reid, 2011). Phytoplankton are indicators of water quality (Chellappa et. al., 2009). Likewise, zooplankton also play an important role in aquatic ecosystem as a secondary consumer.

Benthic macroinvertebrates are animals that are big enough (macro) to be seen with the naked eye. They lack backbones (invertebrate) and live at least part of their lives in or on the bottom (benthos) of a body of water. What is the ecological importance of benthic macroinvertebrates? Benthos are an important part of the food chain, especially for fish. Many feeds on algae and bacteria which are on the lower end of the food chain. Some shred and eat leaves and other organic matter that enters the water. Because of their abundance and position as "middleman" in the aquatic food chain, benthos plays a critical role in the balance and natural flow of energy and nutrients. As benthos die, they decay, leaving behind nutrients that are reused by aquatic plants and other animals in the food chain.

Mangrove forests are among the most productive ecosystems on earth, and serve many important functions, including water filtration, prevention of coastal erosion, coastal protection from storms, carbon storage, food, timber, and livelihood provision, and biodiversity protection, among others. Like coral reefs, mangrove forests are extremely productive ecosystems that provide numerous good and services both to the marine environment and people. This makes mangrove forests vitally important to coral reef and commercial fisheries as well.

Therefore, biodiversity should be considered in Environmental Impact Assessment because conservation of biodiversity is an essential element of sustainable development. The goal of this survey is to rapidly generate and disseminate information on coastal and nearshore shallow water marine biodiversity for conservation purposes – with a particular focus on recommending priorities for pilot cage culture establishment and management. The surveys focused on key indicators of biodiversity including, in particular, plankton, benthos, mangrove and fishes.



### 4.4.1.1 Methodology

In this report, all sample collections were conducted in 15<sup>th</sup> -17<sup>th</sup> July, 2024. The present study follows the methods of Hallegraeff et. al., 2003 and Sournia, 1978 especially for the plankton. Mangrove of the project and adjacent areas were studied by random site seeing from the three stations. To obtain qualitative data, surface water column was hauled for 15 minutes with standard plankton net. For quantitative studies of phytoplankton and zooplankton, 50 L of surface water was collected with a bucket and filtered with a standard plankton net. Samples were fixed with 5 % formaldehyde solution (Throndsen, 2010). Cells counting followed the methods of LeGresley and McDermott, 2010 and Guillard, 2003. Sedgewick-Rafter counting chamber is used for cell counting. Pre-concentration of the sample is necessary when cell density is low. Sub-samples were well homogenized as gently as possible to prevent the damage of cells. Sub-sample of one ml is taken from a well-mixed pre-concentration using a wide opening pipette and placed into the Sedgewick-Rafter chamber which is made with plastic and enumerated under a microscope (Nikon Eclipse E200) using 10X objectives. The entire chamber was screened and 3 ml of sub-samples from each station were counted which is expressed as cells per litre. The concentration factor (CF) is calculated by the following equation:

#### CF= A/B (Murielle-LeGresley and Georgina McDermott, 2010 and Sournia, 1978)

#### Where A= the initial volume, B= final volume

The Sedgewick-Rafter slide has a volume of one ml with the base of the cell being divided into 400 squares (20 rows by 20 rows), each representing 1/400 of the volume of the slide.

#### F = (400/number of squares counted)\* 1,000

To obtain a final result expressed as cells per liter, the following equation is used to calculate the multiplication factor (F). F is dependent on the number of squares of the base of the cell counted during the analysis. Examples of F for the Sedgewick-Rafter slide:

4 rows (80 squares) are counted.

 $\mathbf{F} = (400/80) = 5 * 1,000 = 5,000$ 

#### 20 rows (400 squares) or the entire slide is counted.

#### $\mathbf{F} = (400/400) = 1 * 1,000 = 1,000$

For the benthos samples, a total of 3 stations were established in each mudflat of the coast. Sample collection was carried out by randomly. At each site, 20x20 cm quadrat was placed and the substrate was dug to a depth of 0.2 m. For the data precision there are at least 5-10 quadrats of sampling sites were established in each station. Obtained sediment samples were placed on the sieve (0.5 mm mash size) and wash with water and collected by using forceps and preserved with 5% formalin for further analysis. Identification was conducted by using compound microscope.



Fishery data were collected directly from the landing sites and interviewed of some local fisherman and fisher folks.



*Figure 4-28* Map shown the survey area and stations of plankton, benthos and mangrove

Station	Plankton		Ben	thos	Mangrove		
	Lat.	Long.	Lat.	Long.	Lat.	Long.	
1	9°55'45.76"	98°14'14.62"	9°58'17.15"	98°14'58.75"	9°58'17.15"	98°14'58.75"	
2	9°57'22.69"	98°15'18.39"	9°57'9.25"	98°14'47.63"	9°57'9.25"	98°14'47.63"	
3	9°55'20.26"	98°12'42.57"	9°56'20.38"	98°13'2.79"	9°56'20.38"	98°13'2.79"	

Table 1 10	Logation	of study	ait on with	awaat	nositions
1 ubie 4.19	Locuion	0j sinay	sues wiin	елисі	positions



## 4.4.1.1.1 Phytoplankton

*Table 4.20 Classification system, species occurrence and list of phytoplankton (Diatoms).* (1,2,3= stations, + = present, - = absent).

Phylum	Class	Order	Family	S/N	Genus and Species	1	2	3
Bacillariophyta	Coscinodiscophyceae Round and Crawford 1995	Paraliales Crawford 1995	Paraliaceae Crawford 1995	1	Paralia sulcata (Ehrenberg) Cleve	+	-	+
		Coscinodiscales Round and Crawford 1995	Coscinodiscaceae Kützing 1844	2	<i>Coscinodiscus asteromphalus</i> Ehrenberg	+	+	+
				3	Coscinodiscus centralis Ehrenberg	+	+	+
				4	Coscinodiscus oculus-iridis Ehrenberg	+	+	+
				5	Coscinodiscus radiatus Ehrenberg	+	+	+
				6	Coscinodiscus sp.	+	-	-
				7	Palmeria hardmaniana Greville	+	+	+
		Triceratiales Round and	Triceratiaceae (Schütt)	8	Odontella mobiliensis (Bailey)	+	+	+
		Crawford 1995	Lemmermann 1899		Grunow			
				9	Odontella sinensis (Greville)	+	+	+
					Grunow			
				10	Triceratium favus	-	+	-
				11	Lampriscus shadboltianum	+	+	+
					(Greville) simonsen			
		Hemiaulales Round and Crawford 1995	Hemiaulaceae Heiberg 1863	12	Hemiaulus sinensis Greville	-	+	+
			Bellerocheaceae Crawford 1995	13	<i>Bellerochea horologicalis</i> Von Stosch	-	-	+
				14	Bellerochea malleus (Brightwell)	-	+	-
					Van Heurck			
		Lithodesmiales Round and	Lithodesmiaceae Round	15	Ditylum sol	+	+	+
		Crawford 1995	1995					
Bacillariophyta	Coscinodiscophyceae	Rhizosoleniales Silva 1962	Rhizosoleniaceae De Toni	17	Rhizosolenia cochlea Brun	-	-	-
	Round and Crawford 1995		1890					
				18	Rhizosolenia imbricata Brightwell	+	+	+



Phylum	Class	Order	Family	S/N	Genus and Species	1	2	3
				19	Rhizosolenia setigera Brightwell	+	+	+
				20	Rhizosolenia shrubsolei Cleve	-	-	+
				21	Proboscia alata f. gracillima	+	+	+
					(Cleve) Gran			
				22	Pseudosolenia calcar-avis	+	-	+
					(schultze) sundström			
		Chaetocerotales Round and	Chaetocerotaceae Ralfs	23	Bacteriastrum halinum Lauder	+	-	+
		Crawford 1995	1861/ Smith 1872					
				24	Chaetoceros affinis Lauder	+	-	+
				25	Chaetoceros atlanticus Cleve	-	-	+
				26	Chaetoceros coarctatus Lauder	-	-	+
				27	Chaetoceros compressus Lauder	+	+	+
				28	Chaetoceros costatus Pavillard	+	+	-
				29	Chaetoceros curvisetum Cleve	-	-	+
				30	Chaetoceros decipiens Cleve	+	+	+
				31	Chaetoceros denticulatus Lauder	-	+	-
				32	Chaetoceros lorenzianus Grunow	+	-	+
	Fragilariophyceae Round 1995	l Fragilariales Silva 1962	Fragilariaceae Greville 1833	33	Fragilaria striatula	+	+	+
		Thalassionematales Round	Thalassionemataceae	34	Thalassionema frauenfeldii	+	+	+
		1995	Round 1995		(Grunow) Hallegraeff			
Bacillariophyta	Fragilariophyceae Round	I Thalassionematales Round	Thalassionemataceae	35	Thalassionema nitzschioides	+	+	+
	1995	1995	Round 1995		(Grunow) Mereschkowsky			
				36	Thalassiothrix cf. longissima	+	+	+
					Cleve and Grunow			
	Bacillariophyceae Haecke	Naviculales Bessey 1907	Pleurosigmataceae	37	Pleurosigma angulatum	+	+	-
	1878 emend Mann 1995		Mereschkowsky 1903					
				38	Pleurosigma formosum Peragallo	-	-	+
				39	Pleurosigma normanii	+	+	+
		Mastogloiales Mann 1995	Mastogloiaceae	40	Mastogloia erythraea Grunow	-	-	+
			Mereschkowsky 1903					

Phylum	Class	Order	Family		S/N	Genus and Species		1	2	3
		Bacillariales Hendey 1937	Bacillariaceae	Ehrenberg	41	Bacillaria paxillifera	(Müller)	+	+	+
			1831			Hendey				
					42	Nitzschia lorenziana Gru	inow	-	+	-

Phylum	Class		Order	Family	SN	Genus and Species	1	2	3
Dinophyta	Dinophyceae	West	Dinophysiales	Dinophysiaceae Stein 1883	1	Dinophysis miles Cleve	-	+	-
	and Fritch 1927		Lindemann 1928						
					2	Ceratium deflexum	+	-	-
			Gonyaulacales	Ceratiaceae Lindemann 1928	3	Ceratium gibberum (Gourret) Jörgensen 1911	+	-	-
			Taylor 1980						
					4	Ceratium inflatum	+	-	-
					5	Ceratium macroceros	+	+	+
					6	Ceratium porrectum	-	-	+
					7	Ceratium trichoceros (Ehrenberg) Kofoid 1908	+	+	+
				Cladopyxidaceae stein 1883	8	Cladopyxis hemibrachiata Balech 1964	-	+	+
				Gonyaulacaceae Lindemann 1928	9	Gonyaulax polygramma Stein 1883	-	-	-
				Pyrocystaceae (Schütt) Lemmerman	10	Pyrocystis lunula	-	+	-
				1899					
				Pyrophacaceae Lindemann 1928	11	Pyrophacus sp.	+	-	+
			Peridiniales Haeckel	Protoperidiniaceae Taylor	12	Protoperidinium conicum (Gran) Balech 1974	-	-	-
			1894						
					13	Protoperidinium curtipes (Jörgensen) Balech	+	-	-
						1974			
					14	Protoperidinium depressum (Bailey 1855) Balech	+	-	-
					15	Protoperdinium granii	+	-	-
					16	Protoperidinium pentagonum	+	-	-

Table 4.21Classification system and species occurrence and list of phytoplankton (dinoflagellates). (1,2,3 = stations, + = present, - = absent).

#### Oyster Culture and Pearl Production Project, Myanmar Economic Corporation



Figure 4-29 Phytoplankton Genus and Species

A) Paralia sulcata. B) Coscinodiscus asteromphalus, C) Coscinodiscus centralis, D) Coscinodiscus oculus-iridis, E) Coscinodiscus radiates, F) Coscinodiscus sp., G) Palmeria hardmaniana, H) Odontella mobiliensis, I) Odontella sinensis,J) Triceratium favus,K) Lampriscus shadboltianum, L) Hemiaulus sinensis, M) Bellerochea horologicalis, N) Bellerochea malleus, O) Ditylum sol, P) Rhizosolenia cochlea, Q) Rhizosolenia imbricate.



#### Oyster Culture and Pearl Production Project, Myanmar Economic Corporation



Figure 4-30 Phytoplankton Genus and Species

A) Rhizosolenia setigera, B) Rhizosolenia shrubsolei, C) Proboscia alata f. gracillima, D) Pseudosolenia calcar-avis, E) Bacteriastrum halinum, F) Chaetoceros affinis, G) Chaetoceros atlanticus, H) Chaetoceros coarctatus, I) Chaetoceros compressus, J) Chaetoceros costatus, K) Chaetoceros curvisetum, L) Chaetoceros decipiens, M) Chaetoceros denticulatus, N) Chaetoceros lorenzianus, O) Fragilaria striatula, P) Thalassionema frauenfeldii, Q) Thalassionema nitzschioides, R) Thalassiothrix cf. longissima.





Figure 4-31 Phytoplankton Genus and Species

A) Pleurosigma angulatum, B) Pleurosigma formosum, C) Pleurosigma normanii, D) Mastogloia erythraea, E) Bacillaria paxillifera, F) Nitzschia lorenziana





*Figure 4-32 Dinoflagellates* 

A. Dinophysis miles, B. C. deflexum, C. C. gibberum, D. C. inflatum, E. C. porrectum, F. C. macroceros, G. C. trichoceros, H. Cladopyxis hemibrachiata, I. Gonyaulax polygramma, J. Pyrocystis lunula, K. Pyrophacus sp., L. P. curtipes, M. Protoperidinium conicum, N. P. depressum, O. P. granii and P. P. pentagonum.





*Figure 4-33 Genus wise variations in cell density of phytoplankton* 



# 4.4.1.1.2 Zooplankton

#### Table 4.22Classification system and list of zooplankton

Phylum	Class	Order	Family	Genus	Sr. No.	Species
Cnidaria	Hydrozoa	Siphonophorae	Diphyidae	Diphyes	1.	Diphyes sp.
				Lensia	2.	Lensia multicristata Moser, 1925
					3.	<i>Lensia</i> sp.
Chaetognatha	Sagittoidea	Aphragmophora	Sagittidae	Flaccisagitta	4.	Flaccisagitta enflata Grassi, 1881
Annelida	Polychaeta				5.	Nectochaete larvae of nereid
Arthopoda	Ostracoda	Myodocopida	Cypridinidae	Cypridina	6.	<i>Cypridina</i> sp.
					7.	Nauplius of Cirripedia
	Hexanauplia	Calanoida	Calanidae	Canthocalanus	8.	Canthocalanus pauper Giesbrecht, 1888
				Undinula	9.	Undinula vulgaris Dana, 1849
			Paracalanidae	Acrocalanus	10.	Acrocalanus gibber Giesbrecht, 1888
				Paracalanus	11.	Paracalanus aculeatus Giesbrecht, 1888
					12.	P. parvus Claus, 1863
			Eucalanidae	Parvocalanus	13.	Parvocalanus crassirostris Dahl, 1894
				Pareucalanus	14.	Pareucalanus attenuates Dana, 1849
					15.	Pareucalanus sp.
Arthopoda	Hexanauplia	Calanoida	Euchaetidae	Euchaeta	16.	Euchaeta concinna Dana, 1849
			Centropagidae	Centropages	17.	Centropages furcatus Dana, 1849
					18.	C. tenuiremis Thompson & Scott, 1903
Arthopoda	Hexanauplia	Calanoida	Temoridae	Temora	19.	T. discaudata Giesbrecht, 1889
			Lucicutiidae	Lucicutia	20.	Lucicutia flaviconis Claus, 1863
			Pontellidae	Calanopia	21.	Calanopia minor Scott, 1902
				Labidocera	22.	Labidocera minuta Giesbrecht, 1889



## Oyster Culture and Pearl Production Project, Myanmar Economic Corporation

				Pontellopsis	23.	Pontellopsis scotti Sewell, 1932
				Pontellina	24.	Pontellina sp.
			Acartiidae	Acartia	25.	Acartia spinicauda Giesbrecht, 1889
					26.	A. erythraea Giesbrecht, 1889
			Tortanidae	Tortanus	27.	Tortanus forcipatus Giesbrecht, 1889
		Cyclopoida	Oithonidae	Oithona	28	Oithona brevicornis Giesbrecht, 1891
					29.	O. rigida Giesbrecht, 1896
			Oncaeidae	Oncaea	30.	Oncaea clevei Früchtl, 1923
					31.	O. venusta Philippi, 1843
Arthopoda	Hexanauplia	Cyclopoida	Corycaeidae	Corycaeus	32.	Corycaeus latus Dana, 1849
					33.	C. speciosus Dana, 1849
					34.	C. crassiusculus Dana, 1849
				Ditrichocorycaeus	35.	Ditrichocorycaeus andrewsi FArran, 1911
				Farranula	36.	Farranula gibbula Giesbrecht, 1891
		Harpacticoida	Ectinosomatidae	Microsetella	37.	Microsetella rosea Dana, 1847
			Euterpinidae	Euterpina	38.	Euterpina acutifrons Dana, 1847



No.	Species Name	St.1	St.2	St.3
1.	Diphyes sp.	+	+	+
2.	Lensia multicristata Moser, 1925	-	+	-
3.	<i>Lensia</i> sp.	+	+	+
4.	Flaccisagitta enflata Grassi, 1881	+	+	+
5.	Nectochaete larvae of nereid	+	+	+
6.	Cypridina sp.	+	+	+
7.	Nauplius of Cirripedia	+	+	+
8.	Canthocalanus pauper Giesbrecht, 1888	+	-	+
9.	Undinula vulgaris Dana, 1849	-	-	+
10.	Acrocalanus gibber Giesbrecht, 1888	+	-	+
11.	P. parvus Claus, 1863	+	+	+
12.	Parvocalanus crassirostris Dahl, 1894	+	+	+
13.	Pareucalanus attenuates Dana, 1849	-	+	+
14.	Pareucalanus sp.	-	-	+
15.	Euchaeta concinna Dana, 1849	-	-	-
16.	Centropages furcatus Dana, 1849	+	+	+
17.	C. tenuiremis Thompson & Scott, 1903	+	-	+
18.	T. discaudata Giesbrecht, 1889	-	-	-
19.	Lucicutia flaviconis Claus, 1863	-	-	+
20.	Calanopia minor Scott, 1902	-	-	-
21.	Labidocera minuta Giesbrecht, 1889	-	-	+
22.	Pontellopsis scotti Sewell, 1932	-	-	+
23.	Pontellina sp.	-	-	-
24.	Acartia spinicauda Giesbrecht, 1889	+	-	+
25.	A. erythraea Giesbrecht, 1889	+	+	+
26.	Tortanus forcipatus Giesbrecht, 1889	-	-	-
27.	Oithona brevicornis Giesbrecht, 1891	+	+	+
28.	O. rigida Giesbrecht, 1896	+	+	+
29.	Oncaea clevei Früchtl, 1923	+	+	+
30.	O. venusta Philippi, 1843	+	+	+

Table 4.23Species occurrence of zooplankton of present study area.



#### Oyster Culture and Pearl Production Project, Myanmar Economic Corporation

	Total	25	22	30
37.	Euterpina acutifrons Dana, 1847	+	+	+
36.	Microsetella rosea Dana, 1847	+	+	+
35.	Farranula gibbula Giesbrecht, 1891	+	-	-
34.	Ditrichocorycaeus andrewsi FArran, 1911	+	+	+
33.	C. crassiusculus Dana, 1849	+	+	+
32.	C. speciosus Dana, 1849	+	+	+
31.	Corycaeus latus Dana, 1849	+	+	+



Figure 4-34 Fluctuations in cell density of zooplankton





A. Diphyes sp., B. Lensia multicristata, C. Lensia sp., D. Flaccisagitta enflata, E. Cypridina sp., F. Nauplius of Cirripedia, G. Nectochaete larvae of Nereid, H. Canthocalanus pauper, I. Undinula vulgaris, J. Acrocalanus gibber, K. Temora. discaudata.





A. Paracalanus parvus, B. Parvocalanus crassirostris, C. Pareucalanus attenuates, D. Pareucalanus sp., E. Euchaeta concinna, F. Centropages furcatus, G. C. tenuiremis,







A. Lucicutia flaviconis, B. Calanopia minor, C. Labidocera minuta, D. Pontellopsis scotti, E. Pontellina sp., F. Acartia spinicauda, G. A. erythraea, H. Tortanus forcipatus, I. Oithona brevicornis, J. O. rigida.





Figure 4-38 Zooplankton

A. Oncaea clevei, B. O. venusta, C. Corycaeus latus, D. C. speciosus, E. C. crassiusculus, F. Ditrichocorycaeus andrewsi, G. Farranula gibbula, H. Microsetella rosea, I. Euterpina acutifrons

### 4.4.1.1.3 Benthos

# Phylum: Annelida

Class: Polychaeta

Order: Errantia

Family: Glyceridae

Genus: Glycera

Species: Glycera sp.





Phylum: Mollusca Class: Gastropoda Order: Mesogastropoda Family: Potamididae Genus: *Cerithidea* Species: *Cerithidea cingulata* 



Phylum: Mollusca Class: Gastropoda Order: Archaeogastropoda Family: Neritidae Genus: *Nerita* Species: *Nerita sp*.

Phylum: Mollusca Class: Bivalvia (Pelecypoda) Order: Cardiida Family: Donacidae Genus: *Donax* Species: *Donax scortum* 







Phylum: Mollusca Class: Bivalvia (Pelecypoda) Order: Mytilida Family: Mytilida Genus: Septifer Species: Septifer bilocularis



Figure 4-39 Recorded benthos

Sr. No	Species Name	St.1	St.2	St.3
1	Glycera sp.	+	-	+
2	Cerithidea cingulate	+	-	-
3	Nerita sp.	-	+	+
4	Donax scortum	-	+	+
5	Septifer bilocularis	+	-	-

Table 4.24Species occurrence and list of benthos.



## 4.4.1.1.4 Mangroves

Table 4.25Species compositions and occurrences of Mangroves from Zerdetkyi Island and adjacent coastal water

Phylum	Class	Order	Family	S/N	Genus & Species	Station 1	Station 2	Station 3
Magnoliphyta	Magnoliopsida	Primulales	Myrsinaceae	1	Aegiceras corniculatum	-	+	+
		Lamiales	Avicenniaceae	2	Avicennia marina	+	+	+
				3	Avicennia alba	-	-	-
		Magnoliales	Sonneratiaceae	4	Sonneratia alba	-	+	+
		Rhizophorales	Rhizophoraceae	5	Bruguiera paviflora	-	-	-
				6	Bruguiera gymnorhiza	+	-	-
				7	Ceriops tagal	+	+	-
				8	Ceriops decandra	-	-	-
				9	Rhizophora apiculata	+	+	+
				10	Rhizophora mucronata	-	-	+
		Sapindales	Meliaceae	11	Xylacarpus granatum	+	-	+
			Euphorbiaceae	12	Excoecaria agallocha	+	+	+
		Myrtales	Combretaceae	13	Lumnitzera littorea	-	-	+
		Gentianales	Apocynaceae	14	Cerbera odollam	-	-	+
		Malvales	Malvaceae	15	Thespesia populnea	-	-	+
				17	Tilipariti tiliaceum	-	+	-
		Fabales	Fabaceae	16	Pongmia pinnata	+	-	-
### Oyster Culture and Pearl Production Project, Myanmar Economic Corporation

19	<i>ו</i> ק הר	Derris trifoliate Delbergia candenatensis	-	+	-
Tot	tal	Debergia cumentatensis	7	9	11









Aegiceras corniculatum

Avicennia

Ceriops tagal



Ceriops decandra

- Bruguiera
- paviflora

alba



Bruguiera gymnorhiza



Rhizophora apiculata



Rhizophora mucronata



Lumnitzera littorea



Avicennia marina



Sonneratia alba



Xylacarpus granatum





Cerbera odollam

Excoecaria agallocha



Tilipariti tiliaceum



Caesalpinia crista



Delbergia candenatensis



Thespesia populnea





Pongmia pinnata

Figure 4-40 Mangroves of present study area



# 4.4.1.1.5 Fish

Table 4.26Species composition and occurrence fish

Phylum	Class	Order	Family	Sr.no.	Genus & Species	Common name	Local name	IUCN Red List Status
	•	Mugiliformes	Mugilidae	1	Moolgarda cunnesius	Longarm mullet	Ka-ba-luu	NE
				2	Mugil cephalus	Flathead grey mullet	Ka-ba-lu	LC
		Perciformes	Ambasidae	3	Ambassis gymnocephalus	Bald glassy	Kyaun-ma-sarr	LC
ata cerygii	Jhortata inopterygii		Sillaginidae	4	Sillago sihama	Silver Sillago	Nga-pa-lway	NE
			Terapontidae	5	Terapon jarbua	Jarbua terapon	Nga-gone-kyar	LC
Chor			Leiognathidae	6	Leiognathus equulus	Commonpony		LC
U	Act	Tetraodontiformes		7	Gazza minuta	Toothpony	Nga-din-gar	LC
			Tetraodontidae	8	Chelonodon patoca	Milkspotted puffer	Nga-pu-tinn	NE
			Carangidae	9	Alepes djedaba	Shrimp scad	Pann-zinn	NE
			Scombridae	10	Rastrelliger kanagurta	Indian mackerel	Palar-tue	DD

NE=Not Evaluated, LC= Least Concern, DD=Data deficient

Sr.no.	Interview
1	Epinephelus spp.
2	Siganus spp.
3	Sardinella spp.
4	Stolephorus spp.
5	Polynemeus spp.
6	Priacanthus spp.
7	Pterocaesio spp.
8	Rastrelliger spp.
9	Scolopsis spp.
10	Scomberoides spp.
11	Pomadasys spp.
12	Plotosus spp.
13	Trichiurus sp.
14	Nemipterus spp.
15	Megalapsis spp.
16	Lutjanus spp.
17	Gnathodentex spp.
18	Eleuthronema sp.
19	Dussumieria spp.
20	Carangoides spp.
21	Priacanthus spp.

Table 4.27List of fishes from interview data.





Moolgarda cunnesius (Valenciennes, 1836)

Mugil cephalus (Valenciennes, 1836)



Ambassis gymnocephalus (Lacepede, 1820)

Sillago sihama (Forsskal, 1775)



### Plate II



Alepes djedaba (Forsskal, 1775)

Rastrelliger kanagurta (Cuvier, 1816)



Chelonodon patoca (Hamilton, 1822)

Alectis ciliaris (Bloch, 1787)



#### Plate III





*Terapon jarbua* (Forsskal, 1775)

Leiognathus equulus (Forsskal, 1775)



Gazza minuta (Bloch, 1795)

# Phytoplankton

A total of 58 species of phytoplankton were recorded throughout the study period. Among them, 16 species were dinoflagellates and other are diatoms (*Table 4.20, Table 4.21*). The photograph of phytoplankton was shown in *Figure 4-29* to *Figure 4-32*. The species composition of phytoplankton was not too varied because all the three stations are closely related to each other (same water body). However, the concentration of cell densities was fluctuated in spatially.

The Genus-wise cell density of *Thalassionema* (4574 Cell L<sup>-1</sup>) and Cosconodiscus (3525 Cell L<sup>-1</sup>) were the highest at station 1. At station 2, the Genus-wise cell density was highest with *Coscinodiscus* (2280 Cell L<sup>-1</sup>) and follow *Thalassionema* (1440 Cell L<sup>-1</sup>) respectively (Figure 7). At station (3), *Thalassionema* (3124 Cell L<sup>-1</sup>) and Cosconodiscus (1580 Cell L<sup>-1</sup>) were the highest. The estimated number of total cell concentration of present study area was ranging from 3987-10799 Cell L<sup>-1</sup>.

Coscinodiscus and Thalassionema were the dominant species of present study area. Moreover,



the diatoms such as *Odontella*, *Chaetoceros*, *Nitzschia*, *Rhizosolenia* and dinoflagellates *Ceratium* were also frequently observed after the Coscinodiscus and *Thalassionema*.

#### Zooplankton

There are 37 species of zooplankton were recorded in this survey (*Table 4.22*). Species occurrence was shows in *Table 4.23*. At station 1, the cell density of *Acartia* (563 Cell L<sup>-1</sup>), *Paracalanus* (525 Cell L<sup>-1</sup>) and *Euterpina* (413 Cell L<sup>-1</sup>) shown the high number of cell densities. Likewise, the number of cell concentrations were high in *Acartia* (900 Cell L<sup>-1</sup>), *Paracalanus* (840 Cell L<sup>-1</sup>) and Nauplius of *Cirripedia* (660 Cell L<sup>-1</sup>) at station 2. At station (3), the cell density of *Acartia* (600 Cell L<sup>-1</sup>), *Paracalanus* (340 Cell L<sup>-1</sup>) and Oncea (201 Cell L<sup>-1</sup>) shown the high number of cell densities. Between three stations, the total cell density of zooplankton was higher at station 2 (4260 Cell L<sup>-1</sup>), followed by station 1 (2842 Cell L<sup>-1</sup>) and Station (3). Generally, zooplankton diversity did not harm to marine ecosystem. On the other hand, they play an important role and provide as a basic food for marine ecosystem.

#### Benthos

Five species of benthic invertebrates were found thriving in three sampling spots of the surveyed area; *Glycera* sp., *Cerithidea cingulate*, *Nerita* sp., *Donax scortum* and *Septifer bilocularis* (*Figure 4-39, Table 4.24*). Macroinvertebrates have traditionally been recognized as one of the most difficult biological groups for use in ecological assessment due to several reasons, such as their complex biotic structure, relatively high temporal variability and the high spatial heterogeneity (Brose et al., 2004; Solimini and Sandin, 2012; White and Irvine, 2003).

#### Mangroves

A total of 20 species of Mangroves were recorded in the present study. Among three station, station 2 and 3 have the highest species diversity, there are 9 species of mangrove observed in station 2 and 11 species occurred in station 3. The number of mangroves species were rich, although, the impact due to proposed project and adjacent areas are very little concern because the forest types are too small in each survey site.

#### Fishes

There are 10 species of commercially important fishes viz., *Moolgarda cunnesius, Mugil cephalus, Sillago sihama, Terapon jarbua, Alepes djedaba, Rastrelliger kanagurta,* were recorded from the proposed area and adjacent water. Moreover, 21 species of fishes were also recorded by interview survey (*Table 4.27*). Besides, a total of 11 species of fresh specimens were also observed (*Table 4.26*). However, most of the local people did not used proposed project area as a major fishing ground, except a few fishermen catch the fishes by long line fishing.



# 4.5 SOCIO-ECONOMIC CONDITIONS

# 4.5.1 **Population data**

The demographic structure of study area including number of households, population, number of literates and illiterates, status of birth rate, mortality rate and migrate rate are shown in the following tables.

No Description		Over 18 years old		Under 18 years old		Total				
	•	Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Urban	25136	24723	49859	8826	8818	17644	33962	33541	67503
2	Rural	21346	20026	41372	9753	9814	19567	31099	29840	60939
	Total	46482	44749	91231	18759	18632	37211	65061	63381	128442

Table 4.28Population Data (2019)

Table 4.29Number of Houses and Household Status (2019)

No	Description	House	Household	Quarter	Village Tract	Village
1	Urban	12520	14280	13	-	-
2	Rural	12427	12427	-	18	91
	Total	24947	26707	13	18	91

Table 4.30Rate of Population and Ratio of Male and Female

Township	Previous Year	Current Year	Increased	Increase	Ratio of Male and Fema		Female
	Population	Population	population	rate	Male	Female	Ratio
Kawthaung	99512	116797	17285	0.85	58881	57916	1:0.98
Kamoutkyi	10728	11645	917	0.92	6180	5465	1:0.88
Total	100240	128442	18042	0.85	65061	63381	1:0.97

Table 4.31Number of Population of Birth Rate, Mortality and Migration

Township	Initial Population	Birth rate Population	Mortality rate	Migration (In)	Migration (Out)	Current Population
Kawthaung	108431	124	47	10054	1765	116797
Kamoutkyi	10765	-	-	1307	427	11645



Total	119196	124	47	11361	2192	128442

No.	Race	Population	Township population	Percentage of township Population
1	Kachin	28	128442	0.021
2	Kayar	8	128442	0.006
3	Kayin	1246	128442	0.97
4	Chin	62	128442	0.048
5	Mon	5063	128442	3.94
6	Bamar	103176	128442	80.33
7	Rakhine	1073	128442	0.84
8	Shan	412	128442	0.32
9	Salon	995	128442	0.77
10	Other	12787	128442	9.96
	Total	236042	128442	97.20

 Table 4.32
 Percentage of different Races in Kawthaung Township

# 4.5.2 Economic and livelihood

Kawthaung Township is located in Myeik District, Thanintharyi Region and is an ecolomically developed township. The local people are mainly working in fisheries, plantation, agricultural and also working services. Moreover, Kawthaung Township has good transportation and main products are rubbers, shrimp, crab, betel nut and Thiho seeds and these are mainly exported to Myeik, Dawei and Yangon.

Table 4.33Occupational Status

Township	Workable Person	Employed person	Unemployed person	Percent of employed person	Percent of unemployed person
Kawthaung	98733	65804	2513	97.2%	2.80%
Kamoutkyi	6081	3565	2516	58.63%	41.37%
Total	95814	69369	5029	94.75%	5.25%



No.	Type of Employment	Number of employments
1.	Government Officials	1833
2.	Services Job	1578
3.	Agriculture	1010
4.	Livestock	54
5.	Trading	1010
6.	Small scale Industrial	544
7.	Fisheries	996
8.	Casual job	5432
9.	Other	3493
	Total	17150

Table 4.34Livelihood and Employment Status

# 4.5.3 Land Use

The land use of Kawthaung township is as follow:

Table	4.35	Land	Use

No.	Types of Land	Area (acre)				
1.	Net acre for plantation	151892				
	Farmland	460				
	Yar	-				
	Cultivated land	-				
	Orchid land	150214				
	Nipa palm plantation	1218				
2.	Fellow Land Area	-				
	Farmland	-				
	Yar	-				
	Cultivated land	-				
	Orchid land	-				



	Nipa palm plantation	-				
3.	Grazing Land	765				
4.	Industrial land	49				
5.	Urban Land	721				
6.	Village Land	1202				
7.	Other Land	99475				
8.	Reserved forest and protected forest area	89092				
9.	Wild forest	2230				
10.	Wild land	43				
11.	11.Area not to be cultivated150013					
	Total	647374				

# 4.5.4 Health Status

In Kawthaung township, there are one 100-beded public hospital, four District hospitals that have 16-beded in each hospital. In addition, there are 26 sub rural health centre.

# 4.5.5 Education Sector

Education sector for Kawthaung township, there is no university and institute but there are 9 high schools, 5 sub-high schools, 3 middle schools, 18 sub-middle schools, 25 post-primary schools, 39 primary schools, 4 pre-schools and 6 monastery-based schools.

# 4.5.6 Cultural Heritage

There are no cultural heritage buildings around the project site area.

# 4.5.7 Transportation and Communication

Kawthaung township can be accessed by airways and roadways but not accessible for waterways and railways.



# Chapter 5 POTENTIAL IMPACTS AND MITIGATION MEASURES

# 5.1 **INTRODUCTION**

In this Environmental Impact Assessment (EIA) report employs an appropriate approach and methodology to evaluate the significance of potential impacts associated with the proposed project. It includes the consideration, preliminary identification, and assessment of likely environmental and social impacts. The assessment is categorized into three key areas: physical environment, biological environment, and socio-economic environment. During the impact assessment stage, potential interactions are refined based on additional project details and baseline information. From these interactions, potential impacts on various resources and receptors are identified and analyzed in detail. A diverse range of prediction methods, including quantitative, semi-quantitative, and qualitative techniques, is utilized to ensure a comprehensive assessment.

# 5.2 **METHODOLOGY FOR THE ASSESSMENT AND IMPACT IDENTIFICATION**

The assessment of each impact is based on consideration of sensitivity of receptors, magnitude of impact, significance of impacts, development phases, impact types which are going to be carried out during phases and characteristics of the project site.

The following methodology has been applied to assess the environmental impacts of the project mainly on air, water, land, biodiversity including human beings. Each source of impact has been assessed by five parameters, sensitivity of receptors, magnitude of impact, significance of impacts, development phases, impact types and each assess have five scales as mentioned below:

More detail impacts of environmental and social impacts will be explained in the EIA study report. Baseline Environmental survey such as air quality, water quality, noise and vibration and waste will be continued at the EIA stage after approving the EIA report from Environmental Conservation Department.

# 5.2.1 Sensitivity of Receptors

The sensitivity of baseline conditions within each topic has been determined according to the relative importance of existing environmental features on or near to the project area, or by the sensitivity of receptors which would potentially be affected by the development.



Sensitivity	Definition
Very high	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of national importance.
Low	The receptor is tolerant of change without detriment to its character, is of low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

Table 5.1Sensitivity Criteria

# 5.2.2 Magnitude Of Impact

The magnitude of potential impacts on environmental baseline conditions has been defined by considering the scale or degree of change the proposed development will have on the existing baseline, the duration and reversibility of the impact and has taken into account relevant legislative or policy standards or guidelines.

Magnitude	Definition
High	Total loss or major alternation to key elements /features of the baseline conditions such that post development character/composition of baseline condition will be fundamentally changed.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Low	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material in that the underlying character /composition of the baseline condition will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a "no change" situation

Table 5.2Definition of Magnitude

# 5.2.3 Significance of Impacts

The approach to the assessment of significance has taken into account the sensitivity of the receiving environment and the magnitude of change. **Table 5.3** below provides an indication



of how significance has been determined, although it should be noted that this is meant to be a general approach and has not been treated as a strict matrix.

Magnitude		Sensitivity												
	Very High	High	Medium	Low	Negligible									
High	Major	Major	Moderate	Moderate	Minor									
Medium	Major	Moderate	Moderate	Minor	Negligible									
Low	Moderate	Moderate	Minor	Negligible	Negligible									
Negligible	Minor	Minor	Negligible	Negligible	Negligible									

Table 5.3Impact Assessment

The significance of the potential impacts arising from the proposed development can therefore be reported using a four-point scale, as follows:

- Major Adverse
- Moderate Adverse
- Minor Adverse
- Negligible

Potential impacts predicted to be Minor or Negligible are considered to be 'Not Significant'.

Potential impacts assessed as being Moderate or Major are considered to be 'Significant'.

It should be noted that at this stage the assessment takes into account mitigation and therefore "residual" impacts have been determined, which can be defined as any impact that would remain following the implementation of proposed mitigation measures.

# 5.2.4 Development Phases

Potential impacts have been separated into two main types based on different phases of development, i.e., construction impacts and operational (or permanent) impacts.

**Construction impacts** are temporary, short-term impacts that occur during the construction phase only. This will include impacts resulting from the construction of the infrastructure of pearl culture development as well as any impacts resulting from other temporary works such as access tracks, working areas and compounds.

**Operational impacts** are those long-term impacts that will occur as a result of the development, such as the pearl culture operation and related infrastructure (e.g., vehicle movement, resource utilization, disturbance the natural habitats of the biodiversity).

**Decommissioning impacts** are temporary, short-term impacts that related to the activities of the usage of demolishing equipment. Where needed, any existing hazardous materials used in



decommissioning of these would be properly handled and disposed of in accordance with governing authority requirements.

# 5.2.5 Impact Types

In addition to the direct impacts of the development associated with construction works and operation of the development, other types of impact may arise. These are discussed below.

**Positive or Negative:** Positive impacts merit just as much consideration as negative ones, as international, national and local policies increasingly press for projects to deliver positive biodiversity outcomes.

**Duration:** The time for which the impact is expected to last prior to recovery or replacement of the resource or feature. The duration of an activity may differ from the duration of the resulting impact caused by the activity. For example, if short-term construction activities cause disturbance to birds during their breeding period, there may be longer-term implications due to a failure to reproduce in the disturbed area during that season.

**Reversibility:** For the purposes of this guidance, an irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible (temporary) impact is one from which spontaneous recovery is possible or for which effective mitigation is both possible and an enforceable commitment has been made.

**Cumulative Impacts** and **In-combination impacts**: on specific resources or receptors are described, where relevant, in each of the specialist sections of this report.



v v v			Ŷ	Impact Types												
	Likely Impa environme and its sensitivit		Duration		Positive		Negative		ole	ve	sensitivity	of impact	sessment	Potential	Residual	
Environmental Impacts		Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant	Irreversit	Irreversi Cumulati	Receptors'	Magnitude	Impact A	Reference	Impact
Construction Phase Impact						1										
Loss of land use option	+	+	0	Ø				V		V		Medium	Medium	Moderate	NA	NA
Loss of terrestrial habitat and biodiversity	++	+	0		V			V				High	High	Major	5.3.1.1	Moderate
Soil erosion	++	+	0		V			V				Medium	Medium	Moderate	5.3.1.2	Minor
Ambient Air quality	+	0	0		V			V				Medium	Medium	Moderate	5.3.1.3	Minor
Noise	++	+	0		V			V				High	Medium	Moderate	5.3.1.4	Minor
Transportation and anchoring	+	+	0		V				V			Medium	Low	Minor	5.3.1.5	Negligible
Material Storage	+	+	0		V				V			Medium	Medium	Moderate	5.3.1.6	Minor
Construction waste disposal	++	++	0		V			V			V	Medium	High	Moderate	5.3.1.7	Minor
Sewage	++	+	0		V			V			V	Medium	High	Moderate	5.3.1.8	Minor
Solid waste disposal	++	+	0		V			V			V	High	Medium	Moderate	5.3.1.9	Minor

Table 5.4Potential Impacts, Project Activities and Impact Significance of the Proposed Project



		acted ent ty					Impac	ct Type	es							
		Likely Impa environme and its sensitivit		Duration		Positive		Negative		ble	ve	sensitivity	of impact	ssessment	Potential Mitigation	Residual
	Land	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant	Irreversi	Cumulat	Receptors'	Magnitude	Impact A	Reference	Impact
Replanting and landscaping	++	+	+	V		Ø		V				Medium	Medium	Moderate	5.3.1.10	Minor
Employment	0	0	++		V	V						NA	NA	NA	NA	
Occupational Health and Safety								V				Medium	Medium	Moderate	5.3.1.11	Minor
					(	Operat	tion P	hase I	mpact	ţ		1	1	1		
Resource consumption	+	+	0	V				V		V		Medium	Medium	Moderate	5.3.2.1	Minor
Sewage treatment and disposal	++	++	+	V				V			V	Medium	Medium	Moderate	5.3.2.2	Minor
Solid waste disposal	++	++	+	Z				V			V	Medium	Medium	Moderate	5.3.2.3	Minor
Water circulation from hatchery/nursery pond to aquatic environment	0	+	0		Ø			V				Medium	Low	Minor	5.3.2.4	Negligible
Cleanse the biofouling and boring organisms from pearl oysters	0	+	0		V			V				Medium	Low	Minor	5.3.2.5	Negligible
Disease intrusion to the aquatic environment	0	+	0		V			V				Medium	Low	Minor	5.3.2.6	Negligible
Introduction of Alien, selectively or genetically engineered species	0	+	0	V				V				Medium	Low	Minor	5.3.2.7	Negligible

ncted ent			Ŋ				Impac	t Type	es							
Environmental Imposts	Likely Impa environme and its sensitivit			Duration		Positive		Negative		ble	ive	sensitivity	of impact	ssessment	Potential Mitigation	Residual
	Land	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant	Irreversi	Cumulati	Receptors'	Magnitude	Impact A	Reference	Impact
Anchoring	0	+	0		V			Ø				Medium	Low	Minor	5.3.2.8	Negligible
Oil spills	+	++	0		V			V				Medium	Medium	Moderate	5.3.2.9	Minor
Transportation	+	+	+		V				V			Medium	Low	Minor	5.3.2.10	Negligible
Natural Hazard Vulnerability	++	++	+		V			Ø				High	High	Major	5.5	Moderate
Employment	0	0	++	Z		V						NA	NA	NA	NA	NA
								V				Medium	Medium	Moderate	5.3.2.11	Minor
					Deco	ommis	sionin	g Pha	se Imj	pact						·
Ambient Air quality	++	0	0		V			V				Medium	Medium	Moderate	5.3.1.3	Minor
Noise	++	0	0		V			V				High	Medium	Moderate	5.3.1.4	Minor
Transportation and anchoring	+	+	+		V				Ŋ			Medium	Medium	Moderate	5.3.1.5	Minor
Material Storage	+	+	0		V				Ŋ			Medium	Medium	Moderate	5.3.1.6	Minor
Construction waste disposal	++	++	+		V			V			V	Medium	High	Moderate	5.3.1.7	Minor

\*Note: Likely impacted environment and its sensitivity: ++ = High, + = Medium, O = Low

# 5.3 **POTENTIAL SIGNIFICANT IMPACTS AND POTENTIAL MITIGATION MEASURES**

# 5.3.1 Potential Significant Impacts on Construction Phase

The project construction stage can produce a considerable amount of potential environmental related issues, but most of the impacts on the local community will be transient since the impacts will be occurred only during construction or decommission phase.

Majority of the impacts created in construction phase will be transient in nature. However, proper planning on construction site, waste disposal, and health and safety procedures should be effectively managed.

The construction activities would consist of installation of necessary machinery, small building construction, and alternative activities of M & E processes. In Table 5-4, it shows the evaluation and prediction of potential environmental impacts' significance during construction phase and decommission phase.

# 5.3.1.1 Loss of Land Use Options

### Impact Assessment

The construction of the infrastructure of pearl culture development will involve the erection of permanent concrete structures on what is essentially a green field site. This will result in a loss of the options for alternative land use and thus represents an irreversible commitment of land resources.

# 5.3.1.2 Loss of Terrestrial Habitats and Biodiversity

# Impact Assessment

The site preparation such as clearing and removal of trees and vegetation during entrance road construction and other infrastructure development will result in the loss of a significant part of the existing forest and, as a consequence, a reduction of habitat for terrestrial organisms, such as birds, reptiles and so on. Thus, can be regarded as major impact to the land resources.

#### Mitigation Measures

- Impact mitigation here seeks to retain and restore as much of the original and natural forested condition of the site.
- Site clearance should be performed with intensive search and identify the endemic species and biological valuable species.
- > Collect and maintain these plants for the replanting and landscaping purpose.
- > These activities should be guided by an appropriate and approved management plan.
- > Site clearance should be carried out in a manner that retains the large trees.
- Landscaping should also use native flowering plants to provide habitat and host plants for butterflies.



All construction contractors should be aware to the environmental management plan and sensitized to the environmental issues.

#### 5.3.1.3 Soil Erosion

#### Impact Assessment

Vegetation clearance, road construction and excavation work related to construction of the buildings will expose soils in the affected areas leaving them vulnerable to erosion by surface run-off and ultimately threaten adjacent coastal waters with high turbidity and sediment deposition. The flat topography of the site would tend to reduce erosive surface flows and the threat of turbidity should exist only for the duration of construction works before landscaping and drainage works are put in place that would reduce the susceptibility to soil erosion. It can be regarded as moderate impact to the environment.

#### Mitigation Measures

- To the greatest extent possible, phase site clearance so as to minimize the area of exposed soil at any given time.
- > Re-cover exposed soils with grass and other appropriate species as soon as possible.
- Temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial surface runoff to adjacent marine waters.
- Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project
- OB waste dumps will be reclaimed/by planting with trees to bind the loose soil and to prevent soil erosion.

# 5.3.1.4 Ambient Air Quality

#### Impact Assessment

It can be anticipated that a certain amount of air borne particulate matter (dust) will be generated by earth moving activities during road and building construction. This situation will be worst during the dry season. In addition, the dusty construction activities (soil excavation work, movement of vehicles, blasting of rocks, drilling for installation piping of mechanical, electrical, etc.) can cause emission of fugitive dust to the ambient air during construction stage. Moreover, the diesel generator for emergency use can emit air pollutants (NO2, SO2, CO2, etc.) to the surrounding environment. The pollutant released during the construction activities may cause immediate effect on the construction workers, directly exposed to them. Temporary increase in air pollution will result from the use of construction equipment, portable lights, and fugitive dust. Also, the movement of construction vehicles during earthworks and the transportation of construction material to and from the project site will lead to generation of dust. Dust is anticipated to be generated most significantly during the dry seasons from November to March. Diesel generator, truck and heavy machines will be emitted to the generation of gases such as (CO2, CO and SO2). The occurrence of dusting is periodic and short-term, lasting for the duration of the construction activity. It can be regarded as moderate impact to the environment.



#### Mitigation Measures

- Exposed ground should be regularly wetted in a manner that effectively keeps down the dust.
- Stockpiles of fine materials should be wetted or covered up during windy conditions.
- ➢ Workers on the site should be issued with dust masks during dry and windy conditions.
- The working area for the uprooting of shrubs or vegetation or the removal of boulders or temporary or permanent structures shall be sprayed with water immediately before, during, and immediately after the operation to maintain the entire surface wet.
- All machinery to be used for construction purposes will be of the high standard and properly maintained.
- > Acoustic laggings and silencers will be used in equipment wherever possible.
- All loose material either stocked or transported will be provided with suitable covering such as tarpaulin, etc.
- ➤ Water sprinkling will be done at the location where the dust generation is anticipated.
- Over Burden (OB) waste dumps will be sprayed with water as they are major sources of airborne particulate matter/dust.

### 5.3.1.5 Noise and Vibration

#### Impact Assessment

The use of heavy equipment during site clearance and road construction works will inevitably generate noise, which may create a nuisance to biodiversity of the island. Continuous Exposure of high sound levels to workers and nearest residents may result in annoyance, fatigue. Although annoying, this negative impact will be short-term (limited to the duration of the construction works). Moreover, it is not considered to be a significant threat to the health or well-being of humans, if the construction works take place on breeding season of islands' biodiversity, it could be significantly affected on them. It can be regarded as moderate impact to the environment.

#### Mitigation Measures

- Construction activities that will generate disturbing sounds should be restricted to normal working hours.
- Workers operating equipment that generates noise should be equipped with noise protection gear.
- Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs.
- Construction and decommissioning should avoid breeding season of both terrestrial and marine biodiversity.
- On the other hand, should install sound barrier system to avoid the disturbance of the biotas.



### 5.3.1.6 Transportation and Anchoring

#### Impact Assessment

The various materials required for construction and building (e.g., steel, blocks, lumber, heavy machinery, etc.) will be obtained from sources elsewhere and transported to the site by using boat and sea route. Transportation of these materials, usually results in traffic. In the case of accidents, typically oil spillages occur in the marine water between source and site, oil spills can damage the water quality and biodiversity of the marine environment. Anchoring the boat near or at the marine biodiversity, especially coral reefs and benthic organisms may damage its habitat and ecology. These occurrences represent indirect, short-term, reversible, negative impacts on marine environment and safety. It can be regarded as minor impact to the environment.

#### Mitigation Measures

- All fine earth materials must be enclosed during transportation to the site to prevent spillage and dusting.
- To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.
- The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers.
- Appropriate traffic warning signs, informing road users of a construction site entrance ahead and instructing them to reduce speed.
- Flagmen should be assigned to control and assists to construction vehicles as they attempt to enter and exit the project site.
- Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment.

# 5.3.1.7 Material Storage

#### Impact Assessment

The improper siting of stockpiles and storage of sand, gravel, cement, etc., at the construction sites could lead to fine materials being washed away, during heavy rainfall events, into the drainage system and ultimately into the adjacent marine environment. This would not only represent a waste of materials but would also contribute to turbidity and sedimentation with consequent negative impacts on inshore marine water quality and possibly the ecology of the shallow marine environments, including corals.

Hazardous and flammable materials (e.g., paints, thinner, solvents, etc.) improperly stored and handled on the site are potential health hazards for construction workers and spilled chemicals would have the potential to contaminate soil and inhibit plant growth in localized areas. It is anticipated that refueling or maintenance of large vehicles will take place on the construction site and therefore there will be a requirement to store fuel and lubricants in a safe manner on the site. It can be regarded as moderate impact to the environment.



### Mitigation Measures

- The stockpiling of construction materials should be properly controlled and managed. fine grained materials (sand, cement, etc.) should be stockpiled away from surface drainage channels and features.
- Low berms should be placed around the piles and/or tarpaulin used to cover open piles of stored materials to prevent them from being washed away during rainfall.
- > Safe storage areas should be identified and retaining structures put in place prior to the
- ➤ arrival and placement of material.
- Hazardous chemicals (e.g., fuels) should be properly stored in appropriate containers and these should be safely locked away. Conspicuous warning signs (e.g. 'No Smoking') should also be posted around hazardous waste storage and handling facilities.

# 5.3.1.8 Construction Waste Disposal

#### Impact Assessment

Solid waste generated during site preparation and construction work would include cut vegetation and typical construction waste (e.g., wasted concrete, steel, wooden scaffolding and forms, bags, waste earth materials, etc.). This waste would negatively impact the site and surrounding environment if not properly managed and disposed of at an approved dumpsite. Cleared vegetation burned onsite would generate smoke, possibly impacting negatively on ambient air quality and human health. Pooling of water, in turn, would create conditions conducive to the breeding of nuisance and health-threatening pests such as mosquitoes. Poor construction waste management constitutes a short-term, possibly long-term, negative impact. It can be regarded as moderate impact to the environment.

#### Mitigation Measures

- A site waste management plan should be prepared by the contractor prior to commencement of buildings. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.
- Preparation and implementation of the plan must be made the responsibility of the building contractor with the system being monitored independently.
- Special attention should be given to minimizing and reducing the quantities of solid waste produced during site preparation and construction.
- To reduce organic waste, softer vegetation may be composted onsite and used for soil amendment during landscaping.
- Vegetation and combustible waste must not be burned on the site.
- Reusable inorganic waste (e.g. excavated sand) should be stockpiled away from drainage features and used for in filling where necessary.
- Unusable construction waste, such as damaged pipes, formwork and other construction material, must be disposed of at an approved dumpsite.



Hazardous waste disposal in or off the construction site will be prohibited. Hazardous waste management systems include waste classification, separation, collection, storage, transfer and disposal in compliance with applicable regulations of the government, if any. Hazardous wastes should be disposed of at a designated site inside or outside the project area as appropriate. The method of disposal needs to follow the best international practices.

#### 5.3.1.9 Sewage

#### Impact Assessment

Inadequate provision of toilets for use by workers can lead to improper and unhealthy condition, thus creating of unsanitary conditions and sources of fly infestation. It can be regarded as moderate impact to the environment.

#### Mitigation Measures

Proper solid waste receptacles and septic tanks should be provided in sufficient numbers.

#### 5.3.1.10 Solid Waste Disposal

#### Impact Assessment

Improper disposal of food cartons and other domestic forms of construction camp garbage could lead to littering of the site and pollution of adjacent coastal waters. It can be regarded as moderate impact to the environment.

#### Mitigation Measures

- > Arrangements should be made for the regular collection of litter and for its disposal.
- > Sort the type of waste, practice reuse, recycle system
- > Apply pits that covered with concrete or linen to avoid the ground water contamination.

#### 5.3.1.11 Replanting And Landscaping

#### Impact Assessment

Landscaping and replanting of trees will be carried out to enhance the ecology and appearance of the site. No details of landscaping plans or planting material are available at this stage but the plant species selected for replanting will in large part determine which types of birds, butterflies, and other fauna, if any, inhabit the site (gardens) after construction. In addition to enhancing the aesthetic appeal of the project site, landscaping provides the means for partially restoring the site's natural elements and ecological habitats. It is therefore a significant mitigation activity with a positive impact. It can be regarded as moderate impact to the environment.

#### Mitigation Measures

> Install Greenbelt plantation procedure.



- The landscaping plan should seek to avoid the use of non-native and potentially invasive species. It should include low-maintenance local species and the types of trees and shrubs used for feeding by local bird species.
- The landscape design should seek to encourage bird life, especially for the endemics, maximize shade and windbreak effect, as well as to hide the roofline of the buildings.

### 5.3.1.12 Employment

The proposed development will potentially offer employment or contractor for during construction period. This will represent a positive short-term impact.

### 5.3.1.13 Occupational Health and Safety

#### Impact Assessment

During the construction phase, the construction activities will be involved handling heavy equipment such as boats, cranes and piling machines that prone to occurrence of accidents and injuries. The nature of work can get the workers injured and unsafe and it is expected that workers are likely to have accidental injuries and hazards due to human and workplace interactions. Because of the intensive engineering and construction activities, metal grinding and cutting, concrete work and welding among others, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. Noise and emission from the construction machineries can also cause pollution for the workers.

#### Mitigation Measures

- $\checkmark$  Provision of safety gadgets to the workers
- ✓ Raising awareness of safety guidelines to the workers
- $\checkmark$  Assignment of safety supervisors at the work site
- $\checkmark$  Incentives to workers who obey the safety practices
- $\checkmark$  Penalty to workers who disobey the safety practices
- ✓ Arrangement of morning talks and toolbox meeting
- $\checkmark$  Preparation of health and safety matrix
- ✓ Install proper lifting techniques and use of mechanical aids
- ✓ Provide Life jackets and train buddy system, provide emergency response training
- ✓ Provide Hearing protection (earplugs), limit exposure time
- ✓ To reduce chemical exposure (paints, preservatives), provide proper ventilation and PPE (gloves, masks)

#### 5.3.2 Potential Significant Impacts on Operation Phase

#### 5.3.2.1 Employment

According to the proposed development, approximately 46 employments will offer. It could be identified as long-term and positive impact.



#### 5.3.2.2 Resource Consumption

#### Impact Assessment

#### Water Consumption

Oyster culture and pearl production have relatively low external inputs, making them more sustainable compared to land-based or fed aquaculture systems like fish farming. Oysters and pearl-producing mollusks filter the water, potentially improving water quality and reducing pollution. Longline oyster culture and pearl production generally involve minimal direct water consumption in terms of freshwater or other external sources. These aquaculture practices rely predominantly on natural seawater ecosystems. As in indirect water consumption relied on the cleaning of cages per 2 months and staff and dormitory consumption. The fresh water will available for nearest creeks. The estimated domestic water usage for 46 staff members was 1,175,300 liters per year. It can be regarded as moderate impacts.

#### Mitigation Measures

- ▶ In general, the fresh water consumption of pearl farm is low.
- Provide adequate water storage facilities to ensure adequate supplies for the development.
- Collect the rain water for domestic and operational uses and increase rainwater collection capacity by installing large storage tanks and filtration system for domestic and operational use.
- Implement a water recycling system for cage cleaning to reduce overall freshwater demand.
- Conduct regular monitoring of water usage to identify and fix leaks promptly.
- Wastewater should be carefully managed and treated to ensure it does not contain harmful chemicals or pollutants before it is released back into the environment.

#### **Energy Consumption**

Energy consumption primarily comes from the use of motorboats to monitor, maintain, and harvest the oyster lines. Own generators are used for the electricity supply of the project. There is one generator for required electricity. The estimated daily electricity requirement was 108 kWh per day and diesel required for electricity generation is 31 liters per day. The total diesel requirement for diesel generators and boat were 56 liters per day. It can be regarded as moderate impacts.

#### Mitigation Measures

- > Install environmentally friendly lighting system.
- Reduce losses in energy distribution.
- Install solar panels to supplement electricity needs and reduce reliance on diesel generators.



# 5.3.2.3 Sewage Treatment and Disposal

#### Impact Assessment

The improper disposal of sewage can cause, visual disturbance, odor, bad hygiene, ground water pollution and water quality degradation on coastal area. Inadequate provision of toilets for use by workers can lead to improper and unhealthy condition, thus creating of unsanitary conditions and sources of fly infestation. Improper disposal of food cartons and other domestic forms of construction camp garbage could lead to littering of the site and pollution of adjacent coastal waters. It can be regarded as moderate impacts.

#### Mitigation Measures

- Install sufficient number of septic tanks
- > Decompose organic waste and sewage, use as fertilizer in gardening

### 5.3.2.4 Solid Waste Disposal

#### Impact Assessment

Waste generated from oyster farming primarily includes organic waste, plastic debris, discarded shells, and hazardous materials (e.g., fuel residues, cleaning chemicals). The improper solid waste disposal system may affect the significant negative impact on both terrestrial, coastal and marine environments. It may cause the visual disturbance, odor, bad hygiene and during the heavy rainfall, their run off may contaminate the coastal and marine ecosystem. It can be regarded as moderate impacts.

#### Mitigation Measures

- Establish waste separation bins for organic waste, plastics, metals, and hazardous materials.
- > Utilize oyster shells for coastal erosion protection and soil conditioning.
- Composting or Recycling of Oyster Shells
- Use of Dead Oysters in Animal Feed or Fertilizer
- Controlled Removal of Fouling Organisms
- Recycling or Repurposing Plastic Materials
- > Decompose the organic waste and sewage and use as fertilizer in gardening
- > Apply pits that covered with concrete or linen to avoid the ground water contamination.
- Secure ropes, nets and buoys properly to prevent from breaking loose and polluting the adjacent marine waterbody.
- > Conduct regular shoreline clean up around the farm area.

#### 5.3.2.5 Water Circulation from Hatchery/Nursery Pond to Aquatic Environment

#### Impact Assessment

The wastewater discharge from hatchery/nursery pond without water treatment may cause biopollution and contamination to marine and coastal ecosystem. This activity will perform during



the nursery period and water circulation will apply twice a day. Due to the volume and discharges frequency, its severity assessed as minor.

#### Mitigation Measures

- > Install the filtration system to remove organic debris before discharge.
- > Use UV sterilization or ozone treatment to neutralize pathogens.
- Implement biofiltration systems using aquatic plants or bacterial cultures to absorb excess nutrients.
- Reduce water exchange frequency by reusing and filtering existing water in a closed-loop system.
- > Install settlement ponds to allow natural sedimentation before effluent is released.

### 5.3.2.6 Cleanse the Biofouling and Boring Organisms from Pearl Oysters

#### Impact Assessment

Freshwater will be used during the cleansing of biofouling and boring organisms from pearl oyster. This activity will impact on the marine environment such as bio-contamination, aquatic habitat changes. According to the operation process, this activity will perform only one time per two months, therefore, this impact can be recorded as minor.

- Use low-salinity water flushing instead of freshwater immersion to reduce water demand.
- > Adopt biodegradable anti-fouling coatings on oyster cages to slow biofouling growth.
- > Collect and compost biofouling waste to create organic fertilizers.
- Establish designated disposal zones for fouling organisms to prevent reintroduction into natural waters.

# 5.3.2.7 Disease Intrusion to Aquatic Environment

#### Impact Assessment

Aquatic diseases can severely affect pearl oyster survival, reproduction, and productivity. While the impact on broader marine ecosystems is low, unchecked disease outbreaks may result in mass mortality of oyster stock, leading to economic losses and transmission of parasites and pathogens to wild populations. It can be regarded as negligible impacts.

# Mitigation Measures

- Despite of parasite and pathogens create major damage to the Oyster Culture and Pearl Production and productivity but there is no significant impact to aquatic environment.
- > Implement quarantine protocols for newly introduced oysters.
- Conduct routine health screenings using PCR testing and microscopic analysis to detect pathogens early.

# 5.3.2.8 Introduction of Alien, Selectively or Genetically Engineered Species

#### Impact Assessment



As such, introductions can disturb the existing ecological balance, may cause loss of species biodiversity, loss of genetic diversity of the wild populations and reduce fitness of wild population. For the proposed pearl culture development, the selected species is natively culture species, therefore, it can be regarded as negligible impact.

#### 5.3.2.9 Anchoring

### Impact Assessment

The anchoring systems may damage the marine substrate ecosystem such as benthic organisms and coral reefs. According to the proposed pearl culture procedure, depend on the condition of proposed project location, two pearl culture methods will be used. They are long line culture method and raft culture method. The anchor systems will only apply for the raft culture method. Due to the potential number of anchor systems deployed such as 4 foundations will be installed in every 10 lines, this must be a measurable activity. However due to the deployment systems, the nature of sediments anchoring is regarded as having negligible effect. Furthermore, anchoring in some terrain may be a positive effect by providing habitat and protection (FDA) effect. It can be regarded as minor impacts.

### Mitigation Measures

- Even though, there is no mitigation for this activity, due to the potential number of anchor systems deployed this must be an assessable activity.
- Avoid anchoring coral reef areas.

# 5.3.2.10 Transportation and Oil Spills

#### Impact Assessment

It is noted that the main access to proposed project by sea route. In case of oil spills by accidents and anchoring may negatively impact on marine biodiversity and marine benthic organisms. It can be regarded as moderate impacts.

#### Mitigation Measures

- To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.
- > Equip vessels with double bottom fuel tanks to reduce spill risks.
- Implement oil spill contingency plans.

# 5.3.2.11 Occupational Health and Safety

#### Impact Assessment

The operation phase involves the daily management, maintenance, and harvesting activities in the oyster culture and pearl production farm. Due to the workers who need to work in aquatic environment prone to expose physical injuries and accidents such as cuts and puncture wounds from handling sharp oyster shells, drowning from farm maintenance activities, extreme weather conditions and Skin infections, respiratory issues from waterborne diseases and shell fish allergies.



#### Mitigation Measures

- Provision of safety gadgets to the workers.
- > Raising awareness of safety guidelines to the workers.
- > Provide Life jackets for all water-related activities.
- > Rubber gloves and boots to prevent cuts and infections.
- Eye protection for pearl nucleation.
- ➢ Ear protection for noisy machinery.
- > Diving suits and oxygen tanks for underwater work.
- ➢ In addition, Emergency Response Plan for emergency cases such as fire, natural disasters and disease outbreak will be conducted and trained.

# 5.3.3 **Positive or Negative**

# 5.3.3.1 Construction Phase

#### Negative Impacts

- Loss of land use options
- Loss of terrestrial habitat and biodiversity
- Materials stockpiling and storage Coastal contamination
- Land surcharge Drainage modification
- On-site concrete batching plant operation Dust and toxic effluents
- Construction solid waste and disposal
- Dusting air quality degradation
- Sewage and litter Public health and contamination
- Impervious surfacing and paving Increased runoff
- Construction works water demand Supply shortage
- Coastal excavation and construction work Marine habitat loss
- Sourcing rock, beach fill and sand Indirect impacts
- Coastal works material stockpiling Damage, contamination on coastline
- Fuel, chemicals storage and spillage Damage to biodiversity, fire incidents, health problem
- Equipment and vehicle maintenance Soil contamination

#### Positive Impacts

- Employment Socio-economic benefit
- Replanting and landscaping Habitat recreation

# 5.3.3.2 Operation Phase

#### Negative Impacts

- Water demand- Supply shortage
- Energy demand Fossil fuel combustion/emission of greenhouse gases
- Sewage collection and disposal
- Solid waste generation and disposal



- Water discharge Hatchery/nursery pond
- Cleanse the biofouling and boring organisms- Bio-contamination, aquatic habitat change, water quality degradation
- Disease distribution- From oyster farm to aquatic environment
- Anchoring- Destruct the marine substrate

#### Positive Impacts

- Employment and staff training Socio-economic benefit
- Landscape and grounds maintenance
- Increase in the provision of public services with the introduction of municipal and medical services.

### 5.3.3.3 Decommissioning Phase

#### Negative Impacts

- Loss of terrestrial habitat & biodiversity
- Materials stockpiling & storage coastal contamination
- Construction solid waste & disposal
- Dusting air quality degradation
- Sewage & litter public health & contamination
- Fuel & chemicals storage & spillage
- Equipment & vehicle maintenance soil contamination

#### Positive Impacts

• Employment – socio-economic benefit

# 5.3.4 Magnitude

The impact magnitude during the construction periods and decommissioning periods are typically significant but in short term. The earth works, drilling and pilling and construction activities will cause direct impact on terrestrial environment such as vegetation removal and indirectly impacted on marine environment such as soil erosion, water contamination. The decommissioning activities such as excavation will affect on the terrestrial environment.

The impact magnitude during the operation periods is typically in long term, some activities are significant and some are not. In example of water demand, energy demand would be significantly impacted on the both biological and physical environment such as supply water shortage, fossil fuel combustion and greenhouse gas emission. Improper installation and maintenance of waste management will significantly impact in long term period.

Although the wastewater discharge from hatchery and nursery pond can be regarded as nonsignificant impact based on their duration, frequency and volume, without proper filtration system and drainage system it can be regarded as significant impact in long-term.



# 5.3.5 Duration

In this category, there are divided into short term and long-term period. The construction and decommission phase will be impacted as short-term period and the operation phase of the proposed development will be categorized as long-term period.

# 5.3.6 Reversibility

During the construction phase, some impacts such as loss of land use option and loss of terrestrial biodiversity will not be reversible but in other options such as replanting of trees and proper categorization of the valuable biodiversity, avoids the damaging on the biodiversity resources of the island. During the operation phase, some impacts are recognized as irreversible such as fresh water source.

# 5.4 **SOCIAL ENVIRONMENT**

The proposed development is established on Zerdetkyi Island which located at Tanintharyi Region, Tanintharyi District, Tanintharyi Township, Zerdetkyi Kyi Village Tract, latitude 9°57'21.90"N, 98°13'52.08"E. Zardetkyi Village is located at 11 kilometers far from the project site. According to the site visit, proposed project area and its surrounding area were uninhabited and there were no distinct monuments and historical buildings.

# 5.5 NATURAL HAZARD VULNERABILITY

# 5.5.1 Cyclones

Myanmar is the western-most country of Southeast Asia, situated between latitudes 09°32'N and 28°31'N and longitudes 92°10'E and 101°11'E. The country is surrounded by the Bay of Bengal and the Andaman Sea along its 1,491.29 miles (2,400 km) long coast line. Therefore, the country is potentially threatened by waves, cyclones and other associated hazards.

Myanmar coastline can be divided into three parts. The Rakhine coastal area borders the Bay of Bengal to the west, the Tanintharyi coastal area to the south borders the Andaman Sea (a part of the Bay of Bengal), and the Central Delta region lies in between. The Tanintharyi Coastal area is the longest coastal zone of Myanmar and is bounded by Andaman Sea in the west. The length of the mainland coast is about 745.65 miles (1,200 km) and the total land area is about 43,344 square km.

Annually there are about ten tropical storms in the Bay of Bengal from April to December. Severe cyclones occur during the pre-monsoon period of April-May and post monsoon period of October-December.

Among the cyclones that made landfall in Myanmar coast during the period 1887 to 2005, 30% of the storms are in May, 19% in April and18% in the months of October and November. The Department of Meteorology and Hydrology (DMH) assumes the month of May as the highest possible period for cyclones to take landfall on Myanmar coast.



Rakhine Region, Ayeyarwady Region, Yangon Region, Mon State and Tanintharyi Region are considered as vulnerable areas to cyclones. According to the 1947-2008 data of cyclone landfall on Myanmar coast, the highest probability is at Sitiwe, Kyauk Phyu and followed by Maundaw and decreasing south towards the Ayeyarwady delta. Cyclones generated in the bay have never crossed the southern coast in Mon State and Tanintharyi Division till 2008. However, due to southward shifting of the cyclone track (e.g., The Cyclone Nargis), there is uncertainty that cyclones will not cross the southern coastal zone of Myanmar in the near future.

Date	Place	Title
May 2008	Ayeyarwady/Yangon Delta	Cyclone Nargis
October 2010	Cyclone Giri was one of the strongest cyclones to hit Myanmar, impacting areas like Rakhine State. Though the Tanintharyi Region was not the most affected, southern Myanmar experienced heavy rains and strong winds that led to minor damage.	Cyclone Giri
October 2016	Cyclone Kyant formed over the Bay of Bengal and initially threatened Myanmar. Though it weakened before making landfall, it brought heavy rainfall to the Tanintharyi Region, causing localized flooding and affecting aquaculture and farming activities.	Cyclone Kyant
May 2017	Cyclone Mora made landfall near the Bangladesh-Myanmar border but had considerable effects in Myanmar's Rakhine, Ayeyarwady, and Tanintharyi regions. It caused widespread damage to homes, especially in coastal and low-lying areas, and disrupted infrastructure. The Tanintharyi Region, being located along the coastline, experienced heavy rains, flooding, and landslides.	Cyclone Mora
May 2021	Cyclone Yaas developed in the Bay of Bengal and affected coastal regions of India and Bangladesh. While the storm did not directly hit Myanmar, it caused heavy rains	Cyclone Yaas

Table 5.5Major Cyclone hit Tanintharyi Region (2008-2021)



	and minor flooding in coastal regions like Tanintharyi, contributing to erosion and potential agricultural damage.	
May 2020	Amphan was one of the strongest cyclones to develop in the Bay of Bengal. Although it primarily impacted India and Bangladesh, heavy rains, storm surges, and high winds were also felt along Myanmar's coastline, including Tanintharyi, leading to minor infrastructure damage and disrupting coastal aquaculture.	Cyclone Amphan

According to the literature, while comparing three Myanmar major coastline, Rakhine, Ayeyarwady and Tanintharyi, Tanintharyi region had least major cyclone hit. The location of proposed project is located within the gulf makes it less impacted range of effects of cyclones and storm surges.

# 5.5.2 Tsunami

A tsunami, also known as a seismic sea wave, is a series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean or a large lake. Earthquakes, volcanic eruptions and other underwater explosions (including detonations of underwater nuclear devices), landslides, glacier calving, meteorite impacts and other disturbances above or below water all have the potential to generate a tsunami. Unlike normal ocean waves which are generated by wind or tides which are generated by the gravitational pull of the Moon and Sun, a tsunami is generated by the displacement of water.

The most destructive tsunamis in history are;

Sumatra, Indonesia-	An estimated US\$10b of damages is attributed to the disaster, with around 230,000 people reported dead.					
26 December 2004	alsuster, with abana 200,000 people reported dead.					
North Pacific Coast, Japan-	A powerful tsunami travelling 800km per hour with 10m-					
11 March 2011	high waves swept over the east coast of Japan, killing more than 18,000 people. The World Bank estimates that it could take Japan up to five years to financially overcome the \$235 billion damages.					
Lisbon, Portugal-	The earthquake and ensuing tsunami killed 60,000 in the					
1 November 1755	Portugal, Morocco and Spain.					
Krakatau, Indonesia-	This event killed around 40,000 people in total; however,					
27 August 1883	as many as 2,000 deaths can be attributed directly to the volcanic eruptions, rather than the ensuing tsunami.					


Enshunada Sea, Japan- 20 September 1498	There were reports of homes flooding and being swept away throughout the region, with a total of at least 31,000 people killed.		
Nankaido, Japan-	A total of nearly 30,000 buildings were damaged in the		
28 October 1707	affected regions and about 30,000 people were killed		
Sanriku, Japan-	The tsunami was reported at Shirahama to have reached a		
15 June 1896	height of 38.2 m, causing damage to more than 11,000 homes and killing some 22,000 people.		
Northern Chile-	A total of 25,000 deaths and an estimated US\$300 million		
13 August 1868	in damages were caused by the tsunami and earthquakes combined along the Peru-Chile coast.		
Ryuku Islands, Japan-	The tsunami destroyed a total of 3,137 homes, killing		
24 April 1771	nearly 12,000 people in total.		
Ise Bay, Japan-	It is reported that the nearby Lake Biwa surged over the		
18 January 1586	town, leaving no trace except for the castle. The Ise Bay tsunamis caused more than 8000 deaths and a large amount damage.		

#### 5.5.3 Potential Mitigation Measures

- After the alert, check the consistency of long-line or raft culture, not to break and drift away.
- Should install, routine checkup and maintenance plan for operational mechanism and equipment.
- Cyclone shelters are necessity and for the construction of cyclone shelters, the most appropriate sites should be selected with a detail consideration of the density of population, transportation and communication conditions, distance from areas where the cyclones took landfall in the past and the topography of the area.
- ➤ A proper flood management should be installed. Improve drainage system, raised-platform for flood shelter and elevate shelter on stilts.
- Improve vegetation cover; create coastal shelterbelt plantations such as mangrove shelterbelt plantation.
- Raise embankment or levees.
- Weather station should be established to get proper and on time report about the Tsunamis. (If possible)
- For tsunami warning, connection should be made with the established regional Tsunami station like India, for access to Tsunami Warning System for receiving notifications and warnings.



The proper and timely response plan should be developed and implement in accordance with the plan for employees.

## 5.6 CUMULATIVE IMPACT ASSESSMENT

In reference to the scope for an impact assessment, IFC"s Performance Standards specify that: 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).



Impacts directly and indirectly associated with "MEC" Oyster Culture and Pearl Production Development project are discussed in the previous chapter. This section deals with the cumulative effects of the project and other related impacts concerning the development are described. During the impact assessment, the evaluation of potential cumulative impacts plays an integral part.

Cumulative impacts can be defined as successive and combined impacts of one or more projects upon the society, economy and the environment. Such impacts may occur due to the accumulation and interaction of other developments, being developed within the same area or over a similar time frame of operation to the project being assessed. The majority of the cumulative impacts are associated with the development project and other potential projects in the vicinity of the project area. Impacts related to resources consumption and waste management, are assessed near the project site.

## 5.6.1 Methodology

The cumulative impact assessment has been performed based on the following steps:

• Projects that are either proposed or recently approved but not yet operational and located are identified within the vicinity of the project.



- The spatial boundary of 1 km will be used for the cumulative impacts where existing projects are located away from each other cumulative impacts are likely less significant.
- The temporal boundary (time frame) to be used for the initiation of the project is defined where the operation schedule for the project is not overlapping, and the potential cumulative impacts are likely to be less significant.
- The significance of the cumulative impacts upon the environment is identified on the basis of the significant criteria defined.

## 5.6.2 Assessment Metrix

The assessment matrix that has been used for the cumulative impact assessment of the project is presented in following table.

Table 5.6Assessment Matrix

Asport	<b>Relevance Factors</b>				
Aspect	Low	Medium	High		
Probability of cumulative impact	1	2	3		
Duration of the cumulative impact	1	2	3		
Magnitude/ Intensity of cumulative impact	1	2	3		
Sensitivity of receiving environment, significance	1	2	3		
of environmental and social values	1	2	5		

The proposed development is established on Zerdetkyi Island which located at Tanintharyi Region, Tanintharyi District, Tanintharyi Township, Zerdetkyi Kyi Village Tract, latitude 9°57'21.90"N, 98°13'52.08"E. At the North side of the project area, two pearl farm were located. They are Belpearl pearl farm which is located at 14.90 nautical miles and Myanmar Andaman Pearl Farm which is located at 29.6 nautical miles.





Figure 5-1 Surrounding Pearl Farm of the project area.

Since, the methodology of cumulative impact assessment mentioned that "the spatial boundary of 1 km will be used for the cumulative impacts where existing projects are located away from each other cumulative impacts are likely less significant" the significant cumulative impacts are identified as negligible.



# Chapter 6 Environmental MANAGEMENT PLAN

This document provides the Environmental Management Plan (EMP) for the MEC's Oyster Culture and Pearl Production Project. It aims to provide an environmental and social management framework by outlining the compliance requirements, mitigation measures and monitoring programs to be undertaken throughout the project implementation.

With the proper application of appropriate impact and risk management techniques and by implementing prescribed mitigation measures by appropriately trained and experienced individuals, most environmental and social impacts can be avoided or reduced to a lower level of probability.

## 6.1 **SCOPE OF EMP**

This EMP is the means by which the findings of the environmental impact assessment are implemented during the construction and operation of the development. The scope of the EMP covers all of the project activities as described in CHAPTER 3 of the EIA, with the objective of demonstrating compliance with relevant national and international legislation.

The EMP lists the obligations and responsibilities of each party involved in the project; stipulates methods and procedures that will be followed, and outlines the environmental and social management actions that will be implemented.

## 6.2 **PURPOSE AND OBJECTIVE OF EMP**

This EMP has been prepared based on the finding of the impact assessment and describes management measures designed to mitigate potential environmental and social impacts of the proposed project. Mitigation strategies have been considered according to a series of responses that address impacts to avoid, prevent or reduce any potential impact on the identified sensitive receptors. The purposes of this EMP are to:

- Integrate management and mitigation measures into the project activities in order to reduce or mitigate any potential adverse impacts on natural and socio-economic environments
- Consider and address the concerns and interests of stakeholders who will potentially be engaged or impacted during the execution of the project
- Establish systems and processes for delivery and implementation of environmental and social requirements in order to meet statutory and compliance standards

The objectives of the ESMP are to:

- Demonstrate continuing compliance with the relevant Myanmar environmental legislation and occupational health and safety
- Describe the mechanism for implementing identified control, monitoring and management measures to mitigate potentially adverse impacts
- Provide assurance to regulators and stakeholders that their requirements with respect to environmental and social performance will be met



- Undertake monitoring to provide assurance that the control and management measures are being implemented and
- Combine all of the above in a systematic framework of monitoring, reporting and management that will measure the successful implementation of the project in accordance with Myanmar National Building Code for social and environmental performance, and respond as needed to maintain those objectives.

## 6.3 **PROJECT'S ENVIRONMENTAL, SOCIO-ECONOMIC POLICIES AND COMMITMENTS, LEGAL REQUIREMENTS AND INSTITUTIONAL ARRANGEMENTS**

## 6.3.1 Legal Requirements

Under Section 7 of the Environmental Conservation Law and Articles 52 and 53 of the Environmental Conservation Rules of the Republic of the Union of Myanmar, Myanmar Economic Corporation (MEC) is required to undertake an EIA to obtain an Environmental Compliance Certificate (ECC) for the its Oyster Culture and Pearl Production project. The project is undertaken in line with a number of national and local standards and laws. Local laws relating to EIA include: Environmental Conservation Law (2012); Environmental Conservation Rules (2014); National Environmental Quality (Emission) Guidelines (2015); and Environmental Impact Assessment Procedure (2015). A full list of laws and their relevance to the Project is provided in Section 2. With the published of the final Myanmar EIA Procedure in December 2015, the National Environmental Quality (Emissions) Guidelines were also published. These Guidelines provide the basis for regulation and control of noise and air emissions and effluent discharges from projects in order to prevent pollution and protect the environment and public health. These standards are noted to be based on the standards as recommended by the IFC General EHS Guidelines (2007 & 2015).

## 6.3.2 **Responsibilities of Implementation of EMP for Compliance**

In order to ensure the sound development and effective implementation of the EMP, it will be necessary to identify and define the responsibilities. The environmental management practices, procedures, and responsibilities defined herein to get full compliance with the existing environmental policy, laws, rules, and regulations of the Republic of the Union of Myanmar. The following entities should be involved in the implementation of this EMP:

- 1. Myanmar Economic Corporation (MEC)
- 2. Environmental Conservation Department
- 3. Third-Party Organization

MEC is committed to providing resources essential to the implementation and control of the EMP. Resource includes appropriate human resources and specialized skills. The structure for the organization responsible for environmental and social management and implementation of the ESMP is depicted in Table 6.1.



Role	Responsibility
Top management (Safety and Health	Set the policy, rules and regulations for safety
Committees	and environment programs
SOD manager	Management of CSR, Environmental Team,
	Safety Team
CSR team	Communities' relation, Government Relation,
	Communities Development programs,
	Education, Religions and other correspondent
	activities
Environment Team	Inbound and outbound monitoring process,
	plantation, waste management
Safety team	Employees' and workplace safety such as fire
	safety, workplace safety, vehicles and road
	safety
Liaison Officer	To liaise with the different stakeholders from
	government offices, communities and other
	associated organization like consultants, NGOs,
	etc.
	To receive the grievances/complaints related
	with the project activities via suggestion box, on
	call, email or by person and address and close
	the complaints according with the adequate
	communication and management actions

Table 6.1Organizational Tasks and Responsibility of Implementation Team

ECD - The responsibility of ECD is to exercise general supervision and coordinating over all matters relating to the environment and to be instrumental in providing guidance for recognized regulatory frameworks.

Third Party Environmental Consultant - The environmental consultant will have to ensure that the proposed EMP is up to date and is being followed properly by the proponent. Periodic audits of the EMP will have to be done to ensure that its performance is as expected, by comparing with operating standards so that any corrective actions can be taken.

Moreover, the MEC will organize the EIA Implementation Team for the project development and will response with the timely manner for issues, complaints and follow up the all Environmental Management Plan. The organization chart of team members is as follow:





Figure 6-1 EHOS Organization Chart

## 6.4 Environmental Management Plan

This chapter describes the activities to be taken for the implementation of the proposed mitigation measures described in the impact analysis process. It proposes the institutional responsibilities for the implementation of the management actions, the implementation indicators, the timeframe for monitoring and follow up and also the estimated costs for the effective implementation. The environmental management plan of MEC is organized with the following sections:

- 1. Environmental Management Plan
- 2. Environmental Monitoring Plan
- 3. Waste Management Plan
- 4. Water Management Plan
- 5. Occupational Health and Safety Plan
- 6. Community Health and Safety Plan
- 7. Emergency Preparedness and Response Plan
- 8. Corporate Social Responsible Plan
- 9. Community Grievance Redress Mechanism



The total estimated budget for implementing the proposed mitigation measures is approximately 50,000,000 MMK for the initial phase, with an additional 15,000,000 MMK per year allocated for the environmental monitoring plan. However, estimating the exact cost of implementing the Environmental Management Plan (EMP) is challenging, as many mitigation measures are integrated into the overall operational expenses of the project. Since construction and operational activities are conducted simultaneously in this project, some mitigation measures are combined with those designated for the operational phase.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost MMK	Responsible Person
Construction Phase/	Decommission Pha	ase: This phase that corresponds to any event, proc	ess, or activity th	at occurs duri	ng the construc	ction/decommission of
	Appoint	ment of HSE Officer	(3) vrs			MEC
Loss of Terrestrial Habitats	All Construction site	<ul> <li>Impact mitigation here seeks to retain and restore as much of the original and natural forested condition of the site.</li> <li>Site clearance should be performed with intensive search and identify the endemic species and biological valuable species.</li> <li>Collect and maintain these plants for the replanting and landscaping purpose.</li> <li>These activities should be guided by an appropriate and approved management plan.</li> <li>Site clearance should be carried out in a manner that retains the large trees.</li> <li>Landscaping should also use native flowering plants to provide habitat and host plants for butterflies.</li> <li>All construction contractors should be aware to the environmental management plan and sensitized to the environmental issues.</li> </ul>	Throughout Construction period	Moderate	Already included in operation cost	MEC

Table 6.2	Environmental Management Plan
-----------	-------------------------------



Issues	Location	Mitigation Measures	Time Frame	Residual	Mitigation Cost	Responsible
				impacts	MMK	Person
Soil Erosion	All Construction site	<ul> <li>To the greatest extent possible, phase site clearance so as to minimize the area of exposed soil at any given time.</li> <li>Re-cover exposed soils with grass and other appropriate species as soon as possible.</li> <li>Temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial surface runoff to adjacent marine waters.</li> <li>Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project</li> <li>OB waste dumps will be reclaimed/by planting with trees to bind the loose soil and to prevent soil empired.</li> </ul>	Throughout the construction period	Minor	Already included in operation cost	MEC
Ambient Air Quality	All Construction site	<ul> <li>Exposed ground should be regularly wetted in a manner that effectively keeps down the dust.</li> <li>Stockpiles of fine materials should be wetted or covered up during windy conditions.</li> <li>Workers on the site should be issued with dust masks during dry and windy conditions.</li> <li>The working area for the uprooting of shrubs or vegetation or the removal of boulders or temporary or permanent structures shall be sprayed with water immediately before, during, and immediately after the operation to maintain the entire surface wet.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost MMK	Responsible Person
		<ul> <li>✓ All machinery to be used for construction purposes will be of the high standard and properly maintained.</li> <li>✓ All loose material either stocked or transported will be provided with suitable covering such as tarpaulin, etc.</li> <li>✓ Water sprinkling will be done at the location where the dust generation is anticipated.</li> <li>✓ Over Burden (OB) waste dumps will be sprayed with water as they are major sources of airborne particulate matter/dust.</li> </ul>				
Noise and Vibration	All Construction sites	<ul> <li>Construction activities that will generate disturbing sounds should be restricted to normal working hours.</li> <li>Workers operating equipment that generates noise should be equipped with noise protection gear.</li> <li>Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs.</li> <li>Acoustic laggings and silencers will be used in equipment wherever possible.</li> <li>Construction and decommissioning should avoid breeding season of both terrestrial and marine biodiversity.</li> <li>On the other hand, should install sound barrier system to avoid the disturbance of</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC



Issues	Location	n Mitigation Measures	Time Frame	Residual	Mitigation Cost	Responsible
				impacts	MMK	Person
Transportation and Anchoring	Jetty area	<ul> <li>All fine earth materials must be enclosed during transportation to the site to prevent spillage and dusting.</li> <li>To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.</li> <li>The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers.</li> <li>Appropriate traffic warning signs, informing road users of a construction site entrance ahead and instructing them to reduce speed.</li> <li>Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment.</li> </ul>	Throughout Construction period	Negligible	Already included in operation cost	MEC
Materials Storage	Storage Warehouse	<ul> <li>The stockpiling of construction materials should be properly controlled and managed. fine grained materials (sand, cement, etc.) should be stockpiled away from surface drainage channels and features.</li> <li>Low berms should be placed around the piles and/or tarpaulin used to cover open piles of stored materials to prevent them from being washed away during rainfall.</li> <li>Safe storage areas should be identified and retaining structures put in place prior to the arrival and placement of material.</li> <li>Hazardous chemicals (e.g., fuels) should be properly stored in appropriate containers and these should be safely locked away. Conspicuous warning signs (e.g., 'No</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual	Mitigation Cost	Responsible
				impacts	MMK	1 61 5011
		Smoking') should also be posted around hazardous waste storage and handling facilities.				
Construction Waste Disposal	All construction site	<ul> <li>A site waste management plan should be prepared by the contractor prior to commencement of buildings. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.</li> <li>Preparation and implementation of the plan must be made the responsibility of the building contractor with the system being monitored independently.</li> <li>Special attention should be given to minimizing and reducing the quantities of solid waste produced during site preparation and construction.</li> <li>To reduce organic waste, softer vegetation may be composted onsite and used for soil amendment during landscaping.</li> <li>Vegetation and combustible waste must not be burned on the site.</li> <li>Reusable inorganic waste (e.g. excavated sand) should be stockpiled away from drainage features and used for in filling where necessary.</li> <li>Unusable construction waste, such as damaged pipes, formwork and other construction material, must be disposed of at an approved dumpsite.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Replanting and Landscaping	All construction site	<ul> <li>✓ Hazardous waste disposal in or off the construction site will be prohibited. Hazardous waste management systems include waste classification, separation, collection, storage, transfer and disposal in compliance with applicable regulations of the government, if any.</li> <li>✓ Hazardous wastes should be disposed of at a designated site inside or outside the project area as appropriate. The method of disposal needs to follow the best international practices.</li> <li>✓ Install Greenbelt plantation procedure.</li> <li>✓ The landscaping plan should seek to avoid the use of non-native and potentially invasive species. It should include lowmaintenance local species and the types of trees and shrubs used for feeding by local bird species.</li> <li>✓ The landscape design should seek to encourage bird life, especially for the endemics, maximize shade and windbreak effect, as well as to hide the roofline of the buildings.</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC
Occupational Health and Safety		<ul> <li>Safety policy of the project proponent</li> <li>Provision of safety gadgets to the workers</li> <li>Raising awareness of safety guidelines to the workers</li> <li>Assignment of safety supervisors at the work site</li> <li>Incentives to workers who obey the safety practices</li> </ul>	Throughout Construction period	Minor	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		<ul> <li>Penalty to workers who disobey the safety practices</li> <li>Arrangement of morning talks and toolbox meeting</li> <li>Preparation of health and safety matrix</li> <li>Provide Life jackets and train buddy system, provide emergency response training.</li> <li>Provide Hearing protection (earplugs), limit</li> </ul>			MMK	
		exposure time				
D	Operation/ S	Service Phase: The main project activities of op	eration are: Ca	mp area and I	Farm area	MEG
Consumption	Farm area	<ul> <li>✓ In general, the fresh water consumption of mariculture is low.</li> <li>✓ Provide adequate water storage facilities to ensure adequate supplies for the development.</li> <li>✓ Collect the rain water for domestic and operational uses and increase rainwater collection capacity by installing large storage tanks and filtration system for domestic and operational use.</li> <li>✓ Implement a water recycling system for cage cleaning to reduce overall freshwater demand.</li> <li>✓ Conduct regular monitoring of water usage to identify and fix leaks promptly.</li> <li>✓ Wastewater should be carefully managed and treated to ensure it does not contain harmful chemicals or pollutants before it is released back into the anyironment.</li> </ul>	Operation period		included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual	Mitigation Cost	Responsible
155005	Location	Witigation Wieasures	Time France	impacts	MMK	Person
Solid Waste	Camp area.	<ul> <li>✓ Install environmental friendly lighting system.</li> <li>Energy Consumption:</li> <li>✓ Reduce losses in energy distribution.</li> <li>✓ Install solar panels to supplement electricity needs and reduce reliance on diesel generators.</li> <li>✓ Establish waste separation bins for organic.</li> </ul>	Throughout	Minor	Already	MEC
Disposal	Farm area	<ul> <li>Apply pits that covered with concrete or line to avoid the ground water contamination.</li> <li>✓ Secure ropes, nets and buoys properly to prevent from breaking loose and polluting the adjacent marine waterbody.</li> <li>✓ Conduct regular shoreline clean up around the farm area.</li> </ul>	Operation period		included in operation cost	
Water Circulation from Hatchery/Nursery	All the proposed operation area	<ul> <li>✓ Install the filtration system to remove organic debris before discharge.</li> <li>✓ Use UV sterilization or ozone treatment to neutralize pathogens.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual	Mitigation Cost	Responsible
155005	Location	Whitgation Weasures	Time France	impacts	MMK	Person
		<ul> <li>Implement biofiltration systems using aquatic plants or bacterial cultures to absorb excess nutrients.</li> <li>Reduce water exchange frequency by reusing and filtering existing water in a closed-loop system.</li> <li>Install settlement ponds to allow natural sedimentation before effluent is released.</li> </ul>				
Cleansing Biofouling and Boring Organism	All the proposed operation area	<ul> <li>Use low-salinity water flushing instead of freshwater immersion to reduce water demand.</li> <li>Adopt biodegradable anti-fouling coatings on oyster cages to slow biofouling growth.</li> <li>Collect and compost biofouling waste to create organic fertilizers.</li> <li>Establish designated disposal zones for fouling organisms to prevent reintroduction into natural waters.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC
Disease Intrusion to Aquatic Environment	All the proposed operation area	<ul> <li>Despite of parasite and pathogens create major damage to the Oyster Culture and Pearl Production and productivity but there is no significant impact to aquatic environment.</li> <li>Implement quarantine protocols for newly introduced oysters.</li> <li>Conduct routine health screenings using PCR testing and microscopic analysis to detect pathogens early.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC
Anchoring	Farm area	<ul> <li>Even though, there is no mitigation for this activity, due to the potential number of anchor systems deployed this must be an assessable activity.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost MMK	Responsible Person
		✓ However due to the construction of anchors, the deployment systems, the nature of sediments anchoring is regarded as having negligible effect. Furthermore, anchoring in some terrain may be a positive effect by providing habitat and protection (FDA) effect.				
Transportation and Oil Spills	All the proposed operation area	<ul> <li>To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.</li> <li>Equip vessels with double bottom fuel tanks to reduce spill risks.</li> <li>Implement oil spill contingency plans.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC
Occupational Health and Safety	All the proposed operation area	<ul> <li>Provision of safety gadgets to the workers.</li> <li>Raising awareness of safety guidelines to the workers.</li> <li>Provide Life jackets for all water-related activities.</li> <li>Rubber gloves and boots to prevent cuts and infections.</li> <li>Eye protection for pearl nucleation.</li> <li>Ear protection for noisy machinery.</li> <li>Diving suits and oxygen tanks for underwater work.</li> <li>In addition, Emergency Response Plan for emergency cases such as fire, natural disasters and disease outbreak will be conducted and trained.</li> </ul>	Throughout Operation period	Negligible	Already included in operation cost	MEC

## 6.4.1 Environmental Monitoring Plan

#### Table 6.3Environmental Monitoring Plan

No.	Environmental Concerns	Monitoring Measures	Guidelines	Frequency	Location	Estimated Cost (MMK)	Responsible Party
-	Concernig		Constru	iction Phase			2 42 09
1.	Ambient Air Quality	PM2.5, PM10, TSP SO2, NO2, O3	NEQEG guideline value (PM2.5 – 25 μg/m3), (PM10 – 50 μg/m3), (SO2 – 20 μg/m3) and (NO2 – 200 μg/m3)	Twice a year	AQ1- 9°57'24.84"N 98°13'48.09"E (camp &office) AQ2- 9°56'3.30"N 98°13'46.73"E (near pearl farm)	5,000,000	MEC
2.	Noise Quality	Noise (dBA)	NEQEG guideline value Residential, institutional, educational (Day time – 55 dBA & Night time – 45 dBA) & Industrial, commercial (Day time – 70 dBA & Night time – 70 dBA)	Twice a year	NQ1- 9°57'24.84"N 98°13'48.09"E (camp &office) NQ2- 9°56'3.30"N 98°13'46.73"E (near pearl farm)	1,000,000	MEC
3.	Water Quality	5-day Biochemical oxygen demand Active ingredients / Antibiotics Chemical oxygen demand Oil and grease pH Temperature increase Total coliform bacteria Total nitrogen Total phosphorus Total suspended solids	National Surface Water Quality Standard, 2024 (Class V)	Twice a year	SW-3- 9°56'18.91"N 98°13'50.17"E (Near Shar Island) SW-4- 9°55'33.69"N 98°14'6.50"E (Near Oyster Farm)	3,000,000	MEC



No.	Environmental Concerns	Monitoring Measures	Guidelines	Frequency	Location	Estimated Cost (MMK)	Responsible Party
		Total Suspended Solids, BOD, COD (Cr), Oil and Grease Boron, Cyanide Fluoride, pH Ammonia Nitrogen Nitrate Nitrogen Nitrite Nitrogen Dissolved Oxygen Arsenic, Cadmium Hexavalent, Chromium, Copper Lead, Nickel Selenium, E Coli	National Surface Water Quality Standard, 2024 (Class V)		SW-1- 9°57'27.16"N 98°13'48.45" (Upstream of Creek (Zardatgyi Island) SW-2- 9°57'23.25"N 98°13'50.47"E (Downstream of Creek (Zardatgyi Island)		
4.	Waste Generation	Quantity of waste discharged from all construction activities	-	Monthly	Waste disposal site	3,000,000	MEC
5.	Occupational Health and Safety	Details of any environmental or Occupational incidents and accidents, periodic medical examination Zero accident cases, safety training for workers and accidents reports, community consultations	The Occupational Health and Safety Plan of the Government of Union of Myanmar	Monthly	At the project site	2,000,000	MEC
			Opera	tion Phase			
1.	Ambient Air Quality	PM2.5, PM10, TSP SO2, NO2, O3	NEQEG guideline value (PM2.5 – 25 μg/m3), (PM10 – 50 μg/m3),	Twice a year	AQ1- 9°57'24.84"N 98°13'48.09"E (camp &office)	5,000,000	MEC

No.	Environmental Concerns	Monitoring Measures	Guidelines	Frequency	Location	Estimated Cost (MMK)	Responsible Party
			$(SO2 - 20 \ \mu g/m3)$ and $(NO2 - 200 \ \mu g/m3)$		AQ2- 9°56'3.30"N 98°13'46.73"E (near pearl farm)		
2.	Noise Quality	Noise (dBA)	NEQEG guideline value Residential, institutional, educational (Day time – 55 dBA & Night time – 45 dBA) & Industrial, commercial (Day time – 70 dBA & Night time – 70 dBA)	Twice a year	NQ1- 9°57'24.84"N 98°13'48.09"E (camp &office) NQ2- 9°56'3.30"N 98°13'46.73"E (near pearl farm)	1,000,000	MEC
3.	Water Quality	5-day Biochemical oxygen demand Active ingredients / Antibiotics Chemical oxygen demand Oil and grease pH Temperature increase Total coliform bacteria Total nitrogen Total phosphorus Total suspended solids	National Surface Water Quality Standard, 2024 (Class V)	Twice a year	SW-3- 9°56'18.91"N 98°13'50.17"E (Near Shar Island) SW-4- 9°55'33.69"N 98°14'6.50"E (Near Oyster Farm)	3,000,000	MEC
		Total Suspended Solids, BOD, COD (Cr), Oil and Grease Boron, Cyanide Fluoride, pH Ammonia Nitrogen Nitrate Nitrogen Nitrite Nitrogen	National Surface Water Quality Standard, 2024 (Class V)		SW-1- 9°57'27.16"N 98°13'48.45" (Upstream of Creek (Zardatgyi Island) SW-2- 9°57'23.25"N 98°13'50.47"E		

No.	Environmental Concerns	Monitoring Measures	Guidelines	Frequency	Location	Estimated Cost (MMK)	Responsible Party
		Dissolved Oxygen Arsenic, Cadmium Hexavalent, Chromium, Copper Lead, Nickel Selenium, E Coli			(Downstream of Creek (Zardatgyi Island)		
4.	Soil Quality	Organic Matter (%), Heavy Metals (Pb, Cd), Total Nitrogen (TN)	WHO soil quality standards for agriculture	Twice a year	Waste storage areas	600,000	MEC
5.	Waste Generation	Solid waste, liquid waste, and Hazardous waste	-	Monthly	Temporal waste disposal area	500,000	MEC
6	Occupational Health and Safety	Details of any environmental or Occupational incidents and accidents, periodic medical examination Zero accident cases, safety training for workers and accidents reports, community consultations	The Occupational Health and Safety Plan of the Government of Union of Myanmar	Monthly	Operation area	2,000,000	MEC

## 6.4.2 Water Management Plan

- (i) Objectives
- Ensure sustainable water usage during construction and operational phases.
- Minimize water wastage and promote water reuse/recycling.
- Prevent water pollution from construction activities and operational discharge.
- Ensure compliance with local water quality standards and regulations.
- (ii) Legal Requirement

The project shall adopt the requirement of local and international legislation as provided in Chapter 2.

(iii) Action Plan

- ✓ Provide adequate water storage facilities to ensure adequate supplies for the development.
- ✓ Collect the rain water for domestic and operational uses and increase rainwater collection capacity by installing large storage tanks and filtration system for domestic and operational use.
- ✓ Implement a water recycling system for cage cleaning to reduce overall freshwater demand.
- ✓ Conduct regular monitoring of water usage to identify and fix leaks promptly.
- ✓ Wastewater should be carefully managed and treated to ensure it does not contain harmful chemicals or pollutants before it is released back into the environment.
- ✓ Install environmental friendly lighting system.
- $\checkmark$  Conducting awareness raising programs for the workers on the efficient use of water.

### 6.4.3 Wastewater Management Plan

(i) Objectives

The objectives of wastewater quality management sub plan are

- To ensure that wastewater quality treatment is properly done
- To ensure proper implementation and compliance, including disposal method and treatment system
- (ii) Legal Requirement

The project shall adopt the requirement of local and international legislation as provided in Chapter 2.

#### (iii) Action Plan

#### During Construction Phase

Wastewater will be collected in the detention pond for sedimentation and then discharged to the drainage. Portable toilets will be provided for workers. Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills (if found, the immediate repair and cleansing will be conducted), systematic storage of fuels at construction site yard compound, handling and disposal of new oil and used oil waste, and providing a good pavement at machine workshop and garage will be done.



- ✓ Adequate waste bins will be sufficiently provided at the project site for collection and disposal of wastes
- ✓ Toilets with temporary soak pits and septic tanks will be constructed on the site during the construction phase to prevent wastewater from entering the groundwater or surrounding water bodies.
- ✓ To prevent surface and groundwater contamination by oil/grease, leak-proof containers will be used for storage and transportation of oil/grease.
- $\checkmark$  Controlled withdrawal of groundwater during construction.
- $\checkmark$  Providing a good pavement at machine workshop and garage; and
- $\checkmark$  Practicing the solid waste management system at the construction site.

#### During Operation Phase

MEC is planned to construct water purification plant. The wastewater generation of oyster culture and pearl production was relatively minimal. The wastewater will be generated from the domestic usage and cleaning of hatchery tanks and oyster nets. In cases where water is used for cleaning or processing, **recycling systems** should be installed to treat and reuse water. This reduces the overall water footprint of the Oyster Culture and Pearl Production process. Wastewater should be carefully managed and treated to ensure it does not contain harmful chemicals or pollutants before it is released back into the environment.

- ✓ Ensure to prohibit discharge of untreated sewage or effluents into drains.
- $\checkmark$  Install grease traps and oil interceptors in kitchens and parking areas to prevent contamination.

Install the filtration system to remove organic debris before discharge.

Use UV sterilization or ozone treatment to neutralize pathogens.

Implement biofiltration systems using aquatic plants or bacterial cultures to absorb excess nutrients.

Reduce water exchange frequency by reusing and filtering existing water in a closed-loop system.

Install settlement ponds to allow natural sedimentation before effluent is released.

- (iv) Implementation Schedule
- ✓ This wastewater/ effluent management sub plan will be conducted throughout the lifespan of the project.
- (v) Monitoring Plan
- ✓ The environmental monitoring report will include the items listed in the following table.

Environmental Aspect	Monitoring Measures	Reporting	Location	Frequency
	Co	nstruction		
Water Quality	5-day Biochemical oxygen demand Active ingredients / Antibiotics	National Surface Water Quality Standard, 2024 (Class V)	SW-3- 9°56'18.91"N 98°13'50.17"E (Near Shar Island)	2 times per year

Table 6.4Monitoring Plan for Wastewater Quality



Environmental Aspect	Monitoring Measures	Reporting	Location	Frequency
	Chemical oxygen demand Oil and grease pH Temperature increase Total coliform bacteria Total nitrogen Total nitrogen Total phosphorus Total suspended solids		SW-4- 9°55'33.69"N 98°14'6.50"E (Near Oyster Farm)	
Ground Water Quality	TotalSuspendedSolids,BOD,COD(Cr),Oil and GreaseBoron,CyanideFluoride,pHAmmoniaNitrogenNitrateNitrogenNitriteNitrogenDissolvedOxygenArsenic,CadmiumHexavalent,Chromium,Chromium,CopperLead,NickelSelenium,ESelenium,E	National Surface Water Quality Standard, 2024 (Class V)	SW-1- 9°57'27.16"N 98°13'48.45" (Upstream of Creek (Zardatgyi Island) SW-2- 9°57'23.25"N 98°13'50.47"E (Downstream of Creek (Zardatgyi Island)	2 times per year
	C	peration	I	I
Water Quality	5-dayBiochemicaloxygen demandActive ingredients /AntibioticsChemical oxygendemandOil and greasepHTemperature increaseTotal coliformbacteriaTotal nitrogenTotal phosphorus	Environmental Monitoring Report	SW-3- 9°56'18.91"N 98°13'50.17"E (Near Shar Island) SW-4- 9°55'33.69"N 98°14'6.50"E (Near Oyster Farm)	2 times per year



Environmental Aspect	Monitoring Measures	Reporting	Location	Frequency
Aspect Ground Water Quality	HeasuresTotalsuspendedsolidsSuspendedTotalSuspendedSolids,BOD,COD(Cr),Oil and GreaseBoron,CyanideFluoride,pHAmmoniaNitrogenNitrateNitrogenNitriteNitrogen	Environmental Monitoring Report	SW-1- 9°57'27.16"N 98°13'48.45" (Upstream of Creek (Zardatgyi Island) SW-2- 9°57'23.25"N 98°13'50.47"E	2 times per year
	Arsenic, Cadmium Hexavalent, Chromium, Copper Lead, Nickel Selenium, E Coli		(Downstream of Creek (Zardatgyi Island)	

(vi)Budget Allocation

✓ Estimated budget allocation for management sub plan is already include in EMPs.

### 6.4.4 Waste Management Plan

- (i) Objectives
- Ensure proper collection, segregation, and disposal of waste.
- Promote waste minimization and resource recovery.
- Ensure compliance with local solid waste management regulations.
- (ii) Legal Requirement

The project shall adopt the requirement of local and international legislation as provided in Chapter 2.

#### (iii) Action Plan

#### During Construction

- ✓ A site waste management plan should be prepared by the contractor prior to commencement of buildings. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.
- ✓ Preparation and implementation of the plan must be made the responsibility of the building contractor with the system being monitored independently.
- ✓ Special attention should be given to minimizing and reducing the quantities of solid waste produced during site preparation and construction.



- ✓ To reduce organic waste, softer vegetation may be composted onsite and used for soil amendment during landscaping.
- ✓ Vegetation and combustible waste must not be burned on the site.
- ✓ Reusable inorganic waste (e.g. excavated sand) should be stockpiled away from drainage features and used for in filling where necessary.
- ✓ Unusable construction waste, such as damaged pipes, formwork and other construction material, must be disposed of at an approved dumpsite.
- ✓ Hazardous waste disposal in or off the construction site will be prohibited. Hazardous waste management systems include waste classification, separation, collection, storage, transfer and disposal in compliance with applicable regulations of the government, if any. Hazardous wastes should be disposed of at a designated site inside or outside the project area as appropriate. The method of disposal needs to follow the best international practices.

#### During Operation

- ✓ Establish waste separation bins for organic waste, plastics, metals, and hazardous materials.
- ✓ Utilize oyster shells for coastal erosion protection and soil conditioning.
- ✓ Composting or Recycling of Oyster Shells
- ✓ Use of Dead Oysters in Animal Feed or Fertilizer
- ✓ Controlled Removal of Fouling Organisms
- ✓ Recycling or Repurposing Plastic Materials
- ✓ Decompose the organic waste and sewage and use as fertilizer in gardening
- $\checkmark$  Apply pits that covered with concrete or linen to avoid the ground water contamination.
- ✓ Secure ropes, nets and buoys properly to prevent from breaking loose and polluting the adjacent marine waterbody.
- ✓ Conduct regular shoreline clean up around the farm area.
- (iv) Implementation Schedule
- $\checkmark$  This waste management sub plan will be conducted throughout the lifespan of the project.
- (v) Monitoring Plan
- ✓ The environmental monitoring report will include the items listed in the following table.

Table 6.5Monitoring Plan for Waste Generation

Environmental Aspect Monitoring Measures		Reporting	Location	Frequency		
	Const	ruction				
Solid waste generation	Amount and kind of solid waste generated from each construction activities	HSE Manager	Waste Disposal Site	Weekly Records		
Operation						



Environmental Aspect	Monitoring Measures	Reporting	Location	Frequency
Solid waste generation	Amount and kind of solid waste generated from each activity	Environmental Monitoring Report	Waste Disposal Site	Daily Records

## 6.4.5 Occupational Health and Safety Plan

(i) Objectives

The objectives of Occupational Health and Safety sub plan are

- $\checkmark$  Identify and assess potential hazards during construction and operation.
- ✓ Establish comprehensive safety measures to prevent accidents, injuries, and illnesses.
- ✓ Provide training, monitoring, and communication to ensure compliance with health and safety requirements.
- ✓ Promote a safe work culture and minimize occupational risks.

The project proponent should appoint one Health, Safety, and Environment (HSE) Officer for Health, Safety and Environment (HSE) issues throughout the lifespan of the project. EIA Implementation Team is responsible for the implementation and monitoring of the Environmental Management Plan (EMP) and Monitoring Plan as well as coordination with Proponent, local authorities, and the nearby communities. HSE matters are a line management responsibility requiring the active participation of all levels of management and supervision. Management provides visible, strong and pro-active leadership and commitment to develop, implement, measure and improve the HSE Management System. This is achieved through active participation in safety practices such as Management HSE walkthroughs, Safety Toolbox meetings, Accident / Incident investigation, risk assessment and work site training etc.

The Managing Director is responsible for:

- Approving and endorsing the HSE Plan,
- Ensuring that resources are available to execute the HSE Plan,
- Monitoring and adjusting the HSE Plan.

The Social and Environmental Welfare Manager, as custodian of the HSE Plan has the responsibility for:

- $\checkmark$  Developing the HSE Plan.
- ✓ Monitoring the HSE Plan and reporting its status, deviations and any need for adjustments.
- $\checkmark$  Enforcing & coordinating the overall workings of the HSE Plan.
- ✓ Training all HSE Representatives and Managers on the HSE Plan, procedures & notifying all changes.
- ✓ Keeping the Managing Director immediately informed at all times on the occurrence of all accidents and anomalies together with all other HSE matters.

The Operation Manager/ Site Manager has the responsibility for:

✓ Enforcing an accident-free work environment.



- ✓ Enforcing the overall workings of the HSE Plan.
- ✓ Ensuring that the HSE Manager follows his/her responsibilities.
- ✓ Calling with immediate effect of an accident an HSE investigation meeting with all personnel involved

The EIA Implementation Team is the highest body that enforces the implementation of the HSE program and meets not less than once every six months and/or when there is an emergency.

- ✓ Formulates amends and reviews HSE plan and the HSE Manual.
- $\checkmark$  Reviews the enforcement of the HSE plan.
- ✓ Reviews all legal and statutory matters of HSE plan.
- ✓ Reviews training and performance of HSE representatives and workforce.
- ✓ Reviews investigations of occupational accidents/incident, injuries.
- ✓ Looks into employee safety suggestions.
- ✓ Appoints new HSE Representatives.
- ✓ Appoints HSE Officer when necessary.
- $\checkmark$  Any other matters

The MEC will also ensure the following applicable laws and regulations related to HSE for the proposed project:

- $\checkmark$  National laws and regulations in force.
- $\checkmark$  International laws and regulations when and where applicable.
- ✓ Industry guidelines, codes of practice, etc.
- (ii) Legal Requirement

The project shall adopt the requirement of local and international legislation as provided in Chapter 2.

#### (iii) Action Plan

The MEC Myanmar will implement the following for the proposed project.

- ✓ Adopt a policy for "ZERO tolerance" on accident and Incident.
- ✓ Clearly define HSE line management responsibilities and objectives.
- ✓ Identify and assess all significant HSE risks and place measures which eliminate or minimize these risks to a level, which is feasibly as low as reasonably practicable.
- $\checkmark$  Regular health check to the workers annually.
- ✓ Acted when safety concerns are raised and to support anyone who stops the work if they believe it is unsafe.
- ✓ Visibly imbibe safety through behavior, implement regular HSE tours, and communicate effectively all HSE messages.
- ✓ Promote open dialogue with personnel, and everyone working with the project proponent with a view to achieving continuous improvement.
- $\checkmark$  Provision of safety gadgets to the workers.
- ✓ Raising awareness of safety guidelines to the workers.
- ✓ Provide Life jackets for all water-related activities.
- $\checkmark$  Rubber gloves and boots to prevent cuts and infections.
- ✓ Eye protection for pearl nucleation.



- ✓ Ear protection for noisy machinery.
- $\checkmark$  Diving suits and oxygen tanks for underwater work.
- ✓ In addition, Emergency Response Plan for emergency cases such as fire, natural disasters and disease outbreak will be conducted and trained.

An effective and open communication/reporting system is also established and maintained in order to ensure the correct implementation and constant improvement of the HSE Management System including safety signs, notice boards, and awards. Moreover, HSE monthly meeting, weekly HSE representative meeting and daily tool box meeting should be carried out to ensure HSE manners for the project. The following practices shall also be implemented by the project proponent.

**Personal Protective Equipment (PPE):** A list of PPE requirements is placed on the notice boards. Enforcement of PPE procedure is done by the HSE Manager and the HSE Representatives.

**Medical Facilities**: The MEC maintains close by medical facilities that meet or exceed local reference standards.

**Medical Fitness**: To maintain a healthy and productive work force, every prospective employee must undergo a pre-employment medical check to ascertain state of health and medical fitness prior to employment. Periodic medical checks will also be carried out on old employees. In both categories a certified employee shall be issued with a certificate of fitness which must be stamped and signed by a certified Doctor.

**First Aid**: The MEC maintains First Aid trained representatives at ratio 1 to 30 employees. For severe cases, while the First Aid treatment is administered the medical facility is notified and transportation is provided.

Drug and Alcohol Abuse: Use of alcohol and drugs is forbidden.

Smoking: Smoking is permitted only in designated smoking areas

**Material and Safety Datasheet (MSDS)**: All MSDS used for construction and operation are recorded into a Safety Data Sheet Register and made available to First Aiders for reference in the case of an emergency. MSDS sheets are pasted on the HSE Notice board in the Foundry. It is the responsibility of the HSE department to collate and keep MSDS sheets up to date and conduct a COSHH Assessment for each material used.

(iv)Implementation Schedule

- ✓ This OHSE sub plan will be conducted throughout the lifespan of the project.
- (v) Monitoring Plan
- $\checkmark$  The environmental monitoring report will include the items listed in the following table.



Environmental Aspect	Monitoring Measures	Reporting	Location	Frequency
OHSE	Details of any environmental or occupational incidents and accidents, periodic medical examination Zero accident cases, safety training for workers and accidents reports, community consultations	Incident and accident report, Record keeping and Environmental Monitoring Report	Workers working at Risk areas (noisy workplace, height places, Marine area)	If occurs within the project site Yearly

Table 6.6	Monitoring I	Plan for Occupationa	l Health and Safety
-----------	--------------	----------------------	---------------------

(vi)Budget Allocation

(vii) Estimated budget allocation for management sub plan is already include in EMPs.

## 6.4.6 Community Health and Safety Plan

(i) Objectives

The objectives of Community Health and Safety sub plan are

- Minimize risks to community health, safety, and quality of life during project implementation.
- Mitigate adverse effects such as noise, air pollution, traffic congestion, and safety hazards.
- Engage with the community to raise awareness and build trust.
- (ii) Legal Requirement

The project shall adopt the requirement of local and international legislation as provided in Chapter 2.

- (iii) Action Plan
  - ✓ Regulate noise levels by limiting operational hours for heavy activities.
  - ✓ Install fire alarms, hydrants, and extinguishers.
  - ✓ Conduct regular fire drills.
  - ✓ Ensure proper drainage systems and waste disposal facilities.
  - ✓ Provide regular maintenance of water pipelines and sewage systems.
  - ✓ Build safe pedestrian pathways.
  - ✓ Install clear signage for access routes and emergency exits.
  - $\checkmark$  Establish a system to collect and address community complaints promptly.

(iv)Implementation Schedule

✓ This Community Health and Safety sub plan will be conducted throughout the lifespan of the project.



Frequency

According

the

to

EMoP

- (v) Monitoring Plan
- $\checkmark$  The environmental monitoring report will include the items listed in the following table.

Environmental

Monitoring

Report

Zerdetkyi

Village

Environmental<br/>AspectMonitoring MeasuresReportingLocationEnvironmentalImplementEMPandGRMand

Table 6.7Monitoring Plan for Community Health and Safety

(vi) Budget Allocation

EMoP

(vii) Estimated budget allocation for management sub plan is already include in EMPs.

## 6.4.7 Emergency Preparedness and Response Plan

(i) Objectives

Quality

The objectives of Emergency Preparedness and Response sub plan are

- ✓ Establish robust protocols for managing emergencies such as fires, floods, or accidents.
- $\checkmark$  To identify potential emergencies and develop specific response strategies.
- $\checkmark$  To minimize impacts on human health, property, and the environment.
- $\checkmark$  To ensure effective communication and coordination during emergency situations.
- $\checkmark$  To implement training and drills to improve preparedness and response capabilities.
- (ii) Legal Requirement

The project shall adopt the requirement of local and international legislation as provided in Chapter 2.

The project proponent should prepare an emergency preparedness plan to prevent the consequences of natural disasters such as fire, earthquake, storm and man-made disasters. The purpose of the Emergency Plan is to minimize the danger to life and property in the event of disasters in the proposed project. An emergency response plan will be developed by the project proponent and trained to all employees according to the proposed training schedule. All the people who live around the project compound have to leave the site as soon as possible for all emergency cases. The prevention, preparedness, and response plan for first aid supplies, training, earthquake, fire hazards and emergency communication are described as follows:

(iii) Action Plan

## 6.4.7.1 First Aid Supplies

The most critical equipment required on site is adequate and appropriate first aid equipment and facilities. This equipment is essential for response to any illness or injury that persons may sustain. This first aid equipment must be adequate and appropriate.



- ✓ Identify hazards which may cause an injury or illness (also consider workers' existing illness (e.g., diabetes, asthma, epilepsy, heart condition etc.)
- $\checkmark$  Assess the risk based on the type and extent of injuries or illness that may occur.
- $\checkmark$  Decide on the appropriate first aid equipment and facilities
- ✓ Obtain the identified first aid equipment and facilities
- ✓ Monitor and review first aid equipment facilities and services to ensure they continue to meet requirements

#### 6.4.7.2 Training

All workers must receive basic first aid training as part of their induction. There is also a need to train some workers in more advanced first aid. Keep training records of the first aid training that workers have received. Names of first aid personnel and their competencies must be kept as part of the first aid team and displayed prominently in the work place.

Workers must have access at all times to trained first aid personnel who can undertake initial management of work-related injuries or illness. If ongoing medical care or special medical care assistance is required, first aid personnel must recommend that a worker seeks further medical assistance.

First aid personnel must have current certified first aid qualifications. The level of these qualifications has to be based upon the following:

- ✓ Be reliable
- ✓ Be competent and familiar with the ERP and first aid equipment on site.
- ✓ Have current certified first aid qualifications
- ✓ Undertake the initial management of injuries and illness
- ✓ Record details of first aid given, and
- ✓ Remain calm in an emergency

#### 6.4.7.3 Fire Prevention, Preparedness and Response

Diesel oil will be stored in the project compound for the generator use; without proper storage, these petroleum products are volatile substances and can be very dangerous if they are not looked after carefully. Therefore, it is important to take proper procedures when handling or storing them. Always keep oil storage at room temperature and away from all heat sources. Ensure that a container is tightly sealed to avoid spillage. Oil should always be stored in secure areas with safety precautions.

Fire drills will conduct regularly and firefighting teams also need well trained and organized. Fire alarms, fire hoses and hydrants, fire extinguishers, and excavation routes should inspect and proper maintenance regularly.

The emergency preparedness plan for fire hazards is described as follows:

- Keep the use and storage of combustibles to a minimum.
- Store flammable liquids in approved containers in well-ventilated storage areas.
- Smoking is strictly prohibited near the storage area of flammable liquids.
- Place oily oil-soaked rags or waste in covered metal cans.



• Store adequate quantity of water for firefighting

Fire extinguishers should be provided on the project site. Fire extinguishers come in different varieties. It is important to choose the right kind of extinguishers for putting out different types of fire.

- ✓ Install and maintain smoke detectors, sprinklers, and extinguishers.
- $\checkmark$  Train residents and staff on fire safety procedures.

In case of Fire, the following emergency response plan should be done immediately.

- ✓ Alert other people through fire alarm
- $\checkmark$  If small case of fire, control by using an extinguisher or fire hose reel
- ✓ Contact fire brigade if not under immediate control
- ✓ Attend to human life in immediate danger
- $\checkmark$  Turn off power before fighting for the case of an electrical fire
- ✓ DO NOT USE WATER rather use fire extinguisher for oil and lubricant fire
- ✓ Once out of the building, stay out. Do not allow people to go back into the burning building to collect valuables. While exiting the building, close doors (but do not lock) to slow down the spread of fire
- ✓ Obey all instructions
- ✓ Proceed to emergency evacuation area
- ✓ First-aid measures should be followed to all injured persons and transfer to the hospital if necessary.
- ✓ All emergency contact such as fire department, hospital, police department and ambulance should be identified and listed display on the project area in a visible place.

#### 6.4.7.4 Response Measure for Natural Disaster

Disaster is an abrupt adverse or unfortunate extreme event, which causes severe damage to human beings, plants, and animals. The emergency response plan is considered because of the buildings in the project area. The project proponent has to be aware of the natural disasters that may affect on lives by physical and emotional and loss of productivity.

#### Earthquake Action Plan

#### **Before an Earthquake:**

- Ensure all buildings comply with MNBC seismic guidelines.
- Regularly inspect and reinforce structural components.

#### **During an Earthquake:**

- Activate alarms and announce evacuation instructions in Burmese and other relevant languages.
- Advise residents to Drop, Cover, and Hold On until shaking stops.
- Evacuate to pre-designated safe zones after the shaking subsides.

#### After an Earthquake:

• Conduct safety inspections before allowing re-entry into buildings.



- Coordinate with local authorities and engineers for structural damage assessments.
- Restore essential utilities (water, gas, electricity) only after thorough checks.

#### Flood Action Plan

#### **Before a Flood:**

- Activate flood barriers at basement entry points.
- Deploy sump pumps in low-lying areas to prevent waterlogging.

#### **During a Flood:**

- Move residents to higher area or safe zones identified in the evacuation plan.
- Distribute life vests and emergency supplies to affected residents.
- Continuously monitor water levels and provide updates through the PA system.

#### After a Flood:

- Decontaminate water storage systems and check for waterborne diseases.
- Repair damaged drainage systems and assess landscaping zones.
- Dispose of flood debris in accordance with Myanmar's Environmental Conservation Rules.

#### Cyclone Action Plan

#### **Before a Cyclone:**

- Secure rooftop equipment, furniture, and loose objects in external areas.
- Board up windows and close shutters to prevent wind damage.

#### **During a Cyclone:**

- Advise residents to remain indoors and away from windows.
- Provide real-time updates on the storm's progress via weather announcement by local authorities.
- Use SMS alerts, loudspeakers, and written notices to update residents.
- Ensure multilingual communication for diverse residents.

#### After a Cyclone:

- Inspect buildings for damage to roofs, windows, and external areas.
- Clear debris and ensure pathways are safe for movement.
- (iv)Implementation Schedule
- (v) This Emergency Preparedness and Response sub plan will be conducted throughout the lifespan of the project.



(vi)Monitoring Plan

(vii) The environmental monitoring report will include the items listed in the following table.

Environmental Aspect	Monitoring Measures	Reporting	Location	Frequency
First Aids	Provide training to workers and employee	Training records and Environmental Monitoring Report	Employee	Once per year
Emergency Response	Train workers and employee in disaster response protocols. Conduct quarterly drills to simulate emergencies (earthquakes, floods, and fires).	Training records and Environmental Monitoring Report	Employee	Twice per year

Table 6.8Monitoring Plan for Community Health and Safety

(viii) Budget Allocation

(viii) Estimated budget allocation for management sub plan is already include in EMPs.

## 6.4.8 Cooperate Social Responsibilities Plan

Table 6.9	Corporate Soc	cial Responsibili	ty Plan
-----------	---------------	-------------------	---------

Area	<b>Priority Item</b>	Detailed Targets	%
Community Involvement and Development	Donation to local community	<ul> <li>✓ Donate to local charities with a worthy cause Actively participate in community events</li> <li>✓ Encourage staff to participate, and to form a community engagement team to actively support community events</li> <li>✓ Embedding understanding and consciousness about human rights issues among the employees</li> <li>✓ Development of sexual harassment and "power harassment" (workplace bullying &amp; harassment) prevention efforts</li> <li>✓ Infrastructure development</li> </ul>	20%
Sustainable Environment	Implementation of EMP	<ul> <li>✓ Replanting of trees</li> <li>✓ Water quality control</li> <li>✓ Raise awareness training</li> </ul>	


Area	<b>Priority Item</b>	Detailed Targets	%
		$\checkmark$ Implement monitoring and	
		management plan	30%
Human Rights	Raising awareness of human rights	<ul> <li>Establish a workplace culture where human rights issues do not arise</li> </ul>	30%
Compliance to law	CSR Procurement	<ul> <li>✓ Sharing values regarding the promotion of CSR activities with business partners and avoiding procurement risks with key partners</li> <li>✓ Effect extensive compliance and adherence to laws and regulations about procurement tasks Continuous compliance to environmental regulations</li> </ul>	20%

### 6.4.9 Community Grievance Redress Mechanism

#### **Overview**

Grievances are complaints or comments received by MEC and/ or its subcontractors from stakeholders. Implementing a Grievance Mechanism for projects is stipulated under the IFC guidelines.

Grievance Mechanisms has to be proportionally scaled to the project and potential impacts and should consider local cultures and contexts. The mechanism is a living process- this means that it should be appropriately staffed, monitored and take necessary action, and be adjusted and improved over the life of the project where necessary.

According to the preliminary feedback system, stakeholders were able to phone, email or postal mail to Myanmar Economic Corporation. A Grievance Mechanism is required for the project's construction and operations phases, and this is presented.

Disclosure of the Grievance Mechanism to stakeholders is required, and this is to be undertaken in a manner appropriate to the scale of the project, potential impacts, the local context, and cultures.

Recommended disclosure channels include:

- Community Liaison Officer to attend the pre-operation meetings with government officials
- Provide posters and fact sheets at community places
- Make local FM radio announcements (prior to and during the survey)
- Display documents via the proponent's website, if any prior to and during the survey.



### Key Elements

#### Receive

It is recommended that MEC engage a Myanmar National Community Liaison Officer (CLO) to manage the grievance mechanism for the project. Grievances can be lodged to the CLO by stakeholders via a number of channels including:

- Telephone to MEC's CLO in site.
- Written correspondence by postal mail to MEC Office in Yangon/Site.
- Through community leaders / traditional authorities e.g., Township Administrator.
- Direct contact with the CLO during meetings prior to and during the survey.

#### Assess and Assign

The CLO will register the grievance on MEC Grievance Register and make an initial assessment of the complaint and assign a Complaint Owner. For straightforward complaints, the Complaint Owner may be the CLO. For complex issues, the Complaints Owner may be other personnel/Departments within MEC Senior Management, Grievance Committee, Third Party Mediation, etc.

## Acknowledge

Grievances will be acknowledged by MEC via written response to the complainant within 48 hours of receiving the complaint. The acknowledgment will be via email or letter- whichever mode is most appropriate to the communication requirements of the stakeholders. All communications (written and verbal) should be conducted in a language which is understood completely by the Complainant e.g., Myanmar Language.

#### Investigate

The Complaint Owner investigates the complaint and proposes options to resolve the issue, in consultation with other personnel as required. The identity of the complainant should only be disclosed to the extent necessary internally and should not be shared with any third parties.

Solutions may be determined by:

- The proponent proposes a solution.
- Community and proponent agree on a solution.
- The third party defines solutions, or
- Traditional or customary defined solutions.

The grievance will be resolved within five (5) working days, however complex complaints may take longer to resolve. For complex complaints, the CLO will notify the stakeholder of the delay and the expected timeframe for resolution. Provision should be made for instances where there are an individual or group claims of loss of assets, etc.

The process should be recorded in the MEC Grievance Register. The database should capture:

• Record number.



- Stakeholder name and contact details.
- Date received.
- Responsible personnel within MEC
- Nature of grievance (details).
- Response and any associated documentation.
- Date of close-out

#### Respond

The Complaint Owner and the CLO will agree on a response. The response should communicate the findings of the investigation, set out the proposed corrective actions, define timeframes, responsible parties, monitoring requirements and seek feedback from the Complainant.

The Complaint Owner and CLO determine the next steps based on feedback from the Complainant. If the Complainant accepts the resolution, MEC will precede to implement to the elating agency. If the Complainant does not accept the resolution, the complaint will be escalated to the Relating Committee consisting of Yangon Region ECD, FD, YCDC, for review and development of a final resolution. The Complainant's response will be documented in the Grievance Register.

#### Resolve

If the complainant accepts the response, the agreed actions are then implemented. The Complaint Owner is responsible for assigning action parties, actions and timeframes to implement the resolution. The Complaint Owner informs the CLO once the resolution has been implemented.

#### Review

MEC will seek to reach a resolution with the complainant that is satisfactory to both sides. If MEC and the Complainant are unable to agree on a solution, the Complaint may be sent to receive for review and sent to the MEC Representative for review and final decision.

#### Closed-out

A Complaint is closed out when no further action can be or needs to be taken. The closure status of the complaint and any other final information is recorded in the Grievance Register.

#### Monitoring, Reporting, and Improvement

The Grievance Mechanism is a living process, which should be reviewed, updated and improved as the project progresses. MEC will develop KPIs, gather data and report on performance, which will enable the organization to analyze trends in complaints received and identify any underlying systemic issues. A grievance report is completed once a month during the operations period and submitted to the MEC representative.



#### Worker grievances

Company also established a mechanism to resolve complaints of workers and the worker grievances mechanism procedure includes the followings.

All employees are given equal and fair opportunity to voice out their sentiments and grievances towards particular occasions or situations, including Disciplinary Actions served to them. In any case, the following procedure is to be observed at all times:

**Level 1:** Superior – An employee should first discuss an issue with his/her immediate superior. The superior will give his/her disposition within five (5) days upon the receipt of the issue/concern.

**Level 2:** Human Resources Department - If the employee is not satisfied with the decision rendered by superior, the case is then referred to Level 2, the HR Department. The HR Department is required to give its decision within five (5) days from the receipt of the issue/grievance.

**Level 3:** Senior Management - If the employee is not satisfied with the decision rendered by the HR Department, the case is then referred to Level 3, the Senior Management. The Senior Management is required to give his/her decision within five (5) days from the receipt of the issue/grievance.

**Level 4:** Conciliation Committee - If the employee is still not satisfied with the decision rendered by Senior Management, the concerned Employee may then refer the case of Level 4, the Conciliation Committee, which shall be formed in accordance with the provisions of the Settlement of Dispute Law. The conciliation committee shall, within five (5) working days, from receipt of the grievance by the Employee negotiate and resolve the issue. The conciliation committee shall keep a record of the proceedings of the negotiations.

**Level 5:** Conciliation Body - If the employee is still not satisfied with the result of the discussions with the Conciliation Committee, the Employee may file a complaint to the Conciliation Body. The Conciliation Body shall upon receipt of the complaint conciliate for settlement within three (3) working days. If both parties have arrived at an agreement, the parties shall sign an agreement in the presence of the Body.

✓ If the Employee is still not satisfied with the decision of the Conciliation Body it may further file a case, by himself or through a representative on his/her behalf, at a court of law of relevant jurisdiction.

Across all levels, due process must be afforded the employee and the procedures stated must be undertaken. Appeals must be made by the employee in writing within three (3) working days from the receipt of the decision in each level. If an appeal is not received within the period, it is understood that the employee accepts the disciplinary action without question.



# **Chapter 7 PUBLIC CONSULTATION AND DISCLOSURE**

# 7.1 **REGULATORY REQUIREMENT OF PUBLIC CONSULTATION MEETING**

According to the Paragraph 63 (i) of Environmental Impact Assessment Procedure (2015), stakeholder meeting is one of the necessaries processes to perform EIA study. Public disclosure is required to hold in the scoping stage of Oyster Farming and Pearl Production by Myanmar Economic Cooperation (MEC) of EIA process through the local media and public notification at the project site and arrangements for consultation meetings with all project stakeholders. The public consultation indicated the transparency of proposed project to local people.

The OBES consultant team conducted a pre-engagement meeting with representatives from Myanmar Economic Cooperation for the proposed project to discuss the environmental impact assessment process. During this meeting, the representatives from the proposed project were given information about the processes of the project, and the consultant team was briefed on the environmental impact assessment procedures, baseline survey, and public consultation meetings.

The Oyster Farming and Pearl Production Project by MEC, conducted a public consultation and disclosure process on 28<sup>th</sup> February, 2025 with the help of third party, Olive Bright Environmental Solutions Limited (OBES).

## 7.2 **OBJECTIVES OF PUBLIC CONSULTATION MEETING**

Public consultation and information disclosure concerning with the environmental and social impact assessment (ESIA) for the proposed project. The main objective of the Public Consultation Meeting (PCM) is to incorporate the opinion and suggestions of the all stakeholders including but not limited to potential Project Affected Persons (PAPs), government officials, local communities, NGOs, and other interested persons. The key objectives of the PCM are as follows:

- 1) To disclose and inform well about the project information, potential positive and negative impacts due to project activities to the stakeholder in the earliest stage of the implementation of the project
- 2) To ensure that consultation meetings are undertaken in a meaningful, effective way by actively participation of PAPs, stakeholders and local communities.
- 3) To ensure that the concerns of, and issues raised by the PAPs, stakeholders and local communities are incorporated and adequately addressed in the further ESIA study.

## 7.3 METHODOLOGY AND APPROACH

At the project environmental impact assessment phase, as preliminary identification, relevant main stakeholders to the project and project's affected groups were identified. Government authorities and departments are included as the stakeholders in the consultation meeting and



their opinions are recorded. The proposed project information is disclosed through consultation meetings and putting the documents of the project information and suggestion forms.

## 7.4 **IDENTIFICATION OF PROJECT STAKEHOLDERS**

Public Consultation meeting will be held at Hantharwaddy Hall, General Administrative Department Office, Kawthaung Township, Tanintharyi Region with various stakeholders including the representatives from the government organizations, administrative and local people. Considering the project scope, the legal and institutional framework for environmental and social impact management applicable to the project, the following project stakeholders were invited:

- 1) Township General Administrative Department
- 2) Environmental Conservation Department,
- 3) Department of Public Health
- 4) Fire Services Department
- 5) Forest Department
- 6) Township Management Board
- 7) Department of Agriculture
- 8) Department of Fisheries
- 9) Ward Administrators
- 10) Interested person from local
- 11) Local People

## 7.5 **PRE-ENGAGEMENT MEETING**

On 14<sup>th</sup> July, 2024 and 18<sup>th</sup> February, 2025, the OBES consultant team conducted a preengagement meeting for scoping stage and EIA stage PCM with representatives from Oyster Farming and Pearl Production Project by Myanmar Economic Cooperation for the proposed project to discuss the environmental impact assessment process. During this meeting, representatives from the proposed project were given information about the processes of the project, and the consultant team was briefed on the environmental impact assessment procedures, baseline survey, and public consultation meetings.

## 7.6 **PUBLIC CONSULTATION MEETINGS (PCM)**

On 18<sup>th</sup> July, 2024, Myanmar Economic Cooperation has conducted the consultation meeting of the scoping stage for the proposed project, Oyster Culture and Pearl Production. Meeting has been carried out at the meeting hall of Township Administrative Department, Kawthaung Township.

The consultation meeting includes Kawthaung Township Government authorities and local public. As local public, representatives of the Kawthaung Township such as elders, merchants, have participated at the consultation meeting. As government authorities, Township Administrative Department, Department of Fisheries, Environmental Conservation



Department, Department of Forestry, Department of Public Health, and Fire Services Department have attended the meeting and there were 33 attendees in total.

On 28<sup>th</sup> February 2025, Myanmar Economic Cooperation has conducted the consultation meeting of the EIA stage for the proposed Oyster Farming and Pearl Production project. Meeting has been carried out at Hantharwaddy Hall, General Administrative Department Office, Kawthaung Township, Tanintharyi Region.

The consultation meeting includes the Administrators from Kawthaung Township, government authorities and local people. As local people, representatives of Kawthaung Township such as merchants have participated at the consultation meeting. As government authorities, Township Administrative Department, Ward Administration Office Members, Environmental Conservation Department, Department of Public Health, Forest Department, Department of Agriculture, Department of Fisheries and Fire Services Department have attended the meeting.

The project information, infrastructure buildings, water and land use, and implementation process of Oyster Farming and Pearl Production are presented by Project Manager U Bo Bo Hein from Myanmar Economic Cooperation. The Environmental Impact Assessment Process, the existing condition and the findings of environmental quality about the project that have to be undertaken are explained by Director Dr. Lai Lai Win from third party, Olive Bright Environmental Solutions Limited (OBES). Opinions, suggestions and recommendations are discussed at the meeting. Government Authorities, local people, project proponent and third party all participated in the meeting activities. Project proponent discussed with the issues upon the project and third party expressed the works of Environmental Impact Assessments. After the presentation, meeting has carried out based on the issues of local people. All the opinions in the meetings have been recorded. PCM attendant list and Power Point presentation are described in **Appendix-2**. The meeting details are as the followings.

Venue:	Hantharwaddy Hall, General Administrative Department Office, Kawthaung Township, Tannitharyi Region.
Date:	28-2-2025
Time:	10:00 AM – 11:30 PM
Attendees:	44 persons
Agenda:	i. Greeting and introduction
	ii. Presentation of project information
	iii. Presentation of project process
	iv. Presentation of EIA process by third-party consultant
	v. Q&A session
	vi. Closure

Table 7.1Meeting Agenda

There were 44 attendees in total, and the attendant lists are described in the following table.



No.	Name	Position	<b>Department/ Address</b>
		Officials	
1	U Aung Htay Lwin	Assistant Director	Department of Hotels and Tourism
2	Daw May Zin Oo	Staff Officer	Information and Public Relations Department
3	U Kyaw Soe Naing	Staff Officer	Livestock Breeding and Veterinary Department
4	U Nanda Wint Aung	Staff Officer	Irrigation and Water Utilization Management Department
5	U Myo Myint Than	District Staff Officer	Ministry of Transport and Communications
6	Daw Zin Mar Win	District Naval Officer	Maritime Department
7	U Htet Wai Soe	Deputy Staff Officer	Environmental Conservation Department
8	U Thet Paing Soe	Range Officer	Forest Department
9	Daw Than Than Win	Deputy Director	Department of Social Welfare
10	U Kyone Htaung Lyan	Associate Township Judge	Ministry of Justice
11	U Aung Soe	In Charge of the Township	Myanmar Telecommunications Corporation
12	U Kyaw Soe Aung	Deputy Staff Officer	Kawthaung City Development Committee
13	U Win Tun	Assistant Director	Environmental Conservation Department
14	Daw Cho Cho	Assistant Director	Planning Department
15	Daw Chaw Su Kyi	Assistant Director	Internal Revenue Department
16	U Myo	Township Lawyer Officer	Legal Advisory Department
17	U Nay Yu	Assistant Director	Department of Bridge
18	U Aung Than	Deputy Director of Education	Department of Basic Education
19	U Thaw Wai Yan Soe	Commissioner of Customs	Myanmar Customs Department
20	U Zaw Min Soe	Membership (2)	Township Administrative Committee
21	U Myint Aung	Staff Officer	Settlement and Land Records Department
22	U Kyaw Oo	Assistant Director	Department of Religious Affairs



No.	Name	Position	Department/ Address		
23	U Yu Lwin	Administrator	-		
24	U Aung Htike	Administrator	Shwe Hin Thar Ward		
25	U Naing Win	Administrator (Surrogate Attendance)	Shwe Zin Yaw Ward		
26	U Aung Naing	Staff Officer	Department of Fisheries		
27	U Hein Zaw Tun	Staff Officer	Department of Roads		
28	U Chan Myae K Oo	Staff Officer	Department of Immigration		
29	U Thant Zin	Township Officer	Department of Agriculture		
30	U Thein Aung	Staff Officer	Cooperative Department		
31	U Aung Kyaw Oo	Port Officer	Myanmar Port Authority		
32	U Myo Thura Win	Assistant Director	Fire Services Department		
33	U Naing Lin Htet	Township Administrator	General Administrative Department		
34	Major Wai Lin Ko	Township Police Chief	Myanmar National Police		
35	Major Maung Htay	Membership (1)	Township Administrative Committee		
36	U Zaw Min Oo	Membership (1)	Township Administrative Committee		
37	U Thet Ko Naing Phyo	Deputy Staff Officer	General Administrative Department		
No.	Name	Employment	Address		
	Locals				
1	U Win Htay	Construction	Bogyoke Street, Padauk Shwe Wah Ward		
2	U Din Shein	Town Elder	Bogyoke Street, Padauk Shwe Wah Ward		
3	U Ye Mon	Merchant	Bogyoke Street, Padauk Shwe Wah Ward		
4	U Naing Lin	Town Elder	Annawah Ward		
No.	Name	Position	Organization		
		Third Party Orga	nization		
1	Dr. Lai Lai Win	Director	OBES		
2	Daw Myat Thitsar Naing	Consultant	OBES		
3	Daw Thet Wai Hnin	Operation Manager	OBES		



# 7.6.1 Summarized Outcomes of PCMs

According to the activities conducted during consultation process of the scoping phase, some comments and suggestions are raised as follows.

No.	<b>Comment and Suggestion</b>	Response
1.	<ul> <li>Environmental Conservation Department</li> <li>To prepare EIA report in accordance with EIA procedures and related rules and regulations</li> <li>To submit the scoping report within 3 months from the approved date</li> <li>To provide the plan not to burn the waste on open space</li> <li>To submit EIA report within 6 months from the approved dated of scoping report</li> </ul>	Myanmar Economic Cooperation - Noted with thanks.
2.	<ul> <li>Township Development Committee</li> <li>Both of Positive and Negative impacts can be occurred in implementation of the project</li> <li>Positive impacts (like Job Opportunities)</li> <li>Negative impacts (sewage waste, domestic waste impacts on the aquatic, impacts of burning wastes on open space and how to manage)</li> <li>As project proponent, to implement the project better by taking the responsibilities for negative impacts</li> </ul>	Myanmar Economic Cooperation - Noted with thanks.
3.	Township Fisheries Department	Myanmar Economic Cooperation

Table 7.3Comment and Suggestions at Scooping Stage PCM



	- To access whether there are fishermen	- Small Jetty Construction will be at
	who are fishing at there or not	there and fishermen can rest at there.
	- To allow the fishermen to rest as	- The local residents are already known
	temporary	the place where they can fish or not
	- Wish to find out the freshwater	and some places are restricted and
	resources	they already know about it.
4.	Local	Myanmar Economic Cooperation
	<ul> <li>To consider the way for local fishermen at the project area</li> <li>How to dispose the waste without burning</li> </ul>	<ul> <li>Wet waste and dry waste will be separated.</li> <li>Wet waste will be transformed to fertilizer</li> <li>Dry waste will be collected and disposed by contacting with township municipal</li> </ul>



According to the activities conducted during consultation process of the EIA stage, some comments and suggestions are raised as follows.

No.	Comment and Suggestions	Responses
1.	<ul> <li>U Naing Lin Htet (Township Administrator), General Administrative Department Department, Kawthaung Township gave a greeting speech;</li> <li>There are five Pearl Productions in Kawthaung Township.</li> <li>In performing the projects, there may be different impacts on the environment according to the nature of the project.</li> <li>To assess the impacts, it is the good practice of performing the EIA.</li> </ul>	<ul> <li>U Bo Bo Hein (Project Manager, Oyster Farming and Pearl Production Project) gave a greeting speech;</li> <li>About Myanmar Economic Cooperation.</li> <li>Oyster farming and pearl production around Shar Island.</li> <li>Project Location &amp; Project Activities.</li> <li>Project manpower &amp; Infrastructure construction.</li> <li>Impacts on coral and marine species loss.</li> <li>20 KV diesel engine and Solar usages</li> <li>Electricity usage for domestic activities.</li> </ul>
2.	<ul> <li>U Win Tun (Assistant Director), Environmental Conservation Department, Kawthaung District discussed;</li> <li>To follow the law, rules, guidelines and procedure</li> <li>Not to throw plastic waste into the water</li> <li>Not to make open burning to prevent haze pollution</li> <li>To prepare the report in accordance with procedure 109 &amp; 108</li> <li>After the project proponent have received the ECC, to follow the specifications mentioned In ECC and Management Plan</li> <li>To separate bank account for CSR activities and record the activities</li> <li>To perform monitoring report in every six moth and ECD will visit and examine the project site</li> </ul>	<ul> <li>Dr Lai Lai Win (Director), OBES replied;</li> <li>We appreciate your valuable suggestions and discussions.</li> </ul>

 Table 7.4
 Comment and Suggestions at EIA Stage PCM



No.	Comment and Suggestions	Responses
3.	<ul> <li>U Aung Htay Lwin (Assistant Director), Mingalar Department of Hotels and Tourism, Kawthaung Township suggested;</li> <li>To assess soil pollution.</li> <li>To minimize pollution as much as possible.</li> <li>To implement wastewater management.</li> <li>To manage waste by separating different types and providing green/blue containers for disposal.</li> <li>To cooperate with the municipal authorities.</li> </ul>	<ul> <li>Dr. Lai Lai Win (Director, OBES) responded and suggested;</li> <li>Well noted.</li> </ul>
4.	<ul> <li>A Local Resident, Kawthaung Township discussed;</li> <li>Is pearl production exclusively for export?</li> <li>Is there a plan to sell locally?</li> <li>At Kawthaung also, it is wished to sell pearls to local customers.</li> </ul>	<ul> <li>U Bo Bo Hein (Project Manager, Oyster Farming and Pearl Production Project) replied;</li> <li>10% of pearl production must be allocated to Myanmar Pearl Enterprise.</li> <li>90% of production is owned by MEC and is typically sold through Myanmar Gems Enterprise.</li> <li>It will be suggested to establish a shop exclusively for local customers.</li> </ul>
5.	<ul> <li>U Myo Thura Win, (Assistant Director),</li> <li>Fire Services Department, Kawthaung</li> <li>District discussed;</li> <li>To pay attention Haze Pollution Control</li> <li>To burn small amount of waste per time</li> <li>U Aung Than (Deputy Director of Education), Department of Basic Education</li> </ul>	<ul> <li>U Bo Bo Hein (Project Manager, Oyster Farming and Pearl Production Project) replied;</li> <li>Forest fires occur during the dry season.</li> <li>For burning, fire barriers are constructed to control the spread of fires.</li> <li>U Bo Bo Hein (Project Manager, Oyster Farming and Pearl Production Project) replied:</li> </ul>
	How is the education of workers' children planned?	<ul> <li>The number of people has been identified as 180.</li> <li>Once this number is reached, kindergarten, clinic, canteen, and library will be established.</li> </ul>

There were 44 attendees in total, and 21 suggestion forms were collected. The participants made the comment and suggestions that to ensure the ongoing success of the company, and to have significantly contribution to the community and economic development.



- > To engage local intellectuals and professionals in the project.
- To train employees on preparatory measures to minimize environmental impacts during operations, as pearl farming can affect soil, water and air quality.
- ➤ To construct ponds on the island to ensure a supply of clean water.
- To comprehensively outline the natural disaster protection and waste management plans in the report
- > To provide job opportunities for the local community
- To adhere to (5) specific regulations and (15) general regulations outlined in the ECC certificate
- To have an important role in creating job opportunities for the local community and environmental conservation
- > To prioritize hiring locals when seeking professional experts
- > To systematically store plastic waste within the project area
- > To allocate the project's profits to support the local community's contributions
- > To pay special attention to education
- ➤ To dispose the waste systematically
- > To prohibit the disposal of plastic waste and PE containers into the sea to prevent water pollution.
- To prioritize minimizing environmental impact during the implementation of any project, construction, or business as climate change and natural disasters can lead to unwanted losses due to environmental impact.
- To recognize the critical importance of environmental impacts, which can lead to the loss of human resources, wildlife due to wildfires and the loss and migration of marine animals due to water pollution
- To conserve valuable trees by avoiding felling during the project implementation phase
- > To engage with fishermen and discourage the use of explosive mines, thereby protecting marine animals from extinction
- > To provide health care and educational support for the employees
- > To systematically manage solid waste disposal.
- > To systematically mange waste water disposal
- > To carefully implement the waste management system
- > To develop a plan for protecting underwater coral reefs from damage
- To prevent harm on land and underwater environment while promoting sustainable development
- > To enable OBES and the Pearl Farming Project to achieve greater success
- To coordinate with the relevant departments' laws, rules, and mandates related to the project.
- > To focus on ensuring no air, water or soil pollution.



- To anticipate that the project will create job opportunities for local residents after its implementation.
- > To outline the outcomes obtained from the PCM meeting in the EIA report
- To carefully and precisely comply with the responsibilities of the project proponent and third party
- To pay special attention to the implementation of attendees' discussions by the project proponent.
- > To proceed with the project if there are no side effects or chemical disposal concerns.
- > To be mindful of occupational safety
- > To engage with reginal social activities
- > To provide timely health care services to employees
- > To increase investment when a state-owned organization is involved in resourcevaluable business within Myanmar's water zones and land.
- ➤ To contribute beneficially to local development during the project's operation.
- To achieve success through donations, such as donating solar systems to famous pagodas like Pyi Taw Aye Pagoda, providing batteries and car tires to charity organizations, and donating educational and health care supplies to the entire township.
- To propose that pearls produced by the project be sold through showrooms or shops in the Kawthaung region, enabling local residents to wear pearl jewelry accessories. Additionally, I would like to extend special thanks to OBES for carrying out the projects in the Kawthaung region.
- To precisely comply with the rules and regulations issued by relevant departments to prevent damage to the natural environment.
- To successfully contribute to health, education and social welfares of the families of employees working in the project site.



OBES



Figure – Public Consultation Meeting of Scoping Stage







Figure 7-1 Public Consultation Meeting of EIA Stage

#### 7.7 **DISCLOSURE**

Disclosure is a formal way of making information accessible to interested and affected parties. Communicating such information that is understandable to the stakeholders is an important step in the process of stakeholder engagement. According to EIA Procedure Paragraph (65), "Not later than (15) days after submission of the EIA Report to the Department, the Project Proponent shall disclose the EIA to civil society, Project Affected Persons (PAPs). Local communities and other concerned stakeholders: (i) by mean of national media (i.e. newspapers); (ii) the website(s) of the Project or Project Proponent; (iii) at public meeting palaces (e.g. libraries, community halls); and (iv) at the offices of the Project Proponent". All other activities, from consultation and informed participation to negotiation and resolution of grievances, will be more constructive if stakeholders, including affected communities, have accurate and timely information about the project, its impacts, and any other aspects that may have an effect on them.

Disclosure process was carried out in terms of consultation. Stakeholders were informed about consultation meeting one-week advance by invitation letter. PowerPoint presentation was used at the meeting, and Director of third party, Director from Oyster Farming and Pearl Production by Myanmar Economic Cooperation explained the project information in Myanmar Language



that everyone can easy to understand. Discussion, suggestions and recommendation were performed effectively. Meeting duration was based on the comments and suggestions and attendants can participate without worrying time limitation. Feedback forms are also delivered at the meeting for the ones who do not want to talk. Document of project summary were put the administrative offices attached with feedback forms and everyone can give feedbacks and suggestions by reading the document of project summary. Everyone can read about the project and give feedbacks on the project.



# **Chapter 8 CONCLUSION AND RECOMMENDATION**

# 8.1 **CONCLUSION**

This Environmental Impact Assessment (EIA) Report has been prepared for Myanmar Economic Corporation (MEC) to evaluate the environmental implications of the Oyster Culture and Pearl Production Project. The Myanmar Economic Corporation (MEC) operates a wide range of production activities in alignment with the nation's development policies. It supports various sectors such as healthcare, education, economy, social affairs, religion, security, agriculture, livestock, media and communications, and construction, addressing the needs of each sector.

MEC, aiming to further assist the nation's economic growth, proposed Oyster Culture and Pearl Production activities in the waters and land areas of Shar Kyunn Island (Zadetgyi Island), and Kyantcho Island, located in Kawthaung Township, Kawthaung District, Tanintharyi Region. This proposal was submitted to the Office of the Commander-in-Chief (Army) and was approved. The goal of expanding the Oyster Culture and Pearl Production business as a new industry for MEC is to increase foreign exchange revenue for the country while creating more local employment opportunities.

The primary aim of this study is to assess the environmental impacts associated with the project's activities and to design mitigation strategies and management plans to address identified risks. The EIA has been conducted in compliance with the Myanmar Environmental Conservation Law, Environmental Conservation Rules, and Environmental Impact Assessment Procedure.

The assessment focuses on key environmental aspects, including water quality management, waste and wastewater management and resource utilization. Baseline environmental quality measurements and impact analyses reveal that the project activities may significantly affected by waste generation, water pollution and resource consumption. To address these concerns, the project proponents are required to implement a comprehensive Environmental Management Plan (EMP) and specific sub-plans, such as wastewater treatment, waste management and resource management plans.

MEC is committed to responsibly managing environmental and social issues throughout the project lifecycle. This dedication ensures that sustainable development benefits both the project stakeholders and the surrounding community.

During the project construction, except for the loss of land use option, there is no irreversible impact on the surrounding environment. Loss of terrestrial habitats can be mitigated by replantation and landscaping. Moreover, the impacts in project construction are short period in term. However, to avoid negative affect in long term, needs to install proper and systematic management plan on material storage, construction waste disposal and sewage and litter management.



The nature of Oyster Culture and Pearl Production itself is environmentally friendly and there is no chemical usage throughout the pearl culturing process. During the operation, even though there will be seawater circulation from the hatchery and nursery pond and using freshwater to remove biofouling and boring organisms from oyster farm, according to its frequency and volume, it may not be significantly impact on the environment. Although, Oyster Culture and Pearl Production itself is eco-friendly and not negatively significant impact on the surrounding environment, still need to provide the proper awareness and management plan for human activities such as solid waste disposal and sewage disposal.

Since, the methodology of cumulative impact assessment mentioned that "the spatial boundary of 1 km will be used for the cumulative impacts where existing projects are located away from each other cumulative impacts are likely less significant" the significant cumulative impacts are identified as negligible.

By implementing effective mitigation measures and adopting responsible farming practices, the pearl farms can operate sustainably, contributing to the achievement of relevant Sustainable Development Goals (SDGs) such as zero hunger, decent work and economic growth, responsible consumption and production, life below water, life on land and partnerships for the goals. The proposed development will create the job opportunities for local people, it can be considered as positive impact on social environment.

# 8.2 **RECOMMENDATION**

Although the nature of Oyster Culture and Pearl Production itself is environmentally friendly, it still needs to consider the effect from waste generation, energy demand and natural disaster. Therefore, the proper waste and wastewater management system should be installed and to minimize the energy demand, provide adequate water storage facilities and install environmentally friendly lighting and heating system. The proposed project is located in the open sea, the natural hazard vulnerability is high and cyclone shelters should be established with the adoption of proper emergency response plan.

The EIA study has clearly identified the environmental and social issues to be investigated in detail. Based on the study, the report covers all the identified issues and mitigation measures which are in line with all applicable guidelines, regulations, Good International Industry Practice (GIIP) and Practical Oyster Farming Guideline by FAO.

The following recommendations have been made for efficient and effective implementation of environmental conservation, health and safety and social responsibilities through the lifespan of the proposed project.

- Follow the comments and suggestions made by ECD after reviewing this EIA report.
- Once EIA is approved by concerned authority, the efficient and effective implementation is recommended.
- For full and proper implementation of EIA, well understanding and supports by proponent and authority is deem necessity.



- Water resource will be an issue that needs to be considered to consume water sustainably in the long term.
- The management's responsibilities for the safety and health of workers and providing adequate amount of budget.
- To select operation staff as HSE Manager and Assistants and give proper training.
- Good warehouse management is necessary to prevent hazards that have the potential to occur from chemical storage room and handlings.
- To practice and ensure well management training the fire safety plan
- Abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar.

Finally, the proponent commits to follow the comments and suggestions made by ECD after reviewing this EIA report. Once EIA is approved by concerned authorities, effective implementation of EIA by the project proponent is essential. The proponent should abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar. It can be concluded that all of the anticipated adverse impacts of the project can be minimized by the proper mitigation measures described in this report.



# **APPENDIX-1 GOVERNMENT LETTERS**



သို့

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ သယံစာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန ညွှန်ကြားရေးမှူးချုပ်ရုံး

စာအမှတ်၊EIA-၂/၁၆/ပုလဲ(TP)( ၂၂၂၂ /၂၀၂၄) ရက်စွဲ ၊ ၂၀၂၄ ခုနှစ်၊ မေလ **၂**၇ ရက်

ဦးဆောင်ညွှန်ကြားရေးမှူး မြန်မာ့ပုလဲထုတ်လုပ်ရေးနှင့်ရောင်းဝယ်ရေးလုပ်ငန်း

ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်း ဆောင်ရွက်ရန်အတွက် ပတ်ဝန်ကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း(EIA)အစီရင်ခံစာကို ရေးသားပြုစုမည့် အဖွဲ့အစည်း အမည်စာရင်း တင်ပြလာခြင်းအပေါ် သဘောထားမှတ်ချက်ပြန်ကြားခြင်း

ရည် ညွှန်း ချက် ။ မြန်မာ့ပုလဲထုတ်လုပ်ရေးနှင့်ရောင်းဝယ်ရေးလုပ်ငန်း၏ ၁၁-၅-၂၀၂၄ ရက်စွဲပါ စာအမှတ်၊ ဖစ-၁၇/၀၁/၂၄(၁၁၃၂)

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ တနင်္သာရီတိုင်း ဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်းမြို့နယ်၊ ဇာဒတ်ကြီးကျွန်းရှိ လျှာကျွန်း၏ မြေပြင်၊ ရေပြင်ဧရိယာ (၁၀,၄၀၁)ဧက၊ (၄,၂၀၉.၁၃)ဟတ်တာ၊ ကြံ့ချိုကျွန်း၏ မြေပြင်၊ ရေပြင်ဧရိယာ (၃,၇၁၄) ဧက၊ (၁,၅၀၃) ဟတ်တာ၊ စုစုပေါင်းမြေပြင်၊ ရေပြင်ဧရိယာ(၁၄,၁၁၅)ဧက၊ (၅၇၁၂.၁၃) ဟတ်တာအား ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာရေးဆွဲမည့် တတိယအဖွဲ့အစည်းအား အတည်ပြုပေးနိုင်ပါရန် ရည်ညွှန်းပါစာဖြင့် ညှိနှိုင်းလာပါသည်။

၂။ ရေလုပ်ငန်းဆိုင်ရာလုပ်ငန်းအတွက် လေထုညစ်ညမ်းမှုစောင့်ကြပ်ကြည့်ရှုခြင်း၊ ရေထု ညစ်ညမ်းမှု ကြိုတင်ကာကွယ်ခြင်း၊ ထိန်းချုပ်ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှုကြိုတင် ခန့်မှန်းခြင်း၊ ဖလဗေဒ၊ မြေပေါ်ရေနှင့် မြေအောက်ရေထိန်းသိမ်းခြင်း၊ စွန့်ပစ်အစိုင်အခဲနှင့် ဘေး အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲခြင်း၊ လေထုညစ်ညမ်းမှုကြိုတင်ကာကွယ်ခြင်းနှင့် ထိန်းချုပ် ခြင်း၊ လူမှုရေးဆိုင်ရာလေ့လာခြင်းနှင့် သရုပ်ခွဲဆန်းစစ်ခြင်း၊ ဘေးအန္တရာယ်ရှိမှုဆန်းစစ်ခြင်းနှင့် ဘေးအန္တရာယ်စီမံခန့်ခွဲခြင်း၊ ဂေဟစနစ်နှင့်ဖီဝမျိုးစုံမျိုးကွဲ စသည့်ကျွမ်းကျင်မှုနယ်ပယ်များ လိုအပ် ပါသည်။



J

၃။ Olive Bright Environmental Solution Co., Ltd (OBES)သည် ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင် ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းအရ အကြံပေးအဖွဲ့အမျိုးအစား (က) ရရှိထားသည့် အဖွဲ့အစည်း (လိုင်စင်အမှတ် ElA-CO(A)002/2023) ဖြစ်ကြောင်းနှင့် အထက်အပိုဒ် (၂) ပါ နယ်ပယ်များနှင့် အထောက်အကူပြုအဖွဲ့ဝင် (၃) ဦးတို့ပါရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။

၄။ သို့ဖြစ်ပါ၍ မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ တနင်္သာရီတိုင်းဒေသကြီး၊ ကော့သောင်း ခရိုင်၊ ကော့သောင်းမြို့နယ်၊ ဇာဒတ်ကြီးကျွန်းရှိ လျှာကျွန်း၏ မြေပြင်၊ ရေပြင်ဧရိယာ (၁၀,၄၀၁) ဧက၊ (၄,၂၀၉.၁၃) ဟတ်တာ၊ ကြံ့ချိုကျွန်း၏ မြေပြင်၊ ရေပြင်ဧရိယာ (၃,၇၁၄) ဧက၊ (၁,၅၀၃) ဟတ်တာ၊ စုစုပေါင်းမြေပြင်၊ ရေပြင်ဧရိယာ(၁၄,၁၁၅)ဧက၊ (၅၇၁၂.၁၃) ဟတ်တာအား ပုလဲမွေးမြူ ထုတ်လုပ်မှုလုပ်ငန်းနှင့်စပ်လျဉ်း၍ အောက်ပါအတိုင်း ဆက်လက်ဆောင်ရွက်နိုင်ရန် သဘောထား မှတ်ချက်ပြန်ကြားအပ်ပါသည်-

- (က) Olive Bright Environmental Solution Co.,Ltd (OBES) အား မြန်မာစီးပွားရေး ကော်ပိုရေးရှင်းမှ တနင်္သာရီတိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်း မြို့နယ်၊ ဇာဒတ်ကြီးကျွန်းတွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ပုလဲမွေးမြူ ထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို ပူးတွဲပါလေ့လာဆန်းစစ်ရေးအဖွဲ့ဝင်များဖြင့် ဆောင်ရွက်မည့်အပေါ် အတည်ပြုကြောင်း၊
- (ခ) လေ့လာဆန်းစစ်ရေးအဖွဲ့တွင် လုပ်ငန်းလိုင်စင်မရရှိသေးသော တတိယပုဂ္ဂိုလ်များ ထည့်သွင်းဆောင်ရွက်မည်ဆိုပါက အထောက်အကူပြုအဖွဲ့ဝင်အဖြစ် (၂) ဦးသာ ခွင့်ပြုကြောင်းနှင့် အထောက်အကူပြုအဖွဲ့ဝင်တစ်ဦးလျှင် နယ်ပယ်တစ်ခုအတွက်သာ ဆောင်ရွက်ခွင့်ရှိကြောင်း၊
- (ဂ) (EIA)အစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း
   အပိုဒ် ၄၈၊ ၄၉၊ ၅၀၊ ၅၁၊ ၅၂၊ ၅၃ တို့နှင့်အညီ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း
   ဆိုင်ရာနယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာကို သယံဇာတနှင့်သဘာဝ
   ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ ရေးဆွဲပြုစုတင်ပြ အတည်ပြုံချက်ရယူရန်၊
- (ဃ) အတည်ပြုထားသည့် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာနှင့် ဆောင်ရွက် မည့်လုပ်ငန်းတာဝန်များကို အခြေခံ၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၅၆၊ ၅၇၊ ၅၈၊ ၅၉၊ ၆ဝ၊ ၆၁၊ ၆၂နှင့် ၆၃ တို့နှင့်အညီ



9

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကိုပြုစု၍ သယံဧာတနှင့်သဘာဝ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ တင်ပြ၍ အတည်ပြုချက်ရယူရန်၊

(င) စီမံကိန်းနှင့် ဆက်စပ်သောဒေသများတွင် ဌာနဆိုင်ရာအဖွဲ့ အစည်းများ၊ အစိုးရ မဟုတ်သော အဖွဲ့ အစည်းများ၊ မိဒိယာများ၊ ဒေသခံများ၊ စီမံကိန်းကြောင့် အဓိက ထိခိုက်ခံစားရမည့်သူများပါဝင်လျက် တွေ့ဆုံဆွေးနွေးမှုများ ဆောင်ရွက်ရန်နှင့် ၎င်းတို့၏ အကြံပြုချက်နှင့် လိုလားချက်များအား အလေးထားပေါင်းစပ်ဆောင်ရွက် ရန်။

ညွှန်ကြားရေးမှူးချုပ် (ကိုယ်စား) (အောင်ကျော်မိုး၊ ဒုတိယညွှန်ကြားရေးမှူးချုပ်) ဖွ က တ ဦ

မိတ္တူကို

------

ညွှန်ကြားရေးမှူးချုပ်ရုံး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန ညွှန်ကြားရေးမှူးရုံး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ တနင်္သာရီတိုင်းဒေသကြီး ရုံးလက်ခံ၊ မျှောစာတွဲ



ပူးတွဲ

မြန်မာစီးပွားရေးကော်ပိုရေးရှင်းမှ တနင်္သာရီတိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်းမြို့နယ်၊ ဇာဒတ်ကြီးကျွန်းရှိ စုစုပေါင်းမြေပြင်၊ ရေပြင်စရိယာ(၁၄,၁၁၅)ဧက၊ (၅၇၁၂.၁၃) ဟတ်တာအား ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment – EIA) အစီရင်ခံစာအား ဆောင်ရွက်မည့် လေ့လာဆန်းစစ်ရေးအဖွဲ့ဝင်များ

စဉ်	ပညာရှင်အမည်	လုပ်ငန်း	အဆိုပြုအစီရင်ခံစာအတွက် တာဝနှံယူ
-	Rough a Tel son	လိုင်စင်	ဆောင်ရွက်ခွင့်ပြုသည့် နယ်ပယ်များ
	e és an s	အမှတ်	
С	ဒေါက်တာလဲ့လဲ့ဝင်း	EIA-C 019/ 2023	၁။ ရေထုညစ်ညမ်းမှု ကြိုတင်ကာကွယ်ခြင်း၊ထိန်း
	(Team Leader)	beida aber	ချုပ်ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှု
			ကြိုတင်ခန့်မှန်းခြင်း
	the second		၂။ ဂေဟစနစ်နှင့် ဇီဝမျိုးစုံမျိုးကွဲ
			၃။ စွန့်ပစ်အစိုင်အခဲနှင့် ဘေးအန္တရာယ်ရှိ စွန့်ပစ်
			ပစ္စည်းစီမံခန့်ခွဲခြင်း
			၄။ ဘေးအန္တရာယ်ရှိမှုဆန်းစစ်ခြင်းနှင့် ဘေးအန္တ
			ရာယ် စီမံခန့်ခွဲခြင်း
J	ဦးမင်းမင်းဦး	EIA-C 020/ 2023	၁။ လေထုညစ်ညမ်းမှု ကြိုတင်ကာကွယ်ခြင်းနှင့်
	(Deputy Team		ထိန်းချုပ်ခြင်း
	Leader)		၂။ မိုးလေဝသနှင့် လေအရည်အသွေးဆန်းစစ်
		- angeneration	ူခြင်းနှင့် ကြိုတင်ခန့်မှန်းခြင်း
2	ဒေါ်မြတ်သစ္စာနိုင်	EIA-C 021/ 2023	၁။ လူမှုရေးဆိုင်ရာ လေ့လာခြင်းနှင့် သရုပ်ခွဲ
			ဆန်းစစ်ခြင်း
9	ဦးမျိုးသူရ	EIA-C 046/ 2023	၁။ ဘူမိဆိုင်ရာဆန်းစစ်လေ့လာခြင်း
			၂။ မြေဆီလွှာထိန်းသိမ်းခြင်း
ງ	ဦးခင်မောင်ဝင်း	EIA-AC 028/ 2023	၁။ ရေထုညစ်ညမ်းမှု ကြိုတင်ကံာကွယ်ခြင်း၊ထိန်း
			ချုပ်ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှု
	A State State State State	and the bar is	ကြိုတင်ခန့်မှန်းခြင်း

CS CamScanner

Walter Distant

<b>J J J I</b>
----------------

٩.

		and the second se	
	i sau in	en Fridigianen eta a	၂။ ဇလဗေဒ၊ မြေပေါ် ရေနှင့်မြေအောက်ရေ ထိန်း
1			သိမ်းခြင်း
. 4			၃။ အထွေထွေပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း
G	ဦးစည်ယံဟိန်း	EIA-AC 026/ 2023	၁။ ဘူမိဆိုင်ရာဆန်းစစ်လေ့လာခြင်း
9	ဦးကျော်ဝင် <b>း</b> ဟန်	EIA-AC 027/ 2023	၁။ လေထုညစ်ညမ်းမှုစောင့်ကြပ်ကြည်ရှုခြင်း
ଚ	ဦးထက်သီဟဖုန်းမြင့်	EIA-AC 032/ 2023	၁။ ဘူမိဆိုင်ရာဆန်းစစ်လေ့လာခြင်း
			၂။ ဆူညံသံနှင့်တုန်ခါမှု
6	ဒေါ်အိသက်မွန်	EIA-AC 017/ 2023	၁။ ရေထုညစ်ညမ်းမှု ကြိုတင်ကာကွယ်ခြင်း၊ထိန်း
			ချုပ်ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှု
		1	ကြိုတင်ခန့်မှန်းခြင်း
			၂။ စွန့်ပစ်အစိုင်အခဲနှင့် ဘေးအန္တရာယ်ရှိ စွန့်ပစ်
			ပစ္စည်းစီမံခန့်ခွဲခြင်း
00	ဦးခင်မောင်အေး	EIA-AC 018/ 2023	၁။ ရှေးဟောင်းသုတေသနနှင့် ယဉ်ကျေးမှုအမွေ အနှစ်
၁၁	ဦးစိုးပိုင်ဟိန်း	EIA-AC 019/ 2023	၁။ အထွေထွေပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း
၁၂	ဒေါက်တာဖြူဖြူမြှင့်	EIA-AC 020/ 2023	၁။ ကျန်းမာရေး
<b>5</b> 6	ဦးညွှန့်ဦး	EIA-AC 036/ 2023	၁။ အထွေထွေပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း
	ဦးကောင်းကော်ထက်	EIA-AC 049/ 2023	၁။ ဘေးအန္တရာယ်ရှိမှုဆန်းစစ်ခြင်းနှင့် ဘေးအနွ

J



# **APPENDIX-2 PCM ATTACHMENTS**

22164	ပတ်ဝန်းကျင်ထိခိုက် မှုတ်ဝန်းကျင်ထိခိုက် နူးပွဲကျင်းပသည့်နေရာ – <sup>ဟုဝဘာ</sup>	မြန်မာစီးပွားရေးကော်ပိုရေး မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစ ၂၀၂၅ ၁၀%ခန်းဖ)အဆွင်ခ်ဥ၆ချုင်ဆူး	းရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းနှင့်ပ ၁နှင့်ပတ်သက်၍ အများပြည်သူနှင့် တွေ့ဆုံဂ ၂ ခုနှစ်၊ ဖေဖော်ဝါရီလ ( <sup>2</sup> 8) ရက် <sup>(ဦး</sup> ® ဌာန ၂ရကာသော <sup>ဦး</sup> မြို့	တ်သက်၍ ဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရ	ຸຣີ:
စဉ်	కార్ చెంది	ရာထူး	ဌာန/ အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှ၀
00	Fanet	Epred & B	நீது கூதிழைக்குகு	9-423004678	~
2	Penyrsp. 6m	2-2-2-3-37	Fight Court	09455811389	ð
22	2:08:081	N100 23 (91):	စကိုဗီ ပ တဝန်းကျင်တို့သိဖ်းရား	09.972878640	Reg
29	ર્કી શેદ્ધ	စ္ က ဗ်ဆိန္ က ။ န	Q FUSSings	09422196685	DE
29	63rozha Gps	NULEONE 220 BUL 1	Or of 2220	09 49252205	J.
20	Sien 1	algupussing f	pug 3	09-254281531	a
29	2.69mL	w(0 23 mm og. 21 !	en: Bo	09-691038329	Day
つつ	g: Gene onf:	3. margor 5	uprof;	09251003170	4
28	f: esseria:	home of shi	nonos	0976285640Y	(X-
.10	S. GOGWER S.	1000 (1)	Sala & is is sol and and	09.4100.5428	49



# **©BES** မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းနှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရင်း

၂၀၂၅ ခုနှစ်၊ ဖေဖော်ဝါရီလ (28) ရက် ဆွေးနွေးပွဲကျင်းပသည့်နေရာ - <sup>ဟာသာတာ</sup>ခန်းမမာတွေ<sup>၂</sup>အုပ်ချုပ်ရေး ဗိုးဗီးဌဂုမ ၊ကော့သော မ်းဖြို,

လက်မှတ်	ဆက်သွယ်ရန်ဖုန်း	ဌာန/ အဖွဲ့အစည်း	ရာထူး	အမည်	စဉ်
with in	250 291 495	Ans i al	un and the second	Granzaringe	32
62:	09422196655	28606/2005 88998	Sistering	esteraes.	1"
- ma	0g: 885765 132	usos el.	7:8:58	2? on a ste	2n
Sve.	09425278984	20256098. 3.8.54	\$ G	2: 9302 Gm E	4
- Fi	09-2150333356	gelson 00	276826	fr we sole	<u> </u>
2	09- 481868505	292699693632355	<u>ခရိုင်ရေရွှေဘြဘာသီးစီး</u> ခုနှိုယ်နှိုင်မျှ၊	estecuroe,	G. 9
Part	09-262506465	<i>බොමු</i> හි පිටුදු	ලෙන අවුරිලිපි:	garages.	Ø.
barn	og- 420736663	MB. of 2: 22 3. 34	3-23800:07:90	alles finder	8
P	09-258846897	221, 22, 21, 21, 2	or- of ensomiszo	3: Mileon : WA	00



concert	ပတ်ဝန်းကျင်ထိခို၊ ကျင်းပသာ္ဘင်နေရာ - ဟု <sup>ံည</sup>	မြန်မာစီးလွှားရေးကော်ပုံရေးရှင် က်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှံ ၂၀၂၃ ခုနှ ၂၀၂၃ ခုနှင်းမ ၊အတွေ့ရေးထွာခရာ (၁၉၇)	းအ၊ ပုံလခွေးမြူထုတ်လုပ်မှုလုပ်လ င့်ပတ်သက်၍ အများပြည်သူနှင့် လေ နစ်၊ ဖေဖော်ဝါရီလ (22) ရက် <sup>B:</sup> ရ 2န ၂ကေက္ဘဘောင်းကြီ	နးနှင့်ပတ်သက်၍ ဘွဲ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာ	စရင်း
စဉ်	ఆటన్	ရာထူး	ဌာန/ အဖွဲ့ အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှ
, וכנ	p:p.S.can	Sira	Jua 95:	07.695202050	Se.
77	Geerly D:	esatherie Sizli	Acous 36 e	09-256250991	S
JP' E	Aco george	82 5 34 567 1 St.	<u> </u>	09428712895	Q.
J91 2	mforzarea	الجارة والجار	egossage of the	09266824447	02
19 (	7. 2808-	( mgไ	ଗ୍ଯିତ୍ତେ ବର୍ନ	09252 180631	ACC.
JG	Range	F-18	eliverer.	09254244024	and
12. 8	Son of.	p. 1 g	~5,228	09-493702555	Ő
Ja (	geographic Cer E:	S. G	nom	09.782163030	C
					1000

දෙදෙ	ပတ်ဝန်းကျင်ထိခို၊ းပွဲကျင်းပသည့်နေရာ - <sup>ပက်ဘ</sup>	မြန်မာစီးပွားရေးကော်ဝို က်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်း ၂၀ ခြင်း ဇွဗ်သွာအများ အခြင်း	ရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းနှင့်ပ စံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့် တွေ့ဆုံ၊ ၂၅ ခုနှစ်၊ ဖေဖော်ဝါရီလ (2 <i>8</i> ) ရက် ရေး ဦးစီးဌာန ) ကော့ဘောင်းမြို့	ာတ်သက်၍ ဆွေးနွေးပွဲသို့ တက်ရောက်သူစာ	෧ඁ෮ඁඃ
စဉ်	ఆ కారి	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်ဖုန်း	လက်မှ၀
٦.	\$:08:04'	emu 12 eu 1	אר און א מזוני , שהיה הכסקא.	09428780152	Just
J	G: 25 3	B. E. E. u	-y —	09250470790	H
2	2:927	0262225	L.	09250775225	1
ę.	S. Start	6. 1.5 6.9 - 6	singd gragas.	095845205	D
			- 1960, 118		1



දෙදෙ	ပတ်ဝန်းကျင်ထိခိုက်မှူး းပွဲကျင်းပသည့်နေရာ - <i>ဟဲသာဝတ်</i>	မြန်မာစီးပွားရေးကော်ပိုရေးရ ဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာ ၂၀၂၅ း <sup>ခြ</sup> ခန်း (ခ) ျ <sub>ခံစတ္တေ</sub> ါ့ <sub>အျ</sub> ပ်ချွပ်ကြေး	ရင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်း နှင့်ပတ်သက်၍ အများပြည်သူနှင့် တွေ ခုနှစ်၊ ဖေဖော်ဝါရီလ (2౭) ရက် <sup>ခု.စြ:</sup> ဌဂ <sub>ုမ</sub> ၢကော့ဘော <sup>င်း</sup> မြို့	နှင့်ပတ်သက်၍ ၇့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရ	<b>૧</b> ટેઃ
€	အရည်	ရာထူး	ဌာန/ အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှ၀
37	g. ssf. ore	Coloren "	Bay al.	09422200910	(R) -
÷	S Strome	8.8	22008	09, 250336177	Z
2	BernEard &	252 mg mg	mpa	0943069551	80-
5	Profine Con	60	2000523206	094200 84191	YA
	e we we		U	() 0 1 1	- 10
		- The Arthon and Arth		Sherry Charles	1
		a graty and a	the states of th	A BALLAND	1631
8.9		Sand Martin	Super Co	Mary and the states	. Car
				and the first first	
	S. Wheeler Press	Salar a ser	Carl Contractor and the second	al an and a could	1.11

# 

# မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းနှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရင်း

၂၀၂၅ ခုနှစ်၊ ဖေဖော်ဝါရီလ (2 🕱 ရက်

ဆွေးနွေးပွဲကျင်းပသည့်နေရာ - ဟာသာဝတီခန်း၊ ၊ နာတွေ ဖရပ်ချုပ်ရေး ဦးစီးမှုန္ ၊ကော့သောင်းမြို့

€®	အမည်	a poq!	3 planger 19 mg	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
21	ဦး ဦေလေဒေသ	@. રાગ્ટ્ર જ બર્ગા હતાં . ગ્રાપ	mොහොතිායි.ද051 හෙ ∕ අර		
ىل	ရဲမျး စေ လင်း ကို	ઉ. ૧૦૬ વે જ હ છું. બાર	, 1 දිනරදු,	1.1	
2"	ရိက္ ဂါ[း စောင္ရင္မေး	のは、08(5)	" કુશ્રત્વરગાવયં મંદ્ર		e 31
G1	3,600,08,8,	mg. 0E (j)	ta u		
୍ୱ	g. 2	15 8 3 3 1 3 V	Ge for 180 20 19		25
10					
				E. Engl	
				11 - 11 - 11 - 11 - 11 - 11 - 11 - 11	40.0.2
		201		No.9, Block-36,Nawadi Yangon-Pathein Road, Hlaing	ay Garden Hou Thar Yar Town Yar



# CBES <sup>စန်း</sup>ဦးခြောက်ကြည်းရှောက်မှုကျွှောက်ချင်း ဖွေးသွင်း ကျွှောက်မှုကျွှော် အဖြူကြီး ကျွှောက်ချွှောက်ချင်း ကျွှောက်ချင်း ကျွှောက်ချင်း ကျွှော်ကျွှော် ကျွှော်ကျွှော် ကျွှော်ကျွှော် ကျွှော် ကျွှော် ကျွှောက်ချင်း ကျွှောက်ချင်း ကျွှော် ကျွ အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန် နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ မုတ်ကောင်ာဘ.ဖောက် ပုဂဲခ်မွေးမြူထုတ်လုပ်ရေ : လုပ် မှ : စီမံကိန်း အမည် නේ පියාදි වෙදිවෙදී မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ 2 - 23 for:eq:41: အမည် ရှိလျှင် (√) မရှိလျှင် (x ) (..................) ဆက်သွယ်ရန်ဖုန်း 09-420736663 နေရပ်လိပ်စာ 6000 E: [3]. နေ့စွဲ 28.2.2025 အကြံပြုချက် () 6320 à 32 3 Uznger 30 000 Uznge up. 2 ab Equre av more fle Eq: 62016 g 16 6107 98 No.9, Block-36,Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, angon

**OBES** 

OBES Open Big ed : ent of edibes <u>ကျင်တို့ခိုက်၊</u> နှင့်ပတ်သက်၍ အကြံပြုလွှာ သူနာနှင့် နော် နေလော် အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန် နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ haverer on hos en ale where save nor shok got when he စီမံကိန်း အမည် (जि विदाये မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ 8:08:69: အမည် ရှိလျှင် (√ ) မရှိလျှင် (x ) (.....) ဆက်သွယ်ရန်ဖုန်း 09428780152 ဗိုလ်ချိုမ် ကားမ်း ၊ ပိစ်ကက်ရွှေဝါ နေရပ်လိပ်စာ နေ့စွဲ 28.2.2025 အကြံပြုချက် tred: Oted, Tradisson agres edermer enderages some nover after this after a the contract after a start a start after a start a start after a start Beref Days Mild gerdes norokiut offere entry of areal Aar Oreseerder Bridson ober Bigs 29. meakers welle and be Mer Siland? No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, angon

**OBES** 

OBES အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန် နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ စီမံကိန်း အမည် မိမိအမည်အား အစီရင်ခံစာတွင် ESTAENOE. ဖော်ပြလိုခြင်း ရှိ/မရှိ အမည် ວຊີຮີຣຊຣີເຊາະ 2: 8: ရှိလျှင် (√ ) မရှိလျှင် (x ) (.....) ဆက်သွယ်ရန်ဖုန်း 09-421268505 ကော့သော မြို့၊ ၊ ခရိုစရေ ကောင်း ဦးစီး ဌ ကု နေရပ်လိပ်စာ 28.2.2025 နေ့စွဲ အကြံပြုချက် - စိန့်သစ် ဂစိစာာစစ်သယ် စနစ်သယ် ရိုးစစ်မည် -ဂလမ္ပစ္စာစီး၊ ၊ လော့ရ် စီပဲ စတဲ့ မရှိစာရမ် လွှ ဂ၉လသူ ဖြင့်သင့ No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, angon



# မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ

	အကြံပြုချက်များအား အောက် လူကြီးမင်း၏အကြံပြုချက်အား	ာ်တွင် ဖော်ပြပေးပါရန်နှင့် လှိုက်လှဲစွာ ကြိုဆိုပါသည်။	
စီမံကိန်းအမည်	§ ဖုတ်ကောင်သားဖောက်မှုလဲမွေးဖြူထုတ်လုပ်ရေးလုပ်		
အမည်	2- 2:8: 41.	မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ ရှိလျှင် (√ ) မရှိလျှင် (× ) (/)	
ဆက်သွယ်ရန်ဖုန်း	09455811988		
နေရပ်လိပ်စာ	@,705015VE		
ရက်စွဲ	10.1. 1010		

#### 39/02/03/02

באבי אחר לבגב לא האי ואי אייני אייני אייני איין איי אייני Any source of : WE BE I B & SUS for SU B & SUS of the SU B B & SUS AND SOME OF Ge: 12700001:42 mos about Ge: 600 E 40 from of 2 2 2 3 107 aport fr 01215 4 みしょいたい、大変も、ならい、ののい、あのいをいろう、のたいのいないののない、しかいのかののの、 and sources of now allowing so Bray als and core as all age as as a coper front & sources and and נט כורי אי שלאת אי בדרור אי היאי באבור אי שייוי אי שייו באי או שיירי אי שייו אי שיייי אי שייייי

> No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, angon


# **OBES** မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ ဖုတ်ကောင်သားဖောက်ပုခာမွေးဖြူစ၀ုတ်ရာမရေး ရာဗ်ငန်း စီမံကိန်းအမည် မိမိအမည်အား အစီရင်ခံစာတွင် giannessor. ဖော်ပြလိုခြင်း ရှိ/မရှိ အမည် 3-022069: 911: ရှိလျှင် (√ ) မရှိလျှင် (x ) (.....) ဆက်သွယ်ရန်ဖုန်း 09251003170 နေရပ်လိပ်စာ 500: 4 \$ . OE. ရက်စွဲ 28.2.25 အကြံပြုချက် Non inter mon and and a ste No.9, Block-36,Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, angon

**OBES** မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ เอยาธารรรมเลยาก ปารเมาย์ชื่อเห็นอาเหลา စီမံကိန်းအမည် မိမိအမည်အား အစီရင်ခံစာတွင် BingliconEnge ဖော်ပြလိုခြင်း ရှိ/မရှိ အမည် တွဲ ဖက်မြို့နယ်တရားသူကြီး ရှိလျှင် (√ ) မရှိလျှင် (x ) adrediedes (.....X.....) ဆက်သွယ်ရန်ဖုန်း 09-258846897 နေရပ်လိပ်စာ Misromo ရက်စွဲ 10-1-1019 အကြံပြုချက် » อิบภิษาสีอากพบ บอกอกอส์บอบอายาสา องอกการระสาส » อิบภิษาสุกอก การเกษาตา Goliz wenn ficerwarga yE golg For Ferry 38 No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, Yangon

	အကြံပြုချက်များအား အောက်တွင် ဖေ လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲ	ဉ်ပြပေးပါရန် နှင့် စွာ ကြိုဆိုပါသည်။
စီမံကိန်း အမည်	ဖုတ်ကောင်ဘားဖောက်ပုံလဲ မွေး(	magana beg: ap Beg
အမည်	(મુઝેકીજિલ્ડ! તેી: ) કુ:ભેચદુર્વુ પ્	မိမိအမည်အား အစီရင်ခံစာဝ ဖော်ပြလိုခြင်း ရှိ/မရှိ ရှိလျှင် (√ ) မရှိလျှင် (x ) ()
ဆက်သွယ်ရန်ဖုန်း	cq 266824447	
နေရပ်လိပ်စာ	ອຽດກາງຊີ້ - 262	අගති . කොහොතිවේ.
နေ့စွဲ	elonger - teoplas - teoplas	
නොදු ලැහ	alon and and contraction and c	35 wight and interest
මෙනයම් ලබා නමිත තුරුන ආගාර පොලි මා තැතෙමුවර	වේ වේ විදුවුව මේවා නොගති වෙන්නේ වේ දෙක වේ නොගේ වෙන්නේ නොග නොග වේ වේ වේ වේ වේ වේ වේ වේ වේ වේ වේ වේ වේ	3.5 corofingessfind

OBES <u> (ဗန္ဗနားစွားကြီးထား စေသဥဌာဗဗီး ဗီဠ;</u> 🤐 ရသင္စာသားသားကောက္ခက်<u>ဗား မားကြိုစပ်</u>; လုပ်ငန်းအတွက် ယာင်ရှင်းကျှင်ဝပ်ခိုက်မှု ဆန်းစွဲစွေငြီအစီရင်ခဲ့စာ- နှင့်ပတ်သက်၍ အကြံပြုလွှာ အကြံပြုချက်များအား အောက်တွင်ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏ အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ မုတ်ကောင်စဘးဟော်မူသိစမ္မ:မြူစျေးစုပ်ငန်း စီမံကိန်းအမည် 3: Ge con E မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း အမည် 2:19 ရှိ/ မရှိ ရှိပါက ( 🖌 ) မရှိပါက (×) ୍ୱେତ୍ଦେକ୍ ଟି: ဆက်သွယ်ရန်ဖုန်းနံပါတ် ၀၅ - 6 ရ 5 2 ၀ 205 ၀ emosal: [4]. နေရပ်လိပ်စာ ရက်စွဲ 28.2.2025 အကြံပြုချက် · voro (:m/2003 corsequer for a for more in like : ) and in a (الدرد) محد محمود مرد مرد مرد مرد مرد الم مرد مرد المع مرد المع مرد (المع مرد المع مرد المع مرد (الم 

المحقق فراج المحافظ المحا	ייני גישת EIA איניתי אייני אייני אייני	၏ နှင့်ပတ်သက်၍ အကြံပြုလွှာ
	အကြံပြုချက်များအား အောက်တွင် ဖော် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ	ပြပေးပါရန် နှင့် ၁ ကြိုဆိုပါသည်။
စီမံကိန်း အမည်	ၾတိအောင်သားဖောက် ပုလ်မွေးဖြူထ	anger of a land and the
ఆలన	Brace Brossell, (Bas Bredi)	မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ ရှိလျှင် (√ ) မရှိလျှင် (x ) ()
ဆက်သွယ်ရန်ဖုန်း	09-422200910	
နေရပ်လိပ်စာ	er essa : Br	
နေ့စွဲ	28.2.2025	
<ul> <li>a Streeson of the second of the</li></ul>	venlossfectance or ong of: br: O - greco zischer. y. of ege zal slossficmt -loss - w offered: 10 20 of all of y-of georg 26, 5600 JE of	Alion 206000 of Scienter of regrassinger
		No 9. Block-36 Nawaday Gardei



**BES** 

CBES မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ poromen why is the die bound of the စီမံကိန်းအမည် မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ 3: GmEGGype အမည် ရှိလျှင် (√ ) မရှိလျှင် (x ) (.....) ဆက်သွယ်ရန်ဖုန်း 250 291 495 နေရပ်လိပ်စာ 2255 (002) 65 18 506: เอรีอออ์เมียมา เอาเฉาย:เยิ. ရက်စွဲ 28.2.2025 <u>အကြံပြုချက်</u> on of the function of sandy contaction of the " JN Ju Weast Management with as bangy Soft contation conferences " approved Coral grim: 23 man buy spearer: 202 av. 00 milling " 21 ocoul, ogann wymer acograt Sustainable Development aborgelages " 51 OBES ynderstations and actuary accompany for down " 9. Not comparts m: m: m: No.9, Blogoth Alday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township,

**BES** မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ posenses end the Bill der had in had စီမံကိန်းအမည် မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ Standards: အမည် ရှိလျှင် (√ ) မရှိလျှင် (× ) (.....) ဆက်သွယ်ရန်ဖုန်း 0943069551 ടായ്ക്കുറിവാഷ്ട്ര ബാലാമുരി နေရပ်လိပ်စာ ရက်စွဲ အကြံပြုချက် + 日日のうちののので、このののでのでののののでのでのでの and the shout is the source of the lend for the No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township,

CBES မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ HOY ENDE DU MUNDI &. MY EIDI EUT mage used medden up i har son and i ar sing mage in the second of the son and i ar sing mage in the second of the son and the son and the Billion and the son and the son and the son and the Billion and the son and the son and the son and the son and the Billion and the son and the စီမံကိန်းအမည် 3:00100: fr ဖော်ပြလိုခြင်း ရှိ/မရှိ အမည် ရှိလျှင် (√ ) မရှိလျှင် 😰 (.....) 09. 8857G5132. ဆက်သွယ်ရန်ဖုန်း 生、好をのう? နေရပ်လိပ်စာ 5 28-2.215. ရက်စွဲ အကြံပြုချက် 2 12 25. 30 26 6m: 08 m 28; MD: 8 5 202003 Stop ATANS BURNE CONTRACT CONTRACTOR OF A ~ 313 Ung wE: Ogi ed. ADT al gre egos glee Beg of n 6 65 20 200 (41 41. 07: 28 Eq. 310: 3E 23 8) & ozar for ought of go on EG Rus n of ook: 1945 of mold; mol, Book for A Siosur · soft & antigra ou after ou on one on u No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township,



မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ

$\delta \dot{a} \dot{a} \dot{a} \dot{a} \dot{a} \dot{a} \dot{a} \dot{a}$		wp: 5, 6, 603, 20 gp. N. c. 6 6 8
အမည်	ဦး မျိုး သူ ရ ဝ <u>စ</u> ိုး	မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ ရှိလျှင် (√ ) မရှိလျှင် (× ) ()
ဆက်သွယ်ရန်ဖုန်း	09-420084191	
နေရပ်လိပ်စာ	25788. 22028. 8. 911 9	เ เบร์ (อีเกอ (เมา) ครูอโลบัญณ์เอากอา
ရက်စွဲ	28.2.2025	
	<u> အကြံပြုချက်</u>	
(၁၁ မြန်မာ)	වේ ( හම විද් ලිද්භා දිව	7 var: 30 & 2 & 3 6 ? 00 ?
22000		man and and and and
6905	earenaet to ge	a fill i stel 22.
	9	
(1) m2 2020	20 6 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Jame & Correst &
(1) m2 20 20 20 20 20 20 20 20 20 20 20 20 20	En estersol 20102	6. grap 6322 2' 47; g. G?; β grap 6322 2' 47; g. G?; β g h 6 6 82 m n2 03 P on 03 2 0 20 8 g h 6 2: 60 n 2 1 (0) 4. 20 03 8 (6 2 5 6 0 m 6 n; n) 2 ?. 20 38 (6 2 5 6 0 m 6 n; n) 2 ?. 20 38 tem 13 [ 3 ] 9 (3 ) 0 ?? 20 39 tem 13 [ 3 ] 9 (3 ) 0 ??
(1) m (1) 200 200 200 200 200 200 200 200 200 20	50062:00:00006 & 10000 200000000000000000000000000000000	e grap es 22 2' yr: g. Ch; e grap es 22 2' yr: g. Ch; e g & c b 2' mo 20 e ord g o 20 f & 2' 6 2' 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0



# မြန်မာစီးပွားရေးကော်ဝိုရေးရှင်း၏ ပုလဲမွေးမြူထုတ်လုပ်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာနှင့်ပတ်သက်၍ အကြံပြုလွှာ

စီမံကိန်းအမည် ဎူကဲ ေမွးဖြူ ထုတ်ကုပ်ဖြင်းကုပ် မိုး		રે:n2ઇલે:
အမည်	\$7 06 × CF:	မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ ရှိလျှင် (√ ) မရှိလျှင် (x ) ()
ဆက်သွယ်ရန်ဖုန်း	09.972878640	
နေရပ်လိပ်စာ	man olgunger , com, es	wer &.
ရက်စွဲ	10-1-7070	
(2) ann	ရောက္။ကာဘီ က်ား ဆုေယာင္မ မထ	်မ် ကွေ ဆောင္ပေါ် များသူ ရွာလုု ့ မိုး လင္ ၉ ဒါမ္ ၏ား ဆႏ စ္လာလုု ့သွင္ရရွာ

မြန်မာစီး ပတ်ဝ	ပွားရေးကော်ပိုရေးရှင်း၏ ပုလ်မွေး( န်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အကြံပြုလွှာ	မျှထုတလုပ်မှုလုပ်ငန်းအတွက် အစီရင်ခံစာနှင့်ပတ်သက်၍
	အကြံပြုချက်များအား အောက်ဝ လူကြီးမင်း၏အကြံပြုချက်အား လှိ	၇င် ဖော်ပြပေးပါရန်နှင့် ဂွက်လှဲစွာ ကြိုဆိုပါသည်။
စီမံကိန်းအမည်	မုဏ်ကော၆၁၁ဂ:ဖောက်ဖုလဲ	နေးမြူထွလာပ်စရးလုပ်ငန်း
အမည်	B: Br Esop	မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ ရှိလျှင် (√ ) မရှိလျှင် (× ) (X)
ဆက်သွယ်ရန်ဖုန်း	09-452333356	
နေရပ်လိပ်စာ	අ:ගවු දෙන්න දෙන	esperation 1 emission esta
ရက်စွဲ	10-7-2020	
ත් ැම්ව:	المالي ها ما ما جم ما جم ده	ever for
		No 9, Block-36, Nawaday Garde

BES Beford uniog : comiliog - pt. en or endere del : ersend BIA nogsion ----- နှင့်ပတ်သက်၍ အကြံပြုလွှာ လုပ်ငန်းအတွက် ------အကြံပြုချက်များအား အောက်တွင်ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏ အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ မ္တာအာက်စားစောက်ပုံသိစ်ဖြို့ဖြေကြက်လုပ်ရေး သု မငြန်း စီမံကိန်းအမည် မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း အမည် ရှိ/ မရှိ 3:981 ရှိပါက ( ╯ ) မရှိပါက (×) 8,36,0 ဆက်သွယ်ရန်ဖုန်းနံပါတ် 09250775225 ววยเ ยิญภายแป้นายายางยองวงระสายใจภายนายายเลื่า နေရပ်လိပ်စာ ရက်စွဲ 28.2.2025 အကြံပြုချက် (3) · Genesser : 682002E: 0BES y averagingon megod و جمع فر ال المحمد المحمد معلم معلم المحمد معلم المحمد ا නුණ්ඩු බාගො දැන් පුතුණු සංකා යොතුදි යො නුදි (19 (しょう、(ふ) いっちのっち、みていう 町 ちのっち、みてい、 あんいい (BE 6076205:68202 BD: BB 63000 400 101 2.000 सिंगुल सेट्य ब्रिटिंग स्टोंम सिंहत्व रेक 200 100 C No.9, Block-36,Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, Yangon

လပ်ငန်းအတွက်	BLA nogison	နှင့်ပတ်သက်၍ အကြံပြုလွှာ
		ဖင်ပြင်လှူးပါဝန်နှင့် လကြီးမင်း၏
3000	ျှချက်များအား အောက်တွင်ရေ အကြံပြုချက်အား လိုက်လ	ပွဲစွာ ကြိုဆိုပါသည်။
စီမံကိန်းအမည်		
အမည်	63/2/12/11.	မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း
	0)00 22 F1912	ရှိ/ မရှိ ရှိပါတ ( 🖌 ) မရှိပါတ (ႊ)
	ြေးစားစာသေး ကြ	
ဆက်သွယ်ရန်ဖုန်းနံပါတ်	6 0942219668	35
နေရပ်လိပ်စာ	ေက် စောပင္း ဇြို	
ရက်စွဲ	28.2.2025	
هامه عمد: کلم علم ع هامه عمد کلم ع	232: 600  for  600  for	שורי ער ציי שצב ב איי שורי איי איי איי איי איי
همودس د ی	22: ENN 223 ES	שוריעי ער ציי שצב ב שי שורי אין אין אין אין אין אין אין אין אין אי

**BES** မြားနိုးများတွင် EIA ကန်ရှင်ခဲ့တာ နှင့်ပတ်သက်၍ အကြံပြုလွှာ အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန် နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ စီမံကိန်း အမည် မိမိအမည်အား အစီရင်ခံစာတွင် ခြေစာယားလို ကထရားရား နိုင်ငံ နိုင်ကစားစီးနိုင် နက်ညးမျိန် ဖော်ပြလိုခြင်း ရှိ/မရှိ အမည် ရှိလျှင် (√ ) မရှိလျှင် (x ) (....X.....) ဆက်သွယ်ရန်ဖုန်း 09422196655 eg 25315 rover 1 & connegol gom 1 6 \$ (2010 of 20012857 နေရပ်လိပ်စာ နေ့စွဲ Ja. 7. 7072 အကြံပြုချက် - ကယ်လန် စောင်ရွက်သည် ကမ်းနေး စုန် ဖက်သက်၍ ပာတာလမ်းစန်း ကျွန် possing normal see was a source a source and an an as a port por فكوادهم معالي ومعالي الما ومحمد الله المواد الما المواد والمحالي المحمد க் கிலக்கில் குது துக்கு துக்கு துக்கு புக்கு குக்கு கில் குது நில குது பிக்கு குது குது குது குது குது குது கு ณีย์เอาอนี่ 1026นี่เ 1026 อาวรีอู้ ราชมีเห็มเช่นอร์ยุเอเมย์เ 3/ ame @ Ego ano g Mar 19 30 60 ( 2) 000 No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, angon

လုပ်ငန်းအတွက်	EIA neglion	နှင့်ပတ်သက်၍ အကြံပြုလွှာ
အကြံပြုခ	ချက်များအား အောက်တွင်ဖော်ပြ အကြံပြုချက်အား လိုက်လဲစာ	ပေးပါရန်နှင့် လူကြီးမင်း၏ ကြိုဆိုပါသည်။
စီမံကိန်းအမည်	wor eme son even hype	prianoporo beging Bes:
3962 2:00 - 60 fr	နိုင္ငံ ကိုးရိုးရား သူ – ဦးထိုးဖြူး ပတ္၀န္းက၂ ေထိန်းဆိမ်ား စဂူးဦးစီးဌဂန	မိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/ မရှိ ရှိပါက (
ဆက်သွယ်ရန်ဖုန်းနံပါတ်	09250127136	
20.2	67622520 うそうしちのかの	position we bigg
နေရပ်လိပ်စာ		,
<b>్రశ్రం</b> రియ <b>్రస్</b> రి - హెల్లిగ్రెస్ కారింగ్ - హెల్లి స్రారం - హెల్లె స్రంరం - హెల్లె స్రంరం - హెల్లె స్రంరం - హెల్లె స్రంరం - హెల్లె స్రంరం - హెల్లె స్రంరం -	10-7-9070 30-7070 30-7070 30-7070 30-7070 30-7070 30-7070 30-7070 30-	3830235, 89, 25 Brogen Sci 24, 2 x
<b>ရက်စွဲ</b> - အစီရင်ခံ စာတွင် ၁၁ အမီ ၁၈၇ ကောင်	10-7-7070 30-7-7070 30-7-7070	2830235, 89, 26 Bugan 86 24, 32 36 86 24, 25 x

OBES အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန် နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လှိုက်လှဲစွာ ကြိုဆိုပါသည်။ ဖိုစက်ကောင်သားဖောက်မုဆဲမွေးမြူထုတ်လုမ်ရေးဆုမ်မှ. စီမံကိန်း အမည် မိမိအမည်အား အစီရင်ခံစာတွင် P. OZNE ဖော်ပြလိုခြင်း ရှိ/မရှိ 25 Salged: all? အမည် ရှိလျှင် (√ ) မရှိလျှင် (x ) (.....) ဆက်သွယ်ရန်ဖုန်း 09428712895 (37) 25 Bis 7 5 agas နေရပ်လိပ်စာ 10. 1. 1059 နေ့စွဲ အကြံပြုချက် مح المح وما وما وما و المح و المح و المح و المح و المح المح المح المح المح المح و المح المح المح المح المح المح ે મહેરી સ્વાર્ટ સાંદુ છે. No.9, Block-36, Nawaday Garden Housing, Yangon-Pathein Road, Hlaing Thar Yar Township, angon

**OBES** 



2 2	20.2	<b>—</b>	× ¢
ပတဝနးဂ	ဂျငဆုငရာဒ	ဓုုက္ခပေးအ	ဖွဲ့အစည်း

(က) အဓိကအကြဲပေးဗူဂ္ဂိုလ်များ			
•å	కాలన్	လုစ်ငန်းလိုင်စင်အမှတ်	မှတ်ရက်
э	J	8	9
(ന)	အကြဲပေးပုဒ္ကိလ်		
0	ເລີດໂດງດຽດເຮັດ	EIA-C 019/2023	13
J	ຊູ້ເພຣິເພຣິເຊີຍ	EIA-C 020/2023	1.11
\$	ခေါ်မြတ်သစ္စာနိုင်	EIA-C 021/2023	114
9	કેલ્ક્ષેચ્સન	EIA-C 046/2023	1 2 1
9	ခေါ်ဆေးအေးနီး	EIA-C 068/2023	1000
(0) (0)	ဘွဲစက်အကြံဖေးပုဂ္ဂိုလ်		
0	ຊື່ແຄວວິດດີເມລູ	EIA-AC 027/2023	
J	ဦးစည်ယံဟိန်း	EIA-AC 026/2023	- 3 E
\$	ခေါ်အိသက်ဖွန်	EIA-AC 017/2023	1 2 1
ç	gas Scool and	EIA-AC 018/2023	
9	းဒီထားခဲ့တာ	EIA-AC 021/2023	1. 1. 12
6	බෙන්නා මුලිලිද	EIA-AC 020/2023	1 5 M.
9	ຊູ້ອອີເຊີຣົບອີຊົເ	EIA-AC 019/2023	2.7
•	\$124\$	EIA-AC 036/2023	
8	ဦးကောင်းကျော်ထက်	EIA-AC 049/2023	i star
00	ဦးထက်သီဟမုန်ဖြင့်	EIA-AC 032/2023	121.2
00	81080008081	EIA-AC 028/2023	COM Service

	Action opense wander : Envicol/Jord/2002	
	အဖွဲ့အစည်းက လေ့လာဆန်းစစ်ခွင့်ရှိသော စီခံကိန်းလုပ်ငန်းဆုပ်စု	for .
3•	လုပ်ငန်းလိုင်စင်ဆိုင်ရာလုပ်လုံးလုပ်နည်း (é (a) ပါ နိုင်ငန်းလုပ်ငန်းဆုပ်ခုံရား	စွစ်ခုစိသိစ္စားနံသင်လ လူသို့ရသို့ခြစ်ခန်းဆ ကိုးနှစ်ငှလနာဝီငှာ ပါလ (တ) စွစ်စသောငနော ကွောင်လေ့နန်ကသိန်
08	ကုန်းတွင်းရေနံနှင့် သဘာတောက်ရွှေ့စီမံကိန်းလွင်ငန်း	(20) ¥ (20)
3	ကမ်းလွန်ရေနံနှင့် သဘာဝစာတီငွေ့စိမ်ကိန်းလုပ်ငန်း	(၁၅) မှ (၁၇)
50	ရေနနှင့် သဘာစစာစစ်ရှေ့ မြှပြင်သန်စင်ထုတ်လုပ်ဖြင်းနိမ်လိန်မလုပ်ငန်း	څې (مر) پ (مح) (م)
<b>Ş</b> #	ရေနံနှင့် သဘာဝစာတီရွှေ့သယ်ယူပို့ဆောင်ခြင်။ သိုလှောင်ခြင်းနှင့် ခြန်ခြုံမြင်း လုပ်ငန်း	(چر) پ (در)
9*	ဘော်ရွေ့ရည် (LPG) သဘာသာတီရွေ့ (CNG) နှင့် တေ်သုံးဆီအရောင်းဆိုင် လုပ်ငန်း	(16)
G,	ကျောက်ခီးသွေးသုံးလွှစ်စစ်ခောက်အား ထုတ်လုပ်ခြင်းလုပ်ငန်း	(9)
<b>?</b> *	ရေအားကျွှစ်စစ်စီမံကိန်းလုပ်ငန်း	()
64	အခြားဖြန်ပြည်မြန်းဆင် စီမံကိန်လုပ်ငန်း	(q): (oo) \$\$ (oo) (p)
6.	သဘာဝမာတ်မဋ္ဌသုံး သို့မဟုတ် ခံခောက်ဋ္ဌေသုံး လွှစ်စစ်ခောက်အား ထုတ်လုပ်ခြင်း လုစ်ခန့်၊	(ç)
004	စာတစ်ရွေ့၊ အပူစွစ်အင်နှင့် အပူရွေ့သုံး လွှစ်စစ်တော်အား ထုတ်လုပ်မြင်းလုပ်ငန်း	(e) \$\$ (g)
00#	ခွန်ဝစ်ဝန္စည်းမှ လွှစ်စစ်စာတံအား ထုတ်လုပ်ခြင်းလုပ်ငန်း	(6)
2,8	လွှစ်စစ်စာတ်အား ဖြန်ခြုံဖြင်းလုပ်ငန်း	(مر) پ (کر)
0.04	နီကိမ္ဘိနေရာတုတိက္ခန်မွာ၊ ထုတ်လုပ်ခြင်းလုပ်ငန်း	(us) \$4(st)
996	ဖွေဖြေရေးဆိုင်ရာကူခိုင်နံး	(50) Å (55) (92) ĝe(52)
25	ရေးလွပ်ငန်းဆိုင်ရာလွပ်ငန်း	(25) 9 (26)
264	သစ်တောလိန်းသိမ်းအုပ်ချွှင်ခုတ်လုံတုတ်လုပ်ခြင်းဆိုင်ရာ ရွှံဖြစ်ရေးလုပ်ငန်း	(oq) \$e (85)
0.04	အစားအစာ ဖြပြင်မွှစ်စစ်တုတ်လုပ်ပြင်းလုပ်ငန်း	(0) 34 (0) (1)
006	အဖျော်ယမကာ ဖြစ်ခြံမှုစ်စံထုတ်လုပ်ဖြင့်လုပ်ငန်း	(gg) y (gB)
DBi	အဝတ်အတည်၊ ရွည်သည် ထုတ်လုပ်ဖြင်းနှင့် ဆေးဆိုမြင်းလုပ်ငန်း	(90) 34 (90)
100	သားရေအညီပစ္စည်း ထုတ်လုပ်ဖြင်းလုပ်ငန်း	(Go) \$4 (Go)
108	ပော့စက်နှင့် တွေးထွက်လုပ်ဖြင့်လုပ်ငန်း	(Gc)







# စီမံကိန်းအကြောင်းအရာ

မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း၏ မုတ်ကောင်သားဖောက် ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်းသည် တနင်္သာရီတိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်းမြို့နယ်၊ စာဒက်ကြီးကျွန်းရှိ လျှာကျွန်း၏ မြေပြင်၊ ရေပြင်ရရိယာ (၁၀,၄၀၁) ဧက (၄,၂၀၉.၁၃ ဟတ်တာ)၊ မုတ်ကောင်မွေးမြူရန် အရန်နေရာ အဖြစ် ကြံ့ချိုကျွန်း၏ မြေပြင်၊ ရေပြင်ရရိယာ (၃,ဂ၁၄) ဧက၊ (၁,၅၀၃ ဟတ်တာ) စုစုပေါင်း မြေပြင်၊ ရေပြင်ရေိယာ (၁၄,၁၁၅) ဧက (၅,၇၁၂.၁၃ ဟတ်တာ) တွင် ပုလဲမွေးမြူထုတ်လုပ်မည် ဖြစ်ပါသည်။



စီမံကိန်းအဆိုပြုသူ	မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း
စီမံကိန်း အမျိုးအစား	မုတ်ကောင်သားဖောက် ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း
တည်နေရာ	တနင်္သာရီတိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်းမြို့နယ်၊ ဇာဒက်ကြီးကျွန်း
အကျယ်အဝန်း	<ul> <li>စာဒက်ကြီးကျွန်းရှိ လျှာကျွန်း၏ မြေပြင်၊ ရေပြင်ဧရိယာ (၁၀,၄၀၁) ဧက (၄,၂၀၉.၁၃ ဟတ်တာ)၊</li> <li>အရန်နေရာ အဖြစ် ကြံ့ချိုကျွန်း၏ မြေပြင်၊ ရေပြင်ဧရိယာ (၃,၇၁၄) ဧက၊ (၁,၅၀၃ ဟတ်တာ)</li> <li>စုစုပေါင်း မြေပြင်၊ ရေပြင်ဧရိယာ (၁၄,၁၁၅) ဧက (၅,၇၁၂.၁၃ ဟတ်တာ)</li> </ul>
ရင်းနှီးမြှုပ်နှုံမှုတန်ဖိုး	ကျပ် ၅ ဘီလီယံ
ရင်းနှီးမြှုပ်နှံမှုခွင့်ပြုသက်တမ်း	စ်န ဝ၄
ရင်းနှီးမြှုပ်နှံမှုပုံစံ	ရာနှုန်းပြည့်ပြည်တွင်းရင်းနှီးမြှုပ်နှံမှု
ဝန်ထမ်းအင်အား	၅၀ ဦး

စီမံကိန်းအဆိုပြုသူ	မြန်မာစီးပွားရေးကော်ပိုရေးရှင်း
စီမံကိန်း အမျိုးအစား	မုတ်ကောင်သားဖောက် ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း
တည်နေရာ	တနင်္သာရီတိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ကော့သောင်းမြို့နယ်၊ စာဒက်ကြီးကျွန်း
အကျယ်အဝန်း	<ul> <li>စာဒက်ကြီးကျွန်းရှိ လျှာကျွန်း၏ မြေပြင်၊ ရေပြင်ရေိယာ (၁၀,၄၀၁) ကေ (၄,၂၀၉.၁၃ ဟတိတာ)၊</li> <li>အရန်နေရာ အဖြစ် ကြံ့ချိုကျွန်း၏ မြေပြင်၊ ရေပြင်ရေိယာ (၃,၇၁၄) ကေ၊ (၁,၅၀၃ ဟတ်တာ)</li> <li>စုစုပေါင်း မြေပြင်၊ ရေပြင်ရေိယာ (၁၄,၁၁၅) ကေ (၅,၇၁၂.၁၃ ဟတ်တာ)</li> </ul>
ရင်းနှီးမြှုပ်နှုံမှုတန်ဖိုး	ကျပ် ၅ ဘီလီယံ
ရင်းနှီးမြှုပ်နှံမှုခွင့်ပြုသက်တမ်း	စ်န ၀၄
ရင်းနှီးမြှုပ်နှံမှုပုံစံ	ရာနှုန်းပြည့်ပြည်တွင်းရင်းနှီးမြှုပ်နှံမှု
ဝန်ထမ်းအင်အား	၅၀ ဦး

# စီမံကိန်းအကြောင်းအရာ

 ကန်ထဲတွင် မုတ်ကောင်သားဖောက်ခြင်း လုပ်ငန်းကိုဆောင်ရွက်ပါသည်။ မုတ်ကောင်သားဖောက်ကန် အတွင်း ကြိုးထုံးချထားပြီး ကြိုးထုံးတွင်ကပ်ပါလာသည့် မုတ်ကောင်သားပေါက်များကို ရေချ၍ မွေးမြူပါသည်။





၁၅ ရက်ခန့် ရေချမွေးမြူပြီးနောက် ၂ ပတ်ခန့် ရေချိုပြန်စိမ်ပါသည်။ ရေချိုစိမ်ပြီးနောက် ပင်လယ်ထဲသို့ ရေချ၍ မွေးမြူပါသည်။



OBES

### စီမံကိန်းအကြောင်းအရာ

• မှတ်ကောင်ကြီးလာပါက Triangle Net အတွင်းသို့ထည့်ကာ ရေချ မွေးမြူပါသည်။ တစ်လခန့် ရေချမွေးမြူပြီးနောက် ပြန်လည်ဆယ်ယူကာ ရေပန်းထိုး သန့်ရှင်းရေးပြုလုပ်ခြင်း၊ ရွေးချယ်ခြင်းနှင့် မုတ်ကောင်မွေးမြူသည့် Net လှဲလှယ်ခြင်းတို့အား လုပ်ဆောင်ပါသည်။







• ထို့နောက် ၂ လ တစ်ကြိမ် ပြန်လည် ဆယ်ယူ၍ ရေပန်းထိုး သန့်ရှင်းရေးပြုလုပ်ခြင်း၊ ရွေးချယ်ခြင်းနှင့် မုတ်ကောင်မွေးမြူသည့် Net လှဲလှယ်ခြင်းတို့အား ဆောင်ရွက်၍ ပြန်လည် ရေချမွေးမြူရပါသည်။



OBE

# စီမံကိန်းအကြောင်းအရာ

• မှတ်ကောင်သားဖောက်သည့် အဆင့်မှ စ၍ ရေပန်းထိုး သန့်ရှင်းရေးပြုလုပ်ခြင်း၊ ရွေးချယ်ခြင်းနှင့် မှတ်ကောင်မွေးမြူသည့် Net လုဲလှယ်ခြင်းတို့အား ၆ ကြိမ်ခန့်ပြုလုပ်ပြီးနောက် 10 Pocket Panel အတွင်းသို့ ထည့်သွင်းကာ တစ်နစ်ခွဲခန့် မွေးမြူပါသည်။ ထို့နောက် ၁၅၀ ဂရမ်ရှိသော မုတ်ကောင်များ အတွင်းသို့ ဝတ်ဆံထည့်သွင်းခြင်းကို ဆောင်ရွက်ရပါသည်။









• ဝတ်ဆံထည့်သွင်းပြီးနောက် ၆ လ အကြာတွင် ပုလဲ ပါရှိမှုအား ဓာတ်မှန်ရိုက်၍ ပြန်လည် စစ်ဆေးပြီးနောက် ၂ နှစ်ခန့် ဆက်လက်မွေးမြူပါသည်။ ၂ နှစ်ခန့်မွေးမြူပြီးနောက် ပုလဲဖော်ခြင်းအား ဆောင်ရွက်ပါသည်။

#### OBE

#### စီမံကိန်းအကြောင်းအရာ

• မုတ်ကောင်သားဖောက်သည့် အဆင့်မှ စ၍ ရေပန်းထိုး သန့်ရှင်းရေးပြုလုပ်ခြင်း၊ ရွေးချယ်ခြင်းနှင့် မုတ်ကောင်မွေးမြူသည့် Net လှဲလှယ်ခြင်းတို့အား ၆ ကြိမ်ခန့်ပြုလုပ်ပြီးနောက် 10 Pocket Panel အတွင်းသို့ ထည့်သွင်းကာ တစ်နှစ်ခွဲခန့် မွေးမြူပါသည်။ ထို့နောက် ၁၅၀ ဂရမ်ရှိသော မုတ်ကောင်များ အတွင်းသို့ ဝတ်ဆံထည့်သွင်းခြင်းကို ဆောင်ရွက်ရပါသည်။



 ဝတ်ဆံထည့်သွင်းပြီးနောက် ၆ လ အကြာတွင် ပုလဲ ပါရှိမှုအား ဓာတ်မှန်ရိုက်၍ ပြန်လည် စစ်ဆေးပြီးနောက် ၂ နှစ်ခန့် ဆက်လက်မွေးမြူပါသည်။ ၂ နှစ်ခန့်မွေးမြူပြီးနောက် ပုလဲဖော်ခြင်းအား ဆောင်ရွက်ပါသည်။

OBE

#### လေထုအရည်အသွေးတိုင်းတာမှု



Parameter	Averaging Period	NEQEG Value (µg/m <sup>3</sup> )	AQ-1	AQ-2
Nitrogen	1-year	40	-	-
dioxide (NO2)	1-hour	200	13.82	14.16
Ozone (O <sub>3</sub> )	8-hour daily maximum	100	12.38	11.71
Particulate	1-year	10	-	-
matter PM2.5	24-hour	25	4.07	5.02
Particulate	1-year	20	-	-
matter PM10	24-hour	50	9.82	13.54
Total suspended particles (TSP)	24-hour	-	14.35	20.43
Sulfur dioxide	24-hour	20	3.13	2.66
(SO <sub>2</sub> )	10-minute	500	-	-





Air Quality Monitoring Point-2



1.000		Resu	lt value	Environmental parameter ai
Date and Time	Description	AQ-1	AQ-2	station guideline
	Air Pressure	1012.84	1012.8	Present condition
15th 17th L.L.	Relative Humidity, RH %	82.39	82.59	Present condition
2024	Temperature	26°C	25.93 °C	Present condition
	Wind Speed	2.23	1.56	Present condition
	Wind Direction	SW-NW	SW-NW	Present condition
	Air Quality Monite	oring Point-1		Air Quality Monitoring Poin

### ဆူညံသံအရည်အသွေးတိုင်းတာမှု

ဆူညံသံအရည်အသွေး – ၂ နေရာ

> ဆူညံသံအရည်အသွေးအား BENETECH ျဥားသေးျွာာလွှေရာ Digital Sound Level Meter တိုင်းတာသည့် စက်ကို အသုံးပြု၍ ၂၄ နာရီ တိုင်းတာခဲ့ပြီး ဆူညံသံအရည်အသွေးရလာဒ် များမှာ NEQEGs (2015) သတ်မှတ်ချက် အတွင်းသာ ရှိပါသည်။

								Remark
Indu	istrial	Resid	lential	NQ	-1	N	Q-2	The project was
Day	Night	Day	Night	Day	Night	Day	Night	surrounded by residential and
70	70	55	45	50.13	38.73	45.29	42.02	thus the guidelir value was compared with the residential area.







Noise Quality Monitoring Point-2

# OBES

**©BES** 

### ရေအရည်အသွေးတိုင်းတာမှု

#### ရေအရည်အသွေး တိုင်းတာခြင်း

- > မြေပေါ်ရေ အရည်အသွေး ၄ နေရာ
- ရေနမူနာကောက်ယူ၍ ဓါတ်ခွဲခန်းသို့ ပိုဆောင်ကာ ရေအရည်အသွေး ဓါတ်ခွဲစစ်ဆေးခြင်းကို ဆောင်ရွက်ခဲ့ပြီး National Surface Water Quality Standard, 2024 (Class V) ဖြင့် နိုင်းယှဉ်ဖော်ပြထားပါသည်။

Survey Points	Coordinate Points	Description of Survey Points
SW-1	9° 57'27.16"N 98° 13'48.45"E	Upstream of Creek (Zardatgy Island)
SW-2	9° 57'23.25"N 98° 13'50.47"E	Downstream of Creek (Zardatgyi Island)
SW-3	9° 56'18.91"N 98° 13'50.17"E	Near Shar Island
SW-4	9° 55'33.69"N 98° 14'6.50"E	Near Oyster Farm







#### ရေအရည်အသွေးတိုင်းတာမှု

Parameters	Unit	SW-1	SW-2	National Surface Water Quality Standard, 2024 (Class V)
Total Suspended Solids	mg/L	<5	<5	150
BOD	mg/L	2.7	2.6	30
COD (Cr)	mg/L	18	12	100
Oil and Grease	mg/L	Nil	2	No noticeably seen
Boron	mg/L	< 0.05	< 0.05	141
Cyanide	mg/L	0.006	0.007	(=)
Fluoride	mg/L	< 0.1	<0.1	-
рН	mg/L	6.1	5.9	-
Ammonia Nitrogen	mg/L	0.06	0.1	0.9
Nitrate Nitrogen	mg/L	0.9	1	
Nitrite Nitrogen	mg/L	0.009	0.008	(H)
Dissolved Oxygen	mg/L	8.6	8.7	> 2
Arsenic	mg/L	<0.1	<0.1	-
Cadmium	mg/L	< 0.05	< 0.05	
Hexavalent Chromium	mg/L	< 0.05	< 0.05	101
Copper	mg/L	< 0.05	< 0.05	-
Lead	mg/L	< 0.05	< 0.05	-
Nickel	mg/L	< 0.05	< 0.05	120
Selenium	mg/L	<0.1	<0.1	-
E Coli	IPN/100m	< 0.3	0.74	-









58\*14'6\*E 58\*14'42''E 58\*15'18''E

98\*13'30"E





### ဖီဝမျိုးစုံမျိုးကွဲ

#### ဖီဝမျိုးစုံမျိုးကွဲ

စီမံကိန်း အကောင်ထည်ဖော် ဆောင်ရွက်မည့် ဇာဒက်ကြီးကျွန်းတွင် ပဏာမ ကွင်းဆင်းမေးမြန်းမှုများ အရ

• အပင်မျိုးစိတ်များအနေဖြင့်

သပြေ၊ သပြေညို၊ သပြေနီ၊ သင်္ဃန်း၊ စည်သား၊ ကမ်းစော်ပင် စသည်တို့နှင့် ဒီရေတောများအား တွေ့ရှိရပါသည်။

• သတ္တဝါမျိုးစိတ်များအနေဖြင့်

Benthos

5 species

စာဒက်ကြီးကျွန်းပေါ်တွင် မြွေ၊ တောဝက်၊ ဂျိ၊ တောကြောင်၊ မျောက်တို့အား တွေ့ရှိရလေ့ရှိပါသည်။ ရေနေသတ္တဝါများအနေဖြင့်

ကင်းမွန်၊ ပုစွန်၊ ငါး စသည်တို့အား အများအားဖြင့်တွေ့ရှိရပြီး လိပ်များ လာရောက်မှုကို မတွေ့ရှိရကြောင်းသိရှိရပါသည်။















Survey Stations

OBES

Legend Mangrove&Berthu Office Pearl Farm Pearl Farm Area Planidon Sea Navigator Shar Kyunn







### လူမှုစီးပွားဆိုင်ရာ အစိတ်အပိုင်းများအား လေ့လာခြင်း

#### <u>လူမှုပတ်ဝန်းကျင်</u>

- ကော့သောင်းမြို့နယ်သည် မြန်မာနိုင်ငံတောင်ဘက်အစွန်ဆုံးမြို့ဖြစ်ပြီး မြောက်လတ္တီတွဒ် ဝ၉ ဒီဂရီ ၅၈ မိနစ်နှင့် ၁၀ ဒီဂရီ ၅၅ မိနစ်ကြား အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၂၇ မိနစ်နှင့် ၉၈ ဒီဂရီ ၅၆ မိနစ် အကြားတွင်ရှိပါသည်။
- ကော့သောင်းမြို့နယ်သည် အရှေ့မှအနောက်သို့ ၂၄ မိုင်နှင့် တောင်မှမြောက်သို့ ၆၄ မိုင်ရှည်လျားပြီး မြို့ဧရိယာ စတုရန်းမိုင် ၄.၉၉ ကျယ်ဝန်းပါသည်။
- ≻ လူဦးရေအားဖြင့် ၁၂၇,၇၁၄ ဦးရေရှိပြီး အိမ်ခြေပေါင်း ၂၅,၉၆၂ ရှိပါသည်။
- ကော့သောင်းမြို့နယ်အတွင်းရှိ ဒေသခံပြည်သူလူထုအများစုသည် ရေလုပ်ငန်းကို အဓိက လုပ်ကိုင်ဆောင်ရွက်ပြီး ရာဘာလုပ်ငန်းများကိုလည်း လုပ်ကိုင်ကြပါသည်။ မြို့နယ်၏ အဓိကထွက်ကုန်များမှာ သားငါးဖြစ်ပြီး ထိုင်းနိုင်ငံသို့ အများဆုံးတင်ပို့ရောင်းချပါသည်။
- ≻ ထင်ရှားသည့် မြစ်ချောင်းမှာ ပါချန်မြစ်ဖြစ်ပြီး ကော့သောင်းမြို့အနီးမှဖြတ်၍ တောင်မှ မြောက်သို့ စီးဆင်းပါသည်။ ကျွန်းပေါင်း ၉၃ ကျွန်းရှိပြီး လူနေကျွန်း ၂၀ ကျွန်း၊ လူမနေကျွန်း ၇၃ ကျွန်း ရှိပါသည်။
- > ယခု စီမံကိန်းမှာ ဧာဒက်ကြီးကျွန်းတွင် တည်ရှိပါသည်။





### လူမှုစီးပွားဆိုင်ရာ အစိတ်အပိုင်းများအား လေ့လာခြင်း

#### လူမှုစီးပွားရေးဆိုင်ရာလေ့လာမှု

ອာဒက်ကြီးကျွန်းရှိ စာဒက်ကြီးကျေးရွာမှာ လက်ရှိ စိမံကိန်း အကောင်အထည် ဖော်ဆောင်လျက်ရှိသည့် နေရာမှ ၁၁ ကီလိုမီတာ ခန့်ကွာဝေးပါသည်။ စိမံကိန်းမှ အနီးဝန်းကျင် ၁– ၃ ကီလိုမီတာအတွင်း ကျေးရွာများ တည်ရှိနေခြင်း မရှိပါ။



# ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းနှင့်လျော့ပါးစေရေး နည်းလမ်းများ သက်ရောက်မှု အဆင့် ရှင်းလင်းရက် လျော့ပါသက်သာ စေရေးအဒီအ

သက်ရောက်မှု အဆင့်	ရှင်းလင်းချက်	လျော့ပါးသက်သာ စေရေးအစီအမံများ	ကြွင်းကျန်သက်ရောက် မှုများ
အမြင့်ဆုံး	- အကျွိုးသက်ရောက်မှုသည်ကြီးမားသည်။ သို့သော် ၎င်းကို နည်း ပညာနှင့်/သို့မဟုတ် လုံလောက်သော စိမ်ခန့်ခွဲမှုအစီအမံများ ဆောင်ရွက်ခြင်းအားဖြင့် လျှော့ချ နိုင်သည်။	လျှော့ပါးသက်သာစေရေးအစီအမံများ လိုအပ်ပါ သည်။	ကြွင်းကျန်သက်ရောက်မှု အနည်းငယ်ရှိနိုင်ပါ သည်။
အသင့်အတင့်	- အတိုင်းအတာနှင့် ပြင်းထန်မှုအရ သက်ရောက်မှုသည် အသင့်အတင့် (အလယ်အလဘ်) ဖြစ်သည်။ – ဒိုးရှင်းသော စီမံခန့်ခွဲမှုအဇီအမံများ အသုံးပြု၍ ထိရောက်စွာ လျှောူချ နိုင်သည်။	လျော့ပါးသက်သာစေရေးအစီအမံများ လိုအပ်ပါ သည်။	ကြွင်းကျွန်သက်ရောက်မှု ရှိနိုင်သော်လည်း မသိသာပါ။
အနည်းငယ်	– ကဏ္ဍအနည်းငယ်၌ သက်ရောက်မှု အလွန်နည်းပါးပါသည်။ – ကောင်းမွန်သော အကောင်အထည်ဖော်မှု နည်းလမ်းဖြင့် အလွယ် တကူ လျှော့ချနိုင်သည်။	ထိန်းချုပ်ရေး အစီအမံများ	ကြွင်းကျန်သက်ရောက် မူအလွန်နည်းပါသည်။
ထိခိုက်မှုမရှိ	– သက်ရောက်မှုသည် အလွန်နည်းပါးပြီး အရေးမကြီးပါ။ – ကောင်းမွှန်သော အကောင်အထည်ဖော်မှုနည်းလမ်းဖြင့် အလွယ်တကူ လျှော့ချနိုင်သည်။	လျှော့ပါးသက်သာစေရေးအစီအမံများ မလိုအပ်ပါ။	ကြွင်းကျန်သက်ရောက် မှုရှိလာမည် မဟုတ်ပါ။
ວາກົດກາງຕົ້ນ ໜີ ລວດກາວ ລວກກາດ	အပြုသဘောသက်ရောက်မှု (+)	ကောင်းကျိုး သက်ရောက်မှုကို ဖြစ်စေနိုင် သည်။	
weeks an menn mann	အနတ်လက္ခဏာသက်ရောက်မူ (–)	ဆိုးကျိုးသက်ရောက်မှုကို ဖြစ်စေနိုင်သည်။	

වේ	သက်ရောက်မှုကဏ္ဍ	ထိခိုက်မှု အဆင့်	သက်ရောက်မှုလျော့ရရေးနည်းလမ်းများ	ကြွင်းကျန် သက်ရောက်ရ
C	လေထုအရည်အသွေး	Moderate	<ul> <li>စိမံကိန်း ဆောက်လုပ်ရေးသုံးပစ္စည်းများ သယ်ယူပို့ဆောင်ရာတွင် အစုံးအကာ များဖြင့် သယ်ယူပို့ဆောင်ခြင်း</li> <li>ဖုန်မှုန့်များ ထွက်ရှိနိုင်သည့် နေရာများကို ရေဖြန်းပေးခြင်း</li> <li>စိမံကိန်း ဧရိယာ အတွင်း ယာဉ်များမောင်းနှင်သည့် အရှိန်အား သတ်မှတ်ခြင်း</li> </ul>	Minor
J	ఖ్బస్తు	Moderate	<ul> <li>ဆောက်လုပ်ရေးလုပ်ငန်းများ ဆောင်ရွက်မည့် အခိုန် သတ်မှတ်ခြင်း</li> <li>စိမံကိန်းတွင် အသုံးပြုသည့် ယာဉ်များ၊ စက်ပစ္စည်းများအား ပုံမှန် ထိန်းသိမ်းပြုပြင်ခြင်း၊ စက်ပစ္စည်းပါ သတ်မှတ်ချက်များအတိုင်း အသုံးပြုခြင်း</li> </ul>	Minor
5	ရေအရည်အသွေး	Moderate	<ul> <li>ဆောက်လုပ်ရေး လုပ်သားများအတွက် ယာယီအိမ်သာ/ခ်ိလ္လာနေခံအား စီစဉ်ထားရှိပေးခြင်း။</li> <li>ဆောက်လုပ်ရေးလုပ်ငန်းများသည် ပုံမှန်အားဖြင့် မြေစာများ။ ဂော်ဆီများနှင့် အငြားစွန့်ပစ် ပစ္စည်းများ ထွက်ရှိလာနိုင်သောကြောင့် ရေထုညစ်ညမ်းမှုကို လျှော့ချနိုင်ရန် စိမ်ကိန်းနေရာတွင် စုဆောင်းခြင်း၊ မြေဆီလွှာ တိုက်စားမှု မရှိစေရန် ဆောင်ရွက်ခြင်း</li> </ul>	Minor
9	စွန့်ပစ်ပစ္စည်း	Moderate	<ul> <li>ဆောက်လုပ်ရေးလုပ်ငန်းမှ ထွက်ရှိသော မြန်ဆသုံးမြှနိုင်သည့် ပစ္စည်းမှားအား မြန်လည် အသုံးမြှုံခြင်း၊ ရောင်းချင်း</li> <li>စွန့်ပစ်စစ္စည်းမှားကို စိမ်ကိန်းနေရာအတွင်း သီးခြား ထားရှိခြင်းနှင့် သိုလှောင်သည့်နေရာကို အမီးအာကာဖြင့် ကာစံထားခြင်း</li> </ul>	Minor

වේ	သက်ရောက်မှုကဏ္ဍ	ထိနိုက်မှု အဆင့်	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ	ကြွင်းကျန် သက်ရောက်ရှ
э	လေထုအရည်အသွေး	Minor	<ul> <li>အသုံးပြုသည် ယာဉ်နှင့် အရန်မီးစက်ကို ပုံမှန် ထိန်းသိမ်းပြုပြင်ခြင်း</li> </ul>	Negligible
J	ဆူညံသံ	Minor	<ul> <li>စက်ယန္တရားများနှင့် ပစ္စည်းကိရိယာများကို ကောင်းမွန်သည့် အခြေအနေများတွင် ရှိနေစေရန် ထိန်းသိမ်းခြင်း</li> </ul>	Negligible
5	ရေအရည်အသွေး	Minor	<ul> <li>စီမံကိန်းလူဦးရေနှင့် ကိုက်ညီလုံလောက်သည့် မိလ္လာကန်များထားရှိခြင်း</li> </ul>	Negligible
9	စွန့်ပစ်ပစ္စည်း	Minor	<ul> <li>နွန့်ပစ်ပစ္စည်းများကို ၎င်းတို့၏ အမျိုးအစားနှင့် အခြေအနေ အပေါ်မူတည်၍ ခွဲခြားသတ်မှတ် ထားသော အမှိုက်ပုံးများတွင် သီးခြားစီစွန့်ပစ်ခြင်း</li> <li>အမှိုက်စွန့်ပစ်သည့် နေရာထားရှိ ဆောင်ရွက်ခြင်း</li> </ul>	Negligible
9	အရင်းအဖြစ်များ သုံးစွဲမှု	Moderate	<ul> <li>စိမံကိန်းအတွက် ရေသိုလှောင်ထားရှိခြင်းနှင့် မိုးရေစုဆောင်းခြင်း</li> <li>ရေပိုက်ခခါင်းများ၊ ပိုက်များယိုစိမ်မှု မရှိရေနေန် ပုံမှန်စစ်ဆေးပြုပြင်ခြင်းဖြင့် ရေဖြန်းဘီးမှုကို ကားကွယ်ခြင်း</li> <li>ရှမ်းအင်းပုံးဖိုးမှုအား နေစ်တစ်ကျစန်ခွဲခြင်း</li> </ul>	Minor
G	မုတ်ကောင်သားဖောက်ကန်မှ ရေလဲလှယ်ခြင်း	Minor	• ရေစစ်ကန်နှင့် ရေဆင်းမြောင်းများ စနစ်တကျထားရှိခြင်း	Negligible
9	မုတ်ကောင်များ သန့်ရှင်းရေး ပြုလုဝ်ခြင်း	Negligible	• သီးခြား သက်ရောက်မှုလျှော့ချရေးနည်းလမ်းများ မလိုအပ်ပါ	Negligible
0	မျိုးဗီဇ ပြုပြင်ထားသော မျိုးစိတ်များ ပျံနှံမှု	Negligible	<ul> <li>အဆိုပြု စိမံကိန်းတွင် ဒေသမျိုးရင်း မုတ်ကောင်များအား မွေးမြူခြင်းဖြစ်သဖြင့် သက်ရောက်မှု မရှိနိုင်ပါ</li> </ul>	Negligible

<ul> <li>အလုပ်အကိုင် အခွင့်အလမ်းများ ရရှိမှု</li> <li>ဒေသခံများအား အလုပ်အကိုင် အခွင့်အလမ်း ဖန်တီးမှုများ ဆောင်ရွက်ပေးခြင်း</li> <li>အသက်မျှေးဝမ်းကျောင်း လုပ်ငန်းများအပေါ်တွင်</li> <li>ဒေသတွင်း စီးပွားရေး လုပ်ငန်းများမှ တတ်နိုင်သမျှ အစားအသောက်နှင့် အခြားထောက်ပုံရေးပစ္စည်းများကို ဝယ်ယူ၍ ဒေသခံများအား ပုံပိုး ကူညီခြင်း။</li> <li>ဝန်ထမ်းများနှင့် ဒေသခံများ အကြား လူမှုရေးရာ ပြသနာများ</li> <li>လုပ်ငန်းခွင်စည်းကမ်းများ ချမှတ်ခြင်းနှင့် တင်းကြပ်စွာ လိုက်နာမှုရှိစေရန် ဆောင်ရွက်ခြင်း</li> <li>လုပ်ငန်းခွင်စည်းကမ်းများ ချမှတ်ခြင်းနှင့် တင်းကြပ်စွာ လိုက်နာမှုရှိစေရန် ဆောင်ရွက်ခြင်း</li> <li>CSR အစီဆစ်မှုမှား အကောင်အထည်ဖော် ဆောင်ရွက်မှုနှင့် ဆောင်ရွက်တွားရှိသည့် CSR လုပ်ငန်းစဉ်များအား မှတ်တမ်း အထောက်အထားများ ထားရှိခြင်း</li> <li>မကျေနုပ်ချက် တိုင်ကြားမှုများ</li> <li>မကျေနပ်ချက် တိုင်ကြားမှုများ</li> </ul>		ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ		သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ	
<ul> <li>အသက်မွေးဝမ်းကျောင်း လုပ်ငန်းများအပေါ်တွင် သက်ရောက်မှု</li> <li>ဒေသတွင်း စီးပွားရေး လုပ်ငန်းများမှ တတ်နိုင်သမျှ အစားအသောက်နှင့် အခြားထောက်ပုံရေးပစ္စည်းများကို ဝယ်ယူ၍ ဒေသခံများအား ပုံပိုး ကူညီဖြင်း။</li> <li>ဝန်ထမ်းများနှင့် ဒေသခံများ အကြား လူမှုရေးရာ ပြသာနာများ</li> <li>လုပ်ငန်းခွင်စည်းကမ်းများ ချမှတ်ခြင်းနှင့် တင်းကြပ်စွာ လိုက်နာမှုရှိစေရန် ဘောင်ရွက်ခြင်း</li> <li>အခြောအသောက်အဦးများနှင့် ဒေသဖွံ့ဖြိုးတိုးတက်မှုအပေါ် သက်ရောက်မှု</li> <li>CSR အဒီအစဉ်များ အကောင်အထည်ဖော် ဆောင်ရွက်မှုနှင့် ဆောင်ရွက်တွက်တွက်မှုအပေါ် သက်ရောက်မှု</li> <li>မကျေနုပ်ချက် တိုင်ကြားမှုများ</li> <li>မကျေနုပ်ချက် တိုင်ကြားမှုများ</li> </ul>	•	အလုပ်အကိုင် အခွင့်အလမ်းများ ရရှိမှု	•	ဒေသခံများအား အလုပ်အကိုင် အခွင့်အလမ်း ဖန်တီးမှုများ ဆောင်ရွက်ပေးခြင်း	
<ul> <li>ဝန်ထမီးများနှင့် ဒေသမံများ အကြား လူမှုရေးရာ ပြသာနာများ</li> <li>လုပ်ငန်းနှင့်စည်းကမ်းများ ချမှတ်ခြင်းနှင့် တင်းကြပ်ရွာ လိုက်နာမှုရှိစေရန် ဆောင်ရွက်ခြင်း</li> <li>အခြေခံအဆောက်အဦးများနှင့်</li> <li>CSR အဖီအစဉ်များ အကောင်အထည်ဖော် ဆောင်ရွက်မှုနှင့် ဆောင်ရွက်တားရှိသည့် CSR လုပ်ငန်းစဉ်များအား မှတ်တမ်း အထောက်အထားများ ထားရှိခြင်း</li> <li>မကျေနုပ်ချက် တိုင်ကြားမှုများ</li> <li>မကျေနုပ်ချက် တိုင်ကြားမှုများ</li> </ul>	•	အသက်မွေးဝမ်းကျောင်း လုပ်ငန်းများအပေါ်တွင် သက်ရောက်မှု	•	ဒေသတွင်း စီးပွားရေး လုပ်ငန်းများမှ တတ်နိုင်သမျှ အစားအသောက်နှင့် အခြားထောက်ပံ့ရေးပစ္စည်းများကို ဝယ်ယူ၍ ဒေသခံများအား ပံ့ပိုး ကူညီခြင်း။	
<ul> <li>အခြေခံအဆောက်အဦးများနှင့်</li> <li>CSR အစီအစဉ်များ အကောင်အထည်ဖော် ဆောင်ရွက်ဖွနှင့် ဆောင်ရွက်ထားရှိသည့် CSR လုပ်ငန်းစဉ်များအား မှတ်တမ်း အထောက်အထားများ ထားရှိခြင်း</li> <li>မကျေနပ်ချက် တိုင်ကြားမှုများ</li> <li>မကျေနပ်ချက် တိုင်ကြားမှုများ</li> <li>မကျေနပ်ချက် တိုင်ကြားမှုများ</li> </ul>	•	ဝန်ထမ်းများနှင့် ဒေသခံများ အကြား လူမှုရေးရာ ပြဿနာများ	•	လုပ်ငန်းခွင်စည်းကမ်းများ ချမှတ်ခြင်းနှင့် တင်းကြပ်စွာ လိုက်နာမှုရှိစေရန် ဆောင်ရွက်ခြင်း	
• မကျေနှစ်ချက် တိုင်ကြားမှုများ အကျောနစ်ချက် တိုင်ကြားမှု လက်ခံဖြေရှင်းရေး လုပ်ငန်းစဉ်များ ချမှတ် အကျောင်အထည်ဖော် ဆောင်ရွက်ခြင်း	•	အခြေခံအဆောက်အဦးများနှင့် ဒေသဖွံ့ဖြိုးတိုးတက်မှုအပေါ် သက်ရောက်မှု	•	CSR အစီအစဉ်များ အကောင်အထည်ဖော် ဆောင်ရွက်မှုနှင့် ဆောင်ရွက်ထားရှိသည့် CSR လုပ်ငန်းစဉ်များအား မှတ်တမ်း အထောက်အထားများ ထားရှိခြင်း	
	•	မကျေနပ်ချက် တိုင်ကြားမှုများ	•	မကျေနပ်ချက် တိုင်ကြားမှု လက်ခံဖြေရှင်းရေး လုပ်ငန်းစဉ်များ ချမှတ် အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း	
				အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း	

<ul> <li>လုပ်ငန်းခွင် မတော်တဆမ္မ ဘေးအန္တရာယ်များရှိနိုင်ခြင်း</li> <li>ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ ကျန်းမာရေးနှင့် ပတ်ဝန်းကျင် စိမ်ခန့်ခွဲမှု စနနံ အကောင်အထည်မော် ဆောင်ရွက်ခြင်း</li> <li>အလုပ်သမားများအား ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ လုံဖြုံရေးနှင့် ကျန်းမာရေးအတု စွမ်းဆောင်ရည်မြင့် သင်တန်းများပေးခြင်း</li> <li>စိမ်ကိန်းလုပ်သားများအား ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ လုံဖြုံရေးနှင့် ကျန်းမာရေးအတု စွမ်းဆောင်ရည်မြင့် သင်တန်းများပေးခြင်း</li> <li>စိမ်ကိန်းလုပ်သားများအား ဘေးတွက် First Aid Kit ကဲ့သို့သော ဆေးဝါး အထောက်အကူ ထားရှိခြင်း</li> <li>စိမ်ကိန်းအဆောက်အဦများ ခိုင်ခန့်မှု</li> <li>စိမ်ကိန်းအဆောက်အဦများကို သဘာဝဘေးအန္တရာယ် ခံနိုင်သော ဒီနိုင်း ဆောက်လုပ်ထားခြင်း</li> </ul>	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
<ul> <li>စီမံကိန်းအဆောက်အဦများ နိုင်ခန့်မှု</li> <li>စီမံကိန်းအဆောက်အဦများကို သဘာဝဘေးအန္တရာယ် ခံနိုင်သော ဒီနိုင်း ဆောက်လုပ်ထားခြင်း</li> </ul>	• လုပ်ငန်းခွင် မတော်တဆမှု ဘေးအန္တရာယ်များရှိနိုင်ခြင်း	<ul> <li>ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ ကျန်းမာရေးနှင့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု စနစ်ကို အကောင်အထည့်ဖော် ဆောင်ရွက်ခြင်း</li> <li>အလုပ်သမားများအား ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ လုံခြုံရေးနှင့် ကျန်းမာရေးအတွက် စွမ်းဆောင်ရည်မြင့် သင်တန်းများပေးခြင်း</li> <li>စီမံကိန်းလုပ်သားများအတွက် ကောင်းမွန်သန့်ရှင်းသောရေ၊ မိလ္လာစနစ်များ ပါဝင်သော နေရာဝထိုင်စင်းများစီဖေပးခြင်း</li> <li>အရေးမေး၊ ကိစ္စရပ်များအတွက် First Aid Kit ကဲ့သို့သော ဆေးဝါး အထောက်အကူများ ထားရှိခြင်း</li> </ul>
20 2 2 9 00 2 2 9 2 9	• စီမံကိန်းအဆောက်အဦများ ခိုင်ခန့်မှု	<ul> <li>စိမ်ကိန်းအဆောက်အဦများကို သဘာဝဘေးအန္တရာယ် ခံနိုင်သော ဒီနိုင်းဖြင့် ဆောက်လုပ်ထားဖြင်း</li> </ul>
• မဘေးအန္တရာယ • မဘေးကာက္မယသည္ ကရယာများ၊ မႈသတဆေးဘူးများအား တပဆငထားခြင်း	• မီးဘေးအန္တရာယ်	<ul> <li>မီးဘေးကာကွယ်သည့် ကိရိယာများ၊ မီးသတ်ဆေးဘူးများအား တပ်ဆင်ထားခြင်း</li> </ul>

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
<ul> <li>လုပ်ငန်းခွင် မတော်တဆမှု ဘေးအန္တရာယ်များရှိနိုင်ခြင်း</li> </ul>	<ul> <li>ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ ကျွန်းမာရေးနှင့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု စနစ်ကို အကောင်အထည့်ဖော် ဆောင်ရွက်ခြင်း</li> <li>အလုပ်သမားများအား ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ လုံဖြုံရေးနှင့် ကျွန်းမာရေးအတွက် စွမ်းဆောင်ရည်ဖြင့် သင်တန်းများပေးခြင်း</li> <li>စီမံကိန်းလုပ်သားများအတွက် ကောင်းမွန်သန့်ရှင်းသောရေ၊ မိလ္လာစနစ်များ ပါဝင်သော နေရာတိုင်ခင်းများစိမ်ပေးခြင်း</li> <li>အရေးပေါ် ကိစ္စရပ်များအတွက် First Aid Kit ကဲ့သို့သော ဆေးဝါး အထောက်အကူများ ထားရှိခြင်း</li> </ul>
• စီမံကိန်းအဆောက်အဦများ ခိုင်ခန့်မှု	<ul> <li>စိမ်ကိန်းအဆောက်အဦများကို သဘာဝဘေးအန္တရာယ် ခံနိုင်သော ဒီနိုင်းဖြင့် ဆောက်လုပ်ထားခြင်း</li> </ul>
• မီးဘေးအန္တရာယ်	<ul> <li>မီးဘေးကာကွယ်သည့် ကိရိယာများ၊ မီးသတ်ဆေးဘူးများအား တပ်ဆင်ထားခြင်း</li> </ul>

<ul> <li>လုပ်ငန်းခွင် မတော်တဆမ္ ဘေးအန္တရာယ်များရှိနိုင်ခြင်း</li> <li>ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ ကျွန်းမာရေးနှင့် ပတ်ဝန်းကျွင် စိမ်ခန့်ခွဲမှု စနနံ အကောင်အထည်ပော် ဆောင်ရွက်ခြင်း</li> <li>အလုပ်သမားများအား ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ လုံဖြုံရေးနှင့် ကျွန်းမာရေးအတု စွမ်းဆောင်ရည်မြင့် သင်တန်းများပေးခြင်း</li> <li>စိမ်ကိန်းလုပ်သားများအတွက် ကောင်းရှင်ရေး၊ လုံဖြုံရေးနှင့် ကျွန်းမာရေးအတု စွမ်းဆောင်ရည်မြင့် သင်တန်းများပေးခြင်း</li> <li>စိမ်ကိန်းလုပ်သားများအတွက် ကောင်းရှင်ရေး၊ လုံဖြုံရေးနှင့် ကျွန်းမာရေးအတု စွမ်းဆောင်ရည်မြင့် သင်တန်းများပေးခြင်း</li> <li>စိမ်ကိန်းလုပ်သားများအတွက် ကောင်းမွန်သန့်ရှင်းသောရေ၊ မိလ္လာစနစ်များ ပါဝင်ေး နေရာတိုင်ခင်းများစီမံပေးခြင်း</li> <li>အရေးပေါက် အစွမ်များခံမံပေးခြင်း</li> <li>အရေးပေါက်နှင့်များဆံတွက် First Aid Kit ကဲ့သို့သော ဆေးဝါး အထောက်အကူ၊ ထားရှိခြင်း</li> <li>စိမ်ကိန်းအဆောက်အဦးများ ခိုင်ခန့်မှု</li> <li>စိမ်ကိန်းအဆောက်အဦးများ ခိုင်ခန့်မှု</li> <li>စိမ်ကိန်းအဆောက်အဦးများ ကိုသောဝဘေးအန္တရာယ် ခံနိုင်သော ဒီနိုင်း</li> <li>စိမ်ကာလိုပ်ထားကြင်း</li> <li>စိမ်းဘားကာကွယ်သည့် ကိရိယာများ၊ မီးသတ်ဆေးဘူးများအား တပ်ဆင်ထားခြင်း</li> </ul>	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
<ul> <li>စီမံကိန်းအဆောက်အဦများ နိုင်ခန့်မှု</li> <li>စီမံကိန်းအဆောက်အဦများကို သဘာဝဘေးအန္တရာယ် ခံနိုင်သော ဒီနိုင်း ဆောက်လုပ်ထားခြင်း</li> <li>စီးဘေးအန္တရာယ်</li> <li>စီးဘေးကာကွယ်သည့် ကိရိယာများ၊ စီးသတ်ဆေးဘူးများအား တပ်ဆင်ထားခြင်း</li> </ul>	<ul> <li>လုပ်ငန်းခွင် မတော်တဆမှု ဘေးအန္တရာယ်များရှိနိုင်ခြင်း</li> </ul>	<ul> <li>ဘေးအန္တရာယီ ကင်းရှင်းရေး၊ ကျွန်းမာရေးနှင့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု စနစ်း အကောင်အထည့်ဖော် ဆောင်ရွက်ခြင်း</li> <li>အလုပ်သမားများအား ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ လုံခြုံရေးနှင့် ကျွန်းမာရေးအတွ၊ စွမ်းဆောင်ရည်ခြင့် သင်တန်းများပေးခြင်း</li> <li>စီမံကိန်းလုပ်သားများအတွက် ကောင်းမွန်သန့်ရှင်းသောရေ၊ မိလ္လာစနစ်များ ပါဝင်သေ နေရာထိုင်စင်းများစီမံပေးခြင်း</li> <li>အရေးပေါ် ကိစ္စရပ်များအတွက် First Ald Kit ကဲ့သို့သော ဆေးဝါး အထောက်အကူမျ ထားရှိခြင်း</li> </ul>
<ul> <li>မီးဘေးအန္တရာယ်</li> <li>မီးဘေးကာကွယ်သည့် ကိရိယာများ၊ မီးသတ်ဆေးဘူးများအား တပ်ဆင်ထားခြင်း</li> </ul>	• စီမံကိန်းအဆောက်အဦများ ခိုင်ခန့်မှု	<ul> <li>စီမံကိန်းအဆောက်အဦများကို သဘာဝဘေးအန္တရာယ် ခံနိုင်သော ဒီဗိုင်းဖြ ဆောက်လုပ်ထားခြင်း</li> </ul>
	• မီးဘေးအန္တရာယ်	<ul> <li>မီးဘေးကာကွယ်သည့် ကိရိယာများ၊ မီးသတ်ဆေးဘူးများအား တပ်ဆင်ထားခြင်း</li> </ul>



#### ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် လုဝ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးအတွက် စဉ်ဆက်မပြတ် စောင့်ကြဝ်ကြည့်ရှုမည့်အဖွဲ ဖွဲ့စည်းခြင်း

			۰ź	EOHS အဖွဲ့	တာဝနိဝတ္တရားများ
	EOHS ඔල්.බේද්ෘනොද්		С	အဖွဲ့ခေါင်းဆောင်	ပတ်ဝန်းကျင်၊ လုပ်ငန်းခွင်ကျန်းဓာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ မူဝါဒများအား ရေးဆွဲအကောင်အထည်ဖော်ခြင်း
			J	အတွင်းရေးမှူး	ပတ်ဝန်းကျင်၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာမူဝါဒ များအရ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း
EOHS အဖွဲ့ အတွင်းမ	419N1				ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား အကောင်အထည်ဖော်ခြင်းနှင့် စောင့်ကြဝ်ကြည့်ရှုခြင်း
EOHS ශල් ඉශල් බේර්ානොරි	EOHS အဖွဲ့ဝင် (၁)	EOHS အဖွဲ့ဝင် (၂)	Ş	တာဝန်ခံ	မွေးမြုရေးလုပ်ငန်းအတွင်းရှိ အလုပ်သမားများ၏ လုပ်ငန်းနွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးအတွက် ဆောင်ရွက်ခြင်း
တာဝနံစံ			9	အဖွဲ့ဝင် (၁)	ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ပါ လုဝ်ငန်းများအား အကောင်အထည်ဖော်ခြင်းနှင့် စောင့်ကြပ်ကြည့်ရှုခြင်း
			ŋ	အဖွဲ့ဝင် (၂)	ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ပါ လုဝ်ငန်းများအား အကောင်အထည်ဖော်ခြင်းနှင့် စောင့်ကြဝ်ကြည့်ရှုခြင်း
					OBE



ဆက်သွယ်	ဂြန် စိမံကိန်းအဆိုပြုသူ ဆက်သွယ်ရမည့်ပုဂ္ဂိုလ် လိဝ်စာ ဖုန်းနံပါတ် အိုးမေးလ်	မြန်မာစီးပွားရေးကော်ဝိုရေးရှင်း ဦးဘိုဘိုဟိန်း (ဆေတ္တစီမံကိန်းမန်နေဂျာ) လျှာကျွန်း၊ ကော့သောင်းမြို့နယ်၊ ကော့သောင်းခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီး။ ဝ၉ ၄၄၂၀၃၅၃၈၃ bobohein.navy.mm@gmail.com		အမေးအဖြေကဏ္ဍနှင့် အကြံပြုချက်
			OBES	



OBES

အကြံပြုခွက်ရာအား အောက်တွင်ခော်ပြပေးပါးနှံနှင့် လူကြီးစင်း အကြံပြုခွက်အား ကိုက်လွဲစွာ ကြံရမ်းယည်။

million .

မည်အား အခြံရင်ခံစာတွင် စော်ပြက်ခြင်း မွှိ/ မရှိ မွှိပါက ( \*) မရှိပါက (+)

Beckfrand Science

ဆက်သွယ်ရန်ခုန်နံလဲတဲ နေရင်လိမ်ဆ ရက်ခွဲ

# Air Quality Monitoring Point-1

Sensor	Туре	SO2	NO2	03	со	PM2.5	PM10	TSP	TEMPER	ним	AIRPRE	NOISE
Date	Time	ppb	ppb	ppb	ppm	ug/m3	ug/m3	ug/m3	jæ	%RH	hPa	dB
	9:30 AM	1.00	14.77	7.96	0.03	1.93	10.13	17.92	28.12	65.48	1014.00	55.57
	10:30 AM	1.00	13.37	4.69	0.03	1.43	8.12	13.03	28.56	67.43	1014.00	54.97
	11:30 AM	1.00	12.99	9.43	0.01	1.38	9.38	15.82	29.09	68.77	1014.00	55.06
	12:30 PM	1.00	11.19	7.53	0.01	1.98	12.68	21.90	27.98	85.47	1010.88	50.27
	1:30 PM	1.03	15.56	7.90	0.00	6.48	23.73	40.40	28.16	83.75	1010.52	46.74
	2:30 PM	1.00	12.77	8.41	0.00	13.63	25.48	31.15	29.20	81.83	1011.00	47.20
	3:30 PM	1.16	4.76	7.02	0.00	7.48	14.42	19.78	28.79	81.97	1011.28	44.70
15-07-24	4:30 PM	5.44	3.77	7.39	0.00	4.12	5.83	7.12	27.95	82.12	1011.63	46.50
	5:30 PM	1.03	12.44	8.77	0.00	2.93	4.03	4.85	26.04	86.28	1012.03	54.12
	6:30 PM	1.00	15.00	9.24	0.00	2.98	4.33	5.45	25.43	87.28	1012.00	55.22
	7:30 PM	1.00	5.26	8.97	0.00	1.97	3.10	3.98	25.70	84.33	1012.95	56.09
	8:30 PM	1.00	8.14	7.75	0.00	1.98	3.03	3.72	24.94	85.50	1013.70	47.92
	9:30 PM	1.00	4.20	6.49	0.00	1.45	2.27	2.80	23.99	86.52	1013.00	47.92
	10:30 PM	1.00	2.25	5.65	0.00	1.75	2.45	2.83	23.69	86.67	1013.27	45.77
	11:30 PM	1.00	2.40	4.93	0.00	2.72	4.37	5.53	23.57	87.13	1013.00	40.13
	12:30 AM	1.00	1.10	2.99	0.00	3.60	5.88	7.57	24.13	84.33	1013.00	38.37
	1:30 AM	1.00	1.00	1.53	0.00	6.90	9.23	10.87	23.97	80.97	1013.00	37.78
	2:30 AM	1.00	1.00	1.00	0.00	8.87	16.20	21.65	23.46	84.72	1013.00	39.27
	3:30 AM	1.00	1.00	1.00	0.00	10.27	19.22	25.95	23.70	86.47	1013.00	32.26
16-07-24	4:30 AM	1.00	1.00	1.48	0.00	5.72	16.05	24.73	23.52	86.57	1013.00	35.08
	5:30 AM	1.00	2.33	4.51	0.00	2.52	9.60	15.48	23.68	86.47	1013.80	44.22
	6:30 AM	1.00	5.59	8.05	0.00	1.47	5.48	8.47	24.31	86.50	1014.00	42.71
	7:30 AM	1.00	11.36	8.92	0.00	1.78	9.33	14.73	26.39	83.18	1014.00	43.98
	8:30 AM	1.00	13.16	10.04	0.02	2.34	11.20	18.66	29.57	77.64	1014.00	50.05
	Avg	1.19	7.35	6.32	0.0042	4.07	9.82	14.35	26.00	82.39	1012.84	46.33
24 hr	Мах	5.44	15.56	10.04	0.03	13.63	25.48	40.40	29.57	87.28	1014.00	56.09
	Min	1.00	1.00	1.00	0.00	1.38	2.27	2.80	23.46	65.48	1010.52	32.26
	ug/m3	3.13	13.82	12.38								



Sensor	Гуре	S02	NO2	03	CO	PM2.5	PM10	TSP	TEMPER	HUM	AIRPRE	NOISE
Date	Time	ppb	ppb	ppb	ppm	ug/m3	ug/m3	ug/m3	iæ	%RH	hPa	dB
	10:40 AM	0.97	12.61	7.89	0.00	6.47	15.43	22.93	28.66	67.57	1014.23	47.00
	11:40 AM	0.97	12.99	9.06	0.00	6.18	15.18	22.72	29.36	67.53	1014.43	47.09
	12:40 PM	0.99	11.59	8.40	0.00	2.50	10.70	17.47	27.98	85.47	1013.00	43.76
	1:40 PM	1.03	14.43	8.90	0.00	2.23	11.20	18.75	28.16	83.75	1010.33	40.77
	2:40 PM	1.00	13.42	7.95	0.00	1.98	13.17	23.68	28.19	85.18	1010.52	40.13
	3:40 PM	1.00	6.26	5.53	0.00	3.40	12.62	20.17	28.51	82.93	1011.00	46.73
16-07-24	4:40 PM	1.07	5.27	8.40	0.16	5.10	13.07	19.82	27.95	82.12	1011.23	49.16
10-07-24	5:40 PM	1.36	13.94	6.63	0.01	7.77	17.48	25.83	26.04	86.28	1011.65	48.15
	6:40 PM	1.00	17.33	8.24	0.00	7.83	17.47	25.40	25.43	87.28	1012.03	45.32
	7:40 PM	1.00	7.09	8.30	0.00	8.10	17.83	25.65	25.70	84.33	1012.00	42.29
	8:40 PM	1.00	5.64	5.75	0.00	5.30	13.95	20.82	24.94	85.50	1012.95	43.04
	9:40 PM	1.00	6.94	4.49	0.00	4.43	13.17	20.17	23.99	86.52	1013.70	42.89
	10:40 PM	1.00	1.00	4.76	0.00	3.83	13.62	21.60	23.33	86.98	1013.00	43.74
	11:40 PM	1.00	1.00	3.52	0.00	5.30	14.08	20.98	23.57	87.13	1013.27	45.10
	12:40 AM	1.00	1.00	2.66	0.00	5.82	14.10	20.62	24.13	84.33	1013.00	43.34
	1:40 AM	1.00	1.00	1.00	0.00	5.22	13.05	19.07	23.97	80.97	1013.00	42.75
	2:40 AM	1.00	1.00	1.00	0.00	4.33	11.92	17.83	23.46	84.72	1013.00	44.24
	3:40 AM	1.00	1.00	1.00	0.00	3.73	11.40	17.15	23.70	86.47	1013.00	37.23
17.07.24	4:40 AM	1.00	1.00	2.34	0.00	3.07	10.25	15.55	23.52	86.57	1013.00	40.05
17-07-24	5:40 AM	1.00	1.00	2.37	0.00	2.97	9.85	14.65	23.68	86.47	1013.00	39.19
	6:40 AM	1.00	5.33	7.38	0.00	2.85	8.95	13.30	24.31	86.50	1013.80	44.24
	7:40 AM	1.00	11.59	9.40	0.00	7.55	13.85	18.37	26.39	83.18	1014.00	49.01
	8:40 AM	1.00	13.45	9.88	0.00	9.43	18.57	26.42	29.16	79.43	1014.00	45.03
	9:40 AM	1.00	14.91	8.52	0.00	4.98	13.97	21.46	28.28	65.84	1014.00	50.57
	Avg	1.02	7.53	5.97	0.01	5.02	13.54	20.43	25.93	82.63	1012.80	44.20
24 hr	Мах	1.36	17.33	9.88	0.16	9.43	18.57	26.42	29.36	87.28	1014.43	50.57
	Min	0.97	1.00	1.00	0.00	1.98	8.95	13.30	23.33	65.84	1010.33	37.23
	ug/m3	2.66	14.16	11.71								

# Air Quality Monitoring Point-2



# APPENDIX-4 WATER QUALITY RESULTS

# Surface Water Quality Result (SW-1)

		ANALYTI	CAL TEST REP	PORT	
Customer name : Adress : Zar Dat G Tel :	M.E.C Syi Island,Kaw Tha	aung Township, Tanin	tharyi Region	Issue Date	: 06/Aug/20
Sample No	202/	02101	Papert No.	P 202	0210
Sample Name	Surfa	re Water 1	Sampling Date	K 202-	+- 0210
Sample Tune	Sund	ce water i	Sampling Date		
Sample Taken By	Sun	ave yyalai	Sample Received	22/Ju	1/2024
Date Analyzed	22/Jul/2024	~ 05/Aug/2024	Project Code	PO	0181
Paramete	êrs	Unit	Result	NSWQS Class 5	MDL
Total Suspended Soli	ds	mg/L	< 5	50	5 mg/L
BOD		mg/L	2.7	3	0.5 mg/L
COD (Cr)		mg/L	18	8	3 mg/L
Oil and Grease		mg/L	Nil	0	3.1 mg/L
Boron		mg/L	< 0.05	2.4	0.5 mg/L
Cyanide		mg/L	0.006	0.07	0.002 mg/L
Fluoride		mg/L	< 0.1	1.5	0.1 mg/L
рН		mg/L	6.1	6.5 - 8.5	0.0 - 14.0
Ammonia Nitrogen		mg/L	0.06	0.3	0.01 mo/L
Nitrate Nitrogen		mg/L	0.9	10	0.1 mo/L
Nitrite Nitrogen		mg/L	0.009	1	0.002 ma/L
Dissolved Oxygen		ma/L	8.6	>5	0.1 mg/L
Arsenic	2254 M	mg/L	< 0.1	0.05	0.05 mg/L
Cadmium		mg/L	< 0.05	0,003	0.05 mg/l
Hexavalent Chromium	n	mg/L	< 0.05	0.05	0.05 mg/L
Copper		mg/L	< 0.05	0.3	0.05 mg/L
Lead		mg/L	< 0.05	0.01	0.05 mg/L
Nicke)		ma/l	< 0.05	0.07	0.05 mg/L
Selenium		ma/L	< 0.1	0.04	0.1 ma/l
E Coli		V/PN/100 m	< 0.3	300	MPN/ 100 m
		-		500	
Others (	1				
Remarks	Sample and cu	stomer information is	designated by the request	of customers.	
P L	http: thyo Phyo Aung aboratory Leader	4		MW	AS



## Surface Water Quality Result (SW-2)



## Surface Water Quality Result (SW-3)





## Surface Water Quality Result (SW-4)



**©BES**
## APPENDIX-5 SOIL QUALITY RESULTS





DEPARTMENT OF AGRICULTURE ( LAND USE ) SOIL ANALYTICAL DATA SHEET မြန်မာ့စီးပွားရေးကော်ပိုရေးရှင်း (၂၃.၇.၂၀၂၄) Region /State - တနင်္သာရီတိုင်းဒေသကြီး Sheet No. 2 - ကော့သောင်းမြို့၊ ဇာဒက်ကြီးကျွန်း။ Sr No. S 1/2024 Township Zinc (Zn) Iron (Fe) Manganese (Mn) Boron (B) Lead (Pb) Cadmium (Cd) Nickle (Ni) Chromium (Cr) Sr Copper (Cu) Sample (ppm) No. (ppm) (ppm) (ppm) (ppm) (ppm) (ppm) (ppm) (ppm) Not Detected 1 Soil Sample 0.2316 0.082 97.27 2.156 5.26 2.72 Not Detected Not Detected ။မြေနမ္ခနာဓာတ်ခွဲအဖြေများအရ Lead (Pb), Zinc (Zn), Iron (Fe) နှင့် Copper (Cu) ပါဝင်မှုသည် စိုက်ပျိုးမြေတွင် ပါဝင်သင့်သည့် MPL(Maximum permissible Limit) ထက် မှတ်ချက်။ မကျော်လွန်ပါ။ (Ref : FAO, U. Ewers (1991)) ( ဒေါက်တာသန္တာညီ ) ဒုတိယညွှန်ကြားရေးမှူး ဓာတ်ခွဲခန်းတာဝန်ခံ မြေအသုံးချရေးဌာနခွဲ

